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ABSTRACT BOOK

**36th World Conference
on Lung Health of the
International Union Against
Tuberculosis and Lung Disease (The Union)**

**PARIS • FRANCE
18-22 OCTOBER 2005**

Almost 2 million people die of tuberculosis (TB) each year, mostly in developing nations lacking access to fast, accurate testing technology.¹ TB is the current focus of the Foundation for Innovative New Diagnostics (FIND), established with funding from the Bill and Melinda Gates Foundation. It is a leading nonprofit organization dedicated to the development of diagnostic tests for infectious diseases in developing countries. For more information, visit www.finddiagnostics.org.



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² Source of all statistics cited: *Progress Report on the Global Plan to Stop Tuberculosis*, StopTB/World Health Organization, 2004.

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The International Journal of Tuberculosis and Lung Disease

SUPPLEMENT

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The Official Journal of the International Union Against Tuberculosis and Lung Disease

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| TECHNICAL EDITOR | LISA SALYER | MEMBERSHIP/SUBSCRIPTIONS | membership@iuatld.org |
| EDITORIAL ASSISTANT | JULIE BENNETOT | | |

EDITORIAL OFFICE The Union, 68 boulevard Saint Michel, 75006 Paris, FRANCE

Tel: (+33 1) 44 32 03 60 Fax: (+33 1) 43 29 90 83 e-mail: journal@iuatld.org website: www.iuatld.org

AIMS AND SCOPE. *The International Journal of Tuberculosis and Lung Disease* is the official journal of the Union. The Journal's main aim is the continuing education of physicians and other health personnel, and the dissemination of the most up-to-date information in the field of tuberculosis and lung health. It publishes original articles and commissioned reviews not only on the clinical and biological and epidemiological aspects, but also—and more importantly—on community aspects: fundamental research and the elaboration, implementation and assessment of field projects and action programmes for tuberculosis control and the promotion of lung health. *The International Journal of Tuberculosis and Lung Disease* welcomes articles submitted on all aspects of lung health, including public health-related issues such as training programmes, cost-benefit analysis, legislation, epidemiology, intervention studies and health systems research.

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Awards of the International Union Against Tuberculosis and Lung Disease (The Union)

The Union has two categories of awards:

- self-nominating, whereby candidates send in their own applications
- by nomination, either by the Union Awards Committee or other Constituent Members

The Awards are presented during the Annual Union World Conference on Lung Health.

Self-nominating category

Two prizes of US \$2000.00

A Scientific Prize

A Scientific Prize is awarded to a young researcher (under 45 years of age) for his/her work on tuberculosis or non-tuberculous lung disease published in the last 2 years. One copy of the publication should be sent to the Secretariat with the candidate's application.

A Public Health Prize

The Karel Styblo Prize is awarded to a health worker (physician or lay person) for his/her contribution to tuberculosis control or non-tuberculous lung disease. Applicants should include a well-documented description of his/her work, together with the comments of the manager of the association or programme.

Applications, including a full curriculum vitae, should be sent by the candidates to the Union Secretariat in Paris 3 months before the World Conference (i.e., 1 July 2006).

Nomination category

Honorary Member of the Union

The title of Honorary Member of the Union is granted to a person who has distinguished him/herself in active participation in the Union's activities and fulfilment of its goals. Union Constituent Members can nominate likely candidates 3 months before the World Conference (i.e., 1 July 2006).

The Union Medal

The Union Medal is awarded to those members who have made an outstanding contribution to the control of tuberculosis or non-tuberculous lung disease, by their scientific work and/or actions in the field.

Further information is available on the Union website: www.iatld.org

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"Strengthening human resources for better lung health"

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For more information, please contact:

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68 bd Saint Michel

75006 Paris, FRANCE

Tel: (+33) 1 44 32 03 60

Fax: (+33) 1 43 29 90 87

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10TH Conference of the Union

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For more information contact:

Kitty McAndrews

American Lung Association

of Metropolitan Chicago

1440 W. Washington Blvd.

Chicago, IL 60607 USA

Tel: (+1) 312 243 2000

Fax: (+1) 312 243 3954

e-mail: tb@alamc.org

www.lungchicago.org

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28 JUNE–1 JULY 2006

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For more information, please contact:

Vaira Leimane

State Center for Tuberculosis and

Lung Diseases of Latvia

p/o Cekule, Stopinu p.

Riga, LATVIA

Tel: (+371) 704 8246/8202

Fax: (+371) 790 1014

e-mail: congress2006@tuberculosis.lv

www.tuberculosis.lv

36th World Conference on Lung Health of the International Union Against Tuberculosis and Lung Disease (The Union) Paris, France, 18–22 October 2005

SYMPOSIA: THURSDAY 20 OCTOBER 2005

HIV INFECTION AND THE LABORATORY

Diagnosis of HIV: which tests should be used and when?

Since the first viral lysate enzyme immunoassays (EIA) for HIV antibodies were introduced in 1985, developments in HIV testing proceeded along four paths: 1) more sensitive serum EIAs reduced the window period during which antibodies are undetectable from about 3 months to 22 days; 2) nucleic acid amplification tests (NAAT) that detect viral genomic material make it possible to diagnose HIV infection 10 to 14 days before antibodies develop, and in infants for whom antibody tests are unreliable; 3) convenient rapid screening tests expanded testing outside traditional laboratories with alternative specimens such as whole blood and oral fluid; and 4) alternative algorithms for confirmation evolved to ensure accuracy at a reduced cost. Long-standing infection can be readily diagnosed with any of these approaches, but no single strategy is optimal for detecting early infection when persons may be most infectious. Extremely sensitive assays require centralized testing; in practice, many patients never receive their test results. NAAT can detect infection in up to 5% of persons who are antibody negative in some settings, but cost and complexity limit its feasibility, and the frequency of false-positive and false-negative results ranges from 2% to 7%. The number of rapid antibody tests that deliver immediate results has proliferated, but differences in sensitivity, specificity, and consistency often become secondary to considerations of cost. The increasing sensitivity of new assays makes it difficult to rely on a single gold standard for confirmation. Accurate diagnosis continues to require follow up. Selection of an

Methods for CD4 T enumeration in resource-limited settings

L Weiss. Hôpital Européen Georges Pompidou, Paris, France.
Fax: (+33) 1 56 09 30 26.
e-mail: Laurence.weiss@egp.ap-hop-paris.fr

In patients with HIV infection, CD4 cell counts are the best predictors of opportunistic infections and clinical progression. CD4 cell counts have to be monitored to define the optimal time to initiate ARV treatment in asymptomatic patients and to assess the immunological response to treatment. Thus, there is an urgent need for accurate low-cost methods for CD4 cell enumeration in the context of scaling-up antiretrovirals in resource-limited settings. Among available methods for measuring CD4 cell counts, flow cytometry (FC) is the gold standard. However, the high cost of the equipment and of reagents, the sophistication of the equipment and problems associated with maintenance prevent FC from being widely used in developing countries. Considerable advances in alternatives to the gold standard of flow cytometry have been made. Manual microscopy-based CD4 cell counting technologies, including Dynabeads (Dyna) and Cytospheres (Beckmann Coulter), may be useful as they do not require sophisticated technology, they are less expensive in terms of equipment and reagents and they are easy to use in the field. An excellent correlation was found between the results obtained with the Dynabeads technique and those of the reference FC method in a multicentre study involving 6 sites in West Africa. However, these techniques are labour intensive and do not allow a high sample throughput. These manual techniques remain helpful in low volume non-centralized laboratory settings in remote areas. Newer automated technologies include the pan-leukogating CD4 methodology, the Partec Cyflow system, the Guava EasyCD4 assay and the Point Care system. Other methods, such as the LabNow microchip-based method, are in the pipeline. The pan-leukogating CD4 methodology is based on a pan-leukocyte marker and uses a 2-colour pre-optimised reagent. It provides both a CD4 percentage and absolute CD4 counts. It is of interest for laboratories already equipped for flow cytometry, as it lowers the cost to approximately \$6/test. The Partec Cyflow system

is a miniaturized FC; it uses a 1-colour reagent (only an anti-CD4 monoclonal antibody). Single parameter CD4 gating is more affordable. However, accuracy and precision may be affected as a result of interference with monocytes, particularly in samples with low CD4 cell counts and/or in patients co-infected with TB. Thus, although this equipment is already used in the field in several resource-limited settings, multicentre field studies independent of the manufacturer are needed to validate the robustness of CD4 counting in various clinical settings in developing countries. The Guava Easy CD4 assay system uses a microcapillary cytometry and 2-colour reagents, it can measure absolute CD4 counts and percentage CD4 as % CD3+ T cells. This technique seems simple, quick and uses vastly less reagent. The Point Care system uses a micro-laser cytometry and antibodies conjugated with colloidal gold particles. It provides both CD4 percentages and absolute CD4 cell counts. The investment for these equipments is relatively high (US\$15 000–45 000). More data from rigorous independent field studies are necessary to better evaluate these technologies. The choice of a low-cost CD4 assay should depend on the situation, defined by the degree of sophistication of the laboratory, the sample throughput, the availability of technical support—which is a key issue for flow methods—and cost-effectiveness (if the throughput is high, the final cost for flow methods could be of interest even if the initial cost for flow equipment is high). Whatever the technique, the participation of laboratories in internal and external quality assurance and quality control programmes is critically important. Efforts are currently underway to provide QA reference samples that are compatible between platforms.

What is necessary to follow up HIV-infected patients?

D Coetzee. Infectious Disease Epidemiology Unit, School of Public Health and Family Medicine, University of Cape Town, Cape Town, South Africa. Fax: (+27) 21 4066764. e-mail: dcoetzee@phfm.uct.ac.za

Khayelitsha is a township of Cape Town, South Africa with 450 000 inhabitants, where the HIV seroprevalence in pregnant mothers at ante-natal services was 29% in 2004. In April 2000 a comprehensive service for persons infected with HIV was started at 3 clinics in Khayelitsha. In May 2001 the first patients were started on antiretroviral therapy (ART). Guidelines for the laboratory monitoring of patients were put in place when the programme was started. These guidelines aimed to monitor the immune status of patients, identify opportunistic infections and complications, monitor side effects to specific antiretrovirals used and monitor the response to ART and need to change regimen. The guidelines have been adapted as

the programme has progressed. By the end of 2004 over 2000 patients had been placed on ART. 40% of patients have had at least one antiretroviral changed, 12% had been placed on the second line regimen and 70% had undetectable viral loads. The experience from the laboratory monitoring of patients in Khayelitsha will be discussed and recommendations made for the optimal laboratory monitoring of persons before and once placed on ART and the minimum set of laboratory tests that should be performed in resource limited settings.

Resistance to antiretroviral drugs in developing countries

M Peeters. UMR 145, IRD, Montpellier, France. Fax: (+33) 4 67 41 61 46. e-mail: martine.peeters@mpl.ird.fr

One of the major characteristics of HIV is its high genetic diversity. It is not clear whether differences exist among the various forms of HIV-1 (groups, subtypes, and CRFs) in terms of transmissibility, pathogenicity, and responses to antiretroviral therapy, but some in vitro and in vivo observations suggest that certain variants may respond differently to certain antiretroviral drugs, e.g., HIV-1 group O and HIV-2 strains are naturally resistant to non-nucleoside reverse transcriptase inhibitors, and the rate of nevirapine resistance mutations after a single dose is significantly higher in women with HIV-1 subtype C than in women with subtype A or D (Eshleman, 2005). Many studies have also shown polymorphisms of non-B strains, especially with natural minor mutations in protease and atypical substitutions in protease and reverse transcriptase (RT) at positions associated with resistance. Accessory (or minor) mutations may not result in a significant decrease in susceptibility, but may be associated with an increase in viral fitness (replication capacity) and/or increase in resistance level associated with major mutations, and thus long-term failure of therapy. Clinical studies suggest that the currently available protease and RT inhibitors are as active against non-B viruses as they are against subtype B viruses, but a longer follow-up is needed to confirm this. Data from industrialised countries suggest that the transmission of drug-resistant HIV is an emerging public health problem. Transmission of drug-resistant HIV strains to uninfected individuals may compromise response to initial therapy. Few data are available on primary resistance in developing countries. As ARV drugs begin to be widely used in developing countries, the number of persons with non-B viruses initiating therapy will increase dramatically. Studies are thus needed to understand the development of ARV drug resistance and baseline susceptibilities to ARVs in non-B strains. It is also important to establish a surveillance system to monitor the transmission of ARV-resistant strains in newly infected individuals.

ASTHMA IN LOW-INCOME COUNTRIES: IMPROVING MANAGEMENT

ISAAC III in the Sudan

O S Eldien,¹ A O Jassor,¹ M Elteгани,¹ A El Sony,¹ O A Musa,² N Ait-Khaled.³ ¹Epidemiological Laboratory, AMST, Khartoum, Sudan; ²Medical College, National Rabat University, Rabat, Morocco; ³Union Asthma Division, Paris, France. Fax: (+249) 918 322 44 96. e-mail: maieaie8@hotmail.com

Introduction: The prevalence of asthma is increasing worldwide. It has been observed that the prevalence of asthma is increasing in Sudan.

Objectives: To describe the prevalence and severity of asthma, rhinitis and eczema in children 13–14 years old living in Khartoum, Sudan, and to find out predisposing factors of asthma as part of ISAAC.

Methods: 3000 schoolchildren were prospectively counselled between February and September 2003 in Khartoum, Sudan. The study included any child aged 13–14 in 55 different schools. Data were collected by questionnaire. They were entered, and analysed using Epi info 6.

Results: 53.4% of the samples were males, 46.6% were females. The prevalence of asthma (wheeze in the past 12 months) was 16.3%, and the incidence of wheeze was 12.3%. 14.3% of children had exercise-induced wheeze, 20.0% had night cough without chest infection and 17.1% had sneezing without cold infection. Skin rash has occurred in 9.8% during the past 6 months. Only 4.2% of the total had eczema; 17.7 of children with positive wheeze had dogs in their houses, 61.5 had cats and 69.3% had smokers in their families.

Conclusion: The prevalence of asthma was 12.3%; wheeze was directly related with animals and passive smoking.

Asthma pilot project in Sudan

M Eltigany,¹ N Ait-Khaled,² Y Albushra,¹ O A Musa,³ A El Sony.¹ ¹Epidemiological Laboratory (Epi-Lab), AMST, Khartoum, Sudan; ²Asthma Division, The Union, Paris, France; ³Medical College, National Rabat University, Morocco. Fax: (+249) 183224496. e-mail: aelsony@yahoo.com

Introduction: There is a high prevalence of asthma in Africa. In Sudan, this high prevalence of 12.2% (ISAAC) is associated with a remarkable increase in asthma morbidity and poor management.

Objectives: To establish an asthma control program in Sudan. Specific objectives of this pilot study:

- To register all asthma patient referred to asthma centres.
- To treat and follow patients according to the guidelines.
- To improve accessibility to drugs.

Method: Prospective study done in Khartoum and Gazira state in 4 centres, September 2003–October 2004. All asthma patients male or female all ages and from all areas, self referred to the asthma centres, were included. The total number of patients registered is 600. Data were collected by questionnaire on the patient treatment card provided in the IUATLD manual. The peak flow rate was determined for each patient initially and after stabilisation. Categorisation of patients as mild, moderate, or severe was done according to symptoms and PEF rate. Treatment outcome was determined according to improvement of symptoms, PEF rate, emergency room visits and type of medication.

Results: 55.6% of patients were female, 44.4% were male; 25% were in the age group 35–44 years. 89% were non-smokers, 2.6% were smokers, and 8.3% were ex smokers. Severity of symptoms was classified as follows: 19% severe persistent, 37.7 moderate persistent, 24.7% mild persistent and 18.7% intermittent. Treatment outcome obtained from 113 patients on regular follow-up: 30% were severe, 45% moderate, 21% mild, and 2% were intermittent. After regular treatment 33% had no symptoms, 9% intermittent, 30% mild, 19% moderate and 7% severe. 91.2% of the patients visited ER before follow-up compared to 47.8% after follow up. Peak expiratory flow rate showed improvement, and medication use changed from oral steroids and high doses of inhaled steroids to lower doses of inhaled steroids.

Conclusion: Regular treatment and follow-up of asthma patients can improve symptoms and result in good treatment outcomes.

Recommendation: An asthma control programme should be established in Sudan.

Improving asthma management in Chile

R Sepulveda. University of Chile, School of Medicine, National Institute of Thorax, Adult Respiratory Program. Chilean Ministry of Public Health, Santiago, Chile. Fax: (+56) 2 2744152. e-mail: rsepul@terra.cl

Chile is undergoing an epidemiological transition from an infectious diseases- and mother and child-oriented health organization to one for adult chronic diseases. In 1992, a Childhood Acute Respiratory Disease Program was launched in public health Primary Care Centers (PCC) throughout the country, with the aim of reducing the impact of respiratory diseases at this age. The program developed health units within the PCC with teams consisting of a physiotherapist and a university nurse trained to manage child respiratory diseases under a well defined protocol. The teams were provided with antibiotics, inhaled bronchodilators and corticosteroids to resolve these health problems. The impact on mortality and hospitalization rate was well appreciated by people and health au-

thorities. The socio-economic impact was successfully evaluated after 6 years by an independent organization. In 2001, an Adult Respiratory Program was developed to cover, at PCC level, patients suffering from bronchial asthma, COPD, and community acquired pneumonia classified as mild and moderate in severity. This presentation will cover relevant aspects of asthma management under the Adult Respiratory Program in the PC setting using a similar model of health care: a team composed of a nurse, a physiotherapist and a part-time doctor, trained in the use of specific guidelines produced, in conjunction with the Chilean Society of Respiratory Diseases, to care for this type of adult patients. Asthmatic children under 15 years old were cared for under the Childhood Acute Respiratory Program. The Ministry of Health covers the teams' salaries and a large proportion of drugs included in the official guidelines are provided for free to all patients included in the program. In the first year, 15 units were established in Santiago, Chile, to supervise their activities, and since then 50 more units have been added annually throughout the country. By the end of 2004, there were 156 units country-wide, with 20 000 asthmatic patients under control.

The level of asthma control is evaluated by clinical score and PEFr measurement. A random selection of 1179 asthmatic patients were evaluated with this standardized questionnaire, including questions on waking at night, additional use of BD, limitation of daily life activities, emergency room visits, and patients' asthma control perception. With this evaluation, a regular score of between 0 (total control) and 5 (poor asthma control) is obtained and the team can modify treatment according to the guidelines or send the patient to a chest physician for evaluation. 81% of asthmatic patients on treatment obtain a score of 2 or less. The mean age of this group was 52.9 years; 72% were women. Each unit has on average 142 asthma patients. Adherence to treatment was more than 80%, with a greater proportion among mild cases. The goal of the program is to provide such units for all the country's PCCs to impact the effect of asthma on the quality of life of the Chilean population and reduce emergency visits and hospitalizations. The role of nurses and physiotherapist is a novel approach to handle chronic diseases at PCC level.

A trial of improved asthma management

P Burney. King's College London, London, UK.
Fax: (+44) 207 848 6605. e-mail: peter.burney@kcl.ac.uk

The Union has recently undertaken some research into the management of asthma in patients attending emergency rooms. This showed that in this group of patients a high proportion was not on what would be regarded as adequate inhaled corticosteroids according to GINA guidelines. Those who were on inadequate

treatment were less likely to be receiving regular follow-up for their asthma and were less likely to have health insurance. An earlier study had shown that the costs of asthma medication varies very markedly and is higher than the true economic cost in many middle-income countries. To address some of these problems, the Union has introduced guidelines and a management system for the long-term care of patients with asthma, and is currently setting up an asthma drug facility. There is still a need to demonstrate which elements of the new system are most cost-effective in delivering improved care, and in order to answer this question a trial has been proposed. Trials to identify the effectiveness of new programmes are complex. In this talk the plans for the current trial will be outlined and the choices discussed. Feedback from Union members will be welcomed.

HIV AND THE CHILD

Strategies to improve accurate and timely diagnosis of HIV among children in low-resource settings

M McConnell. Centers for Disease Control and Prevention, Atlanta, Georgia, USA; Thailand MOPH—US CDC Collaboration, Nonthaburi, Thailand. e-mail: mmcconnell@cdc.gov

Early infant diagnosis of HIV is a priority for scaling up pediatric HIV care and treatment programs in resource-limited settings. Mortality of HIV-infected infants is highest in the first 2 years of life, as many infants have high viral loads and rapidly progressive disease, and without a diagnosis there is no treatment. Early diagnosis also allows prevention of mother-to-child transmission (PMTCT) program evaluation, pediatric HIV surveillance, and enhanced HIV care (provision of cotrimoxazole and isoniazid prophylaxis, nutrition and growth monitoring, and treatment and prophylaxis of other opportunistic infections). While serology delays diagnosis until 9–18 months when maternal antibody wanes, alternative diagnostic technologies are increasingly available and affordable for early infant diagnosis. These include nucleic acid testing with DNA or RNA polymerase chain reaction (manual, automated, and real-time PCR) and ultra-sensitive p24 assays. Additionally, dried blood spot testing offers increased ease of specimen collection in resource-limited settings, and results have been validated in several laboratory studies. Using either serologic or virologic assays, infant diagnosis programs should focus on two patient populations: a) HIV-exposed infants from PMTCT programs, and b) HIV-exposed or symptomatic older children in hospital, clinic, or other community settings. However, strategies and algorithms for identifying infected infants or children in these two groups will differ. Early viro-

logic testing is needed to identify young infants, but serologic testing may be used for older children. Challenges to scaling-up infant diagnosis programs include poor infant follow-up and identification of HIV-exposed infants from PTMCT sites, guidance on breast-feeding with negative HIV test results, linkages to care and treatment facilities, and monitoring of program implementation and coverage. Finally, laboratory programs need to develop quality assurance methods for infant testing with standard operating procedures, training protocols, and proficiency testing.

Prevention, diagnosis and treatment of HIV-related pneumonia in children

H Zar. Red Cross Childrens Hospital, University of Cape, Cape Town, South Africa. Fax: (+27) 21 689-1287. e-mail: hzars@ich.uct.ac.za

HIV-related pneumonia is a leading cause of morbidity and mortality in children in developing countries. The HIV epidemic in sub-Saharan Africa has sharply increased the incidence, severity and mortality of childhood pneumonia and reduced the efficacy of preventive strategies. Bacterial infection, particularly *S. pneumoniae*, is a major cause of HIV-related pneumonia; a broader spectrum of pathogens including gram negative infections and *P. jiroveci* occurs in HIV-infected compared to uninfected children. In high TB prevalence areas, *M. tuberculosis* is an important cause of acute pneumonia. Mixed bacterial-viral infections are common. Aetiological diagnosis remains challenging; at present no clinical, radiological or general tests have sufficient reliability to distinguish bacterial from viral pneumonia. Induced sputum is useful in children for identifying pathogens such as *M. tuberculosis* or *P. jiroveci*. The yield from blood culture is higher in HIV-infected than immunocompetent children.

Treatment of pneumonia includes use of case management guidelines, with prompt initiation of antibiotic therapy for children with pneumonia or severe pneumonia. New advances in therapy include the possibility of short course antibiotic therapy, high dose amoxicillin in areas where pneumococcal resistance is problematic and oral therapy for severe pneumonia. Empirical therapy for *P. jiroveci* should be given when there is a high index of epidemiological or clinical suspicion of this infection. Available preventive interventions include immunization as contained in the WHO EPI program and use of cotrimoxazole prophylaxis. New preventative interventions include the development of conjugate vaccines against *S. pneumoniae* and *H. influenzae* but these are neither widely affordable nor available in developing countries. Despite a lower efficacy in HIV-infected children, these vaccines still protect against disease in a significant proportion of children. Available preventative interventions including nutritional support and

micronutrient supplementation with zinc and vitamin A may reduce the burden of pneumonia. Prevention of HIV transmission through MTCT programmes and use of antiretrovirals in HIV-infected children are other strategies to prevent HIV-related pneumonia.

Experience delivering antiretroviral medications: considerations for scaling up

G Anabwani, E Lowenthal, J Millon. Botswana-Baylor Children's Clinical Centre of Excellence, Gaborone, Botswana. Fax: (+267) 310 0079. e-mail: ganabwani@baylorbotswana.org.bw

In 2001, the Botswana Government made the bold decision to provide its citizens with free highly active antiretroviral treatment (HAART). Early in the program, paediatric care unfortunately lagged behind care for adults. In June, 2003 the Botswana-Baylor Children's Clinical Centre of Excellence (BBCCOE) opened, rapidly accelerating the availability of paediatric HIV care for Botswana children. With over 1000 children currently receiving HAART at the BBCCOE, this is probably the largest clinic dedicated to the care of HIV-infected children on the African continent. All patients are managed according to standard national treatment guidelines. Patients are diagnosed using either DNA PCR or ELISA and the first-line regimen consists of zidovudine or stavudine plus lamivudine plus nevirapine or efavirenz. A 2004 analysis of the first 672 children receiving therapy indicated equal numbers of males and females, with a mean age of 65 months. The majority (56.5%) of children were in CDC category C3, but mortality on therapy was only 7.8%. Mean CD4 values at baseline, 3, 6 and 12 months were 15%, 25%, 29% and 31%, respectively. 82% of the children had VL <400 at 12 months. Mean weight increases were 20% and 28% at 6 and 12 months, while mean height increases were 4% and 8% at 6 and 12 months, respectively. 3% of the children were switched to a second-line regimen during the first year. These results demonstrate that HIV-infected children can be managed successfully even in resource-limited settings. However, infrastructure, drugs and health professional training are essential to successful scale-up. In most parts of the world, children continue to receive low priority with regard to HIV care. High cost, lack of paediatric formulations, lack of paediatric-specific health professional training, lack of access to early HIV diagnosis and poor follow-up of mothers in PMTCT programmes are key challenges to scaling up.

ACCESS TO TB CARE FOR UNDOCUMENTED MIGRANTS

TB treatment costs for immigrants

D Menzies. Montreal Chest Institute, McGill University Health Centre, Montreal, Canada. Fax: (+1) 514-843-2083.
e-mail: dick.menzies@mcgill.ca

Tuberculosis can create a substantial economic burden for patients and their families. This is particularly true for immigrants because of their increased risk of disease in the first few years after arrival, and their reduced likelihood of job security, or disability benefits. In addition new immigrants may have limited access to, or awareness of, publicly funded TB services.

We surveyed 234 patients with active TB in Haiti, Dominican Republic, USA and Canada regarding their out-of-pocket expenditures, and work-time lost because of TB. Out-of-pocket spending was greatest before TB was diagnosed, because patients saw multiple physicians and underwent multiple treatments or investigations. Work-time lost was greatest during hospitalization for patients and their family, because they often stayed with them in hospital. Patient costs for travel and time lost from work were substantial with directly observed therapy. When compared between countries the total costs for patients and their families were least in Haiti, but amounted to close to 70% of average income in Haiti. Patient and family costs were substantial in the other three countries, but accounted for less than 20% of average annual income.

We also assessed the cost-effectiveness of different approaches to control tuberculosis among migrants from Haiti, Dominican Republic and Mexico, to the United States. We found that US financial support to strengthen TB control in these three countries through DOTS implementation and expansion could result in savings within the US over the long term. If DOTS expansion achieved the same steady decrease in incidence in these three countries as has been seen in China or Peru, then the United States would achieve net savings of \$128 million—mainly because of reduced spending for TB care by governments and other providers. Patients and their families would save approximately \$22 million over a 20 year time frame. We conclude that the most beneficial strategy to reduce the economic burden of economic burden on immigrants is to emphasize global TB control.

PATIENT AND PROVIDER EDUCATION: SUCCESSFUL MODELS AND LESSONS LEARNED

Turning training into practice: TB infection control in Peru

J Creswell. Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+1) 404-639-8960.
e-mail: jcreswell@cdc.gov

The PARTNERS TB Control Program, funded by a grant from the Bill and Melinda Gates Foundation to address the problem of drug-resistant TB in Peru, developed, designed and implemented a training course, manual and infection control plan as part of a train-the-trainers initiative for health care workers (HCWs) on TB and MDR TB infection control theory and practices. A systematic health education process was used for this project. The need for infection control training for HCWs was identified through a formal needs assessment and literature review. Content and design were validated by HCWs in Peru. Materials were field tested with HCWs during two pilot courses in Lima and revised based on field test results and feedback from expert panel review. After the course, formal evaluation of the training was conducted and as part of follow-up evaluation, participants were asked to develop infection control plans for their own facilities. The results of this program have been encouraging. An infection control training manual and course were developed and 77 HCWs were trained. In addition, 16 infection control interventions were proposed by course participants and are being funded by PARTNERS. Furthermore, course participants have trained personnel in their own facilities on different aspects of infection control and developed guidelines for practices at their centers. One thousand copies of the manuals will be printed and distributed, and additional courses are planned. The success of this plan is due in large part to the systematic process that was employed throughout the project. Extensive formative evaluation provided valuable feedback, enhanced the usefulness of the materials, and increased acceptability among the target audience. In developing effective training materials it is essential to follow a systematic approach that identifies gaps, includes the target audience in the development process, enables collaboration, and provides a structure for monitoring and evaluation.

Culturally appropriate tuberculosis patient education materials in the United States

R Bhavaraju. New Jersey Medical School Global Tuberculosis Institute, Newark, New Jersey, USA. Fax: (+1) 973-972-1064.
e-mail: bhavarrr@umdnj.edu

Rationale: As tuberculosis (TB) rates in the United States remain highest in the foreign born, the need for

linguistically and culturally appropriate patient education materials has become more apparent. Six materials (skin testing, TB disease, latent TB infection, contact investigation, adherence, and TB/HIV) are being developed using the principles of health literacy and a systematic health education process. The target audience includes English, Spanish, Vietnamese, and Tagalog-speaking patients.

Methods: In 2002–2003, 8 focus groups in 5 geographically diverse regions of the US were conducted to gather needs assessment data on preferred TB education material content and format. The materials were drafted in English, translated and culturally adapted, and field tested with the target populations in 2003–2004. Standardized focus group methods and recruitment materials were used with 108 subjects. Groups consisted of both TB patients and community members.

Results: It was confirmed that cultural beliefs heavily impact knowledge of and attitudes about TB causation, diagnosis, and treatment. There were also clear distinctions among groups between preferred material format, content, and use of language. As the needs assessment data was used to draft the materials, the field-testing process revealed that much of the content, language, and graphics were appropriate. However, some changes were required when focus group participants were asked about comprehension of explanations and behaviors depicted in photographs. This was a clear challenge especially when translating various concepts from English.

Conclusion: Understanding health beliefs and related behaviors is necessary for developing comprehensive, culturally-appropriate TB education materials. Providing congruence between health beliefs of the target audience and the health behaviors promoted may lead to improved patient adherence and satisfaction.

Communication and education activities for an MDR TB outbreak in Thailand and California

G Benenson. Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+1) 404-639-8960. e-mail: gkb6@cdc.gov

Introduction: In June 2004, Hmong refugees began arriving in the United States from Thailand's Wat Tham Krabok refugee camp as part of a resettlement program. By the end of 2004, reported TB cases among these refugees in California (one of five states which received the majority of Hmong refugees) were unexpectedly high; approximately 75% of culture-confirmed TB cases included some degree of TB drug resistance. The U.S. Department of State postponed the resettlement of approximately 6000 Hmong refugees while state health departments and the Centers for Disease Control and Prevention (CDC) launched outbreak investigations in the United States and Thailand. The investigation revealed a need for culturally appropriate education and communication for the Hmong ref-

ugees and community members. Language, health beliefs, political history, and refugee experience presented significant barriers for education and communication with the Hmong population.

Methods: Following a systematic plan for communication and education, CDC and partners identified key collaborators who would be involved with educational activities for the Hmong in Thailand and the United States. The next step was to conduct a quick, informal needs assessment. This involved a review of existing education and communication resources, key informant interviews, and discussions with Hmong community leaders.

Results: The collaboration between key partners enables the sharing and adaptation of existing resources and ensures a consistent message is being communicated in the United States as well as in Thailand. It also facilitated the development of a workgroup in California to address education and communication needs identified during the outbreak investigation.

Conclusion: TB outbreak investigations present an important opportunity for training and education. Despite needing a quick response and requiring action at a time when resources and staff are strained with competing priorities, outbreaks can prompt assessments of training and education needs and solicit support and resources to address those needs.

Brief guide on tuberculosis for primary health care (PHC) providers in the WHO European region

E Yurasova. World Health Organization, Regional Office for Europe, Copenhagen, Denmark. Fax: (+45) 39 17 18 51. e-mail: yyu@euro.who.int yyu@who.dk

DOTS implementation in the WHO European Region (EUR) requires PHC involvement in TB control. In 2003–2004, the National TB Center at the New Jersey Medical School (NTBC) and WHO, with USAID support, developed a best practice reference guide on TB control for PHC providers to improve detection and treatment of TB in the EUR countries.

The project cycle followed a systematic approach to health education and included needs assessment in the targeted region with a situation analysis of national TB control programmes (NTP) and health care systems, development and peer review of the draft guide, field testing, publishing of the final document, dissemination to PHC providers in EUR and evaluation of its use.

To define the appropriate contents and format for the guide over 100 key informant interviews were conducted in Georgia, Kazakhstan, Moldova, Romania and two regions of the Russian Federation. The assessment revealed similarities in the structure of health systems and the role of PHC in TB control.

The draft was reviewed by 37 international and 34 national TB and PHC experts, including members of

the TB Collaborative for Training and Education in EUR. Field testing in four countries provided feedback from 200 PHC providers on the contents and format of the guide. The final document was published in Russian and later translated and printed in Romanian. The guide was disseminated to all countries of EUR with a follow-up plan.

Major challenges included the very broad audience, the skepticism of TB specialists regarding the role of PHC in TB control; differences in TB practices and regulations by country or from international recommendations. Broad involvement of international partners and national experts from the very early stages ensured acceptance and relevance of the guide in EUR countries as well as promotion of international standards of TB control in PHC.

Cohort analysis training for providers in Tajikistan

Z Maksumova. International Nongovernmental organization Project HOPE/TB Program (USA), Dushanbe, Tajikistan. Fax: (+992 372) 24 62 51. e-mail: hope.monitor@tojikiston.com

The TB situation in Tajikistan threatens the social and economic growth of the country. According to WHO estimations, the expected morbidity rate in Tajikistan is 127/100 000. Implementation of the DOTS programme started in 2002. As of 31 March 2005, 44.2% of the population is covered by DOTS (population 6 440 000).

Goal: To show role of cohort analysis in achieving programme results.

Materials: Analysis of reporting and recording documents of DOTS regions. For effective Program implementation it is required to conduct regular training and monitoring, and provision of recommendations for quality improvement of anti-tuberculosis activities. For this purpose Project HOPE conducts cohort analysis training in Tajikistan. The training is conducted on a quarterly basis for of TB Programme managers, DOTS coordinators, monitoring and training teams, laboratory specialists and drug management specialists. Cohort analysis is a key working tool for qualitative evaluation and analysis of programme indicators. Cohort analysis training is conducted quarterly; participants are trained to conduct programme analysis, calculate data and assess results on basic programme indicators. Cohort analysis gives a better understanding of programme indicators, trains how to conduct comparative (dynamic) analysis, improve skills and increase knowledge of how to manage the programme.

Results: Since the beginning of regular quarterly programme analysis in pilot regions of Tajikistan, the number of new S+ cases detected has increased from 107 (2002) to 222 (2003), the smear conversion rate has increased from 69% (2002) to 88% (2003), and treatment outcomes have increased from 79% (2002)

to 89% (2003). The cohort analysis allows DOTS programme quality to be improved through evaluation of quantifiable programme indicators. Conducting similar programme analysis allows programme staff to undertake measures for the improvement of TB control activities, correcting problems based on the results of regular quarterly reports.

Train the trainer programmes for TB programme management staff in Vietnam

S D Ngoc, B D Duong, N T Huong. Vietnam National Tuberculosis Control Programme, National Hospital of Tuberculosis and Respiratory Disease, Hanoi, Vietnam. e-mail: thoung139@vnn.vn

Since 1999, the Vietnam National Tuberculosis Control Program (NTP) has worked with the CDC's Division of TB Elimination (DTBE) and Sustainable Management Development Programme (SMDP) to improve the management skills of NTP personnel.

The public health training programme included two phases. The first phase was to send NTP staff each year to attend a management for international public health (MIPH) course offered in CDC, Atlanta, in 1999–2003. Eight of the ten NTP staff who attended the MIPH course continue to be involved in the NTP management training programme in addition to their regular duties within the NTP.

The second phase was to organise a PHP course in Vietnam, with faculties from MIPH graduates from the NTP and the Hanoi School of Public Health. Each course includes three steps. The first step is 3 weeks in a class. At the end of the first step each participant will develop a problem-solving project. The second step is to carry out the project in their provinces. The third step is a follow-up workshop 6–12 months after the 3 week-training course for participants to present and exchange their project results and experiences.

The NTP delivered four management training cycles to 81 NTP managers in Vietnam during 2001–2004. The 81 who attended the NTP management training courses completed 69 applied learning projects with teams from their organisations and presented written reports on the results of these projects to NTP senior managers. The applied learning projects frequently resulted in improved implementation of the DOTS strategy. The project also strengthened staff training and supervision at multiple levels of the NTP.

The NTP will also need to provide continuous reinforcement in applying the management skills for all trainees who participate in the programme if evidence-base management is to become a sustained aspect of the NTP organisational culture in the long term.

TOBACCO CONTROL: KEY TO TB AND ASTHMA CONTROL

Tobacco and asthma

A Pietinalho. Filha, Helsinki, Finland. Fax: (+358) 9 45421210.
e-mail: anne.pietinalho@filha.fi

There are three main fields to be discussed when dealing with tobacco and asthma: 1) maternal smoking during pregnancy and passive smoking in childhood, 2) passive smoking in the asthmatic population and 3) smoking of an asthmatic person. In recent years, we have obtained a lot of information on passive smoking during pregnancy and childhood and evidence on its effect on the risk of asthma. Maternal and passive smoking are not the main causes predisposing asthma, but they are very important in minimizing the risks of asthma.

- Maternity and child clinics should work harder against smoking among parents and support their attempts to quit smoking.

Passive smoking is harmful for all individuals, but particularly for those with asthma. The inflammation of the bronchial tree worsens and the effect of inhaled medicines is impaired. Also the risk of infections increases, which in turn worsens asthmatic inflammation and symptoms.

- Passive smoking should be minimized everywhere so that no one has to be exposed.

Smoking in an asthmatic person is even more harmful than passive exposure. Severe asthma is much more prevalent in smoking than non-smoking asthmatics. Inhaled medicines are not as effective as in non-smokers. The greater risk of developing COPD in a asthmatic smoker is well known.

- We should act very hard against smoking among all asthmatics, starting from childhood when the first experiments with smoking will take place.

With tighter anti-tobacco legislation we could minimize passive smoking and achieve better prevention of asthma. Further, with a more widespread and skilful health care system providing smoking cessation treatment more asthmatics should have only mild asthma and no or minimal symptoms.

The role of tobacco control in the prevention and treatment of tuberculosis

K Ward. University of Memphis, Memphis, Tennessee, USA.
Fax: (+1) 901-678-1715. e-mail: kdward@memphis.edu

This presentation will review evidence linking tobacco use to the development and course of tuberculosis as well as to treatment outcome. Additionally, recommendations will be provided for improving tobacco control efforts in developing countries in the fight against TB, using Syria as an example. Tobacco kills 3–3.5 million people globally each year. This annual toll is expected to increase to 10 million within

the next 20–30 years, with 70% of deaths occurring in developing countries. Tobacco use is an important contributor to pulmonary disease, including tuberculosis. Smokers have increased tuberculin sensitivity compared to non-smokers and are at substantially higher risk of developing pulmonary tuberculosis, with risk being related in dose-response fashion to the magnitude of smoking exposure. Additionally, environmental tobacco smoke in both children and adults is associated with increased risk of developing tuberculosis, and smoking may adversely affect responsiveness to tuberculosis treatment. Both tuberculosis and tobacco use are serious public health problems in Syria, where 60% of men and 23% of women report currently smoking cigarettes. Another prevalent and growing form of tobacco use in Syria and much of the Middle East is waterpipe smoking. In Syria, this traditional form of tobacco use had died out during most of the twentieth century but has enjoyed a resurgence since the 1990s. Current waterpipe use is reported by 20% and 7% of Syrian men and women, respectively. Of concern is growing evidence of several adverse health effects of waterpipe use, including risk of tuberculosis. Founded in 2002, the Syrian Center for Tobacco Studies (<http://www.scts-sy.org>) is conducting epidemiological, clinical laboratory, and intervention development research aimed at understanding and controlling tobacco use. Results from this work will be described, including an on-going prospective observational study of the influence of smoking on response to tuberculosis treatment in Syria.

Economic burden of tobacco

Z Onder. Bilkent University, Ankara, Turkey.
Fax: (+90) 312 266-4958. e-mail: zonder@bilkent.edu.tr

There is no doubt that tobacco use is harmful to health. It is expected that if there is no change in current smoking rates, tobacco will kill almost 10 million people a year, 70% of whom will be from developing countries. Moreover, tobacco use will jeopardize economic growth and development process of countries due to decline in the productivity of the work force as a result of tobacco attributable deaths and diseases. The most effective methods to control tobacco epidemic are increasing excise taxes on tobacco and helping current smokers to quit smoking. We observe that there are huge differences between countries in terms of the application and the effectiveness of these control measures, and recent reports show that the tobacco-attributable economic and health burden has shifted from high-income to low-to-middle and low-income countries. In this paper, first, the estimates of smoking-attributable direct medical care expenditures and the expected deaths will be presented. Second, the impact of the most effective tobacco control measure, increasing excise taxes, on the budgets of the poor and government revenues will be

explained. I will provide evidence on economic burden of tobacco use in selected developing countries (Turkey, Indonesia, Bangladesh, Vietnam and Estonia) as well as some developed countries (USA and UK).

Adapting smoking cessation interventions: the model of TB

M Ziyada. Epidemiological Laboratory (Epi-lab)/ Academy of Medical Sciences & Technology, Khartoum, Sudan.

Fax: (+249) 183 224496. e-mail: mai.zeiada@gmail.com / mai_zeiada2@hotmail.com

Background: Tobacco use is a major cause of respiratory disease, and any action to reduce its use is of great importance for patients whose lungs are already damaged by tuberculosis. The tobacco control unit in the Epi-Lab, in collaboration with the Union, and the department of biostatistics at the University of Khartoum, undertook the challenge of addressing the issue of feasibility in introducing brief cessation advice into tuberculosis treatment.

Objective: To demonstrate the feasibility of adding simple cessation intervention to tuberculosis health care services, by measuring the attitudes and behaviour of health staff over time, besides the assessment of the effectiveness of the intervention among tobacco using tuberculosis patients.

Setting: The study was carried out in 24 health care centres and chest clinics in 3 Sudanese states.

Design: The study was a controlled trial of an intervention to change the attitudes and behaviour of health care workers in the routine use of a brief intervention for tobacco using patients encountered in primary and respiratory health care services.

Population: 48 health care workers were included, 32 in the intervention and 16 in the control centres. Of 1177 newly diagnosed male tuberculosis patients, 513 (43.6%) were recruited into the trial. 43.5% were enrolled in the intervention group and 43.7% in the control group. Data were collected on staff participation in a 4-month intervention protocol for new patients. Feasibility was measured by looking at attitudes and behaviour of health care workers in offering the routine use of a brief intervention for tobacco, the behaviour of the patients involved, treatment variables and evaluated costs.

Results: At baseline, 7 (22%) of the staff reported using some form of tobacco. Almost the same proportion was documented among control staff. Two medical assistants from the intervention clinics reported that they no longer used tobacco by the end of the trial period, while no change occurred in the control group. There were changes in the attitudes of both intervention and control medical assistants. Attitudes about professional role in relation to tobacco became more nuanced. Of the 218 smokers recruited into the trial, 187 (85.8%) reported no longer smoking at the 8-month intervention period.

Conclusion: The intervention implied to have an im-

pact on tobacco use in those centres in which it was implemented, compared with those in which it was not. This study is not sufficient to conclude that this intervention should be broadly applied. It is a single study in one location in which the sites and participation are not necessarily representative of all sites and patients in the same country. In addition, no independent methods were applied to validate the reports of tobacco-using behaviour. Despite the non-generalisability of these results, and non-validation of self-report, the results suggest that the intervention is feasible to implement within routine tuberculosis services.

STRATEGIES TO PREVENT LUNG DISEASE IN CHILDREN

Conjugate vaccines and reducing the burden of bacterial pneumonia

H Nohynek. National Public Health Institute, Helsinki, Finland. Fax: (+358) 9 4744 8675. e-mail: hanna.nohynek@ktl.fi

Pneumonia is a major disease burden in children under 5 years of age in developing countries. Annually approximately one million children die from pneumonia, most of the severe forms of which are believed to be of bacterial origin. Memory inducing conjugated vaccines against *Haemophilus influenzae* type b (HibCV) and against several serotypes of *Streptococcus pneumoniae* (PCV) prevent most invasive, culture proven forms of these diseases (serotype-specific vaccine efficacy over 90%), as demonstrated in clinical trials and as a result of wide scale use in developed countries: Hib disease has virtually disappeared since the introduction of HibCV into national vaccination programs, and invasive pneumococcal disease has dramatically reduced not only in vaccinated age groups but also in older children and adults, indicating a strong herd immunity effect of PCV. The majority of the more severe forms of childhood pneumonia can also be prevented by Hib CV and PCV. In the Gambia, HibCV prevented 20% of radiologically proven pneumonia demonstrating at the same time that the Hib disease burden is much larger than previously thought when relying on bacteriological evidence alone. Recent trials in South Africa and the Gambia demonstrated that a 9-valent PCV can also prevent 20–37% of radiologically proven pneumonia. Also, in the Gambia, 9PCV prevented 16% of overall mortality, and 15% of total hospitalizations among children enrolled in the study. Despite the efforts of the WHO and GAVI, the introduction of HibCV and PCV into national vaccination programs in developing countries has been slow. This is due to the high price of CV, and particularly of PCV, and the lack of understanding of the magnitude of the country-specific disease burden of these pathogens. Indications that fewer than 3 doses of CV can provide sufficient immunogenicity to protect from dif-

ferent forms of disease during the first year of life, and a substantial herd immunity effect, make cost-effectiveness calculations attractive to decision makers.

Cotrimoxazole prophylaxis and ARV for HIV-infected children

P Msellati. UMR 145, Institut de Recherche pour le Développement (IRD), Bobo Dioulasso, Burkina Faso.
e-mail: philippe.msellati@ird.bf

Context: Access to antiretroviral treatment (ART) and cotrimoxazole prophylaxis in HIV-infected children are slowly increasing in Africa, and data are still scarce on these topics. We recruited HIV-infected children in an observational cohort in Abidjan from October 2000 to December 2003 and followed them until September 2004.

Methods: Clinical examination at baseline by the paediatrician and at every moment during follow-up in case of disease. At baseline and every 6 months: CD4 count and viral load. If $CD4 < 25\%$: cotrimoxazole prophylaxis and if $CD4 < 15\%$, ART. Cotrimoxazole and ART are free for children and all care, other drugs, examinations and other health expenses are free of charge. Clinical events have been systematically registered.

Results: 282 children recruited and followed (129 girls, 153 boys, 5.8 years on average). 93% received cotrimoxazole prophylaxis. There were only two problems of allergy, and most of those who stopped prophylaxis did so because CD4 increased beyond 25% under ART. 175 children have received ART (62%) during follow-up; 50% had an undetectable viral load after 18 months follow-up. During ART, the incidence of respiratory infections decreased dramatically compared to before ART. However, respiratory events still represented 40% of all events occurring after the beginning of ART. The cumulative incidence of tuberculosis was 2.93% at 12 months, 3.46% at 2 years and 6.09% at 3 years. The 3-year risk of TB was 14.2% in immunocompromised children ($CD4 < 15\%$) and only 3.4% in other children ($P < 0.0001$).

Conclusions: Cotrimoxazole prophylaxis and ART have a very important impact on the health of HIV-infected children in Africa as it does in industrialised countries.

Air pollution and lung disease

S Gordon. Liverpool School of Tropical Medicine, Liverpool, UK.
e-mail: sbgordon@liverpool.ac.uk

Air pollution was known to influence respiratory health in ancient times, but the industrial revolution brought with it pollution on an unprecedented scale. Clean air is now regulated in industrialised nations, and there is an appreciation of mechanisms by which air pollution influences the incidence of allergy, asthma, COPD, respiratory infections and all cause mortality as well as lung development in children.

In developing countries, however, where industrial pollution is less common and biomass fuel is a major cause of indoor pollution, there is less information about the health consequences of poor air quality. Biomass fuel use is likely to influence the incidence of allergy, respiratory infection and COPD as well as all-cause mortality, but the associations are much less well described.

In this talk, a brief review of the known effects of environmental and indoor air pollution on lung health will be presented, with an emphasis on the sources of pollution common in developing countries. New data on biomass fuel use and its effects in Malawi will be presented and current intervention trials to reduce indoor pollution in other developing countries will be described.

Zinc prevents pneumonia, diarrhoea and reduces mortality in children <2 years

See p S314

SCALING UP THE USE OF INCENTIVES AND ENABLERS TO IMPROVE DOTS PERFORMANCE: WHAT APPROACHES WORK BEST?

Impact and cost-effectiveness of incentives and enablers: evidence and policy implications for TB control programmes?

S Mookherji. Management Sciences for Health/RPM Plus Program, Arlington, Virginia, USA. Fax: (+972) 2 581 5367.
e-mail: smookherji@msh.org

Since 2003, there have been a number of efforts to strengthen the evaluation of the impact of incentives and enablers (I&E) on DOTS programme performance, adding valuable evidence to what has been a weak base. This presentation assesses what the combined evidence on impact, costs, and cost-effectiveness suggests for the use of I&E to improve TB control. Information was primarily collected from NTPs, pilot programs, and specific OR studies, through a survey conducted in mid-2005 by the RPM Plus program, building on the joint work program of Stop TB/WHO, MSH/RPM Plus and the World Bank that began in 2001. The available evidence on provider vs. patient incentives, as well as on different types of incentive schemes, is assessed separately. In particular, the common challenges to evaluating and gathering evidence on I&E are highlighted, and how these evaluation challenges may affect questions of I&E scale-up are considered. Furthermore, hypotheses about the potential effects of common challenges to implementing I&E on costs and scale-up are presented. Policy implications, in particular with regard to where I&E could play a role in DOTS expansion approaches

such as PPM and CB-DOTS, are formulated based on both the breadth of experience with using I&E, as well as the current depth of understanding regarding impact.

Evidence from using provider incentives in Bangladesh

V Begum. National TB Control Program, Directorate General of Health Services, Ministry of Health and Family Welfare, Dhaka, Bangladesh, Dhaka, Bangladesh. Fax: (+880) 2-9884656.

Introduction: BRAC, an NGO-introduced performance-based incentive for female community health volunteers (CHVs) for treating TB patients in one sub-district in 1984 and gradually extended to 283 sub-districts by 2004 in collaboration with the national TB control programme.

Objectives: Reaching the underserved population by introducing performance based incentives for CHVs.

Methods: Trained CHVs provide education to the community, refer TB suspects and ensure DOT. At the beginning, patients were asked to deposit Tk. 75 (US\$1.22) with a bond to guarantee treatment completion. Of this, Tk. 25 (US\$0.40) was given to CHV and Tk. 50 (US\$0.81) was returned to the patient on completion of treatment. Patients are currently requested to deposit Tk. 200 (US\$3.27), which is refunded to them on completion of treatment. Tk. 150 (US\$2.45) from the project fund is given to the CHV for treating each patient.

Results: In 2004, 50 252 patients were diagnosed in the CHV area. Of these, 35 027 patients were new smear positives. The contribution of CHVs increased the national case detection rate from 34% in 2001 to 46% in 2004, and the cure rate reached 85% in 2003.

Conclusions: Performance-based incentives for CHVs is an effective approach in achieving the national targets of case detection and cure rates in Bangladesh.

Social support for patients: evidence from experience in the Russian Federation

W Jakubowiak. WHO TB Control Programme in the Russian Federation, Office of the Special Representative of the WHO Director-General in Russia, Moscow, Russian Federation. Fax: (+7) 095 787 2149. e-mail: w.jakubowiak@who.org.ru

The default rate in the Russian Federation might vary from 3% to 20%, provided social support for TB patients is in place, while in other regions it reaches 30%. Thus, the WHO TB Control Programme in Russia and the Research Institute of Phthisiopulmonology (RIPP) of Sechenov Moscow Medical Academy carried out a 2-phase research on how social support for TB patients impacts treatment results.

To identify default risk groups, the 1st phase enrolled 1948 TB patients in 7 regions of Russia. The data collected revealed that defaulters are mostly males in their 40s (79%), alcohol abusers (71%), single (65%), unemployed (52%), with low education

level (67%), and living more than 5 km from the place of treatment (33%).

To identify optimal standards of social support for selected risk groups, the 2nd phase was based on a specially designed questionnaire developed by TB specialists, psychologists and narcologists. 1500 respondents (1400 new pulmonary TB cases and 100 defaulters) from 4 regions replied to 41 questions during the first month of treatment, after the intensive phase and at the end of treatment. Analysis revealed that TB patients prefer to receive money (more than 50%), food packages or hot meals, coverage of travel expenses, and psychological support (several patients).

The study showed the patient profiles, their attitudes towards treatment, preferences for social support, reasons for default and types of psychological support most influential in increasing patients' adherence to treatment. Based on the analysis different standards of social support for selected risk groups have been identified. These standards will be adjusted in selected pilot territories to learn the most effective model of social support.

TB-HIV CO-EPIDEMICS: THE NEXT WAVE COUNTRIES

Increasing convergence of HIV and TB epidemics in Russia

E Y Vitek, C Wells, O P Frolova, W Jakubowiak. Centers for Disease Control and Prevention (CDC), Division of TB Elimination, Atlanta, Georgia, USA. Fax: (+1) 404-639-1566. e-mail: ebv6@cdc.gov

Since 1991, the former Soviet countries have experienced a major resurgence in TB. In Russia, the TB incidence more than doubled, with 84.3 cases/100 000 population reported in 1999. National and international collaborative efforts to improve control programs stabilized TB rates, with 83.6 cases/100 000 in 2003. However, Russia has experienced a severe HIV epidemic since 1996, with a total of 305 895 HIV-infected persons reported as of January 2005; UNAIDS estimated that the HIV-prevalence was 0.6% in 2003. Although relatively few individuals are severely immunosuppressed as yet, the incidence of HIV-TB co-infection is rising. Routine HIV testing of TB patients detected >7500 co-infected patients from 1990 to 2003; >55% of HIV patients with new TB diagnoses were detected in 2002–2003. In regions affected early in the epidemic, >30% of individuals with advanced HIV disease have developed TB. High rates of drug resistance will complicate TB preventive treatment. To prevent a worsening of TB epidemics in Russia and other former Soviet countries, efforts to limit HIV transmission and implementation of WHO-recommended TB-HIV measures, including improved coordination, intensified TB case finding, treatment of latent TB

infection, and ARV treatment of immunosuppressed TB-HIV patients, are needed.

A growing challenge of TB/HIV in Eastern Europe

A Bobrik. Open Health Institute, Moscow, Russia.
Fax: (+7) 095 684-45-09. e-mail: abobrik@ohi.ru

There are significant variations in the rates of TB and HIV within the European region. The TB rates are declining and HIV incidence is relatively stable in Western and Central Europe. However, many Eastern European countries have a high TB morbidity and a dramatic increase in HIV cases. Long-standing underfunding has prevented these countries from sustaining even the existing health programs, not to mention meeting new needs. The majority of HIV-TB cases are concentrated among difficult to reach population groups, where traditional approaches have limited effectiveness. On the other hand, interventions of proven effectiveness sometimes seem too controversial for the countries to adopt.

The failure of health systems to control the situation is evidenced by the growing proportion of cases of multidrug-resistant tuberculosis, by the generally low coverage of antiretroviral treatment, and by the growing number of TB-HIV co-infections. The expected advent of AIDS can compromise TB control programs and lead to deterioration of the already difficult TB situation. TB-HIV morbidity and mortality can also accelerate significantly in the future.

There are several reasons for cautious optimism, however. Some Eastern European countries have reported a decrease in the HIV registration and stabilization of TB notification rates in the last 2–3 years. Many countries in the region now have access to substantial financial resources to fight AIDS and TB, mainly from external sources, such as the GFATM. The countries' health systems are gaining experience of pilot HIV and TB control projects.

The current key priorities for the most affected Eastern European countries include developing effective collaboration between programs to control TB and HIV as well as adopting effective strategies for reaching vulnerable population groups.

Policy, practice, and the role of stigma in prevention and management of HIV-TB co-infection in Ukraine

A Bishop. PATH, Seattle, Washington, USA.
Fax: (+1) 206-285-6619. e-mail: abishop@path.org

While over 70 000 HIV-positive individuals have been officially registered in Ukraine, estimates of actual numbers range from a low of 200 000 to a high of nearly 600 000, or nearly 1.5% of the adult population. The majority of those infected are under age 29. While men historically account for the majority of HIV cases in Ukraine, women now account for about

40% of known infections, with approximately 60% of all known infections occurring among injection drug users (IDUs). At the same time, Ukraine continues to experience a resurgence of tuberculosis, attributable primarily to socio-economic hardship, continued deterioration of the health service infrastructure, and political resistance to adoption of modern TB control strategies. The increasing incidence of HIV infection suggests that HIV-TB co-infection will account for an increasing proportion of TB cases. Perhaps the greatest threat to effectively addressing the growing HIV epidemic, and its widening intersection with TB, is stigma and discrimination against those perceived to be affected by either or both diseases. Those who are also active or former IDUs experience the greatest discrimination. Although laws and policies are in place to protect the rights of people with HIV and AIDS, as well as patients' rights generally, the experiences of those with HIV and/or TB suggest that in practice, stigmatizing attitudes and discriminatory behavior prevail—and are felt most acutely in interactions with medical professionals. PATH, an international NGO working on both TB and HIV in Ukraine, has conducted formative research with various populations experiencing or at risk of HIV and TB to determine how health services can more appropriately meet their needs. This presentation will juxtapose relevant laws and policies with real-life experiences of PLHA, TB patients, and IDUs in their efforts to seek medical care. Interview data from medical professionals will also be presented.

Tuberculosis and HIV in Yunnan Province, China

R Lijuan. Centers for disease control and prevention in Yunnan Province, Kunming, Yunnan Province, People's Republic of China. Fax: (+86) 871-3613063.
e-mail: yncdclijuan@hotmail.com

Three epidemiological surveys on TB were conducted in 1979, 1990 and 2000 in Yunnan. The surveys have shown that the morbidity rates of TB in Yunnan were 380.0, 538.2, and 496.8/100 000 respectively; and the morbidity rates of smear-positives were 64.0, 77.7, and 171.3/100 000 respectively. According to the results of epidemiological survey in 2000, it was estimated that there are about 200 000 active pulmonary TB cases in Yunnan province at present, including approximately 80 000 infectious pulmonary TB cases.

The TB epidemic in Yunnan tends to aggravate annually, the epidemic in rural area is more serious than that in urban area, and the epidemic in developing area is more serious than that in the developed areas; more males than females are infected with TB, most are young, and more peasants are infected with TB in terms of occupation.

In 1987, the first case of HIV was found among foreign tourists. In 1989, 146 HIV-infected cases were found among IDUs in the cross-border area, which was considered as the first series of HIV infection in

China. By the end of December of 2004, the accumulated reported number of HIV infected was 28 391, covering 27% of reported cases in China at the same period. Yunnan is one of the two provinces that have >20 000 HIV-infected cases, and has serious epidemic in China. It is estimated by the experts that the survivals of HIV-infected is over 80 000 in Yunnan.

The epidemic characteristic of HIV in Yunnan is as follows: the epidemic of HIV/AIDS in Yunnan started in IDUs, and was transmitted through the bridge population (sex workers) to common people. The transmission routes increased from single routes (transmission through IDU) to 3 routes. After the period of transmission, spread and rapid increase, the HIV/AIDS epidemic is spreading in multiple ways at multiple levels.

HIV and tuberculosis in India: epidemiology, programmatic, and clinical issues

S Swaminathan. Tuberculosis Research Centre, Indian Council of Medical Research, Mayor VR Ramanathan Road, Chetpet, Chennai, India. Fax: (+44) 28362528. e-mail: doctorsoumya@yahoo.com

India has an estimated 5.1 million individuals living with HIV infection. The epidemic has become generalized in six states of the country, with antenatal prevalence >1%. Other states are highly vulnerable because of factors like poverty, ignorance and migration. The National AIDS Control program has focused mainly on prevention through public education and information campaigns. Since April 2004, anti-retroviral treatment (ART) has been made available free of cost through government clinics, but the demand is far in excess of the capacity to deliver these services.

India is one of the tuberculosis high-burden countries and accounts for one-third of the world's burden of TB. Over 60% of the adult population is latently infected with TB and there are an estimated 1.8 million new cases every year. By the end of 2004, the Revised National TB Control Program had covered a population of over 900 million, making free high-quality TB diagnostic services and treatment with DOTS available to TB patients. It has been estimated that the incidence of TB among HIV-infected persons living in India is 7/100 patient-years and that TB is the commonest presenting illness in these individuals. TB also accounts for about 50% of AIDS deaths.

There are several clinical issues when TB occurs in an HIV-infected individual. At early stages of the infection when CD4 counts have not dropped, clinical presentation is fairly typical and response to therapy is also good. Sputum smears are more likely to be positive and radiographic features more typical. As HIV disease advances, the presentation of TB tends to become more atypical with more disseminated and extra-pulmonary forms and chest radiographs that can vary from normal to miliary TB. Sputum smears are less likely to be positive, although sputum culture is a sensitive diagnostic tool. The difficulty of diag-

nosing TB with certainty has the potential to increase both under- and over-diagnosis in health care settings in resource-poor countries. Clinical diagnostic algorithms have either high sensitivity or specificity, but not both. Though response to standard short-course anti-TB regimens has been found to be good in clinical trials, mortality during treatment as well as during follow-up is unacceptably high. Our own observations have also shown a high recurrence rate. The median CD4 count of patients with HIV-TB has been found to be 180 cells/mm³ and the median survival 18 months. Thus, patients with HIV and TB should be considered a target group for institution of ART and strategies developed to treat both infections simultaneously.

The challenge for the HIV and TB control programs in India is to develop effective coordination between the two so that TB patients have access to voluntary counseling and testing while those diagnosed with HIV get the benefit of screening for TB and treatment if necessary. With improving access to ART, it will also be necessary to develop strategies to integrate DOTS delivery with ART and to ensure that patients adhere to both drug regimens.

NEW VACCINES AGAINST TUBERCULOSIS

Current progress of the NIH vaccine screening programme

A Izzo. Colorado State University, Fort Collins, Colorado, USA. Fax: (+1) 970-491-1815. e-mail: Angelo.Izzo@colostate.edu

In response to the re-emergence of *Mycobacterium tuberculosis*, the National Institutes of Health identified the urgent need to develop a vaccine to combat this public health threat. An integral part of this development included identifying mechanisms of host defense and improving animal models to identify promising candidates that could move on to clinical trials. The program established at CSU through the NIH has been dedicated to achieving this goal. Significant progress has been made in identifying candidates that could possibly move to clinical trials.

Testing of novel vaccine candidates has involved two basic animal models. The first is the mouse model in which C57BL/6 mice are vaccinated with the candidate formulation, rested and then challenged with a low dose aerosol (100 CFU) of virulent *M. tuberculosis*. At day 30 post challenge, the number of viable organisms in the lung and spleen is assessed. In this model BCG provides up to about 1.0Log₁₀ protection and thus promising candidates should achieve similar levels of protection. The guinea pig model provides a greater window in which to examine a vaccine and is based on the ability to protect animals from succumbing to disease following a low dose aerosol (30 CFU) of virulent *M. tuberculosis*. Unvaccinated guinea-pigs survive for approximately 25 weeks post challenge

while BCG vaccinated animals survive for 52 weeks. A vaccine candidate should be able to do better than BCG in prolonging survival for >52 weeks. This model has been successful in identifying candidates that have moved onto clinical trials.

Vaccine candidates submitted to the contract have been divided into 5 categories, which included sub-unit, DNA, attenuated *M. tuberculosis*, BCG (recombinant and sub-strains), and adjuvant formulations. Submissions have been received from eleven different countries and investigators from fields as varied as plant molecular biologists.

Boosting BCG with MVA85A: update on clinical trials

H McShane. Centre for Clinical Vaccinology and Tropical Medicine, Churchill Hospital, University of Oxford, Oxford, UK. Fax: (+44) 1865 857471. e-mail: helen.mcshane@ndm.ox.ac.uk

Heterologous prime-boost immunisation strategies induce higher levels of cellular immunity than homologous boosting with the same vector. BCG is administered at birth throughout the developing world and confers some protection against disseminated disease. Recombinant pox-viruses, particularly modified vaccinia Ankara (MVA) are powerful boosting agents, which boost both CD4+ and CD8+ T cells. Antigen 85A is a leading candidate antigen for inclusion in a new TB vaccine. Boosting BCG with a recombinant MVA expressing antigen 85A (MVA85A) induces greater protection against aerosol challenge than either vaccine alone in mice and guinea pigs and we have some early data on this strategy in non-human primates. MVA85A was the first new TB vaccine to enter clinical trials and is currently in clinical trials in the UK and Africa. When used alone in BCG naïve subjects, it boosts pre-existing immunity induced by environmental mycobacteria and induces high levels of antigen specific T cells. When administered to subjects previously vaccinated with BCG, significantly higher levels of antigen specific T cells are seen, and these are maintained for at least 6 months after vaccination (McShane et al, Nature Medicine 2004). Data from clinical trials with MVA85A in The Gambia are equally encouraging. We review these clinical trials, and present data from the current study investigating the safety and immunogenicity of MVA85A in subjects latently infected with *M. tuberculosis*.

Development of a defined vaccine for tuberculosis

S G Reed, I Orme, Y Lobet, W Dalemans, R Coler, P Mettens, M Alderson. Infectious Disease Research Institute, Seattle, Washington, USA; Colorado State University, GlaxoSmithKline Biologicals, and Corixa Corp, USA. Fax: (+1) 206-381-3678. e-mail: SReed@idri.org

Developing and implementing a safe, effective, defined and well-characterized vaccine against tuberculosis will be necessary for dramatically reducing or

eliminating the disease. During the past decade, we have learned a significant amount regarding the nature of relevant antigens of *Mycobacterium tuberculosis* and effective ways to deliver such antigens to induce protection in animal models, including mice, guinea pigs, rabbits and cynomolgus monkeys. Each of these models has contributed substantially to the development of candidate vaccines. Not only have protective antigens been identified and evaluated, but several adjuvants suitable for human use been combined with these antigens to achieve protection in TB models. Among these are AS01B and AS02A. Comparative immunogenicity studies revealed significant differences between the adjuvants in mice and in cynomolgus monkeys. Two priority antigens have been combined into a fusion protein, Mtb72f, which has shown significant protection in animal models. Mtb72f formulated in AS02A has now entered clinical development, and is currently being tested in Phase I clinical trials. As back-up vaccine candidates, we have prepared three other fusion proteins currently under evaluation in animal models. Other antigens have been de-prioritized for vaccine development based on their lack of efficacy in animal models and/or weak recognition by human T cells. Thus, the steps taken to advance candidate antigens and adjuvants through pre-clinical development and into clinical testing will be discussed.

ADVOCACY FOR STOP TB AT COUNTRY LEVEL

Planning a coalition countrywide for Stop TB Uganda

H J Kawuma. German Leprosy and TB Relief Association, Kampala, Uganda. Fax: (+256) 41 268244. e-mail: kawuma@infocom.co.ug

Preamble: Uganda is ranked 16th among the world's TB high-burden countries. The TB epidemic is fuelled by the concurrent TB-HIV epidemic in the country. Uganda was one of the first group of 8 countries to benefit from the WHO-driven ISAC initiative. Building of a national StopTB partnership to pool and galvanize financial and human resources to bridge the gap and increase geographical coverage of interventions countrywide was one of the strategies adopted to achieve the goals of the ISAC initiative.

Setting up the national partnership: The plan with inputs from the WHO Stop TB Department had seven basic steps, running from identifying potential partners, agreeing to the terms of reference (TOR) to the final launch. The Uganda partnership was launched in December 2004 after significant delays.

Lessons learnt:

- Positive contributors:
 - Involvement of top Ministry of Health (MOH) officials from the beginning

- Involvement of the Global Stop TB Partnership and WHO Stop TB Department
- Starting with a core of active, motivated potential partners
- Assurance of 'start off capital' by the Global Stop TB Partnership
- Allowing ample time to discuss the TOR and to listen to all the partners
- Maintaining contact and dialogue with potential partners
- What is likely to cause delays:
 - Ensuring commitment by the MOH
 - Poor integration of NTLP into the top management structure of the MOH
 - Clearing fears of loss of identity
 - Invitation bureaucracy
 - Mobilizing financial resources
 - Recruitment of non-traditional partners
- The launching ceremony contributed to giving the partnership a national perspective
- The credibility of the national partnership is enhanced by selection of participants in the launching ceremony.
- **Conclusion:** Establishing a national coalition is in itself a collaborative process.

Mobilising for TB in Italy, a low-incidence country

D Cirillo. Emerging Pathogens Unit- HSR, Milan, Italy.
Fax: (+39) 02 2643 7989. e-mail: cirillo.daniela@hsr.it

Stop TB Italy is a young non profit national organization that officially started its activity on 24 March 2004, with the specific task of increasing the awareness of tuberculosis at the country level and to promote allocation of public and private resources for TB control in Italy and in low-income, high-burden countries. From the very beginning, all efforts were devoted to mobilization of society with the final purpose of keeping pressure on the government to obtain the needed resources. To reach this purpose we contacted the local press and organized press conferences for all scheduled events. At local level, we organized several fund raising events alone or in collaboration with the local Red Cross, such as Christmas raffles, sponsored sales in hospitals or other settings and social events with the double purpose of increasing the awareness in the general Italian population about a disease that is too often perceived as a problem of the past and collecting money for administrative support and for activities directly sponsored by the organization. We are planning a mass educational campaign sponsored by a major advertising company. One of the problems faced was the risk of increasing discrimination against immigrants from tuberculosis endemic areas. For this reason we were extremely careful to pass a positive message instead of a negative one and avoiding involvement of any political parties.

Training is one of the major activities, and several training courses were sponsored on TB management at national and international level. We are now planning the development of an international module for laboratory training. Immediate future commitment is the organization of the Stop TB Partnership Board Meeting in Assisi, in November 2005.

Impediments to advocacy for TB control in Russia

D Pashkevich. Office of the Special Representative of WHO Director General in Russia, TB Control Programme in the Russian Federation, Moscow, Russian Federation. Fax: (+7) 095 787 2149. e-mail: d.pashkevich@who.org.ru

The complex nature of TB calls for a multisectoral approach across political, professional, economic and social sectors. The relatively low position of TB advocacy on the priorities agenda hinders scaling up advocacy. Among major impediments to advocacy for TB in Russia are low awareness and relatively poor knowledge of TB basics among the general population, patients, stakeholders and policy makers. Lessons learnt from the successful competition for journalists carried out by the National Union of Journalists and the WHO TB Control Programme in 2004 showed that most of the 94 entries submitted from 45 country regions lacked accurate reporting on TB-related issues. Whereas such effective mechanisms as the High Level Working Group (HLWG) on TB in Russia and the TB Interagency Coordination Committee (TB-ICC) made staggering progress in gradually changing national TB policy, strengthening commitment and mobilizing resources, the response is inadequate to address the scope of the problem. Although the government shows high commitment to TB control, advocacy lacks the driving force to sustain the scaling up of effective TB control. This might be overcome by establishing a dedicated institution driven by the need to place advocacy high on the national agenda. Misconception of advocacy among stakeholders and professionals and low awareness about modern practices of managing TB from the public health perspective hinders effective response to TB. Coordination of efforts will strengthen advocacy capacities in the country. There is a need to build up a structure at the national level that will allow a broad coalition of stakeholders to be established to foster political will and mobilize resources on a sustainable basis. Supported by HLWG and approved by the TB-ICC, the establishment of the National Stop TB Partnership can give impetus to a supportive environment for sustainable growth of advocacy countrywide.

SYMPOSIA: FRIDAY 21 OCTOBER 2005

SCALING UP TB CONTROL TO MEET THE NEEDS OF THE POOR

Assessing the potential of routine data to promote pro-poor scaling up of TB control: insights from Malawi

G Bello,¹ B N Simwaka,² S Theobald,^{2,3} F Salaniponi,^{2,4} S B Squire.³ ¹Community Health Science Unit/National TB Control Programme, ²Research for Equity and Community Health Trust, EQUI-TB Knowledge Programme, Lilongwe, Malawi; ³Liverpool School of Tropical Medicine, Liverpool, UK; ⁴Malawi National TB Control Programme, Lilongwe, Malawi. Fax: (+265) 1751247. e-mail: gafbello@yahoo.co.uk/bertha@equi-tb-malawi.org

Objectives:

- 1 To explore the suitability of routine TB control data and available data on poverty for developing indicators for pro-poor scale-up of TB control.
- 2 To assess the correlation of poverty with TB notification rates and adverse treatment outcomes, hypothesising that the expected positive correlation is masked by access constraints.

Methods: Examination of suitability of national TB notification and treatment outcome data. Identification of national datasets giving information on district-level poverty, HIV prevalence, and health service coverage. Correlation and regression analysis of the association between TB notification and treatment outcomes with poverty, adjusting for key co-variables including gender.

Results:

- 1 TB notifications (1998–2004) and treatment outcomes (2001–2003) were available in Excel spreadsheets.
- 2 The Malawi Profile of Poverty (2000), Atlas of Social Statistics (2003) and the National Census (1998) enabled estimates of district-level proportions of people living below the poverty line. Estimates of HIV prevalence and health facility coverage were obtained from HIV Surveillance (1998–03) and the Ministry of Health (2003).
- 3 There are challenges in working with these disparate datasets, but initial analysis suggests no association between TB notification rates and poverty when adjusting for covariates (overall $r = 0.007$, $P = 0.97$; men $r = -0.1$ $P = 0.635$; female $r = 0.33$ $P = 0.87$). There is a positive correlation between some indicators of adverse treatment outcome and poverty levels ($r = 0.427$, $P = 0.033$). However, controlling for HIV prevalence reduces the significance of this relationship ($F = 2.65$, $P = 0.093$).

Conclusion: The lack of correlation of poverty with TB notification rates and adverse treatment outcomes may support the original hypothesis but the analysis needs further scrutiny. Locally available datasets can be used to develop crude indicators for monitoring the scale up of pro-poor TB control in Malawi.

Can we make TB control more pro-poor by addressing the sticky business of stigma?

J Macq, A Solis. Université Libre de Bruxelles, Brussels, Belgium. Fax: (+32) 2-555.40.49. e-mail: jmacq@ulb.ac.be

Since 2003, a project financed by Damian Foundation has been implemented in Nicaragua. Its objective is to assess how to reduce TB stigma by testing context sensitive interventions at health services level. This project is implemented in five 'municipios' characterized by geographical accessibility problems, low income and cultural diversity.

An analytical exploration of the stigma was done prior interventions and initial training has been organised in the five municipios. Since early 2004, a mixture of home visits, people affected by TB (PATB) clubs, cases discussion centred on the PATB's problems, first consultation of the PATB, and revision of the care pathway for PATB have been implemented.

Monitoring and evaluation is done in two ways: (1) qualitative evaluation to evaluate the process of implementation; (2) quantitative evaluation (quasi experimental design) to evaluate the changes in TB case holding/finding and the changes in internal or perceived stigma of people affected by TB.

To assess changes in internal stigma, an instrument designed in the frame of this project has been applied for all new patients since March 2004 and will continue at least till December 2005. It is therefore assessing the PATB's perception during the whole implementation of the interventions (which started in May 2004). Moreover, the instrument is applied to the same PATB at various stages of her treatment (At the start, after 15 days, 2 months, 4 months and at the end of the treatment). The 26 statement instruments were applied for internal validity to 114 TB patients after 15 days of treatment. We reduced it to 10 statements to build-up a scale with relatively good internal consistency (Cronbach alpha = 0.7).

During this symposium, initial result will be presented, with stratification by gender, income and municipios. Discussion will include at the usefulness to empower people affected by tuberculosis of low income contexts.

TB-HIV: comments and discussion

See p 314

ADVANCES IN THE DEVELOPMENT OF NEW DIAGNOSTIC TESTS FOR TUBERCULOSIS

Diagnosing AFB-negative in HIV-infected TB patients: new approaches needed

H Getahun. World Health Organization, Geneva, Switzerland. Fax: (+41) 22 791 4268. e-mail: getahunh@who.int

The difficulty of diagnosis of TB in people living with HIV/AIDS (PLWHA) presents a massive challenge for the control of the TB and HIV epidemics. Simple, rapid and effective diagnostic tools to address this problem are crucial. Extensive and aggressive research through multisectoral and multi-institution collaboration and huge investment is necessary. In the meantime, the diagnosis of TB among PLWH should be improved through novel approaches guided by moral and ethical imperatives framed on basic human right values. The current diagnostic algorithms should be urgently revisited to shorten the time required for establishing a diagnosis of smear negative pulmonary TB, and need to include children. The revision should consider HIV status, disease severity (TB or AIDS), poor outcome predictors, good timing for CXR and antibiotic trial, and peer review by clinicians along the decision tree. Effective algorithms to assist the diagnosis of extra-pulmonary TB in both adults and children should be developed and implemented in high HIV and resource constrained settings. Improving sputum microscopy through sputum concentration methods need to be encouraged, with standardization of the techniques and ensuring their feasibility and efficiency under routine programme conditions. Decentralized use of fluorescence microscopy and culture services needs to be explored and encouraged depending on the availability of local experience and expertise. Strong advocacy and activism to influence research and development to yield feasible alternative technology, such as solar powered fluorescence microscope or culture technologies applicable for resource constrained settings with no electricity, need to be promoted.

Serologic tests for TB: is there hope?

M L Gennaro. Public Health Research Institute, Newark, New Jersey, USA. Fax: (+1) 973-854-3101. e-mail: gennaro@phri.org

The immunological diagnosis of *M. tuberculosis* infection and disease is very challenging. Not only is it necessary to distinguish between tuberculosis and other lung diseases, but there is also a need to distinguish active tuberculosis from other tuberculosis states, namely, inactive (past) tuberculosis and latent infection. Each tuberculosis state is associated with antigen-specific immune responses, but they require different management. We find that in humans the antibody profile associated with active disease differs

from that associated with latent infection. Work in animal models indicates that tubercle bacilli preferentially express different antigen sets at different times post infection. Together, these data suggest that antibody profiles may vary during human infection, presumably in relation to changes of bacterial antigen composition occurring in response to host immune status. Thus, it should be possible to identify 1) antibody profiles characteristic of tuberculosis state, and 2) serological markers of infection outcome. Longitudinal serological data on infected monkeys that exhibit different infection outcomes support the latter possibility. Antibody profiles characteristic of tuberculosis state and of infection outcome can be identified by immunoprofiling. This is best achieved by use of high-throughput methods that allow serological screening of the entire *M. tuberculosis* proteome. A combination of proteomic approaches with cross-sectional and longitudinal field studies should be our best hope for developing accurate serodiagnostic methods for tuberculosis.

CONTACT INVESTIGATION PROCEDURES AND OUTCOMES IN INTERMEDIATE AND HIGH INCIDENCE COUNTRIES

Role and involvement of private practitioners in TB control in Kabul city, Afghanistan

Kh Z Zafari,¹ N R Rahimi,² S K Khaleed,³ A H Haidary,³ S Huseynova.⁴ ¹Department of Chest Diseases, Kabul Medical University; ²Chest Clinic at Ibn-Sina Hospital, Kabul; ³NTI Afghanistan; ⁴WHO Afghanistan, Kabul, Afghanistan. e-mail: huseynovas@afg.emro.who.int

Introduction: In Afghanistan, a high proportion of patients affected by tuberculosis seek treatment from private doctors.

Aim: To identify possible interventions to ensure that TB patients seeking care from private doctors are adequately managed according to DOTS.

Objective:

- To assess private doctors' knowledge on TB case detection and management
- To identify the reasons that brings TB patients to seek care in the private sector rather than in PHC facilities.

Methods: A cross-sectional study was conducted among 193 private doctors and 600 patients in 16 districts of Kabul city in February 2004. During one year, private practitioners of these 16 districts were trained in DOTS policy and implementation; a 2-day workshop was held.

Results: 90% of private doctors are unaware of the DOTS strategy and they have superficial knowledge on TB case management. Shortage of public health facilities providing DOTS services is the main factor

that brings TB patients to private sector. Referral of TB cases to public DOTS centers increased by 18% by providing a 3-day workshop for private doctors.

Conclusions: The NTP should expand DOTS and develop a strategy to increase awareness of private practitioners on DOTS policy and implementation based on NTP guidelines.

Detection rates for adult and paediatric tuberculosis during household contact investigations with multi-drug resistant (MDR-TB) TB exposure in Latvia

V Leimane. State Agency of Tuberculosis and Lung Diseases, Riga reg., Latvia. Fax: (+371) 7901014.
e-mail: Vaira.Leimane@tuberculosis.lv

Latvia has one of the highest rates of MDR-TB in Europe. Routine contact tracing is used to detect secondary cases and to interrupt TB transmission. Tuberculin skin testing and chest radiographs are used in child contacts, and chest radiographs plus sputum smears and culture examination are used in adults with MDR-TB exposure.

We analyzed contact tracing results of 119 consecutive culture positive MDR-TB patients diagnosed in Riga city from January 2003 to December 2004. Out of 119 MDR-TB cases: 90 (75.6%) were smear and culture positive 29 (24%) were culture positive only; 73 (62%); age ranged from 17 to 76 years old; 37 (31%) of patients have had known contact with MDR-TB before.

We identified 297 (1:2.9) contacts from 102 index cases and (137 adults; 37 index cases had 60 children household contacts). All were tested for TB, among the 137 adult household contacts, 7 (5%) secondary MDR-TB cases were identified during first contact investigation. Among 60 child household contacts, 4 (6.6%) children were diagnosed with TB, and 25 (41.6%) children were found to be infected with TB. Drug resistance patterns of MDR-TB index cases showed 12% were resistance to 2–3 drugs, 43% to 4–5 drugs; 32% to 6–7 drugs; 17% to more than 7 drugs.

Conclusion: Our results suggest that contact tracing and screening identified new cases along family lines. Drug resistance patterns of index cases shows that there is no possible adequate prophylactic treatment regimen for persons with LTBI. New secondary cases detection and treatment among population at risk using screening algorithms could interrupt transmission of MDR-TB earlier.

Contact investigation policies and practices in Indonesia: experiences from the field

D Manissero. World Health Organization, Country Office, Indonesia, Jakarta, Indonesia. Fax: (+62) 520 11 64.
e-mail: manisserod@who.or.id

Indonesia has a policy for contact investigation to identify children in close contact with newly diag-

nosed smear positive adult cases. National guidelines recommend prophylaxis with INH in healthy children under 5 years of age identified through contact investigation. The recommendation aims at preventing rapid progression toward severe forms of TB (i.e., TB meningitis, miliary TB) in young children.

So far this policy has been rarely implemented and has not been a priority within the strategic framework of the NTP (National Tuberculosis Programme). As Indonesia is entering a phase of 'quality DOTS', local initiatives—at district and health centre level—are starting in line with the national policy.

Data from a sub-urban/rural district in Indonesia that is implementing the contact investigation/prophylaxis policy is presented. Operational steps and outcomes are described. Feasibility of expanding contact investigation practices at national level is discussed.

BRINGING POLICY ADVOCACY FROM HIV TO TB

Strategy to support HIV community involvement in TB advocacy

E Jimenez,¹ J Syed.² ¹Open Society Institute, New York, ²Treatment Action Group, New York, New York, USA.
Fax: (+1) 646-557-2553, (+1) 212-253-7923.
e-mail: ejimenez@sorosny.org, javidattag@gmail.com

In 2004, the WHO *Interim Policy for Collaborative TB/HIV Activities* outlined recommendations for joint TB-HIV activities and called on countries to implement and establish mechanisms to decrease the burden of TB among people with HIV/AIDS and to reduce the burden of HIV among TB patients. Community-based advocacy, education and mobilization were identified as key elements in expanding TB services to communities affected by HIV/AIDS and in establishing effective linkages between HIV and TB programs. This policy package recognized that HIV is a major cause of the increase in TB incidence, at a rate of 1% globally, and nearly 5% in areas of high rates of HIV. The combined impact of these interconnected epidemics is addressed by an increased effort to better coordinate TB-HIV activities on all levels. In response to the need for community oriented advocacy and social mobilization, the Open Society Institute (OSI), in partnership with the Treatment Action Group (TAG), has launched the TB-HIV Advocacy Grant Competition to support and promote community involvement in efforts to improve TB-HIV program integration at the local, national and regional policy levels. The grant competition is intended to support policy advocacy activities by groups led or with major participation at all levels by people living with HIV/AIDS (PLWHA). PLWHA groups have been some of the most effective leaders of HIV/AIDS treatment advocacy

campaigns in areas affected by the dual epidemics, and thus have a key role to play in pressing for improved access to quality TB care and for the integration of TB and HIV policies and programming. This symposium is intended to highlight the results achieved by five of our thirty one grantees during the past 9 months. The panel will feature community organizations that are engaged in unique advocacy efforts to promote the implementation of joint TB-HIV programs.

Community-based advocacy for increased policy engagement in support of joint TB-HIV programs in Nepal

A Siddhi,¹ R Kafle,² ¹Oxygen Research and Development Forum (ORDF), Lalitpur; ² Nava Kiran Plus (NKP), Kathmandu, Nepal. Fax: (+646) 557-2553. e-mail: ordf@wlink.com.np; Siddhi@ordf.org; nkplus@wlink.com.np

Current country context of TB-HIV: The trend of HIV infection is rising in South Asia and an estimated 62 000 people living with HIV in Nepal are at high risk of TB-HIV co-infection.

Aim of TB-HIV advocacy project: To raise mass community awareness of TB-HIV issues and advocate for an integrated response to TB and HIV. In a joint collaborative effort, ORDF and NKP aim to achieve this goal by:

- Organizing a national TB-HIV consultation with stakeholders from TB and HIV programs; government officials; (I)NGOs; CBOs and media journalists
- Forming partnerships with PLWHA organizations
- Training 100 community people in TB-HIV advocacy and collaborating with 250 peer educators from various organizations in local level advocacy activities
- Developing a TB-HIV training manual

Results and lessons learned:

- The national consultation highlighted the commitment of all stakeholders in integrating TB and HIV issues
- HIV activists have embraced the TB-HIV integration agenda because they see joint TB-HIV efforts as a step towards increasing availability of and access to affordable medication
- An effective mechanism for integrating and coordinating TB and HIV programs and services is necessary at the district and national level

Next Steps: Advocate to policymakers and civil society the need to support TB-HIV integration not just in theory but in practice. For this, sustained financial and technical support is necessary.

Recommendations:

- Engage and involve government officials at all levels of TB-HIV integration activities. Joint TB-HIV programs can transpire if synergy is developed at the community level and reinforced by policymakers at the central level
- Conduct research studies to substantiate the merits of TB-HIV integration and draw upon findings for more effective and targeted advocacy strategies

- Devote more attention and resources to address the challenges PLWHA confront around stigma and discrimination

Advocating for the informed involvement of PLWHA in efforts to integrate TB-HIV services in Mexico

F Rosas. Fundación Mexicana Para la Lucha Contra el SIDA, México, D.F., Mexico. Fax: (+52-55) 55-15-79-13. e-mail: frosas22@prodigy.net.mx; frosas_22@hotmail.com

Current TB-HIV statement: Mexico has nearly 35 000 TB cases and 160 000 people living with HIV. There is a lack of innovative educational approaches toward empowering PLWHA to demand improved counseling, care and treatment for TB-HIV.

Aim of TB-HIV advocacy project: To educate PLWHA about TB-HIV through a peer education strategy, empowering them to advocate for better lung health services in local communities within a human rights framework.

To achieve this aim:

- In-depth interviews were conducted with PLWHA to explore their knowledge, attitudes, and willingness to participate in TB-HIV education and advocacy activities
- TB-HIV peer advocates were trained through skills-building workshops
- A public event was held to advocate for scaled-up intervention in populations with high levels of TB-HIV co-infection

Results and lessons learned:

- Translation of TB-HIV policy into specific advocacy activities for better lung health services
- Increased awareness among stakeholders about the benefits of joint TB-HIV services
- Alliances with key people from governmental and non-governmental sectors contributed to the project's success
- Positive leadership has contributed to the development of more effective TB-HIV policy and programming

Next steps: To determine ways to collaborate with TB-HIV public health officers; to encourage more technical support for social mobilization among PLWHA, as a way of overcoming tokenism; and most importantly to continue efforts to reduce stigma and discrimination and exclusion against vulnerable populations and people affected with TB-HIV.

Recommendations:

- Operational Research on DOTS and DART can help justify and support TB-HIV collaborative activities.
- Innovative strategies to reduce persistent self-stigmatization are required to create the supportive environment necessary for affected persons to play a role in health education and advocacy
- Increased emphasis should be placed on ensuring participation of PLWHA in TB-HIV policymaking, including planning, implementation and evaluation

Advocacy to reduce the burden of TB-HIV in Uganda, with particular reference to the PLWHA community

J Mwirumubi. National Forum of PLWHA Networks in Uganda (NAFOPHANU), Kampala, Uganda. Fax: (+256) 41 343 301. e-mail: jane_mwirumubi@yahoo.co.uk; nafophanu@infocom.co.ug

Current country context of TB-HIV: To date, Uganda has registered a reduction of 6.2% in HIV prevalence amongst anti-natal clinic attendees, from approximately 30% in 1992. Currently, about 1–1.5 million people are living with HIV/AIDS. 50%–75% of TB patients are HIV co-infected.

Aim of TB-HIV advocacy project: To reduce the burden of TB-HIV in dually infected populations. The National Forum of PLWHA Networks in Uganda (NAFOPHANU) aims to achieve this goal through:

- Advocacy for increased integration of governmental TB-HIV policies
- Advocacy to ensure that sufficient resources are allocated to TB-HIV programmes
- Formation of partnerships and collaboration with stakeholders at all levels

Strategies: To achieve these goals, PLWHA constituencies have undertaken advocacy through:

- Social mobilization, education and sensitization of the PLWHA community and other stakeholders
- Mass media campaigns on FM radio, TV and Newspapers
- Community mobilization at the grassroots level through drama, film, & health education programs
- Dialogue with key policy makers

Results and lessons learned:

- NAFOPHANU has officially inaugurated a TB-HIV National Coordination Committee (NCC)
- NAFOPHANU has produced a draft 'National Strategic framework/implementation plan on TB-HIV collaboration,' which is currently under review
- NAFOPHANU has developed a plan of action for the NCC to carry out
- NAFOPHANU has established a PLWHA TB-HIV Advocacy Committee

Recommendations: To be able to reach the WHO targets, national TB programs need to think beyond TB control activities previously designed and begin implementing additional HIV control interventions through TB-HIV collaboration. There is also a need for:

- Intensified advocacy for sustained political commitment to TB and HIV/AIDS control
- Training to achieve greater managerial and coordination capacity for the continued expansion and integration of TB-HIV services
- Finalization and implementation of a national strategic plan on TB-HIV collaboration

Strengthening intersectoral partnerships to improve local policy for TB-HIV programs and promote better access to TB services for PLWHA and other high-risk groups

Y Chorna. Salvation (Poryatunok), Kremenchuk, Ukraine. Fax: (+380) 536 79-67-14. e-mail: dolya@sat.poltava.ua

Current TB-HIV statement: The city of Kremenchuk has a population of 250 000. According to unofficial statistics, 1500 people have active TB. There are still no mechanisms to ensure effective TB case-finding among people living with and at risk of HIV/AIDS, and few official efforts to promote effective TB-HIV awareness for PLWHA.

Aim of TB-HIV advocacy project: To improve local policy related to TB-HIV co-infection and TB prevention among people living with or at risk of HIV/AIDS in the city of Kremenchuk, Ukraine. Salvation aims to achieve this goal by:

- Mobilizing local communities, policymakers and resources to address TB-HIV at the local level
- Educating community representatives and high-risk groups (drug users, sex workers), and empowering them to disseminate information through peer networks
- Promoting better access to TB services for PLWHA

Results and lessons learned:

- Signed a treaty with the local municipal TB ambulatory clinic, ensuring the clients of NGO Salvation can obtain free X-ray inspection; sputum analysis and TB treatment
- Held a roundtable meeting with key decision-makers to discuss the necessity of cooperation between authorities and civil society in the implementation of joint TB-HIV programs
- Organized a peer-education training session on TB-HIV co-infection for PLWHA and other high-risk groups
- Held a press conference for journalists on project activities

Next steps: Develop a community-based project to implement TB-HIV co-infection counseling for HIV-positive people at municipal HIV-testing centers. Increasing the availability of such counseling will have a significant impact on TB-HIV prevention and control at the local level.

Recommendations:

- Advocate for more effective linkages between TB and HIV programs
- Improve cooperation among all municipal social sectors in fighting the TB-HIV epidemic
- Promote expansion of integrated TB-HIV services from the local to the national level

Supporting better media coverage of TB-HIV issues in Ethiopia

D Tesfaldet. Panos Ethiopia, Addis Ababa, Ethiopia.
Fax: (+251) 251-1-666-361. e-mail: panahids@ethionet.et;
tesfald@yahoo.com

Current country context of TB-HIV and problem statement: TB is the leading cause of morbidity, third cause of hospital admission and first cause of hospital death in Ethiopia, posing a major public health challenge. The incidence of TB is 292 per 100 000. Active media engagement is necessary to change national public health priorities.

Aim of TB-HIV advocacy project: To encourage accurate reporting of TB-HIV in Ethiopia and enhance the role of the media in promoting informed public dialogue and debate, community mobilization, policy accountability and transparency in the fight against TB-HIV.

Panos aims to achieve the above-stated goals by:

- Organizing an editors' roundtable seminar for media professionals and journalists
- Creating an electronic network of journalists
- Highlighting the urgency of the need for collaborative TB-HIV actions at all levels to counter the dual epidemic

Results and lessons learned

- A series of well-researched articles highlighting the linkages between HIV and TB were published and disseminated to policymakers to underscore the urgency of collaborative action against TB-HIV
- A strong network of journalists with a high level of competence and expertise is now in a position to continue to report on issues related to TB-HIV
- Increased awareness of TB-HIV in society will make it easier to address the issues of stigma and discrimination

Next steps: Panos Ethiopia together with the Panos Global AIDS/TB program will take additional steps to support media coverage on issues around TB-HIV. Two print journalists and one photograph journalist have been awarded fellowships to write TB-HIV features and prepare a photograph essay of TB-HIV.

Recommendations:

- Continued training and technical support for journalists to enhance their role in controlling the TB-HIV epidemic
- Advocacy for increased government resources to be devoted to TB-HIV programs in Ethiopia
- Increased PLWHA involvement in TB-HIV media projects

MAKING SENSE OF THE EVIDENCE: THE ROLE OF CLINICAL TRIALS IN IMPROVING SUSTAINABLE PREVENTION AND CONTROL OF TUBERCULOSIS

Boosting BCG with MVA85A: update on clinical trials

H McShane. Centre for Clinical Vaccinology and Tropical Medicine, University of Oxford, Churchill Hospital, Oxford, UK.
Fax: (+44) 1865 857471. e-mail: helen.mcshane@ndm.ox.ac.uk

There is an urgent need for an improved vaccine against TB. BCG is administered at birth throughout the developing world, but fails to confer reliable protection against pulmonary disease in either children or adults in most of the developing world. However, as BCG does confer some protection against disseminated disease, ideally a new TB vaccine regimen will aim to improve BCG rather than replace it. Recombinant pox-viruses, particularly modified vaccinia Ankara (MVA), are powerful boosting agents that boost both CD4+ and CD8+ T cells. Antigen 85A is a leading candidate antigen for inclusion in a new TB vaccine. Boosting BCG with a recombinant MVA expressing antigen 85A (MVA85A) induces greater protection against aerosol challenge than either vaccine alone in several animal models. MVA85A was the first new TB vaccine to enter clinical trials, and it is currently in clinical trials in the UK and Africa. When used alone in BCG-naïve subjects, it boosts pre-existing immunity induced by environmental mycobacteria and induces high levels of antigen specific T cells. When administered to subjects previously vaccinated with BCG, significantly higher levels of antigen specific T cells are seen, and these are maintained for at least 6 months after vaccination (McShane et al, Nature Medicine 2004). We review these clinical trials, and present data from the current study investigating the safety and immunogenicity of MVA85A in subjects latently infected with *M. tuberculosis*. Phase II studies with MVA85A now underway in Cape Town and the design of Phase III efficacy trials of any new TB vaccine will also be discussed.

Development of TMC207 (R207910), a new TB drug candidate

K Andries,¹ D McNeeley,² ¹Tibotec, Beersse, Belgium;
²Yardley, Pennsylvania, USA. e-mail: kandries@prdbe.jnj.com;
dmcneele@tibbus.jnj.com

R207910 (J) is a new diarylquinoline (DARQ) with potent in vitro activity against *M. tuberculosis* and other mycobacteria. The MIC distribution was studied for 32 MDR TB strains and 41 fully susceptible strains. The MIC distribution was similar, with a median MIC of 0.032 mg/L for both groups. The lack of cross resistance points to a novel mechanism of action. A new target, the ATP synthase, was discovered

by sequencing resistant mutants of *M. tuberculosis* and *M. smegmatis*.

The *in vivo* activity of J was studied the mouse model. J was administrated by gavage 5 days/week from day 14 to day 70, in monotherapy or in association with isoniazid (H), rifampin (R), pyrazinamide (Z), ethionamide (Et), amikacin (A), or moxifloxacin (M). 8 weeks of treatment with J at 25mg/kg decreased the CFU count from 6 to 0.4 log. The combinations of J with either H+R, H+Z or R+Z were more active than HRZ. Both HZJ and RZJ regimens led to negativation of spleen and lung cultures after 8 weeks of treatment, whereas cultures remained positive in the HRZ group.

Comparison of 2-months sterilising activities of several quinolone-containing regimens: a Phase II trial in South Africa

R Rustomjee. Unit for Clinical and Biomedical TB Research, South African Medical Research Council, Durban, South Africa. Fax: (+27) 322034702. e-mail: rustomjee@mrc.ac.za

Efforts have long been pursued to reduce the duration of treatment of TB with the aim of obtaining rapid sterilisation of lesions and avoid patients' failure to comply properly with long-term treatment schedules. Courses of treatment significantly shorter than 6 months would have major operational advantages, and would save greatly on expenditure associated with patient monitoring, and tracing of lost cases. This study aimed to evaluate a potential treatment-shortening regimen containing the fluoroquinolones: comparing the bactericidal and sterilising activities of 3 fluoroquinolone-containing regimens and a non-fluoroquinolone-containing control regimen, over the initial phase of 8 weeks of treatment. After exclusion of patients with strains initially resistant to rifampicin or isoniazid, a total of 216 patients (54 per arm) were randomly allocated to treatment with either (1) HRZE (standard control regimen) and substituting ethambutol moxifloxacin, ofloxacin and gatifloxacin in 3 experimental arms, respectively. Sterilising activity was measured in the factorial design primarily, by the serial sputum colony forming unit (cfu) counts (SSCC) during the 8 weeks. After the initial 8 weeks, all patients were treated with 4 months of RH according to standard South African practice. This presentation will include a detailed site description of clinical trial capabilities and site requirements of the Unit for Clinical and Biomedical TB research, South African Medical Research Council emphasizing methodology and design of phase II clinical trials investigating new TB drugs. A discussion of the issues related to the analysis of phase II SSCC studies as well as an outline of the conduct of the trial will be presented.

Improving adherence to TB treatment in Senegal: results from a cluster randomized trials

S Thiam. Institut de Recherche pour le Développement (IRD), Dakar, Senegal. Fax: (+221) 832 43 07. e-mail: syllath@ird.sn / thiamsylla@hotmail.com

Introduction: A new strategy aiming to improve tuberculosis treatment adherence has been developed and tested, with a multidisciplinary approach

Objective: To assess the effect of the new strategy on cure rate, defaulter rate and death rate

Method: Randomised cluster control trial including 2 groups of 8 health centres in Senegal. The intervention strategy included: improvement of the relationship between health workers and patients, enhanced training of health workers, decentralisation of treatment with community involvement, ensured proper DOT and close monitoring of activities. For comparison, this strategy was implemented in 8 randomly selected health centres, while the current unchanged national TB programme policies continued to be implemented in 8 other health centres in the country.

Results: One thousand five hundred and twenty two patients (1522) participated in the study; 778 in the intervention group and 744 in the control group. Cure rates were greater in the intervention group than in the control group (85.5% vs. 68.08%, $P < 0.0001$). Multivariate analysis including confounding factors (age, sex, socio-professional category, localisation) doesn't modify this difference with an adjusted OR equal to 2.2 (95%IC 1.7–2.8). Defaulter rates were higher in the control group than in the intervention group (17.5% vs. 4.7%, $P < 0.0001$), as well as the death rates (6.1% vs. 1.8%, $P < 0.02$).

Conclusion: This strategy aiming to improve adherence using a package of activities enhanced cure rates and decreased defaulter rates and death rates. This innovative method will be extended to other health centres in Senegal.

The role of randomized trials in the prevention and treatment of tuberculosis

R Hayes. London School of Hygiene and Tropical Medicine, London, UK. Fax: (+44) 20 7637 4314. e-mail: richard.hayes@lshtm.ac.uk

Rational decisions on the allocation of resources to preventive and curative interventions against tuberculosis should be based on rigorous evidence concerning the effectiveness and cost-effectiveness of alternative interventions. Randomized controlled trials are the accepted gold standard for providing such evidence, and have been widely used in the field of TB control. Conventional individually-randomized clinical trials are usually the method of choice for testing new treatment regimens, and have also been used in the evaluation of preventive interventions such as isoniazid prophylaxis for the prevention of TB in HIV-infected individuals. Equivalence trials can be

conducted if the objective is to show that a new intervention is not inferior to an existing regimen. The randomized recruitment design is an innovative variant of the conventional individually-randomized trial. This design, in which eligible patients are recruited to receive a new intervention in random order, has been used to estimate the effectiveness of routine delivery of interventions whose efficacy has already been established in earlier trials. The cluster-randomized trial design has been used to evaluate TB control interventions that are applied at the level of whole communities. This design may be used to capture the additional herd protection effects that accrue when large proportions of a population are covered by an intervention. The stepped-wedge design is analogous to the randomized recruitment design, and involves stepwise introduction of an intervention in different communities in random order. This talk will provide an overview of the different trial designs, their advantages and disadvantages, and the contexts in which they should be used. The designs will be illustrated by previous and current trials of TB control interventions in sub-Saharan Africa.

ELECTRONIC NOMINAL REGISTRATION (RECORDING REPORTING) SYSTEM

ENRS as a tool for data management

S Baghdadi. WHO/EMRO-STB unit, Cairo, Egypt.
Fax: (0020) 2765414. e-mail: Baghdadis@emro.who.int

Establishment of a standard (WHO, IUATLD) recording and reporting system which enables cohort analysis of treatment outcome is one of the key components of DOTS, and this system was successfully implemented in the Eastern Mediterranean Region during DOTS expansion. However, several deficiencies were identified during reporting, but not fully rectified, such as delay, inaccuracy, discrepancy of data, and poor data analysis at district level. Moreover programmes are working on enhancing quality and comprehensiveness of DOTS services, for which more indicators are needed. This implies further strengthening of TB surveillance.

The ENRS is the Electronic Nominal version of the main Registers in the TB recording reporting system based on Excel, where data entry is done at the diagnostic level (district/province) or at central level. Data are processed to produce the routine NTP reports, and to calculate indicators. The district register is the principle register in the package.

ENRS is a strong tool to strengthen data management, improve quality of NTP performance, and facilitate evidence-based planning and budgeting. The ENRS package includes E-Nominal District register, Laboratory register, Suspect register, E-Drugs con-

sumption report and E-Services activities report. It is used to Improve accuracy, completeness and timeliness of NTP reporting and indicators calculation at all levels, save time for analysis and feedback, facilitate supervision and increase its efficiency, facilitate locating the patients' residences and use of GIS, develop a database for operational results, and develop human resources capacity. The characteristics of the ENRS are: flexibility, availability, reliability, comprehensiveness and low cost.

The presentation provides practical examples of all ENRS components and introduces country experience to date in four countries, plus the training package.

Electronic Nominal Registration System implementation: Jordan

N Abu Sabra. Directorate of Chest Disease and Foreigners Health / National TB Programme; Ministry of Health, Amman, Jordan. Fax: (+962) 6 5520177. e-mail: femaletb@yahoo.com

Jordan is one of the low-TB burden EMR countries, with a population of 5 222 000 and an annual estimated incidence of four sputum-positive TB cases/100 000. The case detection rate was 63% in 2004 and the treatment success rate was 88% in 2003.

Jordan is part of the TB elimination initiative in EMR, and strengthened surveillance is important including proper data analysis, and strict high quality follow-up of patients.

The Jordan NTP decided to apply the electronic nominal recording reporting system in 2004. The pilot began in Amman governorate, which has 45% of TB cases. The original file was modified to add additional information available in the district register, such as mode of reference, type of supervision, availability of refugee card, drug consumption calculation.

Data entry was done at central level. A laboratory register is being developed. Data were filled from 2003 (retrospectively) for documentation and accuracy analysis of previous reporting

The NTP applied Access-based aggregated software 18 months before adopting ENRS and found that ENRS implementation was easier, simpler, more informative and user friendly than the previous software. Its benefits are great during the period of quality and comprehensiveness efforts to reach global targets and move towards MDGs and TB elimination. Furthermore, the plan of expansion will cover MDR cases in Alnoor sanatorium where the DOTS plus project is being piloted.

NTP is planning to cover the whole country in 2006 subject to availability of computers. JPRM with WHO will be used while awaiting the response on the Global fund proposal that was submitted this round.

ENRS implementation in Egypt

A Galal. National Tuberculosis Control Programme (NTP),
Cairo, Egypt. Fax: (+20) 02-3428867.
e-mail: agalalm@yahoo.com

Egypt has more than 70 million population, 27 governorates, and 119 districts with chest unit in each district. TB is diagnosed in the chest unit and treated using hospitals and PHC facilities. Annual TB incidence of new positive cases is 14/100 000, with 12 000 TB cases all types notified to the NTP each year.

ENRS pilot implementation began in June 2004 in two governorates (Cairo and Giza) with 17 chest units. The pilot site represents 20% of the population, 14% of chest units, and notifies 13% of TB cases. Computers were in 50% of units only.

ENRS file was modified according to the district register items. Arabic comments for titles plus drop lists in both languages were introduced and (If) condition were used.

Three days of training on Excel, basic epidemiology and data management using the spread sheet was conducted.

Data collected in each chest unit were subject to data cleaning at local, governorate and central level. Data flow timetable was monthly on 5th, 7th, 10th of each month respectively. Close supervision and continuous communication was provided during the first quarter.

Progress and evaluation meetings were before to discuss the implementation and provide refresh training on data management. The response was 93% (one centre with no cases). Data entry was 43% in the same unit, 25% in central unit, and personal efforts 25%.

This implementation proves feasibility of ENRS and leads to strengthening surveillance system in terms of completeness, accuracy and timeliness in addition to improvement of staff skills in data analysis and computer's using. It facilitated supervision and GIS map is being developed.

An expansion plan was developed and 5 more governorates were enrolled during 2005. Full coverage is expected by mid of 2006 subject to availability of computers at all chest units.

ENRS implementation in Syria

F Maamari. NTP Manager, Damascus, Syria. Fax: 11 3319804.
e-mail: ntpsyria@mail.sy

Syria notifies around 6000 TB cases—all types—annually, with an estimated incidence of 20 new positive cases per 100 000. ENRS implementation started in 1997 at the central level only till 2002. Several components of the system were introduced gradually (district register, services activities report and drugs consumption report).

Beginning in 2003, training was provided to statistical officers in 17 TB centers at provincial level. The

training took four days only and did not require high skills in computing. Then the E-district register began to be implemented there gradually according to availability of computers. Currently all TB centers have computers. Data flows from the diagnostic centre to the central level every month using CDs and diskettes via routine mail. However there is delay in sending the data due to lack of internet and e-mail access at provincial level.

Implementing ENRS strengthened TB surveillance and improved accuracy (patient duplication prevented using the index number system), timeliness (where data submission is facilitated electronically) and completeness. Retrieving any data for any reason and indicators calculation is very easy and simple. ENRS facilitated service provision, supervision as well as the drug consumption calculation.

The main challenge faced is establishing proper communication (internet access) at TB centers to ensure timely sending the e-copies. In future, we aim to move towards district level along with the expansion of diagnostic laboratory network to that level, and to establish communication network through e-mails. On the other hand the program will begin to implement the e-lab and the e-suspect registers during 2006.

The presentation will summarize steps of implementation, provide snapshots of the elements currently implemented, and evaluate ENRS role in improving quality of TB recording and reporting.

ENRS implementation in Sudan

I Elhafiz. EPILAB – Sudan, Khartoum, Sudan.
Fax: (+249) 83 224496. e-mail: hafi1232001@yahoo.com

Sudan is the largest country in Africa with a population of about 34 000 000. In 2003, Sudan achieved full DOTS coverage. The case detection rate was estimated to be 40% in 2004, and treatment success was 81% in new smear positive cases in 2003.

NTP adopted the standardized WHO/IUATLD recording and reporting system. During implementation several areas of weaknesses were noticed and need to be addressed. For example there is remarkable delay in reporting from different levels to NTP central unit, lack of feedback about data completeness and treatment follow-up, lack of data analysis at intermediate level, and the high workload at the NTP central level.

To address and solve the above mentioned constraints, Sudan plans to implement the Electronic Nominal Recording Reporting System (ENRS) prepared and promoted by WHO-EMRO in two states (Khartoum and Gezira) as a pilot project.

The template file has been adapted to local situation in Sudan in EPI-Lab and tested in 3 centers. The total number of TB cases (all types) in the three centers represents 3% of total TB cases all types.

With the help of WHO, LHL, and NTP the EPI-Lab is planning to cover Khartoum and Gezira states in 2005. Furthermore, this project has been included in the proposal for the round 5 of Global Fund. In our presentation we will present: general features of the project, piloting results, and future plans.

Training package in ENRS

S Abdel Wahab. World Health Organization, Cairo, Egypt.
Fax: (+202) 670 24 92/94. e-mail: awahabs@emro.who.int

In any reliable system of work the training part is the most important phase to establish the required capacity and achieve the desired goals.

Training for ENRS is composed of three components:

- 1 **Basic epidemiology and data management:** This component provides essential knowledge in epidemiology and data management to establish the link between the tool, i.e., ENRS and the whole framework of TB control
- 2 **Excel training:** ENRS has been designed in an excel template and small access module. It is necessary to check the computer knowledge of the trainee especially Excel before starting training, since there will be different categories of trainees (doctors, nurses and others) and they are in different levels of the computer literacy.

Excel training is composed of a small introduction to the computer then how to use excel as a beginner. The training period of three days is enough for the trainees (even very beginners) to start data entry, cleaning using data filtering, and data analysis using pivot tables.

Hard and soft copy notes are distributed among the trainees to ensure availability of proper reference.

Interactive CBT (Computer Based Training) is also prepared to enable refresh training.

- 3 **Training on the templates and required reports:** Trainees are trained how to enter data on the specific file of their center, and to perform data cleaning and use pivot tables to prepare quarterly reports.

Two other training events are needed during the progress and the evaluation meeting as refresh training. This proved to be useful to enhance staff capacity and follow up/evaluate their performance.

In spite of the poor resources and big number of trainees, they managed to understand and work with the system correctly based on the ENRS training package.

PRIMARY PRESENTATION OF TOBACCO CESSATION

The increasing burden of smoking in the developing world

K Slama. The Union, Paris, France. Fax: (+33) 01.43 29 90 87.
e-mail: kslama@uatld.org

The context: No nation possesses enough resources to eliminate disease risks, but good governance includes allocating resources to achieve the greatest public health. Low-income countries are faced with life-threatening communicable diseases and growing proportions of disabling and life-threatening chronic diseases. The need for these countries to balance between allocating monies for prevention and treatment are apparent but will long continue to be heavily weighted to treatment of infectious diseases. Indeed, very little importance is given to prevention or treatment of chronic degenerative diseases in the Millennium Development Goals.

The situation: Although quite variable by country, the smoking rate for men throughout all low income countries is 46% and stable, for women 12% and growing. Tobacco use currently causes about 3 million deaths annually in developing countries, predicted to rise to seven million per year within the next two decades. It not only brings death, but drains family incomes, affects the health of those exposed to its smoke, and is a low-yield source of national development. One of the best investments in health now available to low-income countries is ratification and commitment to the tobacco control programme of the FCTC, and the success or failure of this treaty will be seen in its effect on tobacco diseases in low income countries.

Health and poverty consequences of smoking

M R Masjedi. National Research Institute of Tuberculosis and Lung Disease (NRITLD), Tehran, Iran. Fax: (+98) 21 22285777.
e-mail: mrmassjedi@nritld.ac.ir

Tobacco is the first major cause of preventable death in the world. It is currently responsible for the death of one in 10 adults worldwide (about 5 million deaths each year). If current smoking patterns continue, it will cause some 10 million deaths annually by 2020. Half the people that smoke today—about 650 million people—will eventually be killed by tobacco. Tobacco is the second most common risk factor for all disease worldwide. The economic costs of tobacco use are equally devastating. In addition to the high public health costs of treating tobacco-caused diseases, tobacco kills people at the height of their productivity, depriving families of breadwinners and nations of a healthy workforce. Tobacco users are also less productive while they are alive due to increased sickness. A 1994 report estimated that tobacco use

resulted in an annual global net loss of US\$ 200 thousand million, a third of this loss in developing countries. Tobacco use has been shown to promote the onset of tuberculosis (TB) and negatively affect the outcome of TB, a disease that mainly affects the poor. A recent study showed that smoking is the cause of half of all male TB deaths in India. There is evidence that tobacco is significantly associated with an increased mortality among TB patients. Our study in 2004 showed that smoker TB patients had delays in visiting a doctor with chronic cough and their response to therapy was less than half. Tobacco and poverty are inextricably linked. Many studies have shown that in the poorest households in some low-income countries as much as 10% of total household expenditure is on tobacco. This means that these families have less money to spend on basic items such as food, education and health care. In addition to its direct health effects, tobacco leads to malnutrition, increased health care costs and premature death. It also contributes to a higher illiteracy rate, as money that could have been used for education is spent on tobacco instead. Tobacco's role in exacerbating poverty has been largely ignored by researchers in both fields. It is the poorer and the poorest who tend to smoke the most. Globally, 84% of smokers live in developing and transitional economy countries. In Iraq, some cheap brands sold for only US 0.15 cents per pack from unknown sources seriously damage health. A UK study shows that only 10% of women and 12% of men in the highest socio-economic group are smokers compared to 35% of women and 40% of men in the lowest socio-economic group. The Union tobacco prevention section could play a key role for implementing National Tobacco Control Programs for low and middle income countries by collaborating with governments and NGOs.

Components of a smoke-free health facility

J J Prignot. University of Louvain, Namur, Belgium.
Fax: (+32) 81 221655. e-mail: Jacques.prignot@pneu.ucl.ac.be

Introduction: Smoking bans aim at the protection of staff and patients against passive smoking, and to help both completely quit active smoking; the health facility plays a model role for the community presenting non-smoking as the norm.

Preliminary steps: A coordinator of the smoke-free policy is appointed (doctor or nurse) to manage the intervention in cooperation with all personnel. The smoking status of the staff (smoker, ex-smoker, never-smoker), knowledge of the health hazards of active and passive smoking and attitudes in front of a total smoking ban in the health facility. The staff are surveyed. During the discussion of the results, basic training is offered to staff concerning relationships between smoking and disease including tuberculosis, low birth weight and poverty and quit counselling

methods. During the discussion of those results, basic training should be offered to all the personnel, including counselling and cessation rates expected among patients after minimal interventions.

Smoking ban: Smoking should be banned in all premises, areas without patients and individual surgeries included. In small facilities, smoking is allowed exclusively outside. In larger facilities, when requested by the staff, an isolated and effectively ventilated smoking room can be built for patients, visitors and tobacco addicted personnel as an intermediate step before a total smoking ban.

Technical measures:

- 1 Non smoking signs are posted in patient areas, corridors and meeting rooms
- 2 Ashtrays are removed and set outside the facility
- 3 A space for patient's smoking status close to other vital signs is foreseen in medical files or registers
- 4 Culturally adapted cartoons about hazards of smoking are posted in waiting rooms
- 5 When possible, smoking cessation medications are available at the hospital pharmacy.

Conclusion: Quit smoking counselling is an essential part of doctors' and nurses' routine activities.

The minimal intervention package during a tuberculosis consultation

J Khan. The Aga Khan University, Karachi, Pakistan.
Fax: (+92) 21 4932095. e-mail: javaid.khan@aku.edu

Tuberculosis and tobacco together are responsible for about 7 million deaths every year across the globe. With the rising trends in smoking in many low-income countries, the death toll from TB and tobacco is expected to rise even further. In a recent large epidemiological study, 50% of deaths from tuberculosis among Indian men were attributed to smoking. TB control programs are now well established in most countries of the world. By December 2003, 182 countries were implementing DOTS, covering 77% of the world's population. Millions of patients visit DOTS centers every day for diagnosis and treatment of TB. However, most health care workers implementing DOTS currently do not discuss the issue of smoking with their patients. Stopping smoking not only reduced the risk of dying from TB but also has several other health benefits. Even brief advice of less than 3 minutes by a health care provider to a smoker can have a significant impact on smoking cessation. It is highly desirable that smoking cessation should be included in the DOTS training module. Every health care provider running a DOTS program should be trained to identify and document tobacco use for every patient at every visit. If a patient is found to be a smoker, a strong message should be given to the individual to quit smoking. Those patients who need more intensive counseling and advice for quitting smoking could be referred to specialist smoking ces-

sation clinics. Several WHO member states have now signed the framework convention in tobacco control; it is expected that smoking cessation clinics will be established at both primary and tertiary care level in many developing countries who are signatories to this treaty. Close cooperation between people running TB control programs and those involved in tobacco control is urgently needed.

TB-HIV CO-TREATMENT ISSUES

TB-HIV co-infection: clinical experience from Cape Town

G Meintjes. GF Jooste Hospital and University of Cape Town, Cape Town, South Africa. Fax: (+27) 21 4613946. e-mail: graemein@mweb.co.za

The diagnosis and management of TB in patients with HIV co-infection poses several clinical challenges. The clinical and radiological presentation is atypical. Smear-negative TB and extrapulmonary TB are more frequent. Combining HAART with TB treatment is complicated by the high pill burden, drug interactions, shared toxicities and the Immune Reconstitution Inflammatory Syndrome (IRIS).

In Cape Town, South Africa, the HIV epidemic was preceded by a high incidence of TB. With the HIV epidemic there has been an explosion of TB incidence rates. The provincial HIV seroprevalence rate is estimated at 10.7%, but in some communities the antenatal seroprevalence rate is as high as 28%. TB incidence rates of up to 1122 per 100 000 are reported with over 60% of cases being HIV co-infected in certain communities. In one study, the annual risk of active TB among HIV co-infected patients not on HAART was 38%.

Currently a national public sector antiretroviral roll-out is underway in South Africa and over 6000 patients have been commenced on HAART in the Western Cape province.

The high levels of co-infection together with the recent widespread availability of HAART in this setting present many challenges to the clinician. This presentation will focus on clinical challenges related to the diagnosis and management of patients with dual infection in this setting. Three major issues will be highlighted:

- 1 Delays in the diagnosis of TB in HIV co-infected patients.
- 2 Difficulties in the diagnosis of TB in HIV co-infected patients and the use of alternative diagnostic methods and clinical algorithms to expedite diagnosis.
- 3 The presentations and management of the TB-IRIS.

Botswana Isoniazid Preventive Treatment Programme: one country's experience in implementation

O I Motsamai. Botswana National TB Programme, Ministry of Health, Botswana, Gaborone, Botswana. Fax: (09267) 390 6680. e-mail: oaitse_Motsamai@yahoo.com

Introduction: Botswana, a southern African country, suffers a high rate of tuberculosis (TB) disease and high HIV prevalence. TB was under fair control in the late 1980s reaching 199/100 000 case notification rate in 1989. Subsequently, rapid rise was experienced reaching 623/100 000 in 2002. This high TB rate is attributed to the rapidly expanding HIV epidemic: national sentinel surveillance reports showed that HIV prevalence increased among pregnant women from 18.1% in 1992 to 37.4% in 2003. Several studies have demonstrated a 60–80% HIV co-infection rate among TB patients.

The Botswana IPT Programme: The introduction of isoniazid TB preventive therapy (IPT) in Botswana followed a recommendation by the World Health Organization in 1998. A pilot study was conducted in three districts in 2000–2001. The pilot established the operational feasibility of the Programme and, after an external review, IPT was recommended to be expanded nationally. The IPT Programme, funded through the Global AIDS Program, was rolled out to the whole country by June 2004. A 'trainer of trainers' approach was used to educate health providers in the procedures involved in dispensing IPT. By March 2005 over 20 000 clients had completed or were receiving IPT. Successes include high awareness and acceptance of the programme by HIV-infected persons. The main challenges include: inadequate manpower at the national level, poor record keeping and follow-up of clients, lack of participation and commitment by some health practitioners, high staff turnover at local clinics, and high mobility of clients.

Conclusions: A national IPT programme may be established in a developing country setting. A formal evaluation of the Botswana IPT Programme will help to assess whether such a national programme is feasible.

TB-HIV co-infection research agenda: priorities and opportunities

F Scano. Stop TB Department/ World Health Organization, Geneva, Switzerland. e-mail: scanof@who.int

Global consensus around the new TB-HIV interim policy has been achieved. However, implementation of joint TB-HIV activities is yet to be scaled-up. Updating research priorities specifically aimed at informing future policy and improving implementation of joint TB-HIV activities in the context of ART programmes should accelerate scale-up.

The priority areas for research in collaborative TB-HIV activities have been identified at the Expert Consultation on TB-HIV Research Priorities, held on 14–

15 February 2005 in Geneva. However, a continuous cycle of policy informing research priorities, and research informing policy must be maintained. Operational research should be encouraged and supported at country level to tailor collaborative TB-HIV activities to country needs and develop research capacity. The results of operational research are often less generalisable than more robust scientific methods but can provide very important lessons for feasibility and improvement of programme performance for TB-HIV activities.

During the presentation, the range of research priorities identified at the above mentioned consultation will be presented and links with the millennium development goals to reduce the global and individual burden of HIV-related TB by scaling up implementation of collaborative TB-HIV activities in countries with a high burden of TB will be discussed.

MOLECULAR AND NEW TECHNIQUES FOR THE DETECTION OF DRUG RESISTANCE

Molecular detection of antimicrobial resistance in *M. tuberculosis*

Y Zhang. Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA. Fax: (+1) 410-955-0105. e-mail: yzhang@hsph.edu

The increasing emergence of drug resistant, especially multi-drug resistant tuberculosis (MDR-TB) in the era of HIV infection poses a significant threat for the effective control of the disease. Timely detection of drug resistant TB is important for effective treatment and management of patients harboring drug resistant bacilli. Because the conventional culture-based drug susceptibility testing is often time-consuming due to the slow growth of *M. tuberculosis*, there is significant interest in and need for developing molecular tests for rapid detection of drug-resistant tuberculosis based on identifying mutations in relevant drug resistance genes. Despite recent progress in understanding the mechanisms of drug resistance in *M. tuberculosis*, rapid detection of drug resistant TB by molecular biology tools has been challenging because of the enormous diversity of chromosomal mutations associated with drug resistance. This presentation will discuss mechanisms by which *M. tuberculosis* develops drug resistance and also review recent progress in molecular detection of drug resistant tuberculosis.

Rapid determination of rifampicin resistance in *M. tuberculosis* using the phage based FASTPlaque technology

R Mole. Biotec Laboratories Ltd, Cape Town, South Africa. Fax: (+27) 21 425 9857. e-mail: richard.mole@bioteclabs.co.za

The FASTPlaque tests utilises novel phage amplification technology to rapidly detect the presence of viable *M. tuberculosis* (MTB) within clinical specimens. The technology has been successfully applied both to the diagnosis of TB and for rifampicin resistance determination. The tests requires only basic microbiological laboratory facilities, equipment and skills. Results are read by eye and are easy to interpret.

Drug susceptibility testing is performed by comparison of the viability of MTB in samples tested with and without antibiotic. Viability is determined by the cells ability to support phage replication and produce plaques on lawns of indicator bacteria. The technology has been applied to both indirect and direct testing.

The performance of the indirect test (FASTPlaque TB-MDRi) from either solid or liquid cultures, has been compared with conventional rifampicin susceptibility testing, in a number of settings (total, $n = 497$). FASTPlaqueTB-MDRi results were available within 2 days and correlated very well with conventional methods, having sensitivity to detect resistant strains of 98.6%, specificity of 97.8 and overall accuracy of 97.2%.

The recently developed direct test, FASTPlaque-Response, determines rifampicin resistance directly from NALC-NaOH decontaminated smear positive specimens in 2 days. Data from a South African study has shown that the FASTPlaque-Response test correlates well with convention results ($n = 229$) having sensitivity, specificity and overall accuracy of 95.6%, 99.3 and 97.8%, respectively. An issue with reduced numbers of interpretable results due to contamination has been overcome with use of an antimicrobial supplement. Additional work has shown improved ability to report result without any loss in performance.

Direct colorimetric assay for rapid detection of rifampicin-resistant *M. tuberculosis*

G Abate. St. Louis University, St Louis, Missouri, USA. e-mail: abateg@slu.edu

Drug-resistant tuberculosis (TB) is a challenging problem to TB control programs. Its rapid detection is essential to limit the spread. This study was conducted with the objective of standardizing MTT assay for detection of rifampicin-resistant *M. tuberculosis* directly from sputum samples. Triple samples were collected from 74 smear-positive re-treatment TB-cases in Addis Ababa. The samples from each patient were pooled

and digested/decontaminated using Petroff's sodium hydroxide method. The decontaminated samples were resuspended in 7H9 broth media. Tubes containing 7H9 broth media supplemented with PANTA and OADC were used for the MTT assay. Aliquots of resuspended samples were transferred to three sets of tubes containing 7H9 broth media and the Löwenstein-Jensen (LJ) media. Each set contained a drug-free control and rifampicin-containing tubes. MTT assay was done every week and the amount of formazan formation was quantified by measuring optical density (OD) at 570 nm. Relative optical density unit (RODU) was calculated by dividing OD of rifampicin-containing tube with OD of control. Resistance was defined as RODU of >0.5 and susceptible was defined RODU <0.2 . Five samples were excluded. MTT assay identified 8/69 (11.6%) as containing rifampicin-resistant and 61/69 (88.4%) as containing rifampicin-susceptible *M. tuberculosis*. The difference in RODU values between samples containing rifampicin-resistance and samples containing rifampicin-susceptible *M. tuberculosis* were statistically significant ($P < 0.01$). The results of the MTT assay were confirmed by the standard proportion method on 7H10 media using strains isolated on LJ media from the same samples. With the MTT assay 43/68 (63%) samples gave interpretable results in the first and 64/65 (98.5%) in the second week. The direct MTT assay can be used as a reliable, rapid and inexpensive method for detection of rifampicin resistance in *M. tuberculosis*.

Rapid and inexpensive drug susceptibility testing of *Mycobacterium tuberculosis* with a nitrate reductase assay

K Ängeby, Swedish Institute for Infectious Disease Control, Stockholm, Sweden. Fax: (+46) 8-30 17 97.
e-mail: kristian.angeby@bredband.net

Background: Current methods for drug susceptibility testing of *Mycobacterium tuberculosis* are either slow and inexpensive or rapid but costly. A new nitrate reductase assay (NRA) based on the ability of *M. tuberculosis* to reduce nitrate to nitrite has been suggested. Briefly, the bacteria to be tested are grown on Löwenstein-Jensen culture medium with incorporated nitrate, with or without antibiotics. The presence of nitrate reduction (indicating growth) is detected by specific reagents, which produce a color change. If the color change is greater in an antibiotic containing tube than in an antibiotic-free one (with a 1:10 diluted bacterial inoculum), the strain is considered resistant to that antibiotic (Figure).

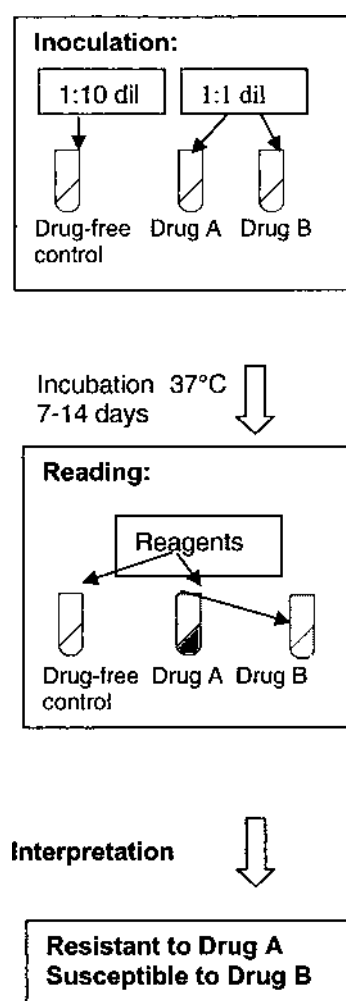
Methods: Medline was searched for papers in English dealing with the NRA method. Data on the accuracy and turn-around time of the NRA compared to reference methods were collected from each found paper.

Results:

| Country, year of publication | No. of strains | Accuracy (%), NRA compared to a reference method | | | | | Time NRA, days |
|---------------------------------|----------------|--|-----|-----|-----|-----|----------------|
| | | RMP | INH | STR | EMB | OFL | |
| Sweden, 2002 ¹ | 57 | 100 | 96 | 88 | 93 | | 7–14 |
| India, 2004 ² | 100 | 100 | 99 | 100 | 99 | | 7–14 |
| Turkey, 2004 ³ | 80 | 100 | 100 | 84 | | | 7–14 |
| Belgium, 2004 ⁴ | 20 | 100 | | | | | 7–14 |
| Cuba, 2005 ⁵ | 100 | 100 | 98 | 96 | 99 | | 7–14 |
| Belgium, 2005 ⁶ | 95 | | | | | 100 | 9–14 |
| Multicenter, 2005 ^{7*} | 30 | 98 | 97 | 85 | 98 | | 7–14 |
| Argentina, 2005 ^{8†} | 121 | 100 | 99 | 96 | 96 | | 10–18 |

* Five laboratories independently.

† Direct drug susceptibility testing from sputum specimens.



Discussion: Drug susceptibility testing with the NRA was comparable to standard methods, at least for rifampicin and isoniazid; the two most important anti-tuberculosis drugs. Results were available within 1–2 weeks and the method is performed on solid medium, which is good for biosafety reasons. The similarities with the proportion method are likely to make implementation of the method in practice uncomplicated. The NRA could become a useful tool for tuberculosis laboratories in the future,

either as a rapid screening tool, or replacing standard techniques.

¹Angeby et al, JCM 2002. ²Sethi et al, Indian J Med Res 2004. ³Coban et al, Int J Antimicrob Agents 2004. ⁴Lemus et al, JAC 2004.Z ⁵Montoro et al, JAC 2005. ⁶Martin et al, JCM 2005. ⁷Martin et al, J Microbiol Methods 2005. ⁸Musa et al, JCM 2005.

ENGAGING THE PRIVATE SECTOR: SCALING UP AND SUSTAINING PRIVATE-PUBLIC MIX DOTS MODELS IN THE PHILIPPINES

Overview. Finding a place in the frontline: involving the Philippine private sector in tuberculosis control

J A Perez. Philippine TB Initiatives for the Private Sector (Philippine TIPS), Pasig City, Philippines. Fax: (+63) 687 2195. e-mail: jperez@philtips.com

The Philippine private health sector has historically initiated treatment for the greater number of Tuberculosis (TB) patients in the country, but private physicians' success in curing TB was much lower than the public sector. The public service, on the other hand, cures the greatest number of Filipino TB patients every year, but over a third of TB cases in the country remain out of reach.

By 2002, government, donors and the private sector were ready to integrate TB control efforts, hoping to achieve the threshold of 70% case detection and 85% success rates by 2005, focusing on the DOTS strategy. Resources and attention for TB control increased when USAID (through the Tuberculosis Initiatives for the Private Sector, TIPS) started in late 2002. In 2003, a handful of private DOTS centers were in place, fixed-dose combination TB drugs became available and a common policy was issued for TB control.

Distinct from the usual disease-oriented projects, the USAID-funded TIPS project has taken a comprehensive, broad-based approach to TB control. The project engages policy makers and funders, establishes effective and efficient service delivery systems based in the private health sector, including workplaces and pharmacies, addresses the human resources needs of the program from pre-service to in-service providers, using a communications package that reaches out to symptomatics and populations at risk. Uniquely, the project enlists engagement and the support of the entire health team: doctors, nurses, laboratory technicians, pharmacists and community volunteers.

The following speakers will be talking about the Philippine TB initiatives for the Private Sector against the background of the National TB Program and our partner, the Philippine Coalition Against Tuberculosis (PhilCAT).

Philippine NTP: the role of PPM

L Vianzon. Philippine National Tuberculosis Program, Quezon, Philippines. Fax: (+63) 687 2195. e-mail: cyu@philtips.com or chrlyu@yahoo.com

The Philippines incorporated the PPMD strategy in 2003, recognizing the role of the private sector in achieving the goal of TB control. The Philippine President signed Executive Order 187 in March 2004 and the Comprehensive Unified Policy (CUP) was launched that same year. The target of the national PPMD strategy is to scale-up PPMD to cover most of the private and NGO outlets that provide TB care. It is expected that by 2006, under the GFATM funded project, 71 PPMD Units will be operating nationwide. Another 20 PPMD Units (all privately owned) were installed by the Philippines Tuberculosis Initiative for the Private Sector (Philippine TIPS), a USAID-funded project, in 2004. Another 5 PPMD Units launched under the Centers for Disease Control and Prevention (CDC-PhilCAT), funded as pilot project (2001–2004), are already operating. There are also 16 self-installed PPMD Units. The total number of PPMD Units operating nationwide by the end of 2006 is expected to be 112. Current PPMD Units contribute considerably to the CDR of $\geq 70\%$ as well as achieving a more than 85% success rate. In some sites, contributions can range from 10% to 20%. PPMD activities likewise contribute to higher CDRs in the public DOTS centers. The intended role of the PPMD Units is to serve as a TB referral center and secure high quality TB diagnosis and treatment. All PPMD units should have TB diagnostic facilities and serve as TB treatment centers, providing treatment free of charge to patients. A National Coordinating Committee for PPMD (NCC-PPMD), chaired by the DOH and co-chaired by the PhilCAT National Chair, oversees the nationwide policies and implementation of PPMD together with the Regional Coordinating Committee for PPMD (RCC-PPMD), which monitors and supervises the implementation of PPMD according to the National Operational Guidelines, and provides training, monitoring and supervision of the corresponding PPMD Units, DOTS certification and technical assistance at regional level directly to the PPMD Units. Operational guidelines for PPMD in the Philippines have been developed through WHO technical assistance, published and disseminated by DOH and PhilCAT since 2004. The PPMD infrastructure is integrated into the NTP infrastructure and is a support instrument to all PPMD Units independent of their funding agency. In 2003, the Philippine Health Insurance Corporation (PhilHealth, a government agency) introduced the TB OPD package to encourage participation by private providers in DOTS and as a supportive financial instrument for the long-term sustainability of the PPMD. As of end of May 2005, over 120 PPM and public DOTS Centers had been certified, of which over 50 had been Philhealth accredited.

PhilCAT and DOH have been trying to expand public-private cooperation in other sectors since 1990. Collaboration with medical schools started in early 2000 with the establishment of a TB Task Force in PhilCAT for medical schools. In 2003, with the Philippine TIPS, medical deans adopted the integration of DOTS in medical schools and the Master TB educator awards. Pharmacies are significant sources of first contact with TB symptomatics and self-medicating patients. The Pharmacy DOTS Initiatives (PDI) pilot sites, started by the Philippine TIPS in 2003, reveal that they contribute to CDR (2% overall). Allied health professionals are presently engaged in integrating DOTS in their schools. A WHO external evaluation of PPMD units, funded by the GFATM in 2004, showed the substantial increase in case detection from 21% to 104% in 5 sites, a total increase of CDR by 11.2%; all but one of the sites reached the 70% detection target. Philippine TIPS sites have reported 92% success rates and contributions to case detection of 2–10% in catchment areas. Overall, PPMD contribute significantly to the attainment of NTP goals.

Role of PhilCAT in the private sector

J Mendoza Wi. Philippine Coalition Against TB (PhilCAT), Quezon City, Philippines. e-mail: zenjeps@mozcom.com

The Philippine Coalition Against TB (PhilCAT), established in 1994, was envisioned to be 'a coordinating body for all organizations with any anti-TB interest'. The 12-member group is now a coalition of 61-member multisectoral groups. From activities such as an annual convention and celebration of World TB Day, in the past 5 years, PhilCAT has become more hands on as project implementer of Public-Private Mix DOTS (PPM-DOTS) of the Global Fund to Fight TB, AIDS & Malaria (GFATM-2003). The PPMD strategy in the Philippines utilizes the relative strengths of the public and private sectors and their capacities to undertake the five essential DOTS elements. Collaboration between the National TB Program (NTP) and private sector has benefited and accelerated TB control. In 2001, PhilCAT, in collaboration with the Department of Health, Centers for Disease Control (CDC) and the US Agency for International Development (USAID) developed 5 DOTS private sector models. It spearheaded an update of the national TB consensus, guidelines on TB in the workplace and a TB Summit resulting in a comprehensive and unified policy for TB Control in the Philippines (CUP). Crucial to the enhanced image of PhilCAT is the Philippine Tuberculosis Initiative for the Private Sector (PhilTIPS) support for strategic planning workshops, short-term consultants, training modules for professionals, DOTS integration in the medical schools, The TB Master educator awards, pharmacy DOTS initiatives (PDI), certification activities, an NTP training course (PTSI) and revisions of the TB consensus. Phil-

CAT is in an organizational development (OD) program and in a twin mission of membership empowerment and TB control.

Local coalition building is one way of reaching out to the entire country. The Philippine partnership between the public and the private sector has catapulted the current case detection rate closer to WHO targets. The challenge is sustaining this momentum towards a 'TB-FREE Philippines', the PhilCAT vision and every Filipino's wish.

Policy initiatives for sustaining private-public mix DOTS models in the Philippines

M Gorra. Philippine Tuberculosis Initiatives for the Private Sector, Chemonics International, Metro Manila, Philippines. Fax: (+632) 687 2195. e-mail: mgorra@philtips.com

The policy initiatives were designed early in our program to create an enabling environment for private sector participation in TB-DOTS. Policy studies done to provide rational and empirical basis for specific policy initiatives included: a) Burden of Disease (BOD) Study; b) National TB Policy Review/Assessment; and c) Private Drug Facility Study. The BOD study provided precise data on the staggering economic costs of TB (wide public/media dissemination made it a wake up call for policy makers) and was instrumental in fast-tracking implementation of the TB outpatient benefit package. The other studies identified TB-specific policy gaps and documented wide variations in cost, quality, and availability of TB services and drugs supply in the private sector.

Initial work focused on consolidating existing policies into a Comprehensive and Unified Policy (CUP) for TB control including basic NTP policies, social security, health insurance, workplace benefits, and employees' compensation. The CUP re-aligned all policies with the DOTS protocol and standardized TB case management, recording and reporting among 23 agencies who participated in its consolidation/updating.

Subsequent initiatives focused on: 1) workplace policy (in collaboration with the Department of Labor and Employment); 2) certification standards/processes (in collaboration with the Philippine Coalition Against Tuberculosis); and 3) partnerships/covenants with professional medical and allied medical societies/colleges to facilitate integration of TB-DOTS in their regular training, examinations, and accreditation.

In progress is the development of policy champions/advocates who will pursue work on the following: 1) multi-year budgeting for NTP; 2) securing uninterrupted supply of TB drugs; and 3) installing provider incentive systems and regulations to promote DOTS among private practitioners.

With these policies and partnerships with institutions who shape/influence private medical and allied medical practice, workplace benefits, social health insurance, and future programs in TB control, the stage

is set for sustaining public-private mix DOTS in the Philippines.

Innovative strategies for improving the quality, sustainability, and accessibility of DOTS services in the Philippines

M Costello. Philippine Tuberculosis Initiatives for the Private Sector, Chemonics International, Metro Manila, Philippines. Fax: (+632) 687 2195. e-mail: mcostello@philtips.com

Involving private practitioners in DOTS implementation remains a challenge. The Philippines Tuberculosis for the Private Sector (Philippine TIPS), a USAID-supported project designed to increase the participation of the private sector in TB control through the promotion of quality DOTS services have been addressing this challenge. Using operation research approaches, we developed and pilot tested innovative strategies for delivering DOTS in the private sector.

Philippine TIPS helps increase the accessibility of quality DOTS services under its model development and DOTS grants programs. The Pharmacy DOTS Initiative (PDI) has been piloted in 7 sites, over 6 million populations. The project engaged the pharmacies to improve TB drug dispensing and clients' health-seeking behavior by training pharmacy personnel on pre-screening and provision of TB information to clients. PDI established a referral system to DOTS clinics for pharmacy clients. Within 10 months, PDI has served 7000 clients and referred a third of these to a DOTS facility. The Single Practice Network (SPN), was designed to create a network of individual health providers, and enable single stand-alone physicians, (estimated 10 000) to participate in the DOTS system. It allows some elements of DOTS to be delivered by different providers in the network. The PPMD clinic model adopted by our DOTS grant program provides DOTS services within a fixed facility, the model has been and replicated in 20 strategic sites in the country.

Finally, the work force approach, a model which leverages on corporate social responsibility by providing assistance in the provision of community TB education, and establishing DOTS facilities in the community where workers reside and appropriate DOTS referral of clients with support from the business sector. Pilot experience in five communities shows 300 symptomatic cases have been treated under the program. Results of evaluations on service quality and prospects for sustainability are included in the discussion.

Educational initiatives DOTS certification, PhilCAT, master TB educator award

C Yu. Philippine TB Initiatives in the Private Sector (Philippine TIPS)/De La Salle Health Sciences Campus, Pasig, Philippines. Fax: (+63) 687 219. e-mail: cyu@philtips.com/chrlysyu@yahoo.com

'DOTS' is unfamiliar to physicians in high burden countries because of lack of coverage during medical education. In 2003, Philippine TIPS built on a previous joint 2000 initiative by Philippine Coalition Against Tuberculosis (PhilCAT) with the Association of Philippine Medical Colleges (APMC) by assisting review, completion and adoption of a DOTS syllabus by medical school deans. A baseline survey showed that medical school teaching of TB was fragmented and uncoordinated. A sponsored Master TB Educator Award (MTBEA) Grant Program enhanced integration of DOTS in medical schools. 10 of 20 competing medical schools (which serve the whole archipelago) were awarded. MTBEA has been a mechanism for innovative teaching and learning strategies, linkage of students to DOTS centers and establishment of DOTS centers. MTBEAs have been major change agents in the whole country by turning recalcitrant private physicians to DOTS 'adopters' and DOTS trainers themselves.

Four sets of modules were developed: 1) basic DOTS course trained over 3000 MDs, half received PhilCAT certification to enable them to receive Phil-Health incentives; 2) trainer modules: over 200 of various health professional society members have been trained; 3) DOTS certifiers training- rudiments on certification and application process to DOH/PhilCAT DOTS certification standards; over 120 people in all major regions have been trained; 4) TB Diagnostic Committee training: over 60 TBDC committees have been trained. In 2005, a PhilTIPS survey of 1500 MD's showed that DOTS over-all awareness is 75% and adoption is 38% which was highest among Pulmonologists and ID Specialists.

Educational initiatives escalated DOTS adoption to 90% of medical schools by inclusion of DOTS in their curricula. The increasing propagation effect shows a direct correlation between training in DOTS and current Public Private Mix referrals; 60% referrals came from DOTS certified physicians. This reflects a behavioral change among health care providers, i.e., doctors and pharmacists.

Investigating news media coverage of TB in a high-burden country like the Philippines

J I Angeles. Philippine Tuberculosis Initiatives for the Private Sector, Chemonics International Inc, Metro Manila, Philippines. Fax: (+632) 687 2195. e-mail: jiangenes@philtips.com

The USAID-funded Philippine Tuberculosis Initiatives for the Private Sector partners with the media to raise visibility of TB, promote DOTS in the private

sector, and influence health policymaking. We investigated how media handled TB messages and strategically applied our findings. Review of TV and radio programs and advertisements for 2002 and 2003 in six broadcast companies, and one cable news company and 396 issues of 3 published broadsheets in 2003 showed reports of 371 disease-related topics. Forty-seven were lung-related topics; 6/47 (13%) dealt with tuberculosis. 54/97 disease-related topics were lung-related; 17/54 were on TB. Broadcasts about TB were minimal. TB advertising and programming were aired in non-primetime hours and in the government channel.

Content focused on symptoms, prevention and non-DOTS treatment. Main drivers were issues of control and assistance to TB patients. There was more TB coverage in print media than in television. Highest frequency of reporting was noted in March. In general, media was not attracted to TB because it was considered an old issue and not as interesting as more 'fashionable' diseases such as HIV or SARS. We focused on two core messages and highlighted 'big ideas' like the P27-Billion annual price tag of TB, one of findings of Burden of Disease study. This generated considerable press coverage. Media coverage caught the attention of the Presidential Palace resulting in a memo from the Press Secretary.

Our experience shows that media coverage increases by raising the news value of TB stories, discussing TB's impact on daily lives, linking TB with famous people, addressing 'frequently asked questions', linking TB to other social issues and other infectious diseases, and telling success stories. Our strategic channels for delivering TB messages to our target audiences (private sector; policymakers) are newspapers; specialty magazines; television news/public affairs; and the Internet.

CIVIL SOCIETY MONITORING OF NATIONAL TB POLICIES: A PRAGMATIC APPROACH TO PROMOTING PUBLIC ENGAGEMENT AROUND TB POLICY

Preliminary findings from civil society monitoring of national TB policies in five countries

E Bell. Public Health Watch, Open Society Institute, New York, New York, USA. Fax: (+1) 646-557-2595.
e-mail: ebell@sorosny.org

International agencies such as the WHO conduct regular reviews of policy implementation to encourage and monitor governments' progress vis-à-vis international commitments. While these international reviews are indispensable, the role of local civil society organizations has been overlooked in holding govern-

ments accountable for the delivery of health services. The Open Society Institute established Public Health Watch in 2004 to support and promote independent civil society monitoring of government health policies.

Public Health Watch's TB Monitoring Project has revealed several common themes among its five focus countries: Bangladesh, Brazil, Nigeria, Tanzania, and Thailand. This presentation will first offer an overview of the TB Monitoring Project and its methodology. Public Health Watch emphasizes both the publication of high-quality reports on government policies and a participatory monitoring process. On the assumption that informed public engagement is essential for effective policy-making, our approach forefronts community-led research and ensures multiple opportunities for dialogue and exchange with a wide range of policy actors, including representatives of affected communities, civil society organizations, public health institutions, journalists and government officials.

Second, the presentation will explore some of the challenges in monitoring policy in each of the five countries, including: obtaining high-quality information on TB policy and implementation efforts; establishing the legitimacy and importance of constructive civil society engagement in policymaking processes; and assessing the accessibility of TB services. The reports also reveal significant shortcomings in NTP policies, including the unintended consequences of health reform on TB policies, the lack of coordination between TB and HIV/AIDS agencies, and the potential—but largely undocumented—threat of MDR-TB.

Despite these obstacles, the reports highlight an opportunity for civil society organizations to assert a stronger presence in efforts to improve government policy to control TB and a need to better coordinate global advocacy efforts with HIV/AIDS organizations.

A case for TB control in Nigeria

A Olayide. Journalists Against AIDS (JAAIDS) Nigeria, Lagos, Nigeria. Fax: (+234) 1 8128565.
e-mail: olayide@nigeria-aids.org

Nigeria ranks fourth among the 22 high-burden TB countries in the world. Official figures indicate that about 3 million Nigerians are currently HIV-positive. Over the last decade, the rising incidence of HIV has led to a resurgence of TB among both PLWH and the general population. Despite this inextricable linkage, TB and HIV control efforts still run as parallel programmes in the country.

Preliminary findings from the Public Health Watch project in Nigeria show that stigma and limited awareness of TB exist among the general populace as well as among the communities most affected by the TB and HIV/AIDS.

Whereas efforts to control the spread of HIV/AIDS have steadily expanded through both strategic gov-

ernment and civil society-led initiatives, TB control efforts are still viewed as a purely government-led initiative, receiving little media attention and lacking community ownership and involvement. Furthermore, a major weakness of national TB control is an insufficient level of government funding for TB programming.

Activities aimed at raising public awareness of TB, including its curability and the availability of services, need to be promoted with a view to increasing case detection rates and creating a demand for treatment services. Expanding the reach and scope of national TB control efforts will require sustained political will, social mobilisation and engagement of local communities, with participation from PLWH, treatment advocates, care providers, civil society groups and relevant stakeholders. In addition, targeted media strategies should be conducted to hold government accountable to international commitments. Coordination between national TB and HIV control strategies must be promoted and practised at all levels of care.

Times of change: initial findings and recommendations from an assessment of the National TB Programme in Brazil

E T Santos-Filho. Consultant, Public Health Watch, Rio de Janeiro, Brazil. Fax: (+55) 21 22 05 39 90. e-mail: ezio@pelavidda.org.br

Despite a long history of governmental TB-control efforts, Brazil still ranks 15th among high-burden countries, with roughly 85 000 new TB cases and 6000 deaths per year. The federal government long resisted formal adoption of the DOTS strategy; DOTS presently covers only 35 percent of the population. However, several recent developments suggest highly significant and positive changes in the policy climate.

First, the National TB Program (NTP) now seems committed to full implementation of DOTS. Since late 2004, DOTS implementation has proceeded in all Brazilian states in collaboration with state and municipal governments.

Second, the Rio de Janeiro State Forum of NGOs Fighting TB, which was established in 2003, has contributed to a changed conception of the potential role of civil society participation in government policy-making. The Forum is composed of community-based organizations from different sectors (such as HIV/AIDS, women, gays and lesbians, sex workers, district associations, and prisoners' rights) which have placed TB and TB-HIV on their policy agenda. Significantly, the Federal Government has welcomed this initiative as an effective means of increasing governmental accountability.

However, despite these promising developments, further efforts are needed to control TB. TB is still not considered a 'priority disease' among some state and local government health departments. The NTP is

trying to encourage state and local authorities to take concrete measures to improve the quality of TB services and to consider greater participation of civil society organizations to ensure a wider partnership.

More broadly, public awareness of TB and community engagement in DOTS expansion plans are lacking. Government and civil society need to work together to conduct regular sensitization and awareness-raising activities, with expanded participation from community-based organizations of all regions of the country. This wider engagement is essential for the identification and dissemination of effective TB control practices and for monitoring programme implementation.

Monitoring TB programmes in Tanzania

J Mwanjisi. Media Bank, Dar es Salaam, Tanzania. Fax: (+255) 22-2600310. e-mail: samara2001@yahoo.com

TB incidence in Tanzania has increased significantly over the last decade and currently constitutes one of the country's most critical public health problems. Tanzania now ranks 14th among the list of high-burden TB countries, with an estimated 371 TB cases per 100 000 population. The emergence of the HIV/AIDS pandemic and ongoing health sector reforms have had a major impact on TB control.

The National TB and Leprosy Programme (NTLP) was formerly regarded as the one of the best performing vertical disease control programmes in the world. However, HIV/AIDS has at once contributed to a marked resurgence of TB in recent years and placed a severe strain on the national health system, compromising the delivery of basic services. To improve basic health services, the government implemented a series of health sector reforms, including decentralization, cost-sharing schemes, and most notably, a transformation of the NTLP from a vertical programme to a programme that is absorbed within general health care services. While ongoing health sector reforms have improved the overall level of health care, health sector reforms have left gaps in funding and program services. The NTLP implementation in particular has been hampered by a lack of resources and poor infrastructure. The TB case detection rate is only 43 percent, for example.

These infrastructure and resource problems stem from a lack of political will to control TB at the national and district levels. Community-based organizations and the media must be equipped with the skills and knowledge necessary to participate in policy debates so that they can pressure government for increased commitment to TB and for strengthened coordination between TB and HIV programmes. A first step is to launch a national campaign to increase TB and TB-HIV advocacy in Tanzania by forming a core group of civil society organizations, government officials, donors, and private sector representatives.

An assessment of health reforms and the National TB Programme in Thailand

A Soonthorndhada. Institute for Population and Social Research, Mahidol University, Salaya Phuthamontol Nakornpathom, Thailand. Fax: (+66) 2 441-9333. e-mail: prast@mucc.mahidol.ac.th

Since the early 1990s, Thailand has experienced an increase in tuberculosis (TB) cases, which is largely attributed to the impact of the HIV epidemic. Rates of TB and TB-HIV co-infection are relatively high: The WHO estimates that at least 8.7 percent of TB patients are HIV-positive. In 1996, Thailand adopted the DOTS strategy as the core policy of its National Tuberculosis Programme (NTP), and achieved nationwide DOTS coverage in 2002. However, health sector reform has posed considerable challenges to effective programme implementation. Increased commitment from the central government is required to prevent further increases in TB rates.

As a result of health sector reform in 2000, the NTP was incorporated into the Bureau of HIV/AIDS, TB and Sexually Transmitted Infections (STIs). The reforms resulted in a reduction in the NTP's budget and staff size, placing an additional burden on remaining staff. To cut costs, training courses for staff are now minimal, and meetings on supervision and monitoring of NTP implementation are held infrequently, often in conjunction with other health programmes. With Global Fund support due to terminate at the end of 2005, renewed political and financial support to sustain and expand NTP activities are crucial.

However, TB control does not appear to be a priority in many provinces, particularly when compared to other health problems such as Severe Acute Respiratory Syndrome (SARS) or dengue fever. To prevent a potential national TB crisis, the central government must redouble its efforts and commit more resources to TB control. Civil society organizations should harness the momentum of the HIV/AIDS movement to draw attention to the problem of TB and to generate increased public and official support for TB control efforts.

SYMPOSIA: SATURDAY 22 OCTOBER 2005

COMMUNITY PARTICIPATION AND DOTS EXPANSION

Community participation and DOTS expansion: going to scale in Uganda

F Adatu-Engwau. National TB/Leprosy Programme, Ministry Of Health, Kampala, Uganda. Fax: (+256) 41-252839. e-mail: francis@ntlp.co.ug

Uganda is among the 22 high-burden countries contributing about 80% of the global TB caseload. Uganda established a National TB/Leprosy Programme in 1990; its activities gained national coverage in 1995. From 1995, there was an annual average increase of 10% in case notification, with overcrowding of the health facilities. The concept of community-based (CB) TB care using the DOTS strategy was conceived. In 1997–1998 the strategy was piloted in Kiboga district, a rural area with a population of about 160 000 and case notification of about 150 TB cases (all clinical forms) annually. The key problems addressed by this WHO funded pilot study were access, cost and equity. The study assessed the effectiveness of CB-DOTS, acceptability by health workers and community members, and its cost-effectiveness. The study proved that CB-DOTS was feasible, highly effective, accepted by health workers, patients and community members and cost-effective (63%). Expansion of this strategy to other districts started in 1999. Total district coverage was achieved in February 2005. The main challenges experienced in scaling up CB-DOTS were:

- High turn over of trained health workers at health facility and district level
- Shortage of laboratory personnel in health units
- Limited staff in Central Unit to facilitate introduction in all the 56 districts in the country
- Discrepancies between urban and rural communities
- Financial flow for support supervision at district level
- Restructuring of the Ministry of Health

To scale up coverage to sub-county and coverage by patients, Uganda is now training focal persons to coordinate activities at sub-district level (214 health sub-districts). It is further supporting the training of microscopists to cover the understaffed laboratory network (40%). NTLP performance showed an increase in treatment success from 60% to 67% in the 2003 cohort, while case detection stagnated at 53%. The recent national review (25 May–6 June 2005) by The Union showed the following weak areas are impacting on NTLP performance:

- The need for strong IEC/BCC activities. A strategy has been drawn up and will be launched in August 2005.
- Missed diagnosis opportunities in health units. The need to introduce PAL as a means of scaling up quality standard diagnosis in all health units.
- Incomplete recording of patients in the registers. Many patients would complete treatment and their outcomes are not accurately recorded.
- The need to address the outcomes of those patients who are referred out of their original districts.
- The need to integrate TB-HIV care. A National Coordination Committee has been established to coordinate TB-HIV collaborative activities.

Scaling up of CB-DOTS will therefore entail a strong IEC/BCC strategy, establishing collaborative TB-HIV activities, laboratory staff recruitment and retention as well as strengthening supervision at district and sub-district levels.

Community participation in TB control as part of social development: the experience of BRAC

I Md Akramul. Health and Nutrition Program, BRAC, Bangladesh. Fax: (+880) 2 8823614.
e-mail: akramul.mi@brac.net

Introduction: BRAC, an NGO initiated community based TB control program in one sub-district in 1984 as one of the components of poverty reduction program in Bangladesh. By 1992, BRAC extended this model to 10 sub-districts with the support of donors to test the program's upscaling potentials. BRAC is now working for TB in 283 subdistricts of 42 districts covering 82 million population.

Objectives: To mobilize society in making TB diagnostic and treatment services accessible at the grass root level particularly to the poor.

Methods: Female community health volunteers (CHVs) play pivotal role in educating community and ensuring DOTS. BRAC gradually enhanced its social mobilization efforts to create demand and generate support to DOTS. Information on TB disease and service availability is disseminated through meetings with community leaders, local government representatives, micro-credit members, school students and teachers, religious leaders, cured TB patients, village doctors, private medical practitioners and government health and NGO workers in collaboration with the NTP. DOTS committee meetings at different levels with the participation civil society, patients, private practitioners and government officials of different sectors ensure support to DOTS program. World TB Day observed at district and sub-district levels for grater participation of community in TB control. TB club meetings with cured patients were also conducted to increase their involvement in suspect identification and proper referral for diagnosis and treatment.

Results: Case detection rate reached to 75% in 2004 where program started 6 years before. Case detection rates also increased by 10% per year where program started in 2002 and 2003. Average cure rate was over 89%.

Conclusions: Involvement of CHVs and social communication activities lead to active participation of the community and thus mobilize them. Social mobilization could increase case detection rapidly and maintain high cure rate. Accessibility to services is also enhanced by reaching the unreached.

HUMAN RESOURCE DEVELOPMENT: ENSURING A COMPETENT TB WORKFORCE

Ensuring a competent TB workforce: what is needed?

K E Bergstrom. Stop TB Department, World Health Organization, Geneva, Switzerland. Fax: (+41) 22 791 42 68.
e-mail: bergstromk@who.int

Having a competent workforce for TB control must be seen and managed in the broader perspective of managing the health workforce for better performance. This brings together the health and educational sectors to achieve three core objectives of human resource development—coverage, motivation and competence. Competence is the professional ability required to carry out certain functions. Competence is a potential realized at the moment of performance. A competent person has the professional ability to effectively perform a role measured by behavior. Competence requires education with an appropriate orientation and curriculum, continued learning, fostering of innovation and leadership. Appropriate orientation and curriculum includes: well defined professional tasks, measurable educational objectives derived from professional tasks; learning experiences planned giving the trainee a chance to practice the behavior implied by the educational objectives; organization of learning experiences to maximize the cumulative effect; certifying evaluation to confirm and certify competence as defined in the educational objectives. Continued learning includes viewing learning as a lifelong and career-long privilege and responsibility. Fostering leadership and entrepreneurship means among other things nurturing leadership skills that can enable workers to collaborate in teams, listen to others, take risk and create change.

Human resource development in China: training courses or more?

E Oey. WHO, Beijing, China. Fax: (+86) 10 6532 2359.
e-mail: _oeye@chn.wpro.who.int

Background: Insufficient human resources are one of the main constraints in global TB control efforts, also in China. Insufficient numbers are not the only constraint; staff are often not competent to do the job they are assigned to. Another constraint is that jobs are often not well defined and tasks are not clearly assigned to available staff. The TB program in China has an extensive training program, making use of lectures to disseminate knowledge. In February 2004, WHO reviewed the human resource development component of the National TB program in China, and recommended intensified support to improve the national training program and build capacity at national level. From October 2004 WHO and the National Center for Tuberculosis (NCTB) are working together on human resource development.

Purpose of the presentation: To give a brief overview of the HRD situation within the NTP in China and to share experiences from one year of working together. The presentation will first give a short overview of the following issues: TB control in China and the status its training program and human resources; Efforts to improve the quality of the training program and trainers; Efforts to address the staffing situation. The presentation will next discuss: accomplishments so far; barriers and constraints; and lessons learnt. Finally, the presentation will: give a brief overview of future plans; give recommendations and suggestions and give room for questions and comments from the audience.

The TB Education and Training Network: bringing together TB education and training professionals

M Fraire. US Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+1) 404-639-8960.
e-mail: mfraire@cdc.gov

The TB Education and Training Network (TB ETN) was formed in 2001 to provide a forum to bring TB professionals together to network, share resources, and build education and training skills. Primarily through capacity building, TB ETN strives to develop a cadre of TB educators and trainers with improved TB education and training skills and abilities, knowledge of available resources, and the ability to serve as a resource for high priority needs, such as outbreaks and the implementation of new guidelines. The goals of TB ETN are to strengthen TB education and training by:

- Building, strengthening, and maintaining collaboration
- Providing a mechanism for sharing resources to avoid duplication

- Developing, improving, and maintaining access to resources
- Providing updated information about TB courses and training initiatives
- Assisting members in skill building

Currently, membership includes representatives from TB programs, correctional facilities, hospitals, nursing homes, federal agencies, universities, the American Lung Association, Regional Training and Medical Consultation Centers, and other U.S. and international organizations interested in TB education and training issues.

This presentation will provide an overview of the TB ETN and its role in ensuring a competent TB workforce.

Nurses educational program in Turkmenistan: ensuring TB training for nurses

B Kochumov. Project HOPE, Turkmenistan, Ashgabat, Turkmenistan. e-mail: bkprojecthope@online.tm

Objective: To strengthen the TB control program in Turkmenistan through ensuring DOTS training for family nurses of primary healthcare (PHC) system.

Methods:

- Goals and objectives of training program determination
- Assessment of training needs for nurses educational program on DOTS conducting
- Pilot site for trainings and target group of trainees identification
- Questionnaire development and questioning campaign to identify gaps in basic knowledge on TB and DOTS
- Tool to strengthen TB Control program development
- Development of curricular and materials for training
- Probe trainings conducting
- Training materials adjustment
- Results estimation
- Experience distribution planning

Background: To build up an effective TB Control Program, it is necessary to ensure that all healthcare providers involved in TB Program implementation including nurses are provided with reliable information about TB and DOTS.

Results: Family nurses are involved in TB case finding, patients' treatment on continuation phase (DOT) and IEC/BCC among population and TB patients. As a site for family nurses training program was selected. The questionnaire assessing the basic knowledge on TB was developed. It consisted of 20 questions on epidemiology, etiology, ways for TB transmission, detection methods, treatment, prevention such as: 'Is TB hereditary disease?', 'Is TB curable disease?', 'How TB is detected?', 'Does BCG vaccination fully protects from TB?' The questioning was conducted among 74 PHC nurses of Turkmenbashi town of Balkanabat velayat. The results of questioning revealed

the lack of knowledge on TB etiology, detection and prevention methods. In particular: 54% of nurses answered that TB was hereditary disease, 8%—that TB could not be cured. 62% and 56% of nurses accordingly believed that BCG vaccination and tuberculin testing could absolutely protect from TB. 88% of interviewees answered that X-ray was probably the main method of detection of infectious TB patients. Curricular and training materials were probed and adjusted. Totally 74 family nurses were trained. Pre-testing and post-testing results demonstrated knowledge increase by 46,1%. Preliminary program performance results evaluation on 93 TB cases treatment results demonstrated performance improvement through increased patients' adherence: number of patients missing dosage intakes decreased by 8%, and length of interruption went down from average 8 days before to 2 days after the training.

Conclusions: Taking into consideration the great importance of family nurses contribution into the process of TB patients' detection, treatment and population/TB patients' education on TB, it is necessary to plan and develop the family nurses' educational program implementing DOTS.

OPERATIONAL RESEARCH IN TB-HIV AND DRUG-RESISTANT TB

Management of HIV-infected smear-negative TB patients

A Harries.^{1,2,3} ¹HIV Unit, Ministry of Health, Lilongwe, Malawi; ²Family Health International, Research Triangle Park, North Carolina, USA; ³London School of Hygiene and Tropical Medicine, London, UK. Fax: (+265) 1 774307. e-mail: adharries@malawi.net

The management of smear-negative pulmonary tuberculosis (PTB) in HIV-infected patients is difficult. In early HIV infection, a TB patient has typical symptoms of TB and tends to have positive sputum smear microscopy. With more advanced HIV infection and compromised immune status, symptoms become atypical and the smear tends to be negative. The main problem in management lies in the diagnosis. In resource-poor countries, diagnosis is based on chronic cough, negative sputum smears, failure to respond to a course of antibiotics, and an abnormal chest X-ray. Operational research has identified a number of issues relating to this process: 1) health workers failing to diagnose HIV-related lung diseases that present like PTB and not adhering to diagnostic algorithms resulting in incorrect diagnosis; 2) inability of the diagnostic antibiotic trial to reliably distinguish TB from other HIV-related lung disease; 3) lack of sensitivity of sputum smears and problems of false-negative sputum smears; 4) non-specific characteristics and difficulties in interpreting the chest X-ray; and 5) the

length of time to make the diagnosis, resulting in a compromised treatment outcome. A rapid, reliable and simple diagnostic tool would immeasurably improve the diagnosis and management of this disease. Previously, lower priority was given to the treatment of smear-negative PTB, because of the perception that it has a low risk of transmission and is associated with a good outcome. However, in HIV-infected patients and their contacts, research has shown that infectivity is not minimal, and operational research has shown that treatment outcomes may be very poor, mainly because of the poor immune status of HIV-infected patients. Research studies have shown that cotrimoxazole preventive therapy may reduce case fatality rates in these patients, and studies need to be done to assess the value of concomitant antiretroviral therapy.

TB-HIV program linkage in northwest Cambodia and an approach to TB screening

C Phalkun. Gorgas TB Initiative / FHI / Cambodia: TB-HIV Pilot Project in Battambang Province, Battambang, Cambodia. Fax: (+855) 23 211 913. e-mail: cphalkun@uab.edu or cphalkun@yahoo.com

Linking TB and HIV care services and improving access for dually infected patients are challenging issues in resource-poor settings. Given limited bacteriology capacities, the diagnosis and management of smear-negative pulmonary TB among HIV-infected patients is particularly difficult. Issues of TB screening and instituting Isoniazid preventive therapy (IPT) must also be addressed. A pilot TB-HIV program in northwest Cambodia (Battambang province) was established with the primary goal of establishing a functional model for integrated TB-HIV care. Its chief aims are to 1) institute active TB case finding, 2) provide early TB treatment access for HIV-infected persons, and 3) improve access to VCT and HIV/AIDS services for TB patients. The pilot relies upon a technical support team with a TB-HIV coordinator, cross referral systems, coordination and monitoring meetings, continuous staff training/capacity building, attention to staff motivation, and patient access to service delivery points.

All HIV-infected persons are referred from VCT to district hospitals and screened for tuberculosis with CXR, smear microscopy and culture. Those without active TB are considered for IPT. Registered TB patients are counseled and referred to VCT. From September 2003–April 2005, among the 1841 VCT clients who tested HIV positive, 1704 were screened for TB. 316 (18.5%) had active TB (94 SS+, 104 SS–, 118 EPTB); 74 enrolled into IPT.

Active case finding among HIV-infected populations is doable, allowing for early TB detection, treatment initiation and consideration for IPT. To facilitate access and patient referrals, transportation

barriers must be addressed. Culture for *Mycobacterium tuberculosis* represents a critical resource for screening for smear-negative pulmonary TB cases among HIV-infected clients. Additional benefit can be realized by integrating early screening for TB into VCT centers, which represent key entry points for HIV/AIDS and TB patients in high burden countries where all HIV-infected persons should be considered TB suspects, regardless of symptoms.

Using DOT workers to deliver ARVs

F Leandre. Zanmi Lasante (Partners In Health), Cange, Central Plateau, Haiti. Fax: (+1) 617-432-6045. e-mail: leandref@aol.com; dmoses@pih.org (assistant in Boston Office)

Optimal efficacy of antiretroviral therapy requires consistent adherence to medications. Even in resource-rich societies, achieving high levels of adherence can be difficult. In situations such as that in rural Haiti, where many people struggle daily to find food and clean water for survival and where medical care has not previously been widely available, ensuring adherence to complicated medical regimens is all the more challenging.

The Zanmi Lasante (Partners In Health) HIV Equity Initiative provides comprehensive HIV care, free of charge to patients in Haiti's rural Central Plateau. The programmatic approach to HIV care was initially based on successful tuberculosis control efforts. Patients with HIV infection (many of whom had active TB at diagnosis) were assigned community health workers to visit daily and deliver HIV medications. Many outreach workers began to visit patients more often than once per day and became 'accompagnateurs' who not only supplied medications to patients, but who provided essential moral and social support, accompanying patients to clinic visits and providing a community-level base for support of their illness. Accompagnateurs are now trained to assess for common side-effects to medications and signs of HIV-related illness. They visit patients at least once per day to deliver and observe doses of antiretroviral medication (ART). They report to clinicians if patients develop new medical or socio-economic conditions that may have gone unnoticed.

Of key importance is also that medical care and medications are provided free of charge to patients, since cost of care may be a significant barrier to adherence. The community-based delivery of ART is combined with comprehensive socio-economic evaluation and support—both financial, housing and nutritional. The drop out rate for patients in this program is less than 2%.

Timing of the introduction of different MDR-TB regimens and their effect on outcomes

C Bonilla. Ministry of Health, Peru. e-mail: cesarbon@yahoo.es

Many National Tuberculosis Programs are facing the task of integrating multidrug-resistant tuberculosis (MDR-TB) therapy into their ongoing program operations. The experience of Peru over the last decade can provide other programs with useful empiric data borne of national-level efforts to improve the care of MDR-TB patients. Between 1996 and 2002, more than 3500 patients were treated for MDR-TB by the National TB Program in Peru with the collaboration of international and local NGOs. During this period, national protocols for management of MDR-TB disease changed several times. Initially, patients were referred to an individualized or a standardized regimen for MDR-TB after failing repeated courses of standardized short-course chemotherapy. Subsequently, patients were referred to MDR-TB regimens after exposure to two courses of standardized short-course chemotherapy. Most recently, the protocol was changed to refer patients to MDR-TB therapy after failing only Category I therapy. About 2500 patients received a standardized MDR-TB regimen and about 1000 received an individualized MDR-TB regimen. We will report on the range of treatment experience and outcomes of the 3500 patients treated for MDR-TB disease in Peru under these different protocols.

RECONSTITUTING MYCOBACTERIAL IMMUNITY IN AIDS

New vaccines for tuberculosis

P Andersen. Department of Infectious Disease Immunology and SSI Centre for Vaccine Research, Statens Serum Institut, Denmark. e-mail: pa@ssi.dk

Tuberculosis is one of the biggest infectious disease killers worldwide, a situation worsened by the advent of the HIV epidemic and the emergence of multidrug-resistant strains of *M. tuberculosis*. The current TB vaccine, BCG, although efficient against severe childhood forms of tuberculosis, has limited effects on the development of the predominant pulmonary form of the disease in adults. Therefore, for a number of years, large resources have been invested in the identification of candidate molecules for the inclusion into a new generation of TB sub-unit vaccines. With the complete genome of *M. tuberculosis* available, antigen discovery has taken a leap forward and applies highly efficient post genomic approaches based on proteomics and antigen/epitope identification in silico. This has resulted in the identification of a large number of antigens within the last 6–8 years, many of them with potential in TB vaccines. Many of these molecules are encoded by genes within a few immuno-

dominant gene families, and the multiple members within these families may serve as a source of antigen variation and result in pathogen escape from the host immune system. The next phase of this work has now started—putting the most relevant molecules back together as fusion molecules and cocktails. This requires careful monitoring of aspects such as immunodominance, recognition in different populations as well as the influence of different adjuvants and delivery systems. The establishment of these highly defined effective vaccines allows detailed studies of the optimal route, as well as prime-boost regime for expression of immunity in the lung, and enables further attempts to determine correlate markers of protection in TB. The most advanced of these vaccines, such as the fusion between ESAT6 and Ag85B, have been evaluated in a range of animal models including non-human primates and are now in the clinical trial pipeline. For these vaccines to be successfully implemented in future vaccination programmes, it is necessary to understand the immunological background for the failure of BCG and optimize the vaccines for their ability to boost the immune response primed by BCG, environmental mycobacteria or already established latent TB.

TB risk in early HIV infection

P Sonnenberg. London School of Hygiene and Tropical Medicine, London, UK. Fax: (+44) 208-2007868.
e-mail: pam.sonnenberg@lshtm.ac.uk

Background: HIV increases the risk of tuberculosis, but no study has assessed how this risk changes with time since seroconversion.

Methods: The incidence of pulmonary tuberculosis was estimated in South African gold miners with and without HIV infection in a retrospective cohort study. HIV results were linked to routinely collected tuberculosis, demographic and occupational data. The rate ratio (RR) for the association of HIV status and tuberculosis was estimated by duration of HIV infection, calendar time and age.

Results: Of the 23 874 miners in the cohort, 17 766 were HIV-negative, 3371 were HIV-positive on entry and 2737 seroconverted during the follow-up period (1962 had seroconversion intervals of ≤ 2 years). 740 cases of tuberculosis were analysed. The incidence of tuberculosis increased with HIV, age and calendar period. Tuberculosis incidence was 2.90/100 person-years-at-risk in HIV positive and 0.80/100 person-years-at-risk in HIV negative miners: adjusted RR 2.9; 95%CI 2.5–3.4. Tuberculosis incidence doubled within the first year of HIV infection (adjusted RR 2.1; 1.4–3.1), with a further slight increase in those infected for longer periods, up to 7 years.

Conclusion: The increase in the risk of tuberculosis so soon after HIV infection was unexpected. In areas endemic for tuberculosis, current models and predic-

tions of tuberculosis incidence underestimate the effects of HIV.

Immune reconstitution inflammatory syndrome

G Breton. Hôpital Pitié-Salpêtrière, Paris, France.
Fax: (+33) 1 42 16 10 65.
e-mail: guillaume.breton@psl.ap-hop-paris.fr

Antiretroviral treatment (ART) induces an immune reconstitution and has led to a decrease in mortality in HIV-infected patients. However, this reconstitution may be pathological and causes immune reconstitution inflammatory syndrome (IRIS). This syndrome includes pleiomorphic manifestations related to an excessive immune response against various infectious or non infectious antigens. Tuberculosis is one of the most frequent pathogen associated with IRIS.

During tuberculosis the frequency of IRIS varies from 11% to 45% in retrospective studies. The most common presentation of IRIS is fever and inflammatory lymphadenopathy occurring within 2 weeks after ART initiation. Numerous other manifestations such as pulmonary infiltrate, pleural effusion, spleen abscess, ascite or intracranial tuberculoma are reported. Severe complication with respiratory distress or compressive lymphadenopathy can occur.

The diagnosis of IRIS relies on negative culture of clinical samples, increase in CD4 cells, decrease in HIV viral load and lack of other etiologies such as relapse of infection, poor adherence to treatment, drugs side effects or other infections. Pathological feature showing epithelioid and giant cell granulomas confirm the functional reconstitution of immune response.

The management of IRIS remains uncertain. Immune reconstitution being the goal of therapy, ART if possible should not be stopped. Even if spontaneous favorable outcome is observed in about half cases, corticosteroids are widely used. However the indication, the posology and the duration of corticosteroid therapy has not been evaluated in clinical studies. Risk factors for IRIS are dissemination of tuberculosis and ART initiation early after tuberculosis treatment initiation. A delay in ART initiation may decrease the incidence of IRIS, however this strategy may facilitate the emergence of opportunistic infections in the most severely immunocompromised patients.

IRIS complicates the management of HIV-tuberculosis infection. A better knowledge of this syndrome should improve the prognosis and allow preventive strategies.

TB CONTROL IN COMPLEX EMERGENCY SITUATIONS: LESSONS FROM THE FIELD

Working together to reconstruct TB health services after major conflict: the experience of Timor Leste

N Martins. UniversidadeDa Paz, Dili, Timor Leste.
e-mail: dasilaku702003@yahoo.com.au

Background: Tuberculosis is a major public health problem in East Timor. Magnitude of TB Problem was increase due to political conflict in 1999. Soon after the conflict resume many people from many different organizations contributed to the establishment of a National Tuberculosis Control Program (NTP). Within a few months, the program was operational in all districts in the country. The keys to success of the NTP, where other programs in East Timor and other TB control programs in other complex emergencies have failed, are worthy of further exploration

Design: We employ a semi-structured interviews in appropriate language with key stakeholders in East Timor, Australia and other countries to explore the barriers and assist factors in reconstructing TB Services in Timor Leste. We found coordination, cooperation and collaboration were the key elements for the development of the NTP. The NTP was regarded by many as the 'shining light' of the reconstruction process in East Timor. The local structure and the experience of Caritas East Timor (a local non government organisation), the widespread commitment to establish an effective TB program and the willingness of international consultants to 'bend the rules' for the establishment of a sustainable program, have been identified as other key factors. Barriers that were overcome during this period included a lack of infrastructure (including physical structures, equipment and consumables), mass displacement and the competing interests of international non-government organisations, Timorese health workers and the United Nations.

Conclusion: A sustainable NTP has been successfully established in East Timor. Our findings suggest that the coordination, cooperation, collaboration, commitment, willingness to adapt to local circumstances and the early appointment of a local structure with local experience were the keys to success to health system development in this post-conflict setting.

Tuberculosis: patient management in complex emergencies

F Varaine. Médecins Sans Frontières, Paris, France.
e-mail: fvaraine@paris.msf.org

Setting: Combinations of war, civil strife, food shortage, and population displacement usually result in significant excess mortality and morbidity related to tuberculosis (TB). However, the relevance of TB management in such situations has often been questioned.

Objectives: To describe TB activities of Médecins Sans Frontières (MSF) in complex emergencies (CE) and discuss the results.

Methods: Review of quarterly reports and evaluation of MSF TB services in CE in 2004.

Results: MSF provided care in CE situations to 4000 TB patients in 29 projects (14 countries) in 2004. Political situations varied from open conflicts (e.g., Chechnya, Somalia) to stable refugee camps, with varying levels of insecurity, with or without displaced populations. Estimated HIV prevalence ranged from below 1% (Caucasus) to about 25% (DRC). Malnutrition was a major concern in Angola and almost non-existent in Abkhazia. Sub-standard treatments were initially always available. Maximal frequencies of different forms of TB were: 45% pulmonary smear-negative (M-) in Bouaké (Côte d'Ivoire), 70% smear positive (M+) in Maela (Thailand), 50% extra-pulmonary (EP) in Lankien (Sudan). Children represented up to 36% of patients (Kaala/Angola). Drug resistant TB (DRTB) affected 48% of patients in Abkhazia. Standard category 1 and 2 or Manyatta regimen (Sudan) were used. Treatment was adapted to resistance patterns in Abkhazia. Support to adherence included patient education, incentives, food and lodging for treatment duration, according to context. Contingency plans to prepare for possible evacuation were designed. Success rates for new cases varied from 60% (Abkhazia) to 90% (Sudan), and death rates from 4% (Sudan) to 20% (Kaala/Angola). Treatment completion was above 90% in 26 projects.

Discussion: TB can be treated in CE with results similar to stable contexts. Once acute emergencies are addressed, objectives should be the detection and adequate treatment of patients. When capacity is limited, priority must be given to severely ill patients (M+, M- and EP). Children deserve special attention. Adapted strategies can ensure adherence to treatment. The right for TB treatment should not be denied in CE.

After the TV images fade: sustaining reconstructed TB control systems

P M Kelly. Menzies School of Health Research, Darwin, Australia. Fax: (+61) 8 8927 5187.
e-mail: paulk@menzies.edu.au

Images of complex humanitarian emergencies make good television and provoke outpourings of humanitarian relief from individuals and governments. Countries with a high burden of tuberculosis (TB) are also more likely to experience major conflict or natural disasters. Given that TB was a public health priority in these countries prior to the crisis, and that crises can increase TB prevalence, TB control should be a priority concern during the humanitarian response.

The link between short-term humanitarian relief and the building of sustainable health systems is a

contentious issue. There is a broad international consensus on the appropriate features of tuberculosis control programs in resource poor countries with well established health systems. There is, however, considerable debate about the timing of the introduction of TB control programs in complex emergency situations, with sustainability and long term implications of TB treatment central to these arguments. Health sector reform is an increasingly common accompaniment of post-conflict health service reconstruction, and is tied to humanitarian assistance packages. There is little published work on the effect of the timing of health service reform on the sustainability of the new systems developed in these settings. Due to the requirements for a well functioning health system to support DOTS, and the long term nature of TB treatment, TB control is a useful marker of health system development and sustainability.

In this talk, the technical, social, political, financial and managerial elements of sustainability of health systems related to TB control will be examined. Examples from the field will demonstrate the essential elements required to sustain TB control after the TV images have faded and global interests and funding have moved on to the next disaster. The feasibility and relevance of the development of revised guidelines for TB control in complex emergencies will also be explored.

TUBERCULOSIS AND TOBACCO

Results of systematic reviews of the relationship between tobacco and tuberculosis

C-Y Chiang. International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+33) 1 43 29 90 87. e-mail: cychiang@iuatld.org

Several studies have reported an association between tobacco and tuberculosis. The International Union Against Tuberculosis and Lung Disease (The Union) and the Tobacco-Free Initiative of the World Health Organization are working together to carry out a systematic review to assess evidence of the impact of active and passive tobacco exposure on tuberculosis infection, disease and mortality.

Article search and selection were performed independently by two people at the Union. A number of experts were invited to be members of a steering committee for this review, to define the criteria for the inclusion of existing literature and information to be included in the systematic review. Five experts working in the field of tuberculosis and tobacco were invited to review articles.

A pilot-tested data collection form is used to obtain information from the articles. Quality is evaluated by a qualitative review form, which gives a

total score to each article based on the study population, assessment of exposure to tobacco, assessment of the tuberculosis outcome, study design and analysis of the data. High quality studies, those that have a quality score above the mean score for all articles in each category, are used to assess evidence of the impact of active and passive tobacco exposure on tuberculosis infection, disease and mortality.

Levels of evidence are ranked according to the following:

- 1 *Strong evidence* is provided by generally consistent findings in multiple high-quality cohort and case-control studies
- 2 *Moderate evidence* is provided by generally consistent findings in
 - a One high-quality cohort and two or more high quality case control studies, or
 - b Three or more high-quality case control studies
- 3 *Limited evidence* is provided by generally consistent findings in
 - a A single cohort study or
 - b One or two case-control studies or
 - c Multiple cross-sectional studies
- 4 *Conflicting evidence* is provided when less than 75% of the studies report consistent findings

Preliminary results of this systemic review will be reported in this meeting.

Potential public health implications of the relationship with tobacco for tuberculosis control

A Khalakdina, K R Smith. South East Asia Regional Office, World Health Organization, New Delhi, India. Fax: (+91) 11-2337-8412. e-mail: asheenak@whosea.org / asheena@gmail.com

TB is a scourge that has a complex epidemiology and the technological tools at our disposal for combating the disease are outdated. Nevertheless, the control of tuberculosis, particularly in developing countries, has progressed with laudable achievements in population coverage for TB services; case detection of actively infectious TB cases; and achievement of high treatment success, under the internationally recognized DOTS strategy. However, as much as DOTS has achieved, the strategy may be reaching limits. The core principle of has been to halt transmission by successfully treating those who are most likely to transmit bacilli, i.e., pulmonary cases who are sputum smear-positive. Even if transmission is greatly reduced, however, there still exist several issues that are not adequately addressed by DOTS. To name a few: re-infection with TB is still possible after cure; latent TB infection serves as a reservoir for new cases; and extra-pulmonary and smear-negative TB comprise a large proportion of all TB cases. A broader public health approach to TB control is called for which would highlight primary prevention from TB infection and prevention of

progression of latent infection to active disease. There have been several inter-related risk factors identified for TB that complicate targeting of preventive measures. The evidence from the past 50 years shows that tobacco smoking is one such modifiable risk factor that has been consistently associated with increased TB infection (as measured by PPD skin test); with active TB disease (bacteriological or clinically confirmed); and with TB mortality. With adequate promotion of smoking cessation at both population and individual level, significant strides could be achieved in reducing the burden of tuberculosis as well as the many other ill-effects of smoking. Presented here are the results of a systematic review and meta-analysis of the worldwide TB and smoking literature and preliminary estimates of attributable fractions of TB from smoking in different populations.

Tobacco and tuberculosis: studies from India

P Gupta. Healix - Sekhsaria Institute of Public Health, Navi Mumbai, India. Fax: (+91) 22 2787 3026. e-mail: pcgupta@healis.org

In India, pulmonary tuberculosis is a major health problem with over 2 million prevalent adult cases. It therefore also constitutes a major cause of premature death. As the prevalence of smoking among men is high, an accurate assessment of the relationship between smoking and TB is of utmost public health importance for India. The cross-sectional studies done in India show that the prevalence of self-reported TB and of confirmed disease was about 3 times higher among the ever-smokers compared to the never-smokers. The relative risk of mortality from TB has been reported from case-control and cohort studies as 3 to 4 times higher in ever-smokers compared to never-smokers. A clear dose-response relationship of smoking exposure has been reported for the prevalence of TB as well as for the deaths due to TB. In India, in addition to cigarette smoking, bidi smoking is very common. Bidi contains a small amount of tobacco (~0.2 g) rolled in a tree leaf in a slight conical shape, tied with thread. In studies where the risk of death due to bidi smoking was calculated separately from that due to cigarette smoking, relative risks were higher for bidi smoking. It is estimated that smoking contributes to half the male deaths from TB in India and a quarter of all male deaths in the middle age (25–69 years). Preventing initiation of smoking and quitting smoking would be important and effective strategies for preventing onset of TB and death from TB.

Smoking and tuberculosis in Hong Kong and other parts of China

C C Leung. Tuberculosis and Chest Service, Department of Health, Hong Kong SAR, China. Fax: (+852) 29775940. e-mail: cc_leung@dh.gov.hk

Tuberculosis (TB) remains an important problem in Hong Kong and other parts of China. Despite successful implementation of DOTS, the estimated annual incidence of tuberculosis is still close to 100/100 000.

Smoking has been found to be an important risk factor of TB in a cross-sectional study in 1988 and in a large-scale mortality study more recently. A clear relationship between smoking and TB has also been demonstrated among a prospective cohort of 42 655 elderly in Hong Kong. The annual TB notification rates were 735, 427, and 174 per 100 000 among current smokers, ex-smokers and never-smokers respectively. The excess risk applied to pulmonary but not extrapulmonary TB. Smoking cessation almost halved the risk. The trend persisted after control of relevant background characteristics using Cox proportional hazards analysis. A statistically significant dose-response relationship was observed among current smokers. Smoking accounted for 32.8%, 8.6% and 18.7% of the TB risk among males, females and the whole cohort respectively. About 45% of the gender difference was attributable to smoking. In another study among TB patients, ever-smokers were more likely than never-smokers to have cough, dyspnoea, upper zone involvement, cavity, miliary lung involvement, positive sputum culture, but less isolated extrathoracic involvement. These differing disease characteristics suggest a probable airborne insult. A higher infectivity also appears likely in the presence of symptomatic and more aggressive lung involvement.

Male smoking prevalence remains high in many parts of China. Female smoking rate, though low, is increasing, especially in urban areas. The interaction between smoking and the huge pool of latently infected individuals in an aging population is a serious concern. Both primary preventive and smoking cessation measures should be considered alongside DOTS in the fight against TB.

Cigarette smoking and infection

L Arcavi. Kaplan Medical Center, Rehovot, Israel. Fax: (+972) 8 9441158. e-mail: arcavi_l@clalit.org.il or lidia.arcavi@gmail.com

Infectious diseases may rival cancer, heart disease, and chronic lung disease as sources of morbidity and mortality from smoking. Both active and passive cigarette smoke exposure increase the risk of infection. The morbidity and mortality of infectious diseases due to smoking are not widely appreciated by physicians. The specific mechanisms by which cigarette smoking increases the risk of systemic infections are

incompletely understood and include structural changes in the respiratory tract and a decrease in immune response. Cigarette smoking is a substantial risk factor for important bacterial and viral infections. For example, smokers incur a 2- to 4-fold increased risk of invasive pneumococcal disease. Influenza risk is several fold higher and is much more severe in smokers than non-smokers. Perhaps the greatest public health impact of smoking on infection is the increased risk of tuberculosis, a particular problem in underdeveloped countries where smoking rates are increasing rapidly. The clinical implications of the increased risk of infection among cigarette smokers include emphasizing the importance of smoking cessation as part of the therapeutic plan for people with serious infectious diseases or periodontitis, and individuals who have positive tuberculin skin tests. Controlling exposure to secondhand cigarette smoke in children is important to reduce the risks of meningococcal disease and otitis media, and in adults to reduce the risk of influenza and meningococcal disease. Other recommendations include pneumococcal and influenza vaccine in all smokers and acyclovir treatment for varicella in smokers.

Where should we go from here?

J-P Zellweger. University Medical Out-patient Department, Lausanne, Switzerland. Fax: (+41) 21 314 47 40. e-mail: zellwegerjp@swissonline.ch

Tuberculosis and tobacco kill about the same number of human beings worldwide each year—and the trend seems to be increasing for both. As the discussion about the efficiency and the failure of control programmes is open, there is room for considering in more detail the factors that increase 1) the risk of being infected if exposed, 2) the risk of reactivating if infected, and 3) the risk of having a protracted or unfavourable outcome if the disease has developed. If such factors exist and can be modified, they should be considered together with the drug treatment of tuberculosis. Smoking increases all these risks, by impairing the local defence mechanisms in the mucosa, by increasing dissemination of mycobacteria from the lung by a coughing patient and by destroying the parenchyma and obstructing the airways. It is therefore quite legitimate to include smoking among the potentially modifiable risk factors for the propagation of tuberculosis and to include support of smoking cessation (or prevention of initiation of smoking) among the actions to be taken in the management of patients with tuberculosis or in a country with a high burden of disease. This means that health care workers and managers in charge of tuberculosis programmes have to understand this interaction, be prepared to address the topics with the patients and be able to stop smoking themselves, if they smoke. This also means that tuberculosis can be included among the possible health

consequences of smoking in countries with a high incidence rate and that the possibility of facing patients with combined pulmonary involvement, increasing the diagnostic and therapeutic difficulties, must be kept in mind.

SCALING UP TB-HIV CARE: IMPLEMENTATION, ADHERENCE, COMMUNITY PARTICIPATION

Update on Malawi: results of first year of implementation

A D Harries. HIV UNIT, Ministry of Health (seconded from Family Health International, USA, and also honorary attachment at the London School of Hygiene and Tropical Medicine, UK), Lilongwe, Malawi. Fax: (+265) 1 774307. e-mail: adharries@malawi.net

Malawi is scaling up antiretroviral therapy (ART), based on a 2-year national scale up plan [2004–2005]. The main elements of the plan are: i) 59 hospitals and clinics in the public health sector are selected for ART scale up, providing broad geographical coverage in the country; ii) ARV drugs are provided free of charge in the public sector; iii) scale up in new facilities involves first line ARV regimen only (stavudine/lamivudine/nevirapine), but when facilities have shown capacity to deliver this treatment, they will be provided with alternative first line and second line therapy; iv) facilities are only provided with ARV drugs if they have been formally assessed by the HIV Unit of the Ministry of Health as ready to deliver ART.

A national training plan on ART commenced in May 2004; one year later over 750 doctors, clinical officers and nurses in all 59 facilities had completed formal training. All facilities were assessed as ready to deliver ART by March 2005. At the start of 2004, 9 facilities were delivering ART; this number increased to 24 by October 2004, 34 by January 2005 and 59 by July 2005.

National monitoring and evaluation takes place quarterly. In the fourth quarter of 2004, 3261 new patients were started on ART in 24 health facilities, with a cumulative total of 13183 patients ever starting ART by the end of 2004. For the quarterly and cumulative analysis, 40% of patients were male and 95% were adults. Of patients who ever started on ART, 84% were alive, 8% were dead and 8% lost to follow-up. Of those alive and on ART: 98% were ambulatory; 85% fit to work; 10% had one or more major side effects; and 96% based on pill counts showed 95% or more adherence to therapy. These are encouraging results.

Positively empowered partnerships (PEP), participatory patient involvement in prevention, detection and adherence: new tools in scaling up TB, TB-HIV and TB-MDR care

C Gordon. TBTV.ORGViols en Laval, France.
Fax: (+33) 4 6759 5359. e-mail: gordon@tbtv.org

In the 25 years since Toman's 'Tuberculosis: Case Detection, Treatment, and Monitoring' was published and became a guiding light, thousands of further studies have looked in depth into tuberculosis with a view to solving a global public health problem. Almost all this scholarship has been from a medical perspective, with the recent exceptions of brand research and marketing communication assessment studies. Only a few have sought to understand the impact of community involvement, and just a mere handful have looked exclusively at the results of patient participation in the implementation of TB programs. Seen through a patient's eyes, most of this scholarship seem to underline the equation that patient equals problem, and reflect a century of stigmatization of those who have been infected by this communicable disease. Recent research into limited community participation illustrates the potential of these interventions, albeit that the community studied does not include the patients as equal participants. However, there have been a few evaluations of patient participation, such as studies of TB Clubs in rural Ethiopia or groups in urban Peru, where the infected/cured community takes responsibility for key elements of tuberculosis care, in partnership with health providers. Each of the studies of patient-driven initiatives provides clear evidence of dramatic increases in results, and calls for further assessments of this approach. The call has remained unanswered. Shining through these dark days of MDR, TB-HIV pandemics and failures to achieve key targets, is the learning from the positive experiences of other people living with diseases. Tuberculosis patients are now seeking to take greater responsibility, to have a role in their and their families' care provisions, and to have a say in what their lives depend on. By doing so, the stigma that has flowed downward for generations can begin to be addressed in real terms, and these positively charged patients can begin to contribute to the community's efforts to control the disease, to develop champions, whose empowerment is contagious. TB patients can finally see a light on the horizon, and the forthcoming Patients Charter of the Tuberculosis Community, in tandem with the International Standards of Tuberculosis Care, will put patient centered care into focus. Patients can now feel welcome to participate, and this initial empowerment can join forces with enlightened health experts and providers to further study and develop new innovative interventions on the ground. Patient experts agree, these positively empowered partnerships can forge new tools for

improved prevention, detection and adherence, scaling up TB-HIV care, and slapping down stigma.

A PLHA support group in Northwest Cambodia: MMM in Battambang

C Natpratan. Family Health International Cambodia, Phnom Penh, Cambodia. Fax: (+855) 23 211 913. e-mail: chawalit@fhi.org.kh

HIV/AIDS care requires a wide range of services such as psychological, social and legal support, as part of a multi-component, comprehensive care program. Mondul Mith Chouy Mith (MMM) is an essential component within the Continuum of Care framework in Battambang. It facilitates PLWHA to come together for a wide range of activities and strengthens partnership with health care workers. MMM translates as 'friends helping friends'; its primary activity is a monthly meeting for PLWHA and the groups working with them to provide care and support. A successful MMM requires the commitment of local health administrators, health staff providing HIV care, and an expanded partnership with community-based NGOs supporting PLWHA. A comprehensive set of care and support activities are offered, such as health education, prayer and meditation, a common meal, support for orphans and self-help group discussions concerning income generation, psychological support and medical services. Applying a 'missed opportunity' strategy, medical services are provided during the MMM day for VCT of family members and friends, OI management including TB, and counseling for PMTCT. Most important, MMM offers opportunities for PLWHA to share experiences, support each other and reinforce positive living. MMM also provides capacity building for PLWHA to become advocates, educators and counselors in their communities. At the start of the MMM component, PLWHA explained they did not frequent the hospital due to stigma and discrimination. Since MMM began, support from health workers has led to more medical consultation, and discrimination has decreased on the part of hospital staff. Additionally, with support from NGOs working on home-based care, a positive people network and support group was established that reaches into villages directly. These home-based care teams play an important role to provide care, follow up PLWHA who miss appointments, and education and information for families and communities on HIV/AIDS.

EXPANDING TB CULTURE SYSTEMS

Developing culture capacity in TB diagnostic services: the new old challenge

M Abdel Aziz. World Health Organization, Geneva, Switzerland. Fax: (+41) 22 7914268. e-mail: azizm@who.int

Although high quality sputum smear microscopy is the cornerstone of DOTS and remains the highest priority for case detection and the TB control, the strengthening of *M. tuberculosis* culture and drug susceptibility testing (DST) services is necessary especially in high HIV and MDR-TB prevalence settings. Culture of mycobacteria provides the definite diagnosis of TB, and is considered the gold standard for bacteriological confirmation of the disease. Culture on solid media, especially Löwenstein-Jensen media and its modified version introduced by the Union, is the most widely used technique. Culture technique is more sensitive and specific than smear microscopy; therefore, TB cases can be detected earlier, often before they become infectious. It was estimated that the number of cultures performed yearly in the public sector exceeds 15 million. To achieve the Millennium Development Goals (MDGs) for TB control, all countries are expected to increase case finding, especially but not exclusively in areas experiencing a high burden of AFB smear-negative TB associated with HIV infection. Therefore, it is necessary that countries develop/strengthen capacity to perform culture and DST according to national policies by 2015. Such improvements require the development of standardized operational procedures for culture and relevant training material to strengthen the technical capacity and increase the overall performance of laboratories. Strengthening of laboratory capacity to perform quality culture will require a substantial increase in human and financial resources and the development of closer, more effective collaboration between national programmes and partner institutions. Recognizing the need for expansion activities, NTPs, national reference laboratories (NRLs), and key international organizations should review the country/regional epidemiological data, organization, structure, and the role of the laboratory networks in order to determine the resources needed for laboratory strengthening. The WHO is encouraging countries to strengthen their laboratory microscopy networks. At the same time, it advocates that countries analyse their epidemiological data and develop relevant plans for phased implementation/improvements of culture technique.

The quest to reduce TB culture contamination rates: a perspective from Zambia

B Madison. Centers for Disease Control and Prevention, Lusaka, Zambia. Fax: (+260) 1-251-142. e-mail: bdm6@cdc.gov

Mycobacterium tuberculosis grows slowly, reproducing only once every 18–24 hours. The TB laboratory has the challenge of isolating *M. tuberculosis* from sputum, a complex mucous matrix consisting of rapidly growing normal respiratory flora. The recovery of *M. tuberculosis* requires optimal digestion, decontamination and concentration procedures that reduce or eliminate rapidly growing bacteria, subsequently releasing mycobacteria trapped in mucous and cells. Mycobacteria are then concentrated to enhance culture growth. Several methods are available for decontamination of specimens for culture of TB. No one method is ideal for all laboratories. However, decontamination procedures that yield the highest percentage of TB isolates requires a capable technical workforce, quality equipment, and appropriate reagents and supplies. Additionally, the TB laboratory workforce must be aware of the limitations of the decontamination procedure used by the laboratory. Because of the increasing number of HIV AIDS patients in the National TB Program, the National TB Reference Laboratory (NRL) in Zambia embarked on a mission to decrease culture contamination rates and increase the yield of TB culture isolates from clinical specimens. In an effort to accomplish these goals, the following activities were implemented; 1) assessment and modification of specimen decontamination and concentration procedures; 2) development and use of standard operating procedures; and 3) staff training and performance monitoring. Safety equipment such as Class II biosafety cabinets, vortex mixers, centrifuge, 50-ml centrifuge tubes and other supplies were provided to enhance optimum specimen decontamination and concentration of mycobacteria. Specimen transport supplies were obtained and a local courier was utilized to transport specimens twice weekly from rural chest clinics in 3 provinces to the NRL. TB culture isolation and culture contamination rates are monitored on a monthly basis. Currently *M. tuberculosis* isolation rates range from 11–22% and contamination rates have decreased as low as 8.4%; however continuous monitoring and training are required to reach an acceptable rate of 5% contamination.

SPECIAL ISSUES FOR COUNTRIES WITH AN INTERMEDIATE RATE OF TUBERCULOSIS

Overview on TB control programmes in a country with an intermediate rate of tuberculosis in EMR and WPR

A Seita,¹ P Van Maaren.² ¹World Health Organization, Regional Office for Eastern Mediterranean, Cairo, Egypt; ²Regional Office for Western Pacific, Manila, Philippines. Fax: (+20) 2-2765414. e-mail: seita@emro.who.int; vanmaaren@wpro.who.int

Twelve of 22 countries in the WHO Eastern Mediterranean Region (EMR) and 7 of 16 countries (excluding 21 small island countries) in the Western Pacific Region (WPR) have an intermediate burden of tuberculosis. These countries account for 45% and 12% of the regional population respectively. In principle, management of tuberculosis in intermediate* tuberculosis burden countries (IBCs) is not different from that in high TB burden countries.

The majority of IBCs falls in the category of middle and high-income countries and has thus been able to allocate significant resources to address the problem of tuberculosis. In both Regions IBCs implement DOTS through their public health services, covering 100% and 80% of the population in EMR and WPR[†] respectively. Treatment success rate is reasonably high as it is 82% in EMR and 79% in WPR.

Case detection is lagging behind in about half of the IBCs with an average rate of 53% in EMR and 62% in WPR. In both Regions IBCs and HBCs face similar challenges for TB control, such as collaboration with private health care providers; tuberculosis care for vulnerable populations particularly people living with HIV/AIDS; and inaccuracy of tuberculosis estimates. However, some challenges are unique to the IBCs: stagnation of the decline of tuberculosis due to ageing of the population and the epidemic; tuberculosis care among migrant workers; and health financing of tuberculosis control through health insurance schemes. In a response to these challenges, IBCs have applied a range of measures, such as INH prophylaxis for populations at risk; active case finding among vulnerable populations; and computerized reporting by private and other health providers.

The symposium will describe the dynamics of TB control in IBCs in both Regions and will highlight the specific challenges these countries face. An overview will be provided of how IBCs have responded to these challenges and what progress has been made recently.

* Defined as countries with an estimated incidence of new smear positive tuberculosis cases between 20 and 100 per 100 000 population.

[†] EMR and WPR data by end of 2003.

Internet based tuberculosis surveillance system in Korea

J-G Bai. Korean Institute of Tuberculosis /KNTA, Seoul, Republic of Korea. Fax: (+82) 2 573 1914. e-mail: baijym@knta.or.kr / baijym@hanmail.net

Background: Korea had carried out national tuberculosis (TB) prevalence surveys at 5 year intervals from 1965 to 1995. However, it was faced with constraints to perform: 1) increased budget in proportion to increased sample size required for the surveys, 2) worsened response rate of subjects. Previous case notification policy could not make any epidemiological index from notified data. For substituting the survey and improving notification rate from the private sector, Korea launched newly revised Internet-based TB surveillance system (TBnet) on 2000 (<http://tbnet.cdc.go.kr>).

Method: Case notification is conducted through Internet. Doctors must report cases to the authority within 7 days after diagnosis with new notification form. Reported data are checked twice for accuracy at peripheral and provincial level. Analysis of medical fee claim data of Health Insurance Review Agency is performed annually to evaluate reporting rate and completeness of the TBnet.

Characteristics: The TBnet is able to monitor the magnitude of TB and its trend by person, time, area, etc., at any level (peripheral, provincial and central) on quasi-time basis and at any place where Internet is accessible. Treatment outcomes of the cases treating from the public sector are also easily analyzable.

Outcomes: The number of cases notified from the private sector has been included in the national morbidity figure. The case detection rate of new smear-positive cases by the WHO definition increased to 80% in 2001 from 63% in 2000.

Conclusion: The advantages of the TBnet are building a consolidated national TB database covering all sectors, inputting of TB information such as number of incident cases and enhancing case detection rate from the private sector. Most of all, the TBnet is expected to be able to induce the private sector to support the national tuberculosis program, and an effective way of achieving public-private mix (PPM) for TB control.

Surveillance and information system in a country with an intermediate rate of tuberculosis, Syria

F Maamari. NTP Manager, Damascus, Syria. Fax: (+963) 11 331 9804. e-mail: ntpsyria@mail.sy

Syria is a lower-middle income country with 17.8 million populations. Estimated incidences of all forms and new smear positive tuberculosis are respectively 42 and 19 per 100 000 population, or 7500 and 3400 cases per year respectively. The national tuberculosis programme achieved 100% DOTS coverage in 2000.

The latest treatment success rate was 87%. The main challenge is the low case detection: 45% in 2003.

NTP took steps to improve the quality of DOTS activities so as to improve case detection. Strengthening surveillance was the core as it allows the NTP to improve programme management. NTP introduced Electronic Nominal version of the main Registers in the TB recording and reporting System (or ENRS). ENRS is Excel based computerized system. This was developed because the classical TB recording and reporting was based on manual work, and often resulted in deficiencies like delay, inaccuracy and discrepancy of data, and poor data analysis.

ENRS is based on e-nominal district TB register and electronic reports on drug consumption service activities. ENRS was firstly introduced at NTP central unit, and then, through 4-day trainings, to provincial TB centers from 2003. High level of computer skills was not required for ENRS introduction. All provincial centers have computers, and send the data in CDs or diskettes to NTP central unit via post as they have no internet access.

ENRS improved accuracy, timeliness, and completeness of TB surveillance. Data analysis became easier. ENRS facilitated supervision and drug consumption calculation. Treatment success rates were improved from 81% (2001) to 87% (2002), which we consider due to effective supervision based on ENRS. Moreover, with epidemiological data of patients available from ENRS, we could modify estimated incidence: from 38 to 20/100 000 in 2001. We plan to introduce e-nominal laboratory and TB suspect registers in 2006 to further improve surveillance.

RIGHTS, RESPONSIBILITIES AND ETHICAL ASPECTS OF PUBLIC HEALTH INTERVENTION

A Russian-Swedish joint project for counteracting the increasing TB problem in St Petersburg

L-O Larsson. Dept. of Thoracic Medicine, Karolinska Hospital and The East Europe Committee of the Swedish Health Care Community (SEEC), Stockholm, Sweden. Fax: (+46) 8 33 29 98. e-mail: lars-olof.larsson@karolinska.se

The cooperative Russian-Swedish tuberculosis (TB) project has been effective in St Petersburg since 2000 and is funded by the government through the SEEC. All SEEC funded projects shall contribute to the improvement of health and well-being through a mutual exchange of knowledge and capacity development for effective prevention and control of disease in the country of cooperation. SEEC-funded projects shall promote sustainable and long term development. The projects should relate to the prevailing conditions in

the partner country and to be settled on a firm political and administrative basis. North West Russia is a priority area for SEEC.

TB is a serious threat to the public health in North West Russia and the disease is especially targeting those who are already hard hit e.g. due to concurrent HIV infection, alcohol and/or drug abuse or incarceration. The overall objective is to counteract TB through the creation of new models for improvement of patient care. The project objectives are to work in the civil health care sector in St Petersburg for the socially underprivileged TB cases, including those who are released from prison, and to support the co-operation between the prison system and the civil health care sector. Adherence to treatment for underprivileged TB cases and a successful transfer of released prisoners with TB to the civil health care are key issues.

Incentives only, as a method to increase adherence to TB treatment, will fail without motivation, information and education of the patients. Communication and pedagogic skills are mandatory for those who are responsible for the care of the TB cases in the project.

Increased adherence to treatment and improved control of disease can be achieved in socially underprivileged patients using a social medical working model and measures as patient motivation and information.

Strategies used to improve patient care in dispensary work in St Petersburg

O Taganova. Dispensary no. 8, Saint Petersburg, Russia. Fax: (+7) 812 271 46 20. e-mail: bocspb@ppp.intplus.ru

St Petersburg is the second largest city of Russia, with 4.6 million inhabitants (2001). Dispensary no 8 serves 231 000 inhabitants in the central district of St Petersburg. It also provides medical care for homeless people with tuberculosis. According to our experience it is a challenge to complete treatment in homeless people with TB as many of them have concomitant diseases, drug and alcohol abuse and a vagabonding lifestyle. Some homeless patients feel a lack of meaning of life and gain benefit from being ill.

Overall it has been difficult to attract homeless people with TB to start and complete treatment. New clinical models for patient care had to be implemented to counteract the factors that had a negative impact on treatment adherence. Supervised controlled daily treatment for all homeless patients with TB is mandatory, i.e., the patient swallows the drugs in the presence of the nurse. Further medical treatment can be provided for the homeless, as a day care centre was opened in 2003 at the Dispensary. Nutritional support is distributed to all homeless who follow the treatment regime, without interruption.

To offer homeless people service beyond what is strict medical and to view TB in a socio-medical context will also increase adherence to treatment. Ac-

cording to an assessment made by the homeless themselves, communication between the patients and the staff and interactions with the staff are main motivating factors for treatment adherence. To get well, the support from the social worker, the food packages and the support from relatives were considered as the other main motivating factors. It is possible to improve treatment adherence in socially marginalised persons by using different measures for improving life for the homeless, based on mutual understanding and interaction between patients and staff.

Actions taken to help patients to improve their health and social life: experiences from St Petersburg

M Zashinskaya. Dispensary no. 8, Saint Petersburg, Russia.
Fax: (+7) 812 542 31 64. e-mail: mavile68@mail.ru

The number of homeless people in Russia is estimated to 3.3 million and in St. Petersburg to 54 000, i.e., people without any official address. Some of the homeless have access to shelters and approximately 15 000 in St. Petersburg. 1500 homeless are registered at Dispensary no 8 and 450 of these have active forms of tuberculosis. There are many reasons for homelessness but the social turmoil in the society and the loss of social privileges in the last decades has contributed. A middle-aged male with alcohol problems and limited or no contact with family and relatives is a typical representative of the group of homeless people. Social-medical service for hospitalised patients with infectious diseases has been effective in St Petersburg since 1995 and for ambulatory patients with tuberculosis since 2000. Many of the necessary actions for improvement of the patient's social life are of legal nature. A major challenge for the social worker is to proof identity and to issue identification documents. To be the holder of identification documents opens different possibilities as e.g. registration at an address and access to pension funds. To reconnect a person to family and/or to the native place is for some of the homeless a major step forward for social and emotional recovery. All actions taken to improve the patients social life will hopefully increase the patients self esteem and to recover control of life and the own responsibility for health and material support.

Ethical issues associated with the delivery of health care: the tension between the individual and the population

J Porter. London School of Hygiene and Tropical Medicine, London, UK. e-mail:john.porter@lshtm.ac.uk

In this presentation, the delivery of TB and HIV services will provide examples to address the ethical issues that societies face in providing appropriate and equitable health services to deal with the combined TB and HIV pandemics. Who receives the HIV drugs and

who should receive them? Who receives direct observation of treatment for TB and how is it delivered?

Ethics, 'how we ought to live', is personal and about us. We struggle internally to find ways through our ethical dilemmas, to balance our rational and intuitive sides, and to find justice for ourselves and for others. As the philosopher Stuart Hampshire says 'we deploy the vocabulary of public adversarial reasoning to describe our own inner conflicts, and we have a feeling for justice in public affairs because each of us is normally in dispute with himself'. Ethics can help each of us to transform these internal tensions into positive attributes to bring to our work in the delivery of health care to patients.

Several philosophical perspectives that address the distributive justice of health delivery systems will be presented including the work of the philosopher John Rawls who talked of 'justice as fairness'. It can be argued that, in a democratic society, the health delivery system reflects the philosophical beliefs of the society/population and according to Rawls 'inequalities should be allowed only when they benefit the least advantaged'.

The role and duties of the individual health provider will be considered, plus the role and duties of governments and managers of the health systems. Although the policy decisions about the type of health delivery system in a country are made by governments, every day each of us plays a role in the ethics of health delivery through the way we treat and serve others, whether they are managers of the system, other health professionals or patients.

The transfer of released prisoners with TB to the civil health care sector

M Svezjankina. Pretrial detention centre no. 4, St Petersburg, Russia. Fax: (+7) 812 542 31 64.

To accomplish psycho-social support and control of adherence with treatment after release from the penitentiary system it is necessary to get acquainted with the social situation of every tuberculosis patient already inside the detention centre and before release. The main objective for successful transfer to the civil health care sector and cure of the disease is to guarantee tuberculosis patients non-interrupted supervised medical treatment and social help and rehabilitation as well as psycho-social empowerment. Education and motivation of the patients already before release are important factors in the process of transferring patients to the civil health care sector. The tuberculosis department of Pretrial detention centre no. 4 and Dispensary no 8 have since some years cooperated in a joint educational program and in the creation of a system for exchange of information. We have directed 50% of the released prisoners with tuberculosis to Dispensary no 8. Of these, 67% continued treatment which according to our earlier results is a major improvement. The impact of the social supportive work

done at Dispensary no 8 for homeless people is a key factor the completion of treatment after release.

Released prisoners are more prone to continue treatment for tuberculosis with motivation and education about tuberculosis, a system for exchange of information between the civil and the penitentiary sectors and a social supportive work.

EXPANSION OF THE REVISED TB CONTROL STRATEGY IN THE RUSSIAN FEDERATION

Mechanisms for cooperation between international partners and national authorities in the Russian Federation

R Khalfin, E Kakorina, O Tarasova. Ministry of Health and Social Development of the Russian Federation, Moscow, Russia. Fax: (+7) 095 200 0212 / 692 5273. e-mail: KHalfin-depart@e-minzdrav.ru

Continuous political and financial support on the federal level is a must for the effective fight against TB in Russia. But for this support positive trends in the TB epidemiological situation would have been impossible. At the same time international collaboration takes on great significance in ensuring further decrease in major epidemiological indicators and accelerating technical modernization of TB service.

Since 1999 the High Level Working Group (HLWG) on TB has been successfully working to ensure coordination of activities carried out by governmental, non-governmental and international organizations, to create an effective dialogue between Russian and international experts and to develop recommendations on TB control in line with international standards.

In 2002 the International Coordination Committee was established to ensure information exchange and coordination of joint efforts by national and international partners, mobilization of additional funds for TB control in Russia.

Russian Ministry of Health (MoH) established the Working Group to ensure effective implementation of the World Bank Loan project on TB and AIDS control under the Agreement between the Russian Federation and World Bank on the loan to fund the project. The Working Group is aimed to coordinate federal ministries, agencies and other stakeholders throughout activities targeted to strengthen infrastructure of the diagnostic service, to enhance human resources and TB monitoring system.

Since 2004 the Country Coordination Committee (ICC) has been successfully working in Russia comprising governmental and non-governmental, national and international organizations. This Committee has been established for the development of proposals and implementation of the projects funded by the Global Fund Against AIDS, TB and Malaria (GFATM).

Thus, Russia has diverse mechanisms for collaboration between Russian and international partners that have proven their effectiveness in tackling TB control challenges in the country.

Progress in TB control in the prison sector, 1999–2005

A Kononets. Federal Correctional Service of the Russian Federation, Moscow, Russia. Fax: (+7) 095 459 0993, 459 0950. e-mail: medphsin@zmail.ru

Currently, more than 50 000 TB patients are incarcerated in the Russian penitentiary system. Only modern effective TB services can prevent spread of TB in the Russian penitentiary system. Started in 1999 international cooperation resulted in 15 joint TB control projects that promote close cooperation between civilian sector and medical departments of the Federal Correctional Service of the Russian Federation (FSIN).

Increased financial support for TB service provided uninterrupted supplies of the 1st-line anti-TB drugs for the last two years, improved prison conditions and capacities of the penal TB services. For the last five years, TB incidence mortality rates have decreased by 2.5 and 3.7 times accordingly. In 2004 drug resistance among new cases was 49% and MDR-TB cases reached 15%. Given MDR-TB is the major problem in medical facilities of the prison sector in 2003, 20 regions started treatment of MDR-TB including 3 regions working according DOTS-Plus programmes approved by the Green Light Committee (GLC).

Recommendations for the organization of TB control in the penal institutions were prepared and approved by international and Russian experts as part of the High Level Working Group (HLWG) on TB in Russia. These recommendations introduce unified system of TB treatment and monitoring both in civilian and penitentiary systems.

In 2005 the implementation of the World Bank loan project has started aimed at improvement of laboratory services, purchase of diagnostic equipment, training and monitoring. The grant from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) will bridge gaps related to supply of the 2nd-line anti-TB drugs and disposables for the laboratory services.

Though certain progress has been achieved in TB control in the penitentiary system, the situation is still of concern. Joint efforts of national and international partners have laid the basis for effective response to TB in penal institutions.

TB control programme in the Russian Federation progress, 1999–2005

M Perelman. Research Institute of Phthisiopulmonology of Sechenov Moscow Medical Academy, Moscow, Russian Federation. Fax: (+7) 095 681 59 88. e-mail: tbcripp@rol.ru

The tuberculosis (TB) epidemic in Russia has stabilized: mortality is now at 21 per 100 000 population, and morbidity has decreased from 91 to 83. In 2000, in the prison sector the number of registered TB cases was 33 901, while in 2004 it was 16 231. Altogether, there were 312 208 registered cases of active TB towards the end of 2004 in Russia. TB prevalence is now 218.3/100 000, with 11.6% patients suffering from fibro-cavernous TB. In 2004, 2055 (2.2%) new cases of fibro-cavernous TB were detected. 41.4% of TB patients were sputum positive when tested by all methods; 8.1% were MDR-TB cases. In 2004, 50% of TB patients were detected by fluorography, 3% by skin test, 2% by sputum microscopy, and 1.3% by culture analysis. Treatment results remain unsatisfactory. Sputum conversion was achieved in 73.5% of cases, while destruction closure occurred in 63% of TB cases. 10 462 TB patients underwent surgery in 2004.

The national strategy was revised through new regulations on TB diagnosis, chemotherapy and monitoring. In early 2004, the TB recording system was revised according to the principles of cohort analysis and implemented in 38 pilot regions; by 2005 it will be expanded nationwide.

Much attention is given to combination of active and passive case detection of pulmonary TB, with 50% of TB patients detected through digital fluorography. In addition to chemotherapy, TB treatment should include collapsotherapy, pathogenetic treatment, sanatoria and surgery. The term 'clinically cured' TB is defined by total elimination of TB symptoms, confirmed absence of *M. tuberculosis*, stable healing of TB lesions, professional and social rehabilitation.

It is crucial to scale up TB control activities accelerating the expansion of the revised TB control strategy and properly address MDR-TB and TB-HIV.

Possible impact of the World Bank loan project and GFATM project on development of national TB control in Russia

W Jakubowiak. WHO TB Control Programme in the Russian Federation, Office of the Special Representative of the WHO Director-General in Russia, Moscow, Russian Federation. Fax: (+7) 095 787 2149. e-mail: w.jakubowiak@who.org.ru

The Russian Federation has made a substantial progress in DOTS implementation (37 territories out of 88 in 2004). Despite the recent reduction in TB notification, the TB epidemic still poses a serious threat (83.1 per 100 000 (2004), 8.3% of new smear-positive TB patients had MDR-TB (2003); 3640 TB patients were registered among 291 512 people living

with HIV (2003)). Though the revised and adopted regulations reflect TB diagnosis, chemotherapy, treatment, surveillance and monitoring, it is crucial to scale up TB control activities accelerating the expansion of the revised TB control strategy and properly address MDR TB and TB-HIV.

In addition to federal funding, funds from the GFATM grant and the World Bank (WB) loan will help Russia to strengthen and improve TB case detection, treatment success, management and cost-effectiveness of TB control activities. The WB loan project is focused on improvement of policy and strategy, strengthening TB services and infrastructure (esp. laboratory), training and human resource development, supervision and monitoring. The GFATM grant is complementary to the WB loan project with the special focus on management of MDR TB, drug resistance surveillance, TB-HIV, capacity and partnership, social support, and TB control in prisons. Both projects will contribute to expanded DOTS strategy countrywide.

In 4–5 years' perspective joint efforts are expected to result in:

- 1 Improved case detection and laboratory services (50% of new pulmonary TB cases confirmed by microscopy/culture)
- 2 Leveled off or decreased new TB cases by 5% or more
- 3 Leveled off or decreased new MDR-TB cases
- 4 Decreased TB case fatality rate among new cases by at least 10%

The preparatory phase mobilized institutions and partners and gave powerful impetus to revise national TB programme. Having substantial and continuously growing co-financing components these projects will create an enabling environment for effective national response to TB.

Development of TB-HIV coordination and control in Russia

O Frolova. Federal Center for TB care for HIV infected, Moscow, Russian Federation. Fax: (+7) 095 268 25 15. e-mail: opfrolova@mtu-net.ru

HIV started rapid expansion in Russia in the late 1990s; in 2001 it reached 79 492 new HIV cases. From 1987 to 1996, only sporadic HIV-associated TB (TB-HIV) cases were registered in Russia, i.e., 1–20 cases/year; in 1997–1998 more than 200 TB-HIV were detected, from 1999 to 2004 the number new TB-HIV reached 1407. Analysis of patient data in late stages of HIV-infection reveals that more than 70% of patients die of TB, and 1 in 5 TB cases are diagnosed after a post mortem examination. This can be explained by atypical TB manifestations at this stage.

The practice of consulting HIV-infected patients for differential diagnosis in TB facilities resulted in bringing immunodeficient persons into a close con-

tact with TB patients. Thus, new problems arose in TB detection of HIV-infected persons, including the treat of TB infection in TB facilities and lack of cooperation between AIDS/HIV Centres and TB facilities. This situation called for specific measures to prevent and manage TB-HIV, including the organization of detection, treatment (including preventive treatment) and out-patient follow-up of patients, with due account of the stage of HIV-infection development, and minimizing overlapping of patients flows, social adaptation and monitoring.

To provide comprehensive TB services to HIV-infected patients a unified three-stage coordination system has been introduced on the federal and regional levels. Improved registration of TB-HIV cases indicated the effectiveness of the new coordination system. Though introduced only in 2004 and not applied countrywide, this system helped to register 2011 patients with concomitant pathology, i.e., 69% more than before. However, some aspects of TB services for HIV-infected patients still require improvement, namely TB detection in HIV-infected persons and provision of ART to patients with concomitant pathology when necessary.

Particular attention is paid to the recording and reporting system, which will provide absolute data on concomitant pathology and enhance reaching WHO recommended indicators.

TB control: current problems and experience in solving them in pilot territories of Russia

V Erokhin. Central TB Research Institute, Moscow, Russia.
Fax: (+7) 095 9638000. e-mail: cniitram@online.ru / citramn@online.ru

Despite some stabilization, and even a decrease in the morbidity index from 88.5/100 000 in 2001 to 83.1/100 000 in 2004, Russia faces a tense TB situation.

Among the many medical issues currently troubling the Russian healthcare system, the TB epidemiological situation deserves the utmost attention. The central problems of TB control include: the prevalence of HIV and MDR TB; defects in the organization of directly observed treatment, especially in the ambulatory phase; shortcomings in the bacteriological service; and the deficiency of second line drugs.

WHO strategy was first applied in 1994–1995 in seven territories. Currently twenty six territories have joined the program, including both civilian institutions and penitentiary facilities.

TB mycobacteria detection has reached a rate of 60% in the pilot territories working jointly with WHO and international organizations. Smear conversion of new TB cases is 82.5–90%, which exceeds the average rate of 73.5% in Russia. TB facilities in pilot regions have well-equipped laboratories.

A program of social support, or incentives, has been implemented in some territories. DOTS+ pro-

grams have been implemented in some regions, while some other territories are planning to start. According to the treatment effectiveness, the WHO program has not yet achieved its goals. Problems have arisen mainly from a lack of control in the treatment in the ambulatory phase and the prevalence of MDR-TB. New cases of MDR TB have reached highs of 8.3% in the civilian sector and 15.5% in the penitentiary system.

For these reasons, the most pressing issues in TB control include the centralization and development of laboratory service, the study of transmission of *M. tuberculosis*, training of personnel, and provision of second line drugs. World Bank loan projects to meet these challenges and quell the epidemic in Russia.

ABSTRACT PRESENTATIONS THURSDAY 20 OCTOBER 2005

THEMATIC SLIDE PRESENTATIONS

INNOVATIONS IN TB DIAGNOSTICS, DRUGS AND CONTROL

TS-1087-20 The nitroimidazopyran PA-824 increases the potency of the rifampin, moxifloxacin, pyrazinamide-based regimen in the murine model of tuberculosis

E Nuermberger, I Rosenthal, K Williams, S Tyagi, W Bishai, J Grosset. Center for TB Research, Johns Hopkins University, Baltimore, Maryland, USA. Fax: (+1) 410-614-8173. e-mail: enuermber@jhmi.edu

Rationale: Shortening the duration of therapy necessary to cure TB is a major goal of drug development. We have shown previously that a 4-month RMZ-based regimen (2RMZ/2RM) permits shortening the duration of TB therapy by up to 2 months compared to standard treatment in the mouse model. Pa has recently demonstrated sterilizing activity in the mouse model. We therefore assessed whether the addition or substitution of Pa in the 2RMZ/2RM regimen would further reduce the duration necessary for stable cure. **Methods:** BALB/c mice, aerosol infected with *M. tuberculosis* H37Rv ($3.5 \log_{10}$ CFU), were treated 19 days later when CFU counts were 7.77 and $5.29 \log_{10}$ in lungs and spleens. The following 3-month regimens were compared to 2RMZ/2RM: 2RMZ/1RM, 2RMZPa/1RMPa, 2PaMZ/1PaM, 2RPaZ/1RPa, 3RMPa. Outcomes were CFU counts after 2 months of therapy and the proportion of mice relapsing 3 months after treatment.

Results: See table for CFU counts at 2 months.

| Regimen | Lung \log_{10} CFU (SD) | Spleen \log_{10} CFU (SD) |
|---------|------------------------------|--------------------------------|
| RMZ | 1.64 ± 0.48 | 0.80 ± 0.27 |
| RMZPa | 1.18 ± 0.54 | $0.23 \pm 0.19^*$ |
| PaMZ | 1.46 ± 0.38 | $0.13 \pm 0.21^{**}$ |
| RPaZ | $3.26 \pm 0.41^{**}$ | 1.12 ± 0.52 |
| RMPa | $4.32 \pm 0.24^{**}$ | $1.91 \pm 0.36^{**}$ |

(* $P < 0.05$ vs. RMZ; ** $P < 0.01$ vs. RMZ). Relapse data are pending.

Conclusions: The addition of Pa to RMZ or substitution of Pa for R significantly improved the potency of the RMZ regimen and may further shorten the duration of treatment necessary to cure murine TB to 3 months or less. Remarkably, PaMZ may have the potential to rapidly cure MDR-TB.

TS-1148-20 A system to address a weak link in TB control: effective referral of TB patients from a tertiary hospital to district clinics

M E Edginton,¹ M L Wong.² ¹School of Public Health, University of the Witwatersrand, ²Department of Medicine, Chris Hani Baragwanath Hospital, University of Witwatersrand, Johannesburg, South Africa. Fax: (+27) 011 717 2084. e-mail: edgintonme@sph.wits.ac.za

Methods: A TB Care Centre for registration, education and referral of patients diagnosed in the hospital was established at Chris Hani Baragwanath hospital in Johannesburg. It addressed the problem previously identified that only 50% of referred TB patients reached the clinics on time. An electronic TB register recorded details of patients. The Centre was evaluated by determining whether patients arrived at clinics. Weekly lists of referred patients were generated and patients' attendances recorded from clinic registers. Researchers also set up a system for recording in-patient deaths from TB by daily checks of all death certificates.

Results: In an 11-month period August 2003 to July 2004, 6708 TB patients were registered at the Centre, 53% of whom (3558) were referred to clinics in the Johannesburg district. 93% successfully attended. The computerised TB register was able to generate demographic and disease characteristics of patients and hospital admission details. Deaths from TB, not previously recorded, were registered on 1275 patients in the period (19% of all registered patients).

Conclusions: TB is a serious problem at this tertiary hospital. A specific TB Care Centre has successfully addressed important registration, education and referral needs.

TS-1160-20 Adherence to INH preventive chemotherapy in children: a prospective study

S Van Zyl, H S Schaaf, M C van Aardt, R P Gie, N Beyers, B J Marais. Desmond Tutu TB Centre, Cape Town, South Africa. Fax: (+27) 21 938 9138. e-mail: bjmarais@sun.ac.za

Introduction: The WHO and IUATLD currently advise 6 months unsupervised INH chemoprophylaxis. This regimen has proven efficacy, but poor adherence in high-burden settings is a major concern.

Objectives: To prospectively document adherence to unsupervised INH chemoprophylaxis

Methods: All children <5 years of age, in household contact with an adult pulmonary tuberculosis case, were screened for tuberculosis (chest radiograph and Mantoux tuberculin skin test) from February 2003 through January 2004 at two clinics in Cape Town, South Africa. Those without tuberculosis received INH chemoprophylaxis and adherence was monitored prospectively.

Results: During the study period 222 adult source cases were identified with 291 child contacts (<5 yrs). Fourteen (4.8%) children were not evaluated. Evaluation was incomplete in a further 35 (12.0%). Forty

(13.7%) children were diagnosed with tuberculosis and received supervised treatment. Of the 202 evaluated children without tuberculosis, unsupervised INH chemoprophylaxis was initiated in 187 (92.6%). Thirty-nine (20.9%) completed 4/12 of INH, while the rest (148, 79.1%) completed 2/12. Four (2.7%) children, all non-adherent, presented with tuberculosis within 12 months of evaluation.

Conclusion: Adherence to unsupervised chemoprophylaxis was poor. Alternative chemoprophylaxis strategies require evaluation in high-burden settings, especially in children who are at high risk to develop tuberculosis following exposure.

TS-1167-20 An intervention trial of a public-private collaboration model for improving treatment outcomes of tuberculosis patients in the private sector in Korea

H J Kim,¹ G H Bai,¹ M K Kang,¹ S J Kim,² J K Lee,³ S I Cho,⁴ W J Lew.¹ ¹Korean Institute of Tuberculosis, Korean National Tuberculosis Association, Seoul, Republic of Korea; ²International Union Against Tuberculosis and Lung Disease, Paris, France; ³Health Promotion Bureau, Ministry of Health and Welfare, ⁴School of Public Health, Seoul National University, Seoul, Republic of Korea. Fax: (+82) 2 573 1914. e-mail: hatchingbird@yahoo.co.kr

Objective: To improve treatment efficiency of new smear positive pulmonary tuberculosis patients in the private sector by improving case-holding activities through a public-private collaboration.

Method: Non-randomized control trial of intervention group (IG) providing health education and case-holding activities by specially trained public health nurses (PHN), compared with conventional group (CG) and cases treated under the National Tuberculosis Programme.

Results: There were 93 male and 79 female cases in IG and 106 and 66 cases in CG, respectively (odds ratio 0.73, 95% confidence interval [CI] 0.48–1.13). The mean age was 48.9 ± 19.0 and 48.2 ± 19.0 in the respective group ($P = 0.66$). PHN contacted the cases in IG an average of six times. IG showed a significantly higher treatment success rate, 91.6% (rate ratio [RR] 1.22, 95%CI 1.11–1.35), lower default (RR 0.31, 95%CI 0.13–0.75) and transfer-out rate (RR 0.32, 95%CI 0.12–0.86) than CG (75.0%, 11.6%, 9.3% respectively). The success rate was even higher than 80.5% of 1053 cases treated in health centers (RR 1.11, 95%CI 1.05–1.17). Of the completed cases in IG, 82% regarded the role of PHN as very helpful.

Conclusion: The treatment outcomes of tuberculosis patients in the private sector was improved by the intervention. Instead, the workload of PHN was increased.

TS-1208-20 Diagnostic and treatment delay among pulmonary tuberculosis patients and its determinants in 7 Eastern Mediterranean countries

A Seita,¹ I A Abdilal,² M Agboatwalla,³ A N Al-Absi,⁴ F Maamary,⁵ M Nasehi,⁶ H A Nassir,⁷ S S Soliman,⁸ S Baghdadi,¹ A Bassili,¹ Z Hallaj.¹ ¹World Health Organization, Cairo, Egypt; ²National Tuberculosis Control Programme, Hargeisa, Somalia; ³Health Oriented Preventive Education, Karachi, Pakistan; ⁴National Tuberculosis Control Programme, Sanaa, Yemen; ⁵National Tuberculosis Control Programme, Damascus, Syrian Arab Republic; ⁶National Tuberculosis Control Programme, Tehran, Islamic Republic of Iran; ⁷National Tuberculosis Control Programme, Baghdad, Iraq; ⁸National Tuberculosis Control Programme, Cairo, Egypt. Fax: (002) 022765414. e-mail: bassilia@emro.who.int

A multicountry study was conducted during 2003–2004 in order to study the extent of delay in the diagnosis and treatment of tuberculosis patients and its determinants. A total of 5053 new smear-positive patients were interviewed in randomly selected DOTS centres in Egypt, Iran, Iraq, Pakistan, Somalia, Syria, and Yemen. The mean delay ranged from 46 to 126.6 days in the different countries. Patient delay ranged from a mean of 9.9 days in Pakistan to 69 days in Somalia, while System delay ranged from 5 days in Iraq to 75 days in Iran. The private sector was the first choice for more than two-thirds of patients. The main determinants of delay were: socio-demographic factors (illiteracy, suburban residence); economic constraints; stigma; time to reach the health facility; seeking care at non-specialized individuals; and visiting more than one health care provider before diagnosis. In conclusion, an unacceptable delay in the treatment of tuberculosis patients was reported in all countries. This was mainly attributed to late diagnosis within the health system in Pakistan, Egypt, and Iran, but also to inadequate health seeking behaviour of patients in the remaining countries.

TS-1392-20 R207910 inhibits susceptible and MDR-TB strains by a novel action mechanism

K Andries,¹ E Huitric,² A Koul,¹ J Guillemont,³ V Jarlier,⁴ S Hoffner.² ¹Johnson & Johnson Pharmaceutical Research & Development, Beerse, Belgium; ²Swedish Institute for Infectious Disease Control, Solna, Sweden; ³Johnson & Johnson Pharmaceutical Research & Development, Val de Reuil, ⁴Pitié-Salpêtrière School of Medicine, Paris, France. Fax: 014 605403. e-mail: kandries@prdbe.jnj.com

R207910 is a new diarylquinoline (DARQ) with potent in vitro activity against *M. tuberculosis* and other mycobacteria. R207910 is equally active against drug-sensitive *M. tuberculosis* (MIC 0.030 mg/L) and strains resistant to isoniazid, rifampin, streptomycin, ethambutol, pyrazinamide and/or fluoroquinolones. The activity against a set of 30 MDR-TB strains was first evaluated using the Bactec system, and a concentration of 0.1 mg/ml was shown to inhibit 99% of their the growth. We now determined the MIC distri-

bution for 41 fully susceptible and 32 MDR-TB strains using a 96-stick replicator, Middlebrook 7H10 medium and an inoculum corresponding to McFarland 1. The MIC distribution was similar for both groups of clinical isolates, with 0.002 mg/L being the lowest and 0.064 mg/L the highest recorded MIC (MIC100). The median MIC was 0.032 mg/L for both groups. The lack of cross resistance to first and second line TB drugs points to a novel mechanism of action. Indeed, we previously identified the ATP synthase as the target by sequencing resistant mutants of *M. tuberculosis* and *M. smegmatis*, and by complementation studies. We recently acquired biochemical confirmation of this target by directly measuring modifications of ATP levels in *M. bovis* upon exposure to R207910.

TS-1514-20 Comparison of the early bactericidal activities and pharmacokinetics of graded doses of rifapentine and rifampicin

D A Mitchison,¹ F A Sirgel,² P B Fourie,³ P R Donald,⁴ N Padayatchi,⁵ R Rustomjee,⁶ J Levin,⁷ G Roscigno,⁸ J Norman,⁹ H McIlleron.⁹ ¹Cellular and Molecular Medicine, St George, London, UK; ²Medical Research Council, Tygerburg, ³Medical Research Council, Pretoria, ⁴Paediatrics and Child Health, Tygerburg, ⁵King George V Hospital and Medical Research Council, Durban, ⁶Unit for Clinical TB research, Medical Research Council, Durban, ⁷Unit for Biostatistics, Medical Research Council, Durban, South Africa; ⁸Findiagnostics, Geneva, Switzerland; ⁹Division of Pharmacology, University of Cape Town, Cape Town, South Africa. Fax: (+44) 208 672 0234. e-mail: dmitchis@sghms.ac.uk

The study aimed to explore the optimal dose size of rifapentine and the reasons for rifamycin mono-resistance in HIV-positive patients. A total of 109 patients with untreated pulmonary TB in Durban and Cape Town were given dose sizes of 150, 300 and 600 mg rifampicin daily for 5 days and 300, 600, 900 and 1200 mg rifapentine once. The early bactericidal activities of both rifamycins were similar and increased linearly with log dose size over the first 5 days, then reaching a maximum with doses between 900 and 1200 mg rifapentine. A comparison of AUC/MIC over 5 days with the early bactericidal activities at doses of 300 and 600 mg for both rifamycins, and clinical trial results, indicated that only fractions unbound to plasma protein were active in lesions. Re-growth between weekly doses of rifapentine accounted for high relapse rates and rifamycin mono-resistance. A dose of 1200 mg rifapentine should prevent re-growth and therefore relapse and rifamycin mono-resistance. It would then not be dependent on the efficacy of the accompanying drug, whose post-antibiotic effect would be stopped by the accompanying rifamycin.

TS-1565-20 Comparing new interferon-gamma assays in diagnosis of childhood-tuberculosis in a low incidence country

A K Detjen,¹ K Magdorf,¹ A Roth,² H Mauch,² U Wahn.³

¹Department of Pediatric Pulmonology and Allergy, Berlin, ²Department of Microbiology, Berlin, ³Department of Pediatric Pulmonology and Immunology, Charite, Berlin, Germany. Fax: (+49) 3081022340. e-mail: anne.detjen@charite.de

Introduction: Among German children infections with non tuberculous mycobacteria (NTM) are increasing whereas the incidence of tuberculosis (TB) continues to decline. Accordingly, the specificity of the tuberculin skin test (TST) in diagnosing TB is significantly reduced. In order to address this shift, new diagnostic methods such as interferon- γ release assays (IGRAs) are needed for reliable discrimination between TB- and NTM-infection.

Objective: To compare T SPOT TB® (ELISPOT) and QuantiFERON TB Gold In-Tube® (ELISA) with TST for diagnosis of childhood-TB.

Methods: TST and IGRAs were performed in children with a) confirmed TB ($n = 15$), b) confirmed NTM-infection ($n = 10$), c) children with close-contact to an TB index-case ($n = 17$), d) controls without risk of TB-infection ($n = 15$).

Results: In contrast to TST the IGRAs equally discriminated between TB and NTM-infection as well as controls. IGRAs were positive in all TB cases, negative in all NTM-infections and controls. Out of 17 children with contact to an index-case 5 were diagnosed having TB, 7 having latent TB-infection (LTBI). 3 BCG-vaccinated children had positive TST but negative IGRAs.

Conclusions: The new IGRAs can help to discriminate between TB and NTM-infections. They also help detecting LTBI. Both tests cannot be recommended to generally replace TST but they are a reliable and helpful diagnostic tool in unclear or problematic cases.

TS-1840-20 Natural ventilation to reduce nosocomial transmission of tuberculosis and other airborne infections

A R Escombe,^{1,2} C C Oeser,² C Martinez,³ J Chacaltana,⁴ R Rodriguez,⁵ M Navincopa,³ E Ticona,³ D A J Moore,^{1,2} J S Friedland,¹ R H Gilman,^{2,6} C A Evans.^{1,2} ¹Imperial College London Department of Infectious Diseases, London, UK; ²AB PRISMA, Lima, Peru; ³Hospital Nacional Dos de Mayo, Lima, Peru; ⁴Hospital Nacional Daniel Carrion, Lima, Peru; ⁵Hospital de Apoyo Maria Auxiliadora, Lima, Peru; ⁶Johns Hopkins University, Baltimore, Maryland, USA. Fax: (+1) 410-510-1284. e-mail: rodescombe@yahoo.co.uk

Institutional tuberculosis transmission is an important problem, especially in resource poor countries where environmental controls such as isolation rooms, negative pressure and masks are difficult to implement. We measured natural ventilation provided by opening windows in 65 rooms in 8 hospitals in Lima,

Peru. A carbon dioxide tracer-gas decay technique was used in 352 experiments. There were a median 1.3 air-changes/hour (ACH) with windows/doors closed and 28 ACH with windows/doors open. Increasing ventilation was independently associated with: increasing wind speed; area windows/doors open to room volume ratio; room volume; and air through-flow (all $P < 0.001$). Facilities built >50 years ago had median 37 ACH, compared with median 18 ACH in modern facilities. Differences in absolute ventilation were even greater: median 1469 m³/h vs. 509 m³/h, respectively. Very high air exchange is therefore readily achievable with natural ventilation, much higher than the 6–12 ACH of recommended expensive mechanical systems. Old-fashioned wards with high-ceilings and large-windows provide highest ventilation, and greater absolute ventilation per occupant. There is considerable potential for widely applicable and cost-free natural ventilation to reduce institutional transmission of tuberculosis and other airborne infections.

POSTER DISCUSSION SESSIONS

TB AND HIV

PC-1125-20 Danish strain BCG disease in HIV-infected infants

A C Hesselning,¹ M E J Manders,² M Lips,² R M Warren,³ H S Schaaf,¹ B J Marais,¹ M F Cotton,¹ N Beyers,¹ R P Gie,¹ A Janse van Rensburg,¹ W Brittel,¹ H Rabie.¹ ¹Desmond Tutu TB Centre and Departments of Paediatrics and Child Health, Stellenbosch University, South Africa; ²Academic Medical Centre, Amsterdam, The Netherlands; ³Department of Medical Microbiology, Stellenbosch University, South Africa. Fax: (+27) 21 9389138. e-mail: annekeh@sun.ac.za

Introduction: Infants perinatally infected with HIV are at risk for complications due to BCG in settings with routine BCG vaccination programs.

Aims: To describe BCG disease, outcomes and surveillance in routinely vaccinated hospitalized HIV-infected children.

Methods: Retrospective hospital-based study. All *M. tuberculosis* complex isolates from children <13 years of age from August 2002 through December 2004 were analyzed using polymerase chain reaction.

Results: Twenty-six children were diagnosed with confirmed BCG disease. All children had been vaccinated with Danish strain BCG at birth. Nineteen (73%) had immune deficiencies of whom 17 were HIV-infected; 2 had other congenital immune deficiencies. The median age at BCG disease was 7 months. Eighteen children (69%) presented with regional BCG adenitis and 10 (39%) with disseminated BCG disease, 2 of whom had concurrent BCG adenitis. Dis-

seminated BCG disease was diagnosed through isolation of *M. bovis* BCG from gastric aspirates. Thirteen children (50%) had died by the end of the study period, of whom 11 were HIV-infected. Mortality was 78% in children with disseminated disease. Five cases (19%) had been notified to local EPI authorities.

Conclusions: Danish strain BCG poses significant risk to HIV-infected infants and is associated with high mortality. Routine surveillance is currently sub-optimal.

PC-1146-20 Trends of HIV among pulmonary tuberculosis adults and antiretroviral therapy needs, 2001–2004, Kampala, Uganda

A O Okwera,¹ H Luzze,¹ E Ssekasanvu,¹ H Mayanja,¹ J L Johnson,² C C Whalen,² H Boom,² R D Mugerwa.¹

¹Department of Medicine, Makerere University Kampala, Kampala, Uganda; ²Uganda-Case Western Reserve University Research Collaboration, Cleveland, Ohio, USA.

Fax: (+256) 41533531. e-mail: a_okwera@mucwru.or.ug

Background: HIV is the greatest risk factor for progression of latent TB to active TB disease. TB-HIV interactions increase morbidity and reduces survival. ARVs are now more widely available in Uganda.

Objectives: To assess trends of HIV sero prevalence among adults with PTB. To evaluate CD4 T cell levels among HIV infected patients with PTB cases.

Setting: National Referral TB Treatment Centre Mulago Hospital, Kampala.

Method: Retrospective review of data of PTB suspects 18 years and older screened through standardized history and physical exam. CXR, CBC, sputum exam, serum HIVeIA and CD4 counts were performed after pre-test counseling.

Results:

| | 2001 n (%) | 2002 n (%) | 2003 n (%) | 2004 n (%) |
|--------------------------------|---------------|---------------|---------------|---------------|
| Total number screened | 264 | 382 | 464 | 765 |
| Sex | | | | |
| M | 150 (56.8) | 232 (60.7) | 263 (56.7) | 421 (55.0) |
| F | 114 (43.2) | 150 (39.3) | 201 (43.3) | 344 (45.0) |
| HIVEIA | | | | |
| Positive | 130 (52.6) | 190 (54.9) | 13 (52.8) | 310 (45.7) |
| Negative | 117 (47.4) | 156 (45.1) | 190 (47.2) | 368 (54.3) |
| CD4 counts per mm ³ | | | | |
| ≤200 | 58 (46.4) | 7 (26.9) | 32 (51.6) | 95 (52.5) |
| ≥200 | 67 (53.6) | 19 (73.1) | 30 (48.4) | 86 (47.5) |
| AFB smear | | | | |
| Positive | 199 (75.4) | 220 (57.6) | 263 (56.7) | 414 (54.1) |
| Negative | 42 (15.9) | 131 (34.3) | 175 (37.7) | 300 (39.2) |
| AFB culture ≥10 cols | | | | |
| Positive | 194 (73.5) | 229 (60.0) | 291 (62.7) | 447 (58.5) |
| Negative | 46 (17.4) | 114 (29.8) | 143 (30.8) | 256 (33.5) |

Conclusion: HIV seropositive rates among PTB adults has remained stable at about 52% over a 4 year period. In Kampala, about 50% of HIV associated PTB are eligible for ART.

PC-1318-20 Results from tuberculin skin testing of asymptomatic HIV-1-infected adults screened for the Botswana isoniazid preventive therapy clinical trial, 2004–2005

A M Mathoma,¹ B Mosimaneotsile,¹ S Nyirenda,¹ O Motsamai,² P H Kilmarx,^{1,3} C D Wells,⁴ T Samandari.^{1,4}

¹BOTUSA Project, Gaborone, ²National TB Program, Ministry of Health, Gaborone, Botswana; ³Global AIDS Program, and

⁴Division of Tuberculosis Elimination, CDC, Atlanta, Georgia, USA. Fax: (+1) 267-318-1697. e-mail: tts0@cdc.gov

Background: TB is highly endemic in Botswana with a reported case rate of 623/100 000 population in 2002. IPT efficacy for preventing TB has been well demonstrated for TST-positive (≥ 5 mm induration) but not for TST-negative PLWH. The relationship between TST and CD4 lymphocyte count is not well characterized.

Methods: Asymptomatic PLWH were screened at local government clinics for inclusion in Botswana's IPT clinical trial. Screening included: TST administration, chest radiograph (CXR) and CD4 lymphocyte count.

Results: TST results for 364 screened asymptomatic subjects were ≥ 5 mm, 73 (20%); < 5 mm, 280 (77%). Subjects with CD4 ≥ 200 ($n = 221$) were 1.71-times more likely to be TST positive than those with CD4 < 200 ($n = 143$; $P = 0.02$). Mean CD4 for TST-negative subjects was 291 ± 260 vs. 351 ± 203 cells/mm³ \pm standard deviation among TST-positive subjects ($P = 0.04$). A positive TST was twice more likely among subjects with abnormal CXRs than those with normal CXRs ($P = 0.01$).

Conclusions: Subjects with CD4 > 200 were more likely to be TST-positive although we were unable to establish a correlation between CD4 cell count and TST induration. Further data from this trial elucidating the TST-CD4 relationship and the use of TST as a screening adjunct for CXR may prove useful in TB diagnosis among PLWH.

PC-1434-20 Anti-retroviral therapy during TB treatment is associated with a dramatic reduction in mortality: the Thailand TB Active Surveillance Network

S Akksilp,¹ J K Varma,^{2,3} O Karnkawinpong,¹ W Wattanaamornkiat,¹ D Viriyakitja,⁴ T Siraprasiri,^{3,4} C D Wells,² J W Tapper.^{2,3}

¹Office of Disease Prevention and Control #7, Ubon-ratchathani, Thailand; ²US Centers for Disease Control and Prevention, Atlanta, Georgia, USA;

³Thailand MOPH - U.S. CDC Collaboration, Nonthaburi,

⁴Thailand Ministry of Public Health, Nonthaburi, Thailand.

Fax: (+66) 25915443. e-mail: jvarma@cdc.gov

Background: Antiretroviral therapy (ART) is lifesaving in patients with advanced HIV, but the magnitude of benefit in HIV-infected patients receiving TB treatment remains uncertain.

Methods: We prospectively collected data from all HIV-infected patients registered for TB treatment dur-

ing February 2003–January 2004 in Ubon-ratchathani, Thailand. Treatment outcomes were measured using WHO definitions for TB programs.

Results: Over 12 months, HIV infection was diagnosed in 327 of 2348 persons registered for TB treatment. Of 327 HIV-infected TB patients, 119 (36%) were smear-positive. During TB treatment, 71 (22%) received ART and 219 (68%) co-trimoxazole. Of 191 patients with a known CD4 count, 168 (88%) had CD4 < 200 . Death during TB treatment occurred in 5 (7%) patients that received ART and 90 (35%) patients that did not. Using multivariable logistic regression, we found a large reduction in the odds of death for patients receiving ART before or during TB treatment (OR 0.19, 95%CI 0.07–0.53) and for patients receiving ART during, but not before, TB treatment (OR 0.06, 95%CI 0.01–0.49), adjusting for CD4 count, smear status, co-trimoxazole use, and treatment facility.

Conclusions: ART is associated with a dramatic reduction in mortality during TB treatment for HIV-infected TB patients in Thailand.

PC-1496-20 The impact of the HIV epidemic on pulmonary tuberculosis in Karonga district, Malawi: analyses of the evolving relative risk of tuberculosis associated with HIV infection

E Vynnycky,^{1,2} A Crampin,³ J Glynn,² F D Mwaungulu,³ J N Mwaungulu,³ R White,² P E M Fine.² ¹Modelling and Economics Unit, Health Protection Agency Centre for Infections, London, ²London School of Hygiene & Tropical Medicine, London, UK; ³Karonga Prevention Study, Chilumba, Malawi. Fax: (+265) 44 2082007868.

e-mail: emilia.vynnycky@hpa.org.uk

The HIV epidemic has led to dramatic increases in the tuberculosis incidence in many developing countries. We apply a model to data from Karonga district, Malawi to elucidate the relationship between these increases and age and sex-dependent trends in HIV infection. The prevalence of HIV increased from 6% among 25–34 year old males and females in Karonga during 1988–1990 to 16–20% by 1998–2001. In this age group, the tuberculosis incidence tripled over the same period for females but remained relatively unchanged for males. These sex differences are consistent with males becoming HIV-positive at older ages than females (e.g., peak ages at infection of 30 and 20 years for males and females respectively). Model predictions based on the (conventional) assumption that the risk of tuberculosis associated with HIV infection increases gradually after HIV infection generally underestimated the HIV prevalence among adult tuberculosis cases. Our finding that the fit improved with the assumption that the risk of tuberculosis doubles during the first year after HIV infection, suggests that HIV affects the tuberculosis disease risk more rapidly than is conventionally believed. We discuss the implications of these findings for the relative risk of tuber-

culosis associated with HIV infection, as estimated in cohort studies.

PC-1518-20 The utility of simple TB symptom questions to screen HIV-infected patients for AFB smear-positive pulmonary TB at the AIDS Information Center in Kampala, Uganda, September 2001–2003

P J Nadol,¹ D B Nguyen,¹ B Mugisha,² J Mermin,³ R Odeke,^{3,4} R Bunnell,³ N N Bock.¹ ¹Centers for Disease Control and Prevention-Global AIDS Program, Atlanta, Georgia, USA; ²Centers for Disease Control and Prevention-Global AIDS Program, Entebbe, ³AIDS Information Center, Kampala, Uganda; ⁴National Tuberculosis Control Program, Kampala, Uganda. Fax: (+1) 404-639-6499. e-mail: pen5@cdc.gov

Objective: To evaluate which TB screening questions for HIV-infected clients at a community based voluntary counseling and testing center in Kampala best determine who should undergo further diagnostic evaluation for pulmonary TB.

Methods: Records review of newly diagnosed HIV-infected persons who underwent TB screening at the AIC during 25 month period. All were asked about TB symptoms (cough at least 2 weeks, fever, hemoptysis, night sweats, weight-loss). We compared symptoms in those with a final diagnosis of AFB sputum smear-positive TB (AFB+), as the diagnostic standard for TB, to those with a non-TB diagnosis. We calculated sensitivity, specificity, and PPV of the symptoms. **Results:** 178 AFB+ patients were compared to 3238 non-TB cases. This analysis included various symptom duration and combinations.

| Symptom (s) | Sensitivity (%) | Specificity (%) | PPV (%) | AFB+ patients with indicated symptom(s) n | Symptomatic non-TB cases with indicated symptom(s) n |
|-----------------------------------|-----------------|-----------------|---------|---|--|
| Cough >2 weeks | 97.2 | 99.5 | 92.0 | 173 | 15 |
| Cough >3 weeks | 84.8 | 99.7 | 93.2 | 151 | 11 |
| Fever >2 weeks | 57.9 | 95.4 | 41.0 | 103 | 148 |
| Fever >3 weeks | 50.0 | 96.1 | 41.6 | 89 | 125 |
| Fever >2 weeks and Cough >2 weeks | 55.1 | 100.0 | 99.0 | 98 | 1 |
| Any 2 symptoms | 92.7 | 89.6 | 32.8 | 165 | 337 |

Conclusion: Cough more than 2 weeks showed a high sensitivity, specificity, and PPV in this population and may be considered as a simple, initial screening criteria for use by peer or lay counselors outside of TB diagnostic centers, such as HIV counseling and testing facilities.

PC-1551-20 Assessment of TB and HIV services prior to introducing TB-HIV activities at health facilities in Siaya and Bondo Districts, western Kenya

A H van't Hoog,^{1,2} J A Onyango,² J Agaya,³ B J Marston.² ¹University of Amsterdam/Academic Medical Centre, Amsterdam, The Netherlands; ²KEMRI/CDC program, Kisumu, Kenya; ³Kenya Ministry of Health, Siaya, Kenya. Fax: (+254) 57 2022 981. e-mail: avanthoog@ke.cdc.gov

Setting: Bondo and Siaya, 2 rural districts with high TB and HIV burden.

Objective: To assess TB and HIV services prior to district wide introduction of TB-HIV activities at health facilities providing NLTP supervised TB services.

Methods: Standard interview of health workers responsible for TB-care; inspection of clinic space, laboratory and equipments; self-administered training questionnaire for all health workers; collection of service-data.

Results: Late 2004, of 58 facilities providing TB treatment, 19 offered sputum microscopy. At ¾ suspected TB-HIV patients were advised on HIV-testing, but providers rarely learnt results. 2/3 of facilities provide HIV/AIDS counseling, 40% HIV-testing but ¼ for PMCT only. Obstacles to diagnostic HIV-testing (DTC) included: busy monthly TB clinics, reviewing >1 patient per room and missing ceilings, which compromise confidentiality. Health workers perceive the need to refer as a barrier to recommending HIV-testing and care. Of facilities with ≥1 staff trained in ≥1 HIV/AIDS service on average 1/3 provides no service.

Recommendations: In these rural districts with decentralized TB-care, expansion of HIV-testing and co-trimoxazole to all TB-treatment facilities is recommended, with mobile ART-teams supporting weekly TB clinics. DTC implementation could utilize staff previously trained on HIV/AIDS and prioritize adaptation of TB-clinic practices and space, supervision and supplies.

PC-1552-20 Incidence of tuberculosis in people living with HIV and AIDS receiving antiretroviral therapy in 5 high TB burden countries

M B Bonnet,¹ L P Pinoges,² R Z Zachariah,³ S B Balkan,⁴ Y K Kebede,⁵ L C Ciaffi,⁶ L F Ferradini.² ¹EPICENTRE-Geneva, Geneva, Switzerland; ²EPICENTRE-Paris, Paris, France; ³Médecins Sans Frontières-Luxembourg, Luxembourg; ⁴Médecins Sans Frontières-France, Paris, France; ⁵Médecins Sans Frontières-Netherlands, Amsterdam, The Netherlands; ⁶Médecins Sans Frontières-Switzerland, Geneva, Switzerland. Fax: (+41) 22 849 84 88. e-mail: maryline.bonnet@geneva.msf.org

Background: ART is known to reduce TB incidence in PLWA. Individuals might be diagnosed with TB either, because they develop TB while on ART or pre-existing TB becomes apparent after starting ART due to Immune Reconstitution Inflammatory Syndrome (IRIS).

Objective: To measure the TB Incidence Rate (IR) after starting ART in high TB burden countries.

Methods: Retrospective review of new TB episodes from 5 HIV programmes supported by Médecins Sans Frontières (Cambodia, Thailand, Kenya, Malawi, Cameroon). IR was calculated according to follow-up time after starting ART.

Results: 3151 patients were enrolled, of whom 90% had less than 200 CD4 T-cells/mm³. IR of pulmonary TB (PTB) in 100 person-years was 7.6 (Cambodia), 10.4 (Thailand), 17.6 (Kenya), 14.3 (Malawi) and 4.8 (Cameroon). IR of extra-pulmonary TB (EPTB) was 12.7, 4.3, 6.9, 2.1 and 0 respectively. 62.3% of PTB and 54.9% of EPTB occurred within 3 months after starting ART.

Conclusion: TB IR is high and likely to be confounded by IRIS from undiagnosed TB before ART initiation. Better TB diagnostic tools are needed to improve TB-HIV management and reduce incidence of IRIS.

PC-1651-20 Assessing patient and provider perspectives on models of HIV testing and counseling for TB patients in Kinshasa, Democratic Republic of Congo

A L Corneli,¹ N Jarrett,¹ M Tabala,² P Kimpanga,³ M Sabue,² L Vaz,¹ M L Mbulula,⁴ E Bahati,⁴ F Behets,¹ A Van Rie.¹

¹Department of Epidemiology, School of Public Health, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA; ²UNC/DRC, Kinshasa, ³Ecole de Sante Public, University of Kinshasa, Kinshasa, ⁴National TB Control Program, Kinshasa, D R Congo. Fax: (+1) 919-966-9304. e-mail: amy_corneli@unc.edu

Objectives: To evaluate acceptance of HIV counseling and testing (CT) for TB patients from the patients' and providers' perspectives to determine the optimal method for roll-out in DRC.

Methods: Three models of provider-initiated HIV CT were piloted. Model 1 and 2 were opt-in models with referral to an off-site or on-site voluntary counseling and testing (VCT) center, respectively. Model 3 provided opt-out, routine CT by TB nurses. The evaluation included semi-structured interviews with 86 patients and 23 nurses. Data were analyzed using content analysis.

Results: Making HIV testing available for TB patients was supported by both patients (98%) and providers (95%). Patient time spent with the provider was perceived as 'too short' by 38% of patients who received routine CT by TB nurses, compared with 13% who received VCT off-site and 7% on-site. 67% of patients considered HIV CT offered at the time of TB diagnosis not stressful and one-third believed that some patients might find it difficult to refuse routine testing.

Conclusion: Provider-initiated routine HIV CT for TB patients was supported by both TB patients and nurses in Kinshasa. However, routine HIV CT should include sufficient time for counseling of HIV positive and negative patients and protect patient autonomy.

PC-1695-20 Contribution of active tuberculosis and/or CD4 count to eligibility for anti-retroviral therapy in Tanzania

J Lyimo,¹ C F von Reyn,² M Bakari,¹ L Mtei,¹ M Matee,¹ S Tvaroha,² R Waddell,² K Pallangyo.¹ ¹Muhimbili University College of Health Sciences, Dar es Salaam, Tanzania; ²Infectious Disease and International Health, Hanover, New Hampshire, USA. Fax: (+1) 603-650-6199. e-mail: fvr@hitchcock.org

Objectives: To determine the proportion of ambulatory HIV-positive persons in Tanzania who meet WHO criteria for anti-retroviral therapy (ART) based on either CD4 count or tuberculosis.

Methods: Subjects were screened for the DARDAR tuberculosis vaccine trial with examination, CD4 count, chest X-ray (CXR) and sputum microbiology.

Results: Among 1794 HIV-positive subjects screened, CD4 counts/mm³ were 0–199 in 617 (34%), 200–499 in 750 (42%), and ≥500 in 427 (24%). Among subjects with CD4 counts <200/mm³ 160 (26%) had suspect tuberculosis; suspicion was based on symptoms in 32 (20%), abnormal CXR in 77 (48%) and both features in 51 (32%). Among subjects with CD4 counts ≥200/mm³ 185 (16%) had suspect tuberculosis; suspicion was based on symptoms in 46 (25%), abnormal CXR in 81 (44%), both features in 45 (24%) and sputum culture only in 13 (7%). The proportion of all patients who met criteria for ART was 44%; 34% with CD4 <200, and 10% with CD4 ≥200 and suspect tuberculosis.

Conclusions: As many as 44% of ambulatory HIV-positive persons in Dar es Salaam, Tanzania meet WHO criteria for ART. Active tuberculosis is suspect or present in many of these patients and requires further evaluation, including CXR and sputum culture, prior to initiation of ART.

PC-1729-20 Treatment outcomes improved, but TB is still prevalent among PLWHA in Phnom Penh, Cambodia

M Tamura,¹ K E Khun,² B H Yuos,² T Yoshiyama,³ K Okada,⁴ I Onozaki,³ T E Mao.² ¹Institute for International Cooperation, JICA, Tokyo, Japan; ²National Center for TB Control, Phnom Penh, Cambodia; ³Research Institute of Tuberculosis, Tokyo, Japan; ⁴JICA National TB Control Project, Phnom Penh, Cambodia. Fax: (+81) 332692054. e-mail: tamura.miyuki@nifty.com

Background: A regular TB screening clinic for PHA under a home-based care program and those referred from Voluntary Counseling and Testing centers in Phnom Penh has been operating at National Center for TB Control since November 2001. Detected TB-HIV cases were treated with 8 months chemotherapy of 2HRZE+6HE by routine DOTS programs.

Methods: Outcomes of TB treatment, TB prevalence, and TB incidence in 2003 among PHA cohort were compared with those in 2001 and 2002.

Results: TB treatment outcomes were improved; in 2003, cure rate, defaulter rate, and death rate among

smear positive new patients were 65.8%, 5.3%, and 21.1%, respectively, in comparison with the last results (57.5%, 7.4%, and 32.5%). Other TB patients also had better outcomes than patients before 2003. TB prevalence was 22.4% in 2003, 3.8% increase from the initial 2 years. Incidence rate of TB was 18.0 per 100 person-years in 2003 compared with 14.1 before 2003.

Conclusions: Ongoing TB screening clinic has made progress for TB treatment management for PHA. These results may have proved increased utility of the screening clinic led by experiences in 2 years. As maturing HIV/AIDS epidemics increase TB incidence, TB-HIV patients should be entitled to involving in ART program urgently.

PC-1773-20 Global progress in implementation of collaborative TB-HIV activities in 2002 and 2003

R A Reid,¹ H Dassanayake,¹ J van Gorkom,² M Hosseini,¹ C Dye,¹ P Nunn.¹ ¹Stop TB Department, World Health Organisation, 27 Geneva, Switzerland; ²KNCV Tuberculosis Foundation, Windhoek, Namibia. Fax: (+41) 227911589. e-mail: reida@who.int

To assess global progress in policy development and implementation of collaborative tuberculosis/human immunodeficiency virus (TB-HIV) activities in 2002 and 2003, questionnaires were sent to the 41 countries with the highest burden of HIV related TB. Completed questionnaires were received from 35 countries for 2002, 36 for 2003, and both years from 34 countries.

| Collaborative TB-HIV activities | 2002 | 2003 |
|---|--------|--------|
| Number of countries with a national TB-HIV coordinating body | 10 | 15 |
| Number of countries reporting joint planning between TB and HIV programmes | 13 | 22 |
| Number of countries carrying out national surveillance of HIV among TB patients | 4 | 7 |
| Number of countries with a national policy on intensified TB case finding in people living with HIV/AIDS | 13 | 14 |
| Number of countries with a national policy on isoniazid preventive therapy for people living with HIV/AIDS | 8 | 10 |
| Number of countries with a national policy on HIV testing TB patients | 8 | 12 |
| Number of countries with a national policy on providing antiretroviral therapy for HIV positive TB patients | 8 | 11 |
| Number of TB patients tested for HIV | 20 920 | 26 978 |
| Number of TB patients reported to be HIV positive | 5 284 | 10 679 |
| Number of HIV positive TB patients started on cotrimoxazole preventive therapy | 2 638 | 7 077 |
| Number of HIV positive TB patients referred for HIV care and support | 2 107 | 4 859 |
| Number of HIV positive TB patients started on antiretroviral therapy | 0 | 195 |

In 2003, 30/34 countries had national policies for collaborative TB-HIV activities. In 2003, 13 countries were able to report the number of TB patients who had been HIV tested and only 4 were able to report how many HIV positive TB patients had been commenced on antiretroviral therapy. The table shows the number of countries with policies on collaborative TB-HIV activities and the number of clients accessing various collaborative TB-HIV activities in 2002 and 2003.

There has been good progress in the development of national policy on collaborative TB-HIV activities between 2002 and 2003 in the highest burden countries but implementation of activities in terms of population coverage remains low. National systems need to be strengthened to be able to monitor and evaluate collaborative TB-HIV activities.

PC-1811-20 Acceptabilité du conseil et dépistage volontaire du VIH dans une clinique de prise en charge des infections sexuellement transmissibles pour la population générale à kinshasa, R.D. Congo

R Nzuzi Kindembi. Centre IST Victoire / Programme National de lutte contre le SIDA, Kinshasa, RDC. Fax: (+243) 08152544. e-mail: dmktivuvu@yahoo.fr

Objectif : Evaluer l'acceptabilité du service de conseil et dépistage volontaire du VIH intégré aux services de prise en charge des IST dans la population générale.

Méthodes : Une sensibilisation a été faite aux clients dans la salle d'attente de la clinique et le test de dépistage du VIH proposé. Un conseil pré et post-test a été fait chez les demandeurs avec des tests rapides selon le protocole national (Unigold et Determine).

Résultats : 2619 demandeurs sur 9475 clients reçus soit un taux d'acceptation de 27,64%. 25,90% de ces dépistages étaient non associés à des plaintes IST. L'âge médian des demandeurs était de 28 ans (IQ : 3–71) et le ratio hommes/femmes de 0,67. Le désir de connaître son statut sérologique était la raison principale de la demande (72,5%). La séroprévalence du VIH était de 9,8%. Seuls 60% de conseils post-test ont été faits.

Conclusion : L'acceptabilité du dépistage volontaire reste faible chez les clients de la clinique IST et la prévalence du VIH élevée. Les obstacles identifiés peuvent aider à améliorer cette acceptabilité dans cette population à risque.

PC-1974-20 Comorbid diseases preventing HAART initiation in an urban primary health care clinic in Durban, South Africa

M Khan,¹ N Padayatchi,¹ K Naidoo,¹ A Singh,¹ G Nair,¹ J Brust,² J Pienaar.¹ ¹CAPRISA, Congella, KwaZulu Natal, South Africa; ²Division of Infectious Diseases Columbia University, New York, New York, USA. Fax: (+27) 312604566. e-mail: khanm18@ukzn.ac.za

Introduction: In 2003 KwaZulu-Natal ranked first in the South African National antenatal HIV survey at 37.5%. 80% of TB disease is confined to SSA and Asia with a 67% TB HIV co infection rate in South Africa. Other than TB, common presenting clinical conditions in individuals infected with HIV/ AIDS include Candidiasis, Herpes zoster and pneumonias (pneumococcal, other bacterial pneumonias and *Pneumocystis carinii*).

Methods: A primary health care clinic was established to provide HAART to HIV infected adults. Eligibility was based on CD4 counts <200.

Results: Between September 2004 and March 2005 313 individuals were eligible for HAART. In the screened population, 42% of patients were diagnosed with PTB in the last year and 40% had no past history of TB. In a subgroup of patients with CD4 counts below 50, 31% required referral for management of pulmonary TB and extra pulmonary TB (liver and cerebrospinal fluid). Other co-morbidities complicating the initiation of HAART include active Hepatitis B co infection (3%) and disseminated Kaposi's sarcoma (2%).

Conclusion: Co-morbidities in an ambulant urban population require referral to tertiary care preventing immediate initiation of HAART in eligible individuals due to possible drug-drug interactions and multi system involvement.

POLICY AND PROGRAMME IMPLEMENTATION-I

PC-1192-20 Treatment compliance of tuberculosis patients under a DOTS-based programme in Thua Thien Hue Province, Vietnam

Huynh Ba Hieu. TB Department, Center for Social Disease Control and Prevention, Hue, Thua Thien Hue, Vietnam. Fax: (+84) 54 820758. e-mail: bahieu2001@yahoo.com

94.3% of 210 respondents were compliance especially during initial phase of treatment. Majority of the studied population were 64% male, 22.4% age 35–44, 23.3% age 45–54, with average age of 45, and 63.3 living in rural area. It was found that farmer, labor, family members less than or equal to four, lower than secondary school, and low monthly family income had lower percentage of treatment compli-

ance. There was a statistically significant association between factors of living place, educational level, and family members and treatment compliance. There was 80% and 91% of respondents with 'need for improvement' knowledge on cause of disease and mode of transmission. Knowledge on treatment and prevention was an important determinant of treatment compliance of TB patients. Perception on susceptibility and seriousness of illness were associated with treatment compliance with $P < 0.01$. However, 70.5% perceived barriers of illness and its treatment were at 'need for improvement' level. The study revealed that the higher client's satisfaction on health providers and drug provision, the higher treatment compliance was.

PC-1219-20 Different DOT implementation forms

R A Arcêncio,¹ A A Monroe,¹ T C S Villa.^{1,2} ¹College of Nursing, University of Sao Paulo at Ribeirao Preto (USP) - Brazil, Ribeirão Preto, São Paulo, ²Coordinator of TB Operational Research Area of Brazilian TB Research Network, Ribeirão Preto, São Paulo, Brazil. Fax: (+55) 16 6333271. e-mail: ricardo@eerp.usp.br

This study aimed to investigate the forms of implementing DOT through a systematic bibliographic review in MEDLINE and the Journal Collection of CAPES (Brazilian Coordination for the Improvement of Higher Education Personnel), between 1997 and 2005. We only selected operational articles that were fully available in the CAPES Collection in English, Portuguese or Spanish, and found 375 articles, 106 of which were selected. 20 articles were related to health professionals' implementation of DOT at a TB Facility. 3 studies evaluated the patient's travel costs. 2 articles presented weekly visits to health units as a factor for non adherence. 8 studies mentioned the realization of DOT by members in the community; pilot projects developed in Africa have demonstrated their efficiency in this treatment mode. 1 article revealed that volunteers with legal problems can be as efficient in DOT realization as health professionals. 77 evaluated the efficacy of this strategy with respect to implementation forms and epidemiological indices: treatment success and death. We conclude that DOT has assumed the cultural, social and economic configuration of the different scenarios it is applied in. Operational research makes it possible to contrast realities, with a view to arriving at a cost-efficiency relation of an implementation form in a specific region.

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PC-1260-20 Optimization of material and human resources in the performance of DOT in Ribeirao Preto, Sao Paulo, Brazil, 2003

R I Cardozo-Gozaes,¹ C M Sassaki,¹ P Hino,¹ M F Oliveira,¹ T C S Villa.^{1,2} ¹College of Nursing, University of São Paulo at Ribeirão Preto (USP), Ribeirão Preto, São Paulo, ²Coordinator of TB Operational Research Area of Brazilian TB Research Network, Ribeirão Preto, São Paulo, Brazil. Fax: (+55) 16 6333271. e-mail: enroisab@eerp.usp.br

This exploratory study analyzed the optimization of resources in 04 Tuberculosis Control Programs (TCP) that realize DOT or supervised treatment at the patients' homes, in function of the usage time of material and human resources (vehicle, driver and supervising health professional), by means of the indicator utilization of DOT resources. Data were collected through daily systematic observation of the health professionals' supervision of patients under tuberculosis treatment at home, during one month. A specific form was used with the following variables: vehicle/driver's time available, departure and arrival times of resources at the health service. A total of 47 patients were followed up. The largest quantity of time was spent in TCP B (91.3%), resulting in a better utilization of resources in comparison with other programs C (75.0%), A (88.5%) and D (89.6%). Factors influencing resource utilization time were related to responsibilities for internal activities assumed by the health professional, to health service organization and resource availability. It is concluded that DOT at home involves two fundamental aspects: supervision site and service management, which include the internal organization of the team responsible for supervising treatment and planning and managing material and human resources.

PC-1263-20 DOT at home in Ribeirao Preto, Sao Paulo, Brazil, 2003: performance evaluation

R I Cardozo Gonzales,¹ A A Monroe,¹ D R Firmino,¹ A Ruffino Netto,^{2,3} T C S Villa.^{1,4} ¹College of Nursing, University of São Paulo at Ribeirão Preto (USP), Ribeirão Preto, São Paulo, ²Medical School, University of São Paulo at Ribeirão Preto (USP), Ribeirão Preto, São Paulo, ³Vice-Coordinator of Brazilian TB Research Network, Ribeirão Preto, São Paulo, ⁴Coordinator of TB Operational Research Area of Brazilian TB Research Network, Ribeirão Preto, São Paulo, Brazil. Fax: (+55) 16 6333271. e-mail: enroisab@eerp.usp.br

This exploratory study evaluated the performance of DOT in the Ribeirão Preto Tuberculosis Control Programs that realize DOT at home. The following indicators were used: coverage, observation of medication intake and time spent per home visit. Data were collected through daily systematic observation of the health professionals' supervision of patients under tuberculosis treatment at home, during one month. A specific form was used with the following variables: number of patients receiving DOT at home; number of visits with medication intake observation; time

spent per supervision day. A total of 47 patients were followed up. During the study, 77 patients were notified and treated; 70.1% received DOT, 87.0% of whom received DOT at home. Medication intake was observed during 256 (68.3%) visits; average time spent per visit amounted to 12.7 minutes. The availability of human and material resources at the health service and the patient's socioeconomic and cultural context can influence the performance of TCP that use DOT at home. There is a need to reconsider other ways of supervising and/or integrating activities for treating and controlling the disease into other intervention strategies, resulting in the rational use of resources and a better care and treatment success.

PC-1264-20 Time between perception of tuberculosis symptoms and start of treatment in Ribeirão Preto, SP, Brazil, 2004

M F Oliveira,¹ C M Sassaki,¹ D R Firmino,¹ M Yamamura,¹ T C S Villa.^{1,2} ¹College of Nursing, University of São Paulo at Ribeirão Preto (USP), Ribeirão Preto, São Paulo, ²Coordinator of TB Operational Research Area of Brazilian TB Research Network, Ribeirão Preto, São Paulo, Brazil. Fax: (+55) 16 6333271. e-mail: mayrafo@eerp.usp.br

This study describes the time passed between the perception of tuberculosis symptoms and start of treatment among patients notified to the Tuberculosis Control Program in Ribeirão Preto – SP in 2004. Data were collected in the Municipal Health Secretariat's EPI-TB program, after which the average time was calculated between the perception of symptoms and the beginning of treatment.

Results: In 2004, 175 patients with TB were registered in the program. Information about time passed from the perception of Tuberculosis symptoms to the start of treatment was filled out in the EPI-TB for only 98 (56%) of them. For those patients who possessed this information, average total time was 15.4 weeks, with a variation ranging from 0 to 240 weeks. The latter referred to a patient with extrapulmonary TB. Average time was 14 weeks (0 to 144 weeks) among patients with pulmonary TB and 35.3 weeks (1 to 240 weeks) among those with extrapulmonary TB.

Conclusion: There is a deficiency in the completion of this information by professionals who notify cases, emphasizing the importance of this variable with a view to the adequate control of time to start tuberculosis treatment.

PC-1577-20 Patient kit system in Tajikistan

M S Makhmudova, T M Mohr. Project HOPE, Dushanbe, Tajikistan. Fax: (+992) 372 24 62 51. e-mail: hope.drugs@tojikiston.com

Background: Tajikistan's National Tuberculosis Control Program introduced DOTS in 2002 in two pilot districts. Since then the program has expanded extensively to 23 districts. The Global Drug Facility (GDF)

provides the anti-TB drugs for Tajikistan. These were subsequently packaged in-country into patient kits by the Tajik-pharmindustry. In 2004 the National TB program ordered GDF drugs in pre-packaged kits from the GDF.

Objectives: To review the process of using patients kits and assess the experiences of the managers, health care providers, pharmaceutical personal and patients.

Design: Structured interviews, monitoring visits, treatment record reviews for identification of areas where more interventions are needed to manage patient kit system.

Results: Using patient kit system improved and simplified the drug management skills of TB control Programme personnel and primary health care workers responsible for the diagnosis and treatment of TB. The patient kit system improved the rational use of drugs for TB patients. The kit system eased the monitoring required to ensure the patients received their full course of treatment.

Conclusion: The patient kit system has been accepted in Tajikistan. Its use has helped guarantee patients receive their full course of treatment.

PC-1610-20 Review by peer professionals, 'Visitatie', a tool in upgrading quality of TB control in the Netherlands

A P Drost,¹ M Verhagen,² J V Kuyvenhoven.¹ ¹KNCV Tuberculosis Foundation, The Hague, ²MHS Noord- En Midden Limburg, Venlo, Netherlands. Fax: (+31) 70358 4004. e-mail: drosta@kncvtbc.nl

Background: In a low incidence country it is difficult to keep up quality in tuberculosis (TB) control. Therefore KNCV Tuberculosis foundation has developed a method of reviewing TB-control-departments by peer TB-professionals.

Aim: To improve the quality of TB-control in Municipal Health Services (MHS) by using the input of TB-professionals.

Methods: KNCV Tuberculosis foundation together with a group of TB-professionals, developed a system of expert reviews of TB-control departments in MHS. They developed standardized questionnaires, a planning system, standardized formats for reporting and evaluation. Having analyzed the questionnaire's information, the review team consisting of a TB-doctor, a TB-nurse, a doctor assistant and a reporter, visits the MHS for one full day. The review team interviews doctors, nurses, doctorassistants and management. Besides she observes the way the department is organized. After 6 weeks the review team sends a report to the visited MHS.

Results: Evaluation of last 6 years learns that both TB-professionals and management are positive about the review and the report with prioritized recommendations.

Conclusion: To improve quality of TB-control the input of professionals in reviewing colleagues is a very valuable method. The system has good results for both the TB-department that has been reviewed as the professionals who are performing the reviews.

PC-1704-20 Cost-effectiveness of the DOTS strategy in Mariupol city of Donetsk oblast DOTS pilot project, Ukraine

K Miskinis,¹ S Svetlichnaya,² S Lypshina,³ I Raykhert,¹ A Kovaliova,⁴ B Scherbak-Verlan.¹ ¹WHO Country Office in Ukraine, TB Control Programme, Kiev, ²Mariupol TB Dispensary, Mariupol, Ukraine; ³Donetsk Medical University, Donetsk, ⁴Donetsk Oblast TB Hospital, Donetsk, Ukraine. Fax: (+380) 44 2309124. e-mail: kmi_who@i.kiev.ua

Setting: Evaluation of the cost effectiveness of TB control program is a part of the project implemented by the WHO Project Office funded by USAID in collaboration with Donetsk Oblast TB Hospital and Mariupol TB Dispensary.

Objectives: To conduct comparative analysis of expenditures and economic effectiveness of the TB notification methods and treatment (considering Mariupol city only) within existing National TB Control Program (without abolishment of mass X-Ray screening, etc.) and after DOTS strategy implementation (core package); to select the most economically effective TB control model for Ukraine. The evaluation results for comparing years 2001 (without DOTS) and 2003 (core DOTS package implemented):

- Implementation of standardize treatment regimen decreases the treatment costs from \$105 to \$93 per patient;
- Costs per cured decreased by 38%;
- Death averted costs decrease from \$2784 to \$1705; and
- DALY costs decrease from \$99 to \$61.

The preliminary evaluation shows that compare to National TB Control program implementation of DOTS (even with existing practices of the old strategy) presents more cost-effective program on TB control.

PC-1879-20 Gender differences and tuberculosis outcomes in Akwa Ibom State, Southern Nigeria

V Obot,¹ A K Udo,² V Ekong.³ ¹National Tuberculosis and Leprosy Control Programme, Ministry of Health, Akwa Ibom, Enugu, ²Infectious Disease Hospital, Ikot Ekpene, Akwa Ibom, ³Primary Health Centre, Ibiono Ibom, Akwa Ibom, Nigeria. Fax: (+234) 42 452311. e-mail: glra@phca.linkserv.com

Objective: To assess gender-related differences in diagnosis, compliance and treatment outcomes of TB patients in Akwa Ibom.

Methods: A prospective study using self-administered, semi-structured questionnaire was conducted on 357 newly diagnosed smear positive patients. These patients were followed up for 8 months.

Results: In the cohort of 357 smear positive patients, 209 (58.5%) were males and 148 (41.5%) females. No significant sex difference was observed in the presentation of symptoms. Males were significantly diagnosed later (69.4 days) than females (45.5 days). In their choice for health services, females preferred to seek care from the patent medicine dealer (62.5%) while males first visited the public hospitals (71.2%). A better compliance and higher treatment success rate was seen in females (73.7%) than in males (62.5%). Defaulter rate was higher in males (10.7%) than females (6.2%). Main reason for poor compliance in males was their economic situation.

Conclusions: There are gender-related differences among TB patients in Akwa Ibom concerning health seeking behaviour and treatment outcomes. Male sex and poverty are significant predictors of negative treatment outcomes. Therefore, incorporation of gender issues in the training of TB care providers and programme managers is likely to enhance tuberculosis control.

PC-2086-20 A study to develop a tool for assessing the quality of care from the perspective of tuberculosis patients: the case of Uganda

J F Mugisha,¹ C Puta,¹ J Matovu,² J Ndyahikayo,¹ A Nkolo.²

¹Reginal Centre for Quality of Health Care, Institute of Public Health, Makerere University, Kampala, ²National Tuberculosis and Leprosy Programme, Kampala, Uganda.

Fax: (+256) 41 530876. e-mail: fmugisha@rcqhc.org

Context: The tuberculosis disease burden accounts for 68 000 clinical cases and about 24 000 deaths annually in Uganda. This has generated concern in the National Tuberculosis and Leprosy Programme (NTLP) about the quality of TB services. This inter-alia calls for appropriate tools to assess the quality of care from the perspective of the TB patient.

Methodology: This was qualitative research jointly undertaken by the NTLP and the Regional Centre for Quality of Health Care, between February and April 2005. Eighteen focus group discussions and 29 in-depth interviews with tuberculosis patients, service providers, and other stakeholders were conducted.

Results: Patients define a good TB service as one that continuously avails free efficacious drugs and nutritional support; prompt diagnosis and treatment, warm patient-provider interactions, a full package of information on TB, counseling and discussing patients' concerns.

Conclusion: Interventions to improve quality of TB care services should simultaneously address limitations at the patient, provider, interpersonal, clinic/organizational and community levels. The study findings strongly suggest a need for a quality assessment tool based on the patients' perspective of a good TB service.

PC-2168-20 Delays faced by rural populations in accessing TB care in Malawi

G H Mann,¹ L Sanudi,² F M L Salaniponi,³ S B Squire.¹

¹EQUI-TB Knowledge Programme, Liverpool School of Tropical Medicine, Liverpool, UK; ²EQUI-TB Knowledge Programme, Lilongwe, ³National Tuberculosis Programme, Lilongwe, Malawi. Fax: (+265) 1 673022. e-mail: gmann@liv.ac.uk

In 1999, the Malawi National TB Programme and its partners initiated a research programme to assess the extent to which the poor have access to TB services. We have previously reported findings from peri-urban populations. More recent work has focussed on rural areas, where 80% of the population lives, to understand the delays and costs faced by these populations in accessing a TB diagnosis.

Preliminary analyses show:

- 1 14% of patients wait more than one month after identifying symptoms before accumulating sufficient money to access free services
- 2 Up to 25% engage in impoverishing activities such as selling assets or borrowing money.
- 3 Access costs (as opposed to user charges) amount to seven months cash income.

Delays not only result from lack of financial access to free services; 56% of patients attend some kind of allopathic facility at least three times prior to diagnosis and the mean time between first attendance and being asked to submit sputa is 2½ months. Many patients, particularly those with difficult geographical access wait a further month before receiving results.

This work underlines the urgent need for more specific and sensitive diagnostics and highlights the importance of quality improvements in service provision.

POLICY AND PROGRAMME IMPLEMENTATION-II

PC-1032-20 Risk of pulmonary tuberculosis disease and out-migration for work among rural workers of China's Henan province

Liu Xi-Li,¹ A C Sleigh,² S Jackson,³ G Wang.¹ ¹Henan Centre for Disease Prevention and Control, Zhengzhou, Henan, China; ²Australian National University, Canberra, ³The University of Queensland, Brisbane, Queensland, Australia. Fax: (+86) 3715953015. e-mail: liuxili@public2.zz.ha.cn

Background: TB is a serious public health problem in Henan, China's most populous province, with a prevalence of 497 cases/100 000 population. We address the question 'Is out-migration for work a risk factor of TB incidence' and presents the sex distribution of TB cases, households income and previous work and living conditions of those with out-migration history.

Method: We conducted a rural 4-county case-control study of 160 incidence cases and 320 age-sex matched

village controls, and follow-up interviews to assess longer-term socioeconomic effects and extent of DOTS completion.

Results: Male TB cases exceeded female at 3.4:1; 47% of patients had been out-migrants compared with 29% controls. In our sampled cases, 82% lived below the international poverty line, 29.4% in absolute poverty by Chinese definition. Of those with previous migrant work, many had worked long shifts and stayed in overcrowded dormitories.

Conclusions: Out-migration for work is a risk factor for farmers. In the economically-productive age groups male TB cases overwhelmingly exceed females. Many of our sampled TB cases were poverty-stricken; the economic burden of TB was heavy even for patients receiving subsidized treatment under China's National TB Control Program.

PC-1043-20 Private sector TB services in Cambodia

T E Mao,¹ B N Kong,² S In,³ G Perla.⁴ ¹National Center for Tuberculosis and Leprosy Control, MOH, Phnom Penh, ²URC, Phnom Penh, ³National Center for Tuberculosis and Leprosy Control, MOH, Phnom Penh, Cambodia; ⁴Quality Assurance Project, URC, Bethesda, Washington, USA. Fax: (+855) 23 21 80 90. e-mail: mao@bigpond.com.kh

Objectives: To understand the need to develop public-private mix strategies for controlling TB in Cambodia.

Background: The private sector is the dominant provider of tuberculosis (TB) services in Cambodia, yet little was known about the nature or extent of such services. Furthermore, the 2002 National TB Prevalence Survey indicates over 60% of TB symptomatics used private service providers for their initial place of treatment suggested the need to examine the nature of private sector TB services. Consequently, private service providers in the four major provinces were surveyed.

Design/Methods: The study examined drug dispensing, diagnostic, treatment, and case management practices; maintenance of patient records; knowledge and training; counseling and referral system; and use of TB Direct Observation Treatment Short Course (DOTS) strategies. Of 552 respondents, 162 were private doctors, 204 were pharmacies, 126 were drug sellers, and 60 were TB patients. In addition, mystery shoppers visited 273 pharmacies to validate the pharmacy interview findings.

Results/Outcome: Private sector patients are generally not observed while undergoing the intensive or maintenance phase of treatment. TB drug dispensing practices are not in accordance with National TB Control Program (NTP) guidelines. TB stigma is still strong deters patients from seeking TB treatment.

Conclusion: TB case management among private providers needs substantial improvement. Training of the private providers on TB case management is ur-

gently needed. The NTP is currently formulating and testing public-private mix partnership strategies to address these important issues.

PC-1046-20 A model for tuberculosis control among injecting drug users

A Bobrik. Open Health Institute, Moscow, Russia, Russian Federation. Fax: (+7) 95 6844509. e-mail: abobrik@ohi.ru

Introduction: Injecting drug users (IDUs) are a group of high risk for HIV and TB, but often traditional health services lack access to IDUs. In addition, chaotic lifestyle of IDUs can lead to low treatment compliance.

Methods: Open Health Institute has supported harm reduction sites in 5 Russian cities (Tomsk, Krasnoyarsk, Tver, Kazan, S. Petersburg) to provide access of IDUs to HIV and TB testing. When TB treatment or chemoprophylaxis was needed, the distribution of TB medications was done under direct observation at needle-exchange sites and/or by outreach workers.

Results: HIV prevalence in the samples of 200–300 IDUs in each city varied from 1 to 15%. Tuberculosis prevalence among IDUs detected via sputum microscopy and X-ray in all cities was around 4%. Improved adherence was demonstrated through more than 50% decline in the interruption of TB treatment among most problematic patients.

Conclusions: Low-threshold programs i.e., harm reduction sites can be effectively used for provision of contact of TB service with hard to reach IDUs and for controlled administration of TB drugs to the most difficult patients.

PC-1171-20 Development and evaluation of scores to target tuberculosis screening in prisons, Rio de Janeiro, Brazil

N Fournet,¹ A Sanchez,^{1,2} V Massari,¹ M L Penna,³ S Natal,³ E Biondi,² B Larouze.¹ ¹INSERM U707, Faculté de Médecine Saint Antoine, Paris, France; ²Superintendencia de Saude de Administração Penitenciária, Rio de Janeiro, Brazil; ³Departamento de Endemias, ENSP, FIOCRUZ, Rio de Janeiro, Brazil. Fax: (+33) 1 44 73 84 62. e-mail: larouze@u707.jussieu.fr

Objectives: To develop and evaluate performances of scores aimed at 'identifying' tuberculosis (TB) suspects' in order to target TB screening among inmates.

Methods: Systematic chest X-ray screening was performed in two prisons ($n = 1910$). TB was diagnosed among subjects with X-ray abnormality by sputum microscopic examination and culture or, if bacteriological results were negative, by response to TB treatment. Using this strategy as a reference, 1) the clinical score proposed in WHO guidelines 'TB control in prisons' was evaluated; 2) using the same variables in a logistic regression comparing TB and non-TB cases, another score was developed and evaluated; 3) a new

score, based on sociodemographic and clinical variables, was developed and evaluated.

Results: When applied to our study population (TB prevalence: 4.6%), these scores missed many TB cases (sensitivities: 56%, 72%, 74% respectively). Among the 'TB suspects', the probability of finding TB cases was low (positive predictive value: 10%). The scores had high negative predictive values (>97%); specificities (75%, 60%, 67%) were low. Performances were similarly poor for smear-negative and positive cases.

Conclusion: The scores investigated performed poorly and would be unhelpful to target TB screening.

PC-1460-20 FIDELIS project greatly increased detection rate of new smear-positive cases in Anhui Province

Kan Xiaoh. Anhui TB institute, Hefei, Anhui, China, China.
Fax: (+86) 5513658250. e-mail: ahfidelis@126.com

Objective: To increase rate of newly detected S+ TB case in Anhui Province

Methods: To collect information about TB suspect in Anhui Province with a population of 15 440 000 through mobilizing 2 420 000 students by health education cards; To find TB suspects and collect sputum specimens by village health personnel; slide made in township health center and read slide in county TB dispensary.

Results: 1) Since May 2004 FIDELIS project has been implemented under the leadership of Anhui Province Health Bureau and Anhui Province TB Institute. Altogether 7917 staff, including doctors, working staff and health care teachers, have been trained and 2 420 000 students have been mobilized, which consequently strengthened the capacity of TB control in Anhui Province. 2) Within the 10 months since the beginning of this project, 4146 cases of TB have been detected, with an increase of 3175 compared with the same period last year. 1075 cases have been cured. 3) In the 24 counties concerned in 2004, 75.3% of the task required the national has been accomplished, which is 54.8% higher than the average level in the whole province. At the same time, rate of newly detected S+ case is 45.2% higher than those counties that are not included in the project.

Conclusions: FIDELIS Project has greatly increased detection rate of new smear-positive case.

PC-1491-20 Food aid and TB control in Cambodia: 10 year review (1994–2004) and future challenges

A Strauss,¹ M Ahmed,² M Tan Eang.³ ¹Policy Strategy and Programme Support Division, HIV/AIDS Unit, United Nations World Food Programme, Rome, Italy; ²Head of Programme Unit, United Nations World Food Programme, Phnom Penh, ³National Center for TB and Leprosy Control (CENAT), Phnom Penh, Cambodia. Fax: (+39) 06 6513 2873.
e-mail: Anne.Strauss@wfp.org

TB incidence in Cambodia (pulmonary and extra-pulmonary forms) is estimated at 540 per 100 000 populations per year out of which smear-positive pulmonary tuberculosis is 241/100 000 (WHO, 2003).

In 1994, the Ministry of Health launched the National Tuberculosis Programme (NTP) which implements the DOTS strategy. In response to the observed high prevalence of poverty associated with food insecurity, WFP and CENAT/JICA, designed the food incentive scheme with the objectives to: 1) increase patient's attendance at DOTS units, 2) support their hospital stay (2 months) and 3) encourage completion of the ambulatory treatment (6 months). In 2004, around 32 000 TB patients benefited from WFP food support in all 700 Health Centers of Cambodia. The case detection rate improved from 44% in 1993 to 59% in 2003, and the cure rate improved from 69% to 89% We will present the lessons learned, the challenges, and raise questions on how to adjust the program to address the co-infected population, as Cambodia has the highest adult HIV prevalence rate in the region (2.6%, UNAIDS 2003) and among TB patients, HIV prevalence increased from 2.5% in 1995 to 10.3% in 2003.

PC-1662-20 Improving the quality of the national tuberculosis programme through systemic project monitoring: findings of FIDELIS monitoring visits in China and Kenya

C-Y Chiang,¹ L-X Zhang,² D A Enarson,¹ F-Z Zhao,² I D Rusen,¹ S G Hinderaker.¹ ¹Department of Scientific Activities, International Union Against Tuberculosis and Lung Disease, Paris, France; ²China Union/FIDELIS Center, Beijing, China. Fax: (+886) 2257 93551. e-mail: cychiang@iuatld.org

Introduction: Fund for Innovative DOTS Expansion through Local Initiatives to Stop Tuberculosis (FIDELIS) was funded by the Canadian International Development Agency and managed by the International Union Against Tuberculosis and Lung Disease to increase global tuberculosis case detection. Ten China projects and two Kenya projects have been implemented to date.

Methods: The findings were obtained from several FIDELIS monitoring visits in China and Kenya. A standard FIDELIS monitoring visit consists of 1) obtaining information on sputum examination by consulting laboratory registers, 2) cross-checking the tuberculosis register with laboratory register, 3) ran-

domly selecting 5 smear positive patients and re-checking their positive slides and 4) visiting one patient out of the 5 randomly selected patients.

Results: In China, the registration of negative sputum results were not consistent. Several sites with complete laboratory registration had very high sputum positivity rates (60%–80%), which implied that only highly suspected patients were examined. In Kenya, a substantial proportion of patients diagnosed in health centers did not receive treatment in the centers, but mechanisms to prevent initial defaulters were lacking.

Conclusion: Careful reading of the laboratory register and treatment register helps identify constraints to be addressed to improve the quality of national tuberculosis programme.

PC-1858-20 Experience at two rural health centers in western Kenya during DOTS expansion

N Bhakta,¹ M Kumar,¹ S Kiboi,² N Buziba,² E J Carter.¹

¹Brown Medical School, Providence, Rhode Island, USA; ²Moi Teaching and Referral Hospital, Eldoret, Kenya.

Fax: (+1) 401-793-2266. e-mail: E_Jane_Carter@Brown.edu

Background: Turbo and Burnt Forest are rural health centers located in western Kenya. Both have in-patient/out-patient wards as well as VCT and ART enabled HIV clinics. In July 2004, a FIDELIS funded active-case finding program was instituted at each site. Although basic program design was identical, results diverged dramatically.

Results: Between July and December 2004, Turbo health center screened 707 TB suspects and registered 69 smear positive cases, many found by health outreach workers based in the community. During the same period, Burnt Forest screened 165 suspects and registered 13 smear positive cases; a significant number coming from HIV clinic.

Discussion: Despite identical community sensitization and initial staffing, personnel attitudes and logistical differences contributed to divergent results. Personnel at Turbo were highly motivated, organized themselves as an operational unit independently, and adopted mobile strategies on bicycles. The staff at Burnt Forest requested monetary incentives to perform work included in their job description, never developed cohesive group dynamics, and declined bicycles despite a large geographic encatchment area.

Conclusion: Three critical components—personnel attitudes, cohesive work groups, and the ability to overcome the logistical challenges of the setting—can determine success or failure of DOTS expansion in rural Kenyan settings.

PC-2033-20 Development of comprehensive software for tuberculosis surveillance and management in prisons (Rio de Janeiro State prisons, Brazil)

A Sanchez,^{1,2} J Pires,¹ E Biondi,¹ B Larouze.²

¹Superintendencia de Saude, Secretaria de Administração Penitenciária do Estado do Rio de Janeiro, Rio de Janeiro, Brazil;

²INSERM U707—Université Pierre et Marie Curie, Paris, France. Fax: (+33) 01 44 73 84 62. e-mail: larouze@u707.jussieu.fr

Objectives: To optimize the management of the tuberculosis (TB) control program in the complex environment of a large carceral system (19 000 prisoners; 2004 TB incidence rate: 2100/100 000).

Methods: Socio-demographic, carceral, clinico-radiological, bacteriological and follow up information concerning each TB case are entered daily in an extensive data base. The individual case files and listing of cases with selected variables are readily available, as well as program indicators generated for a given period, through pre-defined tables and figures concerning the entire carceral system or a given prison.

Results: This software significantly improved the implementation of the TB program epidemiologically (e.g., identification of cluster of cases; permanent evaluation of treatment outcome), operationally (e.g., measure of the delay between onset of symptoms and diagnosis; follow up organisation of this dynamic population), and logistically (e.g., periodic calculation of the number of pills of each anti-TB drug necessary for each prison).

Conclusion: This software proves user-friendly, and provides pertinent information of immediate use for the comprehensive management and evaluation of the TB program at the patient and population level.

PC-2162-20 Contribution of a PPMD clinic to case detection in its catchment area

M I D Quelapio,¹ R B Orillaza,¹ N R Mira,¹ V A Belen,¹

M L Salud,² L Macalintal,¹ L Raymond,¹ T E Tupasi.¹

¹Tropical Disease Foundation, Makati City, ²Makati City Health Department, Makati City, Philippines. Fax: (+63) 2 8889044.

e-mail: mameldquelapio@tdf.org.ph

Background: The case detection rate (CDR) in the Philippines was 63% in 2003. The estimated new cases of TB in the Philippines is 145/100 000. There are 29 public health centers in Makati City, Philippines. The MMC DOTS Clinic is a private-public mix DOTS (PPMD) unit in the city since 1999. Culture facilities required for implementing DOTS-Plus as a pilot project is in place.

Objective and methods: The CDR, cure rate and the contribution of the PPMD unit were determined using data from the City Health Department and the PPMD unit since 2000.

Results: For 2000 to 2003, the success rate of the PPMD unit was 85%, 88% and 77%, respectively, and the CDR in the catchment area ranged from 105%

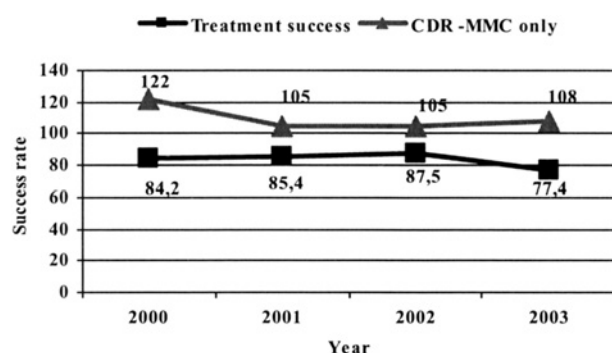


Fig. 1 MMC CDR in catchment and treatment success.

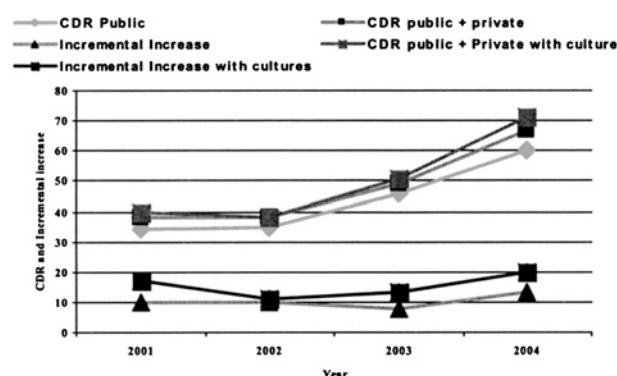


Fig. 2 Case detection rate and contribution of PPMD and incremental increase with smear and culture.

to 122%. The CDR by the public sector improved from 34% to 60% in 2001–2004. The annual CDR increased to 38%–67% if the PPMD unit was included. Further increase was noted to 40%–71% if culture by the PPMD unit was considered. Additionality of the PPMD ranged from 8–13% which increased to 11–20% with culture.

Conclusion: Engaging the private sector through PPMD can modestly increase area CDR. PPMD contribution nationwide can collectively augment the country's CDR and help achieve the global target.

PC-2258-20 Exploring the management and leadership capacities and needs of national tuberculosis control programs in Latin America and the Caribbean

P G Suarez,¹ C M Whalen,² S Johnson,³ C Mundy,¹ L Tawfik,¹ M Partilla.² ¹Center for Health Outcomes, Management Sciences for Health, Arlington, Virginia, ²Center for Health Outcomes, Management Sciences for Health, Cambridge, Massachusetts, ³Management & Leadership Program, Management Sciences for Health, Cambridge, Massachusetts, USA. Fax: (+1) 703-524-7898. e-mail: psuarez@msh.org

Introduction: DOTS strategy has been adopted within MOHs of many developing countries, however strategy implementation and expansion are limited by inadequate organization and management of systems

and services for TB control. Therefore, MSH, WHO/PAHO, and other partners are working to strengthen human capacity development, organizational and management systems and leadership.

Objective: To assess the management capacities and needs of the NTPs in LAC.

Methods: A survey was developed using the questionnaire results from LAC-NTP Directors representing 10 countries. The survey explored five management areas: Mission, Values and ethical principles, Strategies, Structure and Systems. The information collected was processed by MSH and shared with the NTPs.

Main findings: All of the NTPs had 1) strategic plans, 2) formally recognized, 3) technical guidelines, 4) coordinated approaches with the HIV Programs and public services, 5) financial support, 6) regular evaluations. However most of the NTPs lacked 1) sufficient health personnel at the central level, 2) a formal declaration of the mission, organizational values, or ethical principles, 3) a consistent approach for assigning financial resources, 4) mechanisms for monitoring operative expenses, 5) consistent coordination with private sector, 6) IEC and community workplans.

Conclusion: Assessing key management needs of NTPs can lead to the implementation and expansion of quality DOTS strategy.

EDUCATION, ADVOCACY AND SOCIAL ISSUES-I

PC-1036-20 TB-HIV advocacy in Nepal: opportunities and challenges

S A Aryal. Oxygen Research and Development Forum (ORDF), Kathmandu, Nepal. Fax: (+977) 14226791. e-mail: ordf@wlink.com.np

Oxygen Research and Development Forum (ORDF), a Nepali national NGO with a focus on HIV/AIDS prevention and care & support with activities including training, resource material development, advocacy and research has been developing Care and Support materials for PLAs and developing a toolkit for dealing with HIV Stigma. It is also an advocacy organization and is involved in treatment literacy training and advocacy in the grassroots, national and international levels. Recently, ORDF was awarded the coveted Open Society Institute (OSI) grant for TB-HIV advocacy. ORDF participated in TB-HIV community advocacy workshop organized by Treatment Advocacy Group (TAG) with financial assistance from Bill and Melinda Gates Foundation and gained valuable theoretical knowledge as well conceptual clarity on key programmatic issues. ORDF has carried out activities for initiating effective collaboration and coordination between TB and HIV/AIDS activities for

providing comprehensive care and prevention for PLHA and TB. It includes materials development, community street theater, press meeting etc. Recently, ORDF convened a national advocacy meeting with national and regional stakeholders in TB and HIV/AIDS. Through our work and at the forum with the National AIDS program director, AIDS stakeholders, National TB director, TB stakeholders, grass roots activists and community members, we gathered insights and field based realities and challenges for effectively coordinating TB and HIV/AIDS activities. At the 36th world conference, ORDF would like to present real challenges that beface developing countries such as Nepal in terms of collaborative TB-HIV activities.

PC-1680-20 Community participation in TB control as part of social development: the experience of BRAC (Bangladesh Rural Advancement Committee)

M A Islam, F Ahmed, B Roy, M K Barua, A Alam, A M R Chowdhury. Health and Nutrition Programme, BRAC Bangladesh, Dhaka, Bangladesh. Fax: (+880) 28823614. e-mail: akramul.mi@brac.net

Introduction: BRAC, an NGO initiated community based TB control program in one sub-district in 1984 as one of the components of poverty reduction program.

Objectives: To mobilize society in making TB diagnostic and treatment services accessible at the grass root level particularly to the poor.

Methods: Female community health volunteers (CHVs) play pivotal role in educating community and ensuring DOTS. BRAC gradually enhanced its social mobilization efforts to create demand and generate support to DOTS. Information on TB disease and service availability is disseminated through meetings with community leaders, local government representatives, micro-credit members, school students and teachers, religious leaders, cured TB patients, village doctors, private medical practitioners and government health and NGO workers in collaboration with the NTP. DOTS committee meetings at different levels with the participation civil society, patients, private practitioners and government officials of different sectors ensure support to DOTS program.

Results: Case detection rate reached to 75% in 2004 where program started 6 years before. Case detection rates also increased by 10% per year where program started in 2002 and 2003. Average cure rate was over 89%.

Conclusions: Involvement of CHVs and social mobilization could increase case detection rapidly and maintain high cure rate.

PC-1759-20 Culturally adapted tools to reinforce DOTS and community participation in a very high risk setting in Ecuador

C Caicedo,^{1,2} G Montalvo,¹ J Moreira,^{1,3} M Marquez,¹ L Petroche,² F Yagual,² M Anselmi,^{4,1} G Tognoni.^{5,1} ¹Centro de Epidemiologia Comunitaria y Medicina Tropical, Esmeraldas, ²Area de Salud Borbon, Ministerio de Salud Publica, Borbon, Ecuador; ³Clinical Sciences Department, Institute of Tropical Medicine, Antwerpen, Belgium; ⁴Centro per le Malattie Tropicali, Ospedale Sacrocuore, Negrar, ⁵Istituto di Ricerche Farmaceutiche Mario Negri, Milano, Italy. Fax: (+593) 6 272 20 39. e-mail: gregoriomontalvo@hotmail.com

The emphasis on the need of compliance for tuberculosis patients, has been translated into specific programs centred on DOTs. The effectiveness of this strategy depends on the availability of trained personnel, which cannot be assured in disperse rural communities. As part of a broader project based on community epidemiology, an intensive program of information, education, communication (IEC) was activated in the health district of Borbon, Ecuador, with a high-risk indigenous population. The participatory involvement of the community in the overall management of the disease, included a combination of different strategies: audiovisual material in the local language, village assemblies for discussion of cases, adoption of pictorial diaries to register and monitor the suspected as well as the confirmed cases, regular feedbacks to the community on successes and failures. The optimal compliance of treated cases (no drop-outs in the 51 cases out of 5600 inhabitants over a 3 year period) is a promising indicator of the yield of a strategy which is based on non-technical members of the community (health promoters), with a soft periodical supervision by technical personnel. The documentation of the success of IEC in TB control strengthens a broader confidence on all community health programs.

PC-1746-20 Frontline TB care providers' support systems: findings from three experiences in Central America and West Africa

J Macq,¹ A Solis,² M Dembele,³ M Drabo,⁴ B Dujardin.¹ ¹School of Public Health, Université Libre de Bruxelles, Bruxelles, Belgium; ²UNIOSS - CIES, Managua, Nicaragua; ³PNT, Ouagadougou, ⁴Institut de Recherche en Sciences de la Santé, Ouagadougou, Burkina Faso. Fax: (+32) 2555 4049. e-mail: jmacq@ulb.ac.be

Human resources and especially first line care providers have not been enough considered in the past policies in TB control. This has been acknowledged by the world TB-day 2005 theme—'Frontline TB care providers: heroes in the fight against tuberculosis'. We have developed three type of frontline TB care providers' supportive systems. Firstly, since 1998 in Nicaragua, we have implemented at municipal level through a health system research unit, quality management cycles centred on care process to people affected by TB. Secondly, since 2001, the Burkina Faso

coordinator of the TB control program have organised periodic peer-supervisions and district level problem solving and participative meetings. Thirdly, since 2003, we used action research as a tool to strengthen communication between frontline care providers and actors from all the level of the TB and health system in four West African countries. The lessons learned from these three different experiences are 1) the benefits of having actors external to managerial structures (researchers, peers) as frontline TB care providers supporter; 2) the indispensable local leadership to facilitate local processes; and 3) the importance of ensuring a minimal stability of functions at local level of health systems.

PC-1988-20 Sexual behaviour and vulnerability of female street hawkers to HIV/AIDS pandemic in Lagos metropolis: implications for HIV transmission control among children in Nigeria

J L Oyefara. Department of Sociology, University of Lagos, Lagos, Lagos State, Nigeria. Fax: (+234) 01 5820423. e-mail: oyefara@yahoo.com

This paper examines the sexual behaviour, HIV/AIDS knowledge and vulnerability of female street hawkers to HIV/AIDS pandemic in Lagos metropolis, Nigeria. To achieve these objectives, 126 female street hawkers were sampled in cross-sectional survey and 6 Focus Group Discussions (FGDs) were conducted to generate data from respondents. Purposive sampling method was utilized to select the respondents who are female children below 18 years. Data on sexual behaviour reveal that 79.4% of respondents are sexually active, while 62.6% of them initiated sexual intercourse at 11 years or below. There is significant relationship between age and being sexually active at $P < 0.01$. In particular, respondents in ages 14–17 years are more likely to be sexually active compared with their counterparts in ages 8–10 years. Data on knowledge about HIV/AIDS show that all the respondents have heard about the pandemic. Specifically, 64.3% and 35.7% of respondents mentioned sexual intercourse and blood contact as major routes HIV transmission respectively. Information on the use of condom shows that only 7.1% of the respondents use condom during sexual intercourse. There are significant relationships between current age, religious affiliation and use of condom at $P < 0.01$. Young female street hawkers between ages 8–10 years and Christians are less likely to use condom compared with their counterparts who are between ages 11–17 years and non-Christians. Female street hawkers are highly vulnerable to HIV infection in Nigeria. Therefore, government and NGOs working on the prevention of HIV/AIDS in the country should focus special attention on female street hawkers in the major cities.

PC-2004-20 Knowledge and management of tuberculosis among general practitioners in northern areas of Pakistan

M Irfan, J Khan, R Shehzadi, T Zohra, S F Hussain. Pulmonary Section, Aga Khan University Hospital, Karachi, Pakistan. Fax: (+92) 21 493 4294. e-mail: muhammad.irfan@aku.edu

Objective: To assess the knowledge of General Practitioners (GPs) regarding diagnosis and management of tuberculosis.

Methods: The study was a cross-sectional survey. The tool for data collection was a questionnaire with open and close ended questions. General practitioners from NWFP and the Northern areas of Pakistan were evaluated. Verbal consent was taken before giving them the questionnaires. The sampling strategy was convenient sampling.

Results: Of 88 GPs, 43% regarded sputum microscopy and 22% chest radiograph as the best test to confirm the diagnosis of pulmonary TB. During the follow up of pulmonary TB patients 32% doctors considered chest radiograph as the best investigation while sputum microscopy was chosen by only 28%. Eighty seven percent of GPs correctly identified TB as a droplet infection but 6% considered sexual contact to be the main mode of spread of this disease. Two third of the prescriptions, written for a 60 kg man with newly diagnosed smear-positive pulmonary TB, were not in line with national guidelines. Only 3% of the GPs knew all the five components of DOTS.

Conclusion: Severe deficiencies were seen in the management of TB by GPs of Northern areas of Pakistan. National TB control Program must take appropriate measures to educate and train the GPs in TB management. Without involving the GPs, Pakistan will not succeed in TB control.

PC-2043-20 Patient and health care system delays in the diagnosis and treatment of pulmonary smear-positive tuberculosis in Mongolia, 2002–2004

D Otgontsetseg, N Naranbat, B Batkhuyag. National Center for Communicable Diseases, Ulaanbaatar, Mongolia. Fax: (+976) 11450492. e-mail: ntpml@mongol.net

To investigate patient and health care system delays, to describe patient-related and doctor-related risk factors for delays in the diagnosis and treatment of new smear-positive TB patients. To develop health system and public health interventions by reducing these delays. A total 818 patients with newly diagnosed smear-positive pulmonary tuberculosis in the selected study settings. The ratios of male and female 1:1, 85.2% of all patients are 15–44 age group, 14.4% are non-local, 41.6% are unemployed. The median patient delay was 30 days, 32.5% of all patients sought a medical facility within 14 days, and 51.6% within one month of the onset of their symptoms. However, about

21.3% of the patients had visited a medical attention more than 3 months after the onset of symptoms. The median doctor delay was 11 days, 76.9% of all patients were treated for 30 days, 92.21% for 90 days and 97.9% for 180 days.

Conclusion: To reduce patient delays in seeking treatment for tuberculosis, health education campaigns should be investigated to inform the public about the early symptoms of tuberculosis and the importance of early medical consultations. The quality of medical training for both family and soum (township level) doctors should also be improved in order to increase awareness of tuberculosis and reduce doctor delays.

PC-2079-20 Integrating the National TB Program and the DOTS strategy into the medical curriculum

P F Marcelo, A A Balgos, L C Bravo, C D Dimacali, A B Marcelo, M T Mendoza, J C Montoya, A M Salonga. University of the Philippines Manila, College of Medicine, Manila, Philippines. Fax: (+63) 2 5260377. e-mail: portiafm@jhu.edu

The approach to TB education in the current medical school curriculum of the University of the Philippines [UP] does not give due emphasis to the National TB Program [NTP], based on the WHO DOTS strategy. This situation, echoed in other medical schools in the Philippines, was the impetus for the Master TB Educator Award [MTBEA] of the Association of Philippine Medical Colleges [APMC] and the Philippine TB Initiatives for the private sector. Departmental forums drew much interest among faculty and other physicians in training; college-wide forums on TB were also held. The MTBEA, and concurrent Philippine TIPS activities, involved up to 80–85% of the faculty. Medical education interventions include SIMDOTS, community-based TB research, and holistic TB disease case management in the hospital as well as public local health center-cum-DOTS unit settings and 12 other innovative activities. DOTS was discussed among 880 medical students.

UP medical students learn from their seniors. While they are sponges in terms of acquiring knowledge, their behaviours need to be reinforced by modeling by their teachers; and participation in TB management and control systems that are efficacious. i.e., where the NTP- DOTS is implemented systematically in both public and private health centers/hospitals.

PC-2198-20 Assessing human resources for health and TB control: methodology and Kenyan case study

O Adams,¹ C Hanson,² J M Chakaya,³ R Trangsrud.² ¹Orvill Adams & Associates, Amsterdam, Netherlands; ²PATH, Washington, DC, USA; ³Ministry of Health, NTP, Nairobi, Kenya. Fax: (+1) 202-457-1466. e-mail: chanson@path-dc.org

Objectives: 1) Describe a methodology for systematic assessment of human resource capacity for TB control; 2) Evaluate existing human resource capacity for expanding DOTS in Kenya in the context of overall human resources for health (HRH); and 3) Identify strategies for strengthening human resources for TB.

Methods: Implementation of a 10-point assessment framework including policy, staff availability, geographic distribution, motivation, management, public-private, community involvement, education & training, health data, and coordination.

Results: The methodology for conducting an assessment of HRH and TB control will be discussed. Key findings from Kenya suggest a disconnect between TB programmatic needs, human resource policy and planning, and TB-related training. While many have observed staff shortages in the public sector, there is no consensus regarding a general shortage of staff in Kenya. For example, while nurses conduct 45% of consultations related to TB and monitor the treatment of 82% of cases, estimates suggest a national shortage of 4000 nurses in the public sector. In Kenya, the public sector employs fewer than half of all trained nurses and numerous unemployed nurses exist in the general health sector. Contracting of nurses to support DOTS expansion is proposed. Other needs are identified and solutions proposed, including the use of a HRH data system, modifying staff ratio-based planning, and workload assessments.

Conclusions: Human resources for TB have to be assessed in the context of broader HRH issues. Despite constraints in the overall health system, NTPs can contribute actively to the strengthening of human resource capacity.

PC-2226-20 Attitudes and practices of tuberculosis patients and their family members in Kinshasa, Democratic Republic of Congo

P D Kimpanga,^{1,2} E Bahati,² A Ndongosieme,² B De Coster,² M A Mapatano,¹ W Okitolonda,¹ M Kiyombo,¹ P K Kayembe,¹ M Malengreau.³ ¹Ecole de Santé Publique, Université de Kinshasa, Kinshasa, ²Programme National de la Tuberculose, Kinshasa, D R Congo; ³Ecole de Santé Publique, Université Catholique de Louvain, Bruxelles, Belgium. Fax: (+202) 478 1775. e-mail: kimpanga@yahoo.fr

Objectives: To analyze behaviours of TB patients and their TBFM regarding tuberculosis.

Methods: Cross-sectional survey by interview using a questionnaire, conducted in 33 Centres of Health (CH) selected randomly. All patients found in every

CH were interviewed. For each patient, a TBFM of 18 years and more were interviewed.

Results: Four hundred twenty three patients and 154 MFTBS have been interviewed. Among them 77% know symptoms, 93% the treatment and 12% the reason of the TB. For 99% patients, TB is curable, for 37% by the prayer and 10% with traditional treatment. Twenty three percent are ashamed to attend health care in their CH. Sixty one percent hide their illness vs. 48% of the TBFM that would make it in case of illness ($P < 001$, OR = 1.8; 95%CI: 1.1–2.5). Some patients (12%) and TBFM (10%) prefer cares in hiding place, or far from the home (30%). Eighty four percent reported having been observed during treatment, 18% would stop their treatment in case of side effects, 14% in case of improvement and 10% in case of hunger.

Conclusion: Knowledge of TB is good for patients, but their attitudes and cultural perception could influence compliance.

POSTER DISPLAY SESSIONS

MULTIDRUG-RESISTANT TUBERCULOSIS (MDR-TB)–I

PS-1201-20 Drug resistance of *M. tuberculosis* to second-line anti-TB drugs

R A Agzamova, V L Bismilda. National Center For TB Problems, Almaty, Kazakhstan. Fax: (+327) 918658. e-mail: medeubek@hotmail.com

There were studied the drug resistance of *Mycobacterium tuberculosis* isolated from patients with multi-drug tuberculosis to the drugs of the second line: ofloxacin, capreomycin, amikacin, ethionamid, cycloserin. Test for drug resistance was determined by proportion method. Investigations were carried out in 151 patients treated under DOTS-Plus. By clinical forms prevalent majority of patients (56.9%) were patients with infiltrative and fibrocavernous (33.0%) tuberculosis, 10.1% with other forms. The highest drug resistance was determined to the ethionamid: any resistance in 49.7% of cases with MDR-TB, mono-resistance in 11.9%. Any resistance to capreomycin was 35.8%, at the relatively low mono-resistance it was 1.3%. Any resistance to cycloserin was equal 33.8%, mono-resistance was 6.6%. Any resistance to ofloxacin constituted 24.5% at the relatively low mono-resistance. And any resistance to amikacin was 22.5%, mono-resistance to this drug was not revealed. In general mono-resistance was determined in 21.2%, resistance to 2 drugs in 25.0%, to 3 drugs in 12.6, to 4 drugs in 15.9%, to 5 drugs in 1.3% of cases. Thus, results obtained are of evidence of the high resistance to anti-

TB drugs of the second line among patients with MDR-TB.

PS-1246-20 Etude sur la résistance aux antituberculeux des souches de *Mycobacterium tuberculosis* isolées aux centres hospitaliers universitaires de Kigali et de Butare

A U Nyaruhirira,^{1,2} A Dediste,² G Staes,² G Zissis,² E Kamanzi,³ P Pauwels,³ M Struelens,⁴ F Portaels.¹

¹Unité de Mycobactériologie, Institut de Médecine Tropicale, Antwerpen, ²Service de Microbiologie, CHU St Pierre, Bruxelles, Belgium; ³Laboratoire National de Référence, Kigali ⁴Service de Microbiologie, Hôpital Erasme, Bruxelles, Rwanda.

Fax: (+32) 247 63 33. e-mail: alainenyaruhirira@hotmail.com

Cadre : CHU de Kigali et de Butare, Juin 2003–Juin 2004.

Objectifs : Déterminer la prévalence de la résistance de *M. tuberculosis* aux antituberculeux majeurs et de seconde ligne. Evaluer l'intérêt de la culture systématique d'un échantillon extrapulmonaire.

Méthodes : Seuls les patients TPM+ et TEP ont été inclus dans l'étude ($n = 237$). Tous les échantillons ont été cultivés sur LJ et coletos à 37°C. La sensibilité a été déterminée par la méthode radiométrique BACTEC 460.

Résultats : Sur 203 TPM+ et 34 TEP, 183 cultures (77.2%) étaient positives pour le complexe *M. tuberculosis* dont 17.6% (6/34) de TEP. Le taux combiné de résistance à au moins un antituberculeux était de 17.7% (29/164) chez les nouveaux cas et 73.7% (14/19) chez les retraités. La multirésistance était de 14.8% (27/183) avec 9.1% chez les nouveaux cas et 63.2% chez les retraités. 68.5% des patients étaient VIH+ et 63% (17/27) parmi les patients MDR-TB. Toutes les souches MDR étaient sensibles à l'amikacine, la kanamycine, la clarithromycine et la clofazimine et 84.6% résistantes à la rifabutine, 69.2% au PAS et 7.4% à l'ofloxacin.

Conclusion : La résistance est élevée dans les deux CHU. La TB est fortement associée au VIH. Ces résultats ne reflètent pas la situation réelle de la résistance au Rwanda, une enquête nationale est en cours.

PS-1252-20 Evidence of infection by one strain and amplifier effect of drug resistance in pulmonary tuberculosis: report of 3 cases.

A U Nyaruhirira,^{1,2} I C Shamputa,¹ G Staes,² A Dediste,² G Zissis,² E Karita,³ M Struelens,⁴ F Portaels.¹

¹Mycobacteriology Unit, Institute of Tropical Medicine, Antwerpen, ²Service of Microbiology, CHU St Pierre, Brussels, Belgium; ³Elisabeth Glaser Pediatric AIDS Foundation, Kigali, Rwanda, Kigali, Rwanda; ⁴Service of Microbiology, Erasme Hospital, Bruxelles, Belgium. Fax: (+32) 32476333.

e-mail: alainenyaruhirira@hotmail.com

Background: Three female patients were diagnosed with tuberculosis at the Centre Hospitalier Universitaire de Kigali (CHUK). All the three patients were

HIV-1/HIV-2 seronegative. Patients 1 and 2 were hospitalised in the same room of CHUK for one month. Patient 3 was a younger sibling of patient 2.

Objective: To study three related cases of TB with primary multidrug resistance and the origin of transmission by DNA fingerprinting analysis.

Methods: Two consecutive *M. tuberculosis* isolates from each patient collected during the first and subsequent TB episodes were tested for resistance to first and second line antituberculosis drug by the BACTEC 460 radiometric method. DNA fingerprinting was performed using spoligotyping and MIRU-VNTR analysis.

Results: All patients initially received the WHO Category 1 regimen (2ERH7/4RH3). The isolates collected during the first TB episode were resistant to INH, RMP and EMB. After two re-treatment regimens with RMP, INH, SM, Z, CIP. Patients 1 and 2 developed additional resistance to SM and quinolones. Patient 3 received only Category 1 regimen and consecutive isolates retained the initial drug susceptibility pattern. All the isolates were genetically identical as determined by spoligotyping and MIRU-VNTR, indicating the same origin.

Conclusion: For MDR-TB patients, it also highlights the risk of producing resistance to second line drug if only one second line drug is added to category 1. DNA fingerprinting analysis demonstrated transmission of a MDR strain in three cases.

PS-1377-20 Anti-tuberculosis drug resistance in Cuba, 1997–2003

E Montoro, M Echemendia, D Lemus, M J Llanes, J A Valdivia. National Reference Tuberculosis Laboratory, Institute of Tropical Medicine Pedro Kouri, La Habana, Cuba. Fax: (+537) 204 6051. e-mail: emontoro@ipk.sld.cu

Introduction: The resurgence of tuberculosis in the world has been accompanied by rising drug resistance. Prevention of the occurrence and spreads of MDR is therefore a major priority of all TB control programmes.

Objectives: To determine the prevalence of antituberculosis drug resistance in Cuba in patients who had not received prior treatment and in those who had.

Methods: Drug resistance was determined using the proportion method in 2110 *Mycobacterium tuberculosis* strains to first line antituberculosis drugs during the period 1997–2003.

Results: The results included in this study are part of the second and third Global Project on Antituberculosis Drug Resistance Surveillance. Resistance was identified in 132 of 1974 patients (6.69%) who had had no prior treatment. Resistance was 0.7% to isoniazid, 4.66% to streptomycin, 0% to rifampicin and ethambutol and 0.4% to MDR. Among 214 patients who had received prior treatment, 64 (29.9%) were resistance and 16 (7.48%) showed MDR.

Conclusions: The contributed data through Cuba demonstrated that our country is relatively free of MDR strains, recognizing it to world level the good tuberculosis-control programs and the success of the application in our country of the DOT strategy from the year 1971.

PS-1898-20 Anti-tuberculosis drug resistance in Syria, 2003

F Maamari. NTP Manager MOH, Damascus, Syrian Arab Republic. Fax: (+963) 11 3311114. e-mail: ntpsyria@mail.sy

Aim: To determine the first line anti TB drug resistance pattern among newly diagnosed sputum positive cases in Syria and Estimate the prevalence of the TB drug resistance among the previously treated sputum positive cases in Syria.

Design: The design chosen for implementing the survey was 100% sampling of diagnostic centers. The sample size was 304 new positive case. And 72 previously treated the total period was 6 months.

Methods: Drug susceptibility testing to H,R,S,E was performed on Lowenstein-Jensen medium according to the proportion method.

Results: Of the (529) patient (120) sample were irregulars, 47 smears were negative, (362) smears were positive, (5) Cultures were contaminated, (5) cultures were negative (352) patients in analysis (295) with no history of previous anti-tuberculosis treatment and (57) with previous anti-tuberculosis treatment. The male:female ratio was higher in 'new' than in 'previous treatment cases'. primary resistance to one or more drugs was found in 27.12% of new patients: Any resistance to H was (8.81%), any resistant to R was (5.76%), any resistance to streptomycin was (23.39%). any resistance to Ethambutol was (5.42%). Multidrug resistance was (4.41%). In previously treated patients were (57.89%) resistance to one or more drugs. Any resistance to H was (33.33%) and any resistant to R was (29.82%) Any resistance to streptomycin was 31 (54.39%). any resistance to Ethambutol was (15.79%). Multidrug resistance was (24.56%).

Conclusions: Studies such as the should be conducted regularly to monitor drug resistance in Syria in order to effectively manage national tuberculosis control efforts.

PS-1291-20 Analysis of treatment failures from I cohort in Tomsk DOTS-Plus Program (2000–2002)

T P Tonkel,¹ G G Peremitin,¹ O B Sirotkina,¹ A K Strelis,² A D Pasechnikov,³ A B Yedilbayev,³ Y G Andreev.⁴ ¹Tomsk Oblast TB Dispensary, Tomsk, ²Siberian State Medical University, Tomsk, Russian Federation; ³Partners in Health, Boston, Massachusetts, USA; ⁴Department of Corrections, Tomsk, Russian Federation. Fax: (+382) 514298. e-mail: arlyapova@pih.ru

Introduction: 244 MDR-TB patients from civilian (131) and prison (110) sector received DOTS+ treatment between 09/2000–09/2002 (M = 19.2 months). 79.5% culture positive at start of treatment, the rest were smear/culture positive 4.8 months prior DOTS+. **Objective:** To show that treatment failure is in association with late start of DOTS+.

Methods: MDR-TB was documented in all patients before DOTS+. Clinical, laboratory, radiographic, bacteriological monitoring including DST, management of adverse reactions to 2d line drugs and treatment of co-morbid conditions were performed during all course of chemotherapy. Incentives and enablers were provided to improve adherence to all patients. Outcomes: 78.3% cured, 9.8% defaulted, 6.6% failed, 4.9% died, 0.4% transferred out.

Results: All failures (13 males, 3 females) had an extensive bilateral disease, history of 2–4 inadequate treatments in past. 9 received OfI, Eth, Km before. Resistance prior to DOTS+: HRSEKZ - 4, HRSEZ - 4, HRSEK - 4, HRS - 3. One was resistant to OfI, 3 to Cap, 3 to Eth. Quality control was performed at MSLI. 87.6% of failures had chronic alcohol abuse, 87.5% were unemployed.

Conclusion: Out of 244 patients 16 remained smear/culture positive during DOTS+ with amplification to 2d line drugs in 93.7% and further TB progression. An adequate and aggressive treatment should be started once MDR-TB is confirmed by DST.

PS-1025-20 Multidrug-resistant tuberculosis and the importance of development and dissemination of drug information and quality monographs for fixed-dose combination anti-tuberculosis drugs

D Seyoum. USP Drug Quality and Information Program, Rockville, Maryland, USA. Fax: (+1) 301-816-8374. e-mail: dws@usp.org

Background: MDR-TB is a global problem. MDR-TB is the product of inadequate treatment, and may involve noncompliance with treatment, interruption in drug supplies, inappropriate prescribing, and/or substandard drugs. Patients infected with MDR-TB are not only difficult to cure but also more likely to remain sources of infection for a longer period of time than those with drug-susceptible organisms. The use of fixed-dose combination (FDC) of anti-TB drugs

may help reduce patient non-compliance and improve the cure rate. The use of FDC anti-TB drugs is relatively a new experience; and, the development of drug information and quality monographs for these agents is important.

Method: The USP DQI Program analyzed published articles on individual and FDC anti-TB drugs for important information and worked closely with the USP Drug Information Expert Committees (USP DIEC) in the development of drug information monographs. USP has also worked closely with the WHO in the development of drug quality monographs for the FDC anti-TB drugs.

Results: USP has developed drug information monographs for all fixed-dose combination anti-TB drugs on the WHO List of Essential Drugs. USP has also developed drug quality monographs for a number of FDC anti-TB drugs.

Conclusion: The USP drug information monographs provide subscribers, dispensers, and patients with authoritative information on fixed-dose combination of anti-tuberculosis drugs and in fighting the emergence of multidrug-resistant tuberculosis. The USP/NF monographs help identify counterfeit and sub-standard medicines by providing the test methods and results required to determine the quality of FDC anti-TB drugs.

PS-1099-20 Multidrug-resistance among pulmonary TB cases in Lebanon

M Y S Saade, G A Araj. Ministry of Public Health, National Tuberculosis Program, Beirut, Lebanon. Fax: (+961) 1 445734. e-mail: drantoinesaade@hotmail.com

Objective: A nationwide study was undertaken to assess the prevalence of multidrug resistance among pulmonary smear positive TB cases in Lebanon.

Design: Between July 2002 and April 2004, 245 smear positive TB cases were evaluated in Lebanon: 224 new cases and 21 old cases. Culture, identification and susceptibility testing for isoniazid, rifampicin, ethambutol and streptomycin, was done by BACTEC system.

Result: Non Lebanese patients represent a large pool of smear positive cases (22%). Primary MDR is low (0.66%). Secondary MDR is high (62.5%), but total number is limited, the half is non Lebanese.

Conclusion: Continue to adopt the same regimen in the Lebanese DOTS strategy. MDR remains a major problem in old TB cases.

PS-1257-20 Trend of antituberculosis drug resistance in Korea

G H Bai,¹ C H Park,¹ E M Park,¹ Y K Park,¹ Y W Choi,¹ J Y Bai,¹ H J Kim,¹ W J Lew,¹ M K Kang,¹ C H Chang,¹ S J Kim,² S K Kim.³ ¹Korean Institute of Tuberculosis, The Korean National Tuberculosis Association, Seoul, Republic of Korea; ²International Union Against Tuberculosis and Lung Disease, Paris, France; ³Department of Internal Medicine, Yonsei University College of Medicine, Seoul, Republic of Korea. Fax: (+82) 2 573 1914. e-mail: gbai@hotmail.com

The 3rd antituberculosis drug resistance (DR) survey was conducted to measure the prevalence of DR and to assess its impact on treatment outcome in Korea. The result was compared with those of previous surveys performed in 1994 and 1998. Assuming a 20% drop in sampled cases, the sample number required for evaluating DR among new tuberculosis cases (NTC) was estimated at 1094 cases with 1% precision and 95% probability, which could be selected systematically in all health centers (245) throughout the country during 6 months from 1 July to 31 December, 2003. Previous surveys also adopted the same method. Drug susceptibility testing (DST) results were gained from 1348 isolates for isoniazid (INH), rifampicin (RFP), streptomycin (SM), ethambutol (EMB), kanamycin (KM), prothionamide (PTH), capreomycin (CPM), cycloserine (CS), para-aminosalicylate (PAS), ofloxacin (OFX), and pyrazinamide (PZA) by proportion method on Lowenstein-Jensen media. Out of 1348 NTC 172 (12.8%, 11.0–14.5% at 95% C.I.) showed DR to one or more drugs; any INH, 134 (9.9%, 6.0–8.8% at 95% C.I.); any INH+RFP, 32 (2.4%, 1.6–3.2%). Previous surveys revealed that any DR, 11.3% (10.1–12.6%) and 10.9% (9.6–12.1%); any INH, 7.7% (6.7–8.8) and 8.6% (7.5–9.7%); any INH+RFP, 1.6% (1.1–2.1%) and 2.2% (1.6–2.8%) in 1994 and 1998 respectively. Compared with the results of previous surveys, the resistance to antituberculosis drugs in Korea has not been changed significantly since 1994.

PS-1299-20 Drug intolerance with MDR-TB chemotherapy

G Mussabekova, S H Ismailov. National Center for Tuberculosis Problems, Almaty, Kazakhstan. Fax: (+7) 3272 918658. e-mail: MDRTBproject@itte.kz

Aim: Determine the frequency of adverse reactions on anti-TB drugs of the second line at the treatment of patients with polyresistant tuberculosis. There were studied of 197 patients treated under standard regimen of DOTS+ in 2003. Patients with fibrocavernous tuberculosis clinical forms were 156 (79.2%). Concomitant pathology in the gastrointestinal tract and kidneys were revealed in 158 (80.2%) patients. During the chemotherapy (18–24 months) adverse reactions were observed in 185 (93.9%) patients. Allergic reactions (dermatitis, eosinophilia, conjunctivitis)

were marked in 16 out of them, toxic reactions (neuropathy, psychosis, nephritis, hepatitis) in 62, toxic-allergic ones in 107 patients. Side effects needed to be corrected medicamentously and temporary drugs cancellation were developed in 84 (42.6%) patients. Expressed adverse responses which needed to cancel one or more drugs were developed in 84 (42.6%) patients. Cycloserin was repealed the most frequently: in 47 (23.9%) cases during first four months. The full intolerance of the capreomycin was registered in 6 (3.0%), thioamides in 37 (18.8%) and ofloxacin in 10 (5.1%) cases. In the continuation phase of chemotherapy 16 (8.1%) patients were needed to interrupt the treatment because of constant nausea, vomiting, headache, depression. Totally 157 (79.7%) patients completed the full course of chemotherapy, at this 97 (49.2%) were treated by standard treatment regime. Thus, high percentage of cancellation of the drugs of the second line and refusal of patients to continue the treatment under out-patient conditions were due to not because of the expansion of TB process and disease duration, but, it is likely, because of anti-TB drugs quality.

PS-1336-20 Experiences in managing multidrug-resistant tuberculosis at National Institute of Diseases of Chest & Hospital in Bangladesh

A M Mahmud, M A Qayyum, K H Jessy, M R Hassan, M M Rahman, M A Hossain, M M Hiron, M A Rahman, M R Islam, M M Ahmad. Department of Respiratory Medicine, National Institute of Diseases of Chest & Hospital, Dhaka, Bangladesh. Fax: (+880) 29341206. e-mail: sendai@bdcom.com

Background: In Bangladesh, prevalence of MDR-TB is around 5% in previously treated patients. The NIDC&H is the only tertiary referral center for chest diseases and TB is involved in managing MDR-TB patients since 1998.

Results: Here, we present our experiences of managing 75 MDR-TB patients (52 men, 23 women) since January 2002. Forty-seven (62.6%) were culture proven MDR-TB whereas remaining 28 (37.3%) was defined as 'Chronic cases'. Our present regimen consists of 6 month's intensive phase of Kanamycin, Ethionamide, Ofloxacin/Ciprofloxacin, Ethambutol and Pyrazinamide followed by 18 month's continuation phase. Hospitalization is mandatory for two years. Kanamycin, Ethionamide and Ofloxacin are not supplied by the hospital. The patients are supported by private donations or by an NGO. For analysis, 18 patients in the intensive phase have been excluded. Out of the remaining 57, 70% have converted to smear negative. Three patients (5.4%) have died, another 3 (5.4%) absconded and 11 patients (19.2%) failed to convert after intensive phase of treatment—'Treatment failure'. Surgery has been performed on 4 patients yielding excellent results.

Conclusions: In Bangladesh, a specialized center can play a major role in the diagnosis and management of MDR-TB patients, despite resource constraints.

PS-1527-20 Implementing a DOTS-Plus pilot project in Uzbekistan and a strategy for expansion and integration with the existing DOTS programme

Y Kebede,¹ H Cox,² N Zarkua,³ Z Tigay,⁴ S Rüsç-Gerdes,⁵ G Ismailov,³ M Ramirez Santana,³ L Blok,^{1,6} D Doshetov,⁴ M Rich.⁷ ¹Médecins Sans Frontières, Amsterdam, The Netherlands; ²The University of Melbourne, Melbourne, Australia; ³Médecins Sans Frontières, Nukus, ⁴Ministry of Health, Nukus, Uzbekistan; ⁵National Reference Center for Mycobacteria, Borstel, Germany; ⁶Royal Tropical Institute KIT, Amsterdam, The Netherlands; ⁷Partners in Health, Harvard, Boston, Massachusetts, USA. Fax: (+31) 206 205170. e-mail: Yared.Kebede@amsterdam.msf.org

Introduction: The DOTS strategy was implemented in Karakalpakstan, Uzbekistan. Cure rates from 1998 to 2003 have remained at less than 60%. A drug susceptibility testing survey revealed high rates of MDR-TB among new and retreatment cases (13% and 40% respectively), which prompted the initiation of a DOTS-Plus project.

Objective: To share experience in implementing a DOTS-Plus project and opportunities for integration into the existing control program.

Methods: A GLC approved DOTS-Plus program was established in 2003 in Nukus, Uzbekistan, with a fully functional quality-assured laboratory, an individualized approach to treatment based on DST, and a patient data management system for monitoring and evaluation of treatment and outcomes.

Results: Between September 2003 and March 2005, 100 drug-resistant tuberculosis patients were enrolled into the program of which 99% were chronics (failures of WHO retreatment regimen). Preliminary outcome indicators show 80% sustained smear and culture conversions after completing at least 8 months of treatment.

Conclusion: High costs, safety concerns, long treatment duration, side effects and adherence remain challenges. The successful implementation of the pilot program in a low-resource area has paved the way for expansion of services that will detect patients earlier with management being fully integrated with the DOTS program.

PS-1532-20 How complex is multidrug-resistant tuberculosis treatment based on individualized treatment regimens?

S Shin,¹ S Atwood,¹ I Gelmanova,² S Keshavjee,^{1,2}

M Nikiforov,³ G Peremitin,⁴ Y Andreev,⁵ O Sirotkina.⁴

¹Division of Social Medicine, Brigham and Women, Boston, Massachusetts, ²Partners in Health, Boston, Massachusetts, USA; ³Partners in Health, Moscow, ⁴Tomsk Oblast Tuberculosis Service, Tomsk, ⁵Tomsk Prison Service, Ministry of Justice, Tomsk, Russian Federation. Fax: (+1) 617-525-7719. e-mail: sshin@partners.org

We sought to describe the frequency and patterns of regimen changes in a multidrug-resistant tuberculosis (MDR-TB) treatment program in Tomsk, Russia. A retrospective chart review was performed for all 244 patients who were enrolled between September 10, 2000 and September 10, 2002, documenting all regimen changes and reasons for change. The median number of regimen changes (including changes in drug doses) was 6 (mean = 7.2, mode = 3), and the median number of regimen changes (excluding changes in drug doses) was 4 (mean = 5.4, mode = 2). The majority of changes occurred in the first 8 (8.2) months of treatment (9.0 months if excluding only dose change regimens.) Qualitative assessment of regimen changes, using pictorial 'drugograms,' revealed that the majority of patients required few changes, while a minority of individuals required more than 10 changes. We identified basic patterns in regimen management and also compared management patterns in the civilian vs. prison cohorts. We conclude that despite the frequency and heterogeneity of regimen changes, basic patterns of regimen management can be identified, and that the implementation of individualized treatment strategies is feasible, even in resource-poor settings.

PS-1560-20 Extreme drug resistance in tuberculosis ('XDR TB'): global survey of supranational reference laboratories for *Mycobacterium tuberculosis* with resistance to second-line drugs

N S Shah,¹ A Wright,² F Drobniewski,³ S Rüsç-Gerdes,⁴

M Havelkova,⁵ C Gilpin,⁶ T Shinnick,¹ K Laserson,¹

J P Cegielski.¹ ¹US Centers for Disease Control and Prevention, Division of Tuberculosis Elimination, Atlanta, Georgia, USA; ²World Health Organization, Stop TB Department, Geneva, Switzerland; ³King's College Hospital (Dulwich), Department of Infectious Diseases, Mycobacterium Reference Unit, London, UK; ⁴National Reference Center for Mycobacteria, Borstel, Germany; ⁵National Institute of Public Health, Prague, Scrobarova, Czech Republic; ⁶Prince Charles Hospital, Queensland Mycobacterium Reference Laboratory, Brisbane, Queensland, Australia (for the International Collaborative Workgroup on Resistance to Second-line Antituberculosis Drugs). Fax: (+1) 404-639-1566. e-mail: sashah@cdc.gov

Background: Inadequate chemotherapy for multidrug-resistant tuberculosis (MDR-TB) can result in virtually untreatable TB disease. The global network

of Supranational Reference Laboratories (SRLs) provides quality control for TB laboratories and assists in conducting drug-resistance surveys. We sought to enumerate *Mycobacterium tuberculosis* (MTB) isolates resistant to ≥ 3 second-line drugs identified by SRLs.

Methods: We requested data on MTB isolates previously tested for second-line drug resistance from all 23 SRLs. We included strains from 2000–2004 tested against ≥ 3 of the six major classes of second-line drugs (aminoglycosides, polypeptides, fluoroquinolones, thionamides, cycloserine, and para-aminosalicylic acid). Extreme drug-resistance in TB (XDR TB) was defined as MDR (resistant to at least isoniazid and rifampicin) isolates also resistant to ≥ 3 second-line drug classes.

Results: Of 551 included strains, 519 (94%) were resistant to at least one first-line drug, 454 (82%) were MDR, and 309 (68%) MDR strains were also resistant to ethambutol and streptomycin. Of 454 MDR strains, 64 (14%) were resistant to ≥ 3 second-line drug classes, meeting our definition of XDR TB. This included 31% (31/100) of isolates from Russia, 15% (15/103) of isolates from the Czech republic, 10% (9/94) of isolates from the U.S., and 5% (9/189) of isolates from Germany and the U.K.

Conclusion: Extreme drug-resistance in TB—'XDR TB'—is an emerging public health threat. Vigorous efforts to treat MDR-TB effectively and to monitor and prevent second-line drug resistance are needed.

PS-1596-20 Retrospective cohort study of the impact of surgery for multidrug-resistant tuberculosis on treatment outcomes

G Dravniece,¹ K P Cain,² T H Holtz,² I Silins,¹ V Riekstina,¹ V Leimane.¹ ¹State Agency for TB and Lung Diseases, Riga, Latvia; ²Centers for Disease Control and Prevention, Division of Tuberculosis Elimination, Atlanta, Georgia, USA. Fax: (+1) 404-639-1566. e-mail: kcain@cdc.gov

Background: No consensus currently exists on the role of surgery for treatment of multidrug-resistant tuberculosis (MDR-TB). In Latvia, indications for surgical treatment include failure of medical therapy. We sought to evaluate the influence of surgery on patient outcomes in Latvia.

Methods: We performed a retrospective cohort study of all patients initiating treatment for MDR-TB at the State Agency for TB and Lung Diseases in Riga, Latvia from 1997 to 2002. We included all patients treated with surgery and a sample of patients not treated with surgery, chosen using stratified random sampling and matched by year of treatment initiation. We defined good treatment outcome as cured or completed treatment.

Results: Of the 77 patients treated with surgery for MDR-TB, 66 (86%) had a good outcome, compared to 112 (63%) of the 177 patients not treated with sur-

gery (relative risk 1.4, 95% confidence interval 1.2–1.6). Patients treated with surgery were more likely to be resistant to capreomycin, cycloserine, prothionamide, and fluoroquinolones, more likely to have unilateral disease on X-ray, and less likely to drink alcohol excessively ($P < .05$ for all associations). Surgery remained an independent predictor of good outcome after controlling for these and other potential confounders.

Conclusions: Surgical treatment for patients with MDR-TB was associated with improved outcomes in Latvia. Surgery for MDR-TB should be considered a viable treatment option.

PS-1679-20 MDR-TB in TB patients known to be contacts of patients receiving individualized treatment regimens for MDR-TB

E Sánchez-Garavito, M Caso-Huamani, M De la Cruz-Chipana. Hospital Sergio E. Bernales, Lima, Peru. Fax: (+51) 1 5472121. e-mail: episaga6@viabcp.com

Background: In the treatment of MDR-TB, drug-susceptibility test results from a purported source case may be used to select a patient's regimen. It is important to analyze these data in different populations.

Objective: To examine the resistance profiles in TB patients known to be contacts of an MDR-TB patient.

Methods: Retrospective chart review of patients diagnosed with TB and known to be contacts of a patient who received an individualized regimen for MDR-TB at the Hospital Sergio Bernales in Lima, between August 1996 and July 2004. In each patient pair, the first treated was designated the purported source case. Susceptibility testing to 10 drugs was conducted on both isolates in each pair.

Results: 150 TB patients were known to be a contact of a purported source case with MDR-TB. The most common relationship to the source case was sibling (46.6%). 128 (85.3%) had MDR-TB strains, while 22 (14.7%) had drug-susceptible strains. In the 128 MDR-TB case pairs, only 47 (36.7%) had identical drug-resistance profiles.

Conclusions: Among MDR-TB patients presenting to our hospital in northern Lima who are known to be contacts of an MDR-TB patient, the drug-resistance profile is often different from that of the purported source case.

PS-1720-20 Laboratory trends in tuberculosis drug resistance at the TB reference laboratory in Zambia. Are they a useful guide to multidrug resistance levels?

B R Tembwe, J W Chilongo. Chest Diseases Laboratory, Lusaka, Zambia. Fax: (+260) 1282306. e-mail: bwalya@zamnet.zm

In regions where the national TB programs are weak or poor socio-economic environments resistant isolates of *M. tuberculosis* are prevalent. Surveillance of

TB, in Zambia is mainly based on laboratory and patient notifications. In 2000 a national survey was conducted in line with the WHO guidelines. Multi-drug resistance was 1.8% for new cases and 2.3% for previously treated cases. The reference laboratory therefore decided to closely monitor the country trends.

Objective: Laboratory monitoring of levels of TB drug resistance.

Methods: Susceptibility tests were done using the WHO indirect proportion method.

Results: The number of isolates tested from 2002 to 2004 were 90, 136 and 219 respectively. Resistance to one drug shows a gradual increase for Streptomycin. For both Isoniazid (from 13% to 28%) and Rifampicin (from 4.4% to 11%) there was an increase in 2003 then a reduction in 2004 (Isoniazid 2.2% and Rifampicin 1.3%). Multi drug resistance was 7.7% in 2002 5.0% in 2003 but there was a marked increase in 2004 (20.5%).

Conclusion: The results of the three years indicate an increase in both TB drug resistance and Multi drug resistance.

PS-1745-20 Results of primary multidrug-resistant pulmonary tuberculosis cases

F Sungun, A Saygi, M Ozdemir, G Dabak. Heybeliada Chest Hospital, Istanbul, Turkey. Fax: (+90) 2163511994. e-mail: sungunfiliz@yahoo.com

Primary resistance has been detected in 21 patients (27%) out of 77 multidrug-resistant tuberculosis (MDR-TB) cases. Fifteen of 21 primary MDR-TB cases (11 females, 10 males) who were on retreatment therapy showed failure at the end of 5 months and they started second line anti-TB drugs then after. Twelve of 15 primary MDR-TB cases were successfully treated with second line anti-TB drugs, 4 patients had undergone surgical resection (lobectomy) in addition to medical therapy. Out of remaining 3 cases, two of them got lost on follow-up and the other one case is still on follow-up with a sputum conversion at the end of second month. Six cases of primary MDR-TB patients have been received first line drug regimen. Five of 6 patients completed treatment successfully and the last one is still on first line drug therapy with a sputum conversion at the end of 2nd month. Sputum conversion was obtained between 1 to 3 months in both groups and there was also no difference in the hospitalisation period (3–6 months) in both groups. Treatment success was 26.3% in primary MDR-TB cases treated with only first line drug regimen in our department.

CLINICAL TRIALS AND TB TREATMENT-I

PS-1138-20 Impaired bioavailability of rifampicin in the presence of isoniazid and pyrazinamide

L T Luyen, H T K Huyen, N T L Huong. ¹Department of Clinical Pharmacy, Hanoi University of Pharmacy, Hanoi, Vietnam. Fax: (+84) 48430015. e-mail: luyenle66@yahoo.com

Comparative bioavailability study of rifampicin at the same dose level with and without present of isoniazid and pyrazinamide in the standard separate tablets was conducted in 12 healthy volunteers. Bioavailability of rifampicin was estimated by plasma concentration of rifampicin from 0 h to 24 h after dosed. Plasma rifampicin concentration was determined by HPLC method. The results revealed that: C_{max} and AUC for rifampicin was reduced (31.24% and 25.95%, respectively) when administered rifampicin-isoniazid-pyrazinamide at the same time. It was concluded that bioavailability of rifampicin was affected in the presence of isoniazid and pyrazinamide.

PS-1202-20 Effectiveness of implementation of hepatoprotector LIV-52 for elimination of hepatotoxic responses in patients with pulmonary TB

G A Smailova, G L Sagintaeva, S H Shaimuratov, B R Kazykhanova, G Mussabekova. National Center For TB Problems, Almaty, Kazakhstan. Fax: (+327) 918658. e-mail: medeubek@hotmail.com

Tuberculostatics lead to emerge the drug complications in the liver function the most frequently, especially among persons with hepatitis, diabetes mellitus, positive antigen HBS-carrying. This status need to be corrected obligatory. On the base of therapeutic clinics we tested LIV-52, treatment of 33 patients with firstly detected pulmonary TB which had the hepatotoxic reactions due to tuberculostatics. We revealed that the most frequent hepatotoxic responses were due to rifampicin in 18 (54.5%) of cases, pyrazinamid (6.4%), less frequently to isoniazid (9.1%). We controlled the speed of disappearance of such symptoms as skin rush and itch, common reactions, headache, pains in the right subcostal area, liver border increasing, liver tests level growing. By 30th day of LIV-52 taking skin reactions disappeared in 95.2% of patients, common responses in 100%, liver border was normalized in 96.6%. There were observed difficult elimination of hepatotoxic reaction to anti-TB drugs in 4 (12.1%) cases. There were 7 (21.2%) cases of relapses of drug complications. Continuation of treatment with drug inducing adverse responses became possible in 30 patients (90.9%). Thus, as a result, phyto-preparation LIV-52 could be recommended for correction of drug induced complications in the liver function disturbances of the light and moderate

degree for comprehensive treatment of patients with pulmonary TB.

PS-1236-20 Gastrointestinal injuries in patients treated with anti-TB chemotherapy regimens confirmed by autopsy data

G T Khauadamova, G A Myasnikova, Y A V Besstrashnova, L K H Aldyghyreyeva. National Center for TB Problems, Almaty, Kazakhstan. Fax: (+327) 918658.
e-mail: medeubek@hotmail.com

Target: To determine the frequency and nature of gastrointestinal tract injury among patients treated with anti-TB drugs.

Objective: To investigate the morphological status of the gastrointestinal tract of patients treated with anti-TB drugs of the first and second lines and died from tuberculosis.

Material and methods: Investigation is based on autopsy materials of 11 patients died from tuberculosis. According to the autopsy data chronic atrophic gastritis was diagnosed the most frequently, in 27.3%. The chronic esophagitis was confirmed in 27.3% of cases. The small intestine injury was marked in 72.7% of cases including the catarrhal desquamative enteritis in 27.3%, chronic enteritis in 18.2% of cases. In 63.6% there were found out the large intestine injury including both catarrhal desquamative superficial colitis and chronic atrophic colitis—equally by 27.3% of cases. In 81.8% of cases there were observed the combined injury of upper and lower parts of the gastrointestinal tract. Taking into account that injury of the esophagus and stomach occurred in the majority of patients timely correction of their treatment allows to diminish the adverse reactions due to anti-TB drugs.

PS-1240-20 Gastrointestinal injuries confirmed by fibrogastroscopy among patients treated with anti-TB chemotherapy regimens

G T Khauadamova, G A Myasnikova, Y A V Besstrashnova, S Z H Sadykov. National Center for TB Problems, Almaty, Kazakhstan. Fax: (+327) 918658.
e-mail: medeubek@hotmail.com

It is well known that number of drugs induces the injury of gastrointestinal tract mucus. Stomach mucus suffers from medications the most frequently.

Aim of study: To detect the pathology of gastrointestinal tract among patients with pulmonary tuberculosis relapse.

Objectives: To investigate, on the base of biopsies, the morphological status of gastrointestinal tract in patients treated with anti-TB drugs of the first and second lines.

Materials and methods: Investigation is based on the materials of 37 patients hospitalized at the clinics of the National TB Center. There were carried-out the fi-

brogastroscopy, roengenological and bacteriological investigations.

Discussion of the results obtained: Our investigation showed that in the majority of cases among 37 patients examined by fibrogastroduodenoscopy there were marked the gastritis in 31 (83.8%), esophagitis in 11 (29.7%), injury of upper part of the small intestine in 13 (35.1%). It should be noted that the combined pathology occurred in 48.6% of cases. Beside of morphological changes in the gastrointestinal tract revealed through invasive methods of investigations, Candida' dissemination, including the esophage injury, was diagnosed. Thus, frequently gastrointestinal tract of patients treated with anti-TB drugs is injured. Dyspepsia and gastroenterological disturbances among patients under durable chemotherapy regimens need to be corrected.

PS-1290-20 A case of diagnostic errors in a patient with exudative pleurisy

G B Rakishev, S C H Chaimerdenov, K D Erimbetov, U S H Medeubekov, A S H Zyetov. National Center for TB Problems, Almaty, Kazakhstan. Fax: (+327) 918658.
e-mail: medeubek@hotmail.com

Diagnostic of the etiology of the exudative pleurisy remains the topical issue since frequently the clinical and roentgenological data are identical at the pleurisy of different genesis. According to the data of authors, thoracoscopy with pleural biopsy is the important link in the diagnostic algorithm among similar patients. However in 4.5% to 24.2% of cases endoscopic diagnostics through biopsy remains non-informative. We present one case from our practice. Patient, female, 37 years old, had been hospitalized on 14.10.03 with preliminary diagnosis: the exudative pleurisy of the right location of unknown etiology. At the hospitalization this woman complained about body temperature increase to 38°C, pains within the chest of the right location, shortening of breath when walking. After non-specific therapy completed patient had been discharged from clinic in the satisfactory status. Two months later infiltrative changes were revealed in the lungs with sub-total shadowing with slating upper contour to the right. Diagnosis was stated: infiltrative pulmonary tuberculosis complicated with pleurisy of the right location, with *M. tuberculosis* isolated. Specific treatment had been administered. Thus, underestimation of data of PCR of the blood serum and pleural exudation and insufficient quality of the biopsy when thoracoscopy led to the diagnostic mistake. This case is of evidence of the necessity of the comprehensive investigation of this category of patients, when one investigation completes other one that allows to diagnose the exudation etiology and, with this, to administer the adequate therapy.

PS-1296-20 Ultrasonic diagnosis of retroperitoneal and cold abscess in patients with spinal TB

B Kassymova,¹ V Kharchenko,² A Terlikbaeva,³

G Kassymova.¹ Departments of ¹Diagnostics and ²Bone and Joint TB, National Center for Tuberculosis Problems, Almaty,

³Kazakh National Medical University, Almaty, Kazakhstan.

Fax: (+7) 3272 918658. e-mail: ncpt@itte.kz

Method allows to visualize both skeleton and soft tissue structures. Advantages of USI are its rapidity, cost effectiveness, non-invasivity and opportunity of dynamic observations for many times. In majority of cases at the injury of lumbar vertebrae cold abscesses disseminate in the retroperitoneal area within m. iliopsoas with psoas-abscesses formation in the ilio-lumbar area on one or both sides. USI was carried out through: 'SHIMADZU-SDD-1200' and 'JUST VISION-200', Toshiba (Japan). 32 patients with TB spondylitis: 19 (59.4%) men, 13 (40.6%) women were examined. All patients were implemented review roentgenogrammes of spine in right and lateral projections and computer tomogrammes. Clinical symptoms of chronic purulent inflammation in patients the destruction foci within bones with cortical layer caries, sequestrae, purulent accumulation in soft tissues were revealed. In 7 (21.9%) cases there were abscesses in m. psoas major, and in 5 (15.6%) retroperitoneal abscesses were localized in the iliac fossa and subcutaneously at lumbosacral articulations TB. Thus, USI allows to determine the length and volume of retroperitoneal abscess, its structure and its interrelations with surrounding organs. And it reveals the liquid presence that help to decide the operative intervention volume.

PS-1297-20 Ultra-sound diagnosis of diseases of the hepatobiliary system in patients with drug-resistant pulmonary tuberculosis

B Kassymova,¹ S Ussembayeva,¹ A Terlikbaeva,²

G Kassymova,¹ Z H Kassymova.¹ ¹National Center for Tuberculosis Problems, ²Kazakh National Medical University, Almaty, Kazakhstan. Fax: (7) 3272 918658. e-mail: ncpt@itte.kz

For the last years ultrasonic method of investigation (USI) became one of the leading among many diagnostic methods in some fields of medicine. USI was implemented by us through using the devices 'Shimadzu-SDU-1200 Just Vision-200' (Japan). There were examined 250 patients with drug-resistant pulmonary tuberculosis (age from 30 to 70 years). There were revealed the fibrocavernous pulmonary TB in 136 (54.4%), infiltrative pulmonary TB in 78 (31.2%) and disseminated pulmonary TB in 36 (14.4%). Clinical manifestations of the chronic cholecystitis and cholelithic disease were found out in 142 (56.8%) patients, hepatic pathology in 90 (36%) and clinical signs of the liver injury weren't revealed in the hepatobiliary system. Normal echographic gallbladder pic-

tures were obtained in 12 (4.8%) patients with pulmonary TB, echogrammes showed the concrements in a gallbladder in 72 (28.8%), while presence of concrements was not proved in 18 (7.2%). In the group of patients with hepatic pathology thanks to USI signs of liver cirrhosis (later confirmed by clinical, laboratory investigations and computer tomography) revealed in 5 (2.0%) cases. There were diagnosed the signs of the focal liver injury in 8 (3.2%), echinococcal cysts in 6 (2.4%), abscess in the liver was found out in 2 (0.8%), and cancer of liver was in 1 (0.4%) of case. Thus, USI is of the decisive significance in the diagnostics of hepatobiliary system diseases that allows to carry out the examinations in dynamics, especially for treatment effectiveness control. It is the high informative method of investigation allowing to diagnose the wide spectrum of the hepatobiliary diseases in above mentioned groups of patients.

PS-1353-20 Do underweight TB patients treated with first-line regimens suffer more from side effects than normal weight TB patients?

A D Mynck,¹ B B Hota,¹ D N Naik,¹ S Sindhi,¹

S Mahapatra.² ¹Tuberculosis; DANTB, Bhubaneswar, Orissa,

²State TB Cell, Bhubaneswar, Orissa, India.

Fax: (+91) 6742550896. e-mail: aime@dantb.org

The dosages of first line TB drugs are normally calculated as per the bodyweight. RNTCP, India has laid strong emphasis on the continuity of treatment, by preventing interruption of the drug supply. All drugs needed to treat one patient, are packed into 2 boxes, 1 each for the Intensive phase & Continuation phase. To facilitate the operationalisation of the drug supply in the whole country, RNTCP has adopted a unique treatment doses, calculated on the modal normal weight patient. Patients of exceptionally high or low body weight are given loose drugs, with adjustments. Patients with body weight between 35 and 55 kg receive the same treatment box; consequently a patient of 35 kg receives a higher dose per kg than a patient of 55 kg. Apparently, this practice is not inducing extra side effects, but a concrete evaluation is mandatory.

Objective: To assess the incidence and intensity of side effects of the uniform dosage scheme on variable body weights.

Methodology: A study with 3000 patients is undertaken. A questionnaire is structured to follow up the incidence and intensity of side effects with the cooperation of the DOTS providers, STS, STLS, LT and MO.

Results: Will be presented at the Conference

PS-1355-20 TB incidence after 7 years of intensive TB control in Orissa, India

A D Muynck, T K Ray, G Mallick, A K Nayak, S Mohanty.
Department of Tuberculosis, DANTB, Bhubaneswar, Orissa,
India. Fax: (+91) 6742550896. e-mail: aime@dantb.org

RNTCP started in 1997 in the districts of Mayurbhanj, Keonjhar and Sundargarh, in the State of Orissa, India, covering 5 million people. Less than 18 months after the launching of the TB control programme in these 3 districts, the detection target of 70% and cure rate of 85% was obtained and maintained at target level till date, without visible tendency of declining incidence. Normally, after 07 years of intensive & continuous coverage, a decrease in the incidence of pulmonary disease is expected, as proven by statistical models and Peru example. But, in reality these districts shows a tendency to maintain the incidence at the same level over the last 05 years. Reasons for this steady level of incidence have been explored at district and sub-district level. These districts have a high concentration of tribal population, although their coverage and participation in the TB control is outstanding. The TB control program implementation remained excellent throughout the period. High HIV infelicity could be a disturbing factor, but these districts have low HIV incidence.

Objectives: To find the possible rationale and factors for the lack of decreasing incidence of the disease.

Results: Possible explanations for the above will be presented at the Conference.

PS-1445-20 Clinical course of combined forms of tuberculosis of the lungs and the spine

P Nazirov, E Alikulov, A Urazbaev, M Saparov. Department of Osteology, Research Institute of Phthisiatry & Pulmonology, Tashkent, Uzbekistan. Fax: (+371) 785140. e-mail: kasten46@mail.ru

Our research was aimed at studying a course of combined forms of tuberculosis of the lungs and the spine. 86 patients with pulmonary tuberculosis combined with tuberculosis of the spine. Fifty-four patients with tuberculosis of the spine served as controls. In a structure of tuberculosis were prevailed nidus tuberculosis ($45.3 \pm 2.4\%$), disseminated ($25.6 \pm 1.7\%$), infiltrative ($17.4 \pm 1.6\%$), cavernous (1.2%), fibrous-cavernous (7%) and pleural damage (3.5%). A more considerable reduction in content of erythrocytes (3.2 ± 0.4 mln) and hemoglobin ($10.2 \pm 0.2\%$ g/l) was established in the patients in the 1st group than in those in the 2nd group. An analysis of leucocytes revealed that their level was considerably higher in the 1st group (10.0 ± 0.34 thous.) than in the control group. It is explained by the presence of an expressed suppurative process. Results of biochemical studies allowed to detect substantial differences in some functional indices in the liver subject to severity of specific process. It was concluded that a more unfavourable clinical

course of specific process in the patients with tuberculosis of the spine combined with tuberculosis of the lungs. Specific process was accompanied by pronounced intoxications, pain syndromes. Relatively expresses pathologic shifts in peripheric blood, functional disorders in parenchymatous organs especially in the liver were also observed that needs relevant correction.

PS-1448-20 Surgical treatment of thoracic tuberculosis of the spine

P Nazirov, E Alikulov, A Urazbaev. Department of Osteology, Research Institute of phthisiatry & pulmonology, Tashkent, Uzbekistan. Fax: (+371) 785140. e-mail: kasten46@mail.ru

Our purpose was to determine an efficacy of radical restorative surgical interventions of tuberculosis of the spine. Eighty patients with tuberculosis of the spine antibacterial therapy have been operated. These operations on vertebral bodies were performed through transpleural approach.

Efficacy of interventions for tuberculous spondylitis depends upon character of pathology. Specific changes had localized character in 29 (36.2%) patients. Abscessotomy, necrectomy and economic resection of the damaged vertebral bodies have been also conducted. Unilateral paravertebral abscesses were found in 17 patients, bilateral ones—in 44 patients. Abscesses located in thorax and wrapped with pulmonary tissue which capsule was inosculated with visceral pleura attract a particular attention. These abscesses took place in 7 patients. An accomplishment of decompression interventions was needed in relation with presence of cerebrospinal disorders in 64 patients. Osteal plasty was a final stage of operation.

PS-1475-20 Surgical management of childhood tuberculous empyema

G Hacıbrahimoglu, A Orki, A Akgul, O Akin, F Sungun, M Yuksel. Heybeliada Hospital for Chest Disease and Thoracic Surgery, İstanbul, Turkey. Fax: (+90) 216 3511994 e-mail: ghaciibrahim@yahoo.com

The purpose of this study was to evaluate surgical treatment modalities for childhood empyema. Between 1994 and 2004, 25 patients with an average of 12.7 years presented with tuberculous empyema. The empyema was right-sided in 15 patients. All patients had ultrasonography and chest computed tomography and managed according to the stage of empyema. The most common radiologic findings were pleural effusion and pleural thickness, besides 3 patients were seen cavitary lesion. Pleural fluid tuberculous cultures were negative in 21 patients. In patients with fibrinopurulent stage ($n:11$) treated with thoracoscopic drainage and debridement. There were thirteen patients with organizing stage. These patients were treated open decortication due to pleural thickness.

The rest of 1 patient was treated with only chest tube drainage for worse general condition. There was no mortality. Postoperative complications included failure of expansion in 3, prolonged air leaks in 1, empyema in 1, and wound infection in 1 patient. The median follow-up period was 72.4 months. There was no recurrence. The guide of surgical treatment for childhood tuberculous empyema must be stage based and the state of underlying lung. Thoracoscopic drainage and debridement and if necessary open decortication is safe approach with low morbidity.

PS-1484-20 Two year follow-up of tuberculosis cases put on DOTS

P R Sreelatha, K Venugopal, S Manoj. Medical College Hospital, Alappuzha, Kerala, India. Fax: (+91) 477 2262224. e-mail: dtovenu@spectrum.net.in

Introduction: With implementation of RNTCP (DOTS), many are in doubt of relapse rate of fully intermittent regimen, so a follow up study is essential to evaluate relapse of fully intermittent regimen in the field conditions.

Aim: 1) To evaluate present status of TB cases put on DOTS and 2) TB patients response towards long term follow up.

Material and methods: All TB patients registered in one TU are registered for DOTS are included in the study. Patients were invited for follow up examination by sending a letter promising them refreshment and transportation charge. They were examined and interviewed by trained interns.

Observation: Of the total 270 cases registered, 99 (36.66%) reported for follow up examination. Two cases is remaining as chronic cases and one case showed symptoms of relapse. Of the 130 positive cases 52 (40%) reported for follow up. Of the 57 negative cases 25 (43.85%) reported for follow up. Of the 63 extra pulmonary cases 22 (34.92%) reported for follow up.

Conclusion: Relapse rate is negligible evaluating the reported cases. Pulmonary cases are more prompt for long term follow up compared to extra pulmonary cases.

PS-1486-20 Surgical management of secondary spontaneous pneumothorax due to tuberculous

G Hacıibrahimoglu, A Orki, C Tezel, S Urek, M Yuksel. Heybeliada Hospital for Chest Disease and Thoracic Surgery, İstanbul, Turkey. Fax: (+90) 216 3511994. e-mail: ghaciibrahim@yahoo.com

The aim of the study was to evaluate the outcomes of surgical treatment of secondary spontaneous pneumothorax (SSP) due to tuberculous. We retrospectively reviewed our experience between the years 1997 and 2004, 55 patients with an average of 34.5

years presented with pneumothorax. Forty four of the patients were at the first episode and 11 of the rest were at the second episode. The pneumothorax rate was less than 25% at 14 of the cases. Radiologically, 8 patients were seen cavitory lesion. Sputum tuberculous cultures were positive in 15 patients. The cure with tube thoracostomy was achieved at 45 patients of them. The average drainage rate was 4.2 days. We performed operation to 10 patients because of the prolonged air leak. To 8 patients, we underwent operation with videothoracoscopy and other 2 patients with axillary thoracotomy. There wasn't any post-operative complication and mortality. The patients were followed up 46 months. There were no recurrence and development of malignity. The appearance of partial pneumothorax which was the cause of an apical adhesion which depends on a tuberculous at SSP is sufficient for a conservative treatment. Another factors for success are not to hurry up to decide about the surgery and the parenchimal structure.

PS-1851-20 Fast acetylators in a Mexican population that initiates treatment with isoniazid

O Guillermo Caballero,¹ D M C González Ramirez.²
¹Instituto Mexicano del Seguro Social, Monterrey, Nuevo Leon,
²Centro de Investigación Biomédica del Norte, I.M.S.S.,
Monterrey, Nuevo Leon, Mexico. Fax: (+52) 1 83 73 93 19.
e-mail: versustbp@yahoo.com.mx

Objective: To evaluate the proportion of fast acetylators in a segment of a Mexican population that initiates prophylactic treatment for pulmonary tuberculosis after a single dose of Isoniazid.

Design: 300 mg isoniazid were administered to patients of the Unidad de Medicina Familiar (UMF) No. 28 of the Instituto Mexicano del Seguro Social in Monterrey, N.L. Mexico. Six hours after the ingestion of the drugs urine was obtained from these patients. A criterion for the exclusion of patients from the study was the presence of glucose in the urine sample. When the ratio AcINH/INH in the sample was greater than 70%, that person was considered as a fast acetylator

Results: 67 patients (60.4) could be categorized as a fast acetylators where as 44 patients (39.6) be haved as slow acetylators. The group of fast acetylators presented 85+9% of average activity and slow acetylators had an average of 48 + 13% activity

Conclusion: In this study it was observed a larger proportion of fast acetylators. This knowledge could be applied when INH is given singly as a prophylactic therapy of pulmonary tuberculosis or in combination with other drugs.

CLINICAL TUBERCULOSIS—I

PS-1159-20 Evaluation des séquelles de tuberculose dans un groupe de malades déclarés guéris au Centre de Pneumoptysiologie de l'hôpital Laquintini Douala (Cameroun)

N A M Metchedjin, E Nyankiye, B Bouellet. Centre de Pneumophthysiologie Hôpital Laquintinie Douala, Douala, Cameroon. Fax: (+237) 337 01 46. e-mail: metchedjin@yahoo.fr

Objectif : Déterminer la fréquence des séquelles radiologiques dans un groupe de malades traités pour tuberculose pulmonaire.

Méthodologie : Tous les malades déclarés guéris (avoir au 5^e mois en cas de primo traitement ou au 7^e mois en cas de retraitement, deux bacilloscopies négatives) ont été évalués sur le plan des lésions radiologiques séquellaires par rapport aux lésions initiales. Les lésions ont été classées en syndromes interstitiels, de condensations, d'adénopathies médiastinales, d'épanchements pleuraux, de cavernes ; et en plus sur le plan séquellaires des pachypleurites, des atélectasies.

| Lésions | Initiales | Séquellaires | Pourcentage de régression |
|--|-----------|--------------|---------------------------|
| Syndromes interstitiels | 254 | 166 | 35% |
| Cavernes | 114 | 15 | 87% |
| Syndromes de condensation | 70 | 67 | 4% |
| Epanchements pleuraux/ pachypleurites | 42 | 20 | 53% |
| Scissurites | 15 | 10 | 33% |
| Adénopathies | 10 | 6 | 40% |
| TOTAL | 505 | 284 | 56% |

Résultats : 326 malades (58.3% d'hommes) d'un âge moyen de 34.4 ± 13.6 ans (1 à 80) ont été retenus. 54.8% avaient une TPM+, 32.7% une TPM- et 12.6 une TEP. 21% des malades étaient VIH positifs (29% n'avaient pas de statut sérologique). Les protocoles utilisés étaient 52% de quadrithérapie, 44% de trithérapie, 4% de pentathérapie. Nous avons recensé 284 (56%) lésions séquellaires sur 505 lésions initiales. Elles affectaient 257 (79%) malades ; seul 69 (21%) ont eu une normalisation radiologiques. Chez 93 (28.5%) malades nous avons noté des séquelles atélectasiantes. 72.6% de malades ont néanmoins eu une régression des lésions initiales qui couvraient dans 73% de cas moins d'un poumon. Le taux de régression des lésions de condensations était de 4%, et celui des cavernes de 87%. La durée moyenne de la toux était de 4.4 mois, qui expliquerait en partie cette fréquence élevée des séquelles radiologiques.

Conclusion : Les séquelles radiologiques affectent 79% de malades traités pour tuberculose à Douala. Leur détermination est importante pour l'avenir d'un malade tuberculeux.

PS-1168-20 Middle lobe syndrome of the lung

Y A M Voloshyn. Thoracic Surgery Department, Institute of Pulmonology and Phthisiology, Kyiv, Ukraine. Fax: (+380) 445323756. e-mail: volshyn@msn.com

The frequency of middle lobe syndrome (MLS)—4.38–5.73%. 117 patients with m.l.s—observed. Men—58 (49.57%), women—59 (50.43%) aged 6–67 years. Majority—75 (64.1%)—8–37 years. Reasons for MLS: metatuberculous changes of m.l.—53 (45.30%), non-specific diseases—40 (34.19%), bronchitis tumor—24 (20.51%). The connection between the disease and peribronchial lymphonodes lesion (74.49%) revealed. Acute form of bronchitis changes (endobronchitis of II–II degree). Complaints: strong cough—79 (67.52%), increased body temperature—37.9–39.2°C, weakness. Dull percutory sound from III to IV rib to mediastinum—83 (70.94%), moist or harsh rales—73 (62.39%). 32 (27.35%) were unsuccessfully treated (1–4 months) without suspicion of m.l. process before reaching the clinic. Roentgen: side projection—atelectasis of m.l. in a form of wedge—95 (81.2%), bronchoscopy: stenosis of II–II degree, obturation of m.l. bronchus—17 (14.53%), bronchobiospy, histologically, bronchography—bronchoectasis. 117—resection of m.l. Postoperative period—satisfactory, complications—8 (6.84%). Clinical and full effect, confirmed in 1–10 years. So, the number of the patients increased, the main reason—metatuberculous changes, nonspecific diseases. Complex clinic-roentgenologic, instrumental observation with microbiologic and morphologic examinations of bioplates let avoid mistakes of diagnosis. Main method of treatment—timely resection of cirocally changed m.l. let reach high full clinic effect in more distant period and prevent complications.

PS-1178-20 La tuberculose chez le personnel de santé à Conakry

L M Camara, A Camara, M Diallo, M B Diallo, B Bah, O Y Bah. Service de Pneumoptysiologie, Conakry, Guinea. Fax: (+224) 41 20 50. e-mail: camaralmady@yahoo.fr

Notre objectif a été de présenter les cas de tuberculose observés chez le personnel de santé de 1991 à 2001 dans la ville de Conakry. C'est une étude rétrospective qui a concerné tous les cas de tuberculose observés chez le personnel de santé de 1991 à 2001. Les données épidémiologiques, cliniques et biologiques ont été recueillies à partir du registre de déclaration des cas de tuberculose de la ville de Conakry. Les résultats du traitement ont été appréciés selon les critères classiques. Au total 172 personnels de santé souffrant d'une tuberculose ont été enregistrés. Ils se répartissaient en 86 hommes et 86 femmes. La moyenne d'âges des patients était de $38,46 \pm 10,85$ ans, avec des extrêmes de 20 et 84 ans. La tranche d'âges de 31 à 40 ans a été concernée dans 46,51%. Nous avons observé 51% d'infirmier et 18% de médecin. La tuber-

culose pulmonaire a été notée chez 99 patients (58%). Le taux de guérison des nouveaux cas pulmonaires à frottis positifs a été de 54% ; le taux de perdu de vue est important au niveau de toutes les cohortes, particulièrement chez les cas pulmonaires frottis négatifs (36%) et les extra pulmonaires (25%). Malgré les progrès réalisés dans traitement de la tuberculose, le personnel de santé, particulièrement les infirmiers reste exposé à la maladie. Cette exposition risque d'être aggravée par l'accroissement de cas de TB multirésistante et surtout l'épidémie de VIH/SIDA, qui demandent plus de soins. Il est donc nécessaire de renforcer les mesures générales de protection du personnel.

PS-1182-20 Tuberculosis of tonsils: a propos of two cases

I M Campean, S Bako, M Moldovan, L Fischer. Department of Pneumology, Hospital Medias, Medias, Romania. Fax: (+40) 0269 842198. e-mail: puiu@birotec.ro

Tuberculosis of the tonsils and the larynx were not relatively uncommon disease in the past, but they have become rare disease with antituberculous chemotherapy. We report two cases of tonsillar tuberculosis with pulmonary lesions, seen over 2 years, and which were all, surprise histological findings. Such histological findings were not always completely specific and the diagnosis was confirmed by a strongly positive tuberculin skin reaction, pulmonary disease and, above all the elimination of symptoms and physical signs in less than 3 weeks under the influence of specific antituberculous therapy. Chest X-ray showed active tuberculous lesions, and the tuberculous bacilli are seen in the sputum. Furthermore, the presence of acid-fast bacilli in the bronchial lavage suggested the diagnosis of a possibly reactivated pulmonary tuberculosis. Since a histological study revealed tonsillar tuberculosis, antituberculous agents were administered and these patients remains free of disease one year later. These cases provides evidence that tonsillar tuberculosis may represent the first manifestation of tuberculosis. Therefore, the differential diagnosis of nonspecific symptoms such as sore throat should include tuberculosis as a causative factor.

PS-1183-20 Tuberculosis of the spine: prevention and management of neurological complications

C S Schmotzer. Rawalpindi Leprosy Hospital, Rawalpindi, Pakistan. Fax: (+92) 51 5504794. e-mail: alp@isb.paknet.com.pk

22 patients with tuberculosis of the spine (TB spine) were admitted for treatment between 1 January 2000 and 31 December 2004. 14% had TB of the cervical, 45% of the thoracic and 41% of the lumbar spine. 55% showed neurological deficits at the time of diagnosis, verified by a base-line nerve function assess-

ment. All cases received DOTS according to national guidelines. In addition all were put on a physiotherapy regimen, consisting of 2 months bed-rest, isometric exercise programme during bed-rest, bladder and stool training, when required and mobilization training after completion of bed-rest. No patient without neurological deficit at the beginning developed any complications. Out of 12 patients with neurological deficits 5 (42%) showed excellent functional recovery, 1 (8%) had moderate recovery, 1 (8%) was non-TB, 2 (17%) defaulted, 2 (17%) died and 1 (8%) was transferred out. It is recommended to do nerve function assessment for all new TB spine cases and put them an a physiotherapy regimen in order to prevent/improve neurological complications. It was observed that 8 months DOTS seems to be too short to completely heal extensive bone/disc lesions.

PS-1196-20 Optimal duration of chemotherapy before and after surgery in patients with newly diagnosed destructive tuberculosis

Y A M Voloshyn,¹ O A Dobroskok.² ¹Thoracic Surgery Department, Institute of Pulmonology and Phthisiology, Kyiv, Ukraine; ²National University of Kyiv Mohyla Academy, Kyiv, Ukraine. Fax: (+380) 44 5323756. e-mail: voloshyn@msn.com

577 case reports (main group with chemotherapy course 1–10 months) and 214 (control group, 10–14 months) retrospectively analyzed. Men 392 (66.9%), women 185 (33.1%), aged 8–70 years. Resections because of chemotherapy inefficiency: tuberculoma – 258 (55.05%), fibrocavernous tuberculosis – 224 (36.27%), infiltrative – 95 (8.71%). Clinical and full effect (1–14 years) – 98.61 and 96.15%. Analysis of chemotherapy inefficiency reasons, clinic-roentgenologic pictures in dynamics, results of morphologic and microbiologic studying, operation efficiency gives such optimal terms (months) for chemotherapy before operation: matured tuberculoma – 1–1.5, its formation out of infiltrative tuberculosis – 4–5, out of focal – 3–4, fibrocavernous tuberculosis – 4–8, focal, disseminated – 3–8, caseous pneumonia – 1–2, 'round formations' hard to diagnosed – resection without chemotherapy. After operation: focal, disseminated – 4–5, tuberculoma – 3–4, patients without preoperative chemotherapy – 6–10, fibrocavernous tuberculosis, caseous pneumonia – 5–8. Postoperative chemotherapy considers complicating factors: remaining foci in lungs, term of preoperative treatment, concomitant diseases (diabetes mellitus, alcoholism, AIDS, organism reactivity) and based on morphological studying of resected preparations (activity of tuberculosis process): high activity – 7–10, moderate – 4–6, low – 3–5. Antirelapsing treatment – 1–2 in spring and autumn during 3–4 years under complicating factors, including living on radionuclides polluted territories. So, the grounds of optimal chemotherapy duration let reach

high clinical effect and prevented different complications in the patients.

PS-1259-20 Increasing non-tuberculous mycobacteria in smear-positive sputum specimens in Korea

G H Bai,¹ E M Park,¹ Y K Park,¹ Y W Choi,¹ H J Kim,¹ W J Lew,¹ C H Chang,¹ S K Kim.² ¹Korean Institute of Tuberculosis, The Korean National Tuberculosis Association, Seoul, Republic of Korea; ²Department of internal medicine, Yonsei University College of Medicine, Seoul, Republic of Korea. Fax: (82) 2 573 1914. e-mail: gbai@hotmail.com

There have been increasing disease reports caused by nontuberculous mycobacteria (NTM) in Korea since the early 1980s. NTM studied were gained from smear-positive sputum specimens sampled for anti-tuberculosis drug resistance surveys (1994, 1998, and 2003) in Korea. Species were identified by PCR-restriction fragment length polymorphism analysis using *rpoB* gene and compared with physico-chemical methods. NTM isolates were 24 (0.87%) among 2770, 35 (1.16%) among 3,008, 43 (2.3%) among 1860 specimens through the consecutive survey of 1994, 1998, and 2003 in order, suggesting significant increase of NTM isolates ($P \leq 0.0001$) and importance of species identification from AFB positive specimens. In 2003 survey, the most frequent isolate was *M. intracellulare* (55.8%, 24 among total 43 NTM isolated). Followings were *M. kansasii* (23.3%, 10 cases), *M. gordonae* (9.3%, 4 cases), *M. abscessus* (4.7%, 2 cases), *M. avium* (4.7%, 2 cases), and *M. fortuitum* (2.3%, 1 case). Species distributions through three surveys were almost similar. However, *M. kansasii* was significantly increased from 12.5% (3 cases) in 1993 to 23.3% (10 cases) in 2003, while *M. terrae* decreased from 12.5% (3 cases) in 1994 to 2.9% (1 case) in 1998 and no isolates in 2003. NTM are an increasing challenge to the physicians in terms of diagnosis and treatment in Korea.

PS-1283-20 Projection of surgical interventions in patients with pulmonary TB at the stage of detection prior to the initiation of treatment

A K Strelis,¹ A A Strelis,² Y V Nekrasov,² G V Yanova.²

¹Siberian State Medical University, Tomsk, ²Tomsk Oblast Tuberculosis Clinical Hospital, Tomsk, Russian Federation. Fax: (+382) 911260. e-mail: arlyapova@pih.ru

Objective: To project possibilities of surgical interventions prior the initiation of short course chemotherapy (SCC) under DOTS strategy at the stage of detection and diagnosis.

Materials and methods: Clinical, radiographic and microbiological evaluation in dynamics, treatment and post-treatment monitoring (30 months of follow-up, analysis of short-term and long-term results (up to 5 years) of 50 new cases who had indications for

surgery during the SCC but refused it due to different reasons).

Results: During the five-year follow-up period 5 patients (10.0%) died of TB progression, 15 (30.0%) had manifestation of disease or relapse. Absolute indications for resection surgery were: formed local chronic disease in the lungs ($P < 0.01$) such as cavity and tuberculoma; drug resistance ($P < 0.05$); profession/work not related with tuberculosis ($P < 0.05$) and co-morbid disease/condition ($P < 0.05$).

Conclusion: Presence of primary drug resistance, large focal shadow with ($D > 3.6$ cm), leukocytosis and segmental neutrophilosis more than 68% in general blood test can predict a probability of performing surgery in TB patients before the start of SCC even at the stage of detection and diagnosis.

PS-1305-20 Specific synovitis of knee as a first manifestation of miliary tuberculosis: case report

T Adzic, J Stojic, D Pesut. Institute for Lung Diseases and Tuberculosis, Belgrade, Serbia, Serbia and Montenegro. Fax: (+381) 11646988. e-mail: vitnp@ptt.yu

Unlike tuberculous osteomyelitis which typically involves the thoracic and lumbar spine (50%), tuberculous arthritis primary involves the large joints such as hips, knees and ankles.

Case report: A woman, 21 years suffered from pain, swelling in the right knee and elevated body temperature ($>39^{\circ}\text{C}$). According to radiographical findings and high-resolution CT scan bilateral pleural effusions and nodules in upper lobes were found. Erythrocyte sedimentation rate was elevated (>150). PPD skin test was negative. AFB were not found from sputum smears, and cultures were also negative. The diagnosis of specific pleuritis was made by pleural biopsy. The results of the immunological tests were normal. MRI of the knees showed synovial inflammation with intraarticular fluid. Cultures of knee punctation were positive. Treatment was started with recommended drugs (HRZE) and satisfy clinical and radiographical response.

Conclusion: AFB of the fluid yields are positive in less then one third of cases, while cultures are positive in 80%. Treatment with antituberculous drugs is from 6 to 9 months.

PS-1309-20 Thoracic complications of pulmonary tuberculosis at the National Institute of Respiratory Diseases, Mexico

E Lopez Segundo,¹ R Valdez Vazquez,¹ M C Garcia Sancho,² A Torres Cruz,¹ M A Salazar Lezama.¹ ¹TB Clinic, National Institute of Respiratory Diseases, Mexico City, DF, ²Department of Research in Tuberculosis, National Institute of Respiratory Diseases, Mexico City, DF, Mexico. Fax: (+52) 56 65 46 23. e-mail: mcegarci@correo.insp.mx

Background: The National Institute of Respiratory Diseases (NIRD) is a teaching and research institute and a national reference center.

Objective: To determine the thoracic and pulmonary complications in PTB patients.

Methods: Medical records of all cases admitted at NIRD with diagnosis of PTB in 2004 were reviewed.

Results: 124 patients had confirmed diagnosis of PTB; (116/124) 93.6% were bacteriologically confirmed. Of the 124, 73 (58.9%) were WHO category I; time from diagnosis was (mean \pm SD): 5.26 (\pm 5.75) months. There were 46.8% (58/124) men; age (mean \pm SD): 46.0 (\pm 15.5) years; (110/124) 88.7% patients of urban and suburban areas; smoking: (33/124) 26.6%; alcohol use: (30/124) 24.2% and diabetes mellitus history: (52/116) 44.8%. Results of treatment: cure (50/124) 40.3%; failure (9/124) 7.3%, default (3/124) 2.4%, death (3/124), in treatment (39/124) 31.5% and translated patients (20/124) 16.1%. Complications: bronchiectasis (107/123) 86.9%; haemoptysis (38/124) 30.7%; and pneumonia (7/124) 5.7%. In multivariate analysis the presence of pleural effusion was significantly associated with death (RM 23.7 IC95% 1.22–458, $P = 0.03$), controlling by other radiological lesions, age, smoking and presence of haemoptysis.

Conclusions: Patients which attend to NIRD, are new patients who have serious pulmonary complications due to a delayed diagnosis of disease.

PS-1350-20 Resection surgery combined with rational chemotherapy to cure pulmonary TB patients

A A Strelis,¹ A K Strelis,¹ Y V Nekrasov,² A I Zadorozhny,² V K Roskoshnykh,² Y A Gubin,² O V Anastasov,² R S Petrushin,² A N Novitsky,² G V Yanova.² ¹Siberian State Medical University, Tomsk, ²Tomsk Oblast Tuberculosis Clinical Hospital, Tomsk, Russian Federation. Fax: (+382) 911260. e-mail: arlyapova@pih.ru

Objective: To develop a method of the complex treatment for pulmonary TB patients.

Materials and methods: Clinical, radiographic and microbiological evaluation in dynamics, resection surgery, pre- and postoperative chemotherapy; histological, microbiological and bacteriological evaluation of the resected tuberculomas, statistical analysis of complex treatment of 200 patients with lung tuberculomas.

Results: Modern indications for surgery (multiple, circular tuberculomas; cavities or drug resistance confirmed by smear; progression of disease), adequate 3–6

months chemotherapy and treatment of bronchial diseases, comprehensive evaluation during surgery of the lungs, pleura), visual examination of the resected tuberculoma and detailed histological and microbiological evaluation of its structure and dynamics (Ziehl-Neelsen staining, DST), defining strategy (regimen, duration of treatment) for postoperative treatment, provides 95% cure.

Conclusion: To cure patients with lung tuberculomas the treatment algorithm should be strictly followed.

PS-1381-20 DOTS efficacy in psychiatric patients

M D Safaryan, L T Nikolayan, G S H Tairyan. Department of Phtisiopulmonology, Yerevan State Medical University named after M. Heratsi, Yerevan, Armenia. Fax: (+374) 270898. e-mail: marinas@arminco.com

Aim: To study the peculiarities of tuberculosis and DOTS efficacy in psychiatric patients. 43 patients were examined. Males at the age under 40 were taken ill more often. Most of the patients were urban residents (72.1%). Smoking was one of aggravating factors (83.7%). Patients imprisoned earlier made 14%. In all the patients TB was revealed in preventive fluorography examination in mental departments. Most patients revealed expressed (44.2%) and moderate (23.3%) TB symptoms reliability of which was confirmed by clinical investigations: hemogram in 69.8% revealed moderate and expressed shifts, Mantoux test was positive in 62.8%. Smear-positive patients made 51.2%. Infiltrative (34.9%) and disseminative (18.8%) forms prevailed in clinical structure. All the patients had decay cavities. Treatment was carried out according to DOTS I category. Six-month treatment results showed abacillation in 95.3% and in 93% positive radiological dynamics was revealed. Slight side effects were revealed in single patients (3).

Conclusion: Despite clinical manifestations TB was revealed in preventive examination. An increasing tendency in generalized destructive active forms of TB was observed. Combination of mental disorders and TB doesn't significantly decrease DOTS efficacy.

PS-1403-20 Relapses of pulmonary TB after DOTS protocols

O Sidorenko,¹ T Iljina.^{1,2} ¹Almaty State Post-Diploma Institute for Physicians, Almaty, ²Almaty State Post-Diploma Institute for Physicians, Almaty, Kazakhstan. Fax: (+7 8) 3272. e-mail: Sidorenko@mail.KZ

There were studied the terms of TB relapses development among 68 patients by DOTS category I, leading factors and effectiveness of their treatment. 59 new TB case constituted a control group (BK+). Mainly relapses were diagnosed during first year after chemotherapy competed and in 30.9% during first 6 months. Majority of patients with relapses (91.2%) had the

factors commonly social ones enhancing the risk of its development. At the newly detected TB disease they occurred less frequently (75%). Effectiveness of TB relapses treatment was two times lower than that of firstly detected TB. At outcomes of treatment failure number of others factors, such as the resistance to anti-TB drugs (80.8%), non-reversibility of the morphological changes (73.1%), irregular drugs taking (23.1%), heavy comorbidities (84.6%) occurred rather frequently which led to low therapy efficiency. Intolerance of anti-TB drugs was revealed more rarely (7.7%). To timely detection of relapses it is necessary to reveal them actively among risk groups of TB development and diminishment of role of social risk factors. More durable, is the treatment of new TB cases with destruction cavity keeping.

PS-1408-20 Misdiagnosis of pulmonary tuberculosis of low lobe localisation

P Dzhasybekova, T Muminov, S Ismailov. Kazakh National Medical University, Almaty, Kazakhstan. Fax: (+7 8) 3272. e-mail: Sidorenko@mail.kz

Diagnosis of pulmonary TB with localization of the process in segments of low lobe quite often presents significant difficulties. To identify causes of misdiagnosis of pulmonary TB of low lobe localization we reviewed 252 patients. Initial diagnosis made for 90.8% of patients was incorrect. In most cases (65.5%) non-specific pneumonia and as for the rest—cancer of lungs, bronchitis, echinococcus cysts and other diseases were diagnosed. It occurs because PHC doctors believe that tuberculosis lesions of the upper lobes of lungs prevail and absence of suspicion to TB in case of localization of pathological changes in low lobes. Consequently patients are referred for sputum smear examinations. Our research showed that 53.4% of patients with pulmonary TB of low lobe localization had SS+ when arriving at TB dispensary. It proves the necessity of sputum smear microscopy examination in case if prolonged or nonspecific pneumonia was diagnosed and non-specific therapy is ineffective. Thus misdiagnosis and late TB detection among patients with localization of the process in low lobes was caused by untypical for the specific process localization and wrong interpretation of clinical and X-ray findings (38.4%), incomplete examination of patients (47.7%).

PS-1426-20 Profiles of patients with tuberculosis treated in the Institute of Pulmonary Diseases in Nis between January 1985 and December 2004

D T Ristic, M D Filipovic. Institute of Pulmonary Diseases Nis, Nis, Serbia, Serbia and Montenegro. Fax: (+381) 18333355. e-mail: milosfilip@yahoo.com

Tuberculosis (TB) is a major global health problem that claims more than two million lives each year.

The aim of our study was to show the profile of patients with pulmonary (PTB) and extrapulmonary tuberculosis (EPTB). We analyzed medical records of all registered and treated tuberculous patients (pts) in Nis, in the period between January 1985 and December 2004. A total of 1068 pts with TB (912 with PTB and 156 with EPTB) was registered from 1985–2004. The highest percentages of diseased (67.4%) were males mostly between 35–70 years of age. Most patients were workers (47.4%) and retired persons (26.6%). There were 49.1% smear positive and 75% Lowenstein positive cases. Tuberculous cavities were present in 30.1% (73.7% were males). Fever (69.3%), cough (59%), fatigue (22.5%), weight loss (16.8%), anorexia (16%), chest pain (14.6%), and hemoptysis (10.8%) were the most prevalent symptoms. Relapses of TB occurred in 9% of pts. Tuberculous lymphadenitis was present in 74 pts (29 males and 45 females).

Conclusions: TB is still an important cause of morbidity in the region of Nis. The diseased were usually in the most productive age. The percentage of relapses of TB was highest among alcoholics.

PS-1441-20 HLA system for progressing forms of fibrous-cavernous tuberculosis of the lungs

A Sadykov. Department of Tuberculosis, Medical Institute of Pediatrics, Tashkent, Uzbekistan. Fax: (+371) 1185948. e-mail: kasten46@mail.ru

Aim: To study associations of HLA system and progressing forms of tuberculosis of the lungs.

Material and methods: Ninety-seven patients with an advancing course of fibrous-cavernous tuberculosis of the lungs were examined. Antigens of HLA system and haptoglobins' phenotypes were determined.

Results: It was established that HLADR2 was found in 72.1% of cases among the patients with an advancing course of fibrous-cavernous tuberculosis, it was combined with phenotype of haptoglobin Hp2-2 in 48.8% of HLADR2 patients. An efficacy of treatment was the lowest for carriage of antigen of HLADR2 system and Hp2-2.

Conclusions: An association between an advancing course of fibrous-cavernous tuberculosis of the lungs and HLADR2 and Hp2-2 carriage has been revealed.

PS-1452-20 Incidence of pulmonary tuberculosis among patients with tuberculous coxitis

K Y O M Sharipov. Department of Osteology, Research Institute of Phthisiatry & Pulmonology, Tashkent, Uzbekistan. Fax: (+371) 785140. e-mail: kasten46@mail.ru

This research was aimed at preserving function of joint and work capacity of patients with tuberculous coxitis. New methods to replace defects in femoral head with osseo-cartilagenous autografts having a

fungi-like form with a thin spongy base has been worked out. Sixty patients with tuberculosis of femoral joints taking into consideration presence of specific process in the lungs have been examined. Tomography investigations revealed focal tuberculosis in 6, disseminated in 3, infiltrative in 6 and cavernous tuberculosis in 1 patient. Duration of disease before referral to clinic lasted from 6 months to 5 years. Radical restorative operation on femoral joint was carried out in 44 patients without pulmonary tuberculosis in 1.5–2 months following antibacterial therapy. Due to a presence of specific process in the lungs in 16 patients an operation on femoral joint was carried out in 4–5 months following starting antibacterial therapy. Despite of complex therapy performed an aggravation of a course of specific process in the lungs was noted. Thus, a presence of pulmonary tuberculosis aggravates a course and reduces an efficacy of surgical treatment of tuberculosis of the femoral joint.

PS-1466-20 La tuberculose pulmonaire comme problème hospitalier contemporain

P Ziotopoulos,¹ T Topalis,¹ S Kretsou,¹ A Papadopoulou,¹ P Kritis,¹ J Nikolacopoulos,¹ A Lekakou,¹ B Handrinos,¹ C H Maniou,² N Karagiannidis,³ F Apostolopoulou,² B Polychronopoulos.³ ¹Ier Service de Pneumologie, ²2eme Service de Pneumologie, et ³3eme Service de Pneumologie, Hôpital Général Sismanoglion, Athènes, Greece. Fax: (+30) 2108039618. e-mail: maryziotop@yahoo.com

Objet : Malgré que les standards concernant la durée d'hospitalisation des tuberculeux soient revus, la tuberculose constitue toujours un grand problème scientifique et économique. La présentation des paramètres statistiques relatives fut le but de notre étude.

Matériel : 566 TBC-patients hospitalisés dans nos services de 1992 à 2000.

Méthode : Celle de l'analyse des données longitudinales. Plus exactement nous avons fait des tableaux des hospitalisés par intervalle de cinq jours ; histogrammes avec intervalles de temps à l'horizontale et hospitalisations à la verticale ; tableaux des probabilités de sortie par intervalle de temps ; tableaux des probabilités de continuation de l'hospitalisation par intervalle de temps ; courbes d'hospitalisation sur axes X (temps) et Y (probabilités).

Résultats : Tous les histogrammes, tableaux et courbes sont présentés. Valeur moyenne de la durée d'hospitalisation 23.92 jours. Valeur intermédiaire de la durée d'hospitalisation 16–20 jours. Probabilité maximale de quitter l'hôpital égale à 0.394 dans l'intervalle de 26–30 jours.

Conclusions : Etant donné que même jusqu'après l'utilisation des antituberculeux modernes l'hospitalisation durait de 4 à 10 semaines, nos résultats constituent un progrès considérable. Dans l'avenir prochain on imagine l'hospitalisation impérative seulement pour les TBC problématiques.

PS-1440-20 Efficacy of phytotherapy in complex treatment of destructive tuberculosis of the lungs

F Tashpulatova. Department of Therapy of Tuberculosis, Research Institute of Phthisiatry & Pulmonology, Tashkent, Uzbekistan. Fax: (+371) 785140. e-mail: kasten46@mail.ru

The study was aimed at working out phytocollection of such medicinal herbs as *Chamomilla medicinalis*, *Glycyrrhiza celabra*, *Origanum vulgare*, *Hypericum perforatum*, *Plantago Major*, *Styli* and *Stigmatae Maidis* possessing desintoxication, desensibilization, anti-inflammatory effect. This phytocollection was administered 118 patients with destructive pulmonary tuberculosis against a background of 4–5 antituberculous preparations HREZ (S). Control groups consisting Of 151 patients received only basic therapy. Discontinuation of tuberculous mycobacteria (TMB) excretion found to be in 3 month in $97.2 \pm 1.5\%$ of patients in main group, and only in $86.8 \pm 2.7\%$ of control patients ($P < 0.05$). Closure of destructive cavities accounted for $31.3 \pm 4.3\%$ (in control group $18.5 \pm 3.1\%$; $P < 0.01$). Adverse reactions noted to be in a group of patients receiving phytotherapy in $22.6 \pm 7.3\%$, in control group $45 \pm 6\%$ ($P < 0.01$). Thus, inclusion of phytotherapy into complex treatment of destructive tuberculosis of the lungs allows to perfect sufficiently the efficacy of treatment, reduce an incidence of adverse reactions from antituberculous drugs.

TB AND HIV-I

PS-1321-20 Hepatic enzyme elevations among people living with HIV receiving isoniazid TB preventive therapy and the effect of alcohol consumption, Botswana, 2004–2005

S Nyirenda,¹ B Mosimaneotsile,¹ O Motsamai,² P H Kilmarx,^{1,3} C D Wells,⁴ T Samandari.^{1,4} ¹BOTUSA Project, Gaborone, Botswana; ²National Tuberculosis Programme, Ministry of Health, Gaborone, Botswana; ³Global AIDS Program, Centers for Disease Control and Prevention (CDC), ⁴Division of Tuberculosis Elimination, CDC, Atlanta, Georgia, USA. Fax: (+1) 267-318-1697. e-mail: tts0@cdc.gov

Background: Isoniazid (INH) is known to cause increases in hepatic enzymes and may lead to hepatotoxicity especially among alcohol drinkers. Hepatic enzyme increases among PLWH receiving IPT have not been well characterized.

Methods: Alanine aminotransferase (ALT) and aspartate transaminase (AST) levels were measured at IPT screening and 14 days after INH initiation. Enrolled participants had ALT and AST below 2.5-times the upper limit of normal (2.5-ULN). Alcohol use was scored by 'CAGE' criteria as follows: tried cutting down (1), feel angry when questioned (1), feel guilty (1), need eye-opener (1).

Results: Among 300 enrollees, AST and ALT increased from day 1 to day 14 by a mean of 32% and 51%, respectively. Two enrollees had AST- and two enrollees had ALT-increases over 2.5-ULN. 30% of enrollees, 21% of women and 42% of men reported alcohol use. Drinkers were no more likely to have elevations in AST or ALT than non-drinkers. Compared to non-drinkers, day 14 elevations of hepatic enzymes were not any different for any CAGE score.

Conclusions: Increases over 2.5-times ULN in AST or ALT among PLWH initiating IPT is uncommon. Further observation in this 1800-person clinical trial is needed to assess long-term IPT and alcohol-associated hepatotoxicity.

PS-1357-20 Anti-tuberculosis drug induced hepatotoxicity in HIV positive and negative patients

G Y Ali,^{1,2} A Aseffa,¹ L K Yamuah,¹ L Lindquist,³ E Makonnen,² W Amogne,⁴ G Aderaye.⁴ ¹Armauer Hansen Research Institute (AHRI), Addis Ababa, ²Department of Pharmacology, Faculty of Medicine, Addis Ababa University, Addis Ababa, Ethiopia, Addis Ababa, Ethiopia; ³Infectious disease unit, Department of Medicine, Karolinska Institute, Stockholm, Sweden; ⁴Department of Medicine, Faculty of Medicine, Addis Ababa University, Addis Ababa, Ethiopia. Fax: (+251) 1211563. e-mail: getnetyimer@yahoo.com

Objectives: To assess prevalence, severity and prognosis of anti-tuberculosis drug induced hepatotoxicity (DIH) and to identify associated risk factors.

Methods: This study was conducted in Ethiopia, 96 HIV positive and 95 HIV negative tuberculosis patients were followed. CD4 count was measured for the HIV positive patients. All patients were also evaluated for different risk factors. Acetylation status was also determined.

Results: Biochemical hepatotoxicity (more than three-fold elevation of liver enzymes) was seen in 33 (17%) patients (14 males and 19 females), of whom 25 (76%) were HIV positive and 8 (24%) HIV negative. CD4 counts were 0–50 for 7 (35%), 51–100 for 8 (40%), 101–200 for 4 (20%), and >200 for 1 (5%) of the patients. Three patients were positive for HBsAg and none had anti-HCV. Eight out of the 33 patients developed clinical hepatotoxicity (clinical signs and symptoms of DIH plus elevation of liver function tests) that necessitated discontinuation of their anti-TB drugs. Seven of the eight were HIV positive, seven were females, and 2 were positive for HBsAg.

Conclusion: Anti-TB DIH is significantly associated with HIV co-infection ($P = 0.002$) and a decrease in CD4 count ($P = 0.034$).

PS-1366-20 Exemple de collaboration entre les programmes TB et VIH à Guéckédou

F Cissé,¹ A Kaba,² L M Camara,³ N Keita.¹ ¹PNT Guinée, Conakry, ²MSF, Conakry, ³Département de Pneumophtisiologie, Conakry, Guinée. Fax: (+224) 41.20.50. e-mail: cissefode74@yahoo.fr

Objectif : Présenter les résultats de la collaboration entre un Centre antituberculeux et un centre de dépistage volontaire du VIH (CDV)/traitement ambulatoire des PVVIH.

Méthodologie : Etude descriptive de type rétrospectif allant du 1er Octobre au 31 Decembre 2004 portant sur des malades tuberculeux suivis au Centre antituberculeux et PVVIH suivies au Centre de Traitement Ambulatoire CTA) de Gueckedou.

Résultats : Parmi les 67 malades tuberculeux dépistés par le Centre AntiTuberculeux, 2 cas de VIH+ ont été détectés soit 3% ; et parmi les 273 Personnes Vivant avec le VIH suivis par le CDV/CTA, 27 cas de tuberculose ont été dépistés soit 10% ; Chez les tuberculeux en traitement ont été observés : une séroprévalence de 32%, une prédominance féminine chez les co-infectés TB/VIH (62%) et les tranches d'âges de 15–24 et 25–34 étaient les plus touchées 38% et 28%. Enfin, 66% des malades co-infectés venaient des autres régions du pays. Les TEP et TPM0 ont été les formes de tuberculose les plus fréquemment rencontrées 41% et 31% ; 20% des malades TB/VIH sont sous ARV ; 48% sont sous chimioprophylaxie au cotrimoxazole et traitement des Infections Opportunistes. 14% des malades TB/VIH sont perdus de vue. 17% des malades TB/VIH sont décédés

Conclusion : Cet exemple de collaboration mérite d'être encouragé et étendu aux autres régions du pays.

PS-1405-20 The cost to health services of HIV co-infection among tuberculosis patients in Sudan

A El Sony,^{1,2} S A Atitalla,¹ C H Hansen,³ Z Hallaj,¹ A Khamis,¹ D A Enarson,² G Bjune.³ ¹Epidemiological Laboratory (Epi-lab)/ AMST, Khartoum, Khartoum, Sudan; ²The Union, Paris, Paris, France; ³Norwegian Institute of Public Health, Oslo, Norway. Fax: (+249) 183 224496. e-mail: aelsony@yahoo.com

Objective: To compare the cost of managing HIV-positive and HIV-negative tuberculosis (TB) patients in Sudan.

Methods: A prospective cohort of 1797 consecutive TB patients referred to the chest clinics within the general health services from March 1998 to March 2000 were included in this study. Patients were tested blindly for HIV; 1724 were HIV-negative and 73 were HIV-positive.

Findings: The total cost associated with management of tuberculosis was significantly higher for HIV-positive, as compared with HIV-negative TB patients (\$105.08

vs. \$73.92, $P = 0.003$). This difference was due mainly to greater costs for hospitalization of those HIV-positive, as compared with those HIV-negative (190.80 vs. 141.00, $P = 0.001$). The differences in cost for diagnostic tests, for drugs, for management of adverse reactions and for intercurrent symptoms were not significant ($P > 0.05$) between HIV-positive TB patients and HIV-negative TB patients. Side effects of treatment were slightly more common among persons without HIV infection than among HIV-positive patients (14% and 9.6%, respectively). The total cost of management of HIV-positive patients in this series of patients was 6% of all costs for TB case management and the marginal cost attributable to HIV-positivity was 0.9% of the total cost.

Conclusion: The management of HIV-positive TB cases was more costly than that of HIV-negative cases in this stage of the HIV/AIDS epidemic in Sudan.

PS-1437-20 HIV counseling and testing of TB patients improves TB program performance: the Thailand TB Active Surveillance Network

S Akksilp,¹ J K Varma,^{2,3} W Wattanaamornkiat,¹ O Karnkawinpong,¹ D Viriyakitja,⁴ T Siraprasiri,^{3,4} C D Wells,² J W Tapero.^{2,3} ¹Office of Disease Prevention and Control #7, Ubon-ratchathani, Thailand; ²U.S. Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ³Thailand MOPH - U.S. CDC Collaboration, Nonthaburi, ⁴Thailand Ministry of Public Health, Nonthaburi, Thailand. Fax: (+66) 25915443. e-mail: jvarma@cdc.gov

Background: HO recommends that TB programs promote HIV voluntary counseling and testing (VCT). Few successful models have been described.

Methods: We began offering VCT and HIV care to TB patients at all 25 hospitals in Ubon-ratchathani, Thailand. We trained staff and performed monthly site-visits. For VCT, we compared performance between the first four months ('cohort 2003/2') and the most recent four months ('cohort 2005/1'). For TB treatment outcome, we compared cohort 2003/2 with 'cohort 2004/1,' the most recent cohort with end-of-treatment outcomes.

Results: From February 2003–January 2005, the proportion of TB patients with unknown HIV status decreased from 70% (539/772) in 2003/2 to 46% (339/738) in 2005/1 ($P < 0.001$). The proportion receiving HIV counseling remained constant (80%); the proportion agreeing to testing after counseling increased from 37% (233/622) to 68% (399/591) ($P < 0.001$). The estimated HIV prevalence (14% vs. 16%) and proportion with CD4 < 100 (76% vs. 70%) remained similar ($P > .05$). Nevertheless, the mortality rate among smear-positive, HIV-infected patients decreased from 48% (20/42) in 2003/2 to 17% (8/47) in 2004/1 ($P = 0.002$); the TB treatment success rate increased from 38% (16/42) to 68% (32/47) ($P = 0.005$).

Conclusions: In TB programs, increasing access to HIV care through VCT and intensive program monitoring may save lives.

PS-1469-20 HIV-related tuberculosis in Estonia

M Danilovits,¹ V Hollo,² K Vink.³ ¹Department of Tuberculosis Tartu University Clinics, Tartu, ²National Tuberculosis Programme, Tallinn, ³Tartu University, Tartu, Estonia. Fax: (+372) 7318 943. e-mail: manfred.danilovits@kliinikum.ee

Introduction: DOTS implementation started in Estonia in 1999. Since then TB incidence has decreased from 56.6 per 100 000 in 1998 to 41.6 in 2004. At the same time HIV incidence increased to 620 per million populations being the highest in Europe in 2003. The prevalence of HIV/AIDS was 4442 cases by 2004. A total 71 TB-HIV patients were registered from 1997 till 1st Q of 2005.

Objectives: To analyse the TB-HIV data, 1997–2004 and the treatment outcome during 1997–2003.

Results: In 2003 67.4% (390) of TB cases were tested for HIV and 13 cases of co-infection found; in 2004 73.8% (414) were tested and 22 found. Among all 71 co infected 74.5% were men. Mean age among 71 patients was 31 year. Location was pulmonary in 83% (59) with confirmation rate 81.5%. 15.2% (9) had MDR-TB. Treatment outcome is available for all 42 patients started treatment during 1997–2003. Success was in 52.4%, 11.9% defaulted, 30.9% died, and 2.4% failed. 16 patients received anti-retroviral treatment.

Conclusion: Increase of HIV is a serious threat to TB control in Estonia. The treatment success for TB-HIV cases is lower than that of TB mainly due to high death rate.

PS-1517-20 Outcome of HIV-associated pulmonary tuberculosis in the early and late HAART era

E Girardi,¹ D Goletti,² P DeMori,³ E Busi Rizzi,³ R Urso,² M DeMarco,² R Maddaluno,² R Licordari,² A Rianda,² F Palmieri.² ¹INMI L. Spallanzani Department of Epidemiology, ²INMI L. Spallanzani Clinical Department, ³INMI L. Spallanzani Diagnostic Department, Rome, Italy. Fax: (+39) 06 5582825. e-mail: girardi@inmi.it

Objective: To assess outcome of culture-confirmed pulmonary tuberculosis (TB) diagnosed in HIV-infected patients in the early and late time period of introduction in clinical practice of highly active antiretroviral therapy (HAART) in Italy (1996).

Methods: We reviewed charts of 121 TB-HIV patients; 42 were diagnosed in 1996–1998 (period 1 early-HAART) and 79 in 1999–2002 (period 2 late-HAART).

Results: Period 2 patients had a higher median CD4+ count (155 vs. 113/mm³), more frequently started an HAART regimen at least three months before TB

diagnosis (43% vs. 21%, $P < 0.05$), and were less frequently on dual antiretroviral therapy before starting an HAART (6% vs. 48%, $P < 0.001$). Survival proportions at 6, 12 and 24 months was 95%, 93% and 89% in period 2, and 83%, 76% and 66% in period 1 ($P = 0.016$). Risk of death was significantly increased in patients who started HAART after dual therapy or did not take HAART at all ($P < 0.001$ for both comparison).

Conclusions: The increasing use of HAART has continued to modify the survival of patients with HIV-associated TB, probably because of the increased proportion of patients starting HAART when antiretroviral naive in the late-HAART era.

PS-1559-20 Does a structured proforma increase the probability of tuberculosis patients being offered HIV-testing in London?

E M Castro Sanchez. Tuberculosis Service, Islington PCT, London, UK. Fax: (+44) 207 636 0687. e-mail: enrique.sanchez@uclh.org

Background and methods: Routine HIV-testing of all tuberculosis patients in London has been advocated. In 2003 a protocol with a structured proforma to assist physicians with testing interview was introduced to achieve such standard. We reviewed casenotes of tuberculosis patients treated between October 2003 to August 2004 by the Tuberculosis Service, Islington PCT to assess whether the structured proforma increases the probability of these patients being offered HIV-testing. Patients were excluded if already HIV-positive or if tested elsewhere.

Results: Of the 99 patients treated for tuberculosis in the study period, 84 casenotes were extracted and reviewed and 19 were excluded, leaving 65 for analysis. 27/65 (41.5%) notes included the proforma. 11/27 (40.7%) patients were offered testing; 7/11 accepted. In patients without proforma, 7/38 (18.4%) were offered testing; 5/7 accepted. Use of the proforma increased offer rate twofold ($P = 0.045$, χ^2 test). A third (6/18) of all patients offered testing refused to have it.

Discussion: A structured proforma improved the number of tuberculosis patients being offered HIV-testing by twofold. However, even with the use of the proforma, the offer rate was below recommended standards. We are currently mapping nurses' HIV-testing skills to investigate whether uptake rate could be further improved.

PS-1628-20 Community based TB and HIV counseling and care for injecting drug users in Iran, a four year program review

K Alaei, A Alaei, M R Masjedi, D Mansoori, M Bahadori. National Research Institute of TB and Lung Disease, Tehran, Islamic Republic of Iran. Fax: (+98) 21 2285777. e-mail: alaei@yahoo.com

Issue: The Iran experience demonstrates that comprehensive program on HIV/TB with Harm Reduction services are feasible and highly effective.

Setting: Iran has 40 000 estimated HIV cases with almost 9800 registered cases. The majority of HIV cases are drug users. The rate of HIV among TB cases is %5 and the rate of TB in HIV patients is %10 per year.

Project: The establishment of the community based centre for counseling and care of PLWHA, TB and Drug Users, consultations with religious leadership and other stakeholders. The center's work is based on a peer approach for supporting drug users and their families. It has IEC, medical and social support. After two years among IDUs, %13 were HIV positive. For all patients OIs, TB prophylaxis and treatments, HAART and Harm Reduction services are available. Individual and family counseling session were held, several needles, syringes and condoms were distributed.

Outcomes and lessons learned: The retention rate of patients receiving HAART was %85, and on the average their CD4 counts increased by %94.5 (mean from 240 to 454). Likewise, prophylaxis treatment was well adhered too. Many clients were attracted to this program. This project demonstrates the feasibility and effectiveness of comprehensive programs.

PS-1631-20 Integration of harm reduction services with TB-HIV prevention and care programmes for prisoners

K Alaei, A Alaei, P Afshar. National Research Institute of TB and Lung Disease, Tehran, Islamic Republic of Iran. Fax: (+98) 21 2285777. e-mail: alaei2001@yahoo.com

Issue: One of the most important parts of control of HIV and TB epidemic is related to the prisons.

Setting: Initiation of HIV and TB prevention and care programs with Harm Reduction services inside the prisons is as important as outside of the prisons. Also, a peer education program for drug users is presented.

Project: The prison clinic cover HIV, TB, STI with Harm Reduction services. The drug users require an integrated, multifaceted and comprehensive approach. Human care is the remarkable aspect of the care provided at the triangular clinic. The approach is patient-centric rather than disease-centric. They provide supplementary drugs such as Methadone for a good proportion of the current injecting drug users.

Lesson learnt: Incorporating many key principles of effective HIV prevention approaches such as an enabling policy environment, integration of prevention-care and human care services for infected as well as

affected. HIV and TB prevention and care of prisoners are involved through the innovative triangular clinic. Positive leadership from the Governor, strong commitment by the Medical University, dedicated selfless services by the clinic staff and productive partnerships have contributed to the successful implementation of the project.

PS-1835-20 Early favorable tuberculosis and HIV therapeutic outcomes in integrated TB-HIV program in rural KwaZulu Natal, South Africa

N R Gandhi,^{1,2} A Moll,³ R Pawinski,⁴ C Jack,⁴ U Lalloo,⁴ G Friedland.² ¹Emory University School of Medicine, Atlanta, Georgia, ²Yale University School of Medicine, New Haven, Connecticut, USA; ³Church of Scotland Hospital & Philanjalo, Tugela Ferry, KwaZulu Natal, ⁴Nelson R Mandela School of Medicine, University of KwaZulu Natal, Durban, KwaZulu Natal, South Africa. Fax: (+1) 404-880-9305. e-mail: neelgandhi@alumni.williams.edu

Introduction: The HIV epidemic has fueled an increase in tuberculosis (TB) cases. Strengthening TB DOTS programs and co-administering TB and anti-retroviral therapy (ART) for co-infected patients could improve outcomes for both diseases.

Methods: Observational study among patients with active TB and HIV in rural resource-poor KwaZulu Natal. Patients receive both standard TB therapy and once-daily ART concurrently by home-based DOT in strengthened TB program. Patients followed for 12 months for TB and HIV outcomes.

Results: Of the initial 65 TB-HIV patients, (100 to be enrolled by June 2005), half are women, mean age 32.4 years, all WHO Stage 3/4, mean CD4 107 cells/mm³. Preliminary analysis at 9 months: 82% TB treatment success, 3% failure, 15% mortality (half due to suspected MDR-TB); at 6 months: mean weight gain 5.9 kg, CD4 increase 196 cells/mm³, 87% undetectable viral loads. Concurrent therapy well-tolerated with few immune reconstitution or study-related adverse reactions.

Conclusions: Preliminary results in this ongoing demonstration project in high prevalence TB and HIV rural setting indicate that, with additional resources, integration of TB and HIV treatment can bolster struggling TB programs, increase access to ART and result in favorable therapeutic outcomes for both TB and HIV.

PS-1847-20 Default in tuberculosis-HIV

S Carvalho, L Velasque, M J Costa Martins, F Sant, V Cavalcanti Rolla. Fundação Oswaldo Cruz, Rio de Janeiro, Brazil. Fax: (+55 21) 3865 9607. e-mail: simonec@ipecc.fiocruz.br

Objective: To determine the predictive factors of abandon of tuberculosis (TB).

Methods: From July 1999 to December 2004 were analyzed 316 patients. Abandon was defined as inter-

ruption of TB therapy >30 days. The odds ratio (OR) was used as a measure of association between abandon and the co-variables by a logistic regression. Significant variables (25%) in the univariate model were tested in the multivariate model (5% significant).

Results: Therapy was completed by 236 patients (74.68%), 31 (9.8%) died and 49 (15.51%) abandoned. The absence of an adverse event (AE); previous TB therapy; pulmonary TB; tobacco use, being married, males; alcohol abuse income >100 US\$ (OR 0.53 $P = 0.07$) were included in the multivariate model. The absence of AE (OR 2.11 $P = 0.03$) and tobacco use (OR 3.26 $P = 0.001$) were predictive of abandon in the final model.

Conclusions: HIV patients were not at risk for abandon. AE were protective probably because they feel sick. Socioeconomic status did not appeared as a risk factor and tobacco smokers are in high risk of abandon instead of alcohol abuse

PS-1906-20 Treatment outcomes for HIV-positive tuberculosis patient in Latvia, 1999–2003

I Morozova,¹ V Riekstina,¹ C Wells,² V Leimane.¹ ¹The State Agency of TB and Lung Diseases, Riga region, Latvia; ²CDC, Division of TB Elimination, Atlanta, Georgia, USA. Fax: (+371) 7901014. e-mail: ilze@tuberculosis.lv

Background: HIV seroprevalence among tuberculosis (TB) patients increased 25-fold from 0.1% in 1998 to 2.5% in 2003. HIV seroprevalence among all multidrug-resistant tuberculosis (MDR-TB) patients sharply increased from 0% in 1998 to 5.1% in 2001. The situation remained stable 2 years thereafter at 4.3% by 2003.

Aim: To analyze treatment results for HIV-infected TB patients under DOTS and DOTS-plus framework conditions in Latvia.

Methods: We analyzed final treatment outcomes for new HIV-infected TB patients registered during 1999–2003 stratified by MDR-TB status.

Results: Among 107 total HIV-infected TB patients, 7 (7%) were retreatment patients. Among the remaining 102 new TB patients, 22 (22%) had MDR-TB. Outcomes for the 80 HIV-infected non-MDR-TB patients were 62 (77%) treatment success, 12 (15%) defaulters, 1 (1%) failure, 6 (7%) death; for the 18 HIV-infected MDR-TB patients who completed treatment, outcomes were 10 (56%) treatment success, 3 (17%) defaulters, 1 (5%) failure, and 4 (22%) death. HIV-infected MDR-TB patients had a lower level of treatment success and were at 3-fold greater risk of negative treatment outcome (failure or death) than those without MDR-TB [Relative risk = 3.3 (1.2, 9.0), $P = 02$].

Conclusion: High levels of treatment success can be achieved among HIV-infected TB patients without MDR-TB under good program conditions. However, HIV-infected TB patients with MDR-TB present a dif-

difficult clinical management situation and are at great risk of death or treatment failure. Further evaluation of risk factors for negative outcomes among these patients and for the impact on outcome of anti-retroviral therapy for HIV warrant further investigation.

PS-2009-20 TB-HIV coinfection in cohort of new cases TB/BK (+) treated with DOTS in El Salvador, 2000–2002

G H Bonilla. Regulations Direction, Minister of Health, San Salvador, El Salvador. Fax: (+503) 2210978. e-mail: bonillagladys@hotmail.com

Objective: To know and analyze the patients cohort with coinfection TB BK (+)/HIV in El Salvador 2000/2002.

Methods: Study retrospective descriptive. Review book registrations, bacteriologist book, evolution diary book, control of assistance and medical administration cards of patients TB 2000/2002

Results: The number of coinfections TB BK (+)/HIV cases was 154, that represent 5% of the cases TB BK (+) during 2000/2002. 26.2% were female and 73.8% male. Nobody received antiretroviral treatment during received DOTS. The check out condition of DOTS: 47% cured, 42% death, 6.2% abandonment, 1.4% failure. Only 70% of the TB BK (+) were done to HIV test. San Salvador, had 52.6% of the coinfections cases.

Conclusions: The efficiency in study of these cohorts of patients with coinfection TB BK (+)/HIV is principally affected by the higher death percentages and abandonment. Male sex was more affected with coinfection. The detection of TB BK (+)/HIV can turn out to be higher because the HIV test was only done to 70% of all TB BK (+) cases. San Salvador is a higher risk of coinfection. The cause of a high mortality of these coinfection patient maybe was the no use of antiretroviral therapy.

PS-2175-20 Tuberculosis case fatality rate in HIV co-infected patients (HIV+) in Italy

A Matteelli, A Pini, A C C Carvalho, M Manfrin, N Saleri, G De Iaco, S Capone, S Caligaris, F Castelli, G Carosi. Institute of Infectious and Tropical Diseases, University of Brescia, Brescia, Italy. Fax: (+39) 030 303061. e-mail: a.matteelli@bsnet.it

Objective: To evaluate the clinical presentation, laboratory findings and case fatality rate of TB-HIV+ patients.

Methods: A prospective, observational study was done. The clinical characteristics and outcome of TB-HIV+ subjects were compared with those of 340 HIV uninfected cases.

Results: From January 1998 to February 2005, 55 TB episodes in HIV+ subjects were analysed. Patients were predominantly male (64%), foreign borne (58%),

with a mean age of 34 years (SD \pm 11.15) and a mean CD4+ cell count of 191/ μ L. Concomitant HAART was taken by 39 patients (70%). Compared to uninfected cases, HIV+ patients were more likely to be Italian (44% vs. 23%; $P = 0.01$) and have disseminated TB (13% vs. 3%; $P = 0.002$). TB case fatality rate was higher among HIV+ patients: 11% vs. 2% (OR = 6.2, $P = 0.003$). CD4+ cell count of HIV+ patients were significantly lower among cases who died (mean of 85 vs. 205/ mm^3 ; $P = 0.03$) while HIV viral loads were similar.

Conclusion: TB case fatality rate in HIV+ patients in Italy is high. Analysis of causes of death is warranted in addition to more aggressive antiretroviral strategies and earlier diagnosis of both diseases.

PS-2234-20 Tuberculosis associated with HIV in the HAART era in a Brazilian reference hospital: clinical patterns and outcome of treatment

M R Resende,^{1,2,3} C R R Villa,¹ V M Sinkoc,² M Jacques-de-Moraes,³ M C Carvalho,³ R J Pedro.^{1,3}

¹Faculdade de Ciências Médicas da Universidade Estadual de Campinas, Campinas, São Paulo, ²Núcleo de Vigilância Epidemiológica do HC-UNICAMP, Campinas, São Paulo,

³Unidade de Pesquisa Clínica DST-AIDS FCM-UNICAMP, Campinas, São Paulo, Brazil. Fax: (+55) 19 3788 7451. e-mail: mresende@hc.unicamp.br

Objectives: To evaluate clinical presentation and the TB treatment outcome in HIV-infected patients in the era HAART.

Methods: Retrospective, descriptive study involving HIV-infected patients with tuberculosis, from January 1996 through December 1999 (1st period) and January 2000 through December 2003 (2nd period), at a Brazilian University Hospital.

Results: 706 patients with TB and HIV were reported. The number of cases decreased to 270 in the 2nd period.

| | First period <i>n</i> = 436 | Second period <i>n</i> = 270 | <i>P</i> value |
|-----------------------------|--------------------------------|---------------------------------|----------------|
| Clinical manifestation | | | |
| Pulmonary | 195 (44.7) | 117 (43.3) | 0.013 |
| Extra-pulmonary | 134 (30.7) | 62 (23.0) | |
| Pulmonary + extra-pulmonary | 107 (24.6) | 91 (33.7) | |
| Extra-pulmonary forms | 241 | 153 | 0.020 |
| Lymphadenopathy | 64 (26.6) | 56 (36.6) | |
| Pleural | 36 (14.9) | 30 (19.6) | |
| Meningitis | 60 (24.9) | 22 (14.4) | |
| Other | 81 (33.6) | 45 (29.4) | |
| + AFB smear on sputum | 140 (34.4) | 92 (44.2) | 0.138 |
| Regimens without rifampin | 70 (19.3) | 29 (12.0) | 0.044 |
| Outcome of the treatment | | | |
| Cure | 152 (42.3) | 90 (46.9) | 0.223 |
| Default | 76 (21.2) | 46 (23.9) | |
| Death | 131 (36.5) | 56 (29.2) | |

Paradoxical reactions were more common in TB lymphadenopathy.

Conclusion: A decrease in the TB meningitis form was observed as opposed to a increase in the pleural and lymphadenopathy forms. A decrease in the death rate was observed in the 2nd period, but default was about the same for both periods.

PS-2274-20 Community-based TB-HIV-ART care and adherence in Lubombo region, Swaziland

J Walley,¹ X Wei,¹ J Wright,¹ A Philip,² S Dlamini.² ¹Nuffield University of Leeds, UK; ²Good Shepard Hospital, PO Box 2, Siteki, Swaziland. Fax: (+44) 113 343 6997. e-mail: j.d.walley@leeds.ac.uk

Objective: To review the effect of HIV ART treatment in Lubombo, Swaziland, and strengthen the HIV treatment.

Methods: A programme review was conducted including observation, interviews and record review of HIV-ART patients attending the clinic. The ARV treatment patient flow was also reviewed and modified.

Results: 32% of the 1306 HIV patients treated had lost records. Out of 894 with available records, 162 were dead (13.8%) and 90 (7.7%) defaulted. 64.2% of deaths and 57.6% of defaults were in the first 4 weeks of treatment. However some of the defaulters were actually deaths according to our tracing. The study led to the implementation of expert patient facilitated support groups, nurse practitioner follow-up care, and rapid follow up of late-attendees, and other procedures borrowed from its TB programme.

Conclusion: During the first year the death and default rates were too high. However, lessons from a strong community based TB programme can contribute to the further development of ARV.

PS-2289-20 Etude de la seroprévalence du VIH chez les patients atteints de tuberculose à Madagascar

O Ratsirahonana,¹ J Sard,² B Rarivoson,¹ M Andriamiandrisoa,¹ A Rakotoarisaonina,¹ B Raveloanona,³ F Boillot,⁴ H Ramarokoto.¹ ¹Programme National Tuberculose, Antananarivo, ²Coopération Française, Paris, France; ³Laboratoire National de Référence, Antananarivo, Madagascar; ⁴Union Internationale Contre la Tuberculose et Les Maladies Respiratoires, Paris, France. e-mail: ratsirahonana_orelys@yahoo.fr

Contexte : Dans le contexte où la pandémie du VIH/SIDA ne cesse d'accroître, Madagascar reste encore un des pays le moins infecté dans le monde. Mais une enquête menée chez les femmes enceintes en 2003 a montré que le niveau de l'épidémie du VIH semble basculer dans une phase généralisée. En effet, cette prévalence est de 1.10%. En terme de tuberculose, il n'existe pas de données récentes précisant le niveau de prévalence de l'infection par VIH chez les tuber-

culeux. Aussi, le Ministère de la santé avec le consortium des partenaires ont-ils décidé d'établir un protocole d'enquête pour déterminer la prévalence de l'infection à VIH parmi les patients atteints de tuberculose pulmonaire et extra-pulmonaire au niveau national. **Objectifs :** Fournir une base de mesure des tendances de la prévalence de l'infection à VIH chez les tuberculeux à Madagascar à travers une enquête de séro-diagnostic parmi les malades dépistés dans les centres de diagnostic et de traitement de tuberculose.

Matériels et méthode : Une enquête transversale, avec un échantillonnage consécutif jusqu'à atteindre le nombre de sujets nécessaires est la méthode adoptée. Les formations sanitaires ont été tirées au sort sur la base d'une liste exhaustive des CDT, selon un mode de sondage en grappe de type PEV à partir des populations cumulées, de manière à prélever pendant une période de 3 mois (Janvier à Mars 2005) un nombre total de malades égal à 1800 soit 30 grappes de 60 malades. Chaque patient est interrogé à partir d'un questionnaire standardisé contenant des informations socio-démographiques, les habitudes sexuelles, la connaissance du VIH/SIDA et son attitude.

Résultats : Ils sont en cours d'exploitation. Tous les questionnaires seront introduits par double saisie sur un micro-ordinateur grâce au logiciel Epi-Info 6.04c. L'analyse consistera à décrire les caractéristiques de la population constituant l'échantillon. Nous communiquerons ces résultats dès qu'ils sont disponibles.

PS-2250-20 Strategies for modifying cultural practices that affect HIV/AIDS and STDS in Nigeria

E E Enwereji. College of Medicine, Uturu, Abia State, Nigeria. Fax: (+234) 082442410. e-mail: hersng@yahoo.com

Study evaluated strategies for modifying cultural practices that encourage HIV and STDS in ten randomly selected rural areas. This exploratory study used interviews, focus group discussions, key-informant interviews, questionnaire as instruments for study. Data analysis was qualitative and quantitative. Study found that polygamy, which allows men have more than one sex partner common. Subsequently, if one partner gets infected, others are exposed. To discourage this, HIV/AIDS and STD counseling was organized. Wife inheritance that allows a widow to be inherited by an appointed person was common. Consequently, if the husband of the widow died of AIDS, the new husband and wives are exposed. To discourage this, seminars and VCCT were provided. Circumcision for both sexes was common. Findings showed 65% of circumcisers using one knife for circumcision arguing that knives were endowed by ancestors. Only 35% of circumcisers insist that individuals provide their own knives. Another finding is that people living positively with HIV (PLWHAS) receive treatment from traditional healers who use scarifications as a

method of treatment, 68% of PLWHAS studied participated in the treatment. To discourage this, seminars, health education, highlighted mode of transmission of HIV/STD. Study recommends counseling on HIV/AIDS using interactive relationship.

EPIDEMIOLOGY: TB IN HIGH-BURDEN COUNTRIES-I

PS-1121-20 Determining the tuberculosis burden in Eritrea: a new approach for a tuberculosis prevalence survey

M Sebhata,¹ B Kiflom,¹ M Seyoum,² S Ghebreselassie,³ N Kassim,² T Negash,¹ T Kahsay,¹ A Tesfazion,¹ T Ghebregiorgis,² M W Borgdorff,^{4,5} M J Van der Werf.⁴
¹National HIV/AIDS & Tuberculosis Control Division (NATCoD), Ministry of Health, Asmara, ²National Health Laboratory, Ministry of Health, Asmara, ³State of Eritrea Health Management Unit, Ministry of Health, Asmara, Eritrea; ⁴KNCV Tuberculosis Foundation, The Hague, Netherlands; ⁵University of Amsterdam, Amsterdam, Netherlands.
 Fax: (+31) 70 358 4004. e-mail: vanderwerfm@kncvtbc.nl

In Eritrea, the case detection rate of smear positive tuberculosis was 24% in 2003 using the WHO estimate for tuberculosis incidence. To evaluate whether this estimate is correct the Ministry of Health performed a national tuberculosis prevalence survey. This study used a new methodological approach to assess the prevalence of smear positive tuberculosis. We planned to include 35 000 individuals divided over 40 clusters. Three field teams collected census information simultaneously in the clusters. They collected information about name, sex and age of all individuals and information about cough, duration of cough, and smoking of individuals ≥ 15 years. All individuals ≥ 15 years were requested to provide a spot and morning sputum sample. Each field team submitted samples to a laboratory team, which examined the samples by fluorescence microscopy. Samples found positive were confirmed by Ziehl Neelsen microscopy. Data collection is scheduled to be completed in August 2005. We will present the results of the study at the conference, i.e., prevalence of smear positive tuberculosis in different groups. We will also discuss the advantages and disadvantages of using the new approach for assessing the prevalence of smear positive tuberculosis in a population.

PS-1136-20 A city-wide tuberculosis drug resistance survey in an urban setting in the Philippines

R Benabye,¹ A Ohkado,² S Adlawan,³ E Baring,⁴ O Quirante,⁴ M Suchi,⁵ S Endo,⁶ A Fujiki,² T Mori.⁷ ¹Centre for Health Development 7, Department of Health, Philippines; ²Department of Research, The Research Institute of Tuberculosis, Kiyose, Tokyo, Japan; ³Cebu City Health Office, Cebu, Cebu; ⁴Mandaue City Health Office, Mandaue, Cebu, Philippines; ⁵Department of International Cooperation, The Research Institute of Tuberculosis, Kiyose, Tokyo, Japan; ⁶DOH-JICA Tuberculosis Control Project, Manila, Metro Manila, Philippines; ⁷The Research Institute of Tuberculosis, Kiyose, Tokyo, Japan. Fax: (+63) 322540109. e-mail: aguimanlu@yahoo.com

Objectives: To describe the current anti-tuberculosis drug resistance situation in an urban setting in the Philippines, and to evaluate the current treatment services by the National Tuberculosis Control Programme.

Methods: All patients who were detected as smear positive at microscopy centers in Cebu City and Mandaue City during the survey period were included. The recommended procedures by WHO/IUATLD for anti-tuberculosis drug resistance survey were strictly applied. The treatment-outcome data were also collected through routine cohort analysis.

Results: Among 255 samples isolated from new cases, 184 samples showed to be susceptible to all four first-line anti-tuberculosis drugs examined. The prevalence of resistance against Isoniazid and Streptomycin indicated 0.17 and 0.18 respectively. The prevalence of multidrug resistance strains indicated 0.04. Over 90% of new cases susceptible to all four drugs or mono-resistant were successfully treated with the recommended standard treatment regimen.

Conclusion: The implications of the present survey are to keep proper tuberculosis case management, to call attentions to the drug regulation at private market, to conduct the second citywide drug resistance survey in the same area.

PS-1216-20 Detection of spatial kernels of tuberculosis cases in Ribeirão Preto, São Paulo, Brazil

P Hino, C B Santos, T C S Villa. College of Nursing, University of Sao Paulo at Ribeirao Preto, Ribeirao Preto, Sao Paulo, Brazil. Fax: (+55) 16 6333271. e-mail: paulahino@yahoo.com.br

Geoprocessing reveals an enormous potential, mainly in countries like Brazil, due to the fact that it provides a deeper understanding of geographic distribution, allowing for other kinds of future research that can support prevention programs and contribute to a decline in morbidity and mortality rates. This study was based on the premise that tuberculosis does not demonstrate a uniform spatial distribution. Kernel's method made it possible to detect where events were concentrated, disclosing inequalities in events across the city's territory, as well as to reveal spatial kernels

of cases. This research's main aim was to analyze the spatial distribution of tuberculosis cases according to home address in Ribeirão Preto, for 2000 and 2001, with a view to identifying the concentration of these occurrences. An unequal distribution was observed for tuberculosis cases in urban areas during the study period, with a concentration of cases in the North-west of the city. Hence, layering the city into risk areas made it possible to see this area no longer as a whole, but as a series of heterogeneous sub-areas, which is essential to define priority health actions, thus allowing for the rationalization of resources.

PS-1221-20 Risk of tuberculosis infection in adolescents and adults in a rural community in Ethiopia

D Elias,^{1,2} H Akuffo,³ A Aseffa,² A Kedir,⁴ Y Mekonen,⁵ H Engers,¹ S Britton.³ ¹Armauer Hansen Research Institute, Addis Ababa, Ethiopia; ²Microbiology and Tumor Biology Center, Karolinska Institute, Stockholm; ³Unit of Infectious Diseases, Karolinska Institute, Stockholm, Sweden; ⁴Ginchi Health Center, West Shoa Zone, Ambo; ⁵The Ethiopian Health and Nutrition Institute, Addis Ababa, Ethiopia.
Fax: (+251) 1211565. e-mail: eliasroro@yahoo.com

Rationale: Annual risk of tuberculous infection in a population is the most informative index of the magnitude of the tuberculosis problem. The objective of this study was to evaluate tuberculin reactivity in a rural community in Ethiopia in order to establish the prevalence of tuberculin reactivity, to estimate the risk of tuberculous infection and to assess the effect of various sociodemographic variables on tuberculin skin reactivity.

Methods: Tuberculin skin test was performed on 2743 subjects. Relevant socio-demographic data were gathered in the local language using a pre-tested questionnaire. The test was performed by injecting 2TU of PPD intradermally on the dorsal side of the forearm and the result was read after 48 hours.

Results: The overall prevalence of tuberculin reactivity was 29.7% (10 mm cut-off). The annual risk of infection was estimated at 1.7%. Regression analysis showed that the risk of tuberculin reactivity increased independently with age (OR 1.4, $P < 0.0001$), having a history of contact with a known TB case (OR 1.8, $P < 0.0001$), male gender (OR 1.2, $P = 0.04$) as well as having post high school education (OR 1.9, $P = 0.02$), but not history of BCG vaccination (OR 0.9, $P = 0.4$).

Conclusion: These findings indicate a high rate of transmission of tuberculous infection in this rural community of Ethiopia and calls for intensification of tuberculosis control measures.

PS-1224-20 TB-HIV co-infection in Kyiv City, Ukraine

M J Van Der Werf,¹ O B Yegorova,² N Chentsova,³ Y Chechulin,⁴ E Hasker,^{1,4} J Veen,¹ L V Turchenko.² ¹KNCV Tuberculosis Foundation, The Hague, Netherlands; ²Kyiv City TB Department, Kyiv City; ³Kyiv Anti-AIDS Centre, Kyiv City; ⁴Project 'Tuberculosis Prevention and Control in Kyiv City, Ukraine', Kyiv City, Ukraine. Fax: (+31) 70 358 4004. e-mail: vanderwerfm@kncvtbc.nl

The estimated prevalence of TB-HIV co-infection was 6.3% in 2002 in newly diagnosed TB patients in Kyiv, Ukraine. According to data provided by the Ministry of Health HIV-infection numbers have increased with 20% in 2003 and 2004 in Ukraine. An increase in HIV-infection is normally followed by an increase in TB-HIV co-infection. Therefore, we determined the prevalence of HIV infection among TB patients in Kyiv and studied risk factors for TB-HIV co-infection.

Newly diagnosed patients visiting TB Services between 1 March 2004 and 28 February 2005 were requested to provide a blood sample for HIV testing. For included and excluded patients information was collected about sex, age, TB disease classification and TB risk groups. Preliminary results show that of 804 newly diagnosed TB patients 70 (8.7%) refused to participate in the study and 19 patients were excluded from the study because they could not be counselled or a blood sample could not be collected. 56 (7.8%) of 715 tested patients were HIV positive. Homelessness, having been in prison and injecting drug use were associated with HIV infection. TB-HIV co-infection prevalence may have increased slightly between 2002 and 2004. The epidemic is still mainly concentrated in socially disadvantaged groups.

PS-1225-20 Prevalence of smear-negative pulmonary tuberculosis in Kampala, Uganda

H Luzzze,¹ A Okwera,¹ E Ssekasanvu,² J L Johnson,³ H Mayanja,² C C Whalen,⁴ H Boom,³ R D Mugerwa.² ¹National Tuberculosis and Leprosy Control Programme, Kampala; ²Department of Medicine, Mulago Hospital and Makerere University, Kampala, Uganda; ³Tuberculosis Research Unit and Division of Infectious Diseases, and ⁴Department of Epidemiology & Biostatistics, Case Western Reserve University, Cleveland, Ohio, USA. Fax: (+256) 41533531. e-mail: luzzzehenry@hotmail.com

Introduction: Clinicians usually make a firm diagnosis of pulmonary tuberculosis (PTB) basing on sputum smear results. Reports indicate that the prevalence of sputum smear-negative PTB is high in areas of high HIV prevalence.

Objectives: To determine the proportion of patients with smear-negative PTB in Kampala and to determine factors associated with smear-negative PTB in adults.

Setting: National Referral TB Treatment Center, Mulago Hospital.

Methods: Adult patients with suspected PTB were screened through standadised history, physical exam-

ination, sputum examination, CBC, and serum HIVEIA after pre-test counseling. Three baseline sputum smears were examined by Ziel-Neelson stain and cultured on Lowenstein-Jensen media. Data is reviewed retrospectively.

Results: From 2001 to 2004, 1867 patients were screened. 648 (34.7%) were smear-negative and of these 114 (17.6%) had positive mycobacteria cultures. The 534 patients who had both negative sputum smears and cultures were significantly older than patients who had positive cultures—mean age 33.5 vs. 29.9 ($P = 0.0004$) and had higher mean absolute lymphocyte count ($2.1 \times 10^3/\mu\text{L}$ vs. $1.7 \times 10^3/\mu\text{L}$, $P < 0.0001$). The two groups were similar in sex and HIV status.

Conclusion: Smear-negative PTB is rather high in this setting. There is need for development of clinical criteria to guide clinicians in diagnosing smear-negative PTB because cultures are not routinely done in this setting.

PS-1234-20 The use of symptom and chest radiograph screening in tuberculosis prevalence surveys

S Den Boon,^{1,2,3} N White,⁴ S W P Van Lill,¹ M Borgdorff,^{2,3} S Verver,³ C J Lombard,⁵ E D Bateman,⁴ E Irusen,⁶ N Beyers.¹ ¹Desmund Tutu TB Centre, Fac. of Health Sciences, Stellenbosch University, Cape Town, Western Cape, South Africa; ²Department of Infectious Diseases, Tropical Medicine and AIDS, Academic Medical Centre, Amsterdam, ³KNCV Tuberculosis Foundation, The Hague, The Netherlands; ⁴Division of Pulmonology, Department of Medicine, University of Cape Town, Cape Town, ⁵Biostatistics Unit, Medical Research Council, Cape Town, ⁶Department of Internal Medicine, Stellenbosch University, Cape Town, South Africa. Fax: (+27) 021 938 9138. e-mail: 14321823@sun.ac.za

Aim: To evaluate symptom and chest radiograph screening for smear and/or culture-positive tuberculosis (TB) in prevalence surveys.

Methods: Data from all adult (≥ 15) participants of a TB prevalence survey in Cape Town, South Africa were used. Information on symptoms, chest radiograph (CXR) abnormalities, sputum smear and culture were available. Bacteriologically-positive TB was defined as a positive smear and/or culture and was used as the golden standards

Results: Of 2611 participants included in the analyses, 29 were bacteriologically positive. The presence of abnormalities on CXR had highest sensitivity (0.97, 95%CI 0.82–1.00). The different symptoms had low sensitivities (ranging from 0.10 for fever to 0.57 for cough more than 2 weeks), and even when taken together sensitivity was low (0.68, 95%CI 0.49–0.83). Having abnormalities on CXR increased the probability of having bacteriologically-positive TB from 1% before screening to 4% after screening.

Discussion: CXR screening, but not symptom screening, is a good alternative to the prevalence survey in which sputum sample is taken from all partic-

ipants. It is dependent on the local situation which method would be most appropriate to use.

PS-1245-20 High prevalence of tuberculosis and high proportion of previously treated smear-positive patients in an urban area in Cape Town, South Africa

S Den Boon,¹ S W P Van Lill,¹ M Borgdorff,^{2,3} D A Enarson,⁴ S Verver,³ E D Bateman,⁵ E Irusen,⁶ C J Lombard,⁷ N White,⁵ C Villiers,⁸ N Beyers.¹ ¹Desmund Tutu TB Centre, Fac. of Health Sciences, Stellenbosch University, Cape Town, Western Cape, South Africa; ²Department of Infectious Diseases, Tropical Medicine and AIDS, Academic Medical Centre, Amsterdam, ³KNCV Tuberculosis Foundation, The Hague, The Netherlands; ⁴International Union Against Tuberculosis and Lung Diseases, Paris, France; ⁵Division of Pulmonology, Department of Medicine, University of Cape Town, Cape Town, ⁶Department of Internal Medicine, Stellenbosch University, Cape Town, ⁷Biostatistics Unit, Medical Research Council, Cape Town, ⁸City of Cape Town, Health Department, Cape Town, South Africa. Fax: (+27) 021 938 9138. e-mail: 14321823@sun.ac.za

In 2002 we performed a community survey among persons 15 years and older in 2 neighboring areas in the Cape Metropole in South Africa to determine the tuberculosis (TB) prevalence rate. A total of 26 bacteriologically (smear and/or culture) confirmed adults were detected, yielding a prevalence of 10 per 1000 (95%CI 6–14/1000). There were 9 cases of new smear positive confirmed TB and also 9 cases of smear positive TB that were previously treated. The prevalence of new smear-positive TB as well as previously treated smear-positive TB was 3 per 1000 (95%CI 1–6/1000). Previously treated smear-positive TB cases seem to be a high-risk group for getting TB. They may play an important role in the transmission of *Mycobacterium tuberculosis*. Attention should be given to improvement of cure rates.

PS-1247-20 Contrasting patterns of tuberculosis morbidity and mortality between different areas of the European Region

D Falzon, A Infuso. EuroTB, Saint-Maurice, Ile-de-France, France. Fax: (+33) 141796802. e-mail: d.falzon@invs.sante.fr

Tuberculosis notification rates dropped in most countries of the European Union and Western Europe (EUW) between 1995 and 2003 (18 to 14/100 000 population), but increased from 57 to 104 in former Soviet countries excluding Baltic States (East). In Balkan countries and Turkey (Centre), rates remained stable (50 in 2003), excluding Romania (142). Median tuberculosis mortality rates (38 countries; latest available year: 1998–2003) were lower in the EUW (1/100 000) than the Centre (4) and East (17). Drug-resistance data from former Soviet countries are sparse, except from Baltic States where primary multi-drug resistance was 9% in 2003 (vs. 1.1% in 18 other countries of EUW). Median treatment success among representative cohorts of new, definite pulmonary

cases in 2002 was 79% in EUW (23 countries), 82% in the Centre (4 countries), and 75% in the East (4 countries). The combined proportion of default, transfer and unknown was comparable across areas (median: 14% in EUW, 11% in Centre and East). Failure was higher in the East than in the EUW (7% vs. 0%) while deaths were lower (4% vs. 8% in EUW). Tackling the high burden of tuberculosis and drug-resistance in former Soviet countries should be a priority for tuberculosis control in Europe.

PS-1251-20 Report on random survey for epidemiology of tuberculosis in Guangxi, 2000

F Y Liu. Tuberculosis Division, Guangxi Center for Disease Control, Nanning, Guangxi, China. Fax: (+86) 7715315803. e-mail: liufeiying@163.com

Objectives: To realize the dynamic status of the epidemiological situation of tuberculosis in Guangxi and to provide the scientific basis for the preparation of Guangxi Tuberculosis Control Program (2001–2010). **Methods:** The multi-stratified grouping random and proportional sampling method was used. A total of 10 investigation points was sampled. Sputum smear and cultural examination were applied to all tuberculosis symptomatic with cough and expectoration more than three weeks. The investigation of tuberculosis infection among whole population was conducted in 2 investigation points. A retrospective study of tuberculosis mortality was investigated.

Results: The actual examined population in this survey was 11 833 and occupied 96.1% of the eligible population. The prevalence of active, bacteriological culture positive and smear positive pulmonary tuberculosis were 470/100 000, 186/100 000 and 127/100 000 respectively. A tuberculin test was carried out to 1716 adults who were older than 15 years and positive rate was 36.2%. The mortality of pulmonary tuberculosis was 13/100 000.

Conclusions: The result of the survey showed that the epidemiological situation of tuberculosis in Guangxi was much serious than the national average. The magnitude of tuberculosis in Guangxi was still serious. The improvement of epidemiological situation in Guangxi was rather exigency.

PS-1370-20 Predictors of deaths due to tuberculosis in São Paulo, Brazil

A A B Portela-lindoso,¹ E A Waldman,² N K Komatsu,³ S M Figueiredo,³ M Taniguchi.³ ¹Instituto de Infectologia Emilio Ribas - Serviço de Ambulatório, São Paulo, SP, Brazil; ²Faculdade de Saúde Pública da USP, São Paulo, SP, Brazil; ³Secretaria Municipal de Saúde, São Paulo, SP, Brazil. Fax: (+55) 11 3081 2108. e-mail: eawaldma@usp.br

Objective: To identify predictors of deaths by tuberculosis (TB) in São Paulo, Brazil.

Methods: We conducted a matched case-control study (141 pairs), each pair were matched by the pe-

riod of beginning the treatment. Cases were defined as deaths due to pulmonary TB occurred in 2002, and controls were selected among cured patients of pulmonary TB. Cases and controls were 15 years or older, resident in São Paulo, reported to TB surveillance. Bivariate and multivariate logistic regression analyses were performed to identify independent predictors of TB death.

Results: In the multivariate analysis, belonging to the age group of 60 years or older (OR = 7.8; 95%CI 1.2–363.2); tuberculosis in the past (OR = 11.4; 95%CI 2.4–54.5); diagnosis done at the hospital or in emergency room (OR = 6.0; 95%CI 1.6–23.0); diabetes mellitus (OR = 11.4; 95%CI 1.4–94.1); and alcoholism (OR = 7.0; 95%CI 1.5–32.1) were identified as independent predictors of TB death.

Conclusion: In 2002, occurred 420 death by TB in São Paulo, our results suggested that at least a part of them was avoidable and identified predictors that can be targeted for intervention by national and local TB control programs.

PS-1451-20 DOTS and DOTS Plus implementation in Lithuania

E Davidavičienė,¹ A Naujokaitė,² A Sosnovskaja,² L Daukienė,² D Gaidamonienė,² I Demšienė,² R Steigvilienė,² A Petraškaitė.² ¹National Tuberculosis and Infectious Diseases University Hospital, Vilnius, ²Ministry of Health Of Lithuania, Vilnius, Lithuania. Fax: (+370) 5 234 42 14. e-mail: edita.david@takas.lt

DOTS strategy in Lithuania has been implemented. Tuberculosis epidemiology situation have tendency changes. Tuberculosis incidence (new cases) decrease from 76.9 per 100 000 population (1998) until 58.1/100 000 per population (2004); abs n. (new cases) from 2826 (1998) until 2026 (2004). Treatment outcome of new cases are better also. Successful treatment from 82.07% (1999) until 84.6% (2002). Treatment interrupted signally decrease also from 9.32% (1999) until 6.0% (2002). But we have problem with MDR-TB. The Lithuania nationwide Drug Resistance Survey in 2002 showed that 29% of newly diagnosed never treated patients had drug-resistant TB and 9% had multidrug-resistant TB. Compared to the rest of the world, Lithuania has one of the highest rates of MDR-TB. Urgent, decisive action is need to control MDR-TB. In 2004 begining implementing DOTS PLUS strategy. The broad goals of the strategy for MDR-TB control are: 1) to reduce the spread of MDR-TB and 2) to decrease the incidence and prevalence of TB in general and drug-resistant TB in particular. The first and most crucial step in TB control is detection and treatment of the infectious TB patients.

PS1454-20 Small proportion of smear positives to bacteriologically positives in prevalence survey reflects good TB control in high burden settings

K Okada,¹ I Onozaki,² N Yamada,² T Miura,¹ S Saly,³ P Satha,³ M T Eang.³ ¹Japan International Cooperation Agency, National TB Control Project, Phnom Penh, Cambodia; ²Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association, Tokyo, Japan; ³National Center for Tuberculosis and Leprosy Control, Phnom Penh, Cambodia.
Fax: (+855) 23218090. e-mail: kosuke.okada@online.com.kh

Objectives: To investigate what a small proportion of smear positives to bacteriologically positives (S/B ratio) in prevalence survey reflects.

Methods: We compared S/B ratio of TB cases bacteriologically confirmed among three prevalence surveys in Cambodia; National Prevalence Survey (NPS) 2002, Urban Prevalence Survey (UPS) 2003 in Phnom Penh and Follow-up Survey for NPS (FUS) 2004. NPS was conducted in process of decentralizing DOTS nationwide, while Phnom Penh started DOTS in 2001. In FUS implemented after treating and eliminating bacteriologically positive TB of NPS, the participants who had had radiologically abnormal shadows in NPS were re-examined. All smear/culture exams were performed in the same laboratory.

Results: S/B ratio in NPS, UPS and FUS was 30% (81/271), 11% (3/27) and 9% (10/104), respectively. Among 10 S (+) detected in FUS, 7 cases were produced from X-ray active or healed in NPS. Pools with X-ray abnormalities, especially active shadows, had a greater risk of creating C (+) TB.

Conclusion: Small S/B ratio in prevalence survey serves as an indicator for effective DOTS implementation. Further discussions will be required because it is implied that the detection of chronic or mild cases by chest X-ray and treatment could lead to a rapid decreasing S (+) incidence rate in high burden settings.

PS-1498-20 Influence of risk factors on mortality from TB in Pavlodar and Almaty regions, Kazakhstan

F A Iskakova,¹ T A Muminov,¹ G B Rakishev,² K H Baimuhanova.² ¹Kazakh National Medical University, Almaty, Kazakhstan; ²National Center of Problem of Tuberculosis, Almaty, Kazakhstan. Fax: (+7) 3272 928658. e-mail: iskakovaf@msn.com

The achievement of Kasakh National TB program based on WHO strategy has decreased TB mortality rate by 1.8 times (1998–2004). Nevertheless, the indicator remains high. For further program improvement it is necessary to estimate medical and social risk of death from TB.

Goal: TB mortality risk factors analysis.

Methods: Two oblasts with high differences of TB incidence in 1998–2004 have been taken: Pavlodar (P.) and Almaty (A.), accordingly (129–198.5 and 95.8–108.9 per 100 000) have been selected. Social and

medical factors were analyzed Data from TB electronically surveillance case management Data Base have been used.

Results: There was the statistical interaction between death risk from TB and alcohol abuse (P.-OR = 7, A.-OR = 3.33), homelessness (P.-OR = 4.84, A.-OR = 2.28), and presence of concomitant diseases (P.-OR = 1.62, A.-OR = 15.58). ($P < 0.005$). Retreatment TB cases (relapse, treatment failure, treatment after interruption) had the higher risk of death (P.-OR = 1.94, A.-OR = 4.29), which was the highest for alcohol abuse persons (P.-OR = 14.28, A.-OR = 14.38), concomitant diseases (A.-OR = 15.18), ex-prisoners (A.-OR = 6.49), homelessness (P.-OR = 43.55, A.-OR = 17.33) ($P < 0.005$).

Conclusion: The risk factors influenced on mortality from TB in oblasts with different level of TB mortality that demand of efforts on decreasing of numbers of retreatment patients.

PS-1509-20 Tuberculosis performance indicators and factors associated with treatment failure among newly detected pulmonary tuberculosis cases, Kazakhstan, 2000–2002: analysis of surveillance data

E V Bumburidi,^{1,2} S M Ajeilat,² M O Favorov.³ ¹Republican Sanitary-Epidemiologic Station, Kazakhstan, Almaty, ²Applied Epidemiology Training Program, CDC/Central Asian Regional Program, Almaty, ³US Centers for Disease Control and Prevention, Central Asia Regional office, Almaty, Kazakhstan. Fax: (+7) 3272 501777. e-mail: bumburidi7@yahoo.com

In Kazakhstan, the annual notification rate for new Pulmonary Tuberculosis (PTB) cases rose steadily (67.1–165.1/100 000 population, 1995–2002). DOTS strategy started in 1998. Analysis of surveillance PTB cases data from 2000–2002 was conducted to evaluate progress towards achieving DOTS goals and to identify factors associated with treatment failure. Cure rate and the proportion of PTB+ were based on WHO definitions for DOTS. Logistic regression was used to investigate factors associated with treatment outcomes using Epi Info version 3.2. 65 011 new PTB cases were reported during the study period. By province ($n = 16$), the average annual notification rate ranged from 65.1 to 274/100 000 population and the cure rate for new PTB+ ranged from 65%–81%. The PTB+ comprised 44.7% of all adult PTB cases. Treatment failure of new PTB+ was associated with alcohol use OR = 2.1 (95%CI 1.8–2.4, $P < 0.001$), being homeless OR = 2.2 (95%CI 1.7–2.7, $P < 0.001$), and having been imprisoned OR = 1.5 (95%CI 1.3–1.7, $P < 0.001$). The cure rate for new PTB+ and the proportion of PTB+ among all adult PTB cases were below the DOTS target goals. Improving program indicators requires evaluation of detection efforts, laboratory diagnostic capabilities, and adherence to treatment regimens, especially among high incidence provinces and groups at high risk for treatment failure.

PS-1523-20 Social characteristics of pulmonary tuberculosis patients in an ecologically unfavorable region of Kazakhstan

T A Muminov,¹ S H A Beisembayeva,¹ S A Amireev,¹
B T Zhakipbayeva,¹ A M Dauletbakova,¹ G A Shopayeva,¹
A B Bazarbayeva,² Z S Akpanov,² A S Oradova.¹

¹S.J. Asfendiyarov Kazakh National Medical University, Almaty,

²Atyrau Oblast Antituberculosis Dispensary, Atyrau,
Kazakhstan. Fax: (+7) 10 3272 926997. e-mail: tbclab@mail.ru

The questionnaires of 205 persons sick by tuberculosis who living in ecologically unfavorable rural region have been analyzed with the aim to determine the influence of some social factors on disease rate. Among observed persons men have made 52.7%, women – 47.3%. Patients in the age of 20–49 years made 76.8%. The analysis of the social status has shown that unemployed made 63.5% of patients, serving – 13.7%, invalids – 7.4%, pensioners – 6.4%, workers – 4.4%. The majority observed had secondary education – 65.5%, 14.3% of patients had secondary-special, 9.3% – higher, 8.3% – incomplete secondary education. The monthly average income on 1 member of family was estimated as below a living wage by 130 persons. The sanitary-hygienic investigation of 47 patients' houses reveals that only 22.2% of them have good conditions. Among clinical forms infiltrative tuberculosis predominates (77.5% patients). 8.7% patients have fibrotic-cavernous, 7.5% patients – nodular, 4.3% patients – disseminated tuberculosis.

Conclusion: Social portrait of pulmonary tuberculosis patients from ecologically unfavorable region is following: man of capable age with infiltrative form of disease, unemployed with secondary education, below living wage.

PS-1575-20 Molecular characterization of mycobacterial isolates from patients with tuberculosis lymphadenitis seen at Derra Health Center, North Showa, Ethiopia. [Student project in progress]

B Seyoum,^{1,2} D Asmamaw,^{1,2} R Iwnetu,^{1,2} D Wolde-Meskel,²
H Gebre-Egziabhere,² L Yamuah,² Y Wolde-Amanuel,¹
A Aseffa.² ¹Addis Ababa University, Addis Ababa, ²Armauer
Hansen Research Institute, Addis Ababa, Addis Ababa, Ethiopia.
Fax: (+251) 121 1563. e-mail: janmeda13@yahoo.co.uk

Background: One third of the world population is infected with tuberculosis (TB). Annually, over 8 million new TB cases and more than 2 million deaths occur globally. The proportion of extra pulmonary tuberculosis (EPTB), especially lymph node tuberculosis (LNTB) is increasing in sub Saharan African countries due to high TB burden. In Ethiopia, over 107 000 new cases of TB were notified in the year 2002. Of all reported cases, 33% were EPTB, the largest proportion being LNTB.

Objectives: To identify the etiological species responsible for LNTB and type strains of mycobacterial iso-

lates using restriction fragment length polymorphism (RFLP).

Method: Fine needle aspirates (FNA) specimen was collected from 96 patients clinically suspected for LNTB. Bacterial culture [Lowenstein Jensen media], Biochemical tests (nitrate reduction, thiophene 2 - carboxylic acid hydrazid, & pyrazinamidase susceptibility) & PCR were done.

Results: 96 samples were cultured and 35 (36.5%) of them demonstrated growth. Biochemical tests were done for 21/35 (60%) & all were positive for *M. tuberculosis*. PCR was performed for 68/96 (70.8%) of the samples using IS5/IS6 genus complex primers. Of these, 61/68 (89.7%) were amplified. Using PncA (species specific primer), 40/96 samples were done & all of them were amplified for *M. tuberculosis*.

Conclusion: From the available data, it seems that *M. tuberculosis* is the major cause of LNTB in the study area.

PS-1590-20 Progress in TB control in India, 2004–2005

L S Chauhan,¹ D F Wares,² S Sahu.² ¹Central TB Division,
Directorate of General Health Services, Ministry of
Health and Family Welfare, New Delhi, ²Office of the
World Health Organization Representative to India,
New Delhi, India. Fax: (+91) 11 23018126.
e-mail: ddgtb@tbcindia.org

Background: With almost 1.8 million new cases annually, India has the highest TB burden in the world.

Recent progress: Coverage of the Revised National TB Control Programme (RNTCP) expanded from 778 million (January 2004) to 975 million (February 2004). In 2004, 1 187 353 cases were initiated on treatment, with 465 331 new smear positive cases registered—a case detection of 72%. Despite rapid expansion, treatment success remains high at 86% (2003 cohort). RNTCP thus achieved the global targets for case detection and treatment outcome in an area covering 87% of the total country population. In 2004, RNTCP continued to engage with new partners and initiate new projects. To date, >5000 private practitioners, >1000 NGOs, 100 corporate sector units and over 200 medical colleges are involved in RNTCP. Collaborative activities between RNTCP and the HIV/AIDS programme, initially focused in the 6 high HIV seroprevalent states, have been expanded into another 8 states. Increasingly focus is being given to the quality of TB services provided by RNTCP. From early 2005, both the updated RNTCP protocol for external quality assessment of smear microscopy services and the new RNTCP supervision and monitoring strategy, are being introduced into the programme. Drug resistance surveillance surveys are planned in 4 states in the coming 18 months, with a plan to establish a nation-wide network of state level culture and drug sensitivity testing laboratories.

PS-1599-20 National evaluation of treatment outcomes of TB patients in Brazil: a retrospective cohort study

D O Garrett,^{1,2} G Gerhardt,³ L S Diniz,⁴ J Santos,⁵ P Paine,⁶ C Wells,⁷ K Laserson.⁷ ¹International Union Against TB and Lung Diseases, Paris, France; ²United States Agency for International Development, Brasilia, ³Fundacao Ataulfo de Paiva, Rio de Janeiro, ⁴Centro de Referencia Professor Helio Fraga, Rio de Janeiro, ⁵Brazilian National TB Program, Ministry of Health, Brasilia, ⁶Health and Child Survival Fellow, John Hopkins University/United States Agency for International Development, Brasilia, Brazil; ⁷Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+55) 61 225 6416. e-mail: garrettdo@yahoo.com

Introduction: Brazil is one of 22 countries responsible for 80% of all TB cases worldwide.

Objectives: To perform a country-wide cohort analysis and describe treatment outcomes in the 2002 cohort of smear-positive pulmonary TB patients.

Methods: A retrospective cohort study of TB patients registered for treatment in every Brazilian capital city during April 2002. We used World Health Organization (WHO) treatment outcome definitions.

Results: We evaluated 3112 TB patients. The median age was 35 years (range = 1–89 years); 1926 (61.9%) were male. Of these, 2659 (85.4%) were classified as pulmonary TB. Of these, 1730 (55.6%) were smear-positive with 1471 (85%) being classified as new cases, 124 (7.2%) as relapse cases, 73 (4.2%) as return after default and 19 (1.1%) as return after failure. Assessment of treatment outcomes for new smear-positive pulmonary cases showed that 944 (64.2%) cured or completed therapy, 265 (18.0%) transferred to another center, 199 (13.6%) defaulted, 55 (3.7%) died and treatment failed in 8 (0.5%). Treatment outcomes for relapse and re-treatment cases showed that 112 (51.9%) cured or completed therapy, 42 (19.4%) transferred to another center, 40 (18.5%) defaulted, 12 (5.6%) died and treatment failed in 10 (4.6%).

Conclusion: Treatment success rates in this cohort are much lower than the WHO global target of 85%. To achieve WHO's target, Brazil should implement measures to reduce default rates and ensure that referring health units obtain treatment outcomes.

PS-1622-20 Tuberculosis morbidity trends in Brazil: changes in recent years?

J U Braga,^{1,2} M A Hijjar,¹ M J Procopio.¹ ¹Centro de Referencia Professor Helio Fraga. Secretaria de Vigilancia em Saude, Ministerio da Saude, Rio de Janeiro, Rio de Janeiro, ²Universidade do Estado do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+55) 25561971. e-mail: ueleres@openlink.com.br

In the 1980s a decline in the trend of tuberculosis morbidity was detected in Brazil, but with differentiated reductions in the regions with different tuberculosis incidence. Tuberculosis morbidity and mortality

were higher in the North and Northeast regions at the beginning of the decade, reaches the end of the century with a significantly decrease in these regions. However the reduction was not same in all the regions and the morbidity levels of the Southeastern region had dangerously to the levels of the poorest regions (North and Northeast). This study aims to answer the following questions: What has happened with the tuberculosis morbidity in Brazil in the last years? As the changes of Health Service model (Programa de Saude da Familia) the tuberculosis control activities had impacted the tuberculosis trends? Notification data from 1990 to 2002 were analyzed by year and federal unit (state). The data had very different levels of completeness and consistency according to the region. The results indicate a decline trend of tuberculosis incidence in North and Northeast regions. The Southeastern TB notification rates present stability or until an increase in some areas, while in the South, the TB remained steady and in the Center-West a probable fall.

PS-1633-20 Cohort evaluation for tuberculosis treatment: Campinas, Brazil, 2003

H B Oliveira,¹ E W A Ferreira.^{1,2} ¹Social And Preventive Department, State University Of Campinas, Campinas, São Paulo, ²Prefecture of Campinas, Campinas, São Paulo, Brazil. Fax: (+55) 01937888036. e-mail: helenice@unicamp.br

Objective: To analyze the results of non-supervised TB-treatment among patients that attended public health facilities in Campinas, Brazil, in the year of 2003.

Methods: 377 patients of a cohort of 494 diagnosed in 2003 were analyzed. Data were obtained from TB-Registry. The treatment outcome was described for new/retreatment cases, pulmonary/extrapulmonary forms and with/without TB-aids comorbidity. Statistical analyses were performed using EPIINFO version 6.4.

Results: The success rate was 76.4% among non-aids patients and 48.8% for aids patients. New cases presented a chance of 2.3 times more of favorable results when compared with retreatments (OR = 2.35, 95%CI = 1.21–4.56; $P = 0.009$). Among unfavorable outcomes the comorbidity TB-aids with a lethality of 31.6% and dropout of 17.1% was responsible, in part, for low success rate. Smear positive pulmonary-TB among non-aids group presented better success rate than those in aids group (80.5% vs. 46.9%). **Conclusions:** Campinas TB-Programme presented an effectiveness lower than the 85% proposed by WHO. Attention is needed in a city with considerable therapy facilities. DOTS is mandatory for aids patients under treatment of tuberculosis.

TB IN SPECIAL POPULATIONS AND INSTITUTIONS (MIGRANTS, HOSPITALS, PRISONS)

PS-1953-20 Risk factors for tuberculosis development in two pre-trial detentions in St Petersburg, Russia: a case-control study

T Lobatcheva,¹ T Asikainen,^{2,3} J Giesecke.^{1,3} ¹Department of Medical Epidemiology and Biostatistics, Karolinska Institute, Stockholm, ²Department of Mathematical Statistics, University, Stockholm, ³Department of Epidemiology, Swedish Institute for Infectious Disease Control, Stockholm, Sweden.
Fax: (+46) 8 300626. e-mail: tanielob@mail.ru

Background: Remand prison is a place where incidence of tuberculosis (TB) among prisoners is high. Effective prevention of TB spread requires study of factors, which contribute to TB development.

Methods: To estimate the risk factors, which lead to TB development in 2 remand prisons in St. Petersburg, we performed a retrospective matched case-control study (2002–2003). 114 prisoners (57 cases and 57 controls) were interviewed. Main method was logistic regression analysis.

Results: We found that 6 factors can increase the risk of TB development: overcrowding, absence of own bed clothes, low frequency of walking in open air, drug history, living conditions and low income before incarceration.

Conclusion: In this study we consider different factors: individual background factors and prison factors, which characterize life conditions. We found that not only one factor influences on TB in pre-trial detention but that several ones are important for TB development.

PS-1034-20 New group at risk in Slovakia

I Solovic. Institute for TB, Lung Diseases and Thoracic Surgery, Vysne Hagy, Slovakia. Fax: (+421) 524497715.
e-mail: solovic@hagy.sk

In Slovakia, a small country in Central Europe, with the incidence of tuberculosis of 13.6/100 000 population, there are marginal groups, such as migrants, asylum seekers, refugees and gypsies. These represent a problem for national tuberculosis program. In the past four years there were new group at risk created. These are migrants, asylum seekers and refugees, mainly from India, Afganistan and NIS. These groups of patients were responsible for 50% of drug-resistant cases in Slovakia (5 patients of the total 10), it is very difficult to obtain the treatment outcomes, these patients do not remain the Slovak territory for the whole period of their treatment. The gypsy population represents about 8% of the Slovak population. The process of assimilation of this ethnic group is indisputable. There are numerous factors, such as different age structure, socioeconomic and cultural factors,

as well mentality of this population that contribute to the process of the disease transmission. In years 1990–2004 there were 1520 cases of tuberculosis in this ethnic group reported. 73% of total childhood TB cases /8 cases/ were observed in gypsy children. It is necessary to establish the compatibility among the National TB registers of EU member states with the respect to these group of risk, and create a unified system compatible with the majority of EU countries.

PS-1041-20 DOTS strategy and TB control in high-risk groups in Ukraine

Y U I Feshchenko,¹ V G Matushevych,² V M Melnyk,² V A Yukhymets,³ V V Kuts,³ A N Prykhodko.² ¹Department of Pulmonology, ²Department of Epidemiology, and ³Department of Information, Institute of Tuberculosis and Pulmonology, Kiev, Ukraine. Fax: (+380) 44 275 21 18.
e-mail: orgmetod@ifp.kiev.ua

Introduction: The data of the effectiveness of sputum smear microscopy examination (SSME) in high-risk groups are contradictory.

Objectives: To appreciate the effectiveness of SSME in high-risk groups in Ukraine for 2001–2002 years and in the Donetsk region of Ukraine where had used the elements of DOTS for 2003.

Methods: The inspection of risk groups and all population by SSME and fluorography.

Results: In Ukraine the TB incidence had increased on 41% from 54.3 per 100 000 in 1999 to 77 in 2003, the mortality – on 9% from 19.9 to 21.8 per 100 000 respectively ($P < 0.001$). The TB incidence in high-risk groups formed 115–9300 per 100 000 and was 2–71 times higher than of general population. The effectiveness of SSME in risk groups formed 0.7–11% that lower than data of WHO – 37%. In Donetsk region the detection of the patients with tuberculosis by SSME formed 2.1% and of all population in Ukraine – 0.29%.

Conclusion: Was established the ineffective SSME in population and in high high-risk groups. The strategy of TB control had to be changed to rapid identify high-risk groups; it is necessary to improve the microbiological service in country.

PS-1331-20 Epidemiological investigation of tuberculosis transmission dynamics in an aboriginal township in Eastern Taiwan

R Jou,¹ H Liu,¹ C-Y Chiang,² J J Lee.³ ¹Reference Laboratory of Mycobacteriology, Center for Disease Control, Taiwan, Taipei, Taiwan, China; ²International Union against Tuberculosis and Lung Disease, Paris, France; ³Department of Chest, Buddhist Tze-Chi University Hospital, Taipei, Taiwan, China.
Fax: (+886) 2 26531387. e-mail: rwj@cdc.gov.tw

In 2001, the annual incidence of tuberculosis (TB) in aboriginal areas was 259 cases/100 000, which is 4.1 times higher than that in the general population. A

pilot study focusing on Sioulin Township, Hualien County (incidence rate of 552.99 cases/100 000, in 2001) in Eastern Taiwan has been conducted. A total of 62 *Mycobacterium tuberculosis* strains collected from January to September 2004 were genotyped and analyzed. Both restriction fragment length polymorphism (RFLP) and spoligotyping were applied to identify the dynamics of TB transmission. A RFLP dendrogram revealed 45 patterns including 9 clusters at a 98% similarity level. One cluster with a single IS6110 band was excluded by distinct spoligotypes. Among those 8 clusters (28/62, 40.3%), six clusters (cluster A–F) had 2 strains, one cluster (cluster G) had 5 strains and one cluster (cluster H) had 8 strains. Epidemiological relatedness of clusters was investigated based on the stone-in-the-pond principle, and confirmed household contact transmission was linked in 2 clusters (A and 2 cases of H). Possible social contact transmission in the same community was suggested in 3 clusters (B, C, and H), while 4 clusters (D, E, F and G) had no apparent epidemiological links. Detailed understanding of transmission dynamics and risk factors are urgently needed in order to implement an effective TB control strategy.

PS-1371-20 Comparison of patient control during 2001–2004 compared to 1991–2000, at the TB reference center 'G. Papanikolaou' hospital, Aristotle University

E Kalafati-Tzimaka,¹ I Georgitzikis,¹ D Delikatzi,¹ D Chatzidimitriou,¹ M Tzimaka,² D Patakas.³ ¹Department of Tuberculosis of Northern Greece, Thessaloniki, ²Department of Mass Media Communications, Thessaloniki, ³Aristotle University, Pneumonological Clinic, Thessaloniki, Greece. Fax: (+30) 2310350253. e-mail: georkons@SAFE-mail.net

Objective: TB diagnosis and study of incoming TB suspect patients, during 2001–2004 in comparison to 1991–2000 at the MBTB (*Mycobacterium tuberculosis*) reference center of the Aristotle University Pneumonological Clinic.

Material and methods: During 2001–2004 we examined 31 980 TB suspect patients, 105 350 biological specimens and we performed 200 569 laboratory tests (82 450 sputum, 22 900 other biological specimens). 36 522 were examined by Lowenstein-Jensen, 17 588 by Gen-Probe, 57 105 by Ziehl-Neelsen and 17 287 by the MGIT method.

Results: We isolated 711 new strains of *M. tuberculosis* from an equal number of patients (599 Greeks and 112 immigrants) which were inoculated in dilutions of anti-tubercular drugs for susceptibility testing. We used the following drug dilutions: STR 4 and 10 µg/ml, INH 0.2 and 1 µg/ml, RF 20 and 40 µg/ml, EMB 2 and 3 µg/ml, PAS 0.5 and 1 µg/ml, PZ 200 µg/ml (Canetti method).

Conclusion:

| Years | Percentage <i>M. tuberculosis</i> | Biological specimens | Strains |
|-----------|--------------------------------------|-------------------------|---------|
| 1991–2000 | 3.216% | 56 585 | 1820 |
| 2001 | 1.184% | 12 492 | 148 |
| 2002 | 0.61% | 28 566 | 175 |
| 2003 | 0.42% | 55 731 | 234 |
| 2004 | 0.63% | 24 304 | 154 |

The results show:

- a reduction of TB in 2001–2004 in comparison to 1991–2000
- a reduction of the virulence of the biological specimens.

PS-1399-20 Differences in TB beliefs between US-born and African-born latent TB infection patients

R Sondengam, Y Hirsch-Moverman, P W Colson, J Franks, N Holson, W M El-Sadr. Division of Infectious Diseases, Harlem Hospital/Columbia University, New York, New York, USA. Fax: (+1) 212-939-8259. e-mail: rs2227@columbia.edu

Methods: Patients (pts) prescribed self-administered treatment (tx) were enrolled in a randomized clinical trial. Baseline interview assessed knowledge/attitudes and perception of benefits/barriers.

Results: 176 pts were interviewed; 52.3% were African-born. US-born were less likely to be employed (29.8%; 44.6%, $P = 0.043$), and more likely to be homeless (57.1%; 21.3%, $P < 0.001$). US-born more likely to know that TB is easily transmitted in jails/shelters (96.4%; 83.7%, $P = 0.006$), and that TB is not transmitted by sharing dishes with people who had TB (38.1%; 12.0%, $P < 0.001$). African-born were more likely to feel protected against TB (59.5%; 32.9%, $P = 0.001$); said they had no time for clinic (13.0%; 3.6%, $P = 0.031$); believed family/friends would shun them (37.5%; 18.1%, $P = 0.005$); and less likely to believe they had TB infection (55.2%; 75.3%, $P = 0.006$). US-born had significantly more knowledge than African-born (10.97 ± 2.09 ; 10.28 ± 2.22 , $P = 0.035$). African-born perceived significantly more barriers regarding LTBI tx than US-born ($2.19 \pm .340$; $2.04 \pm .355$, $P = 0.005$).

Conclusion: US-born pts tend to have more knowledge and perceive fewer barriers than African-born.

PS-1417-20 An assessment of substance use among LTBI patients in an inner city chest clinic

R Sondengam, J Franks, P W Colson, N Holson, W M El-Sadr. Division of Infectious Diseases, Harlem Hospital/Columbia University, New York, New York, USA. Fax: (+1) 212-939-8259. e-mail: rs2227@columbia.edu

Background: Illicit substance use (SU) is often associated with non-adherence to therapeutic treatment (tx) regimens.

Methods: Pts prescribed LTBI tx were enrolled in a randomized clinical trial and assessed at baseline for SU.

Results: OF 244 pts, 50.8% reported past SU and 13.1% current use. 33.2% used marijuana, 22.5% used cocaine, and 14.3% used crack cocaine. 21.4% reported current or past SU problems, with cocaine most frequently reported as problematic (48.0%). Men were significantly more likely to have a SU history than women (60.6% vs. 29.6%, $P < 0.001$). Pts with past homelessness were significantly more likely to have a history of SU (73.6% vs. 38.4%, $P < 0.001$), and to be current users (25.8% vs. 5.9%, $P < 0.001$). US-born pts were significantly more likely report past SU than foreign-born pts (85.5% vs. 33.5%, $P < 0.001$), and to be current users (25.0% vs. 6.9%, $P < 0.001$).

Conclusion: Pts with past homelessness and US-born pts were more likely to be past and current substance users. Providers of LTBI tx should assess SU as a potential barrier to adherence and offer appropriate support.

PS-1435-20 Investigation of treatment continuity of TB patients released from imprisonment

T F Vasilyeva, N P Protchenko. Public Association 'Monitoring Committee of penal reform and human rights', Pavlodar, Kazakhstan. Fax: (+7) 3182 564557. e-mail: HR_monitoring@nursat.kz

Aim: providing of continuous treatment of TB patients released from imprisonment at regional TB dispensaries. It was prospective research. Target group—TB patients with not finished treatment released from penitentiary establishments of Pavlodar to Pavlodar area in 2004. The following documents were investigated: registering and reporting information of TB dispensary. Pulling of TB patients, their relatives and medical staff is conducted. 38 patients don't finish their treatment at the establishment (6 patients with intensive treatment phase (15.5%), 32 patients with supporting treatment phase (84.5%)). There were 7 bacillary patients in target group (18.4%). 31 patients (81.6%) have continued their treatment at regional TB dispensary. 23 patients have finished their treatment. 7 patients (18.4%) didn't address to the dispensary (2 bacillary patients). The reasons of treatment mode breach are following: 1 patient is convicted repeatedly, 5 patients don't live at the addresses pointed at release.

Conclusions: The fact of treatment mode breaches by some patients can become a cause of relapses and development of stable TB types. So, Establishing of the system of social support and integration of civil and prison healthcare will promote the raise of motivation of TB patients for finishing of their treatment.

PS-1487-20 Tuberculosis screening in asylum seekers in Belgium, 1999–2003

A Aerts,¹ V Vande Gucht,¹ M Wanlin,¹ M Honinckx,² R Sergysels,¹ W Schandevyl.¹ ¹Belgian Lung and Tuberculosis Association, Brussels, ²Federal Agency for Asylum seekers (FEDASIL), Brussels, Belgium. Fax: (+32) 2 511 46 14. e-mail: aaerts@vrgt.be

Methods: Asylum seekers in low incidence countries have a higher risk for tuberculosis than the general population. In Belgium asylum seekers are screened for tuberculosis upon entry and periodically (six monthly) during their first two years of stay.

Results: The tuberculosis detection rate upon entry in Belgium was 313 per 100 000 persons screened between 1999 and 2003. The screening coverage gradually increased to 95.5% in 2003. The periodic screening detected less tuberculosis patients and reached a detection rate of 120–240/100 000. More frequently than tuberculosis, asylum seekers presented with lesions of previously untreated, inactive tuberculosis (1% of persons screened upon entry). Follow-up of tuberculosis treatment remains problematic for asylum seekers: 15 to 30% did not comply with their full treatment scheme.

Discussion: Even though the coverage of tuberculosis screening in entering asylum seekers is optimal, active case detection for tuberculosis is only useful when coupled to a promptly administered and fully completed treatment. Leaving Belgium before the end of treatment is a major cause for the high defaulter rate in asylum seekers under treatment. Persons with lung lesions of inactive tuberculosis have a significantly higher risk to develop active tuberculosis and should be offered treatment.

PS-1521-20 Evaluation of tuberculosis surveillance program for migrants arriving in New South Wales, Australia

G B Marks,^{1,2} L N Nguyen,² S E Simpson,¹ A Christensen.³ ¹Department of Respiratory Medicine, Liverpool Hospital, Liverpool BC, ²Woolcock Institute of Medical Research, University of Sydney, Sydney, ³Communicable Diseases Branch, NSW Department of Health, Sydney, NSW, Australia. Fax: (+61) 2 982 84924. e-mail: g.marks@unsw.edu.au

Migrants to Australia who have radiological evidence of past tuberculosis are required to sign a tuberculosis health undertaking (TBU) and be subject to follow-up screening for two years. We present an evaluation of that program. A database of all migrants on TBUs arriving in New South Wales between 1992 and 2004 was linked to the state-wide TB register for the same period. Available records were reviewed to establish microbiological or clinical confirmation of the diagnosis. Among 41 252 migrants on TBU, 258 were notified as cases of TB. Of these, 150 were culture positive, a further 38 were confirmed on clinical grounds, and 28 were excluded as not active TB or having

arisen prior to migration. Clinical notes were not available for the remaining 42. The incidence rate for tuberculosis was between 80 and 98/100 000 person-years. Incidence rates stratified according to the rate in subjects' country of origin (>50 , 25–50 and $<25/100\,000$) were 136, 78, and 59/100 000 person-years, respectively. One hundred and twenty five cases (54.3%) were notified within 2 years of migration. Alternative strategies may be more cost-effective for controlling tuberculosis among migrants.

PS-1767-20 Burden of latent tuberculosis infection in Canadian Federal Penitentiaries, 1998–2001

J M Smith,^{1,2} R Stirling,² E Ellis,² S I Lavigne.¹ ¹Health Services Branch, Correctional Services Canada, Ottawa, ²Tuberculosis Prevention and Control Program, Public Health Agency of Canada, Ottawa, Ontario, Canada. Fax: (+1) 613-995-6277. e-mail: smithjm@csc-scc.gc.ca

Objectives: To determine the extent of latent tuberculosis infection (LTBI) among inmates and staff in Canadian penitentiaries.

Methods: Baseline tuberculosis infection status was determined by two-step tuberculin skin testing (TST). Converters are defined as those with a documented non-significant baseline TST who subsequently have a significant TST.

Results:

| LTBI (%) | 1998 | 1999 | 2000 | 2001 |
|----------|-------|-------|-------|-------|
| Inmate | 22.2% | 21.9% | 20.5% | 21.1% |
| Staff | 12.9% | 11.2% | 11.5% | 7.5% |

The proportion of inmates found to be TST significant on admission ranged from 21.2% in 1998 to 19.9% in 2001. The conversion rate was 1.02% in 1999 and 1.9% in 2001. Inmates with LTBI and at risk of progressing to active TB disease were estimated to be 22.2% in 1998 and 21.1% in 2001. Among staff, the proportion significant at baseline was 15.4% in 1998, and 8.3% in 2001. The proportion of invalid baseline 2-step TST among staff was 36.3% in 1998 and 26.3% in 2001. The conversion rate was 0.3% in 1999 and 0.28% in 2001. The proportion of staff estimated to have LTBI was 12.9% in 1998, and 7.5% in 2001.

Conclusions: These results outline the burden of tuberculosis infection among both inmates and staff, and emphasize the requirements for ongoing surveillance of tuberculosis in Canadian penitentiaries.

PS-1807-20 Nosocomial transmission in health care students in high incidence country, Vitória, Brazil

E L N Maciel, W R Meireles, A P Silva, K S Fiorotti, R Dietze. Núcleo de Doenças Infecciosas-Universidade Federal do Espírito Santo, Vitória, Espírito Santo, Brazil. Fax: (+27) 33357379. e-mail: emaciel@ndi.ufes.br

The nosocomial transmission of *Mycobacterium tuberculosis* is a well documented problem. Actions of administration and engineering control were effective in the developed world, but they are very expensive. We conducted a comparative study to estimate the tuberculin hypersensitive in the students of medicine ($n = 441$), nursing ($n = 178$) and economy ($n = 230$) in Vitória, Brazil, from April 1997 to August 1999 in students from the Federal University in Espírito Santo (UFES). The antigen used was PPD Rt23 2TU/0.1ml. The positive cut-off point for the PPD test was a 10 mm induration at the 72-hour reading. Any volunteer with a negative result in this evaluation underwent a second test with the same methodology 3 weeks later to rule out a late booster effect: The results shows a significant change of PPD reactivity in the nursing (20.3%) and medical (18.4%) students group comparative with the economy (6%) $P < 0.001$ students group. As expected the medical and nursing students have more knowledge about tuberculosis than the economy students ($P < 0.001$). The medical and nursing students have a high risk to be infected by *M. tuberculosis* and these students should be considered chemoprophylaxis target.

This study was partially supported by Tuberculosis Research Unit-TBRU (CWRU)/NIH

PS-1820-20 Correlation between knowledge of protective measures and incidence of *Mycobacterium tuberculosis* infection in nursing students in Vitória, Brazil

E L N Maciel,¹ M C Viana,² R C G Zeitoun,³ A P Silva,¹ R Dietze.¹ ¹Núcleo de Doenças Infecciosas-Universidade Federal do Espírito Santo, Vitória, Espírito Santo, ²Escola de Medicina da Santa Casa de Misericórdia, Vitória, Espírito Santo, ³Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+27) 33357379. e-mail: emaciel@ndi.ufes.br

This prospective study evaluated the incidence of *M. tuberculosis* infection among nursing students at the Federal University of Espírito Santo, using the purified protein derivative test. In parallel, we evaluated whether knowledge on tuberculosis transmission mechanisms had any impact on nursing students' attitudes in relation to the risk of tuberculosis infection. The incidence of tuberculin conversion was 10.5% per year ($P = 0.035$, 95%CI = 3.63–17.43), whereas the expected conversion rate in the overall population in Brazil is 0.5% per year. These results indicate nursing students as a group at risk for TB infection. Among the risk factors studied only the use of NIOSH95 masks

was associated with protection against infection ($RR = 0.2$). Furthermore there was no statistical difference among students that PPD converted and those who remained negative regarding disease knowledge and the existence of adequate facilities for patient hospitalization. However, fear of acquiring the disease, serves as a protective factor against tuberculin conversion.

This study was partially supported by Tuberculosis Research Unit-TBRU (CWRU)/NIH

PS-1918-20 Epidemiology of tuberculosis in Mexican Indian communities

A Cruz, A Hernandez, E Ferreira. Mexico, Mexico City, D.F., Mexico. Fax: (+52) 5526146433.
e-mail: asalgado@ifc.unam.mx

Introduction: Recently, México's National Tuberculosis Program begun a set of strategies to increase effectiveness of the actions: From an organizational performance evaluation index, movil laboratory strategy, integration of a DOTS TB-nursing Net, to special attention to vulnerable groups, so we started characterizing the epidemiology of TB in ethnic groups.

Methodology: From official EPI-TB system, in epi-info software, a descriptive comparative analysis was performed: Indian populations (characterized by the Indian Populations National Commission for 40% or more talkers of Indian idiom municipality criteria), and non-indian morbidity TB rates were done, by municipality, and compared. Those of Indian journalers migration patterns routes (by Population National Council), were compared with rates of non migration patterns, and with non Indian. Also, we analyzed treatment outcomes.

Results: Pulmonary TB rates in Indian population, were not statistically different, but in the border line. Rates from migration routes municipalities were significantly different to non migration routes. Rates for Indian communities, and outcomes for each strata are described. Comparison of each state with others, stratified by geographic area of the country (South, Coast, etc.), and by Indian population rates, will give a more precise panoram for the decision making.

PS-1942-20 Strategies to prevent and control tuberculosis in a northern Mexican border correctional facilities

P Cerecer,¹ J A H Montalvo,¹ J I V Vega,¹ R E Zamorano,¹ J L A Lozano,¹ I O Soto,¹ E Patiño-Mandujano,² J Á Naranjo-Vera,² N H M Merino,¹ M G Felix-Herrera,¹ A R M Fiol,¹ M G Rangel-Gomez.³ 1ISESALUD Tijuana, Tijuana, Baja California, 2CERESO Servicios Medicos, Tijuana, Baja California, 3 Colegio De La Frontera Norte, Tijuana, Baja California, Mexico. Fax: (+664) 680 65 84.
e-mail: tuberculosismx@hotmail.com

Introduction: Tuberculosis in correctional facilities is one of the most difficult challenge because enviroment, inmates population and transmission of *Mycobac-*

terium tuberculosis. Many reports of conditions like HIV, AIDS, drugs abuse users and active tuberculosis inmates.

Objectives: Identifies cases of tuberculosis and describes demographics, disease presentation, risk factors, diagnostics methods and attacks-mortality rates.

Methods: Descriptive and transversal study was conducted in state correctional facilities from city of Tijuana Baja California Mexico, February 1999 to March 2000.

Results: Total population was 5375 inmates. 1) Demographics: median 28 years old, 83% between 25–44 years. 93.94% males. 40.15% with job before entering in prison. 2) Risk factors: 90.91% HIV/AIDS, 90.91% abuse drugs and other factors 1–2%. 3) Clinical presentation: 75% confirmed, 93.94% pulmonary disease, 96.21% new cases. 96.97% detection in primary health center. 67.42% respiratory symptoms and 32.58% identified by contact tracing. Median 21 months from admission until diagnosis. 4.71 (median) cell mates. 4) Diagnostics methods: 66.67% AFB positive smear, 6.85% Lowenstein-Jensen, 1.52% biopsies, 22.73% clinical-epidemiological and 2.27% clinical-radiology. 5) Attack and mortality rates: attack rates of 2 and mortality rates of 6.3.

Discussion: Pitfalls for contact tracing and early detection are common factors for spread and outbreaks. This study shows: attack rate of 2 and mortality rate 6.3.

Conclusions: Tuberculosis in correctional facilities is a health problem, must have an intervention strategy and success depends on coordination between local tuberculosis programme and the correctional medical services.

PS-1384-20 DOTS impact on tuberculosis prevalence and incidence in prisons

P C Creach, R N Narimanidze, E M Mukhtarli. International Committee of the Red Cross, Geneva, Switzerland.
Fax: (+998) 711 205297. e-mail: philippecreach@hotmail.com

The settings are the prisons in Azerbaijan and Georgia in ex-Soviet Union. Case classification data were obtained from Ministries of Justice TB case notification systems compliant with WHO recommendations. The International Committee of the Red Cross helped in data collection and analysis the Ministries of Justice. TB prevalence of infectious patients decreased by 24% in prisons in Georgia over 4 years of DOTS. Modelling confirms the observed results. TB incidence of infectious prisoners dropped by 12% in prisons in Azerbaijan and 29% in Georgia over 5 years. This was obtained thanks to coverage of more than 90% of the prison population and a treatment success rate over 60%. Implementation of good DOTS in prisons in the Southern Caucasus by the Ministries of Justice with the technical support of the ICRC allowed for a drastic reduction of the number

of TB cases. Very likely disease transmission diminished as well.

PS-1830-20 Investigation of *Mycobacterium tuberculosis* transmission during a homeless shelter outbreak in Rio de Janeiro City

J U Braga,^{1,2} L S R Freitas,³ S M Espirito Santo,^{3,4} L L A Menezes,¹ M A Hijjar,¹ C C Sant'Anna.⁵ ¹Centro de Referencia Professor Helio Fraga, Secretaria de Vigilancia em Saude, Ministerio da Saude, Rio de Janeiro, ²Universidade do Estado do Rio de Janeiro, Rio de Janeiro, ³Secretaria de Saude do Estado do Rio de Janeiro, Rio de Janeiro, ⁴Secretaria de Acao Social do Estado do Rio de Janeiro, Rio de Janeiro, ⁵Universidade Federal do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+55) 212 5561971. e-mail: ueleres@openlink.com.br

The municipality of Rio de Janeiro presents largest number of tuberculosis notification of the state and the metropolitan region area have highest incidence of Brazilian southeastern region. The tuberculosis endemic in Rio de Janeiro city is considered serious because of its incidence, but mainly because it presents clear trend of worsening of this picture. Part of this trend can be attributed to its dissemination in vulnerable groups as homeless people. The aims of this project were to investigate tuberculosis outbreaks in this public shelter, the disease transmission risk factors, and mainly to elucidate the role of shelter geography in the dissemination of tuberculosis. Since August of 2004, 14 cases were detected in the population living in a public shelter Centro de Acolhimento de Benfica in the city of Rio de Janeiro (11 cases in the last six months). When first cases occurred, the Secretariat of Health of the State of Rio de Janeiro planned and developed actions to investigate the outbreak. The knowledge of associated factors to tuberculosis transmission allows adopting specific effective measures of protection the public shelter users. We used specific methodology to detect time, spatial and space-time clusters. We detected clusters related to crowding conditions of living.

PS-1031-20 TB and HIV in prisons

L A Alijev. NGO Convictus Eesti, Tallinn, Estonia. Fax: (+372) 6410133. e-mail: latsin.alijev@convictus.org

Although HIV is a widely recognised problem in Estonia (the number of diagnosed cases being 4200 as of 1 February 2005), the attention to TB and HIV co-infection has so far been virtually non-existent. At the same time, many people infected with HIV are exposed to TB, if not infected already - due to inadequate economic and living conditions and poor health state of many HIV-infected people, many of whom are, or have been in the past, drug abusers. Given that the scope of the present project is inevitably limited, whereas the nature of the problem is extremely complex, the project concentrates on advocacy efforts which aim to raise awareness of the scope and impor-

tance of the problem of TB-HIV co-infection on the part of experts and decision-makers, as well as among the vulnerable populations in Estonia (such as HIV-positive people, prisoners, drug addicts etc.), to promote a two-way consultation process in search of solutions). Raising awareness of HIV-TB co-infection among the vulnerable population groups will include a) a series of training seminars on HIV-TB co-infection in Estonian prisons, and b) production of information materials on TB-HIV co-infection, as well as methods of prevention, diagnosing and treatment, for distribution in prisons and among needle-exchange point customers. Training seminars will be carried out on the basis of support groups for HIV-infected people and drug addicts that Convictus has created in seven Estonian prisons (there are twelve support groups in total).

AIR POLLUTION AND OTHER LUNG DISEASE

PS-1009-20 Purification of an antifungal protein from *Escherichia coli* (BL 21)

V Yadav. Institute of Genomics & Integrative Biology, Delhi, India. Fax: (+91) 11 27667471. e-mail: vib2yadav@yahoo.co.in

Escherichia coli is an important component of gut flora. It is reported to be useful in treating severe pseudomembranous colitis. It also found to be associated with anti-allergic properties. We had investigated the anti-Aspergillus properties of lysate of *E. coli* BL 21. However, which protein possesses antifungal activity, it is yet not known. In the present study, therefore, the antifungal protein components of *E. coli* BL 21 were purified using pathogenic isolates of Aspergillus and Candida. The antifungal protein was purified with a procedure involving ion exchange chromatography on DEAE Cellulose, gel filtration chromatography on Sephadex G 100 and HPLC on C18 reverse phase chromatography. The molecular weight of the purified protein was estimated as 39.306 kDa by a software namely, Kodak 1D software. The purified protein inhibited the growth of *A. fumigatus* completely at a concentration of 1.95 µg/ml by microbroth dilution assay. It also inhibited the 100% growth of *Candida albicans* at 15.625 µg/ml concentration by percent growth inhibition assay. Further work on the characterization of active molecule is in progress.

PS-2114-20 Brazilian children with acute respiratory infection and wheezing

M G A Galvão, M A R C Santos, A J L A Cunha. Department of Pediatrics, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+55) 2122784109. e-mail: marilenecs@terra.com.br

Introduction: Children with acute respiratory infection (ARI) and/or wheezing frequently have chest X-rays (CXR) obtained to establish pneumonia diagnosis and the need to have antibiotics prescribed. Nevertheless there is no radiographic gold-standard to identify pneumonia. Errors and variations in interpretation of CXR also occur, leading to inappropriate prescription of antibiotics.

Objectives: To determine: 1) agreement between pediatricians and radiologists for pneumonia diagnosis, 2) sensitivity and specificity of pediatric CXR reading, considering the radiologist interpretation as gold-standard.

Methods: Cross-sectional study, conducted in the emergence room of a public hospital in Rio de Janeiro state. 217 children aged 2–59 months with ARI, fast breathing (FB) and wheezing were treated with aerolized β 2-agonist. CXR, obtained from 27 children who maintained FB after this treatment, were repeated after a week and read by a pediatrician and 2 radiologists.

Results: Pneumonia was identified respectively by pediatricians and radiologists in 70.4% (19/27) and 25.9% (7/27) children. The Kappa statistics: <0.30 between the pediatrician and the radiologists; 0.89 between the radiologists. Sensitivity and specificity of pediatric CXR reading: 100% (IC95% 65.1–100%); 40% (IC95% 20.6–63.1%).

PS-1161-20 Experience with flexible fibreoptic bronchoscopy from a poorly developed area

N A R O Rao. Department of Chest Medicine, Ojha Institute of Chest Diseases, Karachi, Sindh, Pakistan. Fax: (+92) 21 44934294. e-mail: nisar.rao@aku.edu

Objective: To evaluate the usefulness of fibreoptic bronchoscopy as a diagnostic tool in a tertiary cares hospital in Karachi.

Design: 131 patients with various indications for bronchoscopy were subjected to fibreoptic bronchoscopy during one-year period.

Setting: Ojha Institute of Chest Diseases, Karachi, a tertiary care teaching Hospital, Karachi.

Results: A definite diagnosis was made in 70 patients (53.43%). Bronchial carcinoma was diagnosed in 39, pulmonary tuberculosis in 8, fungal infections in 2, bronchiectasis exacerbation in 9 patients. Hydatid cyst, anthracosis, chronic bronchitis was the other diagnoses.

Conclusion: It is a safe procedure to diagnose bronchial carcinoma, unsuspected cases of pulmonary

tuberculosis and unexplained lung lesions. Squamous cell carcinoma is still the most common tumour followed by small cell carcinoma.

PS-1957-20 Clinical characteristics and outcome of patients with acute pulmonary embolism: an experience from a developing country

M Irfan, A B S Zubairi, K Fatima, M A Zubairi. Pulmonary Section, Aga Khan University Karachi, Karachi, Pakistan. Fax: (+92) 21 493 4294. e-mail: muhammad.irfan@aku.edu

Objective: To determine the clinical profile and outcome of patients with Acute Pulmonary embolism (APE) in a developing country.

Methods: Descriptive study on APE proven on Spiral CT Scan demonstrating an intraluminal filling defect. Clinical records were reviewed for demographic data, risk factors, clinical features, treatment and outcome.

Results: Of a total of 50 patients, 58% were females. The mean age was 52.2 ± 18.3 years. Risk factors for developing APE were present in 58% of patients. The major risk factors were immobilization (34%), surgery within 3 months (26%), trauma (18%), underlying malignancy (18%), and hypercoagulable state (6%). Associated comorbidities were present in 88% of patients. Dyspnea (90%) and chest pain (32%) were the commonest symptoms. Hemoptysis and cyanosis were present in 8% and 10% patients respectively. The chest radiograph was abnormal in 82%. The most common chest radiographic abnormalities were cardiac enlargement (46%), pulmonary parenchymal infiltrates (46%) and atelectasis (32%). Echocardiography was done in 54%. Major echocardiographic abnormalities were pulmonary hypertension (59%), right ventricular hypokinesis (33%) and interventricular septal shift (22%). Mechanical ventilation was needed in 16%. Intravenous thrombolytics were given in 9% and surgical embolectomy was done in 8% of patients with massive embolism. Low molecular weight heparin was given in 67% of patients. Mortality rate was 12%.

Conclusion: This is the first study from Pakistan on CT proven APE that shows the clinical and radiological characteristics and disease spectrum leading to APF and its outcomes.

PS-2002-20 Comparison between samples obtained under guidance of fluoroscopy versus computerized tomography (CT) fine needle aspiration cytology in the diagnosis of lung cancer

S L H B Golam, M Ahmed, Md S R Shah. National Institute of Chest Disease and Hospital, Dhaka, Bangladesh.
Fax: (+880) 2 9884656. e-mail: khyder@dhaka.net

Introduction: Bronchogenic carcinoma is the commonest malignant tumor in males and its frequency is rapidly on the increase. The introduction of sensitive image-qualification fluoroscopy and the development of cytology method having a high degree of diagnostic necessary with acceptable risk has been strengthened in the diagnostic technique recently. FNAC material obtained under CT guidance has also shown as a valuable technique in this respect. However, the rate of agreement regarding the presence or observe of malignant cells in this samples has ranged from 17–96% with a concomitant low false negative rate. If FNAC used as a diagnostic tool for detecting pulmonary lesion in Bangladesh, when most patients are poor and CT scan is not available in most places, therefore use of F-FNAC in diagnosis pulmonary lesion is recommended to reach greater number of population for benefits as well cost effective and even fluoroscopy available at district settings.

Objective:

- 1 To find efficacy of FNAC (under fluoroscopic guidance and CT Scan) in the diagnosis of pulmonary lesion.
- 2 To establish early, reliable and cost effective method in detecting lung cancer and compare efficacy.

Method: A total of 75 patients admitted in NIDCH is included in the study. In all patients, FNAC done first by fluoroscopy guided then by CT guided.

Results: FNAC is performed. By successful completion of this study it will help to establish the role of FNAC in the diagnosis of lung cancer. Detail results will be presented. The present study will reveal the specificity, sensitively and predictive roles of F-FNAC and CT-FNAC in the diagnosis of lung cancer.

PS-1785-20 Impact de la pollution de l'air sur les infections respiratoires aigues à Cotonou

G Ade, R P Agolekou, M Zannou, F Houngbe, S Y Anagonou, M Gninafon. Centre National Hospitalier de Pneumo-Phthisiologie Cotonou, Cotonou, Bénin.
Fax: (+229) 332782. e-mail: gabriade@yahoo.fr

Introduction: La pollution de l'air à Cotonou provient du trafic routier et s'accroît depuis vingt ans

Objectifs: Evaluer l'évolution des IRA de 1996 à 2002 et comparer cette évolution et le niveau de pollution de l'air à Cotonou et dans le département de l'Atlantique.

Méthode: Nous avons réalisé une étude rétrospective en relevant les concentrations des divers polluants de l'air disponibles. Ce sont des concentrations moyennes pour la journée et mesurées en 2000. Nous avons relevé les incidences annuelles des IRA parmi les consultations médicales de 1996 à 2002. Les données de Cotonou ont été comparées à celles de l'Atlantique.

Résultats: Les polluants qui émanent habituellement du trafic routier ont été retrouvés à des concentrations élevées. L'oxyde de carbone était à 20.47 mg/m³ ; les hydrocarbures volatils 0.178 mg/m³ ; le benzène 0.007 mg/m³ et les oxydes d'azote 0.05 mg/m³. Il n'existe pas de données chiffrées pour l'Atlantique, mais la nuisance inhérente à la pollution y est pratiquement inexistante. Les incidences des IRA à Cotonou sont nettement supérieures à celles de l'Atlantique. L'incidence des IRA basses a connu une ascension constante et importante en passant de 5.73% à 11.19%. Les IRA basses ont connu d'abord un accroissement en passant de 6.40% en 1996 à 11.32% en 2000; puis une diminution à 7.09% en 2002.

Conclusion: La pollution de l'air s'est accompagnée d'un accroissement important des IRA. Des mesures promptes et efficaces sont requises pour infléchir la tendance.

PS-2292-20 Evaluation of children with acute respiratory tract infection in Tikreet teaching hospital

A H T Kadum Yousif, E R Al-Saddon. Salah Aldeen Governorate TB Centre, Baghdad, Iraq.
e-mail: thamer_sindibaad@yahoo.com

Background: Acute respiratory tract infections (ARI) are one of the most common causes of death in children in developing countries. They are responsible for more than 4 million deaths that occur in children under five years of age each year. Two-thirds of these deaths are in infants. 30–50% from the out patient clinic patients and about 30–40% of child hospital admissions are caused by ARI. Pneumonia cases estimated to be one from each fifty ARI cases, and the mortality rate from pneumonia among children is 10–20%.

Aim: To evaluate acute respiratory tract infections of children admitted to Tikreet hospital

Methodology: A cross-sectional cohort study. Any child with ARI admitted to the hospital during the year 2003 with age group 5 years or less were included in this study. A total case 5100 cases were diagnosed as having ARI, and statistical analysis were done using chi-square test.

Results: Of 15 000 cases visited the hospital for respiratory tract infection, ARI was diagnosed in 5100 cases representing about 33% of the total cases, 90% of the cases were children with age group less than 2 years, the most common signs and symptoms were

cough followed by cough and wheezing, bronchopneumonia represented in 40% by radiological examination followed by lobar pneumonia, GIT symptoms were observed in 20% of the cases, blood culture was negative in 90–95% of the cases, death occurred in 1–2% of the cases.

Conclusion: Respiratory tract infection still representing a major health problem, following the guide lines adopted by the W.H.O regarding management of acute respiratory tract infection, and health education.

PS-1571-20 Effect of sulphur dioxide and particulate air pollution on hospitalisation due to respiratory diseases in Diyarbakir, Southeast Turkey

H Bayram, L Akyildiz, T Yildiz, D Surmeli, S Colakoglu, B Gundogus, F Topcu. Department of Chest Diseases, School of Medicine, Dicle University, Diyarbakir, Turkey. Fax: (+90) 412 2488440. e-mail: hbayram@dicle.edu.tr

We investigated effects of sulphur dioxide (SO₂) and particulate (PM) air pollution on hospitalisation due to respiratory diseases including COPD, asthma and other lung pathologies at chest departments in hospitals in Diyarbakir, Southeast Turkey. Air quality measurements have demonstrated that winter season (November to March) SO₂ and PM levels exceeded World Health Organisation and European Union long term limits in 2004. However, the maximum mean values of both pollutants were observed in December (SO₂ = 129.5 µg/m³, PM = 126.7 µg/m³), January (SO₂ = 139.9 µg/m³, PM = 136.3 µg/m³) and February (SO₂ = 126.3 µg/m³, PM = 121.7 µg/m³). The preliminary results of hospital admissions data demonstrated that totally 62 (COPD/asthma = 18), 47 (COPD/asthma = 21) and 38 (COPD/asthma = 17) patients were hospitalized by the Department of Chest Diseases, Dicle University Hospital, Diyarbakir in December, January and February, respectively. On the other hand, the total number of patients hospitalized by the same department were respectively as 16 (COPD/asthma = 5), 20 (COPD/asthma = 6) and 22 (COPD/asthma = 6) in June, July and August when the lowest levels of SO₂ (13.3, 11.9 and 12.9 µg/m³, respectively) and PM (12.5, 12.4, 12.69 µg/m³, respectively) were detected. Although these results suggest that there may be an association between increased levels of SO₂ and PM, and respiratory morbidity in Diyarbakir, we think further detailed studies are needed.

PS-1699-20 Analyse de la mortalité et de la morbidité cardio respiratoire pour la mise en place d'un système de surveillance épidémiologique de la qualité de l'air

M Atek,¹ Y Laïd,¹ A Ouchfoun,² N Zidouni.² ¹Institut National de Santé Publique, El-Biar, Alger, ²CHU Béni-Messous, Béni-Messous, Alger, Algeria. Fax: (+213) 21912737. e-mail: atekinsp@yahoo.fr

L'unité santé environnement de l'INSP d'Alger met en place à partir de l'année 2005 un système de surveillance épidémiologique de la qualité de l'air. Les auteurs rapportent les résultats d'une étude sur la transition épidémiologique et l'impact sur les systèmes de santé. La classification des causes de décès montre que les décès cardiovasculaires représentent 26.1% et ceux liés aux affections respiratoires 6.8%. Les décès par affections cardiovasculaires sont dominés par les autres formes de cardiopathies hors rhumatismales avec 31.2% et les maladies cérébrovasculaires avec 28.9%. Les décès par affections respiratoires sont dominés par les maladies chroniques des voies respiratoires inférieures avec 35.7% et les autres affections des voies respiratoires inférieures bronchite aiguë et infections aiguës des voies respiratoires inférieures dans 17.6% des cas. La morbidité hospitalière pour affections de l'appareil respiratoire et cardiovasculaire est respectivement de 13% et 6%. Ces données serviront de base pour la mise en place d'un système de surveillance de la pollution atmosphérique.

PS-1702-20 Mise en place d'un système de surveillance épidémiologique de la mortalité liée à la pollution atmosphérique urbaine en Algérie

Y Laïd,¹ M Atek,¹ N Zidouni,² J F Tessier.³ ¹Institut National de Santé Publique, El-Biar, Alger, Algeria; ²CHU Béni-Messous, Béni-Messous, Alger, Algeria; ³ISPED, Bordeaux, Bordeaux, France. Fax: (+213) 21912737. e-mail: youceflaid@yahoo.fr

Introduction : Une étude précédente a montré un impact sanitaire de la pollution de l'air par les poussières à Alger. Nous proposons la mise en place un système de surveillance épidémiologique de la mortalité liée à la pollution atmosphérique dans deux villes algériennes.

Objectifs : 1) De fournir les éléments nécessaires pour orienter les politiques nationales en matière de protection de la santé des populations ; 2) surveiller les tendances et évaluer les mesures préventives.

Méthodologie : C'est une étude épidémiologique écologique temporelle dans deux villes Algériennes (Alger et Annaba) avec recueil des décès et des données de qualité de l'air. Cette approche consiste à relier les variations à court terme de la mortalité totale d'une population à celles d'un indicateur d'exposition de cette population à la pollution atmosphérique urbaine. La modélisation et l'identification de ces relations prendront en compte les paramètres temporels et les cofacteurs.

Conclusion : La démarche proposée permettra une prise de décision adéquate basée sur des considérations sanitaires, sensibiliser les décideurs tant sanitaires qu'environnementaux de stratégies opérationnelles et spécifiques.

PS-1962-20 Correlation between air pollutants and admissions to emergency departments for cardiovascular complaints in Tehran

M R Masjedi, H Emami, Z Ahmadzadeh, M Padyab, S Khalilzadeh, Z Khalilzadeh. National Research Institute of Tuberculosis and Lung Disease, Tehran, Tehran, Iran. Fax: (+98) 2285777. e-mail: mrmasjedi@nitld.ac.ir

Introduction: We aimed to assess correlation between number of admissions in emergency departments and level of air pollutants in Tehran.

Methodology: In a cross sectional study, monthly cardiopulmonary admissions in emergency wards in different hospitals, and level of air pollutants (PSI = Pollution Standard Indexes) of CO, NO₂, O₃, SO₂ and PM₁₀, were prepared from Coordinator Center of Air Pollution Informatics in Tehran and their correlation was assessed. All the pollution and admission data were collected from 19 August 2004 to 19 January 2005. Data for air pollutants were collected daily from four stations in four different geographical locations in Tehran. Mean values of different pollutants calculated and plotted against time (day). Correlation coefficients (r) and related lines were prepared for each pollutant against monthly admission numbers. Critical level for statistical significance was determined to be 0.05.

Results: Number of admissions was positively correlated with concentration of all pollutants except ozone (O₃), and their correlation were statistically significant with carbon monoxide (CO) and PM₁₀ ($r = 0.73$ $P = 0.016$, $r = 0.75$ $P = 0.012$ respectively). According to this observation 53% of the variance in admission numbers can be explained by variation in concentration of Carbon Monoxide ($r^2 = .53$) and 56% by PM₁₀ ($r^2 = 0.56$).

Conclusion: Our results further emphasize the effects of air pollutants on respiratory health in populated city of Tehran and suggests that increased attention needs to be given to urgent control of air pollution problems.

PS-2290-20 Effect of gaseous air pollutants on the development of asthma among Iraqi school children

T K Y Al Hilfy. Salah Aldeen Governorate TB Centre, Baghdad, Iraq. e-mail: thamer_sindibaad@yahoo.com

Asthma is a disease of airways which characterized by increase responsiveness of the tracheobronchial tree to different stimuli. Air pollution play major role in the spread of disease in area surrounding oil refineries.

Aim: To evaluate the role of pollutants on the in-

crease prevalence of Asthma in the areas surrounding oil refineries.

Methodology: Cross sectional study was done during the year 2004 and lasted for 6 months (up to 30/6/2004). The total number of children included in this study were 600. study persons were selected randomly from 2 different areas with different pollution (high pollutant areas and low pollutant areas) the first one is near the oil refineries north of Iraq and the second one far from these areas (Aldugail, Balad) all in Salah Aldeen governorate. (sample collected from primary school children). Clinical condition of the patients were measured and classified as normal, asthmatic and or other respiratory complaints, with information's related to the demography and geography characteristics. Physical examination and peak flow metric test and exercise were applied. Investigations regarding (WBC, ESR) were done.

Results: Prevalence of asthma was estimated as 12% in highly pollutant area and 5% in low pollutant one with positive association between asthma and degree of pollution. No significant differences were estimated regarding gender, with more hospitalization regarding the first category an elevated ESR. also was more prevalent on younger age group children with no differences regarding gender. Also no significant statistical results regarding PEFR results among the two groups.

PS-2305-20 Evaluation of air pollutants in Tehran

Z Khalilzadeh, Z Ahmadzadeh, E Emami, M Padyab, S Khalilzadeh, M R Madani, M R Masjedi. National Research Institute of Tuberculosis & Lung Disease, Tehran, Iran. e-mail: zkhalilzadeh@excite.com

Analysis and evaluation of air pollutants in Tehran during many years is a confirmation for the security of Tehran's air pollution. According to results of projects corrected in 1998 that studied the level of air pollutants, motor vehicles and traffics were responsible for 70% of air pollution. This result had been reported to people in charge. Steps were taken to control and decrease air pollution. In this regard lead free gasoline was introduced and gas pipeline network was extended. Also taxis in Tehran started to use compressed natural gas (CNG) as the combustion material. Buses and minibuses started using gas instead of petroleum.

Methodology: During a 5-months period i.e from 19th August 2004, to 19th January 2005, the concentrations of 5 air pollutants, i.e., CO, NO₂, O₃, SO₂ and PM₁₀ were measured in four station present in north, west, south and central part of Tehran. The levels of air pollution were calculated according to PSI (Pollution Standard Index).

Result: Based on the results obtained during the Project period, concentration of 'CO' was reported as above standard on most of the days, leading to 'unhealthy' situation. Carbon monoxide (CO): 1) 51.9% of mea-

surements were made at $PSI \leq 100$ at standard conditions. 2) 34.7% of measurements were in conducted unhealthy condition $PSI = 101-200$. 3) 13.2% of measurements were carried out in very unhealthy conditions $PSI = 201-300$. 4) 0.2% of measurements were recorded in one station and in a hazardous condition $PSI > 300$. Ozone (O_3): All measurements conducted during the project period were at standard conditions and $PSI \leq 100$. Nitrogen dioxide (NO_2): All measurements were conducted at standard conditions and $PSI \leq 100$. Sulphur dioxide (SO_2): About 99.4% of measurements were conducted at standard conditions and $PSI \leq 100$. The concentration of SO_2 on most of days was at 'standard' condition. Only 6% of the measurements (2 samples) were in 'unhealthy' or 'hazardous' condition $PSI = 101-200$. Particulate matter (PM_{10}): By evaluating all samples in regard to particulate matter, 88.7% of the measurements were made at standard conditions with $PSI \leq 100$. While 11.3% of the measurements were carried out at 'unhealthy' condition with $PSI = 101-200$.

Conclusion: Based on the results of this project it was observed that carbon monoxide (CO) and particulate matter were the main air pollutants in Tehran. The main source for these air pollutants being vehicles. It is notable that atmospheric condition along with geographical situation of Tehran is such that help and augment air pollution in this city. Thus in addition to encouraging the use of CNG as combustion material for buses and minibuses, other extensive measures should be implemented in this regard.

PS-1782-20 Trouble ventilatoire obstructif et polluants des véhicules à moteurs

A C F Andrianarisoa,^{1,2} N A A Randrianarivorahona,¹ J R Rakotomizao,^{1,2} S P R Bakolitia,² D A Ranaivoarimanana.² ¹ Faculté de Médecine, Antananarivo, ² Hôpital J. Raseta Befelatanana, CHU Antananarivo, Madagascar. Fax: (+261) 202265469. e-mail: angeandr@syfed.refer.mg

Cadre : Les concentrations des particules solides en suspension dont le plomb en particulier sont très élevées pendant les heures de pointe à Antananarivo. Les conséquences à long terme et les effets à court terme pour les personnes fragiles sont préoccupants.

Objet : Identifier sources de pollution atmosphérique à Antananarivo - prouver relation polluants véhicules à moteur et troubles ventilatoires obstructifs.

Méthode : Comptage : véhicules, personnes exposées, mesures DEP, questionnaire.

| Durée exposition | DEP | | | Total |
|--------------------------|------------|------------------------------|---------------------|-------|
| | DEP normal | DEP compris entre 60% et 80% | DEP inférieur à 60% | |
| Inférieure à 5 ans | 61 | 117 | 113 | 291 |
| De 5 à 10 ans | 01 | 09 | 18 | 28 |
| Supérieure à 10 ans | 01 | 13 | 49 | 63 |
| Total des sujets exposés | 63 | 139 | 180 | 382 |

Résultats: 14 987 / 25 395 véhicules émettent fumées noires : 96.35% bus, 83.28% camions. Les véhicules d'occasion sont en nombre croissant. 382 personnes ont répondu au questionnaire et soufflé dans le débitmètre ; 36.4% présentent une fonction ventilatoire limite, 48.10% DEP très bas, 38% d'entre eux ont 5 ans d'exposition aux polluants et 77% pendant 10 ans. **Conclusion:** Il s'agit d'une pollution de proximité à Antananarivo ayant un impact direct sur l'air respiré. L'effet de l'exposition aux polluants des véhicules à moteur est élevé d'après les données cliniques relevées durant cette étude et confirmées par les résultats des mesures du volume respiratoire chez les sujets exposés.

PS-1929-20 Résultats de l'étude de faisabilité de la stratégie d'approche pratique de la santé respiratoire en Algérie

B L Baough, Z N Zidouni, C P Chaulet. Service de Pneumo-Phthysologie Matiben, CHU Beni Messous, Algiers, Algeria. Fax: (+213) 21931386. e-mail: lbaough@sante.dz

Depuis 2002, un groupe de travail national a été officiellement chargé de mettre en place en Algérie la stratégie d'approche pratique de la santé respiratoire préconisée par l'OMS. Un nouveau modèle de registre des consultations médicales et un guide pour la prise en charge des maladies respiratoires ont élaborés par ce groupe. L'étude de faisabilité de la nouvelle stratégie s'est déroulée en 2004 dans 77 sites de consultations médicales dans les unités sanitaires de base, répartis dans 10 départements. Les malades demandeurs de soins pour symptômes respiratoires, tous âges confondus, représentent 30% de l'ensemble des malades consultant dans ces unités. Les résultats observés confirment la validité du nouveau support d'information et son utilité ; ainsi que l'intérêt porté par les médecins généralistes exerçant dans les services de santé de base à une activité de formation médicale continue centrée sur un problème majeur de leur pratique quotidienne.

PS-2248-20 Population benefit and medical costs of syndromic lung guidelines in primary care

L W Niessen, D Bishai. Erasmus MC, Erasmus U, iMTA/iBMG, Rotterdam, ZH, The Netherlands. Fax: (+31) 10 4089092. e-mail: niessen@bmg.eur.nl

Background and objective: Lung disease is one of the leading causes of morbidity and mortality in developing countries. This paper analyzes the long-term cost-effectiveness of implementing WHO's Practical Approach to Lung health (PAL) in adults in Nepal. PAL guidelines on symptomatic case management of tuberculosis, COPD, asthma and pneumonia are compared to the current standard treatment schedule (STS).

Methods: In a facility-based cluster-randomized trial in 42 health facilities and 2242 patients, the impact of

PAL and STS on health-related quality of life and patient-level costs were collected in interviews with patients with respiratory symptoms. Program level PAL implementation costs were also estimated. A multi-disease multi-state life table was used to compute the related lifetime change in population lung health. Costs and effects were estimated for Nepal, with uncertainties presented on a bootstrapped cost-effectiveness plane and in acceptability curves.

Results: Treatment of a lung disease episode costs US\$0.82 following PAL guidelines and US\$1.00 on the basis of STS. Compared to STS, implementing PAL in first-level government facilities with a coverage of 30% in Nepal would cost about US\$200 per quality-adjusted life years gained. At a threshold US\$150 per QALY gained, PAL has a 66% probability to be cost-effective.

Conclusions: Total implementation of PAL guidelines is more costly than maintaining the current STS, and leads to a better population health. Implementation of PAL guidelines in Nepal is likely to be cost-effective.

TUBERCULOSIS IN CHILDREN

PS-1433-20 Community-based therapy for children with multidrug-resistant tuberculosis

P C Drobac,^{1,2,3} H E Del Castillo,⁴ S S Shin,^{1,2,3} D Guerra,³ J J Furin,^{1,2,3} M C Becerra,^{1,2,3} J K Joseph,^{1,2,3} J S Mukherjee.^{1,2,3}

¹Division of Social Medicine and Health Inequalities, Brigham and Women's Hospital, Boston, ²Partners In Health, Boston, Massachusetts, USA; ³Socios En Salud, Lima, ⁴Instituto de Salud del Niño, Lima, Peru. Fax: (+617) 5257719.

e-mail: pdrobac@partners.org

Setting: Resource-poor urban communities in Lima, Peru, an area with high tuberculosis incidence, where multidrug resistance (MDR) was found in 3% of new TB cases, and 12.3% of previously treated cases in 1999.

Objectives: To describe the management and outcomes for children receiving treatment for MDR-TB, and to evaluate the safety and tolerability of second-line antituberculosis drugs in children.

Methods: Retrospective analysis of 38 children under 15 years of age with active MDR-TB who were enrolled in a directly-observed treatment program. Each child received 18–24 months of therapy using at least five drugs to which their *M. tuberculosis* strain was presumed sensitive.

Results: 45% of children had coexisting conditions, 29% had severe radiographic findings, and 13% had extrapulmonary disease. 95% of children achieved cure or probable cure, one child died, and one abandoned therapy. Adverse events were reported in 42% of children, but there were no events requiring suspension of therapy.

Conclusion: Childhood MDR-TB can be successfully treated in resource-poor settings. The drug susceptibility pattern of the child's strain, or that of the source case, should be used to guide therapy. Treatment is well tolerated by children, and serious adverse events with second-line agents appear to be rare.

PS-1206-20 Disseminated non-tuberculous mycobacterial infection in a child with IFN γ -R1 deficiency

M N Tsolia,¹ P Taprantzi,¹ M Servitzoglou,¹ I Tassios,¹ N Spyridis,^{1,2} F Papageorgiou,¹ J L Casanova,³ P Spyridis.¹

¹Second Department of Paediatrics, P and A. Kyriakou Children's Hospital, Athens, Greece; ²Department of Paediatrics, St Thomas, London, UK; ³Laboratory of Human Genetics of Infectious Diseases, University of Paris Rene Descartes-INSERM U550, Paris, France. Fax: (+44) 207 229 0898. e-mail: niksp@netbreeze.co.uk

Idiopathic or Mendelian susceptibility to mycobacterial infection is a rare heterogeneous syndrome characterized by increased susceptibility to BCG or environmental, poorly pathogenic mycobacteria. We describe a young boy with disseminated atypical mycobacterial infection and complete IFN γ receptor 1 (IFN γ R1) deficiency.

Case report: A 2-year-old boy was admitted because of generalized lymphadenopathy, pruritic rash and mild hepatosplenomegaly. He had no fever or other systemic symptoms. Computerized tomography of the neck, chest and abdomen revealed enlargement of many cervical, axillary, mediastinal and inguinal lymph nodes. Extensive immunological work up was normal. Cervical lymph node biopsy revealed serious distortion of the lymph node structure with histiocytic infiltration; acid-fast bacilli were detected but no mature granulomas. Lymph node and gastric fluid cultures were positive for a fast growing mycobacterial species, which belonged to the *Mycobacterium fortuitum-peregrinum* complex. Plasma IFN γ level was increased (940 pg/ml). Lymphocytes were examined for cell surface expression of IFN γ R1 and a complete deficiency was found. IFN γ R1 was then sequenced and a novel homozygous mutation 453delT was found in exon 4 resulting in complete receptor deficiency. The patient was treated with amikacin, clarithromycin and ciprofloxacin to which the isolate was susceptible. He had a poor response with recurrent lymph node abscess formation requiring drainage.

Conclusion: Complete IFN γ R1 deficiency is a rare selective immune defect. It can lead to disseminated infection from poorly pathogenic mycobacteria species of the *M. fortuitum-peregrinum* complex.

PS-2041-20 Presentation and outcome of culture-confirmed tuberculosis among pediatric household contacts in Kampala, Uganda: a case series

J I Schwartz,¹ S Zalwango,² L Nshuti,² A Okwera,² H Mayanja-Kizza,³ R Mugerwa,³ C C Whalen.⁴ ¹University of Rochester School of Medicine and Dentistry, Rochester, New York, USA; ²Uganda-Case Western Reserve University Research Collaboration, Kampala, ³Department of Medicine, Makerere University Medical School, Kampala, Uganda; ⁴Department of Epidemiology and Biostatistics, Case Western Reserve University School of Medicine, Cleveland, Ohio, USA.
Fax: (+1) 914-686-2801.
e-mail: jeremy_schwartz@urmc.rochester.edu

Objectives: To characterize clinical presentation and treatment responses of culture-confirmed TB in pediatric household contacts (PHHC).

Methods: Retrospective cohort study of 34 PHHC (0–15 years) from 1995–present.

Results: Median age was 2 years; 17 (50%) were males. Twenty-nine (85%) were HIV negative, 31 (91%) had TST \geq 5mm, and 23 (68%) had a BCG scar. Nineteen (56%) were asymptomatic at baseline. At TB suspicion, all subjects had cough or lymphadenopathy on examination. Chest X-rays showed infiltrates in 26 (76%), adenopathy in 14 (42%); were normal in 6 (18%). Children \geq 3 years were more likely to have cavities (57% vs. 20%; $P = 0.024$) and to produce sputum (29% vs. 0%; $P = 0.036$) than younger children. Nine (27%) had at least one smear positive diagnostic sample, 91% of which were gastric aspirates. Cough and anorexia resolved by a median of 68 and 42 days after start of TB therapy, respectively; remaining symptoms resolved within one month. By six months, 70% of chest X-rays had improved; by twelve months, 75% of chest X-rays were normal.

Conclusion: Among culture-positive PHHC, presence of cough or adenopathy yielded 100% sensitivity for diagnosis of TB. Older children were more likely to have cavitory disease and sputum production. The majority of symptoms resolved within one month.

PS-2115-20 Polymerase chain reaction test for diagnosing pediatric tuberculosis

N Rahajoe, N Kaswandani, B Supriatno. Respiratory Division, Department of Child Health Ciptomangunkusumo Hospital, Jakarta, Indonesia. Fax: (+62) 21 3148931.
e-mail: nastitirahajoe@yahoo.com

The diagnosis TB in children still represents a challenge due to the lack of a valid diagnostic tool that could replace bacteriological investigations. Various studies have tested the validity of PCR against culture with different outcomes. The aim of this study was to explore whether PCR can be used as alternative diagnostic tool to diagnose TB in children. In the study PCR was compared to culture from gastric aspirate or

other body fluids. Diagnosis of TB was established by a pediatric pneumologist based on anamnesis, physical examination, radiological findings, and tuberculin skin test. PCR and culture tests were performed in 25 TB patients. The majority of clinical symptoms were chronic cough (64%), prolonged fever (48%) and anorexia (28%). Positive results of tuberculin skin tests and BCG scar were found in 15 (60%) and 17 (68%) patients respectively. PCR was positive in 4 out of 25 subjects and culture was positive in 4 of 25 subjects. The sensitivity of PCR was 50%, the specificity, PPV and NPV was 90.5%, 50%, and 90.5% respectively. The study concluded that PCR is not yet to be suggested as a diagnostic tool for childhood TB due to its low sensitivity.

PS-2116-20 Characteristics of culture positive pediatric tuberculosis

B Supriatno, N Rahajoe, D Setyanto. Respiratory Division, Department of Child Health Ciptomangunkusumo Hospital, Jakarta, Indonesia. Fax: (+62) 21 314 8931.
e-mail: bangsupri@yahoo.com

Diagnosis TB in children is still difficult due to unspecific manifestation and supportive examination. Definitive diagnosis of TB is the finding of *M. tuberculosis* in sputum culture, gastric aspirate, pleural fluid or other specimens but it is difficult to get positive culture in children. The aim of this study was to describe the clinical characteristics of culture confirmed pediatric TB. The study retrospectively evaluated 171 pediatric culture positive TB cases collected over a period of 5 years. The proportion of male and female was equal, predominant age was under 5 years old. Clinical symptoms found were fever (81.3%), cough (79.5%), anorexia and night sweating (63.7%), decreased body weight (54.7%) and malaise (45.6%). BCG scar was positive in 63.16% children. The tuberculin skin test was positive in 129 children (75.4%). Chest X-ray showed minimal abnormality (mild infiltrate) in 38 (22.2%) subjects. The study concluded that the most frequent clinical symptoms of TB in childhood were fever, cough, anorexia and night sweating. Twenty-two percents of the patient showed minimal abnormality on chest X-ray.

PS-2119-20 TB scoring for diagnosis of pediatric TB: a preliminary study

D Setyanto,¹ D Manissero,² N Rahajoe,¹ B Supriatno.¹ ¹Respiratory Division, Department of Child Health Ciptomangunkusumo Hospital, Jakarta, ²WHO Country Office, Indonesia, Jakarta, Indonesia. Fax: (+62) 213148931.
e-mail: darmawanbs@yahoo.com

Diagnosis of pediatric TB remains an unsolved problem in pediatric clinical practice. Clinical symptoms of pediatric TB are usually unspecific and can easily mimic other pathologies. Obtaining biological samples for bacteriology is not straightforward in chil-

dren. A number of TB score charts have been developed and tested internationally with often discouraging outcomes, especially in countries with a high prevalence of HIV. The Indonesian Pediatric TB Working Group has developed a TB score chart based on local evidence and expert consensus. To preliminarily validate the scoring system—by testing accuracy and identifying a probable cut-off point for diagnostic decision—a retrospective study has been conducted. The scoring system was applied retrospectively on 255 children whose TB diagnosis had been confirmed bacteriologically, and whose clinical records were complete. By applying the score chart, 94% of patients were accurately diagnosed using a cut-off point of five (5) and 80% of patients were accurately diagnosed using a score of six (6) as cut-off point. The demonstrated accuracy justifies further exploration for the potential application of the TB score chart in the Indonesia context. It is necessary to continue this study with a prospective methodology, which will allow calculating specificity and post-test probability.

PS-2122-20 Clinical manifestations of miliary tuberculosis in infants

N Rahajoe, B Supriyatno, N Kaswandani. Respiratory Division, Department of Child Health Ciptomangunkusumo Hospital, Jakarta, Indonesia. Fax: (+62) 21 314 8931. e-mail: nastitirahajoe@yahoo.com

There are difficulties in diagnosing pediatric TB, particularly in infants below 1-year old. These young children often present with severe forms of TB such as TB meningitis and miliary TB. The aim of the study was to identify the clinical manifestation of patients with severe TB, particularly miliary TB in children under one year of age. The study was conducted retrospectively by collecting the medical records of patients which were hospitalized with miliary TB from January 2000 to December 2001. The study identified 19 miliary TB patients under 1-year of age. The average age of the patients was 5-months. The most frequent complains were fever (89.5%), weight loss or unsuccessful weight gain (89.5%), and anorexia (84.2%). Enlargement of organs was also found: lymphadenopathy (73.7%), hepatomegaly (57.9%), and splenomegaly (47.7%). Positive results of tuberculin skin test were found in 52.6% of patients, increased erythrocyte sedimentation rates (ESR) and anemia in 63.2% and 57.9% of patients. This study concludes that the most prominent clinical manifestations of miliary TB in infants below 1-year of age are fever, weight loss or unsuccessful weight gain, and anorexia. However, enlargement of organs includes lymph nodes, liver, and spleen are also frequently found.

PS-1815-20 Drug-resistant tuberculosis in Greek children

S Kanavaki,¹ S Karabela,¹ A Skroubellou,¹ E Varonou,¹ S Anagnostou,¹ A Raftopoulou,¹ E Moraitou,¹ N Spyridis,^{2,3} S Nikolaou.¹ ¹National Reference Laboratory of Mycobacteria, 'Sotiria' Chest Diseases Hospital of Athens, Athens, Greece; ²Department of Paediatrics, St Thomas, London, UK; ³Tuberculosis Clinic for Children, 2nd Department of Paediatrics, Aglaia Kyriakou Children Athens, Greece. Fax: (+44) 207 229 0898. e-mail: niksp@netbreeze.co.uk

Drug resistance and local epidemiology are two important factors in the fight against TB. We retrospectively examined the drug sensitivities of 74 new paediatric tuberculosis cases over a 10 year period (1994–2004). Children were under 14 years of age: 32 (43.2%) were ≤ 2 years, 20 (27%) 2–5 years, 13 (17.5%) 6–10 and 9 (12.1%) 11–14 years of age. Most of our patients were diagnosed between 1998–2002 which, also reflects the period with the highest incidence of new adult cases and the largest wave of economic refugees documented in Greece the last few decades. The resistance to the antituberculous drugs as proved from the study in the paediatric population was 16.2% for INH, 4% for RIF and 4% multidrug (INH+RIF). During the same period, in adult patients, INH resistance was 8.6%, RIF resistance was 3.8% and multidrug resistance was 3.2%. It is interesting, that Streptomycin resistance in Paediatric population was 14.8% whereas in adult population 3.7%. In order to have correct and sufficient explanations in relation to our results, it is necessary to further investigate and review the history of contact of young patients with infected adults. This is our aim for the near future.

PS-1883-20 Dépistage des enfants tuberculeux comme approche de dépistage familial du VIH/SIDA

F K Kitetele, W M Mbwebwe, S C Callens, S D Diakanua. Département des Maladies Infectieuses; Hôpital Pédiatrique de Kalembelembe, Kinshasa, RDC. Fax: (+243) 81 81 31 600. e-mail: fkitetele@hotmail.com

Objectif : Montrer que le dépistage du VIH/SIDA des enfants tuberculeux, pourrait être l'une des approches de dépistage familial du VIH/SIDA.

Méthodes : L'analyse a porté sur les parents de 261 enfants soignés pour tuberculose à L'unité des maladies infectieuses de l'Hôpital Pédiatrique de Kalembelembe, qui ont accepté de se faire tester volontairement et faire tester les autres membres de la famille.

Résultats : Après counseling des parents et responsables des enfants infectés par la tuberculose :

- 16 couples et 76 adultes accepteront volontairement de se faire tester
- 73 frères et soeurs des enfants soignés pour tuberculose ont été amenés pour le dépistage.
- 102 adultes (parents) infectés par le VIH/SIDA, dépistés, référés dans le centre de prise en charge pour adultes

- 43 enfants infectés par le VIH/SIDA, dépistés, seront pris en charge à l'unité des maladies infectieuses.

Conclusion: Le dépistage du VIH/SIDA des enfants soignés pour tuberculose, après counseling de leurs parents, serait l'une de meilleures approches de dépistage familial du VIH/SIDA et permettrait ainsi une prise en charge précoce du noyau familial infecté

PS-2105-20 Tuberculin skin test reaction in a school community

M I Gheorghiu-Branaru,¹ M C E Gheorghiu-Branaru,² F Branzoi.¹ ¹Pneumology Center nr. 6, 'Dr Marius Nasta' Institute, Bucharest, ²'Carol Davila' Medicine University, Bucharest, Romania. Fax: (+40) 216104187. e-mail: manuelagb@cmb.ro

Objective: To study the risk of TB children infection, in a school collectivity.

Material & method: 1200 students (594 boys and 606 girls, between 6 and 14 years old), in contact with a smear positive patient, school worker, were tested with 2UT of PPD. The test was considered positive at 10 mm induration, Palmer I and II, at 6–7 years old pupils and >14 mm/any Palmer, at 7–14 years old pupils.

Results: 247 (20.5%) pupils presented hyperergia. 12 cases received chemotherapy in the past. All the other 235 (18%), proposed for investigations, attended chest X-ray examination: 3 cases were hospitalized. Among them, only 1 was confirmed with primary TB and treated 6 months HRZ. The 2 others received HZ chemotherapy during 6 months.

Conclusions: hypermetric Mantoux reaction can be regarded as indicator of high risk infection: 18% of the student patients were infected, percentage accepted only in conditions of a high TB morbidity. Chemotherapy to prevent the risk of progression to clinical manifested disease or development of complications from primary TB is under discussion and depends on national TB programmes and correlation with the regional TB incidence.

PS-1573-20 Risk factors for childhood death during tuberculosis treatment: Botswana, 1998–2002

J E Oeltmann,¹ B Chengeta,² J J Mboya,³ B S Koosimile,³ Z M Setlhong,² C D Wells,¹ P H Kilmarx,^{2,4} T Samandari,^{1,2} L J Nelson.¹ ¹Division of Tuberculosis Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ²BOTUSA Project, Gaborone, ³Botswana National Tuberculosis Programme, Gaborone, Botswana; ⁴Global AIDS Program, CDC, Atlanta, Georgia, USA. Fax: (+1) 404-639-8604. e-mail: jeo3@cdc.gov

Background: In Botswana, 5483 cases of tuberculosis (TB) were reported among children <15 years of age from 1998–2002. Of these, 3646 (71.9%) completed treatment and 577 (11.4%) died.

Objectives: To identify factors for death during TB treatment among children <15 years.

Methods: We performed a case-control study of children treated for TB from 1998–2002 using a standardized questionnaire administered to caregivers. Cases were children who died during treatment; controls were children who completed treatment.

Results: We interviewed caregivers of 91 cases and 220 controls; two cases (1.2%) were incorrectly registered as treatment completers, while 23 controls (10.5%) were incorrectly registered as having died. Having drug side effects (OR 4.6, 95%CI 2.5–8.7), and ≤1 biologic parent alive during treatment (OR 1.9, 95%CI 1.1–3.3) were associated with death in univariate analysis. HIV status was unknown for 54% of the children's parents and 76% of the children. No significant association between death and HIV status of the child's mother (OR 2.1, 95%CI 0.9–4.4), or the child (OR 1.0, 95%CI 0.3–4.2), was noted.

Conclusions: Positive treatment outcomes are under-reported among Botswana children. TB control programs should include assessment for drug side effects and expand HIV testing among children diagnosed with TB and their parents.

PS-1788-20 The value of gastric washing in the ambulatory and hospital environment for the diagnosis of childhood pulmonary tuberculosis

E L N Maciel,¹ W R Meireles,¹ R L Peres,¹ S A Vinhas,¹ M Palaci,¹ D J Hadad,¹ R Dietze,¹ C J Struchiner.² ¹Núcleo de Doenças Infecciosas-Universidade Federal do Espírito Santo, Vitória, Espírito Santo, ²Universidade do Estado do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+55 27) 3335 7379. e-mail: emaciel@ndi.ufes.br

Tuberculosis (TB) is now known as one of the most important cause of morbi-mortality in the world. About 1/3 of the world population is infected with the *Mycobacterium tuberculosis* (MTB). The bacteriological finding of MTB is difficult which makes TB diagnosis in the childhood problematic. This a prospective study that compares the diagnostic value of gastric washing (GW) accomplished in the ambulatory and in the hospital environment for the diagnosis of TB among children. A total of 221 children were submitted to GW, 95 in the hospital group and 126 in the ambulatory group with 23 confirmed cases of TB in the ambulatory GW group and 30 in the hospital GW group. None of the variables (clinic, epidemiology and radiology) studied were found to be statistically significant in both groups. Also regarding to the findings of the *Mycobacterium tuberculosis* culture no difference was observed (RR 1.47; 95%IC 0.95–2.27; *P* value: 0.095). Our data suggest that the GW procedure accomplished in an ambulatory environment is equally efficacious to the same procedure realized in a hospital setting.

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PS-1810-20 Descriptive study of childhood tuberculosis in the metropolitan area of Vitória-ES, Brazil

E L N Maciel,¹ C A Marinato,¹ C F R Bandeira,² M S Tonini,² M C Ramos,² R Dietze.¹ ¹Núcleo de Doenças Infecciosas y ²Departamento de Enfermagem, Universidade Federal do Espírito Santo, Vitória, Espírito Santo, Brazil.
Fax: (+55 27) 3335 7379. e-mail: emaciel@ndi.ufes.br

Tuberculosis is considered a serious problem of public health, because it is known to be the main cause of morbi-mortality in Brazil. In the childhood, that indicator presents high index due failures in the diagnosis, treatment and/or vaccination. This study has the objective to describe the epidemiological profile of children from 0 to <15 years old with tuberculosis diagnosis in the metropolitan area of Vitória-ES-Brazil. 793 cases of tuberculosis were notified in the period from 1990 to 2001 in this area. The results in our study show that in only 26.9% of the patients, the smear was done, and 4% out of these, had positive results, with 13% of positive culture. The radiographic exam was available for 70% of the children serving as diagnostic procedure in 50% of the cases. In 295 (37.2%) children the tuberculin skin test was performed with a 57.28% positive result. Only 60.1% were considered cured, with 11.4% death rate. These results show that it is necessary an including policy for controlling the childhood tuberculosis in the state, through educational campaigns besides the implantation of a sufficient number of disease control programs with qualified professionals in the municipal districts.

PS-1209-20 Active tuberculosis among school-children with positive tuberculin skin tests and their household contacts in Iraq

W Al-Kubaisy,¹ D Al-Badrie.² ¹Community Medicine - College Of Medicine Al-Nahrain University, Baghdad, ²TB and Lung Disease - Institute, Baghdad, Baghdad, Iraq.
Fax: (+964) 1 719 9287. e-mail: waqar_abd@yahoo.co.uk

Aim: To determine the incidence and risk factors of active tuberculosis among positive tuberculin skin test (TST) school children and their household contacts. Also to assess the prevalence of latent tuberculosis infection (LTBI).

Subjects & method: Prospective study was conducted on 205 school-children recorded positive TST during nationwide survey in 2000, as well as their household contacts during April–November 2002. All participants <15 years old were subjected to TST. Chest radiograph were performed for children with positive TST and all adults. Three consecutive sputum specimens for acid fast bacilli were performed for every adult participant.

Results: Of 205 schoolchildren only 191 remained TST positive in 2002. Based on X ray and clinical examination, 9 children (4.4%) were active TB cases.

Among 834 households contacts there were 144 new TB cases giving cumulative incidence of 17.3%. Risk factor for TB among household contacts were; age. 15 years; low body mass index; diabetes mellitus and closeness of contact with the index case this cohort of children. Of the total 1039 participants 34 (3.27%) give positive family history and 77.2% of new cases attributed to household contact.

PS-2171-20 Detection and treatment of tuberculosis in severely malnourished children

M B Bonnet,¹ V B Brown,² E D Dortenzio,³ C D Delarue,² B V Vasset.³ ¹EPICENTRE, Geneva, Switzerland; ²EPICENTRE, Paris, ³Médecins Sans Frontières-France, Paris, France.
Fax: (+41) 22 849 84 88.
e-mail: maryline.bonnet@geneva.msf.org

Background: Malnourished children are likely to have TB but few are treated during nutritional crisis.

Objective: To describe characteristics and treatment outcomes of malnourished children with TB.

Method: We looked at 324 children treated for TB in a Therapeutic Feeding Centre (TFC) during the Angolan 2002–2003 malnutrition crisis. Admission criteria to TFC were Weight for Height index (W/H) below 70% of the reference median or 70 to 80% associated to a pathology or oedema. Modified Keith Edwards score was used to detect TB. WHO case definitions and treatment regimens were applied.

Results: Median age was 4.0 years (Inter Quartile Range 2.6–7.5). There was 57.4% pulmonary, 18.8% extra-pulmonary and 23.8% mixed TB. Main baseline symptoms were cough (82.4%), no increase of W/H index (76.8%), fever (36.7%) and adenopathies (36.1%). Mean score was 9.5 (Standard Deviation 2.2). After 2 months treatment, 86.5% improved W/H index. Treatment outcome was 79.0% success, 3.4% default, 4.0% transfer and 13.6% death.

Conclusion: TB should be detected and treated during malnutrition crisis. Difficulties in diagnosing TB may explain the high death rate and require new tools.

PS-2121-20 An exercise of active surveillance of childhood tuberculosis in an urban Indonesian district: findings and operational suggestions

D Manissero, F Loprang. World Health Organization Country Office - Indonesia, Jakarta, Indonesia. Fax: (+62) 21 520 1164.
e-mail: manisserod@who.or.id

Evaluating the burden of TB in children from current notification data presents major obstacles. Globally, WHO only reports smear-positive cases stratified by age, missing the portion of pediatric cases that are smear negative. The same surveillance/notification system is utilized in Indonesia under the NTP requiring detailed analysis of district and health unit data to capture pediatric notifications. For the purpose of evaluating the magnitude of childhood TB notifica-

tions, data was collected and analyzed from the TB register in a typical urban district in Indonesia. Data was collected from the TB register (TB 03) from a lung hospital, a lung clinic and from the district health office. A total of 1259 patients under 15 years of age were recorded and notified in the district in 2003. This represents 25% of the total notifications for the district in 2003. 56% of the children notified were under 6 years of age. 95% of the cases notified were pulmonary cases. Suggestions are made for improvement of the surveillance/reporting system to better capture pediatric cases. The study suggests that there might be an element of childhood TB overdiagnosis in the district. A justification for the revision of the current national childhood TB diagnostic guidelines is also given.

PS-2231-20 Utilisation de la score notation OMS dans le diagnostic de la tuberculose pédiatrique

M N'Dhatz-Sanogo, M Kamate, K Niangoran. UFR Sciences Médicales de Bouake, Abidjan, Côte d'Ivoire.
Fax: (+225) 22477186. e-mail: sanogomel@globeaccess.net

Objectif : Evaluer système de notation du score diagnostique dans la tuberculose pédiatrique but d'apprécier sa valeur diagnostique dans notre contexte d'exercice
Matériel et méthodes : Etude prospective juillet à décembre 2003 CAT d'Adjamé sur enfants présentant symptomatologie pulmonaire, adénopathies, amaigrissement, IDR positive, contage tuberculeux. Score de notation comparés à algorithme de diagnostic
Résultats : 132 enfants de moins de 15 ans enrôlés. 79 avaient un score ≥ 7 en faveur du diagnostic de la tuberculose selon tableau de notification, soit 59,8%. L'algorithme identifie 72 patients tuberculeux (54,5%) des cas. Le score moyen des patients non tuberculeux (60 cas) était 6. Parmi eux 09 des patients avaient un score supérieur à 7. La sensibilité du score dans notre étude était de 97,2%. La spécificité était de 85%, la valeur prédictive positive était de 88,6%. La valeur prédictive négative était de 96,2%.

Conclusion : Pour améliorer le diagnostic de la tuberculose chez l'enfant, le score de notation de LOMS peut donc être utilisé dans les pays en développement où l'accès aux examens paracliniques est difficile. Cependant l'impact de l'infection VIH et de la malnutrition sur le score de notation doit être évalués.

TUBERCULOSIS EDUCATION AND TRAINING

PS-1026-20 Integrating TB treatment into the existing HIV/AIDS treatment education: a practical lesson from AIDS Alliance in Nigeria

F A Mohammed. AIDS Alliance In Nigeria, Lagos, Nigeria.
Fax: (+234) 1 26029. e-mail: faroukaiwalu@yahoo.co.uk

Methods: AIDS Alliance has a treatment education programme from the six sites of Harvard PEPEFAR in Nigeria where 5 participants were brought from all the sites and trained on treatment education that includes TB education. Before the training commencement questioners were administered that are basic knowledge of TB and HIV are intertwined.

Result: The result of the pre training showed that just 2% of the participants have knowledge of TB, but at the end of the training their knowledge have increased by 70%. This has assisted us in all the treatment centers as those 30 people that were trained has been passing the knowledge of HIV/AIDS and TB at the same time. The trained PLWHA went back and training the others that are on the treatment in all the six sites thereby increasing the numbers of PLWHA that are knowledgeable on both TB and HIV. Total numbers that have been reached in the sites are 5836.

Conclusion: It has become very necessary to integrate the education of the two diseases in all training.

PS-1135-20 Improving skills on AFB microscopy through effective training

L A Aguiman,¹ A F Fujiki,² M T Trono,³ T S Shirahama,⁴ M S Suchi.⁵ ¹DOH-CHD, Cebu Regional TB Reference Laboratory, Cebu, Philippines; ²The Research Institute of Tuberculosis, Tokyo, Japan; ³DOH-JICA Project for the Quality TB Control Program, Manila, ⁴DOH-JICA Project for the Quality TB Control Program, Manila, Philippines; ⁵The Research Institute of Tuberculosis, Tokyo, Japan. Fax: (+63) 2 772 2603.
e-mail: qtbcp@meridian.ph

Although AFB microscopy plays a vital role in TB control program, the quality does not appear to have yet reached the satisfactory level in most developing countries. Training method to improve the skills on AFB microscopy was studied through our activities for capability building in Cebu, Philippines.

Method: AFB microscopy trainings were given to 49 medical technologists at peripheral laboratories in 2004. The training was basically participatory, with emphasis on individual assessment and feedback. The capability on AFB microscopy of trainees was itemized and assessed. The results of the initial and last practicum were compared.

Results: In smear preparation, proportion of good quality improved from 53% to 98% in specimen quality, 64% to 98% in staining, 76% to 100% in cleanliness, 42% to 100% in thickness, 30% to 100% in size and 3% to 90% in evenness. Microscopic read-

ing was assessed by the occurrence of errors. Major errors disappeared at the end of practicum.

Discussion: Remarkable improvement can be achieved by providing a participatory training with individual assessment on each item of the skill. Number of participants, facilitators and microscopes, training materials and capability of training facility should also be taken into consideration for effective training.

PS-1211-20 Knowledge attitudes and practice (KAP) of health care workers and tuberculosis patients In Iraq about tuberculosis

D Al-Badrie,¹ W Al-Kubaisy.² ¹Institute Of Tuberculosis and Chest Disease, Baghdad, ²Community Medicine College of Medicine, Al Kadhimya, Baghdad, Iraq. Fax: (+964) 17199287. e-mail: dhafertb@yahoo.com

Aim: To assess the knowledge attitude and practice of pulmonary tuberculosis patients as well as health care workers (HCWs) toward tuberculosis (TB)

Material and methods: Cross-sectional study was conducted on 500 health care workers and 500 tuberculosis patients selected from 259 Primary Health Care Centers. Face-to-face interviewing was carried out using pre tested structural questionnaire.

Results: Acceptable optimum (64.4%) knowledge of TB among patients was found. It was significantly higher (OR = 1.19) in males than females. On the other hand practicing TB as a stigma was still high (54.86). Optimum knowledge of HCWs toward TB was excellent (95.5%). This knowledge was increasing steadily with increased age of HCW and duration of the job elapsed. to reach 100% in certain condition. Physicians and Television were the two most important source of patients information. In addition Education training and supervision of NTP shows good impact on knowledge.

Conclusion: Kind of practicing and attitude toward TB patients play a major role in seeking advice and not only knowledge alone.

PS-1250-20 Challenging difficulties in the scaling up of the DOTS expansion through scientific-based behavior change communication approach

B De Negri,¹ N Kazemi,¹ I Aitken,² H Ahmadzai,³ P Suarez,⁴ C Chappell.¹ ¹Global Health, Population & Nutrition (GHPN Group), Academy for Educational Development (AED), Washington, DC, USA; ²USAID/MSH/REACH, Kabul, ³National Tuberculosis Program MOPH, Kabul, Afghanistan; ⁴Management Sciences for Health (MSH), Arlington, Virginia, USA. Fax: (+1) 202-884-8792. e-mail: bdenegri@aed.org

Working with the Afghan Ministry of Health (MOH), the USAID/REACH Program undertook operational research to identify information-education-communication (IEC) behavior change (BC) objectives and interventions to develop an IEC/BC strategy for TB for the stakeholders to use to develop their workplans. In

the long term, the research aims at benefiting the majority of TB infected (the 25–34 years old urban and rural men and women), therefore contributing to closing the major gaps in DOTS coverage, and increasing the % of case detection and % of case treatment in Afghanistan. The 'Cough to Cure Pathway,' a diagnostic and planning framework (AED, 2005), helped the research team through focus groups discussions, interviews and observation to look at specific barriers that health providers or patients face daily at and around the expansion of the DOTS facilities. Based on the results and recommendations, the MOH and USAID/REACH Program adapted and pre-tested content of IEC/BCC materials (a set of counseling cards and a cloth flipchart, addressed to nurses and community-health workers). Challenges and lessons learned from undertaking such a study in Afghanistan will be presented at the conclusion of this research (to end in August 2005).

PS-1310-20 Approach of practical TB contents in nursing schools, Brazil, 2004

T C S Villa,^{1,2} D R Firmino,¹ R L P Andrade,¹ M E F Brunello,¹ M F Oliveira.¹ ¹College of Nursing, University of São Paulo at Ribeirão Preto (USP), Ribeirão Preto, São Paulo, ²Coordinator of TB Operational Research Area of Brazilian TB Research Network, Ribeirão Preto, São Paulo, Brazil. Fax: (+55 16) 6333271. e-mail: tite@eerp.usp.br

This study analyzed how undergraduate courses taught at Brazilian Nursing Schools (NS) in 2004 approach practical tuberculosis teaching. 64 out of 111 sent questionnaires were answered. Data were compiled in a worksheet (Excel and SPSS).

Results: At 42.2% of the NS, the preceptorship corresponded to between 10 and 20 hours, including activities in Tuberculosis Control Programs, which were carried out at Basic Health Units (78.1%) and in the Family Health Program (70.3%). In 29.7% of the schools, this type of preceptorship was optional. The following practical activities were developed in practical TB teaching: nursing consultations (82.8%), home visits (81.3%) and Supervised Treatment (71.9%) or Directly Observed Tuberculosis Therapy (DOTS). 48% of the faculty who responded mentioned they update their knowledge for tuberculosis teaching through internet, courses, seminars, symposia and congresses.

Conclusion: TB teaching at NS in Brazil has been following a decentralization process, tending towards primary health care services and giving priority to the DOTS strategy. Practical TB teaching is optional in one third of NS in Brazil, which occupies the 15th place in the ranking of countries with the highest disease burden.

PS-1315-20 The approach of theoretical tuberculosis teaching in nursing schools, Brazil, 2004

T C S Villa,^{1,2} M E F Brunello,¹ D R Firmino,¹ R L P Andrade,¹ M F Oliveira.¹ ¹College of Nursing, University of São Paulo at Ribeirão Preto (USP), Ribeirão Preto, São Paulo, ²Coordinator of TB Operational Research Area of Brazilian TB Research Network, Ribeirão Preto, São Paulo, Brazil. Fax: (+55 16) 6333271. e-mail: tite@eerp.usp.br

This study analyzed how undergraduate courses taught at Brazilian Nursing Schools (NS) approach theoretical teaching about tuberculosis. 111 out of 347 sent questionnaires were answered. Data were compiled in a worksheet (Excel and SPSS).

Results: At 60% of the NS, theoretical teaching on tuberculosis corresponded to between 10 and 20 hours. The teaching methods used for approaching the theme were ex cathedra classes (91.9%), reproducing a vertical and teacher-centered way of teaching. These contents were offered in subjects on Public Health (83.8%) and Epidemiology (58.6%), with professionals from Tuberculosis Control Programs participating in teaching in 64% of the cases.

Conclusion: A small number of hours are aimed at tuberculosis teaching at undergraduate level and teaching is based on vertical knowledge transmission and teacher-oriented, instead of a student-based learning strategy. There is a predominance of the biological view and treatment/prevention standards and techniques, leaving little room for a humanistic and social view. Only 57% mentioned dealing with management aspects, in a health system in which the municipal and local health team bears this responsibility.

PS-1322-20 Using a targeted education and communication campaign to recruit subjects for the isoniazid preventive therapy trial in Botswana

B Ndebele,¹ B Mosimaneotsile,¹ M Fraire,² E Kalayil,² S McCoy,² R Bess,² W Walton,² O Motsamai,³ P H Kilmarx,^{1,4} C D Wells,² T Samandari.^{1,2} ¹BOTUSA Project, Gaborone, Botswana; ²Division of Tuberculosis Elimination, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA; ³National Tuberculosis Programme, Ministry of Health, Gaborone, Botswana; ⁴Global AIDS Program, CDC, Atlanta, Georgia, USA. Fax: (+267) 3181697. e-mail: tts0@cdc.gov

Background: Targeted EC strategies are critical to successful recruitment of participants into clinical trials. The screening goal of the Botswana IPT clinical trial was 504 participants by March 31, 2005.

Methods: EC materials were developed using the Stages of Change construct of the Transtheoretical Model (TTM), a behavioral theory framework. EC materials were targeted toward potential study participants and health care providers (HCP). Between January–March, 600 posters were placed at local clinics, schools, traditional council and non-governmental organization offices. HCP received 250 buttons and

200 fact sheets while 11 000 pamphlets were distributed at clinics and businesses. Seventy educational health talks were given to potential subjects and HCP at various venues, including clinics and voluntary counseling and testing centers (VCTs). Nurses pre-screened and then screened potential study participants at 7 local clinics.

Results: By March 25 nurses pre-screened 857 and screened 493 participants, achieving 98% of the screening goal. Referral sources were local clinics (51%) and VCTs (34%) among 478 screened participants.

Conclusion: Health talks and distribution of TTM-based print materials at local clinics and VCTs contributed to meeting the goal of participants screened. Further observation is required for an assessment of the EC campaign efforts as they apply to retention.

PS-1358-20 Training on data management and supervision technique in the revised national tuberculosis control programme in Orissa, India

D N Naik, A D Muynck. Tuberculosis; DANTB, Bhubaneswar, Orissa, India. Fax: (+91) 6742550896. e-mail: dnnaik@dantb.org

Background: HMIS contributes to successful implementation of RNTCP by ensuring that data generated from internal and external sources is converted into useful information, evaluated, and communicated in an appropriate form to various stakeholders. To improve the effectiveness of the programme, an intensive training course on RNTCP data management and supervision technique is being organized for all midlevel TB officers in the State.

Objective: The course aims at capacity building on data management and supervision techniques and providing tools for analyzing and evaluating the health related data generated from the field and convert it into relevant information.

Methodology: The course consists of 3 modules, each of 5 days duration with 2 intermodular periods for the field work. Each module:

- Teaches theoretical concepts necessary to build up an understanding of data acquisition, verification, analysis and interpretation.
- Emphasizes on practical exercises derived and devised from the daily RNTCP experience.

Training methodology is based on adult learning principles.

Target group: District TB Officers, Medical Officer-TB units, RNTCP- MOs from all 30 districts of the State and faculty members from Medical Colleges of the state & State TB Demonstration and Training Centre.

Results: Results & achievements will be presented during the Conference.

PS-1368-20 Cured TB patients as DOT providers in Orissa, India: a strategic review and potential explorations for programme enhancement

S Raye,¹ A K Nayak,¹ D N Nayak.² ¹IEC Consultant, DANTB, Bhubaneswar, Orissa, ²Monitoring Officer, State TB Cell, Bhubaneswar, Orissa, India. Fax: (+91) 6742550896. e-mail: santa@dantb.org

Background: RNTCP (Revised National Tuberculosis Control Programme) started in Orissa in 1997 and gradually expanded to cover the 38 million people of the whole State by 2004. Directly Observed Treatment is a key element of the TB control program in the State. Till date 28 000 DOT Providers (DPs) have been trained. The training programme lasts for 6 hours. The DPs belong to various streams viz. medical system, grassroots workers and volunteers who are not employed by the Health or Social Welfare Departments. Amongst the latter group cured TB patients constitute a sizeable fraction. (130 out of a total of over 28 000). It is seen that these cured patients are extremely well motivated and responsible towards their duties as DP. The TB patients also respond very positively to these DPs

Objective: To assess and evaluate the performance of cured TB patients as DOT providers and explore its potential for further enhancement of the programme.

Results: The overall performance of cured TB patients as DPs is very much positive. The performance assessment of these DPs will be presented at the Conference.

PS-1453-20 Integrated training center for penitentiary system of Kazakhstan

Z H Zhandauletova,¹ A A Trusov,² Z I Ni,³ L V Kartashova,⁴ M M Mahmatov,³ A K Toktabayanov.³ ¹Project HOPE, New York, New York, USA; ²Project HOPE, Almaty, Kazakhstan; ³Project HOPE, Almaty, ⁴Ministry of Justice, Karaganda, Kazakhstan. Fax: (+7 327) 2686680. e-mail: zzhandauletova@projecthope.kz

Introduction: The 2002/03 Prisons TB program focused on results achieved through cohort analysis of case finding and outcomes. This demonstrated that improved management and technical practices, better training and standardized procedures of program implementation caused significant improvement to the poor outcomes previously achieved. In 2004 the program showed sustainability of results achieved with the trend of increasing smear conversion and cure rates among new SS+ TB cases.

Methods: Penitentiary Coordinators used cohort data analysis to develop recommendations to improve practices. A program to prepare patients for release reduced defaulters among ex-prisoners. Algorithms for patient transfer and continuity indicators (percentage of patients reregistered in civil health sector) were also developed. Lab services, clinical care, statistical systems and drug supply were monitored with

the use of check-lists to improve standardization. Training curriculum for TB control in the penitentiary system was developed and specialists trained.

Results: A Center of Integrated Training in the penitentiary system will be used to disseminate good practices about prisons TB control. The team of penitentiary system coordinators skilled in interactive teaching methods will teach other TB specialists from prisons. Representatives from Kyrgyzstan's MOJ and MOH have already been trained in the Center.

PS-1500-20 Will TB case notification in the community be improved by providing free sputum microscopy to private practitioners?

J A Khan, S F Hussain, A Zaki, M Irfan. Pulmonary Section, Aga Khan University Hospital, Karachi, Pakistan. Fax: (+92) 21 4934294. e-mail: javaid.khan@aku.edu

Setting: A densely populated area of Karachi, Pakistan. **Objective:** To assess the impact of providing free sputum microscopy services to private practitioners in case notification to the National Tuberculosis (TB) control program.

Methods: A pre-tested questionnaire was administered to all the practitioners working in the designated area. In the first three months, practitioners were asked to fill TB notification cards and their response recorded. An incentive was then provided to the practitioners for the next three months in the form of free sputum microscopy. They were asked to fill sputum microscopy referral forms for this period.

Results: A total of 103 practitioners participated in the study. Provision of free sputum microscopy did not improve TB notification rate in the community. Half of the practitioners felt that provision of sputum microscopy facility alone was not enough and it should be supplemented with free chest radiograph and blood tests. Severe deficiencies existed in the diagnosis and treatment of TB by practitioners. Sputum microscopy was employed less often than chest radiograph and tuberculin test in the diagnosis of TB. Only 23% of patients were referred to a government TB center and only 22% practitioners kept a record of their TB patients.

Conclusion: Practitioners in Pakistan generally do not rely on sputum for diagnosis of TB. Provision of free microscopy did not lead to an improvement in TB case notification by private practitioners. Strategies for public-private collaboration in TB control are necessary and should take into account the practices of private practitioners.

PS-1621-20 Development of training manual and course for TB infection control in Lima, PerúJ Creswell,¹ P Jensen,¹ M Yagui,² N DeLuca,¹ R Canales.³¹Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ²Instituto Nacional de Salud, Lima, ³Ministry of Health, Lima, Peru. Fax: (+1) 404-639-8960. e-mail: zup7@cdc.gov

Introduction: The Education, Training, Communications, and Advocacy Workgroup of the PARTNERS TB Control Program produced a manual and a 2-week train-the-trainers course for health care workers (HCWs) on TB and MDR-TB infection control theory and practices.

Methods: A systematic health education process was used. The need for infection control training for HCWs was identified through a formal needs assessment. Content and design were validated by HCWs in Peru. Materials were field tested with HCWs during two pilot courses in Lima and revised based on field test results and feedback from expert panel review.

Results: An infection control training manual and course were developed, 77 HCWs were trained, and eight infection control interventions are being funded from proposals generated by course participants. One thousand copies of the manuals will be printed and distributed, and additional courses are planned.

Conclusions: Extensive formative evaluation provided valuable feedback, enhanced the usefulness of the materials, and increased acceptability among the target audience. In developing effective training materials it is essential to follow a systematic approach that identifies gaps, includes the target audience in the development process, enables collaboration, and provides a structure for monitoring and evaluation.

PS-1636-20 Analysis of international usage of the TB Education and Training Resources Website

A R Khan, G Benenson, D Peebles, N DeLuca. Division of Tuberculosis Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+1) 404-639-8960. e-mail: arkhan@cdc.gov

Introduction: Launched October 2003, the TB Education and Training Resources Website (www.findtbresources.org) features a searchable database of TB education and training resources from national and international organizations. Marketing efforts have been employed to increase awareness and use of the website. An analysis was conducted to determine international use of the site.

Methods: The number and type of non-U.S. produced materials included in the database were assessed. In addition, WebTrends data were analyzed to determine the number of visits to the website and user location. An analysis of the marketing activities targeted to international audiences was also conducted.

Results: Analysis of WebTrends data indicates that the website's audience is both domestic and interna-

tional; however, most users are from the United States. Most resources included in the database are produced in the United States with an emphasis on marketing targeted towards U.S. audiences.

Conclusions: Marketing efforts have resulted in an overall increase in usage and awareness of the website. To increase international use of the website, marketing efforts must be expanded to international audiences, and more international resources should be added to the searchable database.

PS-1648-20 Adapting a 3-day patient-provider communication and case management TB course into a 3-hour training session for health care workers

D Peebles, A Khan, E Kalayil, N DeLuca. Division of Tuberculosis Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+1) 404-639-8960. e-mail: bcx8@cdc.gov

Introduction: 'Lost and Found: The Case of Mr. Norwood' is a video that highlights the effect that health care workers' communication and case management skills have on patient adherence. The original course included a video, facilitator's guide, worksheets, and group activities. Participant feedback indicated a need for more condensed course instruction due to provider time and schedule constraints. CDC DTBE is revising the 3-day course into a 3-hour training session.

Methods: An expert panel reviewed the original course materials and suggested revisions. Literature and material reviews were conducted to supplement previous course documentation. Formative evaluation to develop the viewer's guide will include pretest content, format, and design.

Results: Revisions that incorporated expert panel recommendations and field tests were made. The 3-day course was adapted to a 3-hour training session. The training session includes a video and a viewer's guide with group activities on communication and case management skills. Emphasis was placed on assessment of the guide's utility and effectiveness in conjunction with the video.

Conclusions: Existing materials can be modified to meet the changing needs of a target audience. It is essential to follow a systematic approach that includes testing and evaluation to ensure that materials are effective and appropriate.

PS-1724-20 Improving tuberculosis management through pre service TB training of medical doctors in Zambia

L Zulu,¹ L Kafwabulula,¹ B R Tembwe.² ¹National TB Program CBoH, Zambia; ²Chest Diseases Laboratory, National TB Program CBoH, Lusaka, Zambia. Fax: (+260) 1253173. e-mail: lucy_zulu@yahoo.com

Tuberculosis is one of the major public health problems in Zambia. Most curricula of health training either does not have or has an inadequate component of TB management. The National Tuberculosis program in Zambia has taken an innovative way of addressing the management of TB by training medical doctors in proper TB management at the pre service stage. A curriculum focusing on the five components of DOTS has been developed. The topics being covered include TB detection, TB patient treatment drugs and supplies management monitoring of TB case detection etc. The training is being provided to these professionals prior to their induction. The first training was held last year and the second one was held in March this year trained are being followed up and the preliminary outcomes will be discussed. After evaluation this training will be given to all medical professionals at the pre service stage.

PS-2000-20 DOTS implanting in Lithuania: patient training

V G Gajauskiene. Hospital for Tuberculosis and Lung Diseases, Siauliai, Lithuania. Fax: (+370) 41520733. e-mail: tub.lig@splius.lt

Aim: To help patients understand the need to be cured from tuberculosis (TB).

Methods:

- 1 Talks, discussions (individual and group work).
- 2 Tests
- 3 Audiovisual training.
- 4 Practical activities.
- 5 Combined teaching.

Patients are divided into several groups:

- Patients who have some knowledge about TB disease.
- Patients who refuse treatment and are not interested in their disease.
- Children.

Every group has different training methods.

Results: Patient's training instructor organizes discussions and training courses daily. Patients learn more about tuberculosis, transmission ways and treatment. They become more motivated for treatment. Knowledge about tuberculosis helps them to evaluate their situation better. They begin to collaborate with medical staff in contact tracing.

Conclusions: Good results are seen in active patients training in DOT in Siauliai. In 2004, 87% TB patients ended treatment. The number of patients, who interrupted treatment decreased: from 7% to 1.5%.

The job of patients training instructor and social worker together with medical team was confirmed. But in spite all attempts some patients disappeared. Very important tasks are:

- communication and confidence between patient and medical staff in their first meeting.
- support and attitude to those who refuse treatment.

POLICY AND PROGRAMME IMPLEMENTATION

PS-1449-20 Treatment outcome of tuberculosis quality program by national payment system: Taiwan experience

Y C Wu, H S Kuo, S L Yang. Center for Disease Control, Taipei, Taiwan, China. Fax: (+886) 223920132. e-mail: wuyj@cdc.gov.tw

Objectives: Tuberculosis is the major notifiable communicable diseases in Taiwan. The Center for Disease Control (CDC) and Bureau of National Health Insurance cooperate to launch the NHI TB Quality Program since 2004. The study is to evaluate the outcome of this program on tuberculosis control.

Methods: 3189 pulmonary tuberculosis patients were enrolled in the study after exclusion patients who did not reach in the twelve month cohort since 2004. Treatment outcome was used to evaluate the difference between 1082 patients covered / 2107 patients uncovered by NHI TB program.

Results: The mean age of patients was 60.6 ± 20.1 year-old and the major gender was male (70.9%). The treatment outcome between covered and uncovered patients were as below: 12 month treatment success rate was 74.5% vs. 62.1% ($P < 0.001$) and mortality rate was 9.5% vs. 25.1% ($P < 0.001$). The covered patients had the better results than uncovered patients.

Discussion: This is a new start of collaboration for public health efforts and medical service. It also could be a good model for TB control in future.

PS-1457-20 Hospitalizing tuberculosis cases in dedicated regional wards in Israel

D Chemtob,¹ M Lidji,² Z Eliel,³ S Scherman,¹ A Leventhal.⁴ ¹Department of Tuberculosis & AIDS, Public Health Services, Ministry of Health, Jerusalem, ²Pulmonary Department, Shmuel HaRofo Hospital, Beer Yaakov, ³Department of Tuberculosis, Ziv Hospital, Safed, ⁴Public Health Services, Ministry of Health, Jerusalem, Israel. Fax: (+972 2) 6725568. e-mail: daniel.chemtob@moh.health.gov.il

Background: As part of the Israeli Tuberculosis (TB) Control Program, it was decided to hospitalize TB patients in only two regional TB wards.

Aim: To analyze medical and social characteristics of hospitalized TB patients in order to evaluate their specific needs.

Methods: Medical and social files from all TB patients hospitalized during 2000–2001 were analysed. **Results:** In Beer Yaakov (BY) and in Safed hospitals, 302 patients and 34 patients were hospitalized (40 beds and 9 beds, respectively). Male/Female ratio was higher than 2. In average, men were in their fifties. Length of hospitalization was almost similar in both wards (mean = 72 days; SD = 59.3 days in BY and 74.7 days in Safed), but longer for MDR. Almost exclusively pulmonary cases were hospitalized, and some 30% had received a prior treatment. More than 80% were culture positive, and MDR was found in 25%. Intravenous drug users accounted for 8% in BY and for 15% in Safed. AIDS cases for 9% and 6%, respectively.

Conclusions: Despite the new Israeli TB Control Program, some 30% of incident cases were still hospitalized as part of their treatment. It was decided to further improve the social services provided before & during hospitalization.

PS-1276-20 L'évolution de la stratégie de lutte contre la tuberculose en Nouvelle Calédonie de 1992 à 2005

M-P Favory, I Lachard. ESPAS-CMP Province Sud, Noumea, New Caledonia. Fax: (+687) 285528. e-mail: mapyfavory@lagoon.nc

La Nouvelle Calédonie (NC) est un pays français d'Outre mer de la région océanienne connaissant une incidence de la tuberculose dix fois supérieure à celle des pays industrialisés. Un programme de lutte anti-tuberculeux a été élaboré en 1992 fixant la priorité sur les enquêtes à la recherche de contaminateurs et d'infectés (il semblait acquis à l'ensemble des acteurs que les traitements étaient achevés à 85%). Suite à une évaluation épidémiologique, ce programme a été modifié en Stratégie de Lutte Anti-Tuberculose (SLAT) en 1999 intégrant des recommandations des organismes internationaux. Dès lors, la surveillance du traitement devient une priorité devant les enquêtes. En 2005, ces objectifs sont toujours d'actualité. Quelle en sera l'évolution ? Le centre de référence de la Province Sud, l'ESPAS-CMP gère la coordination et l'application de cette stratégie auprès des différents acteurs de la lutte anti-tuberculose. A travers le poster, nous vous présenterons l'organisation de la SLAT actuelle en NC avec ses points forts et ses difficultés qui feront l'objet d'une évaluation pour un éventuel recentrage des objectifs. Cette évaluation s'efforcera d'être une évaluation d'impact et de processus grâce au fichier provincial en cours de saisie.

PS-1316-20 Control analysis of tuberculosis contact investigation in a health service in a large municipality in southeast Brazil, 2002

C E Gazetta,¹ J M P Neto,² S H F Vendramini,¹ A Ruffino Netto,^{3,4} M R C O Cury,⁵ T C S Villa.^{6,7} ¹Medical School at São José do Rio Preto, São José do Rio Preto, São Paulo, ²College of Nursing at Fernandópolis, Fernandópolis, São Paulo, ³Medical School, University of São Paulo at Ribeirão Preto (USP), São Paulo, ⁴Vice-Coordinator of Brazilian TB Research Network, Ribeirão Preto, São Paulo, ⁵Coordinator Tuberculosis Control Program at São José do Rio Preto, São José do Rio Preto, São Paulo, ⁶College of Nursing, University of São Paulo at Ribeirão Preto (USP), Ribeirão Preto, São Paulo, ⁷Coordinator of TB Operational Research Area of Brazilian TB research network, Ribeirão Preto, São Paulo, Brazil. Fax: (+55 16) 6333271. e-mail: cgazetta@uol.com.br

Descriptive study performed in the municipality of São José do Rio Preto, SP. Secondary data of the Information System of Tuberculosis Notification in 2002, a total of 166 in-home tuberculosis contact investigations, 82 males and 84, females, the age group of 15 to 59 years (70%), 42 (25.3%) were between 0 to 19 years, 73 (44%) were in the age group of 20 to 49 years and 44 (25.5%) were 50 years or over. In the familial relationship, 41 (24.7%) were children; 29 (17.5%) were partners; 22 (13.2%) were brothers/sisters and 15 (9.1%) were mothers. The required tests and examinations, 12% had bacilluscopy and/or culture, 100% thorax radiography; out of these, 2 were susceptible of pulmonary tuberculosis, and 5 other disorders. The examined contacts, 3 (1.8%) had the disease detected. The service organization showed that there is not a systematization in relation to the monitoring control of contacts of tuberculosis patients. It is considered a challenge for program managers of the municipality to adopt some intervention strategies which can improve the quality of services for the community, consequently, the decentralization of both some care action and the information system from the program to the Health Basic Units may be effective in relation to these control actions and the development of monitoring strategies by means of systematized protocols.

PS-1319-20 Implementation and expansion of a computerised tuberculosis (TB) register in Tanzania, 2001–2004

M Naicker,¹ S M Egwaga,² E Nkiligi,² P Vranken,¹ P H Kilmarx,^{1,3} T Samandari,^{1,4} C D Wells.⁴ ¹BOTUSA Project, Gaborone, Botswana; ²National TB and Leprosy Programme, Ministry of Health, Dar-es-Salaam, Tanzania; ³Global AIDS Program, and ⁴Division of TB Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+267) 3181697. e-mail: tts0@cdc.gov

Background: Tanzania, a high TB-burden country, reported 180 cases per 100 000 population, 80% treatment success for new cases, and 46% HIV prevalence among TB patients in 2003. Provision of accurate data and tools for surveillance, program manage-

ment, and control has therefore become increasingly essential.

Methods: EpiInfo Electronic TB Register (ETR) v.2.2 was developed by the BOTUSA Project (CDC) for TB control and introduced in resource-limited countries.

Results: In May 2001 the ETR was implemented in Iringa and Shinyanga regions after regional and district TB coordinators previously inexperienced with computers attended a 5-day training course. The software was installed on existing computers in each district. ETR was subsequently rolled out to the remaining 108 districts on a quarterly basis. By July 2004 ETR completely replaced manual compilation countrywide. District TB coordinators enter data, maintain the database, and produce case-finding and treatment outcome cohort reports. ETR is now an integral management and surveillance tool in Tanzania.

Conclusions: Factors critical for successful ETR implementation include political commitment; DOTS strategy in place, a well-functioning paper-based recording system; adequate human resources; and appropriate equipment with training and support. Future efforts include evaluation of data quality and system performance.

PS-1379-20 Quality of health for tuberculosis suspect and patients and its relation to case detection Egypt

W B Nabil. NTP Egypt, Cairo, Egypt. Fax: (+20) 7921079. e-mail: nabilawahib@yahoo.com

The study was a case control study done in Cairo governorate as low case detection surrogate (51%) and Alexandria governorate as high case detection surrogate (78%) to evaluate the quality care of health in both governorate as regard the case detection. The study enrolled in all chest clinics (18) in Cairo (11) Alex (7), 3 PHCs random selected for every clinic (54) in total and the suspect register was introduced, the study was done at the last quarter of 2004, data collecting form of quality indicator was designed followed the international parameters designed for TB, the data analysed through score summation.

Results: (preliminary results) Significant difference better in Alex in the use of infection control measures, QA of pharmacy, employee health programme, reporting, recording system also significant difference better in Alex in asking suspect to do 3 successive sputum sample and justification in clear language, important sig in contact investigation, inform patient of treatment adherence and DOTS.

Conclusion: Rectify the identified gaps, strengthening supervision, introduce the QA system, introduce the suspect register.

PS-1406-20 Tuberculosis (TB) in a large county of Southeastern Brazil, 1985–2004

S H F Vendramini,^{1,2} A Ruffino Netto,^{3,4} F G Kuyumjian,² M R C O Cury,⁵ C E Gazetta,^{1,2} F Chiaravalloti Neto,² J C Figueiredo,⁶ T C S Villa.^{1,7} ¹College of Nursing, University of São Paulo at Ribeirão Preto (USP), Ribeirão Preto, São Paulo, ²Medical School at São José do Rio Preto, São José do Rio Preto, São Paulo, ³Medical School, University of São Paulo at Ribeirão Preto (USP), Ribeirão Preto, São Paulo, ⁴Vice-Coordinator of Brazilian TB Research Network, Ribeirão Preto, São Paulo, ⁵Coordinator Tuberculosis control program at São José do Rio Preto, São José do Rio Preto, São Paulo, ⁶College of Nursing at São José do Rio Preto -UNIP, São José do Rio Preto, São Paulo, ⁷Coordinator of TB Operational Research Area of Brazilian TB research network, Ribeirão Preto, São Paulo, Brazil. Fax: (+55 16) 6333271. e-mail: silviave@eerp.usp.br

Objective: To analyze the morbidity and mortality rates for TB São José do Rio Preto since 1985 the 2004, comparing them with those of São Paulo State and Brazil.

Methods: Information Systems data: Tuberculosis Notification, National Information System of Notifiable Diseases and Mortality Information. Coefficients were standardized for the population of São Paulo state in 2002.

Results: Risk of getting TB was initially higher Brazil than São Paulo State during year of 1985, reaching similar values in during 2003. Risk of getting TB was lower in the county population than it was in relation to State and Federal population. According to the age groups, the incidence rate in the county of São Paulo presented a trend of increasing risk among those in those with 50 years old and higher.

Conclusion: Incidence rate indicates the risk of getting TB in the county of São Paulo is about half of the risk of getting TB in São Paulo State and Brazil. The 50-year old age group presented a higher outcome than that in State and Federal levels. Data emphasize the necessity of clinical, social, and epidemiologic dimension analysis in the context of life conditions, education, organization health care, and the Tuberculosis Control Program in order to explain the differences of morbidity and mortality rates for TB, and the burden of tuberculosis in the county.

PS-1515-20 Study of contacts of persons with newly diagnosed tuberculosis in Galicia, Spain between 1996 and 2003.

E Cruz-Ferro,¹ E Fernández-Nogueira,¹ A Penas-Truque,² D Díaz-Cabanela,³ L Anibarro-García,⁴ R Vázquez-Gallardo.⁵

¹Directorate General for Public Health of the Galician Government Health Department, Santiago de Compostela - A Coruña, Galicia, ²Unidad de Tuberculosis, Complejo Hospitalario Xeral-Calde, Lugo, Galicia, ³Unidad de Tuberculosis, Complejo Hospitalario Universitario de A Coruña, A Coruña, Galicia, ⁴Unidad de Tuberculosis, Complejo Hospitalario de Pontevedra, Pontevedra, Galicia, ⁵Unidad de Tuberculosis, Complejo Hospitalario Universitario de Vigo, Vigo - Pontevedra, Galicia, Spain. Fax: (+34) 981542970. e-mail: elena.cruz.ferro@sergas.es

The study of contacts is an important activity of any Plan for TB Prevention.

Objectives: To analyze the degree of fulfilment of the goals established in Galicia:

- 1 To study 70% of the closed contacts of a bacilliferous case.
- 2 To assure the correct adhesion to the preventive therapy in 60% of cases.

Methods: A census of contacts of TB cases was established. Data of clinical status and follow-up were analysed.

Results: Number of studied contacts: 10 275; 7996; 10 422; 9758; 12 453; 12 019; 11 661 and 13 399 in 1996–2003 respectively. At least, a contact was studied in: 56.26%; 61.58%; 63.92%; 72.34%; 70.93%; 75.23%; 82.00% and 82.72% of the bacilliferous cases in 1996–2003 respectively. 30.57%; 37.39%; 35.77%; 35.03%; 28.18%; 33.41%; 36.09% and 31.05% of them was considered to be infected (tuberculin reaction ≥ 5 mm). Satisfactory results of the treatments of the tubercular infection was: 49.12%; 55.23%; 52.77%; 51.24%; 59.08%, 52.73% and 56.54% in 1996–2002.

Conclusions:

- 1 There is studied a great number of contacts of tubercular patients every year.
- 2 We consider necessary to give priority to the study of contacts of bacilliferous cases.
- 3 Correct adherence to preventive therapy was lower than expected.

PS-1653-20 'Walking to excellence': Mexican strategy for performance evaluation of the national program of tuberculosis

E Ferreira, A Cruz, A Hernandez. Mexican National Tuberculosis Program, Mexico City, DF, Mexico. Fax: (+52) 5526146436. e-mail: micobacteriosis@salud.gob.mx

Mexico, based on the factors that influence the result of the actions against tuberculosis, improved operative strategies aiming to diminish the epidemic: human development, surveillance system, strategic alliances, and social mobilization. But, it was imperative to evaluate the performance, formerly done by

empirical knowledge. The strategy 'walking to excellence' was developed.

Objectives: To have a tool for measurement of achievements from operational activities by indicators of the NTP. To identify opportunity areas to correct deviations.

Methodology: Experts meetings, development of analytic proposal, review and selection of indicators (detection coverage, opportune diagnosis, cure, adequate follow up and laboratory productivity), from the official information systems. Premises: The indicator had a formal source to identify performance: health services, cases nominal, cases numeric, deaths and. Using a vectorial mathematic approach we constructed indexes for speed of change, comparison between years, and advancement in indicators. Analysis for a particular region (s), time limits or selected indicator (s) can be applied.

Results: National diffusion by quarterly bulletin, without cost. State/personal acknowledge for best performances. Bigger political and technical commitment, competition between the operative areas, bigger involvement from the tuberculosis related areas, opportune interventions, capacitated personnel, and DOTS strengthening.

PS-1783-20 Measures to improve data quality in the national TB recording and reporting system, South Africa

C D Idema,¹ W L Coggin.^{1,2} ¹National TB Control Programme, Pretoria, ²Centres for Disease Control-SA, Pretoria, South Africa. Fax: (+27) 012 312 3121. e-mail: IdemaC@health.gov.za

Methods: In 2003, the National TB Control Programme (NTCP) undertook to redesign the Electronic TB Register (ETR). This effort aimed to move the system from DOS-based EpiInfo platform to a more robust, user-friendly Windows (VB.Net) environment and, at the same time, implement tools to improve data quality and use.

Features include:

- 1 Automated generation of standard cohort reports using algorithms reflecting NTCP guidelines.
- 2 On-screen alerts of discrepancies between user-entered and system-generated outcomes.
- 3 Programme management listings:
 - a Patients 'Not evaluated' at the end of treatment,
 - b Patients with 'Mis-matched outcomes' where user-entered outcomes do not meet programme algorithms/guidelines.
- 4 To qualify for outcome evaluation, patients must complete ≥ 5 months treatment (new) or ≥ 7 months (re-treatment)

Findings/Results:

- 1 This application (ETR.Net) has been implemented throughout South Africa.

- 2 Although treatment success appears to decrease in many areas, this reflects previous incorrectly entered outcomes (e.g., patients entered as cured/completed with insufficient treatment duration).
- 3 Coordinators are encouraged to use these features to improve data quality and use at sub-district level.
- 4 Operations research is being undertaken to better understand the reasons for missing data.

Conclusion: ETR.Net is a useful tool to monitor data quality in the process of improving TB programme management.

PS-1931-20 Main directions of the work of a WHO Collaborating Center for tuberculosis in Russia

V V Erokhin, V I Golyshevskaya, E V Putova. Central TB Research Institute, Moscow, Russian Federation.
Fax: (+7) 95 9638000. e-mail: citramn@online.ru

TB situation in Russia is still complicated: the 2003 TB incidence reached 83.2 and mortality – 21.7 per 100 000 population. Particularly severe TB situation is observed in penal institutions, where TB rates are many times higher than in the civil sector. A WHO Collaborating Center for tuberculosis was established in Russia in 1998. Its main tasks are the support of Health Care Units in the implementation of the WHO-recommended TB control Programme, training of staff, improvement of laboratory services, monitoring and supervision of drug-susceptibility testing of *M. tuberculosis*. With financial support from several foreign and international organizations, 3680 doctors were trained in Training Center of the WHO Collaborating Center for tuberculosis during 1998–2003. The WHO Collaborating Center for tuberculosis supported territories of Russia in the implementation of regional TB Control Projects (DOTS Programmes in Vladimir, Ivanovo, Orel, Saratov and other oblasts). 1500 *M. tuberculosis* strains from different regions of Russia were analyzed. Collection of *M. tuberculosis* strains was established as well as a database for it. Joint work with the WHO and regions resulted in better quality of bacteriological examinations and better treatment efficacy, which is higher than average Russian one.

PS-2134-20 The use of a TB sputum register can reduce the number of initial defaulters

E Botha,¹ C E Marsh,¹ J F Coetzee,² S Verver,³ D Enarson,⁴ N Beyers.¹ ¹Department of Pediatrics and Child Health, Stellenbosch University, Cape Town, ²Department of Personal Health, Local Government, Stellenbosch, South Africa; ³KNCV Tuberculosis Foundation, The Hague, The Netherlands; ⁴International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+27) 21 938 9138.
e-mail: ebotha@sun.ac.za

Background: Many countries have introduced a TB sputum (laboratory) register but few have evaluated its value.

Objectives: To determine whether the introduction of a TB sputum register will reduce the number of initial defaulters.

Methods: A TB sputum register was introduced in all 13 clinics and 2 hospitals of the Stellenbosch district, covering urban and rural areas in the Western Cape Province, South Africa. All clinics had TB treatment registers. Each smear positive suspect was traced in the TB treatment register of the same and other clinics within the district. Suspects diagnosed in the hospital were discharged to be recorded in the clinic TB treatment registers.

Results: During the first two quarters, the 13 clinics and 2 hospitals, registered 1754 suspects. The proportion smear positive suspects varied between 4% (2/53) and 27% (7/26), averaging 13% (230/1754). Of the 230 smear positive cases, 212 (92%) were recorded in the treatment registers. The proportion smear positive suspects recorded in TB treatment registers varied between 81% (hospital) - 100% (6 clinics). The proportion initial defaulters decreased from 11% (13/122) in the 1st quarter to 5% (5/108) in the 2nd quarter (OR 0.41 95% CI 0.12–1.28). Among the 18 initial defaulters, 1 had died before recording in treatment register, 1 was known to have moved out the clinic service area, and 16 could not be traced.

Conclusions: The TB sputum register assisted in reducing the number of initial defaulters. For hospitals additional interventions are needed.

PS-2143-20 Amount of supervision needed for proper use of a TB sputum register

C E Marsh,¹ E Botha,¹ J F Coetzee,² S Verver,³ D Enarson,⁴ N Beyers.¹ ¹Department of Pediatrics and Child Health, Stellenbosch University, Cape Town, ²Department of Personal Health, Local Government, Stellenbosch, South Africa; ³KNCV Tuberculosis Foundation, The Hague, The Netherlands; ⁴International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+27) 21 938 9138.
e-mail: ebotha@sun.ac.za

Background: TB treatment registers document TB cases on treatment, but reliable information on number of TB suspects, number of TB sputum samples sent and results are difficult to find. In request of National TB Program a TB sputum-register was introduced with the aim of assessing whether the use of such a register can reduce the number of initial defaulters (see abstract ref nr 2134) and to document the amount of training time required achieving proper use of a TB sputum-register.

Methods: A TB sputum-register was introduced in 1 district (13 clinics and 2 hospitals). Training was followed by regular visits, documenting completeness of records and providing monthly feedback to clinic personnel. Accurate logbook of time was kept.

Results: Personnel attended a 2 hour training session before new sputum-register was introduced. The average supervision time was 19hrs/month, excluding

travel time. Nine months after introduction of the sputum register, 4 registers had 5% or less error, 15 had 10–60% error and 3 registers had 61–100%.

Conclusions: The successful implementation of a TB sputum register requires commitment of time and understanding of such a management tool by clinic staff and supervisor.

PS-2169-20 TB surveillance system by internet: first report

L A R Santos,¹ V M N Galesi,¹ M M B Leorati.² ¹Secretary of Health, São Paulo State - Brazil, São Paulo, ²PRODESP - Data process Company of São Paulo State, São Paulo, Brazil. Fax: (+55) 11 30822772. e-mail: lasantos@cve.saude.sp.gov.br

In São Paulo State, Brazil, almost 20 thousand TB cases are notified each year. To improve data quality, we developed an internet-based TB surveillance system using free softwares (Linux, Post-gree, Java), namely TBWEB, now being tested in 3 pilot cities of the state. Database is built on the principle that each patient has a single registry, containing all TB treatment data. Old database, containing all previous registries, can be consulted by health providers also by internet. By analysing patient's data reported elsewhere, a more consistent and complete TB record can be built, avoiding double notification. If the health service cannot access internet, notification forms and relatories to update patients's status are sent by them to the city surveillance team; few of these teams also can't, and an upper level will be encharged of this task. So, treatment's performance can be followed up-to-date, wherever the patient is being treated, improving opportunity of analysis. This surveillance system, if expanded to all the state, can be useful to this big TB case load area, with a complex and decentralized health system, where more then 1500 health services report and treat TB cases.

PS-2170-20 Role of livelihoods programmes in increasing access to TB services

G H Mann,¹ L Sanudi,² F M L Salaniponi,³ S B Squire.¹ ¹EQUI-TB Knowledge Programme, Liverpool School of Tropical Medicine, Liverpool, UK; ²EQUI-TB Knowledge Programme, Lilongwe, ³National Tuberculosis Programme, Lilongwe, Malawi. Fax: (+265) 1 673022. e-mail: gmann@liv.ac.uk

In 1999, the Malawi National TB Programme and its partners initiated a research programme to assess the extent to which the poor have access to TB services. We have previously reported findings from peri-urban populations. More recent work, in rural areas is focussing on understanding the degree to which non-health systems interventions increase access to TB services. Provisional analyses show:

a Provision of food or agricultural inputs are the most accessible livelihoods programmes to rural populations; 45% of respondents had access to

these, but only 20% to training (in agricultural techniques and/or enterprise) or credit services.

- b 18% of households who had accessed food support, credit or training or said these did help them to access TB services.
- c Food support showed greater association with improved access.

Greater understanding is required on why programmes designed to improve livelihoods do not have greater impact on access to health services, particularly when finances seem to be a limiting factor. Issues include:

- Attribution of benefit
- Correlation between access to programmes, improvements in health and declining need for services
- Equity in access to livelihoods programmes
- Impact of livelihoods programmes
- Targeting of livelihoods programmes

PS-2244-20 Efficiency of third serial smear in the diagnosis of sputum-smear positive tuberculosis under routine conditions in Moldova and Uganda

A Katamba,¹ D Laticevschi,² H L Rieder.³ ¹Department of Epidemiology and Biostatistic, Case Western Reserve University, Cleveland, Ohio, USA; ²Tuberculosis/HIV Project Coordination Unit, Chisinau, Moldova; ³Tuberculosis Division, International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+216) 3683970. e-mail: axk95@case.edu

Objective: To provide policy makers with an estimate of the workload to identify one additional case of TB with third sputum smear examination among suspects.

Methods: To determine the prevalence of cases among suspects and the incremental gain from serial smears, we analyzed TB laboratory records from 24 laboratories in Moldova and 30 laboratories in Uganda. The prevalence of cases among 12 555 suspects in Moldova and 27 296 suspects in Uganda was multiplied by the respective incremental gain from the third smear to obtain the fraction of cases found of the 3rd smear only. The reciprocal value of this fraction gives the required number of slides.

Results: Of the suspects, 9.3% (1166) in Moldova and 22.0% (5998) in Uganda were positive on at least one sputum smear. The incremental yield from the 1st, 2nd and 3rd examinations were: 88.0%, 8.2% and 3.9% in Moldova and 88.0%, 10.0% and 2.2% in Uganda. The number of slides to be examined to detect one additional case on a 3rd smear was 273 (95%CI 212–385) in Moldova and 204 (95%CI 174–245) in Uganda.

Conclusion: In Moldova and Uganda, approximately 96% and 97% of cases of pulmonary TB were diagnosed using two sputum smears respectively. A full time working microscopist would require on average 11 days (8 to 15) and 8 days (7 to 9) in Moldova and

Uganda to diagnose one case of TB with a 3rd smear respectively.

PS-2293-20 Critical analysis of factors leading to default among patients on DOTS treatment in urban slum areas under chest & TB clinic SGM Hospital, Mangol Puri, Delhi

S K Arora. Chest & TB, Sanjay Gandhi Memorial Hospital, New Delhi, India. e-mail: dtodlsgm@tbcindia.org

To make DOTS services more patient friendly, more accessible, with decreased default rate & decrease loss of wages of patients & make Medical community receptive to DOTS treatment, the analysis of various factors leading to default was done among 270 defaulted patients which were registered under DOTS in period Jan 2003 to March 2004 & outcome evaluated in Jan 2004 to March 2005 in area of 2 million population having 13 microscopy centres adopting the methodology of interaction with patients, their relatives & neighbour during house visits following a questionnaire of 12 points. On analysis of datas it was found that in 72% cases either the addresses were wrong or patients had shifted the residence in very early phase of treatment, 9% cases died, 4% cases felt inconvenience in terms of time & distance & 3% case found unsatisfactory behaviour of staff and unfriendly atmosphere of centre. Inference drawn was that most patients knew that the DOTS treatment is area based & hence gave wrong addresses for registration for treatment. It also reflected that probably initial address verification was not done properly otherwise these patients could have been referred to their area DOTS centre for treatment & default could have been avoided. Hence DOTS strategy is very effective & practical provided implemented as per guidelines.

DOTS EXPANSION-I

PS-1045-20 Health system lessons from community DOTS in Cambodia

K B Navy,¹ T E Mao,² S In.³ ¹University Research Co.LLC (URC), Phnom Penh, ²National Center for Tuberculosis and Leprosy Control, MOH, Phnom Penh, ³National Center for Tuberculosis and Leprosy Control, MOH, Phnom Penh, Cambodia. Fax: (+855) 023 221 433. e-mail: KBnavy@urc-chs.com

Objectives: To assess what factors and approaches have been the most effective for scaling up C.DOTS in Cambodia

Background: A study of the lessons learned from pilot C.DOTS projects in Cambodia was undertaken in July 2004. While descriptive information was available, pilots had not been analysed to capture information about best practices and lessons for the national

program. This information was needed to finalise the C-DOTS Guidelines and to develop a strategic plan for a scaling up of C.DOTS in the country.

Design: Study of relevant documentation, interviews with major stakeholders and field visits to three provinces where four C-DOTS pilots projects have been currently operational.

Results: All C-DOTS pilots resulted in an increase in TB case detection rate. 29% of patients knew how many sputum controls were required throughout treatment, and 47% had the correct number of sputum checks. All DOT Watchers (DWs) were supportive and motivated to assist patients. Patients were more likely to produce sputums if DW had knowledge about the need for specimens. Health Centre (HC) staff had excellent knowledge about TB control. No alert system exists in any HC to identify patients not collecting drugs or providing sputums. Some HCs were overwhelmed by the sudden rapid increase in patient numbers after introduction of C.DOTS. Documentation was complete in the majority of HC but some HCs lacked information. Quality smears are poor in all ODs.

Conclusion: TB DOTS strategy must be working well at HC level prior to establishing C.DOTS. Quality of smear and laboratory results must be reliable. An alert system should be in place.

PS-1117-20 Role of NGOs in strengthening the referral of chest symptomatic patients, diagnosis and DOTS expansion in metropolis.

G Saha,¹ S Bandyopadhyay,² T Bagchi,¹ M Rahaman.¹

¹Greater Calcutta Leprosy & Tuberculosis Treatment & Health Education Scheme, Kolkata, ²GLRA, Kolkata, West Bengal, India. Fax: (+91) 3322471917. e-mail: dr.gitanjali@vsnl.net

Introduction: Grecales an NGO started its initiative in the field of tuberculosis in the year 1991. Following the global resurgence of tuberculosis the organization started its Revised National Tuberculosis Control Programme DOTS since 1999. Presently Grecales is rendering its service through 7 DOTS centers and 4 Microscopic centers in Kolkata covering a population of 352 091. A study from 1999 to 2004 has been analyzed and reported.

Objective: To establish that DOTS is the breakthrough in Tuberculosis control Programme in India against the unsupervised methodology of treatment.

Method: For case detection: a) sensitization of private medical practitioners; b) awareness in the community through IEC Programme. For Diagnosis: a) Establishment of 2 microscopic centers in a very congested area resulted almost vertical rise in case detection. b) The remaining two centers are established in very renowned Government Hospital. It is a very good example of Public Private Mix as we are exposed to entire number of Chest symptomatic pa-

tients from the out patient department of the crowded Government Hospital.

Conclusion: NGOs Involvement in RNTCP DOTS Programme and Public Private Mix will raise the effectiveness of TB Control Programme in the aspect of patients treatment adherence and population awareness.

Results:

Table Performance of DOTS Centers Under Grecales in Kolkata RNTCP Area

| Year | Pulmonary positive | Pulmonary negative | Pulmonary total | Extra pulmonary | Treatment results for new sputum positive cases | | | | Sputum conversion |
|------|--------------------------|--------------------|-----------------|-----------------|---|--------------|------------|----------------|-------------------|
| | | | | | Cure rate | Failure rate | Death rate | Defaulter rate | |
| 1999 | NSP - 66 Others - 14 | 39 | 119 | 25 | 82% | Nil | Nil | 9% | 95% |
| 2000 | NSP - 77 Others - 19 | 70 | 166 | 29 | 84% | 1% | 7% | 5% | 87% |
| 2001 | NSP - 102 Others - 17 | 74 | 193 | 29 | 85% | 2% | 6% | 2% | 97% |
| 2002 | NSP - 110 Others - 13 | 76 | 199 | 24 | 88% | 2% | 4% | 3% | 93% |
| 2003 | NSP - 108 Others - 24 | 70 | 202 | 28 | 86% | 1% | 4% | 3% | 94% |
| 2004 | NSP - 189 Others - 44 | 85 | 318 | 60 | 86% | 2% | 4% | 5% | 98% |

PS-1144-20 Expansion of urban DOTS in Bangladesh: an experience through operational research

S Saber,¹ Md K A Hyder,¹ M Becx,¹ V Begum.² ¹World Health Organization, Dhaka, ²National TB Control Program, Dhaka, Bangladesh. Fax: (+880) 2 9884656.
e-mail: sabera_s@yahoo.com

Introduction: It is crucial for all National TB Control Program (NTPs) to strengthen and sustain urban DOTS, a complex area of public-private mix.

Objectives: 1) To discuss a successful Operational Research (OR) in expansion and implementation of Directly Observed Treatment, Short Course (DOTS) by identifying critical elements; and 2) to understand and discuss the issues around implementing OR projects and subsequent interventions.

Methods: DOTS implementation in urban areas of Bangladesh through Participatory Action Research (PAR) usually consists of two parties of actors and researcher. Plan of action prepared by both parties and revised quarterly among partners. Bi-annual meetings/workshops accelerated to identify crucial elements and strategies developed to solve those critiques.

Results: During 2004, the number of microscopy centers increased from 63 to 68. The participation of NTP-NGOs increased case detection to 45.4% (2004) compared to results of 2003 (35.8%). The number of smear positive patients diagnosed during 2004 was 5548 as compared to 3805 during 2003. DOTS was expanded among general practitioners through PAR. Results of implementation of DOTS in urban cities of Bangladesh by different providers will be presented and discussed. In other ways, this OR concentrated the development of system of DOTS in urban area of Bangladesh.

Conclusion: TB Control in big cities is complex. Operational Research only could solve issues in net-

working among NTP partners. This consists of implementation team (Public-Private/ NGOs), technical supervisory team (program management team, supervisors public-private/ NGOs) and research team.

PS-1218-20 DOTS strategy expansion for TB control, Province of La Vega, Dominican Republic

L Bido,¹ L Marte,¹ R Cruz,¹ M Alba,¹ I Marte,¹ I Acosta,² R Elias.² ¹Programa de Control de Tuberculosis, La Vega, DR, Santo Domingo, ²Profamilia, Santo Domingo, DN, Dominican Republic. Fax: (+809) 6868276.
e-mail: iacosta@profamilia.org.do

Introduction: 4.5% of the Dominican population live in the Province of La Vega, DR; DOTS strategy was implemented in 2001 and in 2004 93% of the health establishments had applied the five components of DOTS. In 2005 financial support from the Global Fund was initiated to maintain the obtained expansion.

Objectives: To measure the progress reached in TB control in the province of La Vega, DR.

Methods: Data from 2000 provided by the NTP Information system was analyzed.

Results: In 2004, 98% of the population was covered under DOTS strategy; Respiratory symptoms examined increased by 63.5%, from 2064 (2003) to 3248 (2004). The BK diagnosis increased by 56.2%, from 4926 (2003) to 8762 (2004). The positivist percentage decreased from 3.4% to 2.7% during the same period with 100% agreement in quality control. Incidence rate increased from 27 (2003) to 31 (2004) cases per 100 000 inhabitants, with the successful treatment percentage during the first semester of 2004 at 89.6%.

Conclusion: The success achieved in TB control through the expansion of DOTS in the province of La Vega will continue with the financial support of the project Global Fund.

PS-1303-20 Implementation and expansion of the DOTS strategy in Guangxi, P.R. China

F Y Liu. TB Department, Guangxi Center for Disease Control, China, Nanning, Guangxi, China. Fax: (+86) 7715315803.
e-mail: liufeiying@163.com

Introduction: Guangxi Zhuang Autonomous Region is located in the southern of China with an area of 236 000 square kilometers. The southwest of the area shares border with Vietnam. The areas of mountains and hills account for around 70% of total area. By the end of 2003, the population of Guangxi is 48 millions. Modern TB control based on DOTS was introduced since 2002. Guangxi is receiving with the assistance of WB, JICA, and GFATM Projects.

Objective: To measure progress towards WHO global targets.

Method: Compare routinely annual statistics and cohort analysis based on the quarterly report on case-finding and treatment outcomes.

Results: DOTS coverage increased from 22% in 2002 to 100% in 2004. For new smear positive pulmonary TB patients, case-detection increased from 33% in 2003 to 68% in 2004. The cure rate and treatment success of new smear positive patients increased from 69% and 78% in 2002 to 80% and 84% in 2003 respectively. At same time default rate decreased from 8% in 2002 to 5% in 2003.

Conclusion: With high-level political commitment towards DOTS and external assistance the case finding and cure rate could be improved and is approaching WHO global targets in Guangxi, China.

PS-1306-20 The role of community health workers in tuberculosis treatment adherence in an urban slum, Nairobi, Kenya

J R Ong'ang'o, P O McOdi. International Medical Corps, Nairobi, Kenya. Fax: (+254) 020573973.
e-mail: jongango@imcfrica.org

The objective of the study was to evaluate the effectiveness of introducing community daily observed treatment (DOT) supervision in the Kibera slum, which is characterized by poverty, poor living conditions and high prevalence of HIV/AIDS. Treatment outcomes on new smear positives (NSP) were compared with a historical cohort registered in the previous year 2003 between the months of February–April with those in the same time period of 2004, when community DOT supervision had been initiated. The community DOT involved daily supervision by a caretaker within the household of the patient and weekly supervision by the community volunteers in the intensive phase. Both the community volunteers (CV) and caretakers were trained on the principles of TB control and a referral system between health centers to community volunteers and households was established. In the 2003 cohort, 193 NSPs were registered, and 212 in the intervention cohort of 2004. There was significant better treatment outcome in the intervention cohort of ($P = 0.001$). Treatment success improved from 66% to 77%, defaulter rate decreased from 22% to 15%. Good treatment outcome was related to CV use ($P < 0.05$). Community DOT helps achieve better treatment outcomes than facility based treatment supervision.

PS-1386-20 Integrated DOTS and DOTS-Plus: treatment results among new tuberculosis cases, Latvia, 2002

V Riekstina,¹ V Leimane,¹ T H Holtz,² J Leimans,¹ E Zarovska,¹ K F Laserson,² C D Wells.² ¹State Agency of TB and Lung Diseases of Latvia, National TB Registry, Riga region, Latvia; ²Division of TB Elimination, NCHSTP, CDC, Atlanta, Georgia, USA. Fax: (+371) 790 1014.
e-mail: vija@tuberculosis.lv

Background: Latvia implemented the WHO-recommended DOTS strategy in 1996, followed by the DOTS-Plus strategy in 1998. The aim of this study was to evaluate treatment results for new tuberculosis (TB) cases registered in the Latvian National TB Program in 2002.

Methods: We performed a treatment cohort analysis for all new culture-confirmed cases of pulmonary TB who were registered in DOTS in 2002. Patients with isolates resistant to isoniazid and rifampin were categorized as having multidrug-resistant tuberculosis (MDR-TB) and treated in the DOTS-Plus program. Treatment outcomes for MDR-TB cases under the DOTS-Plus program were incorporated in the cohort analysis for DOTS program.

Results: The treatment cohort included 934 patients: 729 (85%) achieved treatment success, 10 (1%) failed, 51 (6%) defaulted, 3 (<1%) transferred out, 66 (8%) died, and 75 were found to have MDR-TB. Among the MDR-TB cases, 55 (73%) achieved treatment success, 1 (1%) failed, 12 (16%) defaulted, 4 (5%) died, and 3 (4%) still on treatment. Our final cohort analysis revealed 84% treatment success overall, 1% failure, 7% default, <1% transferred out, 8% died, and <1% still on treatment.

Conclusions: Under expanded DOTS framework conditions in Latvia, the success rate for newly detected culture-positive cases is near the global target of 85% cure and/or completion.

PS-1480-20 Needs for supporting of the evolving role of central units of national TB programmes: a review

D Weil, R Martz. Stop TB Department, World Health Organization, Geneva, Switzerland. Fax: (+41) 227914199.
e-mail: weild@who.int

This review aimed to describe the structures of central units of national TB programmes in a range of high burden countries, to assess how their management and stewardship functions differ across countries and are changing over time with DOTS scale up, financing changes, increasing partnerships at national level, and health system reforms, and to propose means to increase the capacity-building and support central units receive. The review relied on written documentation from National TB Programmes, technical and financing partners, selected key informant interviews and published literature on public health and TB con-

trol management. Initial results suggest that TB program central units vary substantially in staffing and flexibility under several different public health system models, in Africa, Asia, Latin America and the former Soviet Union. Most important is the means to perform core functions and innovate within the epidemiological and public health system in which programs operate. Important training programs exist that focus on management skills of senior program managers. Still, additional efforts can be taken at country and global levels to reinforce central units to meet expanding demands. These measures should enable programmes to build sub-national capacity to achieve results within increasingly integrated and decentralized health systems.

PS-1488-20 Achievements and constraints of TB control in Cambodia: experience of DOTS expansion for 5 years

S Touch,¹ B K Team,¹ T E Mao,¹ K Kimsan,² K Okada,³ I Onozaki,⁴ T Kasai,⁵ D I Ahn.⁶ ¹National Center for Tuberculosis and Leprosy Control, Phnom Penh, ²Cambodia Anti-Tuberculosis Association, Phnom Penh, ³Japan International Cooperation Agency, National TB Control Project, Phnom Penh, Cambodia; ⁴Research Institute of Tuberculosis, Japan Anti-Tuberculosis Association, Tokyo, ⁵Miyazaki Prefectural Office, Miyazaki, Japan; ⁶WHO Western Pacific Regional Office, Manila, Philippines. Fax: (+855) 23218090. e-mail: sarethtouch@online.com.kh

Background: NTP Cambodia adopted DOTS strategy in 1994, followed by the introduction into all 145 provincial/district hospitals. To improve access to DOTS and increase case detection, NTP piloted health center DOTS in 1999, collaborated with WHO and Japan International Cooperation Agency (JICA). **Objectives:** To summarize 5-year achievements and identify the key to success and constraints.

Methods: NTP documents and WHO publications were reviewed.

Results: 1) 'DOTS Expansion Package', which contains several steps from pre-assessment to M/E after the implementation, has been the key to success. 2) TB laboratory network has been playing an essential role in DOTS expansion through systematic M/E and training for smear making. 3) NTP could manage drug shortage due to increasing case detection by drug reallocation and emergency procurement, which strengthened TB drug management system. Subsequently DOTS became available in 840 HCs and there was 1.8 times increase in case detection and 2.8 times in examined slides, comparing in 2004 to in 1998. As constraints, geographically isolated areas, limited human capacity, HIV epidemics and insufficient control to smear negative in TB-HIV and pediatric TB were identified.

Conclusion: Technical assistance by WHO and JICA and funding from other donor agencies in context of rehabilitated public health system contributed to successful DOTS expansion in Cambodia.

PS-1540-20 Evaluation of DOTS-Plus in Estonia

K Kliiman,¹ R Centis,² G B Migliori,² K Floyd,³ V Hollo,¹ M Danilovits,¹ K Vink,¹ E Nathanson.³ ¹NTP Estonia, Tartu, Estonia; ²WHO Collaborating Centre, Fondazione S Maugeri, IRCCS, Tradate, Italy; ³WHO, Geneva, Switzerland. Fax: (+372) 7318943. e-mail: kai.kliiman@kliinikum.ee

Background: Increasing numbers of developing/middle income countries are implementing 'DOTS-plus' projects or programmes that use second-line drugs to treat patients with MDR-TB. However, evidence about their feasibility, effectiveness, cost and cost-effectiveness is limited.

Methods: We evaluated the feasibility, effectiveness, cost and cost-effectiveness of the national DOTS-plus programme implemented nation-wide in Estonia from August 2001. Patients are treated with individualised regimens tailored to their drug susceptibility pattern. We compared 3 alternative strategies for a cohort of 100 patients based on data from a cohort of 149 cases DOTS Plus 2001 (a)-1 vs. pre-DOTS plus (b) i.e., treatment as defined by individual physician -1990s, 2000–2002 vs. DOTS only (c). Costs (in year 2002 €) and effects (deaths and DALYs averted) were estimated as the additional (incremental) costs and effects among the 3 alternative strategies.

Results: In (a) 90 (60%) of patients achieved success, 15 (10%) failed, 25 (17%) defaulted, and 19 (13%) died, while in (b) they were, respectively 52, 4, 20 and 24%. The average costs per patient treated were, respectively, €8469 (a), 4677 (b) and 3251 (c). The mean costs per DALY averted were €501 (a vs. b) and 394 (a vs. c). At the univariate analysis age <45 is significantly associated (OR 2.41; 95%CI 1.15–5.07) with treatment success, while homeless status (0.29; 0.08–0.99) and alcohol abuse (0.22; 0.05–0.82) are negatively associated with treatment success.

Conclusions: DOTS-plus for MDR-TB using individualised regimens can be feasible, effective and cost-effective in a middle-income country of the former Soviet Union.

PS-1589-20 Scaling-up DOTS in post-conflict Afghanistan

P G Suarez,¹ H Ahmadzai,² F Hartman,³ H Sevil,⁴ F Kakar.⁵ ¹Center for Improving Health Outcomes, Management Sciences for Health (MSH), Arlington, Virginia, USA; ²National Tuberculosis Program, Afghanistan - MOPH, Kabul, ³USAID/REACH Program (MSH), Kabul, ⁴WHO Afghanistan, Kabul, ⁵MOPH Afghanistan, Kabul, Afghanistan. Fax: (+1) 703-524-7898. e-mail: psuarez@msh.org

Introduction: During 27 years of war and civil strife the Afghan National Tuberculosis Program (NTP) was in a permanent state of crisis. However, since 2001, the new Afghanistan government, the MoPH, and international stakeholders have made TB control a national priority.

Objective: To describe the process to implement and expand DOTS in a post-conflict environment.

Methods: The MoPH, GFATM and stakeholders such as WHO and the USAID/REACH Program, have developed a comprehensive approach for gaining political and technical support for DOTS expansion and guaranteeing the sustainability of TB control. Training of health workers, supplying TB medicines, strengthening laboratory network and working with community health workers are some key activities presently being implemented.

Results: Through financial support from USAID/REACH, the WB and the EC, DOTS is gradually being integrated into the Basic Package of Health Services in Afghanistan. In 2004, DOTS covered 38% of the population. TB case notification increased from 9581 cases in 2001 to 18 500 cases in 2004 (a 93% total increase); 86% of these cases were reportedly as successfully treated. The main challenge is low case detection.

Conclusion: Collaboration between NTP and international stakeholders resulted in the implementation and expansion of DOTS despite serious difficulties.

PS-1607-20 Non-governmental organisation support for DOTS expansion in the Philippines: the Kusog Baga project

Z Gill,¹ M Magno,² I D Rusen,³ J Lagahid.⁴ ¹World Vision Canada, Mississauga, Ontario, Canada; ²World Vision Development Foundation, Manila, Philippines; ³The Union, Toronto, Ontario, Canada; ⁴Department of Health, Manila, Philippines. Fax: (+905) 696 2164. e-mail: zari_gill@worldvision.ca

Background: In 2003, the Philippines had the ninth highest burden of tuberculosis in the world with an estimated 107 000 new smear positive cases. The Kusog Baga (KB) II project was a World Vision Canada/Philippines-executed and Canadian International Development Agency (CIDA)-funded project to assist the Philippines Department of Health in DOTS expansion.

Method: KB II was a \$5.9 million CDN project implemented between 2001 and 2004 in 8 provinces and 9 cities with a target population of 10 million people. The primary project activities included: training, monitoring and supervision, as well as an extensive community mobilization component.

Results: The overall case detection rate increased from 35% in 2001 to 61% in 2003 in the project areas. During the same time period, the treatment success rate increased from 85% to 90%. Strong community mobilization was evident in the project areas, including community tuberculosis task forces and community-based treatment partners.

Conclusion: The KB II project combined close collaboration with the National Tuberculosis Program, strong technical support and extensive community-based efforts to successfully expand DOTS, increase case detection and maintain high treatment success

rates in the Philippines. The impact of the individual project components on the overall successful performance is difficult to determine.

PS-1658-20 Applying the management and organizational sustainability tool for TB control (MOST/TB) to strengthen Ecuador's national TB control programme

P G Suarez,¹ A Monroy,² L Kropsch,³ E Romero,⁴ C M Whalen,⁵ S Johnson.⁶ ¹Center for Health Outcomes and ²M&L Project, Management Sciences for Health, Arlington, Virginia, USA; ³M&L Project, Management Sciences for Health, Rio de Janeiro, RJ, Brazil; ⁴National Tuberculosis Program, MoPH, Ecuador, Quito, Ecuador; ⁵Center for Health Outcomes, and ⁶M&L Project, Management Sciences for Health, Cambridge, Massachusetts, USA. Fax: (+1) 703-524-7898. e-mail: psuarez@msh.org

Introduction: Ecuador is classified as a high-burden TB country in LAC by WHO/PAHO. Since 2001, DOTS coverage has increased in health services through case detection and improved efficiency of TB treatment; however the detection rate and treatment success rate are still below WHO targets. Factors hindering DOTS expansion are: lack of human resources and management capacity.

Objective: To adapt and pilot a process for improving the management of a NTP.

Methods: The USAID-funded MSH/M&L project, in partnership with Ecuador's NTP and CLA, have been working to strengthen managerial capabilities at the national and provincial level. MOST, a structured, participatory process that allows organizations to assess their management performance while developing and implementing a concrete plan, was adapted for use with NTPs; the first pilot was in Ecuador. Facilitated by MSH, a MOST/TB workshop, attended by participants working at different levels of Ecuador's NTP, was used to aid management development.

Results: Using MOST/TB, Ecuador's NTP developed a baseline assessment of their management capacity, a set of performance improvement target indicators, and an action plan. Using the time table agreed upon during the workshop, the action plan is now underway.

Conclusion: MOST/TB is appropriate for addressing management capacity issues challenging many NTPs.

PS-1667-20 DOTS expansion in prisons: experience of BRAC in Bangladesh

T K Ghosh, M A Islam, M N Bhuiyan, B Saha, M S Alam, F Ahmed. Health and Nutrition Programme, BRAC Bangladesh, Dhaka, Bangladesh. Fax: (+880) 2882614. e-mail: health@brac.net

Introduction: BRAC initiated a pilot DOTS expansion project in 7 prisons in 2004 in collaboration with the National TB Program (NTP).

Objectives: To develop an appropriate model to ensure DOTS services in prisons.

Methods: Prisoners who have cough more than 3 weeks are screened every month by BRAC health staff in collaboration with the prison staff. Sputum are collected at prison once a month by BRAC staff and tested at NTP designated laboratory. If sputum is negative, but symptoms persist then the case is referred for further examinations under the guidance of physicians of prison or chest clinic. Health staff at prison or assigned volunteer among prisoners ensures DOT. If patients are released or transferred during treatment, they are referred to the nearest health facility for continuation of treatment.

Results: In 2004, a total of 524 prisoners were examined for TB. A total of 59 TB patients were diagnosed among them. Of them, 38 were sputum positive, 19 sputum negative and 2 extra-pulmonary patients. Among them, 19 were completed treatment and 5 transferred out. Remaining 35 patients are under treatment.

Conclusions: Support from prison authority, local health authority and prisoners are crucial for establishing effective DOTS services at prisons.

PS-1689-20 Expansion of DOTS in teaching hospitals in Bangladesh

A Salam, M A Islam, M K Barua, F Ahmed, A Alam. Health and Nutrition Programme, BRAC, Dhaka, Bangladesh. Fax: (+880) 2 8823542. e-mail: health@brac.net

Introduction: BRAC expanded DOTS services to 14 teaching hospitals between 2004–2005 in collaboration with national TB program (NTP).

Objectives: To make professionals aware and establish collaboration to ensure DOTS services at teaching hospitals.

Methods: Faculty/department heads and concern doctors were oriented on DOTS. BRAC established a DOTS corner in every teaching hospital. Trained paramedics and laboratory technicians are posted there. TB suspects reported at hospitals are referred to laboratory for sputum smear examination. Of the suspects attend at out patient door (OPD), diagnosed TB cases are referred to the NTP treatment center close to their home. Patients residing closely to the hospital are given DOT from hospital. In case of patients admitted in the hospital they are given DOTS form hospital and take appropriate measures describe above when discharging from hospital.

Results: A total of 1659 TB patients were diagnosed till February, 2005. Of them, 783 were new sputum positive, 30 pretreatment sputum positive, 593 sputum negative and 253 extra-pulmonary cases. Of the total patients 211 were treated at teaching hospitals and 1430 were referred to other NTP treatment centers. Of the patients treated at hospitals, sputum conversion rate was 94%.

Conclusions: DOTS expansion in teaching institutes encourages professionals to follow the NTP guidelines and provide extensive support to DOTS strategy.

EDUCATION, ADVOCACY AND SOCIAL ISSUES

PS-1477-20 Problems of socio-medical rehabilitation of TB patients

T V T V Vezhnina. Medical Academy, Kemerovo, Russia, Kemerovo, Russian Federation. Fax: (+7) 3842 586926. e-mail: blinou74@mail.ru

Non-observance of prescribed treatment by TB patients is one of the most significant problems. Incomplete chemotherapy leads to life quality reduction and disability, complicating medical-social rehabilitation. A survey of 51 TB patients who untimely stopped the course of chemotherapy allowed studying the awareness level among TB patients, their perception of disease, their attitude towards treatment, and the attitude of community towards them. The overwhelming majority of patients believed they had complete information about the disease. However, 35% of them did not know why exactly incomplete treatment was dangerous, 25.5% did not have precise information about the timeframe of treatment, and 8% considered TB incurable. 37% of patients were TB invalids. 11.8% untimely stopped the treatment after registering their degree of disability. Since disability pension for them was practically the only source of living, they did not seek further therapy. Three-quarters of patients mentioned lack of family support, which could potentially encourage them for treatment. 14% of patients felt stigmatized by people around. Influences changing the behavior of patients and their surroundings by providing information and by conducting adequate interventions to solve social problems are the necessary measures of medical-social rehabilitation of TB patients.

PS-1022-20 Implementing DOTS strategy through tuberculosis clubs

G X He, L Zhou, M Xu, S M Cheng. National Center for Tuberculosis Prevention and Control, China CDC, Beijing, China. Fax: (+86) 10 63029984. e-mail: heguangxue@chinatb.org

Setting: Chifeng City, Inner Mongolia

Objectives: To increase case detection, to do DOT and to reduce stigma through TB Club.

Design: According to the social assessment in Inner Mongolia, stigma and low case detection are the big problems. Therefore, TB Clubs are organized with the participants including cured TB patients, local officers, celebrities, leaders of health organizations. Experienced TB patients share their stories with other patients while key persons give speeches. Besides spreading TB knowledge, the cured TB patients recommend suspects to TB Center and observe patients to take drugs. Since the cured TB patients have benefit from the free diagnosis and treatment, they are will-

ing to contribute to TB clubs. Meanwhile, their involvement will reduce the stigma of TB patients and the discrimination from the general public.

Results: After attending TB Club, the cured TB patients can spread TB knowledge, recommend TB suspects to TB center, and observe TB patients to take TB drugs. Stigma of TB patient is greatly reduced in TB Club areas.

Conclusion: TB Club is an effective measure to reduce stigma, to increase the number of suspects in TB Center, to increase DOT rate and the awareness rate of TB knowledge among public.

PS-1214-20 The role of NGO and CBO in neutralizing socio-behavioral hindrances leading to stigmatization of TB

M Agboatwalla,¹ H Qureshi,² N Ahmed,³ G N Kazi.⁴ ¹HOPE (Health Oriented Preventive Education), Karachi, ²Pakistan Medical and Research Council, Karachi, ³National TB Control Programme, Islamabad, ⁴WHO (Provincial Office), Karachi, Pakistan. Fax: (+92) 214520464. e-mail: agboat@gerrys.net

Pakistan is the 6th highest country for tuberculosis, where it is still regarded as the disease to be ashamed of. Stigma about TB can only be dealt at the community level by raising awareness and communication. Misconceptions about the disease can be removed by involving the NGOs. A Pilot Project was conducted with the objective of reducing the stigma associated with tuberculosis by involving NGOs. This was a intervention study conducted in 2 rural settings of Thatta within 5 kilometers of two DOTs centers. NGO members were given health education regarding tuberculosis. Baseline information was obtained to identify the perceptions about tuberculosis especially females and the health seeking behaviour. Baseline findings indicate that TB is considered to be a disease leading to death and TB patients are isolated from other family members. In case of females, married women were separated from their husbands and children. Nearly 60% TB patients at baseline said that fear of stigma led to delay in seeking treatment. Social isolation also led to discontinuation of treatment esp. in females who found it difficult to visit the DOTs Centres. Intervention in the form of motivation resulted in improved case detection by neutralizing the stigma factor.

PS-1436-20 TB patients' behaviour should be changed

Z I Ni,¹ A K Toktabayanov,¹ B I Alimbekova,¹ K Z H Bektursynova,² I D Khvan.² ¹Project HOPE, Almaty, Kazakhstan; ²Almaty Oblast TB Dispensary, Taldykorgan, Kazakhstan. Fax: (+327) 2918747. e-mail: nizoya@projecthope.kz

Goal: A survey aimed to study the time period between the first signs of disease and the first visit to a physician. Late visit to a doctor results in spread of TB infection and poor treatment results.

Methods: 40 new TB patients (20 women and 20 men) receiving inpatient care in Almaty Oblast TB Dispensary were interviewed using questionnaires.

Results: TB patients seek medical care quite late, on average 69.5 days after the first symptoms emerged (women - after 83.8 days, and men - after 50.5 days). The main reason for seeking care late for 81.1% of women is fear of being rejected by their family and community. Only 16.6% of men mentioned stigma. The rest 83.4% took no notice of the symptoms. Probably stigma affects men even more but they do not admit this.

Conclusions: Among women stigma is the main reason of late care seeking and among men -negligence to their health. This aggravates the problems of TB detection and treatment, contributes to poor epidemiologic situation and creates impediments to TB program success. One of the solutions to late seeking of care is purposeful health education for the population in order to lessen stigma.

PS-1483-20 Increasing nurses and allied professionals' activities at the Regional European Level

M M G Sebek,¹ E Berga.² ¹KNCV Tuberculosis Foundation, The Hague, The Netherlands; ²State Center of Tuberculosis and Lung Diseases, Riga, Latvia. Fax: (+31) 70 358 4004. e-mail: sebekm@kncvtbc.nl

Aim: Increasing support for active participation of Nurses and Allied professionals (NAPs) in the European Region.

Method: In 2001, NAPs networks start in the African, Latin American, European and Eastern Regions. To embed the region activities into Nurses and Allies Professionals Section (NAPsS), two representatives are appointed per region. Yearly, regional reports are presented at the NAPsS business meeting in Paris. Nurses are identified by using the European NAPs mailing list and the contacts of the Wolfheze workshop participants. Sponsoring by TBCTA makes participation in Regional Conferences and Wolfheze workshops possible.

Results: The first regional workshop took place in Bucharest in 2002. 30 NAPs from 10 European countries focused on the experience of implementing the DOTS strategy, and on opportunities for training and research. In 2003, 34 nurses and allied professionals attended the 9th Wolfheze workshop. Attention was given to the nurses' role in difficult to reach patient groups in large cities. At the 3rd Union Region Europe conference, Moscow 2004, the representatives organised a symposium, a post graduate course and a poster session.

Conclusion: In 4 years time, the newly formed European NAPs network managed to increase support for active participation in symposia, postgraduate courses and poster sessions.

PS-1592-20 Review of information from TB and TB-HIV-related socio-behavioral surveys in the Former Soviet Union countries

Y Hu, I Toskin, C Francis. Stop TB, World Health Organization, Geneva, Switzerland. Fax: (+41) 22 7914268. e-mail: huy@who.int

Background: The TB and HIV epidemic in Eastern European and Central Asian countries is a serious threat for the population. Adaptation to local advocacy and communication strategies to increase patient literacy, early TB treatment uptake and adherence can significantly facilitate TB and TB-HIV programme development and implementation in the region. There is a lack of published data on behavioral attitudes toward TB, TB-HIV and the functions of control programs for both diseases especially in the countries of the Former Soviet Union.

Methods:

- 1 Comprehensive search for related studies through PUBMED and other databases.
- 2 WHO offices, as well as WHO partners at regional and country levels were contacted for related information.

Main findings: A total of 9 countries provided useful information on TB-related behavioral surveys. There are no TB-HIV-related studies. Most of the studies/surveys were based on quantitative methods in populations ranging from a sample size between 20 and 8219. Studies tried to determine the level of knowledge and personal attitudes, beliefs and practices towards TB disease in the general population and TB patients. Although there is a high level of literacy in the region, with almost 100% access to the media in the form of TV and radio patient literacy about TB, free access to TB treatment, and how to access TB treatment through the health service is still very low.

Conclusions: Additional studies aiming to explore knowledge, attitude and practice toward TB disease and TB control programmes in regions (particularly those relating to TB-HIV co-infection in IDUs, MDR-TB and TB in prisons) should be strongly encouraged.

PS-1665-20 Social mobilization for TB control in the Dominican Republic

J H J Heredia, M B M Belkys. National TB Programme, Dominican Republic. Fax: (+809) 5413422. e-mail: belkys_tb@yahoo.es

Introduction: The PNCT commemorates On March 2005 mobilizing of workers of health care unit of Santo Domingo integrating (repaying) them in the struggle against the TB; with activities where there informed representatives of the civil society, University, churches and foreign, national organisms (organizations) of cooperation; ONG's HIV/SIDA.

Objectives: To incorporate diverse sectors to integrate (repay) them in the struggle against the TB

Methods: there were organized activities which messages were 'Health-Care Providers: Heroes in the Fight against Tuberculosis.' Recognition of workers of the health for fighting against the TB; accomplishment mobilization social and religious activities, meeting with the social communicated, marches with the workers of health and mass celebration in commemoration of the fight against tuberculosis.

Results: There represented thousand persons of different social sectors; 12 provinces celebrated mobilization activities; two thousand people marched for the colonial city as far to the Altar de la Patria, between (among) doctors, nurses, Bioanalistas all they work for the PCT to intermediate and local level; the churches was integrate with mass celebration in the cathedral first of America.

Conclusion: The social mobilization in the struggle against the TB increases the accessibility of the population

PS-1780-20 Communicating for change: sustaining media participation for improving TB control

O O Akanni, O A Falobi, K Obom-Egbulem. Journalists Against AIDS (JAAIDS) Nigeria, Lagos, Lagos, Nigeria. Fax: (+234) 8128565. e-mail: olayide@nigeria-aids.org

Objectives: Journalists Against AIDS (JAAIDS) Nigeria, a media based organization utilises communication interventions to address the challenges of TB-HIV in Nigeria by:

- Assessing knowledge of the media on TB-HIV issues and strengthening capacity to effectively report on them
- Increasing TB-HIV awareness to encourage early diagnosis, improve case detection and health seeking behaviour
- Promoting informed public debate through the media on TB-HIV

Methods:

- Media monitoring surveys to assess TB-HIV coverage
- Publication of Access Alert, a bi-monthly advocacy newsletter on TB /HIV issues
- Monthly media roundtables, a platform for scientists, community activists and the media to discuss TB-HIV issues
- Workshops for journalists, care providers, People Living with HIV (PLWH) to improve TB-HIV media reporting

Findings: While the media rated fairly high in HIV/AIDS reporting, TB coverage was abysmally low and centered on World TB Day activities. Several journalists at the roundtables rated their knowledge of TB transmission and magnitude of Nigeria's TB problem low. Others noted that roundtable sessions, trainings and Access Alert were their major information sources on TB

Conclusions: Effective collaboration with the media through a coordinated and sustained communication strategy is needful to achieve desired outcomes of both TB and HIV control programmes

PS-2025-20 Scale up tuberculosis control: development of information, education and communication materials for behavioural change

L Tamba, K Sichinga. Health Department, Churches Health Association of Zambia, Lusaka, Zambia. Fax: (+260) 1 231266. e-mail: tamba_lynn@yahoo.com

The TB notification rate in Zambia has increased from 100/100 000 in 1984 to 580/100 000 in 2004. The HIV pandemic, high poverty levels estimated at 75% and high illiteracy have contributed to the TB scourge. The Churches Health Association of Zambia (CHAZ), an interdenominational, non-governmental umbrella organization of church health facilities and faith based organisations, is responsible for over 50% of formal health care service in the rural areas and about 30% of the total health care in Zambia. CHAZ decided to embark on development of IEC materials for behavioural change.

Description: The rationale of developing the materials was based on factors such as: increased notification rate, high levels of stigma, poor compliance to treatment and ignorance about TB, TB treatment and HIV related issues. The information about misconceptions, myths and traditional beliefs about TB was collected from field staff from across the country during meetings and training workshops. A common belief among others is that TB is transmitted through sexual inter-course with a woman who has had an abortion or by eating food prepared by a woman having her menses. CHAZ developed, pre-tested and deployed IEC materials in form of posters in all its institutions and the impact will be assessed. An example of the posters is here being presented to the conference.

Lessons being learnt:

- Increased passive and active case finding
- TB patients accepting DOT

Conclusion: It is a challenge to combat TB in the country. One area worthy putting effort is behavior change communication. This strategy coupled with community based treatment support would give the country good results.

PS-2230-20 The role of the TB-NGOS Forum in the fight against tuberculosis in the State of Rio de Janeiro, Brazil

C Basília, G Mizael, W Amaral, M Santana, A Costa. Fórum de ONGs TB do Rio de Janeiro -RJ, Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+55) 2122403215. e-mail: carlosbasilia@ibiss.com.br

Problem: The State of Rio de Janeiro has one of the largest incidence of TB in the country, with increasing numbers of cases in poor communities and among more vulnerable groups, such as people leaving in prisons, the homeless and street garbage collectors. There are plenty of misinformation about TB among community members, which delays the search for health services, leading to late diagnostics and non adherence to treatment.

Objective: To sensitise, mobilize and train organized sectors of the Civil Society for an effective participation in the social control of TB.

Methodology: To identify and keep record of community organizations that already acted in preventive health; to promote monthly meetings for discussion of strategies, for the detection of new TB cases and for monitoring DOTS' implementation.

Results: Since its foundation in August 2003, the Forum meets monthly in general assemblies with 70 NGOs in average, promotes trainings and meetings about TB, aiming to attract the participation and involvement of community leaders.

Conclusions: The creation of the Forum of TB-NGOS points towards an innovative process of social mobilization for the control of tuberculosis.

PS-2242-20 Brazil launches Stop TB Initiative

A M T Thomé,¹ J Santos,² C Basília,³ J M P Romain,⁴ V Lorusso,⁵ A Ruffino Netto,⁶ H M Silva.⁷ ¹BEMFAM - Evaluation Department, Rio de Janeiro, RJ, ²Ministry of Health - National TB Control Program, Brasília, DF, ³ONGS-TB Forum of Rio State, Rio de Janeiro, RJ, ⁴Camilianos - Pastoral da Saúde, Campos do Jordão, SP, ⁵Damien Foundation, Salvador, BA, ⁶TB Research Network, Ribeirão Preto, SP, ⁷Pastoral Carcerária, Brasília, DF, Brazil. Fax: (51) 2138612469. e-mail: mthome@bemfam.org.br

Problem: Brazil lacks commitments and involvement of the civil society for TB control, despite world-renowned progresses on AIDS control.

Objective: The national Tuberculosis Control Program met with representatives of the civil society in November 2004 in Brasília, with the participation of the International Stop-TB Initiative. The Brazilian Partnership against Tuberculosis was launched. It aims to bridge gaps in private to public alliances against TB.

Methodology: Brazilian Stop TB initiative is meeting during the regional mobilization and evaluation meetings of the national TB program, fostering public-to-private coordination and synergies every four months, under government's funding.

Results: Representatives elected for the Executive

Secretariat included religious-based NGOS (health sector – ‘Pastoral da Saúde’; people in-prisons – ‘Pastoral Carcerária’), advocacy and services-oriented NGOS (BEMFAM – IPPF affiliate), International PVOS (Damien Foundation), social mobilization groups (Rio State TB-NGOS Forum) the Brazilian TB Research Network (Rede TB) and Government. The statute was approved and action plans are underway. Five work groups were created: IEC - Information, Education and Communication; Logistics; Vulnerable populations; HIV-TB co-infection and Private Sector Involvement.

Conclusion: Brazilian partnership is already a success but faces challenges to build autonomy and sustainability; to develop effective work plans for social mobilization and to enlarge its own social basis.

PS-1050-20 Strengthening community involvement for collaborative TB-HIV activities

H Getahun, P Nunn. Stop TB Department, World Health Organization, Geneva, Switzerland. Fax: (+41) 227914268. e-mail: getahunh@who.int

The community's contribution to TB control has mainly focused on devolving TB care beyond health institutions to provide treatment support to patients and that of HIV/AIDS has been mainly for activism and advocacy for patient empowerment and access to care. Collaborative TB-HIV activities have a broader goal of decreasing the burden of tuberculosis, HIV and AIDS in populations affected by both diseases and build on patient-centred effective collaboration between the two disease control programmes. Therefore, they present a unique opportunity to strengthen community involvement by cross-fertilizing the experiences of the TB and HIV/AIDS communities. Community involvement in TB-HIV can be in both advocacy and service provision. The experiences of the TB-HIV Working Group of the Stop TB Partnership in enhancing community involvement in TB-HIV will be discussed. There is a need to define minimum package of activities to be carried out effectively by community levels and the corresponding core competencies. HIV/AIDS and TB control programmes of high HIV and resource limited countries need to recognise the value of community involvement in collaborative TB-HIV activities and support it. Available funding mechanisms need to be explored to strengthen and embrace community involved activities into the formal health system.

PS-2180-20 Developing systems for evaluating community based DOTS in South Africa

L L Smith,¹ Z A Arosi,¹ A C Peters,¹ A S Millar,¹ W Reed,² V D L Westhuizen,² M B Mapila.¹ ¹TADSA, Cape Town, ²Department of Health, Siyanda District, Northern Cape, Upington, South Africa. Fax: (+27) 0219451758. e-mail: leetadsa@iafrica.com

Objective: To develop a monitoring and evaluation system to quantify and improve the quality of Community Based DOTS (CBD) at health facilities.

Background: CBD has been shown to improve adherence to treatment and reduce costs to the patient and the health services. TADSA is a national NGO helping primary health care facilities develop systems to establish and manage community support for their TB programs. In order to gain the benefit of improved adherence, a CBD program must be implemented effectively—therefore TADSA is developing a system of evaluating and monitoring the quality of CBD programs. Siyanda District, in the Northern Cape Province, has an interruption rate of 20%.

Methods:

- Introduction of CBD using a formative assessment to determine readiness
- Development of localized monitoring and quality improvement system
- Development and piloting of evaluation tool for CBD

Results: Latest treatment outcomes indicate that the interruption rate remains high at 20%, while smear conversion of new patients remains low at 47.7%. District reports indicate CBD is implemented in 37 of 48 clinics across the district, yet early results show that the expected benefits of improved adherence are not necessarily being passed on.

PS-2188-20 Barriers to TB diagnosis: patient and provider delays in San Pedro Sula, Honduras

C E Colvin,¹ K MacIntyre,¹ T Sierra Pineda,² R Espana.² ¹Tulane University School of Public Health and Tropical Medicine, New Orleans, Louisiana, USA; ²National TB Program of Honduras, Tegucigalpa, Honduras. Fax: (+1) 504-988-3653. e-mail: ccolvin@tulane.edu

This study was conducted in San Pedro Sula, Honduras, which reports the highest TB case notification rate in the country (110 per 100 000) and a relatively high rate of HIV prevalence among TB cases (10%). The study objectives were to describe the health seeking behavior of individuals with respiratory symptoms and identify factors associated with delayed care seeking, including knowledge of and attitudes towards TB and TB-HIV co-infection. Individuals ($n = 512$) with cough of greater than 15 days' duration were randomly selected from 8 public sector health clinics and interviewed with a standardized questionnaire. In multivariate logistic regression analysis, the only factor that was significantly associated with de-

layed care seeking was age (>45 years old). Over 40% of the sample reported prior care seeking behavior; of this group, one third visited another public sector facility, another third sought care at a private sector clinic, and one third visited a pharmacy. Future research on delayed diagnosis should utilize a population-based design; the limits of facility-based research have been exhausted in terms of identifying risk factors for delay. Additionally, further investigation of referral practices and specific structural barriers to care are warranted; these obstacles are often most directly related to the care-seeking experience.

PS-2196-20 A multisectorial approach to improve tuberculosis detection rates and directly observed treatment in low accessibility sites in the province of Tungurahua, Ecuador

L Aguirre, S Charcopa. Department of Epidemiology. Provincial's Health Direction, Ambato, Tungurahua, Ecuador. Fax: (+593) 22565861. e-mail: scharcopa@ec.lung.ca

Methods:

- Various strategies were employed to introduce DOTS to health promoters from the Department of Indigenous Health, to staff from other community institutions (schools, police academies, army facilities), and to new public health employees.
- DOTS workshops were tailored to the level of expertise of each group.
- The National Tuberculosis Control Program was promoted in parks, markets, schools, and churches, as well as via local television and radio advertisements.

Results:

| N ^a Health Facilities | Respiratory symptoms | | | | | | | |
|----------------------------------|----------------------|------|-----------------------|------|-----------------------|------|-----------------------|------|
| | 2nd trimester 2004 | | 3rd trimester 2004 | | 4th trimester 2004 | | 1st trimester | |
| | <i>n</i> | % | <i>n</i> ^o | % | <i>n</i> ^o | % | <i>n</i> ^o | % |
| 14 | 107 | 0.91 | 251 | 1.98 | 173 | 1.57 | 348 | 3.71 |

Fourteen health units where community institutions intervened were included in the study. TB suspect detection rates climbed from 0.91% of all health unit visitors in the second trimester of 2004 to 3.71% in the first trimester of 2005. Of these 14 sites, 11 diagnosed cases of active tuberculosis, summing 7 cases during the second trimester of 2004, and 14, 13 and 12 cases thereafter, through the first trimester of 2005.

Conclusion: Though DOTS was only recently implemented in Tungurahua, we have increased the TB suspect detection rate and participation by members of the community to monitor TB treatment. We thus determined that the participation of community groups was beneficial to public health unit users and that DOTS may achieve a higher level of success with a multisectorial approach.

PS-1896-20 Effect on adherence to anti-tuberculosis treatment of measuring risk of treatment default in the state of Chiapas

R I Orejel. Secretaria de Salud, Distrito Federal, México, Mexico. Fax: (+52) 5 26 14 64 33. e-mail: ivonneorejel@yahoo.com.mx

Tuberculosis has been declared a global emergency. Although technical and administrative activities have been developed to control it, no emphasis has been placed on evaluating treatment default. Default has repercussions on public health as it increases costs, diminishes cure rates and perpetuates transmission. Hence, the necessity for activities that will reduce default. This study modified an instrument used in another country to estimate the risk of treatment default with low costs and straightforward application.

Objective: To measure the risk of treatment default as a strategy to improve the administration of the tuberculosis programme, and implement activities that will improve treatment adherence in the state of Chiapas.

Hypothesis: Knowledge about each patient's risk of treatment default will allow the implementation of basic activities that can improve adherence to treatment, thus reducing the cost of care and improving its quality.

Elaboration of instrument: For this study, we modified an instrument used in another country to estimate the risk of default. Its application is inexpensive and straightforward. The risk for each variable of the instrument was calculated, considering the presence or absence of default. With these results, the variables for the new instrument were selected, considering the degree of association of the presence of the variable with default. Each variable was weighted according to the degree of association indicated by the relative risk of default in order to identify maximum sensitivity and specificity.

PS-1976-20 Education and advocacy: keys to enriching human rights

Y Ogunnubi. Nigeria Youth AIDS Program (Programs Unit), Lagos, Lagos State, Nigeria. Fax: (+234) 15840622. e-mail: wendypendy2000@yahoo.com

Background: Everyone has a right to life and dignity of human person. These rights are enjoyed when there is access to good medical care, freedom from discrimination and stigmatization, social welfare and exposure to education. Young people in Nigeria suffer the pains of TB and HIV infection without access to good and affordable medical care and support.

Issue/Problem: Young people do not have adequate information about their fundamental Human Rights and are therefore not able to advocate for the provision of basic needs. Medical care services are not youth friendly and this increases youth denial of TB-HIV infection.

Intervention: Various trainings are conducted for young people and adults in their lives e.g., parents, clergies, teachers, health workers, guidance counselors etc. The Human Rights and Gender Rights approaches to issues are adopted.

Result: Young people have formed themselves into advocacy groups, campaigning for better health care facilities and youth friendly services. Clergies preach against stigmatization on pulpit and care and support groups are formed in churches.

Conclusion: Social problems associated with TB and HIV would be reduced considerable when people know their rights and stand up for it.

PS-1979-20 Community support group

G Ajay. Community Support Group, Care and Support, Pokhara, Kaski, Nepal. Fax: (+61) 538509. e-mail: ajayguy@hotmail.com

Community Support Group (CSG) was formed almost two years back when few of our friends went for counseling training in Katmandu. After their return to Pokhara with new experience and enthusiasm we organized our very first program. Three of our members organized an awareness program for drug users and their families. In Janapriya campus around 50 people gathered to see a video film on drug addiction and hear from us how we succeeded on quitting our habit. There was a good response that gave us hope and courage to continue, and the number of our members started growing rapidly day-by-day. The indicator that assesses the effectiveness of our programs was the rapid growth in our membership. A strong support from the recovering fellowship helped a lot of our members to stay clean which we feel is an essential part in the recovery process. We continued door-to-door counseling, referral and motivation programs. In Mid 2002, CSG was registered as a Non governmental organization (NGO). CSG rented a small office was setup. By the end of 2002 the membership crossed over fifty members who were actively involved in our programs. CSG undertook many activities in 2002 yet the 'Hope and Courage' initiative with a slogan 'we do recover and we are the proof' was outstanding. First time ever in Nepal recovering drug users themselves conducted a survey to assess the Injecting Drug Use (IDU) scenario in Pokhara. In 2003 CSG successfully held a fundraising concert then Serene Foundation was established in January 2003, which started its rehabilitation program for drug users and positive people in Naya Gaun, Pokhara.

PS-1981-20 Advocacy for change

C M Thapa. Da Action Club, Advocacy, Pokhara, Kaski, Nepal. Fax: (+61) 538509. e-mail: da_action_club@hotmail.com

Da Action Club is a group of ex-user and positive people. This club is the branch of Serene Foundation Drug Treatment, Rehabilitation Center and HIV/AIDS Care and Support. In November 2003 A.D., it was established. Especially this club was established for the right's of drug user and positive group and empower ourselves and ourselves that how to fight against stigma and discrimination. There are many activist members in this club all over Nepal. Currently, in Nepal where, there is violation of drug user and positive right's we advocacy for this matter. E.g., By mail, by phone, by media, by press conference etc. Actually we have our small office where we provide free counseling, referral, field motivation and door to door counseling and we provide the training of advocacy. We have self help group and we run the meeting. On the occasion we do one day event, musical awareness program on Drug Addiction and HIV/AIDS. Currently we have more than 200 recovering members from all over nepal working as volunteer in our club. Though there are lots of NGOs working on drug use and HIV/AIDS field with their policy but hasn't been effective because day by day HIV/AIDS has been increasing. Without proper treatment, Care n Support they are loosing their life day by day along with crisis, stigma and discrimination. So we Da Action club are fighting for the rights and welfare of Drug Users and PALWA.

PS-1535-20 Impact des soins à domicile de proximité par les infirmiers pour les PVV en RDC

A Lutete. Hôpital général de Kinshasa, Kinshasa, D R Congo. Fax: (+243) 8913846. e-mail: rigiac_rdc@yahoo.fr

RIGIAC-SIDA/SANNAM, réseau des infirmiers qui luttent contre le VIH/SIDA en RDC, a initié une stratégie de soins à domicile de proximité par les infirmiers formés. Ceci a pour objectifs : promouvoir une prise en charge de qualité dans le respect de l'éthique et des droits des personnes; réduire l'impact de la stigmatisation et la discrimination du VIH sur l'individu et la famille ; améliorer la qualité de vie des PVV ;

Résultats : 672 visites pour les soins réalisées pendant 8 mois. Le RIGIAC a formé 90 infirmiers de 20 communes de Kinshasa sur les soins à domicile de proximité et a reçu 30 PVV référées par les hôpitaux et habitants dans 12 communes : 16 ont bénéficié de soins et vivent aujourd'hui positivement suite à l'encadrement des professionnels en collaboration avec la famille, 5 PVV qui subissaient la discrimination et leurs familles ont pu poser des questions et ont reçu des réponses. Aujourd'hui, elles ont intégré la famille et n'ont plus honte de parler de leur état, 9

PVV ont bénéficié des soins à domicile et 2 ont intégré le groupe de RIGIAC car elles ont trouvé que grâce aux services rendus par les infirmiers au niveau de la maison, aujourd'hui elles ont un traitement de qualité et du respect, la qualité de vie qu'elles menaient a augmenté. Ce renforcement du réseautage, le développement et la promotion de partenariat entre l'hôpital et tous les acteurs constitueront le socle du continuum de soins dans la prise en charge de l'infection à VIH. La stigmatisation des PVV demeure dans le milieu même si elle recule du fait des sensibilisations, alors il faut développer une approche de proximité pour amener la famille à un changement de comportement.

PS-1359-20 La problématique de la prévention contre le VIH dans les entreprises publiques

Tukala-Nzati. Office des Douanes et Accises, Matadi, RDC.
e-mail: benicobabaka@yahoo.fr

Le statistique croissant du VIH en RDC pendant la période post-conflit nous amène à réfléchir et à poser les actes dans le sens de la stabilité et la réduction du taux de prévalence. Sur ce, l'Office des Douanes et Accises travaille depuis 2 ans avec différentes ONGs dans le cadre de la prévention afin d'un changement de comportement des travailleurs, la réduction et par dessus l'élimination de la contamination entre personnels en encourageant un comportement responsable et l'accès au centre de dépistage volontaire car le VIH s'avère un facteur déstabilisant pour la prospérité d'une entreprise du fait de pertes des vies humaines ayant déjà acquis l'expérience et la compétence. Tenant compte des différents problèmes qui entourent cette pandémie, la prise en charge des personnes vivants avec le VIH reste la grande difficulté pour les travailleurs séropositifs. Dans ce cadre, l'ONG les bâtisseurs ensemble avec l'ODC ont mené plusieurs activités sur la formation des pairs éducateurs afin d'une conscientisation continue des personnels au sein de l'ODC. Enfin, nous pensons que notre participation à cette conférence pourra beaucoup apporter sur l'implication des entreprises publiques dans le cadre de la prévention mais surtout dans la prise en charge des travailleurs séropositifs.

PS-2107-20 Organizing dialogue for the provision of family life and HIV/AIDS education curriculum, in Abuja, Nigeria

U R O Onyeizu. Action Development for Life & Environment (Adlife), Abuja, Nigeria. Fax: (+234) 08 033 235755.
e-mail: uchennaonyeizu@yahoo.com

Considering the various forms of obstacles faced in implementing the former curriculum, there was need to inform, sensitize and motivate the teachers as the major implementers, to implementing the FLHE curriculum. This intervention research was carried out with the following objectives: 1) To assess the teachers'

level of knowledge, attitudes, practices towards the former curriculum (National comprehensive sexuality Education curriculum) and the present curriculum (National Family Life and HIV education curriculum). 2) To sensitize, inform and motivate the post-primary school teachers into action on the implementation of the National Family Life and HIV education curriculum. 3) To identify best practices for the implementation of the National Family Life and HIV education curriculum. Data were collected through questionnaires, administered to the teachers located in Abuja, focus-Group discussion and In-depth interview were conducted on level of knowledge of sexuality education, the national FLHE curriculum, and willingness to participate in the implementation of the FLHE curriculum, best practices for smooth implementation of the FLHE curriculum in their various communities/schools. The results showed that 83.33% of the respondents are aware of Sexuality education, while 66.67% are aware of the FLHE curriculum, but only 38.67% were ready to participate in the implementation of the curriculum. 48.67% agrees and believes that sexuality education will encourage early

PS-2128-20 Rapid assessment of popular knowledge about TB in 24 communities in Zambia and South Africa within a community randomized clinical control trial

V Bond,^{1,2} W Fisher,¹ S Wallman,³ E Murray,⁴ ZAMSTAR Social Science Team.^{1,4} ¹Zambart Project, School of Medicine, Lusaka, Zambia; ²London School of Hygiene and Tropical Medicine, London, ³University College London, London, UK; ⁴Desmond Tutu TB Centre, University of Stellenbosch, Cape Town, South Africa. Fax: (+260) 1 257215.
e-mail: gbond@zamsaf.co.zm

Objectives: To conduct a rapid assessment of sites, as part of baseline studies, to obtain a shallow and wide understanding of local domains of TB.

Methods: Based on broad brush survey methodology, spend four days in each site (16 in Zambia, 8 in Western Cape, South Africa) using participatory research tools (free listing, mapping, transect walks, structured observations, daily time charts, snapshot surveys) and informal conversations, to capture places of relevance to TB transmission, treatment and discourse, and, patterns of movement and communication. Two trained research assistants and two locally recruited fieldworkers conduct the fieldwork.

Findings: From preliminary findings to date, this approach is identifying local perceptions about TB transmission, 'hot spots', treatment options, prevention measures; levels of stigma; the relationship of HIV and TB; opinions of TB services. In addition, the use of time and space according to gender and age, the range of livelihood options and housing, and, the type of urban system emerges. Fieldwork in all sites will be finished by September.

Conclusion: Preliminarily, this approach appears to

be appropriate for obtaining a useful rapid and shallow community profile of local understanding and experiences of TB to inform the wider trial. It also captures significant variations between sites.

PS-1972-20 Role of medical school in TB control: the experience of Nepal

N Jha, S Rijal, S Koirala. Department of Community Medicine, BP Koirala Institute of Health Sciences, Dharan, Nepal. Fax: (+977) 25520251. e-mail: niljha@yahoo.com

Medical schools have the unique opportunity to contribute significantly to a nation's health and demonstrate social accountability by introducing changes in medical education, research and delivery of care for TB control. Medical schools should provide every medical graduate with the knowledge, skills and attitudes essential to the management of TB in the patient and in the community as a whole. They should develop an effective educational strategy to provide such ability to their students. The role of the future doctor's extends beyond being care providers to being effective communicators, counselors and managers to lead and mobilize the community in matters related to health. The role of medical schools within the context of TB should include teaching, service delivery, research and advocacy, as well as active participation in national program planning, implementation, monitoring, supervision and evaluation. Most importantly, medical schools must also practice the national policies and strategies for combating tuberculosis. BP Koirala Institute of Health Sciences at Dharan was the first institute in Nepal to set up a DOTS teaching centre. Concerted efforts have been made to orient training to the perceived needs of the community and to the principles of the national TB control program.

heads with 3 years of study or less, proportion of family heads with monthly income below or equal to 2 Brazilian minimum wages and inhabitants per bedroom. Using factorial analysis, these variables constituted a synthetic indicator of living conditions. The city was then layered on the basis of this indicator and by means of the cluster technique. The analysis pointed towards a relation between worse health conditions and residential poverty concentration, suggesting an urgent need for public policies to reduce possible harmful effects of social inequality.

PS-1269-20 Living conditions and tuberculosis: intra-urban differentials in Ribeirão Preto, Sao Paulo, Brazil

P Hino,¹ C B Santos,¹ T C S Villa.^{1,2} ¹College of Nursing, University of São Paulo at Ribeirão Preto (USP), Ribeirão Preto, São Paulo, ²Coordinator of TB Operational Research Area of Brazilian TB Research Network, Ribeirão Preto, São Paulo, Brazil. Fax: (+55) 16 633 3271. e-mail: paulahino@yahoo.com.br

This study describes the methodological framework adopted for constructing the Indicator of Social Necessity, to be used in the analysis of inequalities in risks for the occurrence of tuberculosis in Ribeirão Preto, São Paulo, Brazil and how it relates to the population's living conditions. An ecological study was carried out on the basis of the 2000 census, considering the following variables: proportion of homes with adequate water supplies, proportion of homes with adequate sanitary installation, proportion of homes with waste collection, illiteracy rates among population between 10 and 14 years old, proportion of family

ABSTRACT PRESENTATIONS FRIDAY 21 OCTOBER 2005

THEMATIC SLIDE PRESENTATIONS

ENGAGING THE COMMUNITY FOR BETTER LUNG HEALTH

TS-1438-21 Missed opportunities in TB contact screening in Singapore

S H Gan,¹ V C W Tan,¹ C B E Chee,¹ K W Khin Mar,¹ P Pushparani,¹ S K Chew,² Y T Wang.¹ ¹TB Control Unit, Tan Tock Seng Hospital, Singapore, ²Epidemiology and Disease Control Division, Ministry of Health, Singapore, Singapore. Fax: (+65) 63567391. e-mail: suay_hong_gan@ttsh.com.sg

Objectives: To determine the characteristics of TB patients around whom no contacts were screened and to identify issues which would be addressed so as to expand the reach of contact screening.

Method: A retrospective case-controlled study of sputum smear and culture positive pulmonary or laryngeal cases notified in year 2002. The data was obtained from the national TB notification registry which is linked to the TBCU Contact Clinic. Identified close contacts were invited to TBCU Contact Clinic for screening.

Results: There were 132 (20%) with no contacts screened. Of these, 24.2% did not have any index interview done, 37.1% were interviewed but did not identify any contacts and 38.6% identified their contacts but none of whom presented for screening. Those who lived alone, stayed in 1–2 room flats, and who had their treatment at centres other than TBCU were at significant risk for missed contact screening. Being non-married or unemployed is also significant in those who did not identify any contacts. Contacts of the non-Chinese patients tend not to turn up for screening.

Conclusion: Contact screening could be further improved by reaching out to patients who were treated at centres other than TBCU and those with poor social or economic background.

TS-1528-21 TB patients face heavy economic burden within the WB/DFID assisted free TB programme: perceived and actual costs. Social assessment case study in poor rural China

X Liu,¹ S Tang,² R Thomson,² X Zhao,¹ Y Gong.¹ ¹School of Public Health, Fudan University, Shanghai, China; ²Equi-TB Programme Liverpool School of Tropical Medicine, Liverpool, UK. Fax: (+86) 21 64039594. e-mail: xylu@shmu.edu.cn

Objectives: To describe medical expenditure of TB patients within the WB/DFID programme, and to identify the major influencing factors.

Methods: Social assessment was conducted in 4 provinces of China, using structured questionnaires and qualitative techniques.

Main findings: Most community residents over-estimated the cost of TB diagnosis and treatment, which accounted for 46.2% to 75.0% of their annual household expenditure. On average, it cost 1240 to 2600 RMB to diagnose and cure a TB patient, equating to 12.6% to 39.9% of annual household expenditure. The poorer families experienced higher disease burden. Many patients who knew that treatment is free still faced high costs when seeking TB care. This had led to a distrust and misunderstanding of the programme.

About 1/3 TB patients experienced more than 6 times outpatient visits to health facilities before diagnosis with costs accounting for more than 40% of their annual household expenditure. Also many people reported very high costs for treating side effects and extended treatment.

Conclusions: TB patients, especially the poor, still face heavy economic burden for accessing TB services, even with the WB/DFID supported programme providing free diagnosis and treatment. The main reasons for this high burden were delayed diagnosis and low quality service provision.

TS-1531-21 Multiple perspectives on TB diagnostic delay from community members to policy makers within the WB/DFID assisted programme in poor rural China: social assessment roll out study in Fujian, Henan, Xinj

F Yan,¹ S B Squire,² R Tolhurst,² W Wang,¹ G Wu,¹ Y Gong.¹ ¹School of Public Health, Fudan University, Shanghai, China; ²Equi-TB Programme Liverpool School of Tropical Medicine, Liverpool, UK. Fax: (+86) 21 64039594. e-mail: fyan@shmu.edu.cn

Objectives: To understand the contextual barriers to accessing timely TB diagnosis, especially among the poor and vulnerable.

Methodologies: Both quantitative and qualitative methods were applied among TB patients, suspects, community residents, health providers and policy-makers.

Findings: The duration from first seeking care to diagnosis in TB dispensary was long, 30%–60% patients in four provinces experienced a delay of over 2 weeks. Most patients had to visit health facilities more than once before diagnosis, with 17–30% patients experiencing more than 6 visits. The number of visits before diagnosis was the key factor impact the diagnosis delay. Qualitative study showed the delay was mainly because of limited health professions capability, recognition of TB, responsibility and attitude of doctors toward patients. It was also suggested that the pressures of the cost recovery system meant some doctors were unwilling to refer patients to TB dispen-

saries and sometimes would prescribe medicine without diagnosis. Women and elderly patients were found to experience more diagnosis delay.

Conclusion: Diagnosis delay was serious, and was mainly influenced by provider behaviour. It is recommended that training is increased for health providers at all levels. It is also necessary to strengthen DOTS management and incentive mechanisms to encourage referral.

TS-2129-21 Public-private mix: interventions in DOTS

J N Banavaliker,¹ T Subbareddy,² P Sommerfeld.³ ¹TB & Chest Diseases, Municipal Corporation of Delhi, Delhi, ²Krishna Community Health Interventions Project, Vijay Wada, Andhra Pradesh, India; ³TB Alert, London, UK. Fax: (+55 11) 23654940. e-mail: jnbanavaliker@yahoo.com

Krishna Community Health Interventions Project (KRISCHIP), a joint venture of TB Alert, UK and Lepira, India covers a population of 1 125 260 in Krishna District of Andhra Pradesh, India. Two microscopy center in urban areas, Ranigarithota (MC-I) and Kothapeta (MC-II) in April 2004 were adopted by TB Alert, UK. Health Interventions in form of more training programme, Health Camps, Default retrieval measures, motivation of patients, increasing the number of Community Health workers and involving Primary Health Providers of the area.

Observation: Strengthening and better quality service resulted in increase of following parameters within one year. The details are:

| Sl. No. | Parameters | Baseline (1.4.03–31.3.04) | | Period from (1.4.04–31.3.05) | |
|---------|--------------------------------------|------------------------------|-------|---------------------------------|-------|
| | | MC-I | MC-II | MC-I | MC-II |
| 1. | No. of chest symptomatics (referral) | 372 | 553 | 613 | 723 |
| 2. | No. of sputum examination | 475 | 670 | 760 | 632 |
| 3. | New smear positive cases | 79 | 166 | 97 | 179 |
| 4. | Total case detection | 129 | 285 | 158 | 313 |
| 5. | Sputum conversion rate | 82.4% | 89.1% | 93.5% | 95.8% |
| 6. | Defaulter rate | 6.5% | 4.5% | 1.8% | 1.2% |
| 7. | No. of CHW | 20 | 31 | 32 | 45 |
| 8. | No. of PHP | 2 | 4 | 7 | 10 |

Inference: Health Intervention by TB Alert (NGO) resulted in significant improvement and better overall results in the implementation of DOTS within a period of one year.

TS-1567-21 Contest for journalists on excellence in reporting TB as a tool to raise awareness of media and public about TB

W Jakubowiak,¹ N Azhgikhina,² O Lovacheva,³ K Malakhov,¹ O Oleinik.¹ ¹Office of the Special Representative of the WHO Director-General in Russia, Moscow, ²National Union of Journalists, Moscow, ³Central TB Research Institute of the Russian Academy of Medical Sciences, Moscow, Russian Federation. Fax: (+7) 95 787 2149. e-mail: w.jakubowiak@who.org.ru

Introduction: Low awareness of Russian media about TB and complex epidemiological situation urged WHO and National Union of Journalist (NUJ) to conduct a contest for journalists on excellence in reporting TB within World TB Day campaign'04. International Federation of Red Cross and Red Crescent Societies, Russian Red Cross, Gorbachev Foundation and partners supported the contest.

Objectives: To raise awareness of journalists and foster responsible reporting of TB issues to build public support for effective TB control.

Methods: WHO collaborated with NUJ to advertise, conduct the contest and assist with selecting winners.

Results: 94 print, video, audio and Internet entries from 45 regions of Russia were submitted. The contest increased media coverage of TB issues throughout the country and built up good working relationship with NUJ and national media. Positive feedback was received from media community and partnering agencies.

Conclusion: Contest for journalists became a useful and potent advocacy tool and provided an opportunity to dispel media misconceptions regarding TB. It created a pool of knowledgeable journalists to present accurate information and act as advocates for effective TB control. The quality of entries proved the need to continue building capacity for advocacy and raising awareness of national media through trainings.

TS-1479-21 How can the community contribute in the fight against HIV/AIDS and TB? An example from a rural district in Malawi

R Zachariah,¹ R Teck,² L Buhendwa,² S Labana,² C Chinji,² P Humblet,¹ A D Harries.^{3,4} ¹Medical Department (operational research) Médecins Sans Frontières, Luxembourg; ²Medecins Sans Frontières, Thyolo District, ³Technical Advisor (HIV/AIDS), Ministry of Health and Population, Lilongwe, Malawi; ⁴Honorary Professor, London School of Hygiene and Tropical Medicine, London, UK. Fax: (+352) 335 133. e-mail: zachariah@internet.lu

Setting: Thyolo district, rural Malawi.

Objectives: To describes a) the experience of initiating community involvement in HIV/AIDS and tuberculosis (TB) activities and b) some of the different activities and outcomes of community involvement.

Methods: Community members were involved in planning and implementation. Data from January 2003 to December 2004 was reviewed.

Results: Forty-one per cent of a total of 52 510 HIV-tests which identified 15 556 HIV-positive individuals were conducted by lay-community counsellors. A community network of 465 volunteers, 1362 family care givers and 9 nurses provided care and support to 5106 HIV positive individuals including 2006 (39%) in World Health Organisation stages III and IV. A total of 1634 individuals were placed on ART of whom 895 (55%) were living in areas with community involvement. For all patients on ART living in areas with and without community involvement, those alive and on ART was respectively 96% and 76% ($P < 0.001$); death was 3.5% and 15.5% ($P < 0.001$); defaulted was 0.1% and 5.2% ($P < 0.001$) and stopped ART was 0.8% and 3.3% ($P < 0.001$). A total of 2714 TB patients, 60% of whom were HIV-positive also received community support.

Conclusions: Communities can play a important contributory role in reducing the burden of HIV/AIDS and TB, mitigating its impact and in improving treatment outcomes.

TS-1272-21 Success of DOTS implementation in the Kyrgyz Republic

A S H Alisherov,¹ M B Omurzakov,² T D Aptekar.² ¹General Director of the National Center of Phthisiology, Bishkek, ²Project HOPE Kyrgyzstan TB Control Program, Bishkek, Kyrgyzstan. Fax: (+996) 312 511937. e-mail: momurzakov@projecthope.kg

Introduction: DOTS was introduced in the Kyrgyz Republic in pilot regions in 1996. In 1998 DOTS strategy covered 100% of civil population of the country. **Objective:** To measure progress towards the WHO global targets.

Methods: Cohort analysis based on the WHO quarterly reports on case finding and treatment outcomes from regional reports.

Findings: The percentage of detected new Smear (+) TB patients in primary health care facilities has increased from the point when DOTS covered all civil population of the country 1.2% to 7.2% (2004). The percentage of new detected Smear (+) patients has been increasing (2001 – 36.3%, 2002 – 39.6%, 2003 – 41.0%, 2004 – 45.5%). An increase in detecting Smear (+) cases is accompanied by a fairly high sputum conversion among them (2001 – 87.2%; 2002 – 86.7%; 2003 – 90.8%), which is an indicator of a positive progress in program implementation. Treatment success rate is observed (2001 – 80.6,0%; 2002 – 82.0%, 2003 – 84.5%).

Conclusion: Kyrgyzstan demonstrates a high commitment to DOTS strategy. Kyrgyzstan is approaching to global the WHO target in achieving 85% of treatment success.

TS-1611-21 Ensuring accountability: the impact of the cohort review method on tuberculosis control in New York City

S D Ahuja,¹ S S Munsiff,^{1,2} L King,¹ C Udeagu,¹ M Dorsinville.¹ ¹Bureau of Tuberculosis Control, New York City Department of Health and Mental Hygiene, New York, New York, ²Division of TB Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+212) 7889836. e-mail: sahuja@health.nyc.gov

In 1993, the NYC TB Bureau developed the cohort review process as a quality assurance method to track and improve patient outcomes. The Bureau Director reviews case management, treatment outcome and contact investigation of all TB cases quarterly in a multi-disciplinary staff meeting. Since 2004, we have collected details on issues identified at cohort review to assess how this process impacts TB control efforts. For the 478 patients in the first two quarters of 2004, 306 issues were identified among 222 patients; 59% were incorrect, unclear or unknown patient information, 13% were treatment issues (e.g., wrong regimen or dosage), 12% were case management issues (e.g., delay or lack of follow-up or intervention for cases) and 9% were incomplete contact investigations. Most (92%) issues were resolved within 30 days of the cohort reviews. Since implementing cohort review, there has been a 70% decrease in NYC TB cases from 3811 in 1992 to 1140 in 2003. Treatment completion rates increased from 52% for 1992 cases to 79% for 2002 cases (P for trend < 0.001). Systematically reviewing TB cases improves the quality of patient information, enhances patient treatment and ensures accountability at all levels of the TB control program.

TS-1809-21 Role of peak flowmetry and spirometry in clinical practice of Iranian pediatricians

M H Bermanian, M Gharagozlou, H Abdollahpour, Z Moeinfar, M Sedaghat. Department of Immunology And Asthma And Allergy, The Children Hospital Medical Center, Tehran, Iran. Fax: (+98) 216935855. e-mail: mhbbermanian@razi.tums.ac.ir

In the recent decades, there is an increased incidence of childhood asthma throughout the world. Among the various available investigation modalities, spirometry and peak flowmetry are invaluable tools for the assessment of the lung function in the asthmatic patients including children. This study was done to determine the role of these tools in clinical practice of Iranian pediatricians about childhood asthma. Validated questionnaires were completed by 200 pediatricians from different parts of Iran during the International Congress of Pediatrics in Tehran, October 2002. A total of 193 returned questionnaires (96.5%) were eligible for the survey and analysis, about 49% of the respondents, diagnosed childhood asthma only by clinical finding, about 8% by both spirometry and

clinical finding, 1.6% only by spirometry. About 10% of the respondents ordered spirometry for the patients with acute asthma and 43% for chronic asthmatics. At least one spirometry per year has been done by 21.8% of the pediatricians, for each asthmatic child. About 59% of the respondents had some knowledge about peak flowmetry but 50% of them did not use it at all. Practical use of peak flowmetry and spirometry in of asthma has well known role, but a significant number of the pediatricians were not familiar to their indications and did not use them. This study may provide useful data for health program, planners for further decision about childhood asthma and educational programs.

POSTER DISCUSSION SESSIONS

EDUCATION, ADVOCACY AND SOCIAL ISSUES-II

PC-1102-21 HIV and TB perception among dense populations in Bangkok, Thailand

O Rhucharoenpornpanich,¹ Y Tadashi.² ¹AIDS Control Division, Bangkok Metropolitan Administration, Bangkok, Thailand; ²International Medical Center of Japan, Tokyo, Japan. Fax: (+662) 860 207. e-mail: orrataimoo@hotmail.com

Background: Approximately 15 000 people in Bangkok develop tuberculosis annually. TB cases have sharply increased with the HIV epidemic and most cases live in crowded communities. This study investigated TB perceptions among these communities and recorded suspected TB cases based on respondents' self-reports.

Methods: A total 398 respondents aged 15–49 years were recruited from 12 Bangkok communities using multi-cluster random sampling for household selection. Self-administered questionnaires were conducted regarding TB perceptions. Self-reported signs and symptoms relating to TB were investigated.

Results: Knowledge of TB was rather low. Nearly 40% of respondents had never heard of TB and 55% of those ever hearing of TB were pessimistic that it was terrible and fatal. Over 70% had no idea what caused TB and less than half of respondents understood that HIV and TB were related. Reports of X-ray for suspected TB symptoms was 4.6% and was 3.8% by sputum exam, and 4.6% of respondents reported having TB cases in their families.

Conclusions: Knowledge of TB and its association with HIV was rather limited. More health education and HIV related TB programs are necessary for better understanding of HIV-TB in these crowded communities.

PC-1140-21 Implementation of innovative TB health promotion strategy in Hebei, China

G X He,¹ M Xu,¹ L Yu,¹ L Zhou,¹ J P Cao.² ¹National Centre for TB Control and Prevention, China CDC, Beijing, ²Hebei CDC, Shijiazhuang, China. Fax: (+86) 106 3029984. e-mail: heguangxue@chinatb.org

Background: FIDELIS project is implemented in 45 poverty counties with the population of 19 million in Hebei.

Objective: To increase the case-detection rate of TB while maintaining high cure rate through the innovative Health Promotion Strategy.

Methods: 45 poverty counties in Hebei are selected and a pack of innovative health promotion activities are conducted to inform the general public the knowledge and policy of TB, including wall painting, mass media, government notice, distribution of posters/flyers by students, recreational activities. Incentive mechanisms are implemented to motivate referral of TB suspects to TB dispensary by village doctors/leaders.

Results: From Jan to Dec 2004, 54 732 TB suspects are identified which is 3.99 fold of the baseline. 8882 new S+ TB are detected which is 115.3% of project goal and 2.69 fold of the baseline. 7740 new S+ TB are with limited access to health service which is 113.7% of the project target goal and 4.68 fold of the baseline. The conversion rate at the end of 2nd month and the cure rate are both 96%.

Conclusion: The health promotion strategy has greatly increased the case-detection rate in project area while maintaining high level of cure rate, which prove the effectiveness of health promotion activities.

PC-1300-21 A tuberculosis patient's self applied social stigma assessment instrument to assist front line health workers in customizing care in Nicaragua

J Macq,¹ A Solis,² G Martinez.² ¹School of Public Health - Université Libre de Bruxelles, Bruxelles, Belgium; ²Centro de Investigaciones y Estudios de la Salud, Managua, Nicaragua. Fax: (+32) 25554049. e-mail: jmacq@ulb.ac.be

We developed an instrument to assess TB stigma in individuals. This was primarily aimed at measuring effectiveness of intervention to reduce negative effects of social stigma in Nicaragua. However, frontline health workers started to use it as a way to identify TB stigma problems and capacities in affected people. The TB stigma instrument was inspired from Internalised Stigma Measure Instrument of Ritsher. It contained initially 40 statement to be completed by the patient with the help of a relative. It has been so far applied to 124 TB patients in Nicaragua at the starting of the treatment, 15 days, 2 months and 4 months after. It includes dimension of internalised stigma (alienation, stereotypes endorsement, discrimination experience and social withdrawal) and determinants of coping with it (self-esteem, stigma resistance and

Importance given to social network by PATB and felt autonomy or dependence). To make it easier to use in routine, the initial instrument was reduced to 15 statements particularly relevant in the context of Nicaragua and covering the same dimensions. More testing should be done of similar instruments so as to assist frontline health worker in prioritizing supportive activities to needs and capacities of people affected by TB.

PC-1302-21 Assessing limited access to DOTS among new smear-positive cases in Nairobi, Kenya

J R Ong'ang'o, P O McOrida. International Medical Corps, Nairobi, Kenya. Fax: (+254) 020573973. e-mail: jongango@imcafrica.org

Tuberculosis remains a big burden in Kenya. We examined the health seeking behaviour among the new smear positive (NSP) TB cases. We categorized those with limited or unlimited access to directly observed treatment short course (DOTS) based on the FIDELIS' limited access to DOTS tool. We interviewed 1183 NSP cases in 2004. Males were more than females (60% vs. 40%, $P = 0.001$). Mean age was 30.3 years (95%CI 29.7–30.8). The mean duration from start of symptoms to diagnosis was 7.3 weeks (95%CI 7.0–7.7). 57% reported a health seeking behaviour; traditional (26%), medical non-TB treatment (60%), TB treatment (14%). Total delay was shortest amongst those who sought non-TB treatment. Duration of symptoms was similar in both sexes. 57% of the cases had limited access to DOTS. There was a significant relationship between delay and accessibility ($P = 0.0001$). The TB cases diagnosed in the periphery were more likely to have limited access as compared to the rest (72% vs. 28%, $P = 0.0001$). In conclusion there is considerable delay between onset of symptoms and treatment initiation among newly diagnosed patients. More evaluation about this delay is needed.

PC-1400-21 Knowledge, attitudes and beliefs about tuberculosis among patients undergoing treatment within dispensaries in Almaty City, Kazakhstan

J M Mangan,¹ V Jurkuvenas,² G Rakishev,³ S Ismailov,³ N Mukushev,⁴ R Duisenova,⁴ K Moldakhmetova,⁴ M E Kimerling.^{2,5} ¹Lung Health Center, University of Alabama at Birmingham, Birmingham, ²Gorgas Tuberculosis Initiative, University of Alabama at Birmingham, Birmingham, Alabama, USA; ³National Center of Tuberculosis Problems, Almaty, ⁴Zhetisu Tuberculosis Dispensary, Almaty, Kazakhstan; ⁵Division of Geographic Medicine, Department of Medicine, University of Alabama at Birmingham, Birmingham, Alabama, USA. Fax: (+1) 205-975-6118. e-mail: jmangan@uab.edu

Objective: One-on-one interviews, a focus group and a survey were conducted with patients undergoing tuberculosis (TB) treatment to enable collaborators to

obtain a baseline measure of knowledge, attitudes, and beliefs towards TB and its treatment regimen, and evaluate the impact of a planned patient education case-management protocol.

Methods: Results from the interviews and focus group led to the development of a two-scale questionnaire. Over 5 days in June 2004, the questionnaire was administered to a convenience sample ($n = 138$) of inpatients and outpatients from five adult-care TB institutions in Almaty City.

Findings/results: The majority of patients understood TB transmission; the need for TB-specific medicines and good nutrition to achieve a cure; the benefits of treatment; why relapse occurs and how drug resist strains develop. However, many patients did not understand the need for uninterrupted treatment (41%) and the risk of death (50%). A number of patients do not view medicines are being easy to access (66%), and some suspect that the medications are inferior compared to those of other parts of the world.

Conclusion: Overall, patients have a good knowledge base, yet some patients' perceptions towards their treatment regimen and care could have a negative impact on adherence and cooperation.

PC-2008-21 Medical pluralism in Zambia: experiences of people with HIV/AIDS and/or TB, study in 4 selected districts using qualitative approaches

A Nyirenda,^{1,2} B Ingstad,² T Torfoss.³ ¹Copperbelt Health Education Project, Kitwe, Copperbelt, Zambia; ²University of Oslo, Department for General Practice and Community Medicine, Oslo, ³Association for Heart and lung Patients in Norway, Oslo, Oslo, Norway. Fax: (+260) 222 2723. e-mail: alick@zamnet.zm

Objectives: The purpose of the study is to identify, explore, describe and gain an in-depth understanding of medical pluralism in Zambia through the lived experiences of PLWHA in their therapeutic journeys in search of the best possible treatment options.

Methodology: Qualitative study conducted for 5 months, involving 30 in-depth Interviews of People Living with AIDS and/or co-infected with TB; 10 Focus group discussions involving support group members in purposely selected areas; participant observation of 2 selected male PLWHA for 3 months; a workshop involving various health service providers like doctors, traditional healers, ex-TB Patients and PLWHA to get recommendations on improved service coordination.

Findings: There are various health service providers whose coordination remains to be vertical alone, through associations while others are tokenistic. The formalised coordination mechanisms to jointly support patients are affected by 'professional jealousy'. Qualitative differences in diagnosis and of both TB and AIDS, lack of trust and confidence in providers

way of working and unformalised referrals combine to make the lives of TB patients inadequately met. Food poverty, stigma and discrimination and disrupted treatment increased the dilemmas of TB patients. Most patients are good carers themselves, while carers were 'bad patients'.

Conclusion: There is urgent need to harmonise treatment protocols, agree on workable modalities of collaboration and adequately provide resources to needy patients. More surveys to derive more evidence based insights will help inform policy definers and practitioners in TB and AIDS interventions for cost-effective treatment.

PC-2021-21 Pathways to MDR-TB infection among patients enrolled in a DOTS-Plus project in Karakalpakstan, Uzbekistan

H S Cox,¹ S Allamuratova,² N Zarkua,² Y Kebede.³

¹Australian International Health Institute, The University of Melbourne, Melbourne, Victoria, Australia; ²Medecins Sans Frontieres, Tashkent, Uzbekistan; ³Medecins Sans Frontieres, Amsterdam, The Netherlands. Fax: (+61) 3 8344 9130. e-mail: h.cox2@pgrad.unimelb.edu.au

Introduction: Multidrug-resistant tuberculosis (MDR-TB) arises either through primary infection with drug-resistant strains or through inadequate treatment. Inadequate treatment is often attributed to poor adherence on the part of patients. This perception may contribute to a reluctance to offer effective second-line treatment.

Aim/method: To enhance understanding of the pathways to MDR-TB, a series of 10 case histories of MDR-TB patients were compiled. Five men and 5 women were interviewed about their previous treatment experiences, supplemented by data from medical records. Data from both sources were combined to create a detailed description of their treatment trajectories.

Findings: Several patients were likely to have been directly infected with MDR-TB or a drug-resistant strain, which amplified resistance to MDR-TB during first-line treatment. For those in whom inadequate treatment was the likely cause of their MDR-TB, contributing factors related predominantly to pre-DOTS treatment with non-standardised regimens and poor drug supply. Circumstances forcing treatment outside of the DOTS programme and previous imprisonment were also important.

Conclusion: In this setting, health system and socio-political issues beyond the control of patients, rather than deliberate non-adherence, appear more significant contributors to MDR-TB infection. Therefore, a history of poor adherence should not be a legitimate barrier to second-line treatment.

PC-2126-21 Client perceptions of quality of care in TB control in Kenya

J K Sitienei,¹ O Ouma Onyango,² S G Gacheri,¹

D P Muthama.¹ ¹National Leprosy and Tuberculosis program, Nairobi, ²Nairobi University, Nairobi, Kenya.

Fax: (+254) 202713198. e-mail: kimsitienei@yahoo.co.ke

A qualitative study was undertaken to explore the quality of care through the eyes (QUOTE) of the TB patients with a view to developing a tool for measuring quality of care. Kenya has a large and rising tuberculosis (TB) disease burden. Data were gathered in two rural districts and one urban district using focus group discussions (18) and in depth interviews (27). The study population comprising of patients, providers and stakeholders were selected using convenience sampling. Five most important aspects of TB services in the eyes of the patients were: drugs availability, accessibility, food provision, competent staff and home visits. Quality of care perspectives from the providers and stakeholders were triangulated with patients' views to develop the full range of quality of care issues and to develop the tool for measuring quality of care in the eyes of TB patients. The tool developed can be used for rapid assessment of quality of care in different service delivery points in both public and private institutions. It is recommended that program managers should incorporate the tool in routine assessments of quality of care with a view to achieving patient satisfaction.

PC-2156-21 Training of specialists as an important component of successful DOTS implementation

K Miskinis,¹ S Lyepshina,² A Anishchenko,³ I Dubrovina.¹

¹WHO Country Office in Ukraine, TB Control Programme, Kyiv,

²M. Gorky Donetsk State Medical University, Donetsk,

³Donetsk oblast clinical TB Hospital, Donetsk, Ukraine.

Fax: (+370) 44 2309124. e-mail: kmi_who@i.kiev.ua

In 2004, the WHO Project for implementing DOTS strategy in Donetsk oblast was completed. 100% of 4.8 million population of Donetsk oblast was covered by DOTS. DOTS implementation in Donetsk oblast was assessed by independent technical audit as successful. Training of specialists considered as the most important part of DOTS. Totally 3400 different specialists were trained: 359 TB specialists, 264 lab technicians, 1098 general practitioners (GP), 776 nurses, 186 other specialists, 717 representatives of other oblasts of Ukraine. Cohort analysis shown that results achieved are considerably better after training than before. Detection of smear positive TB cases in general medical care facilities before training of GP was 0.02%, after training increased by 2.8% out of all referred to lab suspects. The monitoring of DOTS program showed that in longer period after training results are going to worsen, which proved that training of specialists should be a constant process. For

that refreshment training was introduced. It included renewal of updated training materials as well as analyzing of achieved results and mistakes made. In 2005 additionally 100 medical specialists have been trained according to this new program, which improved motivation of specialists and strengthened DOTS program in Donetsk oblast.

PC-2185-21 Reaching the un-reached with TB services: the challenge for community DOTS in India

J Seeberg, T K Ray, A Bhattacharya. Danida, Bhubaneswar, Orissa, India. Fax: (+91) 674 2550896. e-mail: jseeberg@hum.au.dk

As part of the implementation of Revised National Tuberculosis Control Programme (RNTCP) to control TB in India, DOTS was launched in the state of Orissa (37 million population) from 1997 onwards. Substantial district-wise variation was observed. In some districts, the health infrastructure is weak and marginalized populations have no access to services. An operational research (OR) project was undertaken in Malkangiri district in 2004–2005 to increase access to services.

Objective: To increase case detection and access to TB services among uncovered populations through a community-DOTS intervention package.

Methodology: A combination of baseline studies were conducted, including an ethnographic community study and health survey of eight villages selected; and a study of the functioning of DPs. A combination of interventions was developed to address the identified problems. Follow-up studies were conducted 6 months after the launch of the intervention.

Results: The baseline studies showed that relations between service providers and communities were characterized by a) substantial unrecognized communication gaps; b) mutual mistrust and sometimes outright hostility caused by social distance; and c) financial and geographical barriers to service utilization. The intervention package was assessed in a follow-up study after 6 months.

EPIDEMIOLOGY OF TB-I

PC-1229-21 Reproducibility of chest radiographs for pulmonary TB as a tool for epidemiological research

S Den Boon,^{1,2,3} D A Enarson,⁴ E D Bateman,⁵ M W Borgdorff,^{2,3} S Verver,³ C J Lombard,⁶ E Irusen,⁷ N Beyers,¹ N White.⁵ ¹Desmund Tutu TB Centre, Fac. of Health Sciences, Stellenbosch University, Cape Town, Western Cape, South Africa; ²Department of Infectious Diseases, Tropical Medicine and AIDS, Academic Medical Centre, Amsterdam; ³KNCV Tuberculosis Foundation, The Hague, The Netherlands; ⁴International Union Against Tuberculosis and Lung Diseases, Paris, France; ⁵Division of Pulmonology, Department of Medicine, University of Cape Town, Cape Town; ⁶Biostatistics Unit, Medical Research Council, Cape Town; ⁷Department of Internal Medicine, Stellenbosch University, Cape Town, South Africa. Fax: (+27) 021 938 9138. e-mail: 14321823@sun.ac.za

Objective: The quality of chest radiograph (CXR) reading is highly dependent on the interpretation of the reader. The aim of this study was to determine if a standardised classification system containing a pre-coded reading form can result in good reproducibility on CXR reading.

Design: An experienced pulmonologist read 2614 CXRs as part of a tuberculosis prevalence survey. A stratified random sample of 810 films was read by a second reader and kappa was calculated to determine inter-reader agreement. The second reader dually read a stratified random sample of 104 CXRs to determine intra-reader agreement.

Results: The kappa agreement between the two readers was 0.47 (95%CI 0.41–0.52) for any abnormalities and 0.70 (95%CI 0.65–0.75) for abnormalities consistent with tuberculosis. The kappas for intra-reader variability were 0.85 (95%CI 0.74–0.95) for any abnormalities and 0.90 (95%CI 0.81–0.99) for abnormalities consistent with tuberculosis.

Conclusion: This standardised method for CXR reading to determine pulmonary TB leads to high inter- and intra-reader agreement. This study suggests that chest radiography may be much more useful as a diagnostic tool for tuberculosis in epidemiological studies than has been previously recognized.

PC-1248-21 High burden of tuberculosis and of drug-resistant tuberculosis in the population of foreign origin in the European Union

A Infuso, D Falzon. EuroTB, Department of Infectious Diseases, Institut de Veille Sanitaire, Saint-Maurice, France. Fax: (+33) 1 41796802. e-mail: a.infuso@invs.sante.fr

In the 25 European Union (EU) countries, 63 224 tuberculosis cases were notified in 2003, an overall rate of 13.8 per 100 000 population. Persons of foreign origin (by birth or citizenship) represented 30% of cases (16% from Africa or Asia; 8% from a non-EU country of Europe or of the former Soviet Union).

Rates per 100 000 (data for 10 countries) were 58.8 in the population of foreign origin and 5.5 in the national population. Age-specific rates peaked at 25–34 years in foreigners (91.7) and over 64 years in nationals (11.9). Between 2000 and 2003 (19 countries), cases in foreigners increased by an average annual 4.4% while those in nationals decreased by 5.4%. In the Baltic States, 594/3050 culture-positive cases (19.5%) were multidrug-resistant (MDR). In 13 other countries, 139/8539 cases (1.6%) were MDR (range: 0–2.2%), of which 109 (78%) of foreign origin, mostly from the former Soviet Union. In 2002 (17 countries), treatment completion for new culture-positive pulmonary cases ($n = 10\,001$) was reported in 76% foreigners and 75% nationals, but the proportion of default, transfer or unknown was higher in foreigners (17% vs. 9%). In the EU, specific interventions in the population of foreign origin are needed to progress towards TB elimination.

PC-1468-21 High yield of LTBI and active TB from large scale contact tracing after a case of smear-positive tuberculosis in a supermarket, the Netherlands, 2005

B Koster,¹ K Borgen,^{2,3} H de Lange,¹ H Meijer,⁴ S van der Plas,² V Kuyvenhoven,⁵ F Cobelens.^{5,6} ¹Municipal Health Service (GG&GD) Utrecht, Utrecht, ²Department of Infectious Disease Epidemiology, National Institute for Public Health and the Environment, Bilthoven, ³European Programme for Intervention Epidemiology Training (EPIET), Bilthoven, ⁴Municipal Health Service (GGD) Midden-Nederland, Zeist, ⁵KNCV Tuberculosis Foundation, Den Haag, ⁶Division of Infectious Diseases, Tropical Medicine and AIDS, Academic Medical Center, Amsterdam, The Netherlands. Fax: (+31) 30 2744409. e-mail: katrine.borgen@rivm.nl

Background: In November 2004, in the Netherlands, a supermarket employee was diagnosed with smear-positive lung tuberculosis (TB) (index case). Contact investigation revealed high yield of latent tuberculosis infections (LTBI), defined as tuberculin skin test (TST) ≥ 10 mm, among family members/friends (100%) and colleagues (56%) of index case. An extended investigation was undertaken to further identify and treat infected contacts.

Methods: Using the 'concentric circle' method, a third circle was defined as all customers of this supermarket between 1 January and 18 November 2004. LTBI was defined as TST ≥ 15 mm. People born before 1 January 1945, were screened by chest X-ray only.

Results: In total, 15 515 people were screened by TST and 5975 persons by chest X-ray. Of 14 128 TSTs assessed, 350 (2.5%) were positive for LTBI. These 350 and 58 people with risk factors for TB were invited for clinical examination. Among these 408, seven cases of active TB were detected and short-course chemotherapy commenced. Of the 5975 persons screened by chest X-ray, 480 (8%) were referred for clinical examination.

Conclusion: In a low endemic country, patients with undetected active TB can infect many persons outside their immediate surroundings and extended contact tracing is essential to limit further spread of disease.

PC-1716-21 Magnitude of extrapulmonary tuberculosis in Cairo, Egypt, 2002

N B Wahib. NTP Egypt, Supervision Coordinator, Cairo, Egypt. Fax: (+20) 7921079. e-mail: nabilawahib@yahoo.com

The study was descriptive study done at Cairo governorate, the capital of Egypt in the year of 2002 in all the chest clinics (11) chest clinics, the study population are all cases of extra-pulmonary type was recorded in tuberculosis registers which were 143 cases

Results: Number of cases were recorded are less in comparison to expected number according to the ARI were expected 420 and detected 143, the main site of case detected were the lymph node (the cervical) and the pleural effusion, the cases prevalence as regard age between 15–40 years, all cases were diagnosed less than 15 years are contacts of pulmonary cases and the cases prevalent in females and males, 76% of cases were diagnosed on scientific bases and 24% on clinical examination, not all the cases were not well recorded and reported, the all cases diagnosed represented 18% of all form of tuberculosis at that year

Conclusion: Good collaboration of all health sectors to reach the NTP objectives; good reporting and recording system is needed; all extrapulmonary cases of tuberculosis should be diagnosed on scientific bases, all contacts of cases should be examined for tuberculosis, more stress on health education for early detection of cases.

PC-1867-21 High tuberculosis incidence during 4 years of follow-up among contacts of sputum smear-positive pulmonary TB patients in Rotterdam, The Netherlands

A C Gebhard,^{1,2,3} S Verver,¹ M W Borgdorff.^{1,4} ¹KNCV-Tuberculosis Foundation, The Hague, ²Municipal Health Service West Brabant, Breda, ³Municipal Health Service Rotterdam, Rotterdam, ⁴University of Amsterdam, Amsterdam, The Netherlands. Fax: (+31) 703584004. e-mail: gebharda@kncvtbc.nl

Population and methods: Retrospective cohort study among contacts of sputum smear positive PTB patients registered from 1998 till 2001. Included were contacts screened only by X ray, in whom TST was not done as they were born before 1945, or had previous TST result ≥ 3 mm, or previous BCG or over 25 years old from counties with high TB incidence. Mean follow-up period (passive) was 3.7 years. Multivariate Cox regression identified variables of indexes associated with survival of contacts.

Results: 65 TB cases occurred in 2663 contacts, 47/65 (72%) bacteriologically confirmed. Incidences

(per year) for household contacts declined from 57/1000 (95%CI 31–96) during month 1–6 till 8/1000 (95%CI 3/1000–18/1000) during month 25–36, for other close contacts from 21/1000 (95%CI 11/1000–5/1000) during month 1–6 till 3/1000 (95%CI 1/1000–6/1000) during month 13–24. Casual contacts had no increased incidence. Index variables independently associated with poorer contact survival ($P < 0.05$) were male sex, originating from several Asian or African countries and combined homelessness/drug abuse.

Conclusions: Both household and other close contacts of SS+ PTB patients in the study have a prolonged increased risk to develop tuberculosis. In The Netherlands active follow-up for 2–3 years should be considered for this group of contacts, possibly in combination with TST examination and preventive treatment.

PC-2085-21 Tuberculosis in nine cities in Asia and the Middle East

C-Y Chiang,¹ A Trébucq,¹ N Billo,¹ Bangkok Workshop Participants.² ¹International Union Against Tuberculosis and Lung Disease, Paris, France; ²Bangkok Workshop Participants, Bangkok, Thailand. Fax: (+886) 225793551. e-mail: cychiang@iuatld.org

Objective: To understand the epidemiologic situation of tuberculosis and to identify the principal obstacles in the fight against tuberculosis in urban environments.

Design: A poster format standardizing the information to be collected was distributed to participants from Bangkok, Cairo, Cebu, Dhaka, Ho Chi Minh City, Jakarta, Karachi, Kathmandu, and Phnom Penh for data collection.

Results: Notification rates of new smear positive tuberculosis in all cities except Phnom Penh were higher than that of the rest of the countries. Rates ranged from 8 per 100 000 in Cairo to 137 per 100 000 in Phnom Penh. Comparing with the estimated rates, the tuberculosis case detection rate ranged from 26% in Karachi to 140% in Ho Chi Minh City. The proportion of new smear positive patients with treatment success ranged from 67% in Bangkok to 94% in Cebu. Treatment success rates were unsatisfactory in some cities due to high default and transfer rates, which was up to 25–30% in Bangkok, Dhaka and Karachi.

Conclusion: To increase tuberculosis case detection and to improve outcome of treatment in urban environments, all the public sector need to be involved and the private sector should be encouraged to participate.

PC-2133-21 Mass migration impact on the epidemiology of tuberculosis in Barcelona: improving the control programme

A Orcau, J A Caylà, J E Ospina, M Casals, M Sanz, R Pedro, P Gorrindo, C Rius. Service of Epidemiology, Public Health Agency, Barcelona, Spain. Fax: (+34) 93 218 22 75. e-mail: aorcau@aspb.es

Objective: To determine the excess of cases of tuberculosis (TB) attributable to observed demographic change in the city between 2000 to 2004 (200 000 new immigrants).

Methods: We fitted a linear regression model with the observed incidence (1995–1999) and calculated the attributable fraction of risk (AFR) to immigrants. Since 2003, foreign-born health agents have been incorporated to Programme.

Results: The incidence decreased from 58 to 39/100 000 in the 1995–1999 period (decline of 6%) and from 37 to 32/100 000 in 2000–2003 (decline of 2.4%). In 2004, the predicted incidence was 15.7/100 000, with an excess of cases of 570 from 2000–2004. During the same period the AFR was over 75% (625 cases). The immigrant patients increased from 6% to 35% in 1995–2004 period, of which 30% were diagnosed during their first year in Spain. Compared with natives, the completion treatment rate (92% vs. 97%) and the study contacts of smear-positive patients (62% vs. 78%) were poorer in immigrants. However, in last 2 years the implementation of study contacts in immigrant patients increased to 72%.

Conclusions: TB epidemiology has been modified by demographic change. The incorporation of health agents is improving TB control.

PC-2145-21 Outbreaks of drug-resistant tuberculosis in Sweden identified by molecular fingerprinting

T Koivula,¹ S Ghebremichael,¹ B Kan,² R Petersson,¹ S Hoffner,¹ V Romanus,³ I Berggren Palme,⁴ B Petrini,⁵ G Källénus.¹ ¹Department of Bacteriology, Swedish Institute for Infectious Disease Control, Solna, ²Division of Infectious Diseases, Department of Medicine, Karolinska University Hospital, Stockholm, ³Department of Epidemiology, Swedish Institute for Infectious Disease Control, Solna, ⁴Department of Communicable Disease Control and Prevention, Stockholm County Council, Karolinska Inst, Stockholm, ⁵Department of Clinical Microbiology, Karolinska University Hospital, Stockholm, Sweden. Fax: (+46) 8 301797. e-mail: tuija.koivula@smi.ki.se

Background: Drug-resistant tuberculosis (DRTB) is a globally increasing problem. In Sweden, DRTB has been rare, but has increased during recent years. The majority of patients with DRTB in Sweden are immigrants from countries with high incidence of TB.

Aim: To investigate the spread of DRTB in Sweden by molecular fingerprinting.

Methods: Isolates from 355 patients collected during 1994–2004, resistant to at least one of the drugs

streptomycin, isoniazid, ethambutol or rifampicin were studied by restriction fragment length polymorphism (RFLP), using IS6110 as a probe, and by spoligotyping. **Results:** 33 clusters of patients with identical strains (2–77 patients per cluster) were identified. One large outbreak of isoniazid resistant tuberculosis was identified, starting in 1996 and involving more than 75 patients. The patients in this cluster were mainly from the Horn of Africa.

Conclusions: Deficiencies in TB control measures were revealed, a fact that calls for improved control strategies. Molecular epidemiological typing of TB isolates could be performed on isolates from all new TB patients, and used in contact tracing.

PC-2227-21 Inverse association between *Mycobacterium tuberculosis* infection and atopic rhinitis in children

C C Obihara,^{1,2} N Beyers,² R P Gie,² B J Marais,² P C Potter,³ C J Lombard,⁴ D A Enarson,⁵ J L L Kimpen.¹

¹Department of Pediatrics, University Medical Center, Utrecht, The Netherlands; ²Department of Paediatrics and Child Health, University of Stellenbosch, Tygerberg, Western Cape; ³Allergy Diagnostics and Clinical Research, University of Cape Town, Cape Town, Western Cape; ⁴Department of Biostatistics, MRC of South Africa, Tygerberg, Western Cape, South Africa; ⁵The Union, Paris, France. Fax: (+31) 0302505349.

e-mail: c.c.obihara@wkwz.azuu.nl

Background: The association between *Mycobacterium tuberculosis* infection and atopy remains controversial.

Aim: To investigate the association between *M. tuberculosis* infection and atopic rhinitis in children living in a high TB incidence area.

Methods: 418 children aged 6–14 years from an epidemiological research-site in a poor urban community were invited to participate. They were assessed for allergic rhinitis (ISAAC questionnaire) and skin responses to tuberculin and eight environmental allergens. Atopic rhinitis was defined, using the new World Allergy Organization (WAO) definition, as reported allergic rhinitis and a positive skin prick test (SPT ≥ 3 mm) to any allergen.

Results: Among the 337 children enrolled 10.4% had allergic rhinitis, 17.5% a positive SPT and 53% a positive tuberculin skin test (TST ≥ 10 mm). Children with a positive TST were significantly less likely to have recent atopic rhinitis (OR_{adjusted} 0.06; 95%CI 0.007–0.5) than those with a negative TST. SPTs were significantly more common in children with negative TST who had recent allergic rhinitis (OR_{adj} 34.0; 95%CI 7.6–152.6), but not in children with positive TST and recent allergic rhinitis (OR_{adj} 0.6; 95%CI 0.07–5.2).

Conclusions: *M. tuberculosis* infection seems to reduce the prevalence of atopic rhinitis, and influences SPT reactivity in children with allergic rhinitis from a high TB incidence area.

PC-2297-21 Characteristics of tuberculosis outbreaks studied by epidemiological surveillance services in Catalonia, Spain

C M Bran. Service of Epidemiology, Agency of Public Health of Barcelona, Barcelona, Spain. e-mail: cbran@aspb.es

Aims: To analyze the characteristics of tuberculosis (TB) outbreaks studied by epidemiological surveillance services in Catalonia, Spain.

Design: Descriptive study of those outbreaks with an epidemiological report during the period 1998–2002. An outbreak was defined as 3 or more associated cases within a period of one year. In two health areas, all detected outbreaks were compared with those which gave rise to a report.

Results: 27 outbreaks were analyzed, 20 (74%) occurred in family settings. 22 outbreaks were detected by a true index case, and 5 by a secondary case. The average annual incidence of outbreaks was 0.40/100 000 inhabitants. Most outbreaks were generated by males aged 16 to 40 years, with cavitary pattern on RX, and an important diagnostic delay. It was observed that greater diagnostic delay more secondary cases occur ($P = 0.08$). In the Barcelona area reports were generated for only 25% of outbreaks detected, while in the Centre Area no reports were generated.

Conclusions: TB outbreaks are common but often not investigated, and diagnostic delay is associated with outbreak size. TB programs should give priority to early diagnostic and to contact tracing, and report the detected outbreaks.

EPIDEMIOLOGY OF TB-II

PC-1265-21 Tuberculosis mortality, Brazil, 1980–2001

C M Sasaki,¹ M L Costa Júnior,¹ P Hino,¹ M F Oliveira,¹

T C S Villa.^{1,2} ¹College of Nursing, University of São Paulo at Ribeirão Preto (USP), Ribeirão Preto, São Paulo, ²TB Operational Research Area of Brazilian TB Research Network, Ribeirão Preto, São Paulo, Brazil. Fax: (+55) 16 6333271. e-mail: midsas@eerp.usp.br

This retrospective study analyzed tuberculosis mortality in Brazil in the period from 1980 to 2001. Crude data were obtained from the site www.datasus.gov.br, by age and gender. Next, mortality rates per 100 000 inhabitants were calculated. This coefficient revealed a downward movement, with a more accentuated decrease in the 1980s, from 5.9 (1980) to 3.8 (1989), reaching 3.1 in 2001. Mortality rates for men were significantly higher than for women. As to age, the highest rates were observed among aged persons. Children (0 to 9 years) and adolescents (10 to 19 years) from both genders revealed a more significant decrease in the 1980s, while these coefficients tended towards equality in the 1990s. This study

demonstrates the active role of efforts to reduce tuberculosis mortality in Brazil, accompanied by decreasing rates in both genders across all age ranges. The implantation of efficient strategies, in operational conditions, into the daily routine of health services, can improve the performance indicators of the Tuberculosis Control Program.

PC-1397-21 Investigating clusters of tuberculosis: effective public health or just a waste of time?

P N Monk,¹ E G Smith,² J Evans,³ S Gardiner,⁴ D Modha,¹ L Abbott,¹ P Hawkey.³ ¹Health Protection Agency, Leicester, ²Health Protection Agency, Birmingham, ³Birmingham University, Birmingham, ⁴Heart of England NHS Foundation Trust, Birmingham, UK. Fax: (+44) 116 2630435. e-mail: philipmonk@ukonline.co.uk

Aim: To determine whether the investigation of clusters of tuberculosis identified through MIRU-VNTR typing (mycobacterial interspersed repetitive units containing variable number of tandem repeats) adds important information to enable improved public health control of tuberculosis.

Methods: Microbiological isolates from patients with tuberculosis in the Midlands Region of England are sent to the Regional Mycobacteriology Centre for confirmation of the organism and typing using 15 loci MIRU-VNTR. In 2004, 128 clusters were identified. All 'clusters' involving more than 5 people were investigated using a proforma developed from a questionnaire from the Communicable Disease Centre, Atlanta, altered to take account of risk factors in England. Records from all identified patients in the clusters were examined and the proforma completed identifying gaps in knowledge. Patients were then interviewed to complete missing information.

Results: Much of the epidemiological information was not routinely available. Interviews with patients were necessary.

Conclusions: These will be presented in full. Preliminary conclusions are that it is effective to investigate large clusters that are still increasing in size. Typing Centres need to develop strong user groups to review identified clusters and to share information about patient characteristics and control strategies for those identified as having a 'clustered' isolate.

PC-1537-21 Delay of diagnosis and tuberculosis drug resistance in Germany

D Sagebiel,¹ S Niemann,² Study Group of Public Health Offices,³ Study Group of Laboratories.⁴ ¹German Central Committee against Tuberculosis (DZK), Berlin, Berlin, ²National Reference Center for Mycobacteria, Forschungszentrum, Borstel, Germany; ³Diel R, Haas W, Heykes-Uden H, Loytved G, Meywald-Walter K, Müller-Meudtner S, Pregler M, Rehder-Schlunbaum E, Schulze A, Thamm W, Zeilinger G; ⁴Feldmann K, Mauch H, Naumann L, Roth A, Rüscher-Gerdes S, Wolf H. Fax: (+49) 30 80022286. e-mail: loddheck@zedat.fu-berlin.de

Aims: Preliminary data on delayed diagnosis and drug resistance from six German study regions.

Methods: Since October 2001, epidemiological data on TB patients have been collected and evaluated by the DZK in cooperation with four laboratories and regional public health services. 1906 cases could be evaluated by November 2004.

Results: The average period between the first consultation of a doctor and the diagnosis of TB was 1.69 months (95%CI 1.5/1.9; $n = 1316$). In 57.7% of patients, TB was diagnosed within one month, in 20.5% after 1–2 months. The time between the first suspicion and the diagnosis of TB was less than one month in 79.7% of patients. In 13%, the diagnosis was made after 1–2 months, in 5.6%, after 2–5 months, and in 1.7% the delay was over 5 months (mean delay 0.88 months; 95%CI 0.6/1.1; $n = 1646$). Resistance to any firstline drug (HRES) was observed in 11.5% of patients and multidrug resistance (MDR) in 1.3%. Drug resistance was more frequent in the foreign-born with 16.7% (HRES) and 2.2% (MDR) than in those born in Germany (6.8% and 0.4%, respectively).

Conclusion: The diagnosis of TB in Germany is often delayed, indicating an urgent need for continuous education and training. Drug resistance is more frequently observed in foreign-born patients and in those previously treated.

PC-1557-21 Enhanced tuberculosis surveillance in England & Wales, 1999–2002

J Crofts, D Antoine, C French, J Jones, J Watson. Respiratory Diseases Department, Health Protection Agency, Centre For Infections, London, UK. Fax: (+44) 20 2007 7866. e-mail: Jonathan.Crofts@hpa.org.uk

Introduction: TB incidence has been increasing in England & Wales since the late 1980s. Enhanced Tuberculosis Surveillance was implemented in 1999 to provide continuous and more detailed information on notified TB cases and population groups at risk.

Methods: Local and regional tuberculosis coordinators collect information on new episodes of TB cases reported by health professionals. This is collated at the national level and linked to reference laboratory information on drug susceptibility testing of positive cultures. A descriptive analysis using Epi info software was performed using data from 1999 to 2002.

Results: Between 1999 and 2002 the number of reported cases increased by 19% from 5704 to 6794. The largest increases were seen in the east of England, London and the west Midlands. In 2002 London accounted for 44% of cases. There were increases in the proportions of cases in young adults aged 20–44 (46% to 54%) and in foreign born persons (59% to 68%). In this time there was a significant increase in cases resistant to isoniazid (5.8% to 7.1%, $P = 0.02$) but not in multi drug-resistant disease.

Conclusions: The number of reported cases of TB continues to increase in England, with the majority of disease occurring in urban centres, and in those born abroad.

PC-1604-21 Multidrug-resistant tuberculosis in the United States, 1993–2003

L R Armstrong,¹ R H Pratt,^{1,2} J S Kammerer,^{1,3} P Cegielski,¹ T R Navin,¹ J M Courval,^{1,2} T Wilson,¹ M Moore.¹

¹Division of Tuberculosis Elimination, Centers for Disease Control and Prevention, Atlanta, ²Northrop Grumman Information Technology, Atlanta, ³Independent Contractor, Atlanta, Georgia, USA. Fax: (+1) 404-639-8958. e-mail: Larmstrong@cdc.gov

From 1993 to 2003 in the United States, 1.6% ($n = 2557$) of all culture-confirmed TB cases with susceptibility testing results reported to the National TB Surveillance System were multidrug-resistant (MDR) (resistant to at least isoniazid and rifampin). In 2003, 1.1% ($n = 114$) of culture-confirmed TB patients with susceptibility testing had MDR isolates, an overall decline of 77% from 1993 (2.7%, $n = 486$). MDR-TB among the US-born and foreign-born has declined 92% and 43%, respectively, since 1993, but was still higher among the foreign-born (1.5%, $n = 86$) in 2003 (US-born 0.6%, $n = 28$). The percentage of MDR-TB among patients previously diagnosed with TB was at least 3 times higher than in those without a previous TB diagnosis for all years studied. Multivariate analyses indicated that from 1993 to 2003, MDR-TB cases were more likely than non-MDR-TB cases to have previous TB (foreign-born odds ratio [OR] 7.3, US-born OR 2.8) or be HIV infected (OR 2.8), Asian/Pacific Islander (OR 1.6), or Hispanic (OR 1.5). The US incidence of MDR-TB has declined, yet special subgroups, particularly foreign-born patients with previous TB, remain at increased risk. Continued emphasis on prompt susceptibility testing, directly-observed therapy, and patient-centered management are essential to continued success.

PC-1666-21 The effects of age, period, and birth cohort on TB incidence rates in the United States

J M Courval,^{1,2} D Katz,² S Linton,^{2,3} J C Newman,^{2,4} T R Navin.² ¹Northrup Grumman, Atlanta, ²CDC/NCHSTP/DTBE, Atlanta, ³Rollins School of Public Health, Emory University, Atlanta, Georgia; ⁴Western Carolina University, Cullowhee, North Carolina, USA. Fax: (+1) 404-639-8604. e-mail: jgc7@cdc.gov

Wade Hampton Frost's analysis of TB death rates in Massachusetts, USA, 1880–1930, identified the impact of birth cohort on temporal trends of age-specific death rates, and showed that the increase in rates with age seen in cross-sectional analyses was due to individual birth cohorts passing through earlier years of higher exposure. Frost's classic study analyzed only TB death rates, and only Massachusetts TB deaths. Comprehensive reporting of TB incidence in the United States began in 1953; we used 51 years (1953–2003) of TB Annual Surveillance Reports to examine the impact of age, period, and birth cohort on temporal trends in incidence rates. As in Frost's study, cross-sectional analyses showed that TB incidence is strongly and positively correlated with age. Birth cohort analysis, however, revealed consistent declines in overall, male, and female, TB incidence rates with age, in patterns remarkably similar to Frost's earlier analyses. These analyses have important implications for public health practice; they confirm that reactivation becomes an increasingly important source for TB cases in older populations and suggest that control efforts should focus more on identification and treatment of latent infection.

PC-1899-21 Case finding in tuberculosis patients: diagnostic and treatment delays and their determinants

F Maamari. NTP Manager, Syrian Arab Republic. Fax: (+963) 11 3311114. e-mail: ntpsyria@mail.sy

A nested case-control study was conducted in all tuberculosis centres implementing directly observed treatment short course (DOTS) strategy for tuberculosis control all over Syria, aimed at determining the extent and determinants of delay in diagnosis and treatment of pulmonary tuberculosis patients. 800 new smear-positive patients were interviewed using a structured and pretested questionnaire regarding their health seeking behaviour and other determinants of delay in getting timely and appropriate care. **Results:** The mean diagnostic delay, defined as interval between onset of symptoms and diagnosis, accounted for 77.6 days. Patient factors constituted the main component of such delay, compared to health system factors. The mean treatment delay, defined as the time interval between diagnosis and treatment, was 2.9 days and approximately half of patients were treated within one day from diagnosis. The mean

total delay, defined as the duration between onset of symptoms and treatment was 80.4 days for all patients and approximately half of patients were treated within 57 days. The significant risk factors for total delay were living at a far distance from the health facility, high degree of stigma, seeking care at non-specialized individuals, and to more than one health care provider before diagnosis.

Conclusion: A long time interval between onset of symptoms and treatment was reported in this study and this was mainly attributed to patient rather than healthcare system factors. The identified determinants of delay durations, and information provided concerning different barriers against timely health care, should be used in order to rectify gaps and for planning future activities.

PC-1903-21 Patient's delay in health care seeking behavior among TB patients in Thanh Hoa Hospital of TB and Lung Disease, Tahn Hoa Province, Vietnam

T H Hung. Thanh Hoa Hospital of TB & Lung Disease, Thanh Hoa Province, Vietnam. Fax: (+84) 37863200. e-mail: trinhhuuhung@yahoo.co.uk

The purpose of the study was to determine the length of delay between the onset of symptoms and patients' first visit to health care (patient's delay) as well as the factors associated with patient's delay.

This study was mainly focused on the socio-demographic and economic factors, health care seeking behavior, knowledge, perception, and sources of information of TB patients on tuberculosis.

The study sample was 196 patients, who admitted at the Thanh Hoa hospital of Tuberculosis and Lung diseases, Thanh Hoa province, Vietnam, from 16 February to 5 March 2005. Data were collected through interview using a structured questionnaire and patient's record review. Computer statistical program was used to analyze the data. The results of the study could be summarized as follows: The finding of the study revealed that 64.8% of the respondents delayed in health care seeking behavior with delay average time 6.72 weeks, in which delay level >4 weeks to 8 weeks account for 43.4%, delay level more than 8 weeks for 21.4%. The association between patient's delay and distance, sources of information, and perception levels were statistically significant with $P < 0.05$. Sex, age group, marital status, family size, occupation, educational attainment, income, accessibility, means of travel, and knowledge were not significantly associated with the patient's delay in health care seeking behavior. Some of the awareness of society on tuberculosis was still the problems which need to be considered example the wrong perception on etiology, transmission, ability of treatment.

PC-2022-21 Evolution of tuberculosis 1990–2003 in a health region of Catalonia with a tuberculosis programme

J M Pina,¹ J L López,¹ M R Sala,² C Arias,² A Domínguez.³

¹Tuberculosis Programme of the Centre Health Region of Catalonia, Terrassa, ²Epidemiological Surveillance Unit of Centre Health Region of Catalonia, Terrassa, ³Departament of Health of the Generalitat of Catalonia, Barcelona, Spain. Fax: (+34) 93 789 35 10. e-mail: 4940jpg@comb.es

The effectiveness of a Tuberculosis Control Programme (TCP) is based on treatment of tuberculosis patients and the study of contacts (SC) for detection and treatment of people with latent tuberculosis infection. In each annual cohort of patients with confirmed pulmonary tuberculosis, the total of patients classified as non compliant with treatment (NC), failures (F) and transfers out (T) should not exceed 10%, and the SC should reach at least 85% of patients. The annual incidence of tuberculosis in the native population of the Centre Health Region (CHR) of Catalonia (1 405 870 population; 6% immigrants) and compliance with the TCP was evaluated.

Results:

| | 1990 | 1994 | 1995 | 1996 | 1999 | 2000 | 2001 | 2002 | 2003 |
|-----------|------|------|------|------|------|------|------|------|------|
| New cases | 474 | 432 | 428 | 349 | 250 | 220 | 251 | 235 | 180 |
| NC+F+T | 12% | 15% | 6% | 7% | 9% | 6% | 8% | 4% | 3% |
| With SC | 45% | 83% | 81% | 82% | 83% | 94% | 100% | 95% | 90% |

The incidence of tuberculosis and compliance with the TCP are shown in the table. Annual decline of incidence. 1990–1994: 3%; 1995–2003: 10%.

Conclusion: The TCP has contributed to the effective control of tuberculosis in the CHR, with an increase of the decline of annual incidence from 3% to 10% after sustained, adequate control measures were introduced.

PC-2058-21 Impact of active search and social mobilization on tuberculosis in prisons

D Arana, E Ferreira. Mexico National Tuberculosis Program, Mexico City, DF, Mexico. Fax: (+52) 5526146436. e-mail: micobacteriosis@salud.gob.mx

In Mexico, the search for patients is carried out in prisons since 2001. Per year 2004 exist 117 prisons with TAES strategy, 36 centers has been trained to the prisoners and participated in tuberculosis detection and treatment.

Objective: Implement DOTS strategy in prisons in order to diminish the risk of making ill by tuberculosis, with training and social mobilization.

Hypothesis: The social mobilization and the DOTS strategy diminish the risk of making ill by tuberculosis in prisons.

Selection of the sample: Prisons that have identified tuberculosis as risk in the population.

Methodology: Was carried out agreement with the authorities of the Prisons and the Health Services of

the State to be able to carry out the tuberculosis case-finding.

Results: 2001 to 2004: in a population of 143 580 prisoners studied were identified 15 904 patients with respiratory symptoms, confirming 919 cases of tuberculosis. In 2004, 213 cases of pulmonary tuberculosis identified were cured 77% and only failed 1.7%.

Conclusions: Establishing DOTS in prisons reduces the risk and lag in tuberculosis, there was improved the detection of tuberculosis and HIV, exists active participation of prisoners and personnel, there was carried out social recognition through white flag that means prison with tuberculosis.

EPIDEMIOLOGY: ASTHMA/TOBACCO/ARI

PC-1049-21 Prevalence of bronchial asthma in Delhi, India

V K Vijayan,¹ S K Chhabra,¹ A N Aggarwal,² D Gupta,² S K Jindal.² ¹VP Chest Institute, Delhi, ²Postgraduate Institute of Medical Education and Research, Chandigarh, India.
Fax: (+91) 1127667420. e-mail: vijayanvk@hotmail.com

Bronchial asthma is an important public health concern worldwide. The aim of the study was to estimate the population based prevalence of asthma at Delhi in both the rural and urban populations. A standardized and validated questionnaire based on IUATLD asthma prevalence questionnaire was used. A two stage stratified (urban/rural) sampling procedure was adopted where villages/urban localities in Delhi formed the first stage units and the households the second stage units. A house to house survey was done in a random manner and the adult members of over 15 years of age in the family were interviewed. Computer programme using the software Epi info (version 6) and the SPSS (version 10.0) was used for analysis. A total of 15 642 individuals were studied. There were 7966 (50.9%) males and 7676 (49.1%) females. 7682 (49.1%) individuals belonged to the rural area and 7960 (50.9%) to urban area. Asthma was diagnosed in 1.69% of individuals. The prevalence was 1.33% in rural area, 2.04% in urban area, 1.84% in females and 1.54% in males. The population prevalence of asthma in Delhi is 1.69%.

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PC-1082-21 Cotinine levels in asthmatic children

B J Brabin,^{1,2} A Delpisheh,¹ Y Kelly,³ S Rizwan.¹ ¹Child and Reproductive Health Group, Liverpool, Merseyside, UK; ²Emma Kinderziekenhuis Medical Center, Amsterdam, Amsterdam, The Netherlands; ³Department of Epidemiology, London, London, UK. Fax: (+44 151) 7093229.
e-mail: b.j.brabin@liv.ac.uk

Setting: Asthmatic children are more at risk from the consequences of environmental tobacco smoke (ETS) due to impaired lower airway function.

Objective: To assess ETS exposure in asthmatic children.

Design: A cross-sectional study of 425 schoolchildren (5–11 years, 46% boys) in Merseyside (UK) using a parent completed questionnaire and childrens' saliva samples.

Results: 29.5% of children had doctor diagnosed asthma (DDA) and 12.2% had a history of hospital admission for respiratory illnesses. The symptom triad of cough, wheeze and breathlessness (C+W+B+) was reported in 11.9% of children. Mean cotinine level was 2.1 ng/ml (± 0.6 SD). 45.6% had ETS exposure (cotinine levels > 1.0 ng/ml). Children with DDA (OR = 2.8; 95% CI = 1.8–4.5), or from disadvantaged households (OR = 1.4; 1.0–2.2) had greater ETS exposure, than non-asthmatic or those from advantaged households. Cotinine levels and parental asthma were independently associated with DDA, and socio-economic status with C+ W+B+ in multivariate analysis.

Conclusions: A high cotinine level was significantly associated with increased risk of childhood asthma particularly amongst disadvantaged households. Interventions aimed at limiting ETS exposure amongst asthmatic children are needed.

PC-1093-21 Prevalence and severity of asthma symptoms in children of Tehran: ISAAC Study

L Fadaizadeh, M R Masjedi, K Najafizadeh, P Dokouhaki. National Research Institute of Tuberculosis and Lung Disease, Tehran, Iran. Fax: (+98 009) 21 2285777.
e-mail: lfadaizadeh@nritld.ac.ir

Objectives: To determine the prevalence of asthma and related symptoms among schoolchildren in Tehran: ISAAC phase III.

Design: Descriptive study.

Method: The ISAAC written questionnaire was given to a total of 6127 students of 72 schools in urban area of Tehran. Simple random sampling was performed with a uniform distribution throughout 12 clusters of 22 divisions of the municipality. All 6–7 and 13–14 year old students were enrolled into the study.

Results: Results showed that 15% of the 6–7 year olds and 17% of the 13–14 year olds had positive history of wheezing ever, among which 8.6% and 10.6% had had recent attacks respectively.

Physician confirmed asthma was reported in 2.1% of the 6–7 year olds and 2.6% of the 13–14 age group.

Conclusion: Overall, no significant change in prevalence of asthma symptoms has occurred since 1997 (the last phase of ISAAC) among children of Tehran. The results of our study suggest higher rates of confirmed asthma among 6–7 year old girls compared to boys. However, more precisely designed studies are needed to further confirm these findings.

PC-1184-21 Role of NGO support in asthma care and prevention at the grass root level: two years' experiences of a peripheral center at Bogra, Bangladesh

K Uddin. Ziaur Rahman Foundation, Dhaka, Bangladesh.
Fax: (+88) 8013228. e-mail: axis@bdmail.net

Background: In Bangladesh, prevalence of asthma is 5.2%. The Asthma Care and prevention centre established in April 2003. To provide integrated Asthma treatment facilities, patients education program (PEP) at the grass root level and training for the doctors. Ziaur Rahman Foundation, an NGO, supports the centre.

Objectives: This paper presents the experiences of patient management to facilitate planning of nationwide network.

Methods: Secondary source data were analyzed.

Findings: Services offered are: treatment and follow-up, diagnostic services including spirometry, PEP through audiovisual aids, educational material, direct interaction by doctors and week-long doctor's orientation program. Registration fee was Tk. 50 per patient. 6023 patients attended the center, including 2820 new patients, majority were referred by satisfied patients. 88% were Adults (>15 years), remaining were children. Among adults, majority (30%) belonged to 25–35 years age group; in children 67% were of school going age. New patients were provided with an Asthma guidebook. Investigations including sputum eosinophil and spirometry were done. Disease profile shows, bronchial asthma- 60%, COPD-30%, Respiratory tract infections (RTI)- 6% and others 4%. 125 doctors received training.

Conclusions: A comprehensive approach with cost sharing can lead to improvement in Asthma care in community.

PC-1210-21 Risk factors for asthma among primary schoolchildren in Baghdad

W Al-Kubaisy,¹ S Hussien.² ¹ Department of Community Medicine, College of Medicine, Al-Nahrain University, Baghdad, ²Department of Pediatrics, Baghdad, Iraq.
Fax: (+964) 17199287. e-mail: waqar_abd@yahoo.co.uk

Background: Asthma is one of the commonest chronic diseases of children.

Aims: To fill the gap in data concerning this disease in Iraq, we investigated the sociodemographic and other risk factors related to asthma occurrence among primary schoolchildren.

Materials and methods: Case-control study was conducted in Baghdad (Capital of Iraq) among primary schoolchildren aged 6–12 years, for the period between October 2000 to June 2002. Cases were 644 children with asthma, and control group was 1618 children without asthma. A well constructed standardized modified questionnaires of ISAAC were completed by the parents of the chosen children.

Results: From the studied risk factors, the following were found as significant risk factors for asthma development: Crowding rate of >5 (OR = 1.65, 95%CI = 1.1–2.4), lower educational level of parents, prematurity (OR = 1.61, 95%CI = 1.003–2.59), low birth weight (OR = 2.41, 95%CI = 1.87–3.09), family history of asthma whether father (OR = 3.86, 95%CI = 2.54–.87), or mother (OR = 8.27, 95%CI = 5.21–13.15) or sibling (OR = 4.33, 95%CI = 3.24–5.8) and environmental exposure to tobacco smoke during pregnancy or currently from both parents. On the contrary, our study failed to detect significant association for the following factors: Gender, residency, type of birth, breast feeding and duration.

Conclusion: Crowding, low parental education, prematurity, low birth weight, family history of asthma and smoking are significant risk factors for asthma development among our primary schoolchildren in Baghdad.

Recommendations: Efforts must be concentrated for hygienic environment, good antenatal care and quitting smoking.

PC-1428-21 Asthma prevalence and severity among primary schoolchildren in Baghdad, Iraq

A Al-Kubaisy,¹ W Al-Kubaisy.² ¹College of Medicine, Al- Mustanseriya University, Baghdad, ²College of Medicine, Al-Nahrain University, Baghdad, Iraq. Fax: (+964) 7199287. e-mail: waqar_abd@yahoo.co.uk

Objectives: To measure the prevalence of asthma and its severity among primary schoolchildren in Baghdad.

Methods: A random sample of 3360 primary schoolchildren of both sexes was collected. Standardized questionnaire was completed by their parents.

Results: Response rate was 86%, male to female ratio was 0.75:1, age range was 6–12 years in the study population. Prevalence of wheezing ever was 25%. Wheezing during the last 12 months was 19.9%; only 3% of them developed >12 attacks. Nocturnal wheezing attacks were reported by 16.3%, only 3.1% of them were suffering >4 attacks per month, 10.5% of children demonstrated severe attacks limiting speech. Prevalence of asthma ever was 22.3%. Asthma was detected in 81.9% of those with wheezing in the last 12 months. Among children with wheezing ever; males were predominant, while among children with asthma ever; females were predominant. Prevalence rates of both asthma and severe asthma symptoms decreased with increasing age.

Conclusion: Asthma is a major health problem in Baghdad.

PC-1744-21 Forced vital capacity norms among Nigerian subjects

R A Adedoyin,¹ G E Erhabor,² T O Akinola,³ A T Onigbinde.⁴

¹Department of Medical Rehabilitation, Obafemi Awolowo University, Ile-Ife, ²Department of Medicine, Obafemi Awolowo University, Ile-Ife, Osun State, ³Department of Physiotherapy, General Hospital, Ikeja, Lagos State, ⁴Department of Medical Rehabilitation, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria.

Fax: (+234) 036 230705. e-mail: gregerhabor@yahoo.com

Introduction: Forced vital capacity is one of the determinants of fitness in patients with chronic obstructive pulmonary lung disease.

Objective: There is scarcity of data on FVC among all Nigerians age groups.

Methods: The study included 1920 volunteers (960 males and 960 females) in the age range 5–80 years. Subjects were instructed to stand erect and take deep breath while a nose clip was applied after 15 min rest period. The pocket Spirometer was placed in the subject's mouth and the subject exhaled into the disposable mouthpiece as deeply as possible.

Results: The results of the study showed that the pocket Spirometer is highly reproducible ($r = 0.87$; $P < 0.001$). The vital Capacity of both sexes increase with chronological age and peaked at 29 years in males and 39 years in females. Significant positive correlations existed between vital capacity and 1) height ($r = 0.75$; $P < 0.001$), 2) weight ($r = 0.67$; $P < 0.001$) and 3) body mass index ($r = 0.67$; $P < 0.001$).

Conclusion: Pocket spirometer is a simple less expensive and reproducible instrument in assessing lung function in the developing countries.

PC-1806-21 Risk factors for childhood asthma in Iran central region

M Gharagozlou, S Khalili, M Hallajmofrad, A Parsikia, G Mousavi. Immunology and Allergy Department, the Children Medical Center, Tehran University of Medical Sciences, Tehran, Iran. Fax: (+98) 21 6938545. e-mail: gharagoz@tums.ac.ir

Setting: The prevalence of asthma during recent years is increasing and environmental factors may account for it and variation among populations and countries.

Aim: To identify factors that influence the asthma symptoms in children from Kashan, a central region in Iran.

Methods: In Kashan, 1800 schoolchildren, aged 12–14 years, were selected by random sampling. Parents filled in questionnaires about the asthma symptoms and some environmental factors.

Results: A significant association was observed between asthma symptoms and positive family history of asthma, parental smoking, past history of sinusitis and pneumonia in the infancy period which revealed

by (95%CI) and 1.32 (1.132–1.55), 1.31 (1.09–1.57), 1.86 (1.52–2.27) and 2.62 (1.89–3.63), respectively. On the other hand no significant relationship was seen between asthma symptoms among children and the family size, having breast feeding and carpet making in their houses, which is common in the region.

Conclusion: The results suggest that some environmental factors may affect the prevalence of asthma in children which can be preventable

PC-2088-21 Asthma symptoms and morbidity in Brazilian children

M A R C Santos, M G A Galvão, A J L A Cunha.

Department of Pediatrics, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+55) 212 278 4109. e-mail: marilenecs@terra.com.br

Introduction: Children with recurrent asthma symptoms frequently use health care system.

Objectives: To determine: 1) asthma prevalence 2) symptoms of wheezing related to acute care utilization 3) frequency of acute exacerbations 4) bronchodilator use prior to emergency-room visit.

Methods: A questionnaire was administered to 211 parents of 5- to 14-year-old children who had assistance at an inner-city pediatric hospital. Asthma was defined by an affirmative answer when asked 'Has your child had wheezing in the chest in the last 12 months?' Asthma episodes were assessed by inquiring about the frequency of wheezing symptoms. Health care utilization comprehended any emergency or out-patient department visit or hospitalization for that symptom.

Results: 67% of the families had an annual income of US\$3.600. Asthma prevalence was 45%. 43% of the children referred acute exacerbations with 1 to 3 episodes and 57% with 4 to 12. Health care use was higher among children with wheezing symptoms (OR = 29.0; 95%IC 13.8–61.2). 43% of the 95 families reported giving a bronchodilator before seeking emergency care.

Conclusion: Questioning parents about the frequency of their child's wheezing symptoms is an important tool that may aid in the detection of asthmatic children and thus assessing the burden of asthma for the health care system.

PC-1828-21 Influence du tabagisme passif sur l'asthme de l'enfant

S Bousnina, K Marniche, E Hassine, S Cheikhrouhou, S El Farhati, E Gaies, H Racil, S Yaalaoui, M L Megdiche, A Chabbou. UR Insuffisance Respiratoire, Ligue Nationale Contre le Tuberculose et les Maladies Respiratoires, Ariana, Tunisia. Fax: (+216) 70850143. e-mail: abdellatif.chabbou@rns.tn

Le tabagisme (TC), actif ou passif est très nocif chez les asthmatiques (AS). Notre étude s'est intéressée à l'influence de l'exposition TC passive sur les caractéristiques de l'asthme de l'enfant (EF) avec comparaison

cas-témoins, de 75 EF AS, 49 garçons et 26 filles, âgés de 3 à 16 ans, surveillés pendant une année, et répartis en 2 groupes comparables, en particulier pour l'âge, le sexe et l'ancienneté de la maladie : groupe A (g A) : 25 EF non exposés, Groupe B (g B) : 50 EF exposés au TC des parents, parmi eux 42 exposés pendant la grossesse aussi. Le TC parental moyen est de 26PA (4 à 80). Il est presque exclusivement paternel (2 mères fumeuses). 3 tests statistiques ont été réalisés, χ^2 , test de Fisher et test de Yates avec un seuil de signification à 0.05. L'asthme dans le g B est plus sévère avec 6 fois plus d'exacerbations (E) / g A. En moyenne, il y a 6 crises par an dans le g A et 26 crises par an dans le g B. Le nombre d' E est lié au degré de TC et à sa durée 2 E / an pour 20 cigarettes (cg) / jour vs. 20 E / an pour 40 cg / j. Quand le père fume le narguilé, il ya plus d'E: 20 E / an vs. 2 E / an sans narguilé. Le débit de pointe est plus bas dans le g B $P < 0.06$. Les rhinites et otites sont plus fréquentes pour le g B $P = 0.03$ et $P = 0.017$. La consommation médicamenteuse est plus importante pour le g B. Pour les enfants, le TC maternel est plus fréquemment incriminé, mais sa prévalence est faible en Tunisie, et le TC paternel est en cause avec le narguilé plus utilisé à la maison et dont la fumée, plus riche en co est plus nocive. Plus de conséquences seraient attendues avec la progression du TC féminin nécessitant une action orientée

PC-1325-21 The result of discontinuous, but long-term struggle against smoking in health workers

T T Suluburic,¹ D M Suluburic.² ¹Health Center Cacak General Practice, Cacak, ²Health Center Cacak DZ Guca, Guca, Serbia and Montenegro. Fax: (+381) 32854539. e-mail: sulubura@eunet.yu

Aim: To show if discontinuous long-term action, which draws support from conscience and morality of smokers, can cause reduced number of smokers among health workers.

Method: The action was done in a general hospital on all employed (doctors, sisters, accessory staff). The results were got on the basis of anonymous questionnaire, done January 2003, and repeated on January 2004, on the same examiners. In a meantime there was done discontinuous action of struggle against smoking (lectures, personal contacts, doctors' advice etc) during the year of struggle against smoking.

Results: Results are disappointing. Only 4% of smokers gave up smoking. A great number of them know everything about harmfulness of smoking, they live and work with smokers. Most of them haven't got any problem with their health (89%) as a result of smoking (J44, J45, C34, etc). Most of them aren't against building new tobacco factories in Serbia if it is a good 'export business'. In their opinion education of children and whole family is the best way to get some results in the struggle against smoking.

Conclusion: As there is no any difference in results between the first and second questionnaire, which were followed by such struggle against smoking, in our opinion that the struggle against smoking should be continued by firm law regulations. The violators should be punished.

PC-1016-21 Lung function and airways responsiveness during pregnancy

A A Bashir, O A Musa. Faculty of Medicine, University of Gezira, Wad Medani, Gezira, Sudan. Fax: (00) 249 5118 43415. e-mail: amirali_22@hotmail.com

Objectives: To find the changes in FVC, FEV₁, PEFR and abdominal girth during pregnancy and in the postpartum period.

Design and setting: A randomized prospective longitudinal study was performed in Rabak town-central Sudan in January to November 2002. 48 normally pregnant women were included (26 in 3rd trimester, 19 in 2nd trimester and 3 in the 1st). The microplus spirometer was used to measure FVC, FEV₁ and PEFR during pregnancy then 1–2 month after delivery. The abdominal girth was measured concurrently with lung function parameters. Paired T-test was used to compare lung function during pregnancy and in postpartum period.

Results:

| Pregnancy stage | 1st trimester | 2nd trimester | 3rd trimester | Post partum |
|----------------------|---------------|---------------|---------------|-------------|
| FVC (L) | 2.55 + 0.77 | 2.64 + 0.65 | 2.55 + 0.57 | 3.01 + 0.57 |
| FEV ₁ (L) | 2.41 + 0.64 | 2.37 + 0.53 | 2.31 + 0.47 | 2.62 + 0.51 |
| PEFR (L/min) | 287 + 23.67 | 293 + 66.09 | 296 + 84.42 | 304 + 66.15 |
| Abdominal girth (cm) | 80 + 0.01 | 100 + 29.07 | 106 + 13.96 | 86 + 10.16 |

There was significant increase in both FVC and FEV₁ after delivery ($P < 0.01$) with insignificant increase in PEFR. The abdominal girth had decreased significantly in the postpartum period ($P < 0.01$). In spite of the steady drop in FEV₁ from the 1st to the 3rd trimester, PEFR values showed some what steady increase. There was no significant correlation between abdominal girth and lung function during pregnancy. Some pregnant women had reported dyspnea.

Conclusion: There was significant reduction in FVC and FEV₁ values during pregnancy compared to postpartum period which can not be only explained mechanically, because this decrease had occurred from the 1st trimester even before any increase in the abdominal girth. The improvement in PEFR values from the 1st to the 3rd trimester can be explained by the rise of plasma cortisol and this improves asthma severity during pregnancy. The reported dyspnea during pregnancy can be explained by the hyperventilation during pregnancy caused by progesterone and not mechanically.

PC-1189-21 Normal spirometric values in Sudanese

A A Bashir,¹ O A Musa.² ¹Faculty of Medicine, University of Gezira., Wad Medani, Gezira, ²Faculty of Medicine, University of National Ribat, Khartoum, Khartoum, Sudan.
Fax: (+249) 511 843415. e-mail: amirali_22@hotmail.com

Objectives: To find out normal values of FVC, FEV₁ and PEFr for normal Sudanese, derive prediction equations, construct lung function tables and correlate the obtained lung function values with age, weight, sex and ethnic group.

Design and setting: A randomized stratified study was performed in 2250 healthy Sudanese subjects (1162 males and 1088 females). An ethical clearance was issued and more than 95% had accepted to be included in our study. The subjects were exposed to questionnaire and pulmonary function testing using the microplus spirometer. The mean values for lung function parameters and anthropometric measurements were derived and correlation between them was found. Regression equations and lung function calculators were derived. T-test was used for significance and the degree of confidence was taken as $P < 0.05$.

Results:

| Population | Function | Equation |
|---------------------------|------------------|---------------------|
| Adult males >19 | FVC | .02H - .019A + 0.7 |
| | FEV ₁ | .02H - .02A + .52 |
| | PEFR | 2.1H - 2.2A + 201.2 |
| Adult females >19 | FVC | .02H - .01A + .1 |
| | FEV ₁ | .02H - .01A + .12 |
| | PEFR | 1.5H - .8A + 139.7 |
| Adult males >15 and <20 | FVC | .05H + .13A - 7.26 |
| | FEV ₁ | .046H + .09A - 6.08 |
| | PEFR | 5.1H + 14.5A - 670 |
| Adult females >15 and <20 | FVC | .024H + .13A - 3.42 |
| | FEV ₁ | .02H + .11A - 2.93 |
| | PEFR | 2.6H + 23.36A - 486 |
| Male children <16 | FVC | .026H + .026A - 2.1 |
| | FEV ₁ | .025H + .033A - 2.2 |
| | PEFR | 2.25H + 15.9A - 238 |
| Female children <16 | FVC | .018H + .06A - 1.29 |
| | FEV ₁ | .014H + .07 - 1.04 |
| | PEFR | 1.7H + 3.93A - 25.3 |

Sudanese of Arab ancestry have significantly higher FVC and PEFr compared to those of African ancestry. Although ethnic groups of Sudanese varied in their lung function values, but all showed no significant differences from the general equations for all Sudanese. The only exceptions were the adolescent southerners and westerners who showed lower lung function values by almost 8% from the general equation. **Conclusion:** Lung function values were found to be 15% lower in Sudanese than Europeans, but similar to those of Africans. Positive correlation between lung functions and height was present with negative correlation with age in adults. The positive correlation of lung functions with weight disappeared when similar ages and heights were compared. Gender as well as ethnic variations in Sudanese lung function did exist.

PC-1696-21 Surgical treatment of complicated lung echinococcosis

T Kariev, S Abulkasimov. Thoracic surgery, Instituts of Phthiisology and Pulmonology, Tashkent, Uzbekistan.
Fax: (+998) 712781901. e-mail: kariev31@mail.ru

Surgical treatment of complicated lung echinococcosis was performed in 62 patients at ages of 8 to 63 (43 males, 19 females). Cyst festering was observed in 37 patients, rupture into pleural cavity – in 25 patients. Before the hospitalization into a clinic the complicated echinococcosis had not been diagnosed and the patients were received treatment for lung tuberculosis, pleurisy, spontaneous pneumothorax, pleural empyema. Because of diagnostic difficulties, in the clinic the correct pre-surgical diagnosis was not established in 22 patients, in which cyst festering or its rupture into pleural cavity were revealed during operation. Festered echinococcus cyst located in the right lung in 23 patients, in the left lung – in 14 patients. Cyst rupture into the right pleural cavity occurred in 16 patients, left cavity – in 9. At festered cyst the echinococectomy was performed in 16 patients, segmentary resection of lung – in 8, lobectomy – in 12, pulmonec-tomy – in 1 patient. At the rupture of cyst into pleural cavity the thoracotomy, ablation of shrunken chitinous membrane and lung decortication were performed in 12 patients, echinococectomy of lung and decortication – in 4, lobectomy and pleuroectomy – in 3, pulmon- and pleuropulmonectomy – in 6 patients. In all of the patients good effect was achieved after the operation.

Conclusion: Diagnostics of complicated lung echinococcosis before operation presents significant difficulties and quite often is fallacious. Surgical treatment of mentioned pathology is the basic and highly effective method of treatment.

PC-1421-21 L'infection respiratoire chez les enfants

L B Zayuya. Réseau des Infirmiers dans la Lutte Contre le Sida RIGIAC-SIDA/Sannam, Kinshasa, D R Congo.
Fax: (+243) 98136640. e-mail: zayuya_lola@yahoo.fr

Introduction : Une infection respiratoire peut toucher les voies respiratoires supérieures ou inférieures comprenant les nez, les oreilles moyenne, le pharynx, les bronchites et les poumons.

Développement : Les signes et les symptômes d'une infection respiratoire sont : la toux, les difficultés respiratoire les voix de la gorge, écoulement nasal et des douleurs ou des oreilles, la fièvre aussi courante. Les voix respiratoires des petits enfants sont plus étroites et peuvent être plus facilement obstruées par une œdème et des sécrétions. Le trompe d'Eustache, le tube entre le nasopharynx et l'oreille moyenne est plus courte chez les bébés et les petits enfants. Cela entraîne une plus grande susceptibilité aux infections d'oreille. Dans le premier stade de l'infection à VIH

avant le définitive immunitaire, l'enfant atteint l'infection respiratoire touchant les voies respiratoires supérieures et inférieures.

Conclusions : L'enfant atteint d'une infection plus grave comme pneumonie doit être traité à l'hôpital. Dans le cas contraire, 25% des enfants meurent, identifier très tôt la maladie et administrer le traitement adopté peut réduire la taux de mortalité.

POSTER DISPLAY SESSIONS

BACTERIOLOGY/IMMUNOLOGY

PS-1013-21 Combination of immunotherapy with *Mycobacterium vaccae* in new smear-positive TB patients in districts in Hanoi and Hatay province, Vietnam

D H Thanh. National Hospital of TB and Respiratory Diseases, Hanoi, Vietnam. Fax: (+84) 4 8326162. e-mail: thangduduc@yahoo.com

The main purpose of the NTCP is to achieve good effective treatment and to reduce the relapse ratio. Vietnam is using a treatment regimen of 8 months, with 90% cured and 6% relapsed. To improve the efficiency of the treatment, we included 3 injections of *Mycobacterium vaccae* in the chemotherapy regimen and reduced the treatment period to 6 months (2SHRZ/4HE) (group B), and compared it with a group of similar new AFB (+) TB patients taking 8 months of treatment without *M. vaccae* (group A). The reagent is produced from *M. vaccae* bacteria, which is prepared by S R Pharma PLC. We use changes of indices of immunization, clinical signs, X-ray, etc, to compare relapse ratios between the 2 treatment groups. The research was carried out from September 2003 in 8 districts of Hanoi and Hatay province. We followed 233 patients in 18 months; 116 of group A and 117 of group B. The preliminary clinical and immunological indices results, after 2, 6 and 12 months of treatment show that the results for group B are better than for group A, so we can reduce the duration of treatment by 2 months using regimens incorporating *M. vaccae*.

PS-1020-21 TH1 cytokine patterns in BCG vaccinated and non-vaccinated children

S Kalpana, C Prabha, V Kumarasamy, D Manjula. Department of Epidemiology, The TN Dr M G R Medical University, Chennai, Tamil Nadu, India. Fax: (+91) 44 2827 1659. e-mail: tbvaccine@yahoo.com

Objectives: To study the in vitro cytokine response of the BCG vaccinated and Non-vaccinated children and to compare the in vitro cytokine response in the Mantoux positive and Mantoux negative children.

Methods: 8–10 ml of blood was collected and the lymphocytes were isolated from whole blood and cultured it with Phytohemagglutinin, Purified protein derivative, Culture filtrate and BCG antigen. The Th1 cytokines IFN- γ , IL-2 and TNF- α were measured by ELISA.

Results: A total of 105 healthy schoolchildren were recruited in this study. In this study the IL-2 cytokine response to PHA stimulation were higher in BCG+Mx- group with no appreciable difference between BCG+Mx+, BCG-Mx+ and BCG-Mx- groups. There was a significant difference in IFN- γ production between each group in all the antigen-stimulated condition. TNF- α levels were significantly higher in all the stimulated conditions, for all the groups except BCG-M+ group that did not show significant production to BCG.

Conclusion: The Th1 cytokine response was admixed with the Th2 cytokine response for all the mycobacterial antigens in vitro in both vaccinated and non-vaccinated children from an endemic region, irrespective of their mantoux status.

PS-1039-21 IFN- γ and TNF- α production by CD4+T and CD8+ T lymphocytes in AIDS patients with tuberculosis

R M C Cunha, E G K Kallas, D S R Rodrigues, M N Burattini, R S Salomao. Federal University of Sao Paulo, Sao Paulo, Sao Paulo, Brazil. Fax: (+55) 11 50815394. e-mail: drodrigues.dipa@epm.br

Tuberculosis is usually more severe in HIV-infected patients, and the immune derangement found in co-infected patients may differ from that in each isolated disease. Following mitogen stimulation of PBMC, IFN- γ and TNF- α production was evaluated in T cells by flow-cytometry, and in culture supernatants by ELISA in AIDS patients with tuberculosis. The proportion of CD4+ T lymphocytes expressing IFN- γ did not differ between the groups, whereas a trend towards increased proportions of TNF- α expression in CD4+T cells was observed in the TB compared to the HIV group, while intermediate values were observed in co-infected patients. Detection of IFN- γ and TNF- α in CD8+ T lymphocytes was higher in TB than in HIV individuals. Co-infected patients presented intermediate values for IFN- γ , while TNF- α detection was similar to that in HIV monoinfection. The proportion of T cells expressing IFN- α was relatively preserved in co-infected patients compared to TB patients, while the percentage of T cells expressing TNF- α was decreased, mainly in CD8+ T lymphocytes. However, the marked reduction in T lymphocyte numbers in co-infected patients led to a striking reduction of both cytokines in PBMC supernatants, a finding that is consistent with the impaired response to *M. tuberculosis*.

PS-1230-21 Case presentation of antituberculosis antibodies in serum of newborns

I Bardisevičienė, E Sučilienė, A Našliunienė. National Tuberculosis and Infectious Diseases University Hospital, Vilnius, Lithuania. Fax: (+370) 5 234 42 14. e-mail: edita.david@takas.lt

Immunological investigation of child in very important in the detection of congenital tuberculosis (TB). The aim of study was to evaluate the specific (cellular and humoral) immune response of mother with generalized tuberculosis and her newborn baby. We investigated antituberculosis cellular immunity by in vitro test-lymphocytes transformation (LT) with mycobacterial antigen-purified protein derivat (PPD) and leucocytes migration inhibition (LMI) by the same specific antigen. For evaluation of specific humoral immunity level enzyme-immunoassay (EIA) for the detection of IgG class antibodies to *Mycobacterium* species (ATM) in human serum (Omega Diagnostics) was used. Mother's specific immunity results were: LT with PPD -5% (N 2–3%), index of LMI with PPD – 0.68 (N 0.9–1.3), amount of antituberculosis antibodies in serum – 0.660 (cut-off 0.403). The results showed the activated specific cellular and humoral immunity of the patient with generalized TB. As the congenital TB was suspected for newborn of sick Mother, the antituberculosis antibodies of IgG class in serum of baby were investigated for several times. 10 days after birth the level of antibodies in the serum of newborn was high - 140U/ml (N 120U/ml), after 1 month it decreased till 90 U/ml and after 2 months reached 75 U/ml. The diagnosis of congenital TB was denied as level of ATM deceased and there was no clinical manifestation of congenital TB and Mantoux test for child was negative at age of 2 months. We conclude that the high level of antituberculosis antibodies of IgG class in newborn's serum after birth was associated with the passive cross of them through placenta.

PS-1324-21 Relationship between tuberculin skin testing reactivity and CD4 lymphocyte count among adult HIV-1-infected patients hospitalized with tuberculosis disease in Botswana

A Sheth,¹ E A Talbot,² J Mboya,³ P H Kilmarx,^{1,4} C D Wells,² T Samandari.^{1,2} ¹BOTUSA Project, Gaborone, Botswana; ²Division of Tuberculosis Elimination, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA; ³National TB Program, Ministry of Health, Gaborone, Botswana; ⁴Global AIDS Program, CDC, Atlanta, Georgia, USA. Fax: (+267) 3181697. e-mail: tts0@cdc.gov

Background: PLWH are less likely to have a reactive TST. The relationship between CD4 count and TST reactivity is not well characterized in high TB-incidence countries.

Methods: CD4 lymphocyte counts and TST results were collected from PLWH hospitalized with micro-

biologically-confirmed TB disease in a major referral hospital in Gaborone.

Results: CD4 count and TST results were available for 117 patients. TST = 0 mm in 90% of patients (range 0–14). Median CD4 count was 44 cells/mm³ (range 0–402). TST reactions were as follows: 105 (90%) had 0 mm, 6 (5%) had 1–4 mm, 6 (5%) had >5 mm; CD4 counts ranged 0–354, 5–111, 71–402 cells/mm³ respectively for these TST categories. Of 6 patients with TST > 10 mm, 5 (83%) had CD4 count >200 cells/mm³; however, 12/17 (71%) with CD4 >200 cells/mm³ had 0 mm. Linear regression analysis showed no correlation between TST induration size and CD4 count ($r = 0.1856$).

Conclusions: TST = 0 mm was common among this population of hospitalized PLWH with active TB, even among those with higher CD4 counts. TST results were of limited diagnostic value and CD4 counts did not aid in interpretation of TST results. Better TB and LTBI diagnostic tools than TST are greatly needed for settings of high HIV and TB burden.

PS-1839-21 Human antimycobacterial immunity is augmented by ascent to high altitude

S Eisen,^{1,2} S Pealing,^{1,2} A Necoechea,^{2,3} I Leybell,^{2,4} R Pacheco,⁵ L Caviedes,⁶ T Valencia,⁶ R H Gilman,^{2,4,6} C F Santillan,^{2,6} J S Friedland,⁷ D A J Moore,^{2,6,7} C A W Evans.^{2,6,7} ¹Royal Free and University College Hospital Medical School, University College London, London, UK; ²Asociacion Benefica PRISMA, Lima, Peru; ³Yale University School of Medicine, Yale University, New Haven, Connecticut, USA; ⁴Johns Hopkins University, Baltimore, Maryland, USA; ⁵Department of Microbiology, Universidad de San Antonio Abad, Cusco; ⁶Department of Microbiology, Universidad Cayetano Heredia, Lima, Peru; ⁷Wellcome Centre for Clinical Tropical Medicine, Imperial College London Hammersmith Hospital Campus, London, UK. Fax: (+44) 870 442 1724. e-mail: carlton.evans@imperial.ac.uk

Ascent to high altitude was used to treat tuberculosis in the pre-antibiotic era; tuberculosis remains relatively uncommon in most high altitude regions; and in Peru some tuberculosis patients interrupt their therapy to migrate to the highlands because they believe that this will help to cure them. To test for possible mechanisms to explain these observations, we used an assay of human whole-blood killing of bioluminescent *M. bovis* BCG to investigate altitude effects on antimycobacterial immunity. During 96 hours incubation at body-temperature, heparin-anticoagulated whole-blood diluted in an equal volume of tissue-culture medium (RPMI-HEPES) allowed mycobacterial growth to 1.6-times lower concentrations than simultaneous control cultures in mycobacterial culture-broth (7H9-OADC-PANTA). In contrast, whole-blood collected from each volunteer an average of 48 hours after ascent to 3400 m in the Peruvian Andes and then incubated in tissue-culture medium restricted mycobacterial growth to 4.6-times lower concentrations

than simultaneous growth in mycobacterial culture-broth ($P < 0.001$). Simultaneous incubation of the mycobacteria in the plasma from each individual demonstrated that this altitude-related restriction of mycobacterial growth was specific to the cellular component of blood. These studies support the use of altitude to augment antimycobacterial immunity, a strategy that may warrant clinical evaluation during antibiotic therapy for multidrug-resistant tuberculosis.

PS-1943-21 Vitamin D: a double-edged sword in anti-mycobacterial immunity?

A R Martineau,^{1,2,3} K A Wilkinson,^{2,3} S M Newton,² C J Griffiths,¹ A W Norman,⁴ R J Wilkinson.^{2,3} ¹Institute of Community Health Sciences, Queen Mary, London, ²Wellcome Trust Centre for Research in Clinical Tropical Medicine, Imperial College, London, UK; ³Institute of Infectious Diseases and Molecular Medicine University of Cape Town, Cape Town, South Africa; ⁴Department of Biochemistry, University of California, Riverside, California, USA. Fax: (+44) 207 8826396. e-mail: a.martineau@qmul.ac.uk

Introduction: Calcitriol, the active metabolite of vitamin D, may modulate immunity to tuberculosis by binding either a membrane vitamin D receptor (VDR) to initiate rapid responses or a nuclear VDR to regulate gene transcription. Calcitriol stimulates rapid superoxide production in *M. tuberculosis*-infected macrophages, but down-regulates transcription of type 1 cytokines in peripheral blood mononuclear cells (PBMC). We investigated the effect of calcitriol \pm antagonists of rapid and genomic responses on anti-mycobacterial immunity in PBMC.

Methods: We incubated PBMC with calcitriol \pm rapid response antagonist $1\beta,25$ (OH)₂ D₃ (HL) and genomic response antagonist (23S)-25-dehydro-1 α -OH-D₃-26,23-lactone (MK) for 72 hours. We then infected them with *Mycobacterium bovis* BCG *lux*. Luminescence and cytokine secretion were determined at 24 and 96 hours post-infection.

Results: Calcitriol suppressed BCG *lux* luminescence despite decreasing the secretion of IFN- γ , IL-12 p40 and TNF- α and stimulating secretion of IL-10. MK attenuated suppression of BCG *lux* luminescence by calcitriol, but HL did not.

Conclusions: Calcitriol induces anti-mycobacterial immunity in PBMC despite inhibiting secretion of type 1 cytokines. Suppression of BCG *lux* luminescence is inhibited by blocking nuclear-initiated signalling, but not by blocking membrane-initiated signalling. The anti-mycobacterial effect of calcitriol in PBMC is primarily mediated by nuclear events other than the transcription of protective cytokines.

PS-2130-21 Association of arylamine N-acetyltransferase slow acetylator genotype with drug-induced hepatitis in short-course chemotherapy in Iranian tuberculosis

M-F Sheikholeslami, V Bakayev, F Mohammadi, P Tabarsi, A Javeri, V Amiri, M Mirsaidi, M Aghaii, M R Masjedi, A A Velayati. NRITLD Molecular Medicine Laboratory, Tehran, Iran. Fax: (+98) 212285777. e-mail: m_sheikholeslami@yahoo.com

Human N-acetyltransferase 2 (NAT2) is responsible for the acetylation of chemical agents and drugs such as isoniazid (INH), an important component of short course anti-tuberculosis chemotherapy. Drug-induced hepatitis is one of the most prevalent liver injuries in tuberculosis (TB) patients under treatment. In this study, we selected 35 TB patients who suffered from induced hepatitis and used allele-specific PCR and PCR-RFLP techniques to determine the NAT2 gene polymorphisms in them and in a matched control group of 62 normal individuals.

Results: The mean age of patients was 48.8 years and about 72% of them were female. The most frequent allele was NAT*5 and the frequency of all mutations in one or two alleles was 97.2%. Totally, 54.2% of cases were slow acetylators compared to 32.9% in control group ($P < 0.05$). Of 10 patients who did not respond to anti-tuberculosis drugs, eight had a mutation in one or both alleles and changing the regimen was successful in 30% of them.

Conclusion: In tuberculosis patients with drug induced hepatitis, the frequency of NAT2 slow acetylator genotype was significantly higher than in normal population. There might be an association between the NAT2 gene polymorphism and adverse effect of short-course chemotherapy in TB patients.

PS-2159-21 Genetic analysis of polymorphic variants of IL1B, IL1RA, NRAMPI, and VDR genes in patients with pulmonary tuberculosis in Republic Bashkortostan, Russia

M M Imangulova, B B Yunusbaev, A S Karunas, E K Khusnutdinova. Institute of Biochemistry and Genetics, Ufa Research Center, Russian Academy of Sciences, Ufa, Bashkortostan, Russian Federation. Fax: (+7) 3472 356088. e-mail: milyausha_ufa@mail.ru

Susceptibility to tuberculosis is believed to be determined by a large number of polymorphic genes each having insignificant contribution. Range of variations reported to be associated with disease continuing to increase. Here we report results of an association study of polymorphisms in IL1B (-511C/T), IL1RA (VNTR), and NRAMPI (1729+55del4, D543N) and VDR (FokI, TaqI) genes in tuberculosis patients ($n = 160$) and healthy individuals ($n = 180$) from Bashkortostan. We matched controls with cases following self reported ancestry in order to minimize effect of possible population stratification. An increased frequency of IL1B*CC (34.39% and 13.46% respectively; $P <$

0.001, OR = 3.37) and IL1RA*1/1 (82.9% and 61.62%, respectively, $P < 0.001$, OR = 3.022) genotypes was observed in tuberculosis patients compared to controls. The frequency of heterozygous genotype TGTG/del of NRAMP1 (1729+55del4) was 5 times higher among patients (15.89% and 3.47%, respectively, $P < 0.001$; OR = 5.26). We found no significant associations with tuberculosis susceptibility in the case of variations for the NRAMP1 (D543N), VDR (FokI, TaqI). Obtained results thus suggests that variations in IL1B (-511C/T), IL1RA (VNTR), NRAMP1 (1729+55del4) genes probably contributed to development of pulmonary tuberculosis in patients of studied region.

PS-1572-21 Immune response generated by *Mycobacterium habana* in experimental pulmonary tuberculosis: preliminary study

O Asin,¹ J A Valdivia,¹ E Montoro,¹ A P Acosta,² R Hernandez-Pando.² ¹Tuberculosis National Reference Laboratory, Institute of Tropical Medicine Pedro Kouri, La Habana, Cuba; ²Instituto Nacional de Ciencias Médicas y Nutrición Salvador Zubiran, Mexico DF, Mexico. Fax: (+537) 2046051. e-mail: oasin@ikp.sld.cu

Introduction: *Mycobacterium habana* contains cross reactive antigens with *M. tuberculosis* and *M. leprae*. This mycobacterium has the potential to prevent *M. tuberculosis* infection. The existence of a *M. habana* strains collection in our institute, and the interesting results found by other authors, motivated us to carry out this study.

Methods: *M. habana* strains (TMC 5135, IPK 220) were grown in liquid Sauton's medium for 21 days and irradiated with Co60. Five groups of 8 male Balb/c mice were immunized with 100 µg of SP or 105 bacilli of *M. habana* in saline. After 28 days of immunization animals were challenged with 106 viable bacteria of *M. tuberculosis* H37Rv by intratracheal route. We measured the colony forming units (CFU) in infected lungs, morphometry, mean survival time and determination of cytokines in lung homogenates by ELISA.

Results: Immunization with SP of *M. habana* IPK 220 showed significant reduction ($P < 0.001$) in CFU, numerous small size granulomas, a significant increase ($P < 0.001$) in survival time and highest levels of IL-2 and IFN-γ and low levels of TNF-α and IL-4.

PS-2216-21 New nasal TB vaccine candidates

S B Svenson, G Kallenius, A Pawlowski, B Hamasur. Swedish Institute for Infectious Disease Control, Solna, Sweden. Fax: (+46) 8913903. e-mail: stefan.svenson@vmm.slu.se

The only available vaccine against TB is BCG which protective efficacy against adult pulmonary TB is doubtful. Hence, there is an urgent need of a more efficient vaccine. Most studies on new subcellular vaccine candidates have focused on protein/peptide

antigens, in particular secreted proteins. Based on the accumulating knowledge of the importance in the pathogenesis in TB of carbohydrate antigens of the cell surface of *M. tuberculosis* we have developed new vaccine candidates based on arabinomannosyl oligosaccharides (AMOs, obtained from the major mycobacterial surface carbohydrate antigen, lipoarabinomannan) covalently conjugated to carrier proteins. The protective effect of such AMOs-protein conjugates when given as a nasal vaccine in the for humans approved L3 adjuvant were in the mouse model equal or slightly better than BCG. The importance of the L3 adjuvant to elicit this protective immunity was evidenced by that a similar protection was obtained also using L3 adjuvanted whole killed BCG while the same killed BCG preparation alone was completely unprotective. These results are particularly encouraging as nasal vaccination is simple to perform and does not need hazardous and costly syringes.

1 Haile M, Hamasur B, Jaxmar T, et al. Nasal boost with adjuvanted heat-killed BCG or arabinomannan-protein conjugate improves primary BCG-induced protection in C57BL/6 mice. *Tuberculosis* 2005; 85 (1-2): 107-114.

2 Haile M, Schroder U, Hamasur B, et al. Immunization with heat-killed *Mycobacterium bovis* bacille Calmette-Guérin (BCG) in Eurocine L3 adjuvant protects against tuberculosis. *Vaccine* 2004; 22 (11-12): 1498-1508.

3 Hamasur B, Haile M, Pawlowski A, et al. *Mycobacterium tuberculosis* arabinomannan-protein conjugates protect against tuberculosis. *Vaccine* 2003; 21 (25-26): 4081-4093.

PS-1077-21 Method of pulmonary tuberculosis therapy

M D Safaryan,¹ K G Karagezyan,² D G Khachatryan.²

¹Department of Phthisiopulmonology, M. Heratsi Yerevan State Medical University, Yerevan, ²Molecular Biology Institute, Yerevan, Armenia. Fax: (+374) 270898. e-mail: marinas@arminco.com

The aim of present work is to estimate the effectiveness of simultaneous use of traditional anti-TB chemotherapy with a complex of membrane-protective and membrane-reductant agents. 90 TB patients were observed. They were divided into two groups. I group (40 patients) was treated with traditional therapy based on the combination of the preparations (streptomycin, isoniazid and rifampicin). II group (50 patients) besides the same traditional chemotherapy received α-tocopherol, vitamin C and sodium nucleinat during 2 months. Sputum smear become negative in 77% (I group) and in 98% (II group) of the cases after 2 months of treatment. After 6 month of the treatment the closure of the decay cavities was revealed in 30% (I group) and in 70% (II group) of the cases. Residual changes as scars were observed only in 16% (I group) and in 62% (II group) of the cases. The results proved that traditional chemotherapy in combination with membrane-protective and membrane-reductant agents shortened the terms of status improvement, sputum conversion, as well as disappearance of cough

and intoxication, promoted the formation of insignificant residual changes more frequently than using only the chemo preparations.

PS-1078-21 Efficiency of tuberculosis treatment in children according to the DOTS strategy

M D Safaryan, A P Gevorkyan. Department of Phthisiopulmonology of Yerevan State Medical University named after M. Heratsi, Yerevan, Armenia. Fax: (+374) 270898. e-mail: marinas@arminco.com

50 children with the pulmonary form of tuberculosis were observed. Treatment efficiency has been assessed by intoxication's symptom disappearance, positive dynamics of X-ray analysis and blood tests as well as according to the character of pulmonary regenerative processes. Chest lymph node TB was revealed in 20 (40%), and primary TB complex in 15 (30%) of the cases. The secondary forms of TB have been mainly shown as the infiltrative tuberculosis in 10 (20%) cases, in 2 (4%) patients have been revealed focal TB, in 1 (2%) - disseminated TB and in 2 (4%) of all cases pleuritis was revealed. The treatment according to the first category of DOTS program has been carried out among 94% of patients, and according to the third category in 6% of patients. After 2-month treatment of intensive phase the intoxication symptoms have disappeared in all patients, the positive dynamics in X-ray dates have been revealed in 84% cases, and smear conversion in 92% of all cases. In the end of whole treatment courses improvement in X-ray dates as a formation of minor changes has been revealed in 98% cases. After 6 months relapses have been revealed only in 3 patients, mainly connected to the poor living conditions. Thus, the efficiency of treatment of children with TB according to the DOTS program is enough high.

PS-1413-21 An antioxidant with promising antimycobacterial activity

M S Shelgaonkar,¹ S D Shelgaonkar.² ¹Institute of Diploma in Pharmacy, Nagpur, ²Government Medical College, Nagpur, Maharashtra, India. Fax: (+91) 712 2244528. e-mail: meena_shelgaonkar@yahoo.com

Setting: Significant rise in free radicals is implicated in pathogenesis of lung fibrosis and dysfunction in patients with pulmonary tuberculosis.

Objective: To investigate whether concomitant use of antioxidants with first line anti tuberculosis agents in patients with pulmonary tuberculosis improves clinical outcome and probable mechanism thereof.

Design: A total of 143 patients with active pulmonary tuberculosis were studied during the intensive phase of antimycobacterial chemotherapy. The recruited patients were randomly allocated either first line antituberculosis agents only or first line anti-

tuberculosis agents along with a chain breaking antioxidant Vit E and Vit C. The study was approved by Institutional Ethics Committee.

Results: Significant reduction in oxidative stress, early and augmented sputum smear AFB negativity, and radiological improvement was noted in study group receiving antioxidants. Early and augmented sputum smear AFB negativity, unrelated to known properties of antioxidant used in study group, was found to be due to antimycobacterial activity of tocopheryl acetate in vitro.

Conclusion: Better clinical improvement in cases of pulmonary tuberculosis, receiving concurrent antioxidants is not only due to antioxidant activity of Vit E but also it has antimycobacterial activity.

PS-1660-21 In vivo dissolution is predominant factor determining bioavailability of rifampicin from its formulations

R Panchagnula, Y Ashokraj, K J Kaur, I Singh, G Kholi, S R Bhade, S Kandavilli, M V S Varma. National Institute of Pharmaceutical Education and Research, SAS Nagar, Punjab, India. Fax: (+91) 2214 700. e-mail: panchagnula@yahoo.com

Bioavailability of rifampicin from its solid oral dosage forms is influenced by its in vivo dissolution. To test this hypothesis, a bioequivalence study was conducted comparing a solution formulation (prepared from a sachet containing rifampicin, isoniazid, pyrazinamide and ethambutol hydrochloride) with two FDC tablets (FDC I and FDC II) with same drugs at same dose levels (450 mg dose of rifampicin). Study was conducted as per WHO protocol using 24 healthy human volunteers with an extended sampling time up to 24 h by a three-way cross over design experiment. Mean pharmacokinetic parameters for solution (AUC₀₋₂₄ – 50.90 ± 12.91 µg.h/ml, C_{max} – 7.92 ± 1.88 µg/ml, T_{max} – 1.33 ± 0.48h), FDC I (AUC₀₋₂₄ – 46.81 ± 8.43 µg.h/ml, C_{max} – 7.07 ± 1.71 µg/ml, T_{max} – 1.83 ± 0.70h) and FDC II (AUC₀₋₂₄ – 41.61 ± 11.69 µg.h/ml, C_{max} – 6.29 ± 1.73 µg/ml, T_{max} – 1.92 ± 0.93h) indicated that solution formulation was more bioequivalent than FDC I and II. However, statistical evaluation indicated that solution formulation was bioequivalent to FDC I but not bioequivalent to FDC II. Beside this, there was no change in Kel values (0.21 ± 0.01h⁻¹, 0.20 ± 0.04h⁻¹ and 0.22 ± 0.06h⁻¹ for solution, FDC I and FDC II, respectively), showed that the difference in treatment was due to difference in absorption of drugs. Hence, it was concluded that rapid in vivo dissolution and absorption of rifampicin is prerequisite for its better pharmacokinetics.

PS-1731-21 Targeted delivery of anti-tuberculosis drugs to *M. tuberculosis*-infected macrophages via scavenger receptors type AI/II

Y S H Schwartz,¹ M I Dushkin,¹ O M Khoschenko,¹ E N Kudinova,¹ A P Agafonov,² A Y U Alekseev,² A M Shestapalov,² M S Azaev,² P N Filimonov,³ R Reynolds,⁴ S H L Morris,⁵ V M Blinov.² ¹Institute of Clinical Immunology SD RAMS, Novosibirsk, ²State Research Center of Virology and Biotechnology 'Vector', Russian Ministry of Public Health, Koltsovo, Novosibirsk Region, ³Novosibirsk Institute of Tuberculosis, Russian Ministry of Public Health, Novosibirsk, Russian Federation; ⁴Southern Research Institute, Birmingham, AL, ⁵FDA/CBER, Bethesda, Maryland, USA. Fax: (+7) 3832 227028. e-mail: YShSchwartz@mail.ru

Macrophages (Mf) are the major cellular reservoir for *Mycobacterium tuberculosis* in the host, and the targeted delivery of anti-tubercular drugs to infected Mf could provide high concentration of the drug within the very site of mycobacteria persistence. Using carboxymethylglucan (CMG) ligand to Mf type AI/II scavenger receptor (ScR) as a carrier to anti-TB antibiotic moxifloxacin we have demonstrated rapid accumulation of high concentrations of antibiotic conjugated with CMG in lung and spleen Mfs. Analysis of pharmacokinetics of the conjugate CMG-moxifloxacin demonstrated its more prolonged persistence in the tissues in comparison with free antibiotic. The histological and mycobacteriological evaluation of anti-TB effect of the conjugate in the acute murine model of TB infection has demonstrated two orders of magnitude superior therapeutic effectiveness of the carrier-bound moxifloxacin vs. free antibiotic. One can conclude that application of the conjugates *anti-infectious drugs-ScR ligands* seems to be most promising approach to the treatment of chronic intracellular infection localized in Mfs.

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PS-1742-21 Immunomodulatory mechanisms of anti-tubercular activity of the conjugate of anti-tubercular antibiotic-ligand to macrophage receptors

E N Kudinova,¹ Y S H Schwartz,¹ M I Dushkin,¹ O M Khoschenko,¹ A P Agafonov,² A Y U Alekseev,² A M Shestapalov,² M S Azaev,² P N Filimonov,³ R Reynolds,⁴ S H L Morris,⁵ V M Blinov.² ¹Institute of Clinical Immunology SD RAMS, Novosibirsk, ²State Research Center of Virology and Biotechnology 'Vector', Russian Ministry of Public Health, Koltsovo, Novosibirsk region, ³Novosibirsk Institute of Tuberculosis, Russian Ministry of Public Health, Novosibirsk, Russian Federation; ⁴Southern Research Institute, Birmingham, AL, ⁵FDA/CBER, Bethesda, Maryland, USA. Fax: (+7) 3832 227028. e-mail: e-kudinova@cn.ru

As we have demonstrated very recently in the murine model of acute tuberculosis (TB) the conjugate of anti-TB antibiotic moxifloxacin with macrophage scavenger receptor polysaccharide ligand carboxymethylated (1→3)-beta-D-glucan (CMG) exerts a

profound dose-dependent anti-TB therapeutic effect, which is two orders of magnitude higher as compared to free antibiotic. Because macrophages could be involved in the innate and adaptive immune response playing an essential role in anti-TB host defense one cannot rule out, that this effect could be owed not only to the targeted delivery of antibiotic to *M. tuberculosis*-infected macrophages, but also to immunomodulatory activity of CMG carrier. Experimental studies of the immunomodulatory effects of CMG in C57Bl/6 mice infected with *M. tuberculosis* strain Erdman with ELISA and Real-Time RT-PCR technique revealed the ability of CMG to modify IFN- γ and TNF- α mRNA expression and production during TB infection in anti-TB manner. We conclude that moxifloxacin conjugation with CMG provides anti-TB effect not only for the targeting of antibiotic but also for immunomodulatory properties of the carrier.

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PS-1846-21 Genetic pattern of N-acetyltransferase 2 gene in Brazilian individuals: preliminary results

R F Teixeira,¹ M Q P Lopes,¹ L B Spinasse,¹ F C Q Mello,² A L Kritski,² P N Suffys,¹ A R Santos.^{1,2} ¹Department of Mycobacteriosis - Oswaldo Cruz Foundation, Rio de Janeiro, ²Tuberculosis Unit Center (UPT) / IDT / HUCFF / UFRJ, Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+55) 21 25984467. e-mail: raquelft@yahoo.com.br

Isoniazid (INH) is an important drug used for treatment of active and latent TB. In humans, N-acetyltransferase2 is the main enzyme involved during INH biotransformation and differences in INH-induced toxicity have been attributed to genetic variability in the *nat2* gene. To estimate the frequency of the previously described *nat2* polymorphisms and to look for the presence of new SNPs in Brazilian individuals. Genotyping of the 17 known polymorphisms and SNPs discovery approach was performed by direct DNA sequencing. Sequencing analysis of DNA samples from 48 individuals showed that SNPs G191A, T341C, G590A and G857A (associated with low INH acetylation) were present with frequencies of 8%, 46%, 42% and 8%. The SNPs C282T, C481T and A803G (not related to NAT phenotype) were present in frequencies of 54%, 48% and 54%. Regarding to the SNP discovery approach, four new SNPs were identified. In this small sample no SNPs described to belong to the high acetylation phenotype were identified. Inversely, the low acetylation associated SNPs were the more frequent, suggesting the predominance of this phenotype in the sample studied. At the moment, more samples are being sequenced to estimate properly the genetic profile of *nat2* in Brazilians.

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PS-1850-21 Prevalence of CYP3A5*6 in Brazilian individuals: a pilot study

J Fonseca-Costa,¹ L B Porto,¹ G A A Kleszczuk,¹ G R Pupo,¹ F Q Marins,¹ A S Rezende,² F S Aguiar,² A G F Pacheco,³ A L Kritski,^{1,2} F C Q Mello,^{1,2} A R Santos.^{1,4} ¹Tuberculosis Unit Center (UPT) - IDT / HUCFF / UFRJ, Rio de Janeiro, ²Hospital TB Control Program - IDT / HUCFF / UFRJ, Rio de Janeiro, ³Department of Epidemiology and Health Quantitative Methods (DEM QS) - ENSP / FioCruz, Rio de Janeiro, ⁴Department of Mycobacteriosis - Oswaldo Cruz Institute - Fiocruz, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 25506903. e-mail: joseane@hucff.ufrj.br

Rationale: Human CYP3A5 is the second major CYP450 isoenzyme in adult human liver involved in metabolism of many xenobiotic and endogenous compounds. Rifampin, which is used in Tuberculosis treatment, is a powerful inductor of the CYP3A5 and therefore reduces the plasmatic concentration of co-administrated drugs. The absence of CYP3A5 expression was recently correlated with polymorphisms in CYP3A5*6.

Objective: To estimate the frequency of CYP3A5*6 among Brazilian donors from Clementino Fraga Filho University Hospital, in Rio de Janeiro.

Methods: Genotyping of the CYP3A5*6 was performed by PCR-RFLP method as described by Fukuen et cols (2002).

Results: After genotyping of the DNA samples from 80 patients, the allelic frequency of the CYP3A5 wild-type was 96% while for the CYP3A5*6 variant was 4%. The frequencies of CYP3A5*1*1, *1*6 and *6*6 were 91%, 9% and 0%, respectively. Our findings, further, will contribute to a better understanding of molecular basis of ethnic differences in drug response, which may help to improve individualization of drug therapy and offer a preliminary basis for more rational use of drugs that are substrates for CYP3A5 in Brazilian population.

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PS-1880-21 Evaluation of the quality of informed consent in a vaccine field trial in a developing country situation

D Minnies,¹ T Hawkridge,² G Hussey,² R Ehrlich.³ ¹Institute for Infectious Diseases and Molecular Medicine, University of Cape Town, Worcester, ²Institute for Infectious Diseases and Molecular Medicine, University of Cape Town, Cape Town, ³Department of Public Health and Family Medicine, University of Cape Town, Cape Town, South Africa. Fax: (+27) 0233477426. e-mail: deom@iafrica.com

Setting: Informed consent is an ethical and legal requirement for research involving human participants. However, few studies have evaluated the process, particularly in the African context. Participants in an immunology case control study designed to identify a correlate of immune protection against TB in South Africa.

Objective: To evaluate the quality of consent in a large BCG vaccine trial.

Study design: Cross-sectional study conducted over a 4 month period.

Methods: A questionnaire dealing with the key requirements of informed process and content were completed by participants and the knowledge and comprehension of consent were measured.

Results: The majority of the 202 participants obtained high scores (>75%) for both the knowledge and comprehension sections. The median score for knowledge was 66.7% (IQR = 55.6%–77.8%) and for comprehension 75% (IQR = 50%–87.5%). Most (79.2%) were aware of the risks and 64.1% knew that participation was voluntary. Education level and experience of research staff were predictive factors for good quality informed consent.

Conclusion: The quality of informed consent for the immunology study can be considered as reasonable, in the context of public health research in a developing country.

PS-1583-21 Interleukin-10 promoter haplotypes in tuberculosis patients and health care workers in Southeast and Middle-West Regions of Brazil

M M Oliveira,¹ J C S Simião da Silva,¹ J Fonseca Costa,¹ A G F Pacheco,² F C Q Mello,¹ C C S Loredi,¹ M F Rabahi,³ H Melo,⁴ F C V Ribeiro,⁴ J R Lapa e Silva,¹ A L Kritski,¹ A R Santos.⁵ ¹Tuberculosis Unit Research - Federal University of Rio de Janeiro, Rio de Janeiro, ²DEM QS - ENSP - Fiocruz, Rio de Janeiro, ³Infection Disease Hospital - Anuar Auad, Gioania, Goias, Brazil; ⁴Santa Maria Stadual Hospital, Rio de Janeiro, ⁵Department of Mycobacteriosis - IOC - Fiocruz, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 25506903. e-mail: martholiveira@yahoo.com.br

Background: Interleukin 10 (IL-10) is a powerful Th2 type cytokine produced by lymphoid cells that inhibit macrophages/monocytes and T-cell replication and secretion of Th1 cytokines involved in the pathogenesis of several diseases including tuberculosis (TB). Several polymorphisms (SNPs) have been described within the promoter region IL-10 coding gene being (-1082, -819 and -592) the most studied.

Objective: To evaluates the distribution of the different IL-10 haplotypes among Health Care Workers (HCWs) and active TB patients.

Methods: SNPs and haplotypes within the IL-10 gene were evaluated by PCR-RFLP among TB patients ($n = 194$), and asymptomatic (HCWs) ($n = 252$). Statistic analyses were performed using R software for Windows, version 2.0.1.

Results: Upon analysis of both groups, the most frequent haplotypes were ATC (45%) and ACC (18%). The ATC haplotype showed a higher frequency in HCWs than in TB patients ($P = 0.00026$). Inversely, GCC, GTC and ACC haplotype frequencies were higher in TB patients than in HCWs ($P = 0.01$, $P = 0.00056$ and $P = 0.00034$).

Conclusions: These results suggest that the IL-10 locus

may contribute to human susceptibility to TB disease and depending on the SNP combination (haplotype).

PS-1294-21 Influence of BCG vaccination on TB incidence and TB mortality among children population in Kazakhstan

Y E S Belova, K K H Baimukhanova, K S Serikbaeva.
National Center for TB Problems, Almaty, Kazakhstan.
Fax: (+327) 918658. e-mail: medeubek@hotmail.com

At present BCG vaccine the main means of the specific prevention of TB among children and adolescents. In 2002 in Kazakhstan cover with BCG vaccination of newborns constituted 97.8%, in 2003 98.4% while BCG re-vaccination 97.8% and 98.4% correspondingly. Against this background TB incidence among contact children don't prevalent 0.6–0.7%, and TB mortality 0.4–0.7 per 100 000. For the last 2 years there occurred 28 cases of TB meningitis only. In 2004 in Kazakhstan there were implemented the vaccine inducing the faster reaction than earlier that led to increase the number of cases of post-vaccinal complications from 0.01 to 0.5% among which lymphadenitis were the most frequent. As a result, vaccine was canceled to use and 350 000 children remained without BCG vaccination. This led to increase the TB incidence and TB mortality among newborns from heavy disseminated TB forms. Thus, during 2 months of 2005 there were notified three lethal outcomes due to the development of the internal organs miliary TB injury and TB encephalitis among newborns non-vaccinated. At the same time all children with post-vaccinal complications were treated successfully and no case of TB disease development was registered. Data obtained demonstrate the importance of the specific prevention to save the children from TB disease development and death from TB.

CLINICAL TRIALS AND TB TREATMENT–II

PS-1492-21 Surgical treatment of tuberculous empyema

G Hacıbrahimoglu, A Orki, A Akgul, O Akin, C Dudu, M Yuksel. Heybeliada Hospital for Chest Disease and Thoracic Surgery, Istanbul, Turkey. Fax: (+216) 3511994. e-mail: ghaciibrahim@yahoo.com

The purpose of this retrospective study was to evaluate surgical treatment protocol for tuberculous empyema. Between 1990 and 2004, 191 patients with an average of 29.7 years presented with tuberculous empyema. Four drug anti-tuberculosis regimens were given in all patients at least 6 months after operation. The most common radiologic findings were pleural effusion and pleural thickness, besides 11 patients were seen cavitary lesion. Most of the patients (n :164) had mixed empyema. In patients with exudative and fibrino-

purulent stage (n :56) treated with tube thoracostomy (n :38) and thoracoscopic drainage and debridement (n :18). One hundred and four patients with organizing stage were treated decortication due to pleural thickness. Resection and/or space obliteration procedures were required in 29 patients. In 2 patients with bronchopleural fistula were treated thoracostoma. There was no mortality and postoperative complication rate was 16.2%. An average hospital stay was 26.9 days (6–150 days). The median follow-up period was 72.4 months. In this period there was one tuberculous reactivation. The guide of surgical treatment for tuberculosis empyema must be stage based and the state of underlying lung. Tube thoracostomy and thoracoscopic drainage and debridement must be first procedures. But presence of parenchymal disease and bronchopleural fistula was required more complicated procedures.

PS-1493-21 Profil radio-clinique de la tuberculose chez les lycéens tunisiens

F Tritar, H Daghfous, O Kahloul, N Chaouch, D Haouari, T Aissi, S Chikhrouhou, G Krid, S Ben Mrad, S Merai, F Djenayah. Service de pneumologie pavillon C, Ariana, Tunisia. Fax: (+216) 718 21184. e-mail: fatma.tritar@laposte.net

Introduction : La tuberculose continue à sévir de manière endémique dans le monde. En Tunisie, l'incidence globale est de 19.6/100 000 habitants en 2003. Elle touche essentiellement les sujets âgés de 15 à 59 ans (75,53%).

But : Etudier le profil radio-clinique de la tuberculose en milieu scolaire.

Matériel et méthodes : Il s'agit d'une étude rétrospective ayant intéressé des lycéens âgés de plus de 12 ans hospitalisés pour tuberculose active durant la période de 1996 à 2004.

Résultats : Quarante quatre patients (17 hommes et 27 femmes) d'âge moyen 14,5 ans (13 à 20 ans), tous vaccinés par le BCG, ont été inclus dans l'étude. Il s'agit d'une tuberculose pulmonaire confirmée dans 37 cas (83%), bacillifère dans 75% des cas. Ailleurs, il s'agit d'une tuberculose pleurale (11,5%), une tuberculose ganglionnaire (9%) et une miliaire fébrile (2%). Un contage tuberculeux est retrouvé dans 43% des cas et des antécédents de tuberculose pulmonaire sont rapportés dans 2 cas. La majorité des lésions radiologiques (90%) sont de type réticulo-nodulaire et excavé et sont souvent bilatérales (70%). L'évolution clinique sous traitement antituberculeux est favorable dans tous les cas. Le délai moyen de négativation des bacilloscopies est de 26 jours. Des séquelles radiologiques sont notées dans 43% des cas.

Commentaires : La tuberculose en milieu scolaire est de plus en plus fréquente avec des formes contagieuses et graves de part leur étendue souvent à l'origine de séquelles, source de contagiosité, d'absentéisme et d'échec scolaire.

PS-1617-21 Treatment results of 129 patients in 2001, Guayas, Ecuador

G S Ludwing. Dirección Provincial de Salud del Guayas, Guayaquil, Ecuador. Fax: (+593) 302491. e-mail: ludwingg71@hotmail.com

Background: PAHO / WHO estimates the existence of more than 50 millions of infected persons with TB-MDR around the world. Considering that statistics in Ecuador offer unreal amounts by sub-registry, but tuberculosis is still a public health threat because of the existence of elements that create conditions for its recrudescence. The TB control program becomes weak, less efficient in its actions. This has determined the emergency of an important problem that darkens the future of this disease: The resistance of drugs against tuberculosis. A retrospective and descriptive study in 129 patients was realized in the PRO-GRAMA TB-GUAYAS. They presented MDR, the efficacy of the treatment was valued, standardized MDR applied in base to the leaving condition and its impact. The sample is constituted with 129 patients that complete the criterions of inclusions in the period 2001.

Results: From the 129 evaluated cases, 61 cured (47%), 20 failures (16%), 3 transferred (2%), 17 abandonment (13%) and 28 dead (22%).

Conclusions: The efficacy of the treatment gave the following result (cured 47%) is comparable with the amounts obtained in countries with the same geographical and ethnic similarities of our country. In the international level it doesn't pass the 60% of cured persons using the standardized second line scheme. We believe that with support and advice of Canada (ACDI and ACP) strengthening the program, implementing and applying DOTS strategy. We will avoid the appearance of more MDR cases in our country with PAHO and WHO support.

PS-1686-21 Outcome of multicentric clinical trials of 4-drug FDCs in 'single dose sachet' formulation for tuberculosis

S K Katiyar. Department of Tuberculosis & Resp Disease, Kanpur, Uttar Pradesh, India. Fax: (+91) 2225202121. e-mail: skkatiyar_in@yahoo.com

Though 4 FDCs have a number of obvious advantages over single drug formulations, patient non compliance has been a cardinal cause of tuberculosis treatment failure in case of defaulters. The new delivery system '4 drug FDC in a powder form in the Sachet for suspension, for once a day administration is convenient & acceptable form to dispense drugs. Unfortunately, many patients, especially those who are prescribed medication for a long period of time were found not to comply with the physician's instructions, with a magnitude of the non compliance rate ranging between 16.8% and 74.3% of the patients. Case findings based on sputum examination & chest X ray on 60 day, of the Multicentric Clinical trial confirmed

99.6% sputum negativity after 2 month treatment of 'Single Dose Sachet' for initial intensive phase of Tuberculosis in new smear positive patients. The characteristics associated with rate of sputum conversion during this trial indicates that the 4 FDC single Dose Sachet formulation, could help promote an objective of 4 FDC to help countries meet the Global TB control target of a 70% case detection rate and expand 85% sputum conversion rate of detected cases.

| Age group | No. of patients | No. of male patients | No. of female patients |
|----------------------------------|-----------------|----------------------|------------------------|
| 0-16 | 0 | 1 | 1 |
| 17-20 | 22 | 12 | 10 |
| 21-30 | 28 | 13 | 14 |
| 31-40 | 20 | 11 | 8 |
| 41-50 | 7 | 3 | 4 |
| 51-60 | 5 | 5 | 0 |
| Total No. of patients | 82 | 45 | 37 |
| (Total) - (Dropouts) | (82) - (11) | (45) - (5) | (37) - (6) |
| No. of completed cases | 71 | 40 | 31 |
| No. of cases: | | | |
| sputum negativity after 2 months | 70 | 40 | 30 |

PS-1700-21 Analysis of delayed diagnosis of tuberculosis in a TB outpatient clinic

G P Przybylski,¹ J N Nowacka-Apyio.² ¹Department of Pulmonary Diseases Nicolaus Copernicus University in Torun, Collegium Medicum in Bydgos, Bydgoszcz, ²Department of Pulmonary Diseases City Hospital, Grudziadz, Poland. Fax: (+48) 523256606. e-mail: przybylski@lekarz.net

Tuberculosis was an extremely common cause of death in Europe in nineteenth century. Nowadays the situation is much more better, we can cure this disease completely, but total eradication is still far away. The problem is not only because of poor countries with high prevalence of tuberculosis, where people suffer from hunger, lack of treatment etc. In our research we want to show, what are the causes of delayed treatment in patients at a TB outpatient clinic in a polish town—Grudziadz. The population of this town is about 100 000. There are no difficulties in contacting a lung diseases specialist and availability of medications which are free for TB patients. Despite this, the tuberculosis notification rate in 2003 was 35 per 100 000 (in comparison to the whole country, where the rate was 26.5). We tried to demonstrate, what factors prevent the TB patients from seeing the doctor immediately, why they interrupt the treatment, why they do not come to control after recovery. We analysed, when health organisations or general practitioners were guilty of delaying sending patients suspected of TB to the consulting unit. We analysed 80 tuberculosis cases in the years 2000–2004. We considered age, sex, marital status and socioeconomic level of the patients. We divided the cases into two categories—with high bacterial load in expectorated sputum (smear positive) and with low bacterial load (smear

negative)—positive in culture colony-forming units. The results of our research were quite interesting. Low knowledge of TB, low health consciousness, alcoholism touch patients with low socio-economic levels.

PS-1725-21 Factors affecting patient delay amongst TB patients

O O Adewole,¹ G E Erhabor,¹ O Awopeju,¹ A Jeje,¹ O Ogunwemimo,¹ F A Erhabor.² Departments of ¹Medicine and ²Nursing, Obafemi Awolowo University Teaching Hospital Complex, Ile-Ife, Osun State, Nigeria.
e-mail: gregerhabor@yahoo.com

Introduction: Tuberculosis is disease of antiquity and despite advances made in its treatment and control, morbidity and mortality are still rising. One factor responsible for this is delay in diagnosis and treatment initiation.

Objective: To determine factors associated with patient delay amongst TB patients in Ile-Ife.

Method: One hundred newly diagnosed patients with PTB were enrolled. Patients were taken through a MRC questionnaire.

Results: There were fifty male and forty eight female patients, with age ranging from 17 to 60 years with a mean of 32.7 years. Seventy five (75%) patients presented after one month while 25 (25%) patients presented within one month. The mean patient delay was 32 weeks. Factors identified associated with delayed in presentation include female sex ($P < 0.05$), history of smoking and low level of knowledge about TB. HIV positive patients has a higher degree of patient delay when compared with their HIV negative counterpart

Conclusion: Significant time is wasted by the patients before presenting at a formal health center. There is a need to educate the public about TB, availability of free and effective treatment and the need for early presentation.

PS-1777-21 Pancreatic tuberculosis: a case report

G Przybylski,¹ B Dolecka,² A Rajewska.¹ ¹Department of Pulmonary Diseases Nicolaus Copernicus University in Torun Collegium Medicum, Bydgoszcz, ²Outpatient Clinic of Pulmonary Diseases, Swiecie, Poland. Fax: (+48) 523256606.
e-mail: przybylskig@lekarz.net

Tuberculosis infrequently involves pancreas. Its occurrence may pose diagnostic problem in differentiating from carcinoma of the pancreas. The clinical features in patients with pancreatic tuberculosis are usually non-specific with a wide spectrum of symptoms predominantly such as abdominal pain, loss of weight and a pancreatic mass mimicking malignancy. The radiological features mimic pancreatic malignancy or pancreatitis. Its indolent course and vague symptomatology along with non-specific laboratory

and radiological findings call for greater vigilance. We report a case of a 50-year-old woman with pancreatic tuberculosis. The many months' abdominal pain, the loss of weight and CT image of abdominal cavity was suggested of tumor of pancreas. Imaging techniques revealed a mass located in the head of the pancreatic gland. The dichotomy between the radiological findings and the general condition of the patient, as well as the laboratory results, cast doubt on the diagnosis. There was no history of tuberculosis. The chest radiograph revealed no pathological findings. This patient underwent surgery. The diagnosis of tuberculosis was confirmed by histopathological examination of biopsy specimens obtained at the time of laparotomy. Pathological images revealed granulomas with caseous necrosis, consistent with tuberculosis. After 6 months of anti tubercular chemotherapy and are now asymptomatic. The response to antituberculosis treatment is very favorable. In view of variable clinical presentation and atypical radiological signs, a clinical diagnosis of pancreatic tuberculosis is usually not possible without surgical intervention.

PS-1930-21 Efficiency of DOT providers in a TB control programme

R B Prabhakara. Damien Foundation India Trust, Chennai, Tamil Nadu, India. Fax: (+91 044) 28362367.
e-mail: damienin@vsnl.com

Introduction: Directly Observed Treatment (DOT) could be done by different persons including government staff. The general belief is that personnel from government should preferably be engaged as DOT providers. Community volunteers are considered to be less reliable.

Objective: To compare the effectiveness, in terms of cure rate, of community volunteers with the Government staff in DOTS supervision.

Methodology: When a TB patient is diagnosed in any government Health Facility the patient is counseled for treatment. DOT provider either a Government staff or community volunteers was identified as per the convenience and acceptable to the patient. The DOT providers were counseled for supervised treatment delivery (DOT). They were periodically supervised by Medical Officer of Health Facility.

Results: Sputum positive TB patients registered from Jan to June 2003 were included in the study. Data was collected from records like patient treatment record and TB register. Both groups could achieve a cure rate of 80% for Cat I TB patients and 65% for Cat II TB patients.

Conclusion: Both volunteers and Govt. health workers are equally efficient DOT Providers.

PS-1998-21 Time to diagnosis and treatment of tuberculosis in Chennai, India

V Chandrasekaran,¹ R Ramachandran,¹ J Cunningham,^{2,3} R Balasubramanian,¹ A Thomas,¹ G Sudha,¹ N R Charles,¹ K Jaggarajamma,¹ M Perkins,³ P R Narayanan.¹ ¹Statistics, Tuberculosis Research Center, Chennai, India, Chennai, India; ²UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases, Geneva, ³Foundation for Innovative New Diagnostics, Geneva, Switzerland. Fax: (+91 044) 28362528. e-mail: kvksekar@yaho.co.in

Background: Multiple behavioural and health system factors lead to diagnostic delay resulting in economic costs to patients and ongoing TB transmission. **Methods:** Cross sectional study, in 24 Chennai clinics, indicates the economic impact of diagnostic processes and factors associated with delay before diagnosing TB.

Results: 408 newly diagnosed adult TB patients were interviewed: 240 (59%) smear positive pulmonary; 108 (26%) smear negative pulmonary and 60 (15%) Extra-Pulmonary. Among pulmonary TB cases (348) mean and median total delay time was 90 days and 69 days, respectively. For extra pulmonary mean were 113 days and median 82 days. The patient delay mean and median for pulmonary cases 55 and 40 respectively and for extra-pulmonary was 75 and 60 days. Increased patients delay was associated with rural living and first visit to private practitioner. Sputum smear microscopy was ordered during the first visit to government clinics in 67% of pulmonary cases (84/125) and in 9% (20/211) of first visits to private practitioners. The median cost of diagnosis for pulmonary and extra-pulmonary cases was \$5.22 (Rupees 235) and \$7 (Rupees 315) respectively.

Conclusions: Extra-pulmonary TB is associated with taking longer time to diagnosis and higher direct costs. Sputum smear microscopy is rarely requested by the first private practitioners.

PS-2001-21 Factors leading to tuberculosis diagnostic drop-out and delayed treatment initiation in Chennai, India

V Chandrasekaran,¹ R Ramachandran,¹ J Cunningham,² R Balasubramanian,¹ A Thomas,¹ G Sudha,¹ N R Charles,¹ K Jaggarajamma,¹ M Perkins,³ P R Narayanan.¹ ¹Department of Statistics, Tuberculosis Research Center, Chennai, India; ²UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases, Geneva, ³Foundation for Innovative New Diagnostics, Geneva, Switzerland. Fax: (+91 044) 28362528. e-mail: kvksekar@yaho.co.in

Objectives: To determine the causes for drop-out among pulmonary TB suspects.

Methods: Subjects (>15 years) presenting to government health centres with >3 weeks cough or haemoptysis were enrolled in a prospective observational study. All symptomatics had smear microscopy and were followed-up. Causes for patient's failure to give

either first, second or third specimen, not collecting results and not starting treatment were recorded. In all these cases 2 weeks time was given to declare as drop-outs.

Results: 1000 subjects recruited, 872 (87%) completed the diagnostic processes. Of 128 drop-outs, 107 (84%) failed giving second sputum sample and 14 (11%) failed collecting results, one patient not initiated treatment, one not given any specimen and 5 not given third specimen. Of 128, 92 (72%) tracked and interviewed, 30 for inadequate address, 5 migrated and 1 expired. Of 92 the reason for drop-out were personal reasons 46 (50%), disease related 30 (33%) and issues related to health system 16 (17%). Among 46, the main personal reason was work related (30%) and social engagement (15%).

Conclusion: In this study, 87% of respiratory symptomatics complied with the diagnostic process. Failure to collect results was high. Major reason for drop out was 'personal'.

PS-2012-21 Incidence of tuberculosis disease in younger people who received chemoprophylaxis in Sullana, Peru between 2000 and 2004

V Aguila Rivera, M E Galloza Palacios. Health Ministry of Peru, Sullana, Piura, Peru. Fax: (+51) 073 502309. e-mail: varupch@yahoo.com

Material and methods: Descriptive, retrospective and transverse study.

Universe-sample: Younger people with 15 years old or less who take contact with patient of tuberculosis smear positive, belong to Bellavista Region in Sullana, between 2000 and 2004.

Definitions: Total Incidence: Cases of TBC / interview contacts $\times 100$. Incidence of TBC in interview contacts who take chemoprophylaxis: Interview contacts with TBC / Interview contacts who received quimio-profilaxis $\times 100$. Contact: People who have a relationship in home with Tuberculosis patient smear positive. Chemoprophylaxis: Isoniazid administration to younger healthy contacts (people with 15 years old or minus) to TB patient smear positive. Smear positive: TB Patient smear positive

Results: From 412 contacts only 310 (75%) received quimioprofilaxis and 3 (0.96%) of them have TB disease; one of them have ganglionar tuberculosis. We have an incidence of 0.97% or 1% to contacts with TBC Disease to total of interviews contacts (4 patients to 412 interview contacts) between 2000 and 2004). We didn't find difference respect about sex, ages more affects was 5 to 14 years old. Moda value is 8 años and mediana is 8.

PS-2045-21 Effect of vitamin D supplementation on anti-mycobacterial immunity: a double-blind randomised placebo-controlled trial in London tuberculosis contacts

A R Martineau,^{1,2,3} B M Hall,¹ S M Newton,² K A Wilkinson,^{2,3} Z Maunsell,⁴ G E Packe,⁵ R N Davidson,^{2,6} R J Wilkinson,^{2,3} C J Griffiths.¹ ¹Institute of Community Health Sciences, Barts, London, ²Wellcome Centre for Research in Clinical Tropical Medicine, Imperial College, London, UK; ³Institute of Infectious Diseases and Molecular Medicine, University of Cape Town, Cape Town, South Africa; ⁴Department of Clinical Biochemistry, Northwick Park Hospital, London, ⁵Newham Chest Clinic, Shrewsbury Centre, London, ⁶Tuberculosis Clinic, Northwick Park Hospital, London, UK. Fax: (+44) 207 8826396. e-mail: a.martineau@qmul.ac.uk

Introduction: Vitamin D has no direct anti-mycobacterial action, but it modulates the immune response to *M. tuberculosis* in vitro. Historically vitamin D was used to treat tuberculosis, causing resolution in some cases but exacerbation of immunopathology in others. We present results of the first controlled study to investigate the effect of vitamin D supplementation in vivo on antimycobacterial immunity in vitro.

Methods: We assayed serum 25-hydroxy-vitamin D (calcidiol) levels of 202 London tuberculosis contacts and performed baseline whole blood assays of anti-mycobacterial immunity. 192 subjects were randomised to receive 2.5 mg vitamin D₂ or placebo per os. Assays were repeated at 7 and 49 days.

Results: 121/202 subjects were vitamin D deficient (serum calcidiol <27.5 nmol/l) at baseline. 176/192 randomised subjects were followed up; vitamin D deficiency was corrected in all subjects at all time-points in the intervention group. Results of whole blood assays of anti-mycobacterial immunity will be presented.

Conclusions: Vitamin D deficiency was common among study participants at baseline, and was corrected in the intervention group. The influence of vitamin D status and of polymorphisms in the vitamin D receptor and vitamin D binding protein on anti-mycobacterial immunity will be discussed.

PS-2177-21 Determination of the effect of blood testing intervals on bioavailability and bioequivalence of fixed-dose drug combination anti-tuberculosis drugs isoniazid, rifampicin, pyrazinamide and ethambutol

G A Gabriels,¹ H McIlleron,¹ P J Smith,¹ P I Folb,¹ P B Fourie.² ¹Division of Pharmacology Department Medicine Faculty of Health Science University of Cape Town, Cape Town, Western Cape, ²Medical Research Council, Pretoria, Gauteng, South Africa. Fax: (+27 021) 4066288. e-mail: ggabriel@uctgsh1.uct.ac.za

Setting: The assessment of fixed-dose combination (FDC) formulation is widely accepted, however focus has been placed predominantly on rifampicin within the FDC when assessing screening protocols. It would

be advantageous for both the drug regulatory authorities and drug manufactures, for optimum minimum time intervals, that embraces all anti-tuberculosis active constituents within the FDC.

Objective: To determine the optimum time intervals and duration for testing novel fixed-dose anti-tuberculosis drugs in 13 clinical trials conducted.

Design: The blood level results of each of the active constituents of 13 different bioavailability and bioequivalence FDC clinical studies that were randomised, single dose, crossover design with appropriate reference formulations were analysed.

Results: The pharmacokinetic parameters to determine bioavailability and Hauschke method to determine bioequivalence, revealed that a 6 points time protocol, namely 0, 1, 2, 4, 6 and 8 hours, would be sufficient to determine quality assurance for FDCs already in the market, and a 11 point time protocol of 0, 0.25, 0.5, 1, 1.5, 2, 2.5, 3, 4, 6, and 8 hours provide sufficient information, and is comparable to the conventional 15 time points for FDCs of up to four drugs.

Conclusion: The findings would result in economic and convenience benefit for quality assurance testing of existing and novel FDCs.

TUBERCULOSIS DIAGNOSTICS: MICROSCOPY

PS-1114-21 Evaluation of a novel artificial sputum developed for panel test slides to be used in external quality assessment

H Yamada,¹ S Mitarai,² L Aguiman,³ A Fujiki.⁴ ¹Pathology Division and ²Microbiology Division, Mycobacterium Reference Center, The Research Institute of Tuberculosis, JATA, Kiyose, Tokyo, Japan; ³Cebu Regional TB Reference Laboratory, -CHD, Cebu, Philippines; ⁴Department of Research, The Research Institute of Tuberculosis, JATA, Kiyose, Tokyo, Japan. Fax: (+81) 424924600. e-mail: hyamada@jata.or.jp

Introduction: A newly developed sputum smear panel preparation method using a novel artificial sputum was evaluated in the external quality assessment system.

Objectives: To develop a material of panel testing and training for the quality assessment of sputum smear microscopy.

Methods: We reported a new artificial sputum without using patients' sputum containing virulent AFB last year. A set of slides composed of 10 slides with 3+, 2+, 1+, ± and negatives was prepared using the artificial sputum. The panel test slides were evaluated in several laboratories for the usefulness.

Results: Smears made from the artificial sputum were applicable to Ziehl-Neelsen and fluorescent staining. The artificial sputum was prepared in ease and safe, and the positivity was controlled easily being free from biohazard problem. The final products were so

similar to real sputum smears that it is almost impossible to distinguish between them both macro- and microscopically.

Conclusion: The smear slide by the artificial sputum was superior to the other methods for its quality and safety. It will be utilized for the panel testing and training material in the external quality assessment.

PS-1177-21 Conversion at months 2/3 in tuberculosis patients of the Centre Antituberculeux of Lomé, TOGO in 2002

A Hounkpati,¹ K Adjoh,¹ E M Massengo Kiamanga,² D Sadzo-Hetsu,² O Tidjani.^{1,2} ¹Service de Pneumo-phthisiologie et de Maladies Infectieuses du CHU Lomé Tokoin, Lomé, ²Centre antituberculeux de Lomé, Lomé, Togo.
Fax: (+228) 221 83 63. e-mail: hounkpati_1@hotmail.com

Background: The sputum conversion rate predicts the treatment results and the defaulter rate in tuberculosis patients. The aim of this study is to determine the sputum conversion rate at the antituberculosis centre of Lomé.

Methods: We studied retrospectively the smear microscopy of all smear positive pulmonary tuberculosis (new cases, relapse, failed, retreatment) registered at Centre Antituberculeux of Lomé from January through December 2002 at the end of the intensive period of treatment.

Results: We registered 485 patients with 432 in category 1 and 53 in category 2. Mean age: 38 years (Range: 7 and 72 years). Sex-ratio (H/F): 2. The conversion rate was 78.24% ($n = 383$) and 86.80% ($n = 46$) respectively in patients of category 1 and in category 2. After one month continuing the intensive phase in category 1 patients, conversion and positivity rates became respectively 85.18% and 3.70%. The defaulter rate was 3.70% ($n = 16$). The mortality rate was 3.93%. Masculine gender and an age between 15 and 54 years are features associated with the non-conversion of sputum smear.

Conclusion: Checking-up the sputum conversion rate must be a routine test in National Tuberculosis Programs.

PS-1180-21 Devénir des tuberculeux pulmonaires identifiés dans un laboratoire de microscopie de Conakry

L M Camara, M B Diallo, M Diallo, M P Diallo, M D Barry, O Y Sow. Département de Pneumo-phthisiologie, CHU Ignace Deen, Conakry, Guinée. Fax: (+224) 41 20 50. e-mail: camaralmdy@yahoo.fr

L'objectif de cette étude était d'évaluer le traitement de la cohorte de tuberculose pulmonaire identifiés dans un laboratoire de microscopie de Conakry. Etude rétrospective couvrant l'année 2002. Tous les nouveaux cas de TPM+ enregistrés dans le registre de microscopie ont été inclus. Nous avons utilisé pour la collecte des données une fiche d'enquête qui a permis

de noter les renseignements généraux, le résultat de la bacilloscopie et les résultats du traitement. Les registres du laboratoire, de déclaration des cas de tuberculose et d'hospitalisation et de garde, les fiches de traitement de la tuberculose et les dossiers médicaux ont servi de matériel. Sur les 685 cas de tuberculose identifiés, 636, soit 92,6% ont bénéficié d'un traitement antituberculeux. Parmi les 51 patients n'ayant pas reçu de traitement antituberculeux, 30 étaient décédés avant les résultats du crachat et, aucune information n'a été retrouvée sur les 21 patients restants. Parmi ceux admis au traitement nous avons observé 61,6% de guérison, 6,3% de décès, 5,8% de perdu de vue, 1,3% d'échec, 13,4% de transfert et 11,6%, de traitement terminé. Le devenir d'un certain nombre de malades reste inconnu dans les conditions d'application du DOTS. Le dialogue entre Médecin et Laborantin doit être renforcé pour retrouver à temps ces malades.

PS-1233-21 Pathohistologically diagnosed tuberculosis on pleural biopsies

J Stojic, D Pesut, J Radojicic, T Adzic, D Jovanovic. Institute for Lung Diseases and Tuberculosis, Belgrade, Serbia, Serbia and Montenegro. Fax: (+381) 11646988. e-mail: jelena8@yubc.net

We analysed importance of pathological diagnosis of tuberculosis on pleural tissue obtained by percutaneous needle biopsies. Clinically, pleural tuberculosis had similar, diffuse, multinodular, growth pattern on pleural surface as malignant mesothelioma and pleural carcinosis. They all were accompanied with pleural effusion. Pleural tuberculosis was diagnosed on 329 biopsies during last 10 years. Biopsies contained numerous caseating and productive granulomas in pleural fibrous tissue, covered or not with mesothelial cells. Pleural effusion were haemorrhagic and their smears contained constantly the same kind of cells in the same ratio: scanty reactive mesothelial cells with a mass of lymphocytes and eritocytes without malignant cells. Malignant mesothelioma and pleural carcinosis had a similar tubulo-papillary morphological pattern, but immunohistochemistry accurate distinguished these malignancies on tissue samples. In malignant conditions pleural effusions were also haemorrhagic, but their smears contained a mass of eritocytes mixed with malignant epitheloid cells. Pathohistological examination of pleural tissue by needle biopsy was important in cases of recidivant pleural effusions to distinguish pleural tuberculosis from primary and secondary pleural malignancies.

PS-1237-21 Diagnosing tuberculous pleural effusion: comparative diagnostic yield of mycobacterial culture and histopathology

I V Liskina,¹ A A Zhurylo,² A I Barbova.² Departments of ¹Histopathology and ²Microbiology, Institute of Tuberculosis & Pulmonology, Kiev, Ukraine. Fax: (+380) 44 275 21 18. e-mail: morphol@ifp.kiev.ua

It is well known that still now microbiological diagnostics of tuberculous pleurisy (TB-P) is difficult. The aim of our study was to elucidate diagnostic yield of MBT-revealing as by microbiological method so as in histological specimens. 22 cases with final diagnosis of tuberculous pleuritis were analyzed. Pleural biopsies were obtained by percutaneous needle biopsy of the parietal pleura (PNB) (12 cases) and by thoracoscopy (10 cases). Specimens from all cases were submitted for histologic study and appropriate special stains and for mycobacterial culture. PNB allowed to reveal MBT in 6 (50%) cases in histological samples (Ziehl-Nielsen stain) and 4 (33.3%) cases had pleural cultures positive for MBT. General efficacy was 66.7%. Thoracoscopic pleural biopsies allowed to find out MBT in 9 (90%) cases by histological examination and only in 2 (20%) cases of mycobacterial cultures. General diagnostic yield has comprised 90%.

Overall diagnostic yield has compounded 77.3%. To take into attention the fact of presenting the complex diagnostic morphological criteria of tuberculous inflammation in all cases of interest it is expedient to orient on histomorphological examination of pleura biopsies.

PS-1268-21 Comparison of two decontamination/liquefaction methods for microscopy detection and recovery of mycobacteria in clinical practice

N S Morcillo,¹ C N Fernandez,¹ B R Imperiale,¹ A N Bodon,¹ J C Palomino.² ¹Dr. Cetrangolo Hospital. TB Control Program of Buenos Aires Province, Vicente Lopez, Buenos Aires, Argentina; ²Institute of Tropical Medicine, Antwerp, Belgium. Fax: (+54) 11 4721 9153. e-mail: nora_morcillo@fullzero.com.ar

The clinical performance of the hypertonic decontamination method (HT), which uses a combination of hypertonic sodium chloride and sodium hydroxide, was compared to that of 4% NaOH plus N-acetyl-L-cysteine (NALC) method in a two phase study: Phase I: 683 respiratory clinical specimens were divided in two parts of equal volume each and decontaminated by NALC or HT. Smears were prepared from each one of the decontaminated volumes and stained by Ziehl-Neelsen for microscopy detection (AFB). After that 0.2 ml were inoculated onto Löwenstein-Jensen slants and 0.5 ml on MGIT960 (BD Argentina) and incubated at 37°C during 60 and 42 days respectively. Phase II: 3388 respiratory specimens were included under a double blind and randomized design to be treated by either NALC (1357) or HT (2031). Sam-

ples were processed as specified in Phase I. AFB and cultures results from Phases I and II showed that no significant differences were found between both HT and NALC when analyzing sensitivity, specificity, the area under the ROC curve, and predictive values. These findings suggest that HT could be used as an inexpensive method in the clinical diagnosis of TB cases especially in low-income countries.

PS-1335-21 Quality assessment of sputum microscopy in the SAARC (South Asian Association for Regional Cooperation) region

R M Piryani, B P Rijal, K K Jha, R M Rahman. SAARC Tuberculosis Centre, Thimi, Bhaktapur, Nepal, Kathmandu, Nepal. Fax: (+977) 1 6634379. e-mail: saarctb@mos.com.np

Introduction: SAARC TB Reference Laboratory has started quality assessment of sputum microscopy in the SAARC Region through External proficiency Testing. The result of second round External Proficiency Testing is highlighted here.

Objective: To assess the quality of sputum microscopy in National TB Reference laboratories in the SAARC region.

Methods: In January 2004 a panel of 10 slides was prepared and sent to nine National TB Reference Laboratories in the SAARC region. After examining the slides by the National Reference laboratories, reports and slides were sent back to SAARC Reference Laboratory, where the reports were analyzed. The WHO and IUATLD guidelines and reporting criteria were followed for slide preparation and reporting respectively. Courier service was used for slide transportation. **Results:** None of the nine National TB Reference laboratories reported error of any type and achieved 100% score.

Conclusion: The performance of all the National TB Reference Laboratories was excellent and consistent with that of the first round.

PS-1632-21 Sensibilité comparée de la microscopie avant et après traitement des prélèvements à l'hypochlorite de sodium

N L Slim-Saidi, E Mehiri, W Mahjoubi, E Berrich, L Ben Salah. Laboratoire de Microbiologie, Hôpital Abderahman MAMI, Ariana, Tunisia. Fax: (+216) 71821184. e-mail: leila.saidi@rns.tn

L'examen direct après coloration de Ziehl Neelsen est une étape primordiale dans le diagnostic bactériologique de la tuberculose permettant la mise en évidence et le traitement rapide des formes bacillifères et contagieuses de la maladie. C'est également le seul examen dont disposent les laboratoires régionaux de la santé publique dans de nombreux pays. Le présent travail se propose de comparer deux variantes techniques de cette méthode de diagnostic : - La coloration de Ziehl Neelsen des frottis réalisés directement

sur les expectorations. - La coloration de Ziehl Neelsen après fluidification des crachats par l'hypochlorite de sodium et centrifugation. 275 prélèvements provenant de patients différents et suspects de tuberculose sont étudiés et comparés aux résultats des cultures sur milieu de Lowenstein-Jensen. Une concordance entre les deux variantes est retrouvée dans 95,6% des cas. L'examen direct est positif avec les deux techniques chez 62 patients parmi 78 ayant une culture positive à *M. tuberculosis*. La sensibilité de la microscopie des frottis directs par rapport à la culture est de 82% alors que celle de la variante utilisant l'hypochlorite est de 91%. Le traitement à l'hypochlorite de sodium a l'avantage d'inactiver les mycobactéries diminuant ainsi le risque de contamination des manipulateurs par les souches virulentes ; cette méthode améliore les performances du diagnostic direct dans 12,8% des cas selon notre étude. Cette technique pourrait être particulièrement indiquée dans les laboratoires de diagnostic de la tuberculose de première ligne ne pratiquant pas la culture des mycobactéries.

PS-1766-21 Correlation between sputum smear microscopy and cultures in follow-up of tuberculosis patients

V Safar, K Kalemba, K Saengrengsong, N Durier, F Varaine. Médecins Sans Frontières, Paris, France.
Fax: (+33) 1 48 06 68 68. e-mail: fvaraine@paris.msf.org

Objective: To describe concordance between direct M and C in the identification of failures to treatment in patients treated for pulmonary TB.

Setting: TB program for migrant workers and refugees in Tak Province (Thailand)

Methods: Retrospective analysis on patients who had positive M (M+) at 5 months of treatment and C performed during treatment course from November 2000 to December 2004.

Results: Of 80 category 1 patients M+ at 5 months: 63 (79%) were C negative (C-); 15 (19%) were C+; 13 multidrug-resistant (MDR), 1 not tested, 1 full susceptible; 2 (2%) non tuberculous mycobacteria. Of 32 category 2 patients M+ at 5 months: 17 (53%) were C-; 14 (44%) were MDR; 1 (3%) was resistant to isoniazid.

Conclusion: A large number of patients had non concordant results between M and C. M did not seem to be an adequate trigger for a change in the treatment particularly for category 1. Further study is required.

PS-2054-21 Pathohistological diagnosis of endobronchial tuberculosis

J Stojisic,¹ D Jovanovic,² E Sudjic,³ J Radojicic.¹ Departments of ¹Pathology, ²Pulmology and ³Bronchology, Institute for Lung Diseases and Tuberculosis, Belgrade, Serbia, Serbia and Montenegro. Fax: (+381) 11 686988. e-mail: jelena8@yubc.net

Aim: To evaluate pathohistological (PH) examination in cases of endobronchial tuberculosis (ETB). Bronchoscopy finding of ETB is similar to obstructive stenosis with tumour mass. Bronchoscopic biopsies are required in such cases.

Material and methods: Bronchoscopic biopsies are obtained and performed for PH examination. In all cases biopsies were fixed, dehydrated, embebed in paraffin and stained routinely by hematoxylin-eosin method.

Results: During last 10 years 3928 patients (pts.) were hospitalized and treated from TB. In 979 pts. (29.4%) diagnosis of TB was performed pathohistologically. Among them in 351 pts. TB was diagnosed on biopsies performed on bronchoscopy. It meant that ETB was diagnosed in 8.9% off all hospitalized and treated from TB or in 35.85% of all biopsied with diagnosis of TB due to PH diagnosis. Granulomas, with or without caseating necrosis, contained a few giant, multinuclear cells, surrounded by lymphocytes and plasma cells, in bronchial biopsy were diagnosed. Also, squamous metaplasia of bronchial epithelia was associated with tuberculous granulomas in 85% biopsies without significant epithelial dysplasia. **Conclusion:** PH of ETB on bronchial biopsies is useful in cases of ATL resistance to confirm TB and to eliminate the suspicion of malignancy. It is also useful in differentiation from the other granulomatosis, mostly sarcoidosis. In cases where differentiation is not possible diagnosis of ETB could be established in correlation with clinical findings (ARB, skin tests, etc.).

PS-1721-21 Challenging the establishment of laboratory network in Afghanistan

H Ahmadzai,¹ K Yamakami,² T Hayakawa,² A Afghanzada,³ H Habibi.³ ¹National TB Control Program, Kabul, Afghanistan; ²JICA, Kabul, Japan; ³Global Fund Management Unit, Kabul, Afghanistan.
Fax: (+873) 763422573. e-mail: ntpafgmanager@yahoo.com

Background: The NTP Afghanistan has recognized that establishing Laboratory Network is the one of the key issue for leading DOTS program success in Afghanistan. At least 250 laboratories are required for TB diagnostic in the country. However, there was very little reliable information about the TB laboratories available. Nationwide Quality Assurance for TB sputum smear microscopy is not existed.

Objectives: Establishment of the functional Lab Network for the NTP activities.

Methods: The NTP Afghanistan and JICA conducted two surveys to know the allocation of the existing

functional TB diagnostic laboratories, and its condition and quality of examinations. 1) Situation Analysis Survey on TB Laboratories from February to April 2005. 2) Panel Testing Survey in April 2005. The EQA operational research has been started at three model areas after surveys.

Results: Laboratory technicians working at the provincial TB Centers collected information from 190 TB diagnostic laboratories for situation analysis. 180 laboratories participated the Panel Testing Survey. According to the analysis of these data, the NTP started the comprehensive EQA activities in the model areas.

Conclusion: There are still many difficulties need to be overcome for establishing the Laboratory Network, however, the NTP continues to give the enormous effort.

EPIDEMIOLOGY OF TUBERCULOSIS

PS-1332-21 Screening high-risk adolescents for latent tuberculosis infection in the San Diego/Tijuana border region

L Hill, N Kelley, E Blumberg, M Hovell, C Sipan, K Schmitz, M Ji. CBEACH/GSPH/San Diego State University, San Diego, California, USA. Fax: (+1) 858-505-8614. e-mail: eblumberg@projects.sdsu.edu

Objectives: To describe the characteristics of high-risk adolescents with LTBI.

Methods: As part of a larger trial designed to increase adherence to INH, high school students were screened for LTBI. Demographics and risk factors for tuberculosis were ascertained.

Results: 1139 high-risk adolescents were screened; 157 tested positive. Of those testing positive, 90.4% were Hispanic. 41% were foreign born and 61% reported ever having a BCG vaccination. 56.3% reported ever living in a high-risk country; 48.3% reported ever visiting a high risk country; and 42.1% reported eating 'fresh cheese.' Compared to those testing negative, PPD+ youth were significantly ($P < 0.05$) more likely to have lived in or visited a high-risk country, to have eaten fresh cheese, and to be foreign born.

Conclusions: Results confirm high-risk status for high school youth living in the San Diego/Tijuana border region. While vaccinations might lead to overestimates of infection, experience in high-risk countries suggests ongoing possible contact with individuals with active TB. More aggressive screening and treatment of LTBI remains warranted along the border.

PS-1519-21 Evaluation of an MIRU-VNTR-based approach for the genotyping of *Mycobacterium tuberculosis* for epidemiological purposes

N A Rodríguez, D G de Viedma, S Andrés, S Muñoz, M J Ruiz, E Bouza. Servicio de Microbiología y Enfermedades Infecciosas, Hospital Gregorio Marañón, Madrid, Spain. Fax: (+34) 915044906. e-mail: dgriedma@microb.net

134 cultures received in 2004 were genotyped by IS6110-RFLP, Spoligotyping and MIRU-VNTR, and analyzed by Bionumerics 4.0. The MIRU type was obtained 21 days prior to RFLP. The discriminatory power (HGDI) of RFLP and MIRU were 0.989 and 0.978, respectively. RFLP clustered 41.8% of the isolates (17 clusters; 2 to 9 representatives) whereas MIRU increased the number and size of clusters (57.5% of the isolates in 20 clusters; 2 to 14 representatives). With regard to the clusters defined by RFLP, MIRU data showed full correlation in 7/17 clusters and no correlation in 8/17. When MIRU and Spoligotyping were considered together (HGDI: 0.992), the analysis fitted better with RFLP data: i) 42.5% of the isolates grouped in 20 clusters from 2 to 6 representatives and ii) full correlation increased to 11 out of 17 RFLP clusters and no correlation decreased to 2/17.

Conclusions: MIRU VNTR proved to be the quickest method to obtain MTB fingerprints but the correlation between MIRU types and RFLP types was low. The addition of spoligotyping to MIRU analysis fitted better with RFLP analysis, although full correlation was not achieved in all cases.

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PS-1843-21 Studies of airborne tuberculosis transmission

A R Escombe,¹ M Gil Saavedra,² M Navincopa,³ C Martinez,³ E Ticona,³ D Ramos,² L Caviedes,⁴ F Arenas,⁴ D A J Moore,^{1,5} J S Friedland,¹ R H Gilman,⁵ C A Evans.^{1,5,4}

¹Department of Infectious Diseases, Imperial College London, London, UK; ²Universidad Nacional Mayor San Marcos, Lima, ³Hospital Nacional Dos de Mayo, Lima, ⁴Universidad Peruana Cayetano Heredia, Lima, ⁵AB PRISMA, Lima, Peru.

Fax: (+1) 410-510-1284. e-mail: rodescombe@yahoo.co.uk

Airborne tuberculosis transmission was investigated using a guinea-pig facility mechanically ventilated with all air from a tuberculosis-HIV ward. Over 16 months, an average of 92 guinea-pigs were continuously exposed to air from a total of 88 HIV-positive patients with pulmonary tuberculosis, 40% of whom were sputum smear-positive. 177 guinea-pigs became positive on tuberculin skin-testing, an average of 12%/month. Mycobacterial culture and histopathology confirmed tuberculosis. 69% of patient TB strains were multidrug-resistant, compared with 94% in guinea-pigs. DNA fingerprinting demonstrated that guinea pig strains originated from only 11% of ward patients. The average infectious particle production, q, was calculated as 11.2/patient/hour. This was 33 times

greater, $q = 365$, for one multidrug-resistant tuberculosis patient who infected 123 guinea pigs during a 33 days on the ward (11 untreated). These heterogeneous HIV-positive tuberculosis patients produced on average almost ten times as many infectious particles/hour as the patients studied by Riley in the pre-HIV era. DNA-fingerprinting demonstrated a minority of patients caused most transmission. We are now using this facility to evaluate upper room ultraviolet lights and negative air ionizers for preventing tuberculosis transmission.

PS-2288-21 Approche moléculaire de l'épidémiologie de la tuberculose en Seine Saint-Denis par spoligotypage

F Jaureguy,¹ C Gutierrez,² E Pigné,³ P Cruaud,⁴ A Bianchi,⁵ A Fontanet,⁶ V Vincent,² P Dény,¹ B Picard,¹ D Valeyre.³

¹Service de Bactériologie-Virologie-Hygiène, Hôpital Avicenne, Bobigny, France; ²CNR des Mycobactéries, Institut Pasteur, Paris, France; ³Service de Pneumologie et ⁴Service de Bactériologie, Hôpital Jean Verdier, Bondy, France; ⁵Laboratoire de Microbiologie Départemental, Montfermeil, France; ⁶Unité d'Epidémiologie des Maladies Emergentes, Institut Pasteur, Paris, France. Fax: (+33) 1 48 95 59 11. e-mail: francoise.jaureguy@avc.ap-hop-paris.fr

Le département de Seine Saint Denis (SSD) est particulièrement exposé à la tuberculose en raison de facteurs favorisant sa transmission (précarité, immigration, co-morbidité) et l'incidence représente près de 3 fois la moyenne nationale. Mais la diminution de 40% de cette incidence en 10 ans traduit les efforts déployés pour contrôler cette endémie. Ce contrôle passe par une connaissance précise de son épidémiologie fondée en partie sur une comparaison moléculaires des souches de *Mycobacterium tuberculosis*. Dans le cadre du Réseau Tuberculose 93 regroupant cliniciens, bactériologistes des hôpitaux publics du département et le CNR des Mycobactéries de l'Institut Pasteur, 135 souches isolées entre mai 2002 et juin 2004 dans les hôpitaux Avicenne, Jean Verdier et de Montfermeil, ont été comparées. Le typage moléculaire a été réalisé par spoligotypage. Quatre vingt trois spoligotypes ont été différenciés et se sont répartis de façon comparable parmi les souches des 3 hôpitaux. Cette analyse a mis en évidence un haut niveau de polymorphisme génétique qui traduit la diversité des origines géographiques des souches correspondant à l'importance de la population migrante et également le contrôle satisfaisant de l'endémie tuberculeuse. Ce résultat confirme les efforts mis en oeuvre pour limiter la transmission de la tuberculose en SSD.

PS-1120-21 Seasonal changes of reported new tuberculosis cases in Mongolia and their correlation with air temperature and solar radiation

N Naranbat,¹ P Nymadawa,¹ H Rieder.² ¹National Center for Communicable Diseases, Ulaanbaatar, Mongolia; ²International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+976) 11450492. e-mail: ntpml@mongol.net

Setting: Mongolia, 1998–2003.

Objectives: Determining the association tuberculosis notifications and surface air temperature (and solar radiation intensity).

Methods: Tuberculosis cases reported from 1998 through 2003 were compared to the monthly average surface temperature for the whole country (AST), collected daily from 22 meteorological and average total solar radiation (ATSR), collected from 14 actinometric stations throughout the country.

Results: In the six-year period a total of 9102 sputum smear-positive tuberculosis were reported (annual average 1517 cases, range 1358–1670). Reported tuberculosis cases fluctuated markedly with a peak from March through June and a trough from September through December. A sinusoidal model fitted closely the observed data. AST had a maximum in July (20.1°C) and a minimum in January (−19.9°C) and ATSR had a maximum in May (10 143 kW/m) and minimum in December (2473 kW/m). The peak of reported tuberculosis cases preceded the similar sinusoidal course of AST and ATSR in Mongolia.

Conclusion: During the cold season much time is spent indoors, resulting in crowding particularly among the poor. It is tempting to speculate that the increased tuberculosis incidence towards spring is a result of diagnostic and reporting delay coupled with increased acquisition of infection in the preceding months. With the warming more time is spent outdoors and the probability of transmission of *M. tuberculosis* is reduced.

PS-1526-21 Surveillance of outbreaks and incidents of tuberculosis in England and Wales, 2004

C S Anderson, J Anderson, A Story, J Jones, P Sonnenberg, J M Watson. Health Protection Agency, Centre for Infections, London, UK. Fax: (+44) 208 2007868. e-mail: charlotte.anderson@hpa.org.uk

Background: Incidents associated with tuberculosis, including outbreaks, occur in a variety of settings and require co-ordinated public health and health service responses. There is however very little established evidence for their management.

Objective: To establish a database of incidents and outbreaks of tuberculosis in England and Wales to inform the evidence base for their public health management.

Methods: A passive system of surveillance of incidents and outbreaks was supplemented in 2004 with active follow up to improve completeness of data and information on outcomes.

Results (preliminary): In total 274 incidents were recorded of which 41% occurred in health and 30% in educational settings. Thirty-nine per cent of all incidents occurred in the London region, which is in keeping with the proportion of total TB cases in England and Wales that occur in the capital.

Discussion: Active follow up has improved understanding of the number and settings of incidents and outbreaks of tuberculosis that occur in England and Wales. Further work is required to improve the information that is available about the outcomes of these incidents to contribute to the evidence base for their management.

PS-1037-21 Seasonality of tuberculosis in Iran

A R Taghizadeh,¹ K Mohammad,^{1,2} R Majdzadeh.¹

¹Department of Epidemiology, Tehran School of Public Health, Tehran, ²Department of TB in CDC of Iran MOH, Tehran, Iran. Fax: (+98) 21 224 58 79. e-mail: taghizadehasl@yahoo.com

Setting: To explore seasonal pattern of TB in Iran we decided to do this study.

Methods: This study have been done as an ecologic study. All notified TB cases during 1997 to 2001 have been included in this study. All data have been processed and analyzed by the Cosinor analysis method.

Results: We found 59 756 registered TB cases during above mentioned years.

TB in this 5 year period has seasonal pattern (amplitude = 11.73%, acrophase = 13 June (85.23), $P < 0.000$). Frequency of TB cases evaluated by sex in this model and found that there is seasonality by sex too ($P < 0.000$), but different amplitudes found for female and male (13.35%, 10.5%) and point estimate of acrophase for them were consequently 18 June and 8 June. When we evaluate this pattern among smear positive and smear negative cases found that smear positives have seasonal pattern ($P < 0.000$). According to this study there is a seasonal pattern in TB notification (incidence) in Iran which should be notified in population based studies and surveys in this regards.

Comments: We recommend performing more studies on patterns of pulmonary disease, other relevant factors on TB involvement and also laboratories circulations to clarifying cause of existing seasonality

PS-1113-21 Seasonal pattern of tuberculosis in Hong Kong

C M Tam,¹ C C Leung,¹ W W Yew,² Y K Chan,³ C Y Chan,⁴ C K Chan,¹ N Tang,⁵ K C Chang,¹ W S Law.¹ ¹TB and Chest Service, Centre for Health Protection, Department of Health, Hong Kong, ²Tuberculosis & Chest Unit, Grantham Hospital, Hong Kong, Departments of ³Medicine and Therapeutics, ⁴Microbiology and ⁵Chemical Pathology, the Chinese University of Hong Kong, Hong Kong, China. Fax: (+852) 28346627. e-mail: cm_tam@dh.gov.hk

Objective: To analyse the seasonal pattern of TB in Hong Kong.

Method: Monthly TB notification data in Hong Kong from 1991–2002 were examined. A seasonal model was then developed after standardisation by period, sex, age, history of TB, form of disease, and bacteriological status.

Results: A sine model was fitted for 82 104 notifications (adjusted $R^2 = 0.373$, $P < 0.001$). A summer peak was observed with seasonal fluctuation of 18.4% ($P < 0.001$). The amplitudes of fluctuation were 35.0%, 15.0%, 19.0%, and 20.2% respectively for those aged ≤ 14 , 15–34, 35–64, and ≥ 65 respectively (all $P < 0.001$). No gender difference was noted (18.2% vs. 19.0%, $P = 0.790$). Seasonal pattern was detected among new cases (18.6%, $P < 0.001$), but not retreatment cases (5.2%, $P = 0.333$). Culture-positive cases showed greater fluctuation than culture-negative cases (29.4% vs. 6.4%, $P < 0.001$). No significant difference was found between pulmonary and extrapulmonary cases (16.8% vs. 21.6%, $P = 0.356$). TB cases notified in summer were more likely to be smear-positive (OR 1.100, 95%CI 1.045–1.158, $P < 0.001$) and culture-positive (OR 1.175, 95%CI 1.121–1.232, $P < 0.001$) than those notified in winter.

Conclusion: A consistent seasonal pattern was found, with variable amplitudes of fluctuation in different subgroups and differing disease characteristics in different seasons. These are suggestive of a seasonal disease-modifying factor.

PS-1131-21 How can socio-economic factors influence the incidence of tuberculosis?

M Ilic, V Kuruc, S Pavlovic, G Popovic. Institute for Lung Diseases, Sremska Kamenica, Serbia, Serbia and Montenegro. Fax: (+381) 21615711. e-mail: micailic@yahoo.com

Tools for detecting and curing tuberculosis (TB) have been available for many years. But TB remains almost a big problem as ever, especially in developing countries. Main reasons for that differ from country to country and the most important ones in ours are economic recession, civil unrest, poverty, homelessness and immigration from regions with high TB prevalence. We investigated influence of economic situation on TB incidence rate in 7 regions of Vojvodina (Northern Province of Serbia) which has 2 million

inhabitants. We used epidemiologic (TB incidence), economic (number of unemployed, average salaries) and demographic (number of inhabitants and refugees) data for each of seven regions for 5 consecutive years (1998–2002). We performed statistic analyses using linear correlation. TB incidence rate is increasing in Vojvodina, during investigated period of time, from 28.86 to 37.25/100 000, together with increasing of unemployment rate and decreasing of salaries. TB incidence rate differs from region to region and is the highest in those with the largest number of refugees (up to 25%), the highest number of unemployed and the lowest salaries. Negative linear correlation between the salaries and TB incidence rate and positive correlation between unemployment and TB incidence rate was confirmed.

PS-1889-21 Gender differentials of tuberculosis transmission and reactivation in an endemic area

M E Jimenez,¹ M L Garcia,¹ M C E Garcia-Sancho,² K DeRiemer,³ L D Ferreyra,¹ M Bobadilla,⁴ B Cano,¹ A Martinez,⁴ P Small,⁵ J Sifuentes,⁴ A Ponce de Leon.⁴

¹Instituto Nacional de Salud Publica, Cuernavaca, Morelos,

²Instituto Nacional de Enfermedades Respiratorias, Mexico DF, Mexico; ³Stanford University, Palo Alto, California, USA;

⁴Instituto Nacional de Ciencias Medicas y Nutrición, Mexico, DF, Mexico; ⁵Bill & Melinda Gates Foundation, Seattle, Washington, USA. Fax: (+52) 73175529. e-mail: ejimenez@correo.insp.mx

Context: In most low-income countries, there are twice as many tuberculosis cases reported among men than among women, a difference commonly attributed to biological and epidemiological characteristics as well as socioeconomic and cultural barriers in access to health care.

Objective: To identify gender-based differences in tuberculosis patients.

Methods: We screened persons with more than 2 weeks cough in southern Mexico from March 1995 to April 2003. We collected clinical and mycobacteriological information (isolation, identification, drug-susceptibility testing and IS6110-based genotyping and spoligotyping) from individuals with bacteriologically confirmed pulmonary tuberculosis. Patients were treated in accordance with official norms and followed to ascertain treatment outcome, retreatment, and vital status.

Results: We enrolled 623 patients with pulmonary tuberculosis; the male:female incidence rate ratio for overall, reactivated and recently transmitted disease was 1.58 (95%CI 1.34–1.86), 1.64 (95%CI 1.36–1.98) and 1.41 (95%CI 1.01–1.96), respectively. Men were more likely than women to default from treatment (OR = 3.30, 95%CI 1.46–7.43) and to be retreated for tuberculosis (OR = 3.15, 95%CI 1.38–7.22).

Conclusions: Men had higher rates of tuberculosis due to both reactivation of latent infection and recent

transmission. These differences were not explained by access to health care, diagnosis and treatment.

PS-2016-21 Extra-pulmonary tuberculosis in Belgrade, 2000–2004

D Mandic. Municipal Institute for Lung Disease and TB, Belgrade, Serbia, Serbia and Montenegro.

Fax: (+381) 11 3283 857. e-mail: bodman@eunet.yu

The aim of our study was to analyze epidemiological, clinical and diagnostical characteristics of EPTB during 5-year period (2000–2004). In Belgrade (1.7 million inhabitants), 2755 cases of tuberculosis were registered, out of which 395 (14%) were EPTB, including pleural tuberculosis. 220 (56%) patients were female and 175 (44%) were male. The average age was 47.5 years. According to localization of the process, the most frequently present was tuberculosis of pleura 184 (47%), then of lymph nodes 96 (24.3%), genitourinary system 52 (5.7%), bone and joint 12 (3%), meningitis 4 (1%), and in other organs 34 (8.7%). The diagnosis was confirmed by positive culture in 18 (9.5%), pathohistologically in 194 (59.7%), PCR (urine, liquor) in 38 (11.7%) and with therapeutical test in 145 (35.7%) patients. The number of patients, as well as of clinical forms of EPTB, during 5-year period didn't significantly vary. Bacteriological confirmation was present in a few number of cases while in 35.7% the diagnosis was based on positive therapeutical test. This speaks of difficulties in diagnosing EPTB and also of a need for new diagnostical procedures and multidisciplinary approach to this disease.

PS-1562-21 Adenites tuberculeuses

Z Semra,¹ B Ait Kaki,¹ N Zemmouli,¹ L Bencharif,¹ F Smati,¹ D Yala.² ¹Laboratoire de Microbiologie CHU Benbadis, Constantine, ²Institut Pasteur, Alger, Algeria.

Fax: (+213) 31 94 71 91. e-mail: semrazahia@caramail.com

Introduction : Les adénites tuberculeuses constituent une des formes cliniques de la tuberculose extrapulmonaire. Leur fréquence de survenue est variable. Elles constituent avec la localisation pleurale et rénale les étiologies les plus fréquentes de tuberculose extrapulmonaire. Le caractère peu inflammatoire, peu douloureux, évoluant dans la chronicité fait évoquer une origine tuberculeuse.

Objectif : *Mycobacterium tuberculosis* est la principale étiologie. Cependant, d'autres mycobactéries peuvent être responsables d'adénites : *M. bovis*, dont le mode de contamination est essentiellement digestif, à partir de lait contaminé, ainsi que des mycobactéries de l'environnement.

Materiel et methode : Nous avons étudié une série de 133 cas d'adenites. Le diagnostic bactériologique est basé sur l'examen direct après coloration de Ziehl-Neelsen et, sur la culture sur Lowenstein-Jensen.

Résultats : 21 cas sont trouvés positifs essentiellement par culture, les caractères biochimiques indiquent qu'il s'agit de *M. tuberculosis*.

Conclusion : Les ganglions tuberculeux continuent de poser des problèmes tant sur le plan diagnostique que thérapeutique. Au plan du diagnostic bactériologique, *M. tuberculosis* ou *M. bovis* ne sont pas toujours mis en évidence pour une preuve absolue avec les méthodes actuelles

PS-1625-21 La tuberculose pulmonaire bacillifère : évaluation du traitement des 7404 cas

M G Kipulu, J G Kinzanza. Bureau Diocésain des Oeuvres Médicales, Kinshasa, D R Congo. Fax: (+243 2) 1898808. e-mail: godekipulu@yahoo.fr

Contexte : La R.D Congo : Pays pauvre, revenu annuel = 78 dollars US/année/habitant, cosmopolite, insalubre. Incidence tuberculose : 10^e pays du monde et 4^e d'Afrique. Risque annuel d'infection : 5%

Intérêt : L'évaluation de traitement de 2002 : taux de guérison = 82%.

Objectif : Identifier l'efficacité de traitement en 2003.

Méthode : Etude rétrospective portant sur 7.404 patients tuberculeux bacillifères soignés en 2003 dans les 45 centres de santé du Bureau diocésain des œuvres médicales de Kinshasa.

Résultats :

| Guéris | Traitement terminé | Décédés | Echec | Abandon | Transféré |
|--------------------------------------|-----------------------|---------|-------|---------|-----------|
| a) Nouveaux cas (6.497 cas) | | | | | |
| 84% | 2% | 5% | 1% | 3% | 4% |
| b) Retraitement – rechutes (806 cas) | | | | | |
| 80% | 2% | 8% | 4% | 2% | 4% |
| Echecs (101 cas) | | | | | |
| 40% | 1% | 18% | 20% | 8% | 12% |

Conclusion : Nouveaux cas : taux de guérison amélioré de 82% à 84%. Retraitement : Rechutes : inquiétude, échec 4%, abandon 2%. Echec : inquiétude : échec 20%, abandon : 8% au traitement de seconde ligne. Nécessité de renforcer les stratégies de prise en charge, faire une étude de sensibilité.

PS-1266-21 Tuberculosis mortality in Brazil, Sao Paulo and Ribeirão Preto, SP, 1980–2001

C M Sasaki,¹ M L Costa Júnior,¹ R I Cardozo Gonzales,¹ A A Monroe,¹ T C S Villa.^{1,2} ¹College of Nursing, University of São Paulo at Ribeirão Preto (USP), São Paulo-Brazil, Ribeirão Preto, São Paulo, ²Coordinator of TB Operational Research Area of Brazilian TB Research Network, Ribeirão Preto, São Paulo, Brazil. Fax: (+55) 16 6333271. e-mail: midsas@eerp.usp.br

This retrospective study analyzed tuberculosis mortality in Brazil, in São Paulo State and in Ribeirão Preto-SP, in the period from 1980 to 2001. Crude data were obtained from the site www.datasus.gov.br, by age and gender. Next, mortality rates per 100 000

inhabitants were calculated. Figures for Brazil revealed a more accentuated decrease in the 1980s, stagnated in the 1990s and have decreased again from 1999 onwards. In São Paulo, this coefficient also demonstrated a downward movement until the end of the 1980s, followed by a slight increase in the 1990s and a decrease in 1999. Although figures for Ribeirão Preto tended downwards, there was great variability due to the small number of cases. In all locations, mortality rates for men are significantly higher than for women. In Ribeirão Preto, during three years, this coefficient was equal to zero for women while, in the country and the State, figures tended towards equality from 1989 onwards. As to age, in all sites, the rates for the age range from 20 to 59 years acted in accordance with tuberculosis mortality rates in general. Mortality is one index that can represent the performance of the Tuberculosis Control Program, since practically all patients would have a chance of cure in case of early diagnosis and correctly administered treatment.

TREATMENT AND ADHERENCE

PS-1007-21 Conversing with patients: involving patients in a hospital audit of tuberculosis service delivery in some health facilities in Malawi

P Kapulula, F M L Salaniponi. Ministry of Health, National TB Control Programme, Lilongwe, Malawi. Fax: (+265) 01 757 205. e-mail: pkapulula@yahoo.com

Setting: 13 tuberculosis registration and case holding centres in Malawi.

Objective: To involve patients in evaluating tuberculosis service and give them an opportunity to suggest improvements.

Methods: A semi-structured questionnaire was administered to 208 patients receiving treatment in the initial intensive phase in 13 of the 44. Patients on intensive phase were targetted that they can remember care seeking behaviors leading to their diagnosis.

Results: Close to 40% of the patients lived with the signs and symptoms of TB for longer than 11 weeks without seeking professional medical care. Half the patients visited the facility that diagnosed their disease once and the other half made more than two visits before they were detected. To avoid multiple visits patients feel they have a right to ask for TB diagnosis. 89% of the patients reported a great improvement in health status and reduction in morbidity by the second week of treatment. While on treatment, both hospitalised and ambulatory patients reported that TB drugs were available when required. Patients indicated that they feel free to present their complaints to health workers. However, patients complained of

poor, unbalanced and monotonous diet. Another major concern is the infrequent visits clinicians make to the wards to assess the progress of patients.

Conclusion: TB service is regarded to be satisfactory. However, there is need to improve the diet and increase the frequency of ward rounds.

PS-1061-21 Ten years experience with DOTS and follow-up of cases in Gulabi Bagh Chest Clinic, Delhi

K N Tewari. Municipal Corporation of Delhi, Delhi, India.
Fax: (+91) 1123942056. e-mail: kntewari@yahoo.com

DOTS under RNTCP Project was launched in Chest Clinic Gulabi Bagh on 2 October 1993, covering 10 lacs population. As per the norms ten microscopy centers were established in different areas under the project. In addition there were seven DOTS centres (without microscopy). The treatment result of sputum positive category I, sputum positive category II, failures of category I and category II, relapses in category I and category II of all the cases registered from 1.1.94 to 31.12.2003 has been analyzed in the paper. The important observations are reduction in category I relapsed cases from 14.64% to 2.65%. The decrease in default rate by 50% in the positive cases of category II, the relapsed rate from 10.50% to 1.31% based on self reporting cases. The failure rate and the default rate which varies from 7.3% to 12.5% are the potentially MDR cases. One of the important factors leading to high default rate is addiction of patient with one or more abusive drugs or alcohol.

Recommendations: For good National Tuberculosis Control Program a strong component of the de-addiction clinic and detection of MDR cases and their management should be essential component.

PS-1072-21 Possible reason for the low discipline in treatment with pulmonary tuberculosis

V N Barsukov, S V Smirnov, E V Soukhova.
Samara Medico-Social Rehabilitology Institute, Samara State Medical University, Therapy Department, S, Samara, Russia, Russian Federation. Fax: (+7) 35 56 00.
e-mail: suchova@mail.radiant.ru

Introduction: Researches showed that the majority of patients are afraid of side-effects of antitubercular medicine.

Objectives: 180 patients with pulmonary tuberculosis (aged from 22 to 56), taken with method of continuous selection.

Methods: General examination, questioning; the ten-mark system was used.

Results: The most often statements: I am afraid to infect others and (or) relatives; the long presence in hospital oppresses me, I'm afraid of side-effects of antitubercular medicine. Data analysis with the help of

Pirson system showed the direct significant interdependence between the reasons of the fear, formulated in statements: 'I think that my disease is incurable' and 'I am afraid that medicine has many side-effects' ($r = 0,394$; $P = 0.005$); 'I am afraid that relatives will turn away from me' and 'I am afraid to die early' ($r = 0,383$; $P = 0.006$).

Conclusion: The revealed dependence explains the autocratic discontinuance of treatment by patients and incomplete performance of medical prescriptions. It is possible to approve that the possible reason of the low discipline of patients' treatment with pulmonary tuberculosis can be the fear of side-effects of antitubercular medicine.

PS-1073-21 Reasons for late diagnosis of pulmonary tuberculosis

E V Soukhova, S V Smirnov, V M Soukhov.
Samara Medico-Social Rehabilitology Institute, Therapy Department, Section of Tuberculosis and Lung, Samara, Russia, Russian Federation.
Fax: (+7) 35 56 00. e-mail: suchova@mail.radiant.ru

Introduction: The later address of patients leads to delay of beginning of treatment, consequences of that synchronization of process, development of plural medicinal stability, patients' disability can be.

Objectives: 200 patients, 112 male and 88 female (aged from 22 to 56).

Methods: General examination, questioning of the social status.

Results: 5% of women associate cough with smoking, they didn't address to the doctor. 10% of women—the lonely mothers couldn't begin the treatment because they had nobody to sit with their small children. 10% of women didn't attach importance of appearance of symptoms and didn't address to the doctor, the tuberculosis was revealed with help of scheduled photo-roentgenography. 20% of women immediately had addressed to the doctor, they were repeatedly treated in a polyclinic with the diagnosis 'flu', pulmonary tuberculosis was diagnosed easy after photoroentgenography. 40% of men didn't address to the doctor deliberately because of fear to lose work, they administered self-treatment. 'Pneumonia' was diagnosed for 15% of men, they were treated as out-patients.

Conclusion: The late diagnostics of pulmonary tuberculosis is usually connected with roentgenological investigation of coughing patients was not perform and with fear of to lose work.

PS-1094-21 Gender differences observed in the recovery pattern with FDC versus single dose therapy of pulmonary tuberculosis patients: Pakistan study

Z A Shuja, M Jamshaid. Pharmacy Department, University of the Punjab, Lahore, Pakistan. Fax: (+92) 42 6856631. e-mail: zebashuja@hotmail.com

Objectives: To determine any differences in the recovery pattern observed during the treatment of male and female patients suffering from pulmonary tuberculosis using fixed dose versus single dose therapy.

Method: 293 male and female patients with sputum positive between the age of 15–55 years were selected. Patients with cardiac, hepatic or diabetic problems were not included. Patient consent was mandatory. Six month short course therapy was given with a 2 month intensive phase of four antibiotics (rifampicin, ethambutol, isoniazid and pyrazinamide) and a 4 month continuation phase of three antibiotics (rifampicin, ethambutol and isoniazid). Three groups were made by randomization, A and B getting FDCs and C getting single drug therapy.

Results: Female patients have lower body weight therefore their sputum conversion rate was faster than the male patients. Their X-rays also improved faster. Recovery of other factors like Haemoglobin improvement, reduction in ESR value (erythrocyte sedimentation rate) and weight gained for all three groups was acceptable and on the same pattern.

Conclusion: Female patients recovered faster than male patients but the number of incidences of side effects and toxicity observed in female patients is significantly higher in females with 2 cases of jaundice and 1 death.

PS-1119-21 Comparative study of the characteristics of TB treatment partners of DOTS strategy and its effect on treatment adherence of TB patients

N Jorvina,¹ C Canlas,¹ A Lagos,² T Shirahama,² M Kasamatsu,² M Suchi.² ¹CHD4-Calabarzon-Laguna, Santa Cruz, ²DOH-JICA Project for Quality TB Control Programme, Muntinlupa City, Philippines. Fax: (+63) 2 7722063. e-mail: qtbcp@meridian.ph

Setting: 27 Rural Health Units and 2 City Health Offices (Health Centres) of Laguna Province.

Objective: To evaluate the characteristics of treatment partners for DOT implementation in DOTS strategy and its effect in treatment compliance of TB patients.

Methods: A retrospective study is conducted in the Province of Laguna. Included in the study were treatment partners of 885 new smear positive and negative cases treated the period of July 2002 to June 2003. Data were gathered through review of records and interview of patients and treatment partners. Data were analysed on characteristics, such as knowledge, com-

mitment of treatment partners and treatment outcomes and follow-up examinations.

Results: Majority of treatment partners were Barangay Health Workers (BHWs, community health volunteer supported by local government). Good characteristics of treatment partners, as to knowledge and commitment and good compliance to treatment were seen among BHWs as treatment partners. However, there is no significant difference seen with those who complied and not complied to treatment in relation to the characteristics of the treatment partners.

Conclusion: Barangay Health Workers are good treatment partners of DOTS.

PS-1122-21 High percentage of defaulter cases in a free sponsored short course research group of pulmonary tuberculosis patients

Z A Shuja, M Jamshaid. Pharmacy Department, University of the Punjab, Lahore, Pakistan. Fax: (+92) 42 6856631. e-mail: zebashuja@hotmail.com

Objectives: To determine the defaulter cases amongst sputum +ve pulmonary TB patients during a free sponsored short course treatment.

Method: Six month short course therapy with a 2 month intensive phase of four antibiotics and 4 month continuation phase of three antibiotics was used. The 293 male and female patients were not required to pay for either their medication or their tests. Over a period of six months, approximately US\$70 was spent on each patient by the sponsors for their treatment. During this period, the patients were required to spend US\$20 for commuting to and from the hospital. This amount was also paid for patients who could not afford it.

| Time of therapy received by patients | Percentage of total patients |
|--------------------------------------|------------------------------|
| Defaulter in initial phase | 4.1% |
| Defaulter in continuation phase | 24.0% |
| Patients who completed therapy | 71.9% |

Results: 28.1% of the total patients left against medical advice, 4.1% of these had not even achieved sputum conversion. It was observed that the patients were very poor and the incentive of free treatment was not sufficient in many cases to bring the patients back for continuation phase treatment and check ups. Most of the patients were single, illiterate, working males from rural areas.

Conclusion: To ensure that all detected sputum +ve tuberculosis patients complete their therapy some attractive schemes like food vouchers and free transport should be started so that patients complete therapy.

PS-1285-21 Implementation of CB-DOTS in five districts in Kenya

S M Gacheri. National Tuberculosis Program, Nairobi, Kenya.
Fax: (+254) 2713198. e-mail: gacherism@yahoo.com

Kenya still remains one of the 22 high TB burdened countries in the world. The major cause being the high HIV prevalence (7%) and effects of poverty. Kenya reported about 106 000 new cases in 2004—which is about 50% CDR. Community based TB care (CTBC) initiative being a new concept, it was found wise to implement it in five districts then scale it up to 30 other districts in order to allow lessons learnt. The district selection was based on high TB/HIV cases; long distances in-between TB clinics and existence of community health groups.

Summary of the pre-implementation activities in the 5 districts

- Regional sensitization meetings with senior health administrators;
- Regional/districts trainers of trainers;
- District meetings with the stakeholders/health facility committees;
- Identification and training of Community TB treatment supporters.

Challenges:

- High expectation of the treatment supporters
- Overdecentralization of certain tasks to the community level.
- Sustainability of the treatment supporters
- Increased need for frequent supervision of the supporters
- Diverse cultural beliefs

Conclusion: CTBC will be instrumental especially in retrieving defaulters and promoting adherence to TB treatment and also increase case finding through raising community awareness,

PS-1317-21 Is there any protector effector against tuberculosis treatment default with the right diagnostic confirmation?

E D Sucupira,¹ M Marneili,¹ L M R Freitas,¹ D D Neves,² E P Bethlem.^{1,2} ¹Rio de Janeiro State Secretary of Health, Rio de Janeiro, ²Federal State University of Rio De Janeiro, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 2552.6739. e-mail: epbethlem@uol.com.br

Many factors are involved in the patient's decision to quit treatment for tuberculosis (TB). It is important to identify those that might have some importance in order to correct the problem. The objective of this work is to verify if there is any difference in the pulmonary tuberculosis treatment abandon between patients with and without diagnostic confirmation.

Methods: The SES-RJ SINAN data were analyzed. The districts that had more than 200 notified cases and more than 85% of right ending cases in the 1999 to 2002 period were selected. Diagnosis confirmation was considered when there was a positive AFB and/or

a positive culture for TB. Statistic analyze was made with the qui-square test and the odds ratio (OR).

Results: Among 8866 analyzed patients 8495 (95.8%) had a satisfactory final notification. There was a 21.2% (1800 cases) abandon rate. From 4509 patients with diagnostic confirmation 18.3% (833 cases) abandoned treatment while 3986 patients without diagnostic confirmation had a 24.3% (967 cases) abandon rate. This difference was statistically significant ($P < 0.0001$) with an OR of 0.831 (CI95% from 0.744 to 0.928).

Conclusion: This study results point out to a possible protector effect of diagnosis confirmation in the abandon of TB treatment, although more complex studies are necessary to confirm this apparent association.

PS-1361-21 Tuberculosis treatment outcome in Denmark, 2001–2003

P H Andersen,¹ A Kok-Jensen.² ¹Statens Serum Institut, Department of Epidemiology, Copenhagen, ²Lung Department, Gentofte Hospital, Hellerup, Denmark. Fax: (+45) 32683874. e-mail: PEA@SSI.DK

Background: The population is 5.3 million and TB notification incidence is 8.6/100 000/year in 2001–03. TB treatment is routinely not-DOT and 3RHEZ/3RH. Medicine is free of charge for the patients. Treatment outcome (TO) results for TB patients have not been routinely collected in Denmark earlier.

Methods: Reporting of TO result was voluntary. A request was sent to the hospital in charge of treatment, if no report was returned, and TO result was obtained for all persons notified with TB in these 3 years by end of March 2005. TO is based on the report and it is not controlled centrally whether the report is correct. The detailed TO will be available at the congress. **Preliminary results:** 1327 persons were notified with TB in this 3-year period, and 1003 (76%) had diagnosis confirmed by culture of MT. Death rate was quite high and many outcomes were not controlled by late culture for MT.

Discussion: Problems with classification will be mentioned. Are the results satisfactory?

PS-1401-21 Motifs d'abandon du traitement anti-tuberculeux à Brazzaville Congo

J M'Boussa, G Eleka. Ministère de la Santé, Brazzaville, Congo. Fax: (+242) 81 01 81. e-mail: jmboussacg@yahoo.fr

D'août à octobre 2004, une enquête sur les malades ayant abandonné le traitement a été menée au Centre antituberculeux (CAT) de Brazzaville. Elle portait sur des malades absents au traitement depuis au moins 15 jours. 700 malades ayant abandonné le traitement étaient repertoriés. Le taux moyen d'abandon au CAT est de 25%, la moyenne nationale étant de 20%. Des enquêteurs étaient chargées de la recherche des malades à domicile.

Résultats : 210 malades ont été retrouvés (30%) et 490 non (70%). 80 fiches des malades retrouvés ont été analysés ; les principaux motifs d'abandon étaient : financiers (16,25%), voyage (16,25%), arrêt volontaire (33,75%), perte de la fiche médicale (16,25%), aggravation de la maladie (12,5%). Pour les malades non retrouvés, les principales raisons d'absence étaient : décès (93/700, soit 13,28%), changement d'adresse (11,85%), voyage (6,42%), inconnus à l'adresse indiquée (19,28%).

Conclusion : Les taux de mortalité inférieurs à 5% dans nos cohortes sont sous-estimés car les décès parmi les perdus de vue sont élevés. Il faut intensifier l'éducation des malades.

PS-1430-21 Periods of sputum-negative conversion treated by WHO short-course tuberculosis chemotherapy

T Fujikawa, R Maekura, M Ito. NHO Toneyama National Hospital, Toyonaka-shi, Japan. Fax: (+81) 668501750. e-mail: tabo.f@dream.com

Introduction: The hospitalization period of TB patients is very long in Japan, because it is generally accepted that the criteria of discharge is the sputum culture negative conversion. We compared the periods of sputum smear negative conversion and sputum culture negative conversion in order to shorten the hospitalization period.

Objectives: To confirm the periods of sputum negative conversion in TB patients whose sputum smear tests were positive at admission.

Subjects: 65 pulmonary TB patients with smear-positive at admission were enrolled from April to September 2004 in our hospital. These patients underwent WHO short-course chemotherapy.

Methods: We checked the results of weekly sputum tests retrospectively.

Results: The period of sputum smear negative conversion was 8.11 (± 4.90) weeks from admission. The period of sputum culture negative conversion was 7.43 (± 3.04) weeks from admission. In 44 (68%) patients, the time difference between the duration of the two conversions was less than one week.

Conclusion: The length of the period of sputum smear negative conversion after the tuberculosis chemotherapy was similar to that of sputum culture negative conversion. This results means that we are able to shorten the hospitalization period of TB patients using sputum smear test result.

PS-1494-21 TB treatment outcomes in east London: directly observed compared with self administered treatment

K Viney,¹ G Bothamley,² J McCarthy.³ ¹Population Health Division, NSW Health, Sydney, NSW, Australia; ²Department of Respiratory Medicine: Homerton University Hospital Foundation NHS Trust, London, UK; ³School of Population Health: University of Queensland, Brisbane, QLD, Australia. Fax: (+61 02) 9391 9556. e-mail: trevandkez@hotmail.com

The relative merit of directly observed therapy (DOT) versus self administered treatment (SAT) for antituberculous therapy remains controversial. The aim of this study was to audit the selection of patients for DOT and treatment outcome at Homerton TB service in London between January 1997 and December 2001. Patients were offered DOT if they fulfilled specific selection criteria. Of interest was how many patients who fulfilled these criteria received DOT, and the treatment outcomes for those on DOT compared to those on SAT. 70% of patients with risk factors received DOT, while the remainder received SAT. While treatment completion rates were lower on DOT than on SAT overall (89% vs. 94%) this difference was not significant. In patients with criteria for DOT, those who received SAT had a significantly poorer treatment completion rate than those on DOT (90% vs. 79%, $P < 0.05$). In conclusion DOT appeared to confer benefit among those patients with documented risk factors, a finding that is in line with WHO recommendations for low incidence countries. More attention should be paid to those with documented risk factors but nevertheless on SAT, as their treatment outcomes were poor.

PS-1538-21 Reasons for treatment failure among TB patients in Ivanovo region

O Medvedeva,¹ W Jakubowiak,² V Testov,² T Petrova.¹ ¹TB Control Programme in Ivanovo Region, Ivanovo, Russian Federation; ²Office of the Special Representative of the WHO Director-General in Russia, Moscow, Russian Federation. Fax: (+7 095) 787 2149. e-mail: w.jakubowiak@who.org.ru

Background: DOTS pilot project has been implemented in Ivanovo region since 1995.

Objective: To evaluate reasons for treatment failures.

Methods: Quarterly reports and findings of monitoring missions.

Results: According to 2000–2003 data treatment failure rate varied from 13.4% to 10.1% and death rate from 11% to 7.5%. The default rate remained stable around 5%. Primary MDR was the reason for treatment failure in 20.7%, while the rest failures occurred due to multiple treatment interruptions and development of secondary drug resistance (92%). They included: 1) TB cases with serious concomitant conditions (liver disorders, diabetes mellitus, coronary diseases, etc). (27.8% of all failure cases), 2) treatment interruptions (51.5%) due to social prob-

lems and negative attitude to the therapy. 72% of the patients with failure abused alcohol. 40.3% were ex-prisoners.

Conclusion: There are 3 main reasons for treatment failure: 1) primary MDR, 2) treatment interruptions due to medical problems (concomitant disease), 3) treatment interruptions due to management problems (insufficient adherence of socially vulnerable patients to treatment). The most effective tool for decreasing treatment failure would be the improvement of social support for TB patients.

PS-1550-21 Review of WFP's support to TB control programmes

A Strauss, W Mpoyi. Policy, Strategy and Programme Division, HIV/AIDS Unit UN World Food Programme, Rome, Italy. Fax: (+39) 06 6513 3541. e-mail: anne.strauss@wfp.org

Global TB morbidity is higher today than ever. Malnutrition and poor sanitation are conditions that increase the probability of becoming infected with TB. There is a strong link between TB and HIV/AIDS. HIV is wreaking Sub-Saharan Africa and the highly populated countries of Asia where TB burden is high and health resources scarce. TB is the first manifestation of AIDS in over 50% of cases in developing countries and is also the leading cause of death in people living with HIV. Thus, it is vital to implement high quality TB control programmes throughout the world especially in those countries ravaged by HIV/AIDS. The evidence base on optimal strategies is limited and the literature on the use of enablers and incentives schemes in TB control in developing countries, scarce. Food assistance is the most common form of incentive used. It improves the nutritional status of the infected person and contributes to boost the immune system. It also helps to reduce the financial loss due to the disease. Since 1994, WFP has been supporting TB programmes in 15 food insecure countries. A survey of the data obtained through these programmes is provided and analyzed hereby and propositions for optimal strategies made.

PS-1555-21 Age, sex and social characteristics data analysis for new pulmonary sputum smear-positive TB patients registered in Ashgabat city who failed treatment in 2003

I Schelokova,¹ B Chapau,¹ S H Khokgushev,² M Durdyeva.³
¹Project HOPE Turkmenistan, Ashgabat, ²TB Prevention Center, Ashgabat, ³Turkmenistan State Medical Institute, Ashgabat, Turkmenistan. Fax: (+993) 12 344 543, 344 548. e-mail: isprojhope@online.tm

Background: In Ashgabat city DOTS Program has been implemented in 2000. Cohort analysis for new pulmonary sputum smear positive TB cases revealed that the 'failure' rate did not meet WHO standards

and in 2001 made up 18.8%, in 2002–20.4%, in 2003–14.8%. High failure rates incited us to conduct age-sex and social characteristics data analysis for the patients who failed to cure in 2003.

Objective: To conduct age-sex and social characteristics data analysis for new pulmonary sputum smear positive TB patients, registered in Ashgabat city, who failed to cure in 2003.

Methods: Cohort analysis, TB 01, TB 03 forms review.

Results: Cohort analysis of treatment results revealed, that out of 39 new pulmonary sputum smear positive TB patients, who failed to cure in 2003, 31 (79.5%) were male in the age of 15–64 and 8 (20.5%) female in the age of 25–65. The major part of patients who failed the treatment were in 25–44 age group and did not have the permanent job. Among them 17 (43.6%) were amnestied from prisons and 19 (48.7%) with pernicious habits. 12 (30.7%) of patients had weak adherence to treatment, which was proved by interruptions of TB drugs taking.

Conclusions: In Ashgabat city the most risk of getting 'failed' treatment outcome is expected from patients of the age of 24–44, amnestied from prisons, persons with pernicious habits and weak adherence to treatment.

PS-1630-21 Pichincha Ecuador: a good change with the DOTS strategy

H Peralta, N Tates. Direccion Provincial de Salud de Pichincha, Ministerio de Salud Publica de Ecuador, Quito, Pichincha, Ecuador. Fax: (+593) 22565861. e-mail: pitufili@hotmail.com

Introduction: In 2001 the implementation of DOTS strategy began in Pichincha. The training of doctors, nurses and other workers of health had contributed to assure an opportune and appropriate information to the community, however, the most important thing has been to observe the sanitary personnel's change that now works with a lot of enthusiasm in the control of the tuberculosis.

Methodology: The doctors and the nurses work very hard and they make it with the hope of curing the sick people. So that their objectives are reached they educate individually to the sick person and his family. When the patients begin the treatment, later on, the nurses every morning they gather people that are in the wait rooms to inform them about the importance of fulfilling the treatment that the doctor indicates in the treatment.

Results: Cohort of treatment for 211 TB patients with DOTS in 2004:

| | |
|---------------------|------------|
| Cured | 183 (87.0) |
| Treatment completed | 7 (3.3) |
| Defaulted | 14 (6.6) |
| Failure | 2 (0.9) |
| Died | 5 (2.2) |

Conclusion: This change allows to detect in quick form sick people with tuberculosis, those that are diagnosed by the sputum smear and they receive the treatment recommended by the WHO and IUATLD.

PS-1661-21 Influential factors on cure effectiveness of tuberculosis treatment in Ninh Thuan province, Vietnam, in 2003

T D Tran. Department of Administration, The NinhThuan Center for Social Disease Prevention, Ninh Thuan, Vietnam. Fax: (+84) 068.820596. e-mail: ttd4985@yahoo.com

The retrospective study with 196 new sputum smears positive pulmonary tuberculosis cases over 15 year was conducted in Ninh Thuan province, in Vietnam with the main objective was to determine factors influencing the cure effectiveness of TB treatment through studying general characteristics of patients, TB severity's characteristics, TB treatment compliance, presence of side effects, nutritional status, and care of health provider's characteristics. The result showed 82.1% of 196 cases were cured. There was a statistically significant association between cure effectiveness and age ($P = 0.021$), sputum smear examination result before treatment ($P = 0.011$), degree of lung lesion in chest X-ray ($P = 0.0001$), TB treatment compliance ($P = 0.004$), presence of side effects ($P = 0.018$), nutritional status ($P = 0.001$), patient home visit ($P = 0.0001$), drugs supply in the continuous phase ($P = 0.004$). The study recommended that the TB control program should make suitable plans and projects to help TB patients to get early detection; provide information to help patients have proper nutrition during treatment course; and train TB staffs properly to improve their knowledge and skills.

PS-1707-21 Effectiveness of a comprehensive approach to DOTS implementation on rayon level

M B Khodjikhonov, R R Kurbanova, S U Usarova. Project HOPE Consortium, Tashkent, Uzbekistan. Fax: (+998) 712 78 19 01. e-mail: m_khodjikhonov@nc.uz

Introduction: During 2001–04 Project HOPE and local partners established a TB control program in Urgut rayon of Samarkand oblast, population 344 500. **Subject of study:** 322 specialists were trained, and 3 microscopy laboratories equipped and are currently operating. Good conditions for sputum collection were created in all primary health care facilities and doctors were provided with posters containing the TB diagnosis algorithm. Program monitoring was conducted quarterly, including cohort analysis and discussion of the results. IEC activities and tracking of defaulted patients are carried out jointly with local representatives of Red Crescent Society of Uzbekistan and the TB facilities. 21 704 people from different target groups have been covered by IEC activities.

2300 booklets and 350 TB posters were printed out and distributed. 1170 conferences and lectures were conducted for patients and their families and 549 presentations were provided for general population. The Red Crescent Society is supporting patients by product and hygiene kits.

Results: During the reported period the proportion of new smear positive patients among total cases for the first time increased from 35.5% to 44.9%; their smear conversion rate increased from 92.9% to 96.2%; their cure rate increased from 78.5% to 82.3% and treatment success rate raised from 80.0% to 84.8%.

Conclusion: A comprehensive approach to DOTS implementation activities can be effective and be used for DOTS expansion in Uzbekistan.

PS-1751-21 Facteurs liés à l'inobservance thérapeutique des malades tuberculeux au Centre national hospitalier de pneumophtisiologie de Cotonou

G Ade, M P Wachinou, S Y Anagonou, M Gninafon. Centre National Hospitalier de Pneumophtisiologie Cotonou, Cotonou, Bénin. Fax: (+229) 332782. e-mail: gabriade@yahoo.fr

Introduction : Malgré l'application de régimes capables de guérir presque tous les malades, les résultats sont en deçà des attentes à cause de l'irrégularité de la prise des médicaments.

Objectif : Relever les facteurs liés à l'inobservance thérapeutique au CNHPP de Cotonou

Méthode : Nous avons effectué du 9 décembre 2004 au 9 mars 2005 une enquête au cours de laquelle nous avons recherché 102 malades dans 52 quartiers de villes et villages de l'Atlantique et du Littoral. Nous les avons soumis à un questionnaire pour identifier les raisons de leur inobservance

Résultats : Sur les 102 malades recherchés, 40 (39,2%) ont été retrouvés. 54 personnes n'ont pas été retrouvées. Ceux qui étaient décédés étaient au nombre de 8 (7,8%). L'abandon du traitement s'est produit à la phase de continuation chez la grande majorité (75,68%). Les principales raisons de l'abandon sont : l'amélioration clinique (21,6%), le manque de soutien (16,2%) et l'ignorance de la durée du traitement (13,5%). Les raisons professionnelles (8,1%), l'oubli (8,1%), les obsèques d'un parent et les voyages sont des motifs plus rares. L'amélioration clinique et l'ignorance de la durée du traitement qui constituent 35,1% des motifs, dépendent des prestataires de soins. Ils peuvent être réduits sans un investissement particulier.

Conclusion: La recherche des malades perdus de vue est peu performante. Les facteurs qui sont à l'origine de l'inobservance dépendent essentiellement des prestataires de soin.

PS-1862-21 Risk factors for tuberculosis treatment interruption among indigenous populations of Venezuela, 2003

A Guilarte,¹ M España,¹ R Mendez,¹ N S Shah,² K Laserson.² ¹National Program of Respiratory Health and Tuberculosis, Ministry of Health and Social Development, Caracas, Venezuela; ²US Centers for Disease Control and Prevention, Division of Tuberculosis Elimination, Atlanta, Georgia, USA. Fax: (+1) 404-639-1566. e-mail: sashah@cdc.gov

Background: Patient adherence is critical to tuberculosis (TB) treatment success. Despite a strong DOTS program in Venezuela, 11% of new patients in 2002 interrupted treatment, particularly in states with large indigenous populations. We sought to determine risk factors for treatment interruption among the indigenous populations in Venezuela.

Methods: We conducted a retrospective cohort analysis of all TB patients who were members of an indigenous ethnic population and who initiated TB treatment from 1/1/2003 to 31/12/2003. We reviewed TB registries and interviewed all patients who interrupted treatment. Treatment interruption was defined as failure to present for TB therapy for >30 consecutive days. Risk factors will be analyzed using logistic regression.

Results: There were 447 TB cases reported among indigenous populations in 2003; 64 patients (14%) interrupted treatment. Preliminary analysis revealed that of these, 23 (50%) were female and the median age was 27 years (range 0–75). 63 (98%) were new cases, 56 (87%) had pulmonary TB disease, and 26 (41%) had sputum smear-positive for acid-fast bacilli. Forty-one (64%) were from rural areas, with the largest proportion from Zulia state (24/64, 37%). Analysis of risk factors for treatment interruption will be performed.

Conclusion: Indigenous populations have high rates of TB treatment interruption, particularly in rural areas. Identifying risk factors for treatment interruption can aid in targeting interventions to improve patient adherence and treatment outcomes.

PS-1885-21 Reasons for re-hospitalization of TB patients

M T Trajcevska, A D Sandevski. Institute for Lung Diseases and Tuberculosis- Skopje, Skopje, Macedonia. Fax: (+389) 23229166. e-mail: drtrajcevska@yahoo.com

Every year we treat about 250 TB patients, 20% of them are on retreatment.

Aim: We were interested why some of TB patients are coming back to hospital, what was the main reason for their coming?

Patients and methods: We examined 110 patients, treated in 2003 and 2004 year. 74 of them were males, 36 were females. Age range between 32–82. We were interested are there similarities or differences

among them, for example: regular/irregular taking TB medicaments, abuse of alcohol, abuse of drugs, other diseases like diabetes, under chronic use of corticosteroids, having TB in the family

Results: The analysis of data showed that 53 patients (48.1%) did not take TB drugs regularly, 35 (31.8%) were patients with diabetes, 5 (4.5%) patients under corticosteroids, 13 (11.8%) with TB in family, 4 (3.63%) who did not belong to any mentioned category.

Conclusions: The main reason for retreatment is irregularly taking TB drugs. Therefore the health education is of great importance for every TB patient.

PS-2141-21 Main outcomes and achievements of DOTS implementation in Donetsk oblast, Ukraine

S M Lyepshina,¹ A V Anishchenko.² ¹TB and Pulmonology Chair, Donetsk Medical University, Donetsk, Ukraine; ²Donetsk Oblast Health Administration, Donetsk, Ukraine. Fax: (+380) 3829587. e-mail: idu@whotb.donetsk.ua

For three years of DOTS implementation in Donetsk Oblast (2002–2004) the definite results were achieved, the most important of them are following:

- The resource base of TB facilities, in particular of laboratory departments, has improved considerably;
- All TB specialists of oblast and the majority of general practitioners were trained on principles of detection, diagnostics and treatment TB patients according to WHO recommended strategy;
- 100% coverage of Donetsk Oblast by DOTS strategy was reached by 1 January 2004;
- Mentality of medical workers has changed, especially regarding participation of general practitioners in TB control;
- Detection of TB cases in general practitioner's facilities increased from 0.02% before DOTS implementation to 2.8%;
- For the first time during last 12 years TB morbidity rate among adults reduced by 3.4%, whereas throughout the country it increased by 3.9%;
- TB mortality reduced also by 2.1%, whereas throughout the Ukraine it increased by 3.7%.

Foregoing facts allow to draw a conclusion about positive role of DOTS implementation in Donetsk Oblast and expediency of spreading this experience throughout the Ukraine.

PS-2282-21 Résultats de la décentralisation du traitement directement observé des malades tuberculeux à Cotonou, Bénin

G P Monteiro, F Kassa, L Tawo, S Y Anagonou, M Gninafon. PNT, Cotonou, Bénin. e-mail: mongermainpio@hotmail.com

Introduction : Pour déconcentrer la charge de travail de l'unique centre de dépistage et traitement (CDT)

de la tuberculose de Cotonou et rapprocher les soins des populations des Centres de traitement directement observés (CTDO) ont été créés.

Objectifs : 1) Évaluer les résultats de la décentralisation de la prise supervisée des médicaments antituberculeux. 2) Recenser les difficultés et contraintes liées à cette activité

Cadre : Le Centre National Hospitalier de Pneumophtisiologie (CNHPP) de Cotonou (1.000.000 habitants), unique CDT de la ville, 1.000 tuberculeux par an. Deux centres de santé de la ville identifiés comme CTDO où sont administrés la phase intensive de la chimiothérapie sous observation directe par le personnel formé ; supervision hebdomadaire.

Résultats : 79 cas de TPM+ référés en 2003 : 3% sans contrôle au 2ème mois ; à 8 mois : 8% de perdus de vue contre 11% au CNHPP ; taux de succès 83% pour les CTDO et 84% pour le CNHPP

Difficultés et contraintes : 1) Surcroît de travail, crainte de contracter la tuberculose. 2) Encadrement des CTDO accroît le travail du personnel du CNHPP. 3) Autoadministration les week-end et jours fériés.

Conclusion : Bons résultats, extension prévue.

PS-1841-21 Treatment of latent tuberculosis infection in patients submitted to transplant at a university hospital, Rio de Janeiro, Brazil

M A M S Vieira, M C A C Pinheiro, J A M Leung, S R G Souza, A L Kritski, F C Q Mello. Hospital Tuberculosis Control Programme, Thoracic Diseases Institute, Federal University Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+55) 21 25506903. e-mail: marmanda@globo.com

Pharmacological immunosuppression induced after transplant is a risk factor for developing active TB. LTBI is routinely investigated before the procedure in live donors and receivers.

Objective: To describe a cohort of patients submitted to immunosuppression after transplant and LTBI treatment.

Methods: Patients' charts from 2000 to 2003 were reviewed. LTBI treatment indications were receiver's tuberculin skin test (TST) >5 mm or live donors' with TST >10 mm and normal chest X-ray. The standard treatment was isoniazida/6 months.

Results: Sixty patients fulfilled LTBI treatment criteria. Forty-six (76.7%) were kidney, 13 (21.7%) were liver and 1 (1.6%) was kidney-pancreatic transplant, respectively. In liver transplant patients, four (30.8%, 4/13) were treated with ethambutol+ofloxacin due to persistent liver dysfunction. Among kidney transplants, one patient was treated with ethambutol+pyrazinamide due to isoniazid intolerance. Fifty-one (85.0%) patients completed treatment, five (8.3%) defaulted; one (1.7%) was transferred, one (1.7%) died from transplant complications and 2 patients (3.3%) developed active TB.

Conclusions: The occurrence of active TB (3.3%) was higher than described in general population with

LTBI (1,3%) after isoniazida/6 months. As the adherence to LTBI treatment was high and serious adverse effect rare, perhaps would be better in high TB prevalence country, to lengthen LTBI therapy.

PS-1842-21 Outcome of latent tuberculosis infection treatment at a general university hospital, reference for AIDS, in Brazil

M C A C Pinheiro, M A M S Vieira, S R G Souza, F A D Sanches, A P G Santos, R A Marques, F C Q Mello, A L Kritski. Hospital Tuberculosis Control Programme, Thoracic Diseases Institute, Federal University Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+55) 2122470276. e-mail: mariapinheiro@hucff.ufrj.br

Rationales: Considering patients under care at our hospital and their clinical profiles, LTBI has been considered as one of the priority interventions.

Objective: To describe patients' profiles with LTBI and their outcomes.

Methods: From October 1998 to December 2002, 311 patients were eligible for LTBI treatment, based on Brazilian Ministry Health criteria, at the outpatient clinic of the Hospital Tuberculosis Control Program (HTCP) following a standardized routine.

Results: Regarding clinical criteria for LTBI treatment, 96 (30.8%) were HIV+/AIDS patients; eighty-eight (28.2%) were close contacts and immunosuppression conditions (sarcoidosis, corticosteroid therapy, collagen diseases, transplant) were described for 92 (29.5%) patients, of these 34/92 (37.0%) were kidney and 9/92 (9.8%) liver transplantation, respectively. Health care workers with TST conversion represented 11.5% (36/311). Active TB was identified in 10 (3.2%). Complete LTBI treatment was observed in 268 (86.2%) patients; default in 23 (7.4%); transference to another health unit in 8 (2.6%), death in 2 (0.6%).

Conclusion: LTBI treatment adherence rate was high, despite patient's socio-economic limitations and clinical profiles showing the feasibility of LTBI treatment under routine conditions at a public health unit.

DIAGNOSIS OF MDR-TB

PS-1030-21 Detection of MDR tuberculosis using direct and indirect drug susceptibility testing

T Kummik,¹ M L Katila.² ¹Mycobacterium Reference Laboratory, Tartu, Estonia; ²FILHA, Helsinki, Finland. Fax: (+358) 945421210. e-mail: marja-leena.katila@fimnet.fi

Rapidity and reliability of direct drug susceptibility testing (DST) was evaluated for detection of MDR. Smear-positive sputa of 100 consecutive new patients were cultivated in L-J (*n.* 51), or in L-J and Bactec12B (*n.* 39). DST to INH and RMP was performed using

Bactec460. Direct DST was done from smear-positive sputum, and indirect DST from growth in L-J or Bactec12B bottle.

Results: 90 specimens grew *Mycobacterium tuberculosis* in direct testing. Time to DST result: Direct DST results became available 5.8 days faster in 81%, simultaneously in 7%, and slower in 12% compared to indirect DST. Time to indirect DST result was 7.2 days and 3.8 days slower than direct DST when inoculated from growth in L-J and Bactec12B, respectively. Direct and indirect DST results were identical in 98%. Three sensitive results (INH/1; RMP/2) turned resistant and one resistant INH turned sensitive in indirect DST.

Conclusions: Direct DST, successfully performed in 90%, gave a correct result in 98%. It decreased time to DST result by 7.2 days and 3.8 days compared to indirect DST done from L-J and Bactec12B, respectively. Direct DST is considerably faster only if L-J is used in primary isolation. Standardisation of inoculum may be problematic in direct DST.

PS-1143-21 Implication of embB gene mutation in ethambutol-susceptible clinical isolates of *Mycobacterium tuberculosis* in Korea

Y K Park,¹ S Shin,² S J Kim,¹ G H Bai,¹ W J Lew.¹

¹Department of Microbiology, Korean Institute of Tuberculosis, Seoul, Republic of Korea; ²Division of Social Medicine and Health Inequalities, Brigham and Women, Boston, Massachusetts, USA. Fax: (+822) 5760357. e-mail: ypark7@empal.com

Objectives: Detection of embB mutations have been observed in both EMB-susceptible and EMB-resistant isolates; it remains controversial whether these mutations are associated with EMB resistance

Methods: The 36 *M. tuberculosis* isolates which tested susceptible to EMB and resistant to at least one drug. DNA extracted from the isolates was analyzed by amplifying seven fragments. The PCR products were purified and directly sequenced. We reviewed the history of past DST results.

Results: Out of 36 ethambutol-susceptible strains, 3 strains (8.3%) had a mutation in codon 306 or 406 of the embB gene. These three strains had at least isoniazid resistance. They grew at 1.0 mcg/ml of ethambutol in Lowenstein-Jensen media. The patients of the strains were continuously smear-positive for over 3 years despite taking TB therapy. One strain had been ethambutol-resistant in past drug susceptibility tests.

Conclusion: We found that drug-resistant strains sometimes did not maintain identical DST patterns because of decreased viability in in vitro tests. Therefore we postulate that embB mutations at least in codons 306, 406, 497 are correlated with EMB resistance.

PS-1298-21 Application of the colorimetric assay MTT and resazurin for drug resistance detection in *Mycobacterium tuberculosis*

D Lemus,¹ E Montoro,¹ M Echemendia,¹ A Martin,² F Portaels,² J C Palomino.² ¹Tuberculosis National Reference Laboratory Institute of Tropical Medicine Pedro Kouri, La Habana, Cuba; ²Tuberculosis Laboratory. Institute of Tropical Medicine, Antwerp, Belgium. Fax: (+537) 2046051. e-mail: dlemus@ipk.sld.cu

Background: Early detection of drug resistance is an urgent priority to avoid dissemination of resistant strains. The conventional methods require several weeks to give results; the commercial test and molecular tool are expensive for routine uses.

Objective: To evaluate the performance of two colorimetric methods for detection of resistance to the first-line antituberculous drugs.

Methods: One hundred *M. tuberculosis* strains were tested by the MTT and the resazurin assay, and compared to the results obtained with the gold standard proportion method (PM). The results were analyzed using the MEDCALC statistic program.

Results: The cutoff values obtained by the ROC analyses were >0.25 g/mL, >1 g/mL, 4 g/mL and >0.25 g/mL for INH, STR, ETH and RIF, respectively. Sensitivity was 100% for isoniazid and rifampicin, for streptomycin and ethambutol was >91.1%, the specificity was >88.5% for isoniazid, streptomycin and rifampicin, respectively, for ethambutol was low (>57.8%).

Conclusion: This study shows a high level of agreement of these methods for rapid detection of isoniazid and rifampicin resistance. More standardization is needed for streptomycin and ethambutol. These methods are an attractive alternative and could be implemented in low resource laboratories.

PS-1330-21 Development of a strategy for genotyping *Mycobacterium tuberculosis*

R Jou, P J Chin, M H Chen, S Y Chang. Reference Laboratory of Mycobacteriology, Center for Disease Control, Taipei, Taiwan, China. Fax: (+886) 2 26531387. e-mail: rwj@cdc.gov.tw

Objective: To evaluate an adequate automated high throughput fingerprinting strategy for highly diversified genotypes of *Mycobacterium tuberculosis* strains in Taiwan, a moderate incidence country.

Methods: The restriction fragment length polymorphism (RFLP), spacer oligotyping (spoligotyping) and variable-number tandem repeats of mycobacterial interspersed repetitive units (VNTR-MIRU) methods using different genetic markers were applied for genotyping the same panel of 334 isolates from 4 different geographic origins and the allelic diversities were compared.

Results: Sixty strains had clustered RFLP patterns and 274 were unique. Seventy-four spoligotypes were resolved. One hundred and thirty-two 12-loci MIRU

patterns and 161 15-loci VNTR-MIRU patterns were found, respectively, in this sample collection. The Hunter-Gaston discriminatory index (HGDI) was the highest for RFLP (0.997), followed by spoligotyping plus 15-loci VNTR-MIRU (0.967), 12-loci MIRU alone (0.937) and the lowest for spoligotyping (0.755). Furthermore, 8 of 15 VNTR-MIRU loci were highly (26, 31) or moderately (10, 16, 39, 40, ETR-A and B) discriminative, while 3 loci (2, 20 and 24) with HGDI lower than 0.1 could be excluded in the initial typing. **Conclusion:** The strategy using spoligotyping and modified 15-loci VNTR-MIRU in conjunction with the conventional surveillance will facilitate the epidemiologic investigations of tuberculosis.

PS-1356-21 Prospective real-time molecular typing of *Mycobacterium tuberculosis*: development from research to a regional public health service

J T Evans,¹ E G Smith,¹ S Gardiner,¹ P Monk,² G Hong,³ P M Hawkey.^{1,4} ¹HPA West Midlands Laboratory, Birmingham, West Midlands, ²East Midlands South Health Protection Unit, Leicester, Leicestershire, UK; ³Transgenomic Inc., Omaha, Nebraska, USA; ⁴The University of Birmingham, Birmingham, West Midlands, UK. Fax: (+44) 1217726229. e-mail: Jason.Evans@heartsol.wmids.nhs.uk

Objectives: To move a TB typing research platform into a prospective molecular typing service for all clinical isolates of *M. tuberculosis* in a population of 10 million in the Midlands, UK, that directs contact tracing and resources to those who will most benefit. **Methods:** Previous research has shown MIRU-VNTR (mycobacterial interspersed repetitive units containing variable number tandem repeats) typing on a Transgenomic WAVE System to be a valid alternative to IS6110 RFLP. Automation increased capacity and reduced hands-on time. Protocols employed assured result quality. Typing results were electronically reported to public health teams by individual patient, quarterly summary reports and cluster analysis meetings were organised.

Results: Analytical capacity is twice that required for the workload of 1000 isolates per annum, allowing for urgent and retrospective typing. Quality control of amplicons is essential to assess accuracy of the system. Electronic result transmission is necessary for speed and accuracy. Active engagement with TB and public health teams ensures utilisation of results and recognition of unsuspected transmission events across administrative boundaries.

Conclusions: For large-scale real-time typing, various stages must be automated and quality controlled. Laboratory developments can enhance the public health control of TB in the 21st century.

PS-1378-21 Rapid drug susceptibility testing of *Mycobacterium tuberculosis* with a nitrate reductase assay

E Montoro,¹ D Lemus,¹ M Echemendia,¹ A Martin,² F Portaels,² J C Palomino.² ¹Tuberculosis National Reference Laboratory. Institute of Tropical Medicine Pedro Kouri, La Habana, Cuba; ²Mycobacteria Unit. Institute of Tropical Medicine, Antwerp, Belgium. Fax: (+537) 2046051. e-mail: emontoro@ipk.sld.cu

Background: Rapid and accurate susceptibility testing is essential to identified *Mycobacterium tuberculosis* resistance strains and prevent the transmission of the diseases. In the last years different methods have been described, the nitrate reduction assay (NRA) is one of the most attractive and has been used in different setting with high level of agreement with the conventional methods.

Objective: To evaluate the Nitrate Reduction Assay for rapid detection of resistance to the first line anti-tuberculous drugs.

Methods: One hundred thirty two *Mycobacterium tuberculosis* strains were studied by the NRA, for determine the susceptibility to first line anti-tuberculosis drugs. The same drugs critical concentration recommended for the proportion method was used in the NRA. The results were compared with the proportion method in Löwenstein-Jensen medium.

Results: The results were obtained from 7 to 14 days. The sensitivity and specificity was >94.4% and >98.7%, respectively. The global agreement was 98.6%.

Conclusions: The NRA is simple to perform, don't need any sophisticated equipment and might represent an inexpensive procedure for rapid detection of resistance to first-line drugs in low-resource countries.

PS-1382-21 Phage amplification assay for detection of rifampicin resistance in *Mycobacterium tuberculosis*

D Lemus,¹ S L Yzquierdo,¹ M Echemendia,¹ E Montoro,¹ A Martin,² F Portaels,² J C Palomino.² ¹Tuberculosis National Reference Laboratory. Institute of Tropical Medicine Pedro Kouri, La Habana, Cuba; ²Mycobacteriology Unit, Institute of Tropical Medicine, Antwerp, Belgium. Fax: (+537) 2046051. e-mail: dlemus@ipk.sld.cu

Background: Since rifampicin (RIF) was identified as a marker of multidrug resistance, different method has been proposed for the rapid identification of RIF resistance strains. Some of them are very slowly and others require sophisticated equipment and are impractical for routine uses in low resource countries. In the last years several alternatives methods including the phage amplification assay have been propose.

Objective: To evaluate the phage amplification assay as an alternative method for rapid rifampicin resistance detection in *M. tuberculosis*.

Methods: Thirty strains of *M. tuberculosis* were evaluated by the phage amplification assay to deter-

mine susceptibility to 10 g/mL of RIF. The proportion method in Löwenstein-Jensen medium was used as a gold standard.

Results: The result by the phage assay were obtained in 2 days, 15 strains were defined and resistance and 15 as sensible to RIF. A very good correlation between both methods was obtained (100% of agreement).

Conclusions: The phage amplification assay represents an alternative method for rapid RIF resistance detection. This method is very easy to perform and practical for routine use in low resource laboratories

PS-1402-21 Evaluation of a gas sensor array as a novel diagnostic tool for pulmonary tuberculosis

R Fend,¹ A H J Kolk,² P Buijtelts,³ P R Klatser,² A C Woodman.¹ ¹Cranfield BioMedical Centre, Cranfield University at Silsoe, Silsoe, Bedfordshire, UK; ²KIT Biomedical Research, Royal Tropical Institute, Amsterdam, Noord Holland, ³Department of Medical Microbiology, Medical Centre Rijnmond-South, Rotterdam, Zuid Holland, The Netherlands. Fax: (+31) 20 6971841. e-mail: a.kolk@kit.nl

Introduction: Current TB control depends on new case finding followed by adequate treatment. The recommended mean of case finding by the WHO is microscopy after Ziehl-Neelsen stain. However, this procedure lacks sensitivity, requires special skills and is cumbersome to perform.

Objectives: To demonstrate the potential of an electronic nose to detect *Mycobacterium tuberculosis* in clinical specimens (sputum).

Methods: 287 clinical sputum specimens were obtained from South Africa and Zambia. Sputa were mixed with a 1 M sodium chloride solution and incubated in sealed headspace vials for 330 minutes at 37°C prior to the analysis with the sensor array. The data were analysed using principal component analysis and neural networks.

Results: It was possible to distinguish between TB positive samples and TB negative samples. Within the TB negative samples, a sub-cluster containing patients suffering from pneumonia could be identified. Smoking patients formed a separate group within each group (TB positive and TB negative). The specificity and sensitivity of the described method is 91% and 89%, respectively compared to culture.

Conclusions: This study has shown the ability of an electronic nose to detect *M. tuberculosis* in clinical specimens and opens the way to make this method a rapid and automated system for the early diagnosis of respiratory diseases.

PS-1404-21 Early detection of *M. tuberculosis* in culture and sputum using electronic nose technology

R Fend,¹ A H J Kolk,² P R Klatser,² A C Woodman.¹ ¹Cranfield BioMedical Centre, Cranfield University at Silsoe, Silsoe, Bedfordshire, UK; ²KIT Biomedical Research, Royal Tropical Institute, Amsterdam, Noord Holland, The Netherlands. Fax: (+31) 20 697 1841. e-mail: a.kolk@kit.nl

Tuberculosis (TB) remains a major health challenge, with over 1/3rd of the world's population being infected. The WHO estimated that in 2005, 8 million new cases and 2 million deaths will occur with the majority of the infected people living in low-income countries. The current method for diagnosis TB is the Ziehl-Neelsen stain of sputum followed by direct microscopy. However, this method is time consuming, operator dependent and lacks sensitivity. In endemic areas, lab technicians are often overloaded with sputum samples. Therefore, a new test (method) replacing the current technique is urgently needed.

We investigated the potential of an electronic nose (gas sensor array) to detect different *Mycobacterium* spp. and *Pseudomonas aeruginosa* in both culture and sputum. Three different *Mycobacterium* spp. and *P. aeruginosa* were cultivated in Middlebrook 7H9 with OADC enrichment. Sputum samples were collected from non-TB patients and spiked with *M. tuberculosis*, *M. avium* and *P. aeruginosa*. The headspace of the cultures and spiked sputum samples were analyzed by an electronic nose comprising 14 conduction polymers. The electronic nose was able to differentiate between different *Mycobacterium* spp. and between mycobacteria and other lung pathogens such as *P. aeruginosa*. The detection limit for *M. tuberculosis* in culture and sputum was found to be as low as 1×10^4 mycobacteria ml⁻¹. This study has shown the ability of an electronic nose to detect *M. tuberculosis* in both culture and sputum and opens the way to make this method a rapid and automated system for the early diagnosis of respiratory diseases.

PS-1508-21 Development of a lateral flow test for the identification of mycobacteria in early cultures

S van der Werken, S Kuijper, A H J Kolk. KIT Biomedical Research, Royal Tropical Institute, Amsterdam, Noord Holland, The Netherlands. Fax: (+31) 206971841. e-mail: a.kolk@kit.nl

Introduction: The current method for diagnosis TB is the Ziehl-Neelsen stain of sputum followed by direct microscopy. However, this method is time consuming, operator dependent and lacks sensitivity. In endemic areas, lab technicians are often overloaded with sputum samples. Therefore, a new test (method) replacing the current technique is urgently needed.

Methods: We have selected monoclonal antibodies suitable for the capture of *M. tuberculosis* antigens in solution. These monoclonal antibodies were used as

detector antibodies by coating onto 40 nm gold particles and 200 nm paramagnetic particles. As capture antibodies bound to nitro cellulose we used monoclonal antibodies and polyclonal antibodies.

Results: The lateral flow test consisted of a sample pad, a conjugate pad, a nitro cellulose strip and a wick (absorption pad) to direct the flow. The test with the gold particles was read visually the test with the paramagnetic particles with the MAR (magnetic assay reader from Magna Bioscience). The mycobacteria were disrupted with glass beads. Detection limit of the lateral flow test with gold particles and paramagnetic particles corresponded with 10E4 mycobacteria. The objective reading is an advantage of the paramagnetic detection. We could identify *M. tuberculosis* complex mycobacteria grown on solid media, e.g., Löwenstein Jensen and in the liquid culture tubes from MB/BacT and BacT/ALERT 3D, and MGIT mycobacteria detection systems.

Conclusions: The lateral flow test for *M. tuberculosis* can be used for the early identification of mycobacteria grown on solid and liquid media.

PS-1643-21 Tuberculosis lymphadenopathies: prospective bacteriology study in Tunisia

N L Slim-Saidi,¹ E Mehiri,¹ W Mahjoubi,¹ R Fourati,² R Djbeniani.² ¹Microbiology Laboratory, A. Mami Pneumology Hospital, Ariana, ²Health and Care Department Tunis, Tunis, Tunisia. Fax: (+216) 71821184. e-mail: leila.saidi@rns.tn

Lymph node tuberculosis is the most frequent form of extrapulmonary tuberculosis. A prospective study was carried out from June 2001 to June 2002. During this period, 72 cases suspect of ganglia tuberculosis were recorded. Lymph node biopsy or puncture were performed in all patients and examined in microbiology laboratory. Bacteriological diagnosis based on smear microscopy for acid-fast bacilli and culture on Lowenstein Jensen and Coletsos media. Identification of mycobacteria used niacin, nitrate reduction, TCH, PNB and pyrazinamide tests. Drug susceptibility test was performed using the proportion method (Canetti). The sex-ratio was of 0.56, mean age: 31.5 years old (range 1–75 years). All cases are non-HIV-infected. Diagnosis is confirming by bacteriology in 37 patients (51.4%). Microscopies were positive in 23.6% and culture in 43.1% of cases. Thirty-one strains was identified, *Mycobacterium tuberculosis* in 20 cases, *Mycobacterium bovis* in 7 cases and 4 isolates just tuberculosis complex. One *M. tuberculosis* strain was resistant of streptomycin and one *M. bovis* isolate was multidrug-resistant (INH, RIF, EMB, PZ). A complementary method could be used to ameliorate extra pulmonary localization diagnosis and improve identification of strain other than *M. tuberculosis*.

PS-1671-21 Evaluation of two liquid media for the diagnosis of pulmonary tuberculosis in a hospital in Lima, Peru

A R Soto,^{1,2} L Solari,^{3,4} C Acuna,² J Agapito,² E Gottuzzo,^{2,4} F Samalvides Cuba.¹ ¹Department of Medicine, Hospital Nacional Hipólito Unanue, Lima, ²Universidad Peruana Cayetano Heredia, Lima, ³National Institute of Health (INS), Lima, ⁴Institute of Tropical Medicine, Universidad Peruana Cayetano Heredia, Lima, Peru. Fax: (+51) 14823404. e-mail: 03356@upch.edu.pe

Objective: To evaluate the diagnostic performance of two liquid culture media for diagnosis of pulmonary tuberculosis.

Patients and methods: Patients with respiratory symptoms who came to the emergency room of Hospital Cayetano Heredia were included. Sputum samples were cultured in Ogawa medium, Mycobacteria growth indicator tube (MGIT) and a modification of the Middlebrook 7H9 medium based in the addition of a colorimetric (tetrazolium bromide) indicator of mycobacterial growth (BT-TB). The gold standard was composite.

Results: 101 patients were included from May to July 2003. For the MGIT both sensitivity (Se) and specificity (Sp) were 100%. The BT-TB medium had a Se of 71.9% and a Sp of 100%, while the Ogawa medium had a Se of 68.8% and a Sp of 100%. The time of growth was 12.18 ± 5.68 days for MGIT ($P < 0.001$ vs. Ogawa and BT-TB), 16.65 ± 5.26 days in the BT-TB medium ($P < 0.001$ vs. Ogawa) and 25.74 ± 8.46 days in Ogawa.

Conclusions: The liquid culture medium MGIT is superior to the BT-TB and the Ogawa media in diagnostic performance and in time of growth of colonies of *M. tuberculosis* in pulmonary tuberculosis. The BT-TB medium is faster but comparable in diagnostic performance to Ogawa.

PS-1849-21 Molecular epidemiological characterisation of quinolone resistant strains of *Mycobacterium tuberculosis* by IS6110 fingerprinting

A Faerber,¹ K Feldmann.^{1,2} ¹Kuratorium Tuberculosis in the World, Gauting, ²Institute of Laboratory Medicine, Asklepios Clinics Munich - Gauting, Gauting, Germany. Fax: (+49) 89 8509742. e-mail: andreas.faeber@gmx.de

Thirteen isolates of *M. tuberculosis* tested with a high level resistance to ciprofloxacin (MHK >4) were identified in the strain bank of the SRL in Gauting, Germany (origins of patients: Nepal 5, Bolivia 1, Germany 7—two of them of former Eastern Block origin). The mechanism of the resistance was determined by gyrA sequencing: two of them did not have a gyrA mutation; six did have a codon 94 mutation and five a codon 90 mutation. Two strains isolated in Nepal did show an identical non-Beijing fingerprinting pattern. Two strains from patients from Germany differed only by one additional band. Interestingly in

both couples the mechanism of resistance was due to different mutations in the *gyrA* gene. Four strains could be classified as Beijing strains. One patient with a Beijing strain did develop a ciprofloxacin resistance inducing codon 94 mutation under treatment. As described for *katG* and *rpoB* mutations, different resistance inducing mutations of *gyrA* can be found in clustered genotypes, maybe indicating development of secondary resistance by inadequate treatment. In this small sample no genotype could be found to be significantly overrepresented. Relevant *Gyr A* mutations were a good marker for quinolone resistance (sensitivity 84%, specificity 100%).

PS-2051-21 Comparaison de deux méthodes de décontamination pour l'isolement des mycobactéries

J P S Simelo,¹ E B Bahati,² G K Kabuya,¹ J P K Kashongwe.³

¹Laboratoire National de Référence, PNT/RDC, Kinshasa,

²Programme National de Lutte Contre la Tuberculose / RDC,

Kinshasa, ³Université de Kinshasa, Kinshasa, D R Congo.

Fax: (+243 01) 775 599 4917. e-mail: simelokahodi@yahoo.fr

Objectif : Evaluer les avantages inhérents à 2 méthodes de décontamination dans les conditions du terrain en RD Congo.

Matériel et méthode : Echantillons 4 ml d'expectoration issue de nouveaux cas de TB positifs recueillis sur 1 mois dans 2 grands centres de diagnostics de Kinshasa, additionnés de CPC à 1% à part égale.

Technique : Préparation de 2 aliquotes de 2 ml pour chaque échantillon dans un tube flacon de 50 ml. Décontamination d'un aliquote par la méthode de Pétroff et l'autre par le lauryl sulfate de sodium (lauryl sulfate). Examen direct d'une goutte du culot, chaque tube après coloration de Ziehl-Neelsen. Mise en culture de chaque aliquote sur milieu de Lowenstein-Jensen fraîchement préparé et contrôlé.

Résultats : Total : 102 crachats décontaminés à la fois par les 2 méthodes. Cultures positives : Pour la méthode de Pétroff : 77 (75%), pour le lauryl sulfate de soude : 95 (93%). Cultures contaminées : Pour la méthode de Pétroff : 10 (9.8%), Pour le lauryl sulfate : 1 (<1%)

Conclusion : Les résultats obtenus au lauryl sulfate sont meilleurs.

PS-2062-21 In vitro susceptibility to moxifloxacin among isolates of multidrug-resistant *Mycobacterium tuberculosis* in Hong Kong

K M Kam,¹ C W Yip,¹ T L Cheung,² H S Tang,¹ O C Leung,¹

M Y Chan.¹ ¹TB Reference Laboratory, Public Health Laboratory

Centre, Department of Health, Hong Kong, ²Microbiology

Division, Public Health Laboratory Centre, Hong Kong, China.

Fax: (+852) 27761446. e-mail: kmkam@dh.gov.hk

We study the effectiveness of moxifloxacin (MOX) against multidrug-resistant (MDR) *Mycobacterium*

tuberculosis. In vitro drug susceptibility tests on MOX and OFX using MGIT system against 132 non-duplicate MDR-TB (108 sensitive to OFX and 24 resistant to OFX) was performed. In addition, 11 OFX resistant non-MDR-TB isolates were also included. Results showed that all strains susceptible to OFX were also susceptible to MOX. For OFX resistant isolates, regardless of their MDR status, a 4- to 8-fold decrease in MIC was observed for MOX when compared to OFX. All except two OFX resistant isolates possessed a MOX MIC of 2 mg/L or lower and was considered to be susceptible to MOX. DNA sequence analysis for gyrase A mutation, which was an indicator for OFX resistance, correlated with MOX susceptibility changes. Decrease in MOX susceptibility amongst MDR-TB strains was observed that correlated with OFX susceptibility. Asp94Gly mutation appeared to be associated with higher level of MICs to both OFX and MOX. These in vitro susceptibility results to MOX suggest that clinical usage of MOX should be accompanied by careful monitoring of susceptibility to this important anti-MDR-TB drug.

PS-2068-21 A comparative study of *M. tuberculosis* susceptibility to first-line anti-tuberculosis drugs using the agar plate proportions method vs. the conventional Lowenstein-Jensen method

E Leo-Hurtado, N Quispe-Torres. Mycobacteria Laboratory, Peruvian National Institutes of Health, Lima, Peru.

Fax: (+51) 1 4712529. e-mail: elenaleo@ins.gob.pe

Objective: To assess the comparative performance of the agar plate proportions (APP) method vs. conventional Lowenstein Jensen technique.

Methods: Critical concentrations for drugs in this study were: Isoniazid (H): 0.2 µg/mL, Streptomycin (S): 4 µg/mL, Ethambutol (E): 2 µg/mL, and Rifampin: (R); 40 µg/mL. For APP critical concentrations were, 0.2 µg/mL, 2 µg/mL, 5 µg/mL, and 1 µg/mL, respectively. Middlebrook 7H10 + OADC agar was used for APP method, with and without drugs, and the inoculum was standardized to McFarland scale 0.5, being assessed after 21 days. For L-J method, the inoculum was standardized to McFarland scale 1, being assessed after 45 days.

| Drug | Proportions Method (L-J) | Resis. (R) | Suscep. (S) | Suscep.: L-J | Suscep.: APP | Spec.: L-J | Spec.: APP |
|--------------|--------------------------|------------|-------------|--------------|--------------|------------|------------|
| Isoniazid | Resistant | 117 | 4 | 96.7 | 94.4 | 73.1 | 82.6 |
| Isoniazid | Susceptible | 7 | 19 | | | | |
| Streptomycin | Resistant | 62 | 44 | 58.5 | 96.9 | 95.1 | 47.0 |
| Streptomycin | Susceptible | 2 | 39 | | | | |
| Ethambutol | Resistant | 26 | 29 | 47.3 | 96.3 | 98.9 | 75.8 |
| Ethambutol | Susceptible | 1 | 91 | | | | |
| Rifampin | Resistant | 109 | 6 | 94.8 | 98.2 | 93.8 | 83.3 |
| Rifampin | Susceptible | 2 | 30 | | | | |

Resis. = Resistant; suscep. = susceptible/susceptibility; spec. = specificity.

Results/Conclusion: 147 susceptibility tests were assessed, and the concordance for APP method vs. L-J was: H, 93%; S, 69%; E, 80% and R, 95%. 12 strains reported as resistant with APP method were susceptible with L-J, an overestimation of resistant strains. APP showed good concordance with L-J, allowing a shorter time for result reporting (3 weeks compared to 6 weeks). However, new analyses should be performed because of the higher frequency of resistant strains found.

PS-2070-21 Isolation rate of mycobacteria species in smear positive pulmonary tuberculosis patients in the Kombos, The Gambia

M Chukwuma,¹ K Obinna,² Y Jobe.¹ ¹Laboratory, Banjul; ²Ganeni Pharmacy, Banjul, The Gambia. Fax: (+220) 4495914. e-mail: cdcdiagnos@yahoo.com

Of 704 patients screened microscopically for acid-fast bacilli (AFB), 289 were smear positive. The smear positive patients yielded 100% positive culture. Of the 289 isolates, 230 representing 79.6% were characterized as *Mycobacterium tuberculosis*, while 33 (11.4%) were *M. bovis*, 17 (5.9%) were *M. kansasii* and 9 (3.1%) were *M. avium*. It could be inferred that simple Ziehl Neelsen (ZN) staining procedure gives similar result as those of cultural technique, which is hazardous, cumbersome, time consuming and capital intensive. We therefore recommend the use of ZN direct microscopy as first line method of diagnosis. While we also support the use of cultural procedure for research and drug trials.

PS-2142-21 Rapid DST detection by real-time PCR for resistance associated mutation in MTB

D Rienthong, S Rienthong, J Juntaaksorn, S Smithtikarn, L Ratanavijit, S Nateniyom. TB Division, Bureau of Aids TB & STI, Bangkok, Thailand. Fax: (+662) 2125935. e-mail: dhanida2547@yahoo.com

Objective: To detect point mutation of drug resistance of *M. tuberculosis* from isolated specimens of pulmonary tuberculosis (PTB) patients by using the rapid real-time PCR.

Setting: In clinic of TB division Thailand, PTB patients during the specified intake period about one year of 2003 were eligible for inclusion in the study.

Methods: A total of 200 isolated cultures positive for *M. tuberculosis* from respiratory specimens obtained from 200 patients were extracted DNA and performed the LightCycler PCR assays with the primers used additional of the fluorescein and Red 640-labeled probes of rpo1, rpo2, inh1 and kat1. DNA assay method will combine both rapid cycle PCR with real-time monitoring of the process and generation of mutation-specific fluorescent probe melting profiles on the LightCycle.

Result: According to its melting temperature (T_m) that was compared to T_m for the susceptible strain H37Rv using as a control. Six samples from six patients were found to contain strains resistant to rifampicin. A mutation at codons 526 and 531 of the rpoB gene by rpo1 probes was found in three of them, whereas a mutation at the region containing codons 513 and 518 of the rpoB gene by rpo2 probes was found in the remaining three samples. A mutation at nucleotide substitution C209T in the regulatory region of the inhA gene by inh1 probes was found in 6 of 19 samples, whereas a mutation at the region containing codons 315 of the katG gene by kat1 probes was found in the remaining 13 samples.

Conclusion: The LightCycler PCR assays could detect rifampicin-resistant and isoniazid-resistant more earlier than phenotype method.

PS-2273-21 α -crystalline protein expression in hypoxically induced nonreplicating persistence of susceptible and multidrug resistant *Mycobacterium tuberculosis* strains

N Mosleh. Department of Mycobacteriology, National Research Institute of Tuberculosis & Lung Disease, Tehran, Iran. Fax: (+98) 21229203. e-mail: n_mosleh@yahoo.com

Evidence suggests when adaptation to gradually oxygen depletion occurs, *Mycobacterium tuberculosis* (MTB) undergoes to hypoxic state of nonreplicating persistence (NRP) that was designated as NRP1 and NRP2 stages. α -crystalline protein was expressed at NRP 1, plays major role in induction of the persistence. In this study the modified Wane method, was used to investigate the physiological response of MTB to different oxygen level including α -crystalline expression, and evaluation the activity of antimicrobial agents against MTB. Susceptible & drugs resistant isolated strains of MTB were cultivated in Dubos Albomin Tween and the effects of antimicrobial were evaluated during NRP stages of MTB. α -crystalline was detected via pellet preparation, cell disruption and SDS-PAGE technique. Some drugs affected the MTB at actively replicating period and the rifampin effect was continued slightly during NRP-1 stage. Meteronidazole was affected the MTB at NRP-2 stage. α -crystalline protein was detected in both susceptible and drug-resistant strains at NRP-1 stage but do not detected in aerated cultures. Understanding the mechanisms of factors associated with the hypoxic condition helps to the development of strategies for preventing that persistence of MTB in human.

PS-1803-21 Evaluation of direct susceptibility testing on Lowenstein-Jensen medium for detection of MDR-TB in smear-positive patients in Lima, Peru (Preliminary report)

L Vasquez,¹ L Ascencios,² N Quispe,² G Henostroza,¹ C Seas,¹ H Guerra,¹ J Saravia,³ R O'Brien,⁴ M Perkins,⁴ L Llanos,¹ E Gotuzzo.¹ ¹Instituto de Medicina Tropical Alexander von Humboldt -UPCH, Lima, ²Instituto Nacional de Salud, Lima, ³DISA III Lima Norte, Lima, Peru; ⁴FIND Diagnostics, Geneva, Switzerland. Fax: (+51) 1 4823404. e-mail: 03093@upch.edu.pe

Direct susceptibility testing on Lowenstein-Jensen (Direct LJ) is a rapid diagnostic test that detects multidrug-resistant tuberculosis (MDR-TB) within 4 weeks by inoculating sputum from smear positive patients. A multicenter prospective observational study was designed in the North area of Lima, Peru; to evaluate the accuracy of the Direct LJ test in detecting MDR-TB against the proportion method on Lowenstein-Jensen medium, which remains used as the gold standard. Patients with smear positive pulmonary TB were included. We report here the preliminary results on the first 392 patients tested for isoniazid and rifampin. The dilutions in the Direct LJ were the same to the ones used in the proportion method. Resistance to both Rifampin and Isoniazid was detected in 12.7%. Sensitivity and specificity were 88.00% and 98.77%, with a positive predictive value of 91.66% and a negative predictive value of 98.17%. Direct LJ is an accurate method for detection of MDR-TB, faster than the indirect proportion method and requires minimal lab implementation. Since it has a strong similarity with the gold standard it is a good alternative. Further analysis is needed for a better understanding of its performance.

PS-1818-21 Evaluation of a phage amplification assay for detection of MDR-TB in smear-positive patients in Lima, Peru (Preliminary report)

H Guerra,¹ G Rojas,¹ J Chauca,¹ G Henostroza,¹ C Seas,¹ L Vasquez,² J Saravia,³ R O'Brien,⁴ M Perkins,⁴ L Llanos,¹ E Gotuzzo.¹ ¹Instituto de Medicina Tropical Alexander von Humboldt -UPCH, Lima, ²Instituto Nacional de Salud, Lima, ³DISA III Lima Norte, Lima, Peru; ⁴FIND Diagnostics, Geneva, Switzerland. Fax: (+51) 1 4823404. e-mail: 03093@upch.edu.pe

FastPlaque TB-MDRiTM (BIOTEC) is a commercially available diagnostic kit that uses phage amplification technology, and rifampin resistance as an indication of multidrug resistance in strains of *Mycobacterium tuberculosis* (MDR-TB) within 48 hours. The use of phages as a diagnostic tool is rapidly gaining ground today. The proportion method on Lowenstein-Jensen (LJ) medium is used as the gold standard to evaluate the sensitivity of *M. tuberculosis* to first line drugs. A multicenter prospective observational study was designed to evaluate the accuracy of the fast plaque test

in detecting MDR-TB compared to the proportion method in the north area of Lima, Peru. Patients with smear positive pulmonary TB were included. We report here the preliminary results on the first 465 patients tested. Resistance to rifampin was detected in 13.5%, 57.2% were susceptible, 14.4% were contaminated, and 14.8% were indeterminate. Sensitivity and specificity of the Fast Plaque method as indicator of MDR-TB were 89.79% and 93.96%, with a positive predictive value of 73.33% and a negative predictive value of 98.03%. The FastPlaque TB-MDRiTM kit is a fast and accurate method for diagnosing MDR-TB among smear positive patients. Measures to decrease the contamination rate should be implemented to further improve its diagnostic accuracy.

PS-1819-21 Evaluation of a line probe assay for detection of MDR-TB in smear positive-patients in Lima, Peru (Preliminary report)

L Ascencios,¹ L Vasquez,¹ N Quispe,¹ T Caceres,¹ G Henostroza,² C Seas,² H Guerra,² J Saravia,³ R O'Brien,⁴ M Perkins,⁴ L Llanos,² E Gotuzzo.² ¹Instituto Nacional de Salud, Lima, ²Instituto de Medicina Tropical Alexander von Humboldt -UPCH, Lima, ³DISA III Lima Norte, Lima, Peru; ⁴FIND Diagnostics, Geneva, Switzerland. Fax: (+51) 1 4823454. e-mail: 03093@upch.edu.pe

INNO-LiPA Rif.TB (Innogenetics) is a commercially available line probe assay for the detection of *M. tuberculosis* which simultaneously detects the *Mycobacterium* complex and the presence of mutations in the *rpoB* gene associated with resistance to rifampin (RMP). Multi-drug-resistant tuberculosis (MDR-TB) is an under diagnosed health problem in our country, the minimal time for its detection is 12 weeks. A multicenter prospective observational study was designed in the north area of Lima to evaluate the accuracy of the line probe assay in detecting MDR-TB compared to the proportion method on Lowenstein-Jensen medium as the gold standard to evaluate the sensitivity of *M. tuberculosis* to first line drugs. Patients with smear positive pulmonary TB were included. We report here the preliminary results on the first 385 patients tested. Resistance to rifampin was detected in 12.7% and 87.3% were susceptible. Sensitivity and specificity of the Fast INNO-LiPA Rif.TB assay were 85.71% and 97.09%, with a positive predictive value of 80% and a negative predictive value of 98.04%. INNO-LiPA Rif.TB is a reliable and accurate method for the diagnosis of MDR-TB. It is probably more valuable for patients with a high suspicion of MDR-TB, but further analysis is needed.

TB AND HIV-II

PS-1794-21 Tuberculose et VIH/SIDA aux cliniques universitaires de Kinshasa

J M K Kayembe, B K Kabengele. Médecine Interne, Université de Kinshasa, Kinshasa, RD Congo, D R Congo.
e-mail: dr12jmkayembe@yahoo.com

Objectifs : Décrire état de lieu de cette coinfection aux CUK. Profil clinique et accessibilité thérapeutique

Méthode : Renseignements des dossiers médicaux, période : 2000 à 2004. Patients avec tuberculose pulmonaire ou extrapulmonaire ayant suspicion clinique d'infection à VIH ou sérologie VIH+.

Questions : Type de tuberculose ? status VIH ? traitement antirétroviral (ARV).

Résultats : 258 patients éligibles (139 H, 119 F). Co-infection TB-VIH 88 sujets (34%). Tuberculose pulmonaire (179 sujets, 69%). Tuberculose extrapulmonaire (79 sujets, 30%). Tableau clinique semblable aux sujets VIH-. Status VIH+ confirmé (39 sujets, 44%) et suspecté (49 sujets, 55%). Traitement TBC selon DOTS et ARV seulement. 14/29 patients (2004).

Conclusions : La coinfection TB-VIH est réalité à Kinshasa (35%) ; la TEP touche 1 sujet sur 3 ; les formes ganglionnaire et pleurale sont les plus fréquentes. Le dépistage du VIH reste très faible et l'accès aux ARV est loin d'être optimale.

PS-1814-21 Presumptive smear-negative tuberculosis among Peruvian HIV/AIDS patients with respiratory symptoms

E Gonzalez,¹ L Solari,¹ K Verdonck,² J Chauca,¹ G Rojas,¹ E Neyra,¹ I Best,¹ B Bustamante,^{1,3} H Guerra,¹ E Gotuzzo.^{1,3}
¹Instituto 'Alexander von Humboldt'. Universidad Peruana Cayetano Heredia, Lima, Peru; ²Prince Leopold Institute of Tropical Medicine, Antwerp, Belgium; ³Department of Infectious Diseases, Tropical Medicine and Dermatology, Hospital Nacional Cayetano He, Lima, Peru.
Fax: (+51) 4823404. e-mail: egonzalezlagos@yahoo.com

Background: In low-resource settings, where tuberculosis tends to be a prevalent disease, limited availability of procedures and antiretroviral therapy complicate SNTB diagnosis, especially among HIV/AIDS patients.

Methods: Observational, ongoing study that evaluates clinical follow-up and standard laboratory tests on spontaneous sputum samples for etiological diagnosis of respiratory disease among HIV/AIDS patients at a public referral hospital.

Results: TB diagnosis and corresponding treatment were proposed in 43 of 175 patients (25.4%); 72.1% ($n = 31$) were men, with a mean age of 33.9 years \pm 8.8 (SD). The median CD4 cell count was 38 lymphocytes/L (interquartile range: 7; 308) and 16% (7/43) were on antiretroviral therapy. TB diagnosis was microbiologically confirmed with smear and/or culture results in 13/43 (30%) cases. Besides clinical and

radiological features, likelihood of TB diagnosis in unconfirmed cases (30/43, 69%) was supported by previous episodes of smear positive TB (SPTB) (11/30, 36%), intradomiciliary contact with a SPTB case (12/30, 40%), or in adherence to isoniazid prophylaxis (25/30, 83%). Within the first month of diagnosis, 21% of those who had follow up (33/43, 77%) died.

Conclusion: SNTB diagnosis is frequently considered among Peruvian HIV/AIDS patients with respiratory symptoms. Further evaluation is needed to clarify factors related with apparently poor outcome.

PS-2123-21 Relativity and special features of chest X-ray in cases with AIDS complicated by pulmonary tuberculosis

W-Y Yu. Department of Tuberculosis, Shenzhen East Lake Hospital, Shenzhen, Guangdong, China. Fax: (+86) 25509623.
e-mail: lpx98132@sina.com

Objective: To study the relativity and special features of chest X-ray in cases suffering from AIDS complicated by PTB.

Methods: Retrospective analysis on clinical and imaging materials of 13 cases (8 males, 5 females) with confirmed AIDS complicated with pulmonary tuberculosis, their age from 19 to 37 years (mean 26). 12 of the patients presented a history of sexploitation, among them 4 played homosexuality while the other 8 possessed multiple sexual partners; 6 out of 13 gave a history of intravenous injection of drugs. All 13 cases accepted CD4 T lymphocytes examination; 13 cases had both frontal and lateral chest X-ray film.

Results: (1) all 13 cases showed positive HIV antibody by laboratory examinations; 5 cases showed positive sputum culture for T.B.; 5 cases were proved to have PTB by bronchoscopic as well as histological examinations. (2) Chest X-ray film of all 13 patients revealed presence of patchy confluent exudative foci, 8 cases showed their foci homogeneous in density while another 5 cases inhomogeneous; (3) All cases had accepted regular anti-inflammatory therapies for 1 to 3 weeks, then treatment was changed to the regime of triple TB chemotherapy for 1 to 3 months; all cases revealed improvement of their conditions by absorption to different extent.

Conclusion: 1) There is relativity existing between AIDS and pulmonary tuberculosis, its possible mechanism is due to significant depletion of CD4 T lymphocytes of the AIDS patient. 2) Chest X-ray results did not show much typical changes with all the foci mostly located in the lower lung field; foci could be seen at any part; 3) Prompt examination of CD4+ T lymphocytes will be beneficial to diagnosis.

PS-1320-21 Characteristics of people living with HIV-1 screened for isoniazid preventive therapy, Botswana, 2005

B Mosimaneotsile,¹ S Nyirenda,¹ E A Talbot,² O Motsamai,³ P H Kilmarx,^{1,4} C D Wells,² T Samandari.^{1,2}

¹BOTUSA Project, Gaborone, Botswana; ²Division of TB Elimination, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA; ³National TB Program, Ministry of Health, Gaborone, Botswana; ⁴Global AIDS Program, CDC, Atlanta, Georgia, USA. Fax: (+267) 3181697. e-mail: tts0@cdc.gov

Background: IPT prevents tuberculosis (TB) among PLWH in highly TB-endemic countries. National programs can implement IPT more effectively with knowledge of the characteristics of PLWH seeking treatment.

Methods: PLWH referred from local clinics and voluntary counseling and testing centers were pre-screened for a 1800-person, 36-month clinical trial of continuous IPT per guidelines of Botswana's National IPT Program; primary exclusion criteria included acute illness or recent TB treatment. Secondary, trial-related screening resulted in exclusion for abnormal chest radiographs (CXR), elevated hepatic enzymes, significant neutropenia, or anemia.

Results: Between January–March 2005, 857 persons were pre-screened (66% female; median age 33 years). 315 (36%) were primarily excluded, 40% due to acute illnesses. 402 persons (74% of pre-screened) completed trial-related screening. 114 (28% of screened) were secondarily excluded of whom 38% had abnormal CXRs and 31% had neutropenia. 288 (33% of those pre-screened) were enrolled for IPT. Among enrollees, 77% had tuberculin skin tests with <5 mm induration, median CD4 lymphocyte count was 243 cells/mm³ and 9% were receiving highly active antiretroviral therapy.

Conclusions: These preliminary results suggest that IPT should be targeted to healthier PLWH for more effective trial enrolment. IPT programs may need more comprehensive screening than currently recommended.

PS-1015-21 People living with HIV/AIDS, a living tool for adherence

W Mwape, M Hirota. Community Based TB-HIV Organisation - CBTO, Lusaka, Zambia, Zambia. Fax: (+260) 255150. e-mail: cbto@microlink.zm

Issue: It is acknowledged that successful treatment with ARV and TB therapy requires the patient to maintain consistent adherence to the prescribed regimen on a long-term basis. before and during treatment TB-HIV infected clients and their buddy may confront some problems that may affect adherence. volunteers can fill the gap.

Description: Health workers and volunteers working with community preventive team in enrolling new TB patients in Zambia, Kamanga Compound at CBTO

by managing group activities such as giving information concerning disease process, TB and ARV and their undesirable side effects. taught techniques of pill taking, conduct regular home visit psychosocial support, assessed adherence drugs and relayed data to health team at the centre.

Lessons learned: Adherence was effectively enhanced with help of PLWHA and former TB patients who supervises drug taking and educates clients. They have enough time to create intimate relationship with clients.

Recommendation: With adequate support PLWHA can be a valuable living tool in enhancing adherence. They provide complimentary task for health care workers in TB and ARV delivery at community level.

PS-1418-21 Suivi des soins à domicile des patients sous antiretroviraux

C B Tembwa. ONG Les Bâtisseurs Projet LASAAC, Kinshasa, D R Congo. Fax: (+243) 98046312. e-mail: bamba_tembwa1@yahoo.fr

Description du problème : Comme la plupart de pays africains, la République Démocratique du Congo se trouve parmi les pays touchés par l'épidémie du Vih/Sida. La stigmatisation, l'exclusion des malades, le non annonce de résultats positifs aux malades, constituent les facteurs favorisant l'état de dégradation des patients. Il a fallu mettre en place des stratégies de CDV permettant de rendre complice l'équipe médicale, le patient et sa famille pour une bonne prise en charge médicale et sociale efficace des patients sous les antiretroviraux. L'ONG Les Bâtisseurs, de ce fait à initié un projet de suivi de soins à domicile des patients sous ARV, ces soins sont assurés par les infirmiers. L'implication des membres de famille est un atout majeur dans la pratique des soins à domicile.

Activités réalisées : Les interventions consistent à : 1) s'assurer que les patients prennent ses médicaments chaque jour ; 2) l'apprentissage d'une bonne hygiène rigoureuse ; 3) conseiller une alimentation adéquate ; 4) vivre positivement ; 5) garder un contact permanent avec son médecin soignant.

Résultats obtenus : Nombre de patients suivis à domicile 11 ; visites effectuées 50 ; implication de la famille 55% ; expérience de vie augmentée.

Projet futur : Vu ces résultats nous pensons que le suivi des personnes sous antiretroviraux constitue un élément très important dans le traitement des ARV afin d'éviter de résistance et de rechute. On pourrait préconiser la formation de personnel de santé dans l'exécution de soins à domicile des patients sous ARV pour permettre une réduction de la perte de vie des patients

PS-1616-21 ARV for injecting drug users in Iran: results of a 4-year programme review

A Alaei, K Alaei, B Safari, D Mansoori, M R Masjedi.
National Research Institute of TB and Lung Disease, Tehran,
Tehran, Iran. Fax: (+98) 21 2285777.
e-mail: alaei2001@yahoo.com

Issue: As the majority of PLWHA in Iran is from IDUs group and based on the program of 3 by 5 by WHO to expand under treatment cases, the strategy of HIV/IDUs treatment seems to be one of the first priorities. The experience of Iran demonstrates that comprehensive approach to HIV positive IDUs is highly effective.

Setting: Iran has 40 000 estimated HIV infected and 7800 PLWHA individuals among whom 65% estimated to be drug injectors.

Project: To prepare and provide HAART to HIV/IDUs. The center's work is based on a peer approach to support drug users and their families. After 4 years, more than 390 AIDS cases received HAART in Iran that half of them were IDUs. The criteria for entering HIV/IDUs to HAART are their adherence to one of the Harm Reduction services such as Methadone Maintenance, Needle Ex, condom distributions before starting treatment. This group showed good adherence to HAART comparing to other groups of PLWHA and the under treatment group.

Outcomes and lessons learned: The retention rate of patients receiving HAART in a clinic is 85%, and on the average their CD4 counts increased by 94.5% (mean from 240 to 454). Likewise, prophylaxis treatment was well-adhered too.

PS-1467-21 Second National HIV seroprevalence survey among TB patients: preliminary report in Cambodia

K E Khun,¹ K Okada,² T Miura,² K Yamaguchi,³
N Yoshihara,³ I Onozaki,³ M T Eang,¹ P Jayavanth.⁴
¹National Center for Tuberculosis and Leprosy Control,
Phnom Penh, ²Japan International Cooperation Agency,
National TB Control Project, Phnom Penh, Cambodia;
³Research Institute of Tuberculosis, Japan Anti-Tuberculosis
Association, Tokyo, Japan; ⁴STOP/TB World Health
Organization, Phnom Penh, Cambodia. Fax: (+855) 23218090.
e-mail: kkimeam@hotmail.com

Background: Cambodia has been struggling with the highest burden of TB and HIV epidemic in the South East Asia. The first survey 2003 showed an 11.8% positive result.

Methods: All newly diagnosed and registered TB patients including re-treatment cases in January 2005 except transfer-in were enrolled as representative samples after informed consent. This survey is unlinked anonymous study. The serums which reacted to both Serodia HIV1/2 and Determine HIV1/2 test were considered as positive. The samples reacting to either one were further examined by confirmatory HIV testing.

Results: Total 2664 TB patients were contacted and 27 were excluded in the analysis. Male-female ratio of the participants was 1:1. The largest age group was between 35–44 years old. Overall HIV prevalence was 10%. HIV prevalence among male and female was the same. HIV prevalence of smear positive TB, smear negative TB and extra-pulmonary TB was 5.5%, 15% and 22%, respectively.

Conclusions: The survey ascertained the high HIV seroprevalence among TB patients in the country. The positive result (10%) in the 2nd survey was little lower than the previous survey (11.8%). Effort to identify HIV positive TB patients should be prioritized through the existing VCT as an entry point for ART.

PS-1637-21 Outcomes of tuberculosis cases by HIV status, Rio de Janeiro City, 1998–2003

V Saraceni, S C Cavalcante, E C C Soares, B Durovni.
Rio de Janeiro City Health Department, Rio de Janeiro, RJ, Brazil.
Fax: (+55) 21 22747542. e-mail: vsaraceni@rio.rj.gov.br

Objective: To ascertain the differences of tuberculosis (TB) outcomes regarding HIV status, from 1998 to 2003, in Rio de Janeiro City (RJC).

Methods: Information about TB cases, HIV status and outcomes came from the National Surveillance System. Data were analyzed as annual TB cohorts, and when homogeneous, pooled analysis was applied.

Results: TB incidence in RJC decreased from 117.8 (1998) to 105.5/100 000 (2003), with a stable proportion of HIV+ subjects during this period. TB mortality decreased from 9.2 to 6.3/100 000. Significant pooled differences are shown in Table 1. The relative risks in the 2003 cohort using HIV+ as the exposure were cure – RR = 0.72 (CI95% 0.66–0.77), default – RR = 1.89 (1.49–2.40) and death – RR = 5.46 (3.77–7.90).

Conclusion: Data showed that TB diagnosis is more difficult to be done and the outcomes are worse among HIV+. New strategies to promote earlier diagnosis and to enhance adherence are needed to better care of this population.

Proportional distribution of diagnosis and outcomes of TB according to HIV status, Rio de Janeiro City, 1998–2003

| Variables | HIV+ (%) | HIV– (%) |
|------------------------------------|----------|----------|
| TB suspicious CXR | 76.5 | 90.2 |
| Positive sputum smear | 31.7 | 53.5 |
| Isolate pulmonary positive disease | 35.2 | 58.9 |
| First-line therapy | 81.4 | 85.9 |
| Cure | 54.9 | 76.2 |
| Default | 16.6 | 9.5 |
| Death | 12.6 | 2.3 |

PS-1659-21 Diagnosis, follow-up, and HIV seroprevalence of TB patients in Cameroon Baptist Convention Health Board (CBCHB): case study of Bansa Baptist Hospital

C Njoukwe,¹ T K Welty,¹ P D Tata,¹ E R Kongnyu,¹ G Forgewei,¹ P M Tih,¹ H Yeager,² M H Proctor,¹ E Nsutebu.³

¹Cameroon Baptist Convention Health Board, Bamenda, Northwest Province, Cameroon; ²Georgetown University, Washington, DC, USA; ³Bradford South and West Primary Care Trust, Leeds, UK. Fax: (+928) 5269059. e-mail: twenty@earthlink.net

CBCHB provides TB care in collaboration with the National TB Program. Sputum microscopy is the main diagnostic test, supplemented by gastric aspirates, chest X-rays and Mantoux tests. Patients are hospitalized for 14 days during which nurses administer medication, train patients to self-administer medicines, and train family members as treatment supporters. Although TB staff follow up defaulters, resources are insufficient to support direct observation of treatment after hospital discharge. From 1999–2004, BBH diagnosed 1465 patients with TB; 66% completed treatment, 22% died, and 12% were lost to follow up. Of 1241 patients diagnosed with pulmonary TB, 87% had positive AFB smears. Acceptance of HIV testing increased significantly from 67% in 1999–2002 to 84% in 2003–04 ($P < 0.01$). Overall HIV seroprevalence was 67%. The mortality rate among HIV positive patients was 28.7% vs. 12.8% among HIV negative patients (relative risk 2.54 – 95% CL 1.84–3.45). Few TB patients with AIDS can afford antiretroviral treatment (ART). Additional human and financial resources are needed to fully support direct observation of treatment and to provide ART to all TB patients who need it, so that the treatment completion rates increase and mortality rates decrease.

PS-1410-21 Realization of measures by early detection of tuberculosis among HIV-infected patients in the Kaliningrad oblast.

G S Balasanyants,¹ I Y Blinovskaya,² T N Nikitina,³ G G Sergeeva.³

¹Epidemiology Department, Saint-Petersburg Medical Academy of Postgraduate Study, Saint-Petersburg, ²Committee of Public Health of Kaliningrad, Kaliningrad Oblast, ³Kaliningrad Oblast AIDS Centre, Kaliningrad, Kaliningrad Oblast, Russian Federation. Fax: (+812) 1847339. e-mail: balasanianz@mail.ru

The index of tuberculosis (TB) among HIV patients has made 1516.1 cases per 100 000 of HIV patients in Kaliningrad oblast in 2001. During 1997–2002 detection of TB among HIV patients was carried out in general medical service. Fluorography was carried out in 7.1% and Mantoux test in 6.6% cases of HIV patients. Sputum examination has not been done. With financial support of Norway Ministry of Health oblast AIDS Center has bought digital fluorography machine in 2003. During 5 months of 2003, 289 HIV

patients were examined by fluorography, 35 (12.1%) lung diseases including TB (22–7.3%) were detected. Mantoux test using has shown that 20.0% patients have had negative and 17.8% patients positive Mantoux test, in 8.8% of cases test have not been interpreted, for 53.4% patients test have not been done in due time. Sputum examination on TB by direct microscopy was introduced in AIDS centre in 2003. Identification of MBT by this method has made 5.1% in 2003 and 7.1% in 2004. On the basis of the AIDS Center the conditions for complex primary examination on TB are created.

PS-1533-21 Tuberculosis in human immunodeficiency virus infected patients in Serbia and Montenegro between 2000 and 2004

D Vukovic,¹ D Salemovic,² I Dakic,¹ L J Tomic,³ B Savic.¹

¹Department of Bacteriology, Institute of Microbiology and Immunology, University of Belgrade, Belgrade, ²Institute for Infectious and Tropical Diseases, Clinical Centre of Serbia, Belgrade, ³Institute of Lung Diseases and Tuberculosis, Clinical Centre of Serbia, Belgrade, Serbia and Montenegro. Fax: (+381) 11 265 7258. e-mail: jelisaveta1@beotel.yu

The incidence rates of tuberculosis (TB) in Serbia and Montenegro ranged between 34.6 and 37.5 per 100 000 people over the last 5 years, while the incidence of human immunodeficiency virus (HIV) infection over the same period remained below 1 case per 100 000. However, surveillance of HIV-related TB in the region is required due to the close interaction of TB and HIV epidemics. All HIV-positive patients in the country are referred to the Institute for Infectious and Tropical Diseases in Belgrade. Retrospective analysis of their medical records revealed 125 HIV-positive patients diagnosed with TB over the last 5 years. TB was culture confirmed in 39 patients (31.2%). Two *Mycobacterium tuberculosis* isolates were obtained from cerebrospinal fluid, two from pleural fluid, while the remaining 35 originated from sputum. Out of the 35 patients with pulmonary TB, 14 (40%) were sputum smear positive. Thirty-four (87.2%) of the isolates were susceptible to isoniazid, rifampin, ethambutol, and streptomycin; two (5.1%) were mono-resistant; while three isolates (7.7%) displayed multi-drug resistance (MDR). Although no significant variation in number of HIV-related TB cases over the last 5 years was found, the present study showed that both TB incidence and rate of MDR-TB are significantly higher among HIV-infected individuals than in general population in the study region.

PS-2076-21 HIV and TB co-infection among hospitalized patients in a rural hospital in central Africa

K D Nzaumvila, E A Bafende. Department of Internal Medicine, IME Kimpese Hospital, Kimpese, D R Congo. Fax: (+243) 0828926337. e-mail: doug_nk@yahoo.fr

Introduction: The HIV and TB are closely linked. There is not study which assesses this link among TB hospitalized patients at IME/Kimpese hospital located in rural area of Lower Congo.

Objective: To assess the co infection HIV and TB among hospitalized HIV patients during the 5 last years in a rural hospital in central Africa.

Methodology: The present study aims to deal with the co infection HIV and TB among HIV+ patients admitted at IME/Kimpese hospital located in rural area of Lower Congo at 220 km south-west of Kinshasa for a period of 5 years, from January 2000 to December 2004. For this purpose the authors have used all recorded data available at the hospital for those 5 years.

Results: During the last 5 years from January 2000 to December 2004, 12 567 patients were admitted at internal medicine department with different conditions, out of 235 had associated conditions to HIV. Among those patients 44 (18.7%), had TB for different locations, but 34 had pulmonary TB (14.5%).

Conclusion: HIV and TB co infection is present among 18.7% of HIV patient hospitalized in rural central African area.

PS-2078-21 Prevalence of pulmonary infections other than TB among HIV+ patients in a rural hospital in central Africa

K D Nzaumvila, E A Bafende. Department of Internal Medicine, IME Kimpese Hospital, Kimpese, D R Congo. Fax: (+243) 818926337. e-mail: doug_nk@yahoo.fr

Introduction: Pulmonary infections are, some times, opportunistic to HIV infection. The best known in Africa is TB, but few studies have been done for other infections.

Objective: To assess the prevalence of pulmonary infections other than TB among hospitalized HIV patients during the last 5 years in a rural hospital in central Africa.

Methodology: We are trying to identify the place of other pulmonary infections than TB among HIV hospitalized patients at IME Kimpese Hospital located in rural area of Lower Congo at 220 Km south-West of Kinshasa for a period of 5 years, from January 2000 to December 2004. For this purpose the authors have used all recorded and available data at the hospital for those 5 years. The patients in concern must have been positive to HIV tests and have also pulmonary infection.

Results: During the last 5 years from January 2000 to December 2004, 235 patients were admitted at in-

ternal medicine department for different conditions associated to HIV at IME Kimpese Hospital. There were among those patients 34 who had pulmonary TB (14.5%), and 44 had other pulmonary infections (18.7%).

Conclusion: The other pulmonary infections are the first cause of admission of HIV patients at IME Kimpese, and TB is the third, after enteritis. All of pulmonary infections represents almost than 33.2% of hospitalized HIV patients.

PS-2218-21 Scale development of TB and HIV/AIDS stigma with TB patients in Southern Thailand

S S Sengupta,¹ P S Punggrassami,² A V Van Rie.³

¹Department of Social Medicine, UNC-CH, Chapel Hill, North Carolina, USA; ²Prince of Songkla University, Songkla, Thailand;

³Department of Epidemiology, UNC-CH, Chapel Hill, North Carolina, USA. Fax: (+1) 919-966-7499.

e-mail: sengups@med.unc.edu

Background: TB stigmatization is a social factor affecting TB treatment utilization and compliance. TB stigmatization is linked to AIDS, which has similar clinical manifestations, and is often confused with TB. We developed scales that measure TB and HIV/AIDS stigma among TB patients in southern Thailand. **Methods:** 200 TB patients with known/unknown HIV status were recruited from TB centres in southern Thailand. Structured interviews with TB and HIV/AIDS stigma items were conducted with each patient. Scale development involved factor analysis (FA) of stigma items, and subsequent calculation of Cronbach alpha of the scales formed.

Results: The FA reduced the original 56 TB stigma items to two factors; one with seven items and one with 11 items, with Cronbach alphas of .81 and .86, respectively. The FA reduced the original 47 HIV/AIDS stigma items to two factors; one with 20 items and one with five items, with Cronbach alphas of .94 and .87, respectively.

Conclusion: Developing scales to measure TB and HIV/AIDS stigma will be useful to public health intervention in managing TB given that stigmatization of TB, as well as of HIV/AIDS, negatively impacts not only patients' quality of life, but their TB treatment compliance.

PS-1619-21 HIV/AIDS status among women in Iran

K Alaei, A Alaei, D Mansoori, Z Etaati, A Nasiri, M R Masjedi. National Research Institute of TB and Lung Disease, Tehran, Iran. Fax: (+98) 21 2285777. e-mail: alaei2001@yahoo.com

Issue: From the beginning, when HIV/AIDS appeared to be confined to groups perceived as socially deviant, the AIDS epidemic has been shrouded by ignorance. This has led to stigmatization against PLWHA.

Setting: The pattern of HIV infection in West of Iran is Injection (>%85), and in South of Iran is transsexual (>%50). The majority of the women (>%90) are unpredicted infected by their husbands. In some areas one of the routine jobs of men is going to some southern borders' neighbors to work and lack of condom use is common among them, and so if they become HIV infected, they transmit HIV to their wives.

Project: Iran has an innovative model has been conceptualized that addresses critical issues of drug use intervention, STI, TB and HIV care. All the services are free and charge including Harm Reduction services. In this center one of the main cores are women in different levels. They could find the governmental support to prepare home for 16 HIV infected divorced females. Fortunately, the government approved expanding the program of national strategy plan for the control of HIV/AIDS 2003–2008.

Lesson learnt: Women are more stigmatized with HIV. Stigma leads women to avoid being tested for HIV.

PS-1638-21 The role of Iranian families in implementation of TB and HIV programs

A Alaei, K Alaei, M Rastegar, M Bahadori, M R Masjedi.
National Research Institute of TB and Lung Disease, Tehran, Iran.
Fax: (+98) 21 2285777. e-mail: alaei2001@yahoo.com

Issue: Iranian families are increasing stigma of drug use and HIV/AIDS and their discrimination. Due to lack of appropriate advocacy about TB, HIV/AIDS, this group caused HIV-TB/IDUs become more isolated from their families and society.

Setting: The rate of drug use in Iran is 4% of GP and 1% of them are IDUs. The rate of HIV is 15% in IDUs. Until 1998 the HIV was ignored by the society and psychosocial supports for drug users were rare.

Project: The families have established NGOs, which contain ex-drug users, and PLWHA to design outreach and supportive programs. The families have active role in our family counseling unit and they have peer education approaches for other rigid families to motivate them to accept HIV, TB cases and follow their care. They support partners and children of HIV/IDU prisoners and help after release care centers. They support divided or widow HIV infected females who don't have any support. They have role in reduction of express emotional problems for PLWHA, they have an essential role to accept different harm reduction services.

Lesson learnt: The study shows the key role of the family in acceptance and promotion of HIV, TB programs in the society.

PS-1624-21 Multilateral and multisectorial approach to HIV/AIDS and TB among IUDs: a four-year review

A Alaei, K Alaei, M R Masjedi. National Research Institute of TB and Lung Disease, Tehran, Iran. Fax: (+98) 21 228 5777. e-mail: alaei2001@yahoo.com

Issue: Providing HIV and TB program with Harm Reduction services and psychosocial supports often meets significant skepticisms by professionals and the community.

Setting: Suicide was the major cause of death in PLWHAs. Stigma was one of the main barriers for HIV infected females to submit to the clinics.

Project: The establishment of the multilateral and multisectorial community based project has been followed consultations with medical, social, religious leaderships and other stakeholders. The Harm Reduction and HIV, TB prevention and care and ART programs are supported by Medical University, outreach programs such as mobile center is provided by welfare Organization, Drop In Center and Harm Reduction services is supported by NGOs, with cooperation of Welfare Organization, IEC programs are implemented by Medical university, Red Crescent and Education and training organization, family support of affected and infected women are done by Charities such as Komite Emdad. The similar programs are implemented by prison organization with collaboration of NGOs. These activities are based on a peer approach in different levels to motivate policy makers to support PLWHAs.

Outcomes and lessons learned: The project experience demonstrates that comprehensive support to TB-HIV prevention and care program for PLWHAs is feasible and highly effective.

EPIDEMIOLOGY: TB IN HIGH-BURDEN COUNTRIES-II

PS-1683-21 Effectiveness of DOTS implementation based on the number of potential lives saved in the Republic of Kazakhstan, 1998–2004

E M Belilovsky,¹ I Aitmagambetova,² G B Rakishev,³ M O Favorov.¹ ¹US Centers for Disease Control and Prevention, Central Asia Regional office, Almaty, ²US Agency for International Development, Central Asia Republics, Almaty, ³National Center of Problem of Tuberculosis, Almaty, Kazakhstan. Fax: (+7) 3272 501777. e-mail: belilo5@email.ru

In 1998, the Republic of Kazakhstan (RK) had one of the highest rates of TB mortality in the WHO European Region (38.8/100 000). As a result of six years of DOTS implementation, the mortality rate has decreased by 41.6% in 2004 (20.6/100 000). The number of potential lives saved (NPLS) was proposed as

an indicator to measure the effectiveness of DOTS implementation. TB mortality data for 1998–2004 were collected from national statistics records. TB mortality was compared with the same index (1998–2002) from neighboring territories with TB systems based on the Soviet model and with no or limited DOTS coverage: four Russian oblasts (Novosibirsk, Omsk, Kurgan, Orenburg) and Uzbekistan. Data were analyzed using linear regression. Predicted TB mortality without DOTS implementation for RK was calculated based on TB mortality trends for the five neighboring territories. The slope reflects an annual increase in TB mortality rate by 1.86/100 000. The NPLS was calculated by comparing the predicted and actual mortality rates in Kazakhstan. According to the NPLS calculation, the DOTS program saved approximately 18 200 lives in Kazakhstan from 1998–2004.

PS-1697-21 Prevalence of sputum smear positive tuberculosis in a rural area in Bangladesh

K Zaman,¹ M D Yunus,¹ S E Arifeen,¹ A H Baqui,² D A Sack,¹ S Hossain,¹ Z Rahim,¹ M Ali,³ S Banu,¹ M A Islam,⁴ V Begum,⁵ R E Black.² ¹ICDDR,B: Centre for Health and Population Research, Dhaka, Bangladesh; ²Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA; ³International Vaccine Institute, Seoul, Republic of Korea; ⁴Bangladesh Rural Advancement Committee, Dhaka, Bangladesh; ⁵National Tuberculosis Control Programme, Dhaka, Bangladesh. Fax: (+880) 2 8826050. e-mail: kzaman@icddr.org

Objectives: To determine the prevalence of smear positive tuberculosis (TB) in a rural area in Bangladesh at Matlab.

Methods: A TB surveillance system was established among 106 000 people in rural Bangladesh at Matlab. Trained field workers interviewed all persons >15 years to detect suspected cases of tuberculosis (cough >21 days) and sputum specimens of suspected cases were examined for acid-fast bacilli (AFB).

Results: Of 59 395 persons interviewed, 4235 (7.1%) had cough >21 days. Sputum specimens were examined for AFB from 3834 persons, 52 (1.4%) of them were positive for AFB. The prevalence of chronic cough and sputum positivity were significantly higher among males compared to females ($P < 0.001$). The population-based prevalence rate of smear positive TB cases was 95/100 000 among persons aged >15 years. Cases of tuberculosis clustered geographically (relative risk = 5.53, 95%CI 3.19–9.59).

Conclusions: The high burden of tuberculosis among rural population warrants appropriate measures to control tuberculosis in Bangladesh. The higher prevalence of persistent cough and AFB-positive sputum among males need further exploration. Factors responsible for higher prevalence of tuberculosis in clusters should be investigated.

PS-1701-21 Genetic biodiversity of *Mycobacterium tuberculosis* isolates from patients with pulmonary tuberculosis in India

U B Singh,¹ J Arora,¹ V N Suresh,¹ T Rana,¹ H Pant,¹ C Sola,² N Rastogi,² J C Samantaray,¹ J N Pande.¹ ¹Department of Microbiology, AIIMS, New Delhi, Delhi, India; ²Institut Pasteur de Guadeloupe, Pointe-à-Pitre, Guadeloupe, Guadeloupe. Fax: (+91) 11 26588663. e-mail: urvashi00@hotmail.com

Spoligotyping was performed on 557 *Mycobacterium tuberculosis* isolates in order to evaluate the biodiversity of tubercle bacilli in India. The isolates typed were obtained from five different cities Delhi, Pune, Lucknow, Chennai and Trivandrum under multicentric project. The spoligotyping results were compared to International spoligotyping database, SpolDB3 which contains data from >14 000 *M. tuberculosis* isolates world wide. 557 isolates revealed 196 distinct spoligotypes. 148 isolates were unique and 409 were grouped in 48 clusters. The most predominant clades among TB isolates were CAS and EAI with ST26 and ST11 alone responsible for 36% of TB cases. 21 (3.7%) isolates belonged to Beijing genotype. The present study results demonstrated that a few ubiquitous spoligotypes are well conserved and were well spread throughout the country (ST1, ST11 and ST26), whereas some shared types are specific for certain geographic regions. Marked variations were observed in strains circulating in North and South. Shared types belonging to CAS family predominated in North whereas EAI was more common in South. The study has helped us to know the distribution of various spoligotypes in India, their predominance and their impact on disease transmission.

PS-1733-21 TB screening of women in the peripartum period in Cameroon, West Africa

S Washington,¹ T K Welty,² G Forgwei,² M H Proctor.²

¹Harvard Medical School, Boston, Massachusetts, USA;

²Cameroon Baptist Convention Health Board, Bamenda, Northwest Province, Cameroon. Fax: (+1) 928-526-9059.

e-mail: twelty@earthlink.net

Setting: Two rural mission hospitals in the Northwest Province of Cameroon.

Objective: To determine the prevalence of tuberculosis infection in HIV positive and negative women in the peripartum period.

Design: As part of a program for prevention of mother to child HIV transmission, women whose HIV status was known were tested with purified protein derivative (PPD) skin tests when they were admitted in labor. Induration was measured prior to discharge from the hospital in 48–72 hours. HIV positive mothers who had a positive PPD (induration = >5 mm) were offered treatment for latent TB infection (LTBI) after active TB was ruled out.

Results: Overall 12.1% (56/470) of women screened were PPD positive; 13.5% (14/104) HIV positive

women were PPD positive (induration ≥ 5 mm); whereas 11.5% (42/366) of HIV negative women were PPD positive (induration ≥ 10 mm) ($P = 0.58$). BCG vaccination was not associated with tuberculin reactivity.

Conclusion: Rates of tuberculosis infection were lower than anticipated and did not differ in HIV positive and negative mothers. Further evaluation is needed to determine whether screening and treatment for LTBI in HIV positive obstetric patients is cost effective in resource poor settings.

PS-1741-21 Lack of gender differences among tuberculosis patients in a poor county in Rio de Janeiro state, Brazil

M T Belo,^{1,2,3} L Selig,^{1,4,5} R R Luiz,⁶ E Teixeira,^{1,2,3} C Hanson,^{7,8} R F Freire,¹ D Lins,¹ S Caldas,¹ R Serpa,¹ A Trajman.^{1,2} ¹Department of Internal Medicine, Gama Filho University, Rio de Janeiro, ²Rio de Janeiro County Health Department, Rio de Janeiro, ³Souza Marques School of Medicine, Rio de Janeiro, ⁴Serra dos Orgãos Foundation, Rio de Janeiro, ⁵Rio de Janeiro State Health Department, Rio de Janeiro, ⁶Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil, ⁷World Bank, Washington, DC, ⁸PATH, Seattle, Washington, USA. Fax: (+55) 2125321661. e-mail: mtbelo@uol.com.br

Introduction: Sex inequalities can lead to poor access to health care and delay in diagnosis of tuberculosis (TB). One study in Vietnam reported that the delay before sipping hospital was longer among women and men provided more sample sputum for examination. The cause of this gender difference is unclear.

Methods: A questionnaire-based survey was carried out during 2004 in a primary care unit, which notifies 85% of all TB cases in the county.

| Symptoms | Men (n = 206) | Women (n = 90) | P |
|-------------|------------------|-------------------|-----|
| Feeling ill | 90 days | 90 days | .52 |
| Cough | 90 days | 65 days | .43 |
| Fever | 30 days | 30 days | .89 |
| Weight loss | 90 days | 85 days | .52 |

Results: The study group consisted of 296 patients, out of whom 206 (69.6%) were male, with a median age of 39 years (15–98), 98 (48%) lived alone. Women's median age was 36 years (14–70, $P = 0.04$), 44 (49%, $P = 0.84$) lived alone. There were no differences regarding clinical presentation, number of medical appointments before TB diagnosis ($P = 0.38$) and history of previous treatment default ($P = 0.99$). Table 1 shows the median days of symptoms before the diagnosis among men and women.

Conclusion: Although gender differences have been described in other settings, this was not confirmed in our study. A striking finding was the long duration of symptoms, regardless of gender.

Sponsored by: World Bank, Reaching the Poor Program

PS-1822-21 Spatial diffusion of tuberculosis in Manaus, Amazonas, 1997–2003

J U Braga,^{1,2} M J F Gonçalves.³ ¹Centro de Referencia Professor Helio Fraga. Secretaria de Vigilancia em Saude. Ministerio da Saude, Rio de Janeiro, ²Universidade do Estado do Rio de Janeiro, Rio de Janeiro, RJ; ³Universidade Federal do Amazonas, Manaus, Amazonas, Brazil. Fax: (+55) 2125561971. e-mail: ueleres@openlink.com.br

Tuberculosis is one of the most important endemic diseases of Brazil. The North region presents the highest incidence of the country, and Amazon state has a disease burden above the regional and national averages. Despite of the incidence reduction in a country wide, in Manaus city, the capital of Amazonas, were notified 70% of cases of state and no evidence of incidence reduction was detected in recent years. It is proposed that its spatial patterns, in this scenario, can reveal an unknown tuberculosis dynamics in the city. This study aims to identify the spatial patterns of tuberculosis incidence, its high and low risk clusters, and the spatial dispersion trend. This is an ecological study of 56 quarters of the city. Choropleth maps of tuberculosis incidence rate are drawn based on moving averages rates; spatial trend and clusters maps of moving average rates and risks areas. Local indicators of spatial autocorrelation are used to draw LISA maps, using adjacency as neighborhood criteria. In conclusion, despite of tuberculosis incidence stability in Manaus, occurred a dispersion trend addressing to the lower rates quarters, as compared to the begin of the study. These quarters have a very inequality socio-economic situation and intense population growth.

PS-1852-21 The annual risk of tuberculosis infection in Orel Oblast, Russian Federation

T M Krapivina,¹ A M Finlay,² L Nelson,² V A Aksenova,³ A Gordina,³ N Mar'ina,³ P Cegielski,² C Wells,² K Laserson,² K Kourbatova,⁴ B Y Kazzeniy.¹ ¹Orel Oblast Tuberculosis Dispensary, Orel City, Orel, Russian Federation; ²National Center for HIV, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ³Russian Institute of Phtisiopulmonology, Moscow, ⁴Samara University, Samara, Samara, Russian Federation. Fax: (+1) 404-639-1566. e-mail: avf0@cdc.gov

Background: Tuberculosis (TB) notification rates in Orel doubled during the 1990s with a reported incidence of new cases increasing from 39/100 000 in 1991 to 81/100 000 in 2000. *Mycobacterium tuberculosis* (MTB) infection in children is a sentinel indicator of transmission and annual risk of TB infection (ARTI) surveys among children can estimate disease incidence independently of the national reporting system. In Orel, children are screened annually for TB with the tuberculin skin test (TST).

Objective: To evaluate existing TST data as an indicator of MTB infection among schoolchildren in Orel to estimate ARTI and smear-positive pulmonary TB (SPTB) incidence and its trend over time.

Methods: We have selected children by multistage sampling. TST results, history of BCG vaccination and TB disease will be collected for first- and second-grade children representing 3 different time periods.

Results: The prevalence of tuberculosis infection will be measured and ARTI calculated using cut-off values for a positive TST at 5mm and 10 mm. ARTI will also be estimated using the internationally accepted mirror image technique and SBTB incidence calculated using the assumption that 1% ARTI corresponds to an annual incidence of 50 SPTB cases per 100 000.

Conclusions: This important independent measure of TB morbidity will be compared to official notification rates and used to assess the impact of improved TB control strategies over the past decade. Demographic risk factors for infection and the impact of BCG on TST reaction will also be evaluated.

PS-1856-21 The annual risk of tuberculosis infection in Ivanovo Oblast, Russian Federation

A M Finlay,¹ I Kuznyetsova,² L Nelson,¹ A Gordina,³ N Mar'ina,³ V A Aksenova,³ P Cegielski,¹ F Cobelens,⁴ C Wells,¹ J Jereb,¹ K Laserson,¹ I Medvedeva.²

¹National Center for HIV, STD, and TB Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia, USA;

²Ivanovo Oblast Anti-Tuberculosis Dispensary, Ivanovo,

³Russian Institute of Phtisiopulmonology, Moscow, Russian

Federation; ⁴Royal Netherlands Tuberculosis Association (KNCV Tuberculosis Foundation), The Hague, The Netherlands. Fax: (+1) 404-639-1566. e-mail: avf0@cdc.gov

Background: Tuberculosis (TB) notification rates in Ivanovo increased 3-fold during the 1990s. In 2000, the notification rate of acid-fast bacilli smear-positive pulmonary TB (SPTB) patients was 41/100 000. *Mycobacterium tuberculosis* (MTB) infection in children is a sentinel indicator of transmission and annual risk of TB infection (ARTI) surveys can estimate disease incidence independently of national reporting systems. In Ivanovo, children are screened annually for TB with the tuberculin skin test (TST).

Objective: To use existing TST data as an indicator of MTB infection among schoolchildren in Ivanovo to estimate ARTI and SPTB incidence.

Methods: We selected children by multi-stage sampling. TST results, history of BCG vaccination and TB disease were collected for first- and second-grade children in 3 different years. ARTI was estimated using the mirror image technique and SBTB incidence calculated assuming that 1% ARTI corresponds to an annual incidence of 50 SPTB cases/100 000.

Results: Preliminarily, records of 2508 children have been collected from 36 schools. Median age at time of first grade TST was 7 years (range 5–14) and 5 (0.2%) had documentation of previous TB disease. The calculated ARTI was 1.6% in 1997, 2.1% in 2000, and 1.9% in 2004, corresponding to 78/100 000, 105/100 000 and 93/100 000 rates of SPTB cases in 1997, 2000, and 2004.

Conclusions: These results suggest that SPTB incidence in Ivanovo may be 2.5 times higher than currently reported. Analyzing existing TST records is useful for measuring ARTI. Enhanced case finding and improved surveillance are needed.

PS-1877-21 The effect of change in the route of administration of BCG on TB incidence in Cape Town

H Mahomed,¹ T Hawkrigide,¹ L Geiter,² S Ververs,³ L Workman,¹ F Little,¹ M Kibel,¹ G Hussey.¹ ¹South African TB Vaccine Initiative, Cape Town, Western Cape, South Africa; ²Aeras Global TB Vaccine Foundation, Bethesda, Maryland, USA; ³KNCV Tuberculosis Foundation, The Hague, The Netherlands. Fax: (+27) 21 4066081. e-mail: hassan@rmh.uct.ac.za

Background: There have been few studies comparing method of administration of BCG. South Africa changed from percutaneous BCG (Tokyo strain) to intradermal BCG (Danish strain) and this was implemented in Cape Town between June and December 2000.

Objective: To compare the incidence and severity of tuberculosis in children up to 2 years of age born one and a half years before and after the changeover from percutaneous (PC) to intradermal (ID) BCG.

Methods: Patient records of all the TB patients under 2 years of age, born between January 1999 and June 2002 in Cape Town, were collected. An independent reviewer assessed all patients for likelihood of TB, severity of disease and dissemination.

Results: The number of possible, probable and definite TB patients among the PC cohort was 1289 and the ID cohort, 1304 (annual incidence of respectively 809 and 795/100 000). The number of disseminated TB cases were respectively 148 (11.5%) and 92 (7.1%). This was a significant decrease (OR 1.71, 95%CI 1.29–2.26).

Conclusion: BCG ID did not prevent more infant TB cases as compared to PC, but appeared to reduce the proportion with disseminated disease.

PS-1884-21 Space distribution and data analysis of tuberculosis database of Brazil, 2000–2004

R A Coelho, A B F Gomes, J R Santos, J B Silva Jr. Ministry of Health, Brasília, DF, Brazil. Fax: (+55) 61 2256416. e-mail: ronaldo.coelho@saude.gov.br

This work had as objective determine the quality of the database of national TB surveillance system and made a comparative study in the five major cities in cases of TB. We made quality and missing data analysis and space distribution of the database in all the Brazilian cities and especially in the 315 national priority cities, where they concentrate 70% of the cases. We also made a comparative study in the five major cities in cases of TB with socioeconomic indicators

and a distribution of these data in graphs and maps. The study showed that there is an inverse relationship between the quality of the TB database and the distribution of the disease in the country. In the 5 cities we verified a great relationship of the disease with the socioeconomic factors. Besides, a larger treatment success was observed in those areas in patients under DOTS strategy in relation to 'non-DOTS'. The study also make possible to observe a trend of correlation among the quality of the surveillance, socioeconomic conditions and maintenance of the disease. Then, additional efforts in one of these conditions can help the control of TB.

PS-1887-21 Gender differentials in tuberculosis in Akwa Ibom State, Nigeria

M N Aghaji,¹ I R Uko.² ¹Department of Community Medicine, University of Nigeria, Enugu, ²Infectious Disease Hospital, Ikot Ekpene, Nigeria. Fax: (+234) 42252923. e-mail: aghajimn@yahoo.co.uk

Objectives: To examine gender differentials in cases accessing the treatment centres of the tuberculosis control programme in Akwa Ibom State of Nigeria.

Methods: Cohort analysis of routinely collected data on 2046 smear-positives diagnosed in 2000–2001. Treatment outcome data was based on 1068 cases treated in six centres.

Results: There were 1236 (60.4%) males and 810 (39.6%) females diagnosed smear positive. The ratio of males to females (M:F) was 1:5 & 1:1.2 for those aged 0–14 and 15–24 years but 1:0.3–0.6 for other age-groups. Females were younger (28.6 ± 10.5 years) than males (33.8 ± 11.2 years). No HIV infection was recorded for ages 0–14 years and for men ≥ 55 years. Significant co-infection was observed in women generally (F = 28.9%, M = 23.5%), especially for ages 15–24, 35–44, ≥ 55 years and for women treated at the big centres. Of the 632 (59.5%) males and 431 (40.5%) females treated, HIV infection contributed to all failures in women (6) and all deaths in men (19). The success, cure and failure rates were better for women (87.2%, 81.0% 1.4%) than men (80.4%, 72.8%, 5.5%). Unlike other outcome parameters, case fatality was higher for older women.

Conclusion: There are gender disparities in disease prevalence, treatment outcome and HIV co-infection interactions in this population which need further exploration and intervention

PS-2055-21 Estimating the burden of bacteriologically-positive pulmonary tuberculosis in former Soviet Union countries

D Falzon,¹ A Infuso,¹ U Buchholz,² C Dye,² B Williams.² ¹EuroTB, Department of Infectious Diseases, Institut de Veille Sanitaire, Saint-Maurice, France; ²World Health Organization, TME, Geneva, Switzerland. Fax: (+33) 141796802. e-mail: d.falzon@invs.sante.fr

Objectives: To estimate the frequency of bacteriologically positive pulmonary tuberculosis (PTB) cases notified in the Former Soviet countries (FSU; Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Turkmenistan, Uzbekistan) in 2003.

Methods: Using individual data on cases reported to EuroTB between 1998–2003 (10 observations), we investigated the correlation between culture and smear-positive PTB rates in the Baltic states of Estonia, Latvia and Lithuania (BS). Taking the proportions of culture and smear-positive PTB cases in BS as reference, we applied the same proportions to FSU aggregate data from 2003 and compared with reported data.

Findings: Of 11 085 PTB cases with complete culture and smear information reported by BS, 75% were culture-positive and 49% smear-positive (excluding smear-positive/culture-negative). FSU reported 224 344 PTB cases, 7352 cases (3%) were culture-positive and 88 546 (39%) smear-positive (only Kazakhstan and Russia submitted information on culture). Applying proportions observed in BS to FSU, the expected number of culture-positive cases was approximately 168 000 and that of smear-positive cases 111 000.

Conclusions: Reported culture and smear-positive PTB cases in FSU under-represent the burden of infectious tuberculosis. More intensive use of culture and smear and reporting of results could contribute to monitor tuberculosis control efforts in the FSU.

PS-2072-21 Tuberculosis epidemiology in the new millennium: a five-year survey

M Lecuona, M J Ramos, B Castro, M A Miguel, M Cuervo, S Campos, I Montesinos, A Sierra. Department of Microbiology, Hospital Universitario de Canarias, La Laguna, Tenerife, Spain. Fax: (+34) 922 679 067. e-mail: mlecuona@huc.es

Objective: To describe the epidemiological characteristics of patients diagnosed of tuberculosis (TB), to know role of foreign-born patients and the drug resistance trends to the mayor TB drugs.

Methods: All new cases of TB diagnosed in a tertiary hospital, between 1st January 2000 and 31st December 2004, were included. The following variables were taken from each patient: gender, age, place of birth, sample smear, TB localization, HIV serology and drug susceptibility pattern. For statistical analysis, we used the EpiInfo 6.0 program.

Results: We registered a total of 242 new TB patients. 76% were male. Mean age 39.9 ± 15.6 (1–82)

years. 13.2% were HIV (+). 68.2% of sample were smear positive. 83.9% were pulmonary, 9.9% extra-pulmonary and 6.2% mixed localization. Foreign born patients represented 11.6%, mainly from South America, Africa and East Europe. 21% of isolates were resistant to one or more drugs: 16.5% streptomycin, 9.9% isoniazid and 4.5% rifampin. Our resistance rate in 1990–1999 period was 14.5%. We have not found significant differences between Spanish and foreign born population neither in gender, mean age, site of TB and HIV status nor in resistance strains ($P = 0.7$). **Conclusions:** 1) There are not significant differences in the epidemiological characteristics between TB foreign and TB Spanish patients. 2) We have found an increase in the global resistance rate compared to the past ten years period, but this was not statistical significant ($P = 0.06$).

PS-2109-21 Incidence of tuberculous meningitis, 1998 to 2004, São Paulo State, Brazil

E T Skazufka, M C V Santos. Epidemiology Surveillance Centre, Health Secretary, São Paulo State, Brazil. Fax: (+55) 1137261719. e-mail: evateresa@uol.com.br

Introduction: Brazil has 90 000 new cases of tuberculosis per year; São Paulo State has the largest absolute number of cases, 19 000 to 20 000 per year, and a incidence rate around 54/100 000. The BCG intradermic vaccination, mandatory in the first year of life, has a coverage of 100% of the population and an efficacy close to 80%, avoiding the tuberculosis meningeal forms. The incidence rate of the tuberculous meningitis is an important epidemiologic indicator, since it is a sentinel for the bacilliferous tuberculosis in the adult population.

Objective: To analyze the incidence rate of meningitis tuberculosis, during the period from 1998 to 2004, in São Paulo State, Brazil.

Method: Analysis of 100% of the meningitis tuberculosis notifications received by the Epidemiology Surveillance Centre, São Paulo State, about the annual incidence rate and the age group.

Results: Until 2001, the highest incidence rate was in the age group 0–1, followed by 20–49. After 2002, the highest incidence rate was in the age group 20–49, followed by 0–1.

Conclusion: These changes have been linked to tuberculosis/HIV co-infection in the age group 20–49.

PS-2131-21 Molecular characteristics of LAM/A1 lineage of *Mycobacterium tuberculosis*

I Shemyakin, V Stepanshina, M Lipin, I Ivanov, A Nizova. Department of Molecular Biology of State Research Center of Applied Microbiology, Obolensk, Moscow, Russian Federation. Fax: (+7) 0967 360010. e-mail: shemyakin@obolensk.org

Introduction: We revealed the other than Beijing/W *M. tuberculosis* lineage, designated as LAM/A1.

Strains of LAM/A1 family are associated with drug resistance and prevalence in some regions of Russia.

Objective: To investigate of molecular characteristics of LAM/A1 lineage of *M. tuberculosis*.

Methods: *M. tuberculosis* strains from 260 patients with pulmonary tuberculosis from Tula Region of Russia in 2001–2002 were analyzed by genotyping (spoligo-, VNTR- and RFLP-IS6110 typing), PCR-sequencing (genes *katG*, *rpoB*, *gyrA*), and PCR (TbD1 region). Susceptibility to isoniazid (1 µg/ml) and rifampin (20 µg/ml) was tested by absolute concentration method on LJ medium.

Results: Spoligo-, VNTR-, and RFLP-IS6110 typing revealed large group of 171 (66%) strains having highly correlated genotypes, designated as LAM/A1 lineage. All strains of this lineage belong to the 2nd major genotypic group (polymorphisms 463CGG in *katG* gene and 95ACC in *gyrA* gene) of modern *M. tuberculosis* strains (TbD1 region is absent), have identical VNTR-profile 222222 (ETR-A, B, C, D, E, F), spoligotypes LAM (absence of spacers 21–24 and 33–36), and most of the following 11 restriction fragments: 6010, 4840, 4640, 4510, 4120, 3280, 2750, 2620, 2000, 1280, 920 bp. Multidrug-resistant were 53% strains from newly diagnosed patients and 95% of chronics. Mutation 516GTC in *rpoB* gene was detected in 74% of rifampin-resistant strains of this lineage.

Conclusion: Moderate genetic diversity among LAM/A1 strains indicates on their recent dissemination, whereas the association with multiple drug resistance indicates on low efficiency of anti-TB treatment of patients infected with LAM/A1 strains.

PS-2194-21 Preventing nosocomial TB among laboratory staff, Russian Federation

S A Popov,¹ V A Puzanov,² T P Sabgaida,¹ V I Golyshevskaya,² V V Erokhin.² ¹Department of Microbiology, Research Institute for Phthisiopulmonology, Moscow, ²Department of Microbiology, Central TB Research Institute, Moscow, Russian Federation. Fax: (+7) 095 6810233. e-mail: popov_s55@mail.ru

The main TB epidemic indicators in Russian Federation twice increased during the last decade. They reached 90/100 000 and 230/100 000 for incidence and prevalence accordantly (1998–2004). Establishing new lab technology standards according international quality requirements two National TB Research Institutions have analysed a state of regional bacteriological TB network in context of risks of TB spread among laboratory personnel. As a result it was elucidated the main reason of TB infections for lab staff. The data from 40 bacteriological laboratories (BL) were collected and factors were positioned according their importance.

Results: *The main factors of TB risk:* The workload: performing >40 000 cultures per year results in TB

risk for 75% of labs; Arrangement of BL: crowded and adjusted areas without following on epidemiological chain for workplace organization get the TB risk for 72% of labs; Engineering tools: Absence of local biosafety equipment (BSC) create the TB risk for 57% of labs;

Safety factors for preventing TB: Organization of lab and processing of infectious materials according to epidemiological safety requirements reduces the TB risk for 43%; Training for staff according good laboratory practice reduces risk for 43%; Using BS cabinets reduces risk for 32%;

Indifferent indicators for lab readiness: presence of license for work with MTB; presence of General Ventilation System; presence of local exhaust equipment; presence of respiratory masks.

Conclusion: In addition to conventional opinion regarding an importance of biosafety cabins the data revealed another measures for preventing TB.

PS-2211-21 USAID Project 'DOTS implementation in São Paulo State': preliminary evaluation

V M N Galesi, L A R Santos. DIV TBC- SES/SP, São Paulo, Brazil. Fax: (+55) 11 30822772. e-mail: veragalesi@uol.com.br

Introduction: A project to implement DOTS strategy is being carried out in two cities at São Paulo metropolitan area: Guarulhos, with 1 251 178 inhabitants and Carapicuíba, with 382 772 inhabitants, in 2005. They discover an average of 500 and 170 TB new cases each year. In 1st trimester 2004, 409 and 367 respiratory symptomatics, were examined with 14.1% and 40.4% of the proposed target (to examine 1% of the population) and had a DOT coverage of 29% and 6.3% in January 2004. In March 2004, about 2000 and 700 health professionals were trained.

Objective: To evaluate active case finding and DOT coverage upon DOTS implementation.

Methods: Data were obtained from routine surveillance systems, EPI-TB and LAB-TB and local data.

Results: In the 1st trimester, 2005 1327 and 447 respiratory symptomatics were examined, attaining the proposed target of 42.4% and 47%. Among new cases, DOT coverage went up from 29% to 72.7% in Guarulhos, and from 6.3 to 100% in Carapicuíba.

Conclusions: Although these data are preliminary, we can infer that the investment in DOTS strategy was beneficial to tuberculosis control in both cities.

PS-2228-21 Twelve years of hospital-based TB surveillance at State University of Campinas Hospital, Brazil: temporal trends and outcome of treatment

M R Resende,^{1,2} V M Sinkoc,² O M Brognoni,² G J Carvalho,² E O Campos,² M T Garcia,² R N Angerami.²

¹Faculdade de Ciências da Universidade Estadual de Campinas, Campinas, SP, ²Núcleo de Vigilância Epidemiológica do Hospital de Clínicas da Unicamp, Campinas, SP, Brazil.

Fax: (+55) 19 3788 7451. e-mail: mresende@hc.unicamp.br

Objectives: To evaluate the occurrence of TB during two periods I (1990–1995); II (1996–2001) and TB treatment outcome.

Design: A retrospective study.

| | Total | Pulmonary TB | +AFB (%) | +HIV (%) |
|------|-------|--------------|----------|----------|
| 1990 | 214 | 154 | 45.4 | 18.7 |
| 1991 | 244 | 170 | 40.6 | 22.9 |
| 1992 | 231 | 155 | 32.9 | 26.4 |
| 1993 | 291 | 205 | 34.6 | 27.5 |
| 1994 | 347 | 241 | 25.7 | 33.1 |
| 1995 | 410 | 267 | 29.2 | 35.6 |
| 1996 | 350 | 241 | 40.7 | 37.7 |
| 1997 | 339 | 230 | 42.2 | 36.9 |
| 1998 | 327 | 236 | 50.0 | 32.4 |
| 1999 | 263 | 214 | 37.4 | 30.4 |
| 2000 | 234 | 184 | 29.5 | 32.9 |
| 2001 | 195 | 158 | 36.4 | 28.9 |

Results: 3445 cases of TB were reported. Pulmonary TB (PTB) occurred in 2455 patients. In 95, a pseudo-outbreak was detected. The proportion of PTB was similar during the period of study (mean = 70%). HIV-infected increased between the 1st (27.4%), and the 2nd (33.2%) period ($P < 0.0005$) (Table 1). In 172 (5.0%) cases there was change of diagnosis; 356 (10.3%) patients were transferred out of the hospital. The rate cure was 50.1% and 60.3%, death 27.4% and 21.4%, default 22.5% and 18.3%, during the 1st and the 2nd period, respectively.

Conclusion: Occurred decrease of default rate, related to reorganization of TB local program and reduction of mortality rate after HAART introduction.

PS-2237-21 Profile of TB cases notified in the EPITB Database in 2003, Sao Paulo, Brazil

M L V Oliveira. TB Control Program, Epidemiological Surveillance Center-State of São Paulo Health Secretary, Sao Paulo, Sao Paulo, Brazil. Fax: (+55) 30822772. e-mail: viudeoli@usp.br

Introduction: The State of São Paulo, with the largest population in the country (38 709 339 inhabitants), had also the larger number of TB cases and totalled 19951 in 2003.

Objective: To draw a profile of the TB patients registered in the State EPITB database system.

Methods: An analysis of the 2003 year period was prepared for the new cases included.

Results: During 2003, 17 299 new cases of TB were notified and broken down as follows: 11 505 (67.4%) were male; age group of 20–40 years (46.8%) had most of the cases; cure and default rates were 71.3% and 9.2%, respectively; and transfers 5.3%. Regarding mortality, 4.0% of patients died from TB and 4.6% from Non-TB death causes. RMP, INH and PZA were the drugs given to 80.5% of patients. From the total, 51.5% were smear positive and 24.9% were hospitalized.

Conclusion: The high incidence rate of tuberculosis in young adults and low cure rate call for strengthening of the State TB Control Program as well as for DOTS activities.

PS-2245-21 Epidemiology of TB in Eldoret, Kenya, and its environs

T Ogaro,¹ N Bhakta,² M Kumar,² S Kiboi,³ E J Carter,² J M Chakaya.¹ ¹National TB and Leprosy Program, Eldoret, Kenya; ²Brown Medical School, Providence, Rhode Island, USA; ³Moi University Faculty of Health Sciences, Eldoret, Kenya. Fax: (+1) 401-793-2266. e-mail: E_Jane_Carter@Brown.edu

Background: Eldoret is Kenya's fifth largest urban center with 250 000 people and is among the fastest growing towns in the country. TB health care services for the urban and semi-rural population are provided through several local health centers and a university teaching and referral hospital.

Methods: We reviewed the treatment registers at nine TB treatment clinics within the Eldoret municipality.

Results: A total of 1309 cases of TB were registered at nine treatment centers between January and December 2004. Among the patients diagnosed and treated with TB, 59.9% (784) were male and 40.1% (525) were female. The median age was 30 years with 56.2% falling between the ages of 25 and 44. 39.8% (521) of all patients were diagnosed through a positive AFB smear. 21.5% (282) were found smear negative but started anti-TB medications based on clinical findings. 26.5% (347) were treated for extrapulmonary TB.

Discussion: The case notification rate in Eldoret municipality remains 524/100 000 for all forms of TB and 208/100 000 for smear positive cases. The high burden of TB in this area warrants continued intensification of DOTS implementation and program strengthening.

PS-2269-21 TB patients' patronage of community pharmacies in the DOTS era: a survey of Lagos State of Nigeria

C O Okolo. Centre For Evidence-Based Pharmacotherapy, Birmingham, UK. Fax: (+44) 784 906 2089. e-mail: mezieo@yahoo.com

Objective: To document how much of TB patients patronage community pharmacies still enjoy in an era when anti-TB drugs are given free of charge courtesy

of DOTS and to advance possible reasons for the patronage so recorded.

Method: A cross-sectional descriptive study involving the use of semi-structured questionnaires administered to a random sample of 150 community pharmacists resident in Lagos State of Nigeria. Data was analysed by the use of SPSS12.

Results: Out of 129 responses, 86.8% stock anti-TB drugs while 13.2% do not stock them in their pharmacies. 67.2% had dispensed those drugs in the immediate past one month prior to survey while 29.7% had not. The rest (3.1%) could not remember dispensing such drugs. 19.3% dispensed anti-TB drugs daily, 16.7% weekly and 64% occasionally. It follows logically that those who do not stock do not dispense, however some of them responded. With regards to ethical practice, 43.3% dispense anti-TB drugs without a doctor's prescription while 53.3% insisted on a doctors prescription before they dispensed anti-TB drugs. However, 2.5% would dispense without a prescription under pressure- financial, mere persuasive words etc. When they see cases that they suspect to be TB, 7% would place them on routine anti-TB drugs while 93% would refer the seeming TB cases to a hospital (77.7%), laboratory (9.8%) or both (3.6%). No respondent acknowledged sending the suspected TB patients away.

Conclusions: Community pharmacies stock a wide range of TB drugs and are well patronised. Most patients cant stand for so long at overcrowded DOTS centres and knowledge of DOTS is not yet wide spread. Chances of MDR-TB are increased. Rapid DOTS expansion is solicited.

TUBERCULOSIS AND SOCIETY/POVERTY

PS-1153-21 Socio-economic factors in relation to tuberculosis in Danang City, Vietnam

Le Van Duc. Danang Tuberculosis Center, Danang, Danang, Vietnam. Fax: (+84) 511984233. e-mail: drlevanduc@s.vnn.vn

A cross-sectional study of socio-economic factors in relation to tuberculosis among 1625 TB patients living in Danang city, Vietnam. Data were collected by using structured interview from June to December 2004. In Danang city, TB is still public health problem. This study was carried out to assess socio-economic factors of TB patients and to determine the influences of these factors with pulmonary TB patients in Danang city. The results of this study showed that majority (69.1%) of the respondents were male. The mean age of patients suffering from tuberculosis was 43.3 ± 17.7 , and 79.3% were between 15–54 years old, 67.5% had secondary level of education or less. Out of 1625 respondents, there were 23.3% patients had very low income, 60.9% of the respondents were

the principal laborers of their families and 77.7% of them had irregular income. 83.1% of TB patients had small houses on sideway with make-shift materials and lack of ventilation, sunlight. This study found that socio-economic factors were significantly associated with TB patients ($P < 0.05$). As a result, it is recommended that should improve living standard for pulmonary TB patients; it is essential that all actions must be systematic carried out: policy, developing economy of communities so that make more jobs for TB patients, health service accessibility of TB patients. It is also necessary to strengthen TB knowledge of Health workers so that they can effectively provide TB information to the patients. Besides, health information dissemination regarding TB should be encouraged by using mass media such as radio, television and newspapers to help TB patients, to correctly understand tuberculosis.

PS-1162-21 Relationship between gender and tuberculosis infection in Kalingalinga community from 2003 to February 2005

C Habeenzu. Zambia Tuberculosis and Leprosy Trust (ZATULET), Lusaka, Zambia. Fax: (+260) 1252911. e-mail: habeenzu@yahoo.co.uk

Background: Tuberculosis (TB) in Zambia accounts for about 13% of all adult hospital deaths. Despite tuberculosis services being free in public health institutions in Zambia, females in Kalingalinga community delay in seeking medical help compared to their male counterparts. This was a retrospective study to determine the sex which was more infected and why females delay in seeking medical help in this low income setting.

Method: In February 2005 a survey was done to determine the sex prone to TB infection in Kalingalinga. A structured questionnaire was used to record the total number of patients seen in ZATULET TB community clinic according to sex, ages, sputum smear results, the cure and treatment completion rates, defaulters and died according to sex. A second questionnaire was administers to the staff and patients to find out why males did seek medical help early compared to females.

Findings: Total of 375 TB patients (214 males and 161 females) were register. Sixty (16.0%) males and 59 (15.7%) females were sputum smear positive. Twenty one males (5.6%) and 24 females (6.4%) were declared cured while those completed treatment were 49 (13.1%) males and 40 (10.7%) females. Defaulters for males were 31 (8.3%) while females were 35 (9.3%). More females (5.3%) died compared to 3.5% males. Sixty per cent of male patients were working while only 10% females were working. The female patients who delayed were poor widows, middle aged house wives and old grandmothers. Young employed females did seek medical help on time.

Interpretation: Females delayed seeking medical help because of poverty and prone to TB because of working in dusty factories.

PS-1271-21 Gender issue in tuberculosis in different dimension in Bangladesh

A B M T Islam,¹ V Begum,² Md. K A Hyder,¹ M Becx.¹
¹World Health Organization, National TB Control Program, Bangladesh, Dhaka, ²National TB Control Program, Dhaka, Bangladesh. Fax: (+880) 2 9884656. e-mail: sagarconnect@yahoo.com

Background: The gender ratio of tuberculosis patients in different dimension like urban and rural area in Bangladesh is not precisely known. Stigma taboos, social and religious barrier, health seeking behavior and environment are different in different dimension. **Objective:** To review gender difference in tuberculosis in different dimensions like metropolitan area and other area of Bangladesh.

Design/method: Analysis of database of laboratory reporting format introduced by national Tuberculosis Control Program.

Results: Data from 329 laboratory center was analyzed. A total of 344 391 people were examined as tuberculosis suspect among whom 211 407 (61.4%) male and 132 984 (38.6%) were female, (male/female ratio was 1.6:1) and 41 488 suspects were identified as smear positive TB case among whom 28 635 (69%) male and 12 853 (31%) were female (male/female ratio was 2.2:1). Case positivity among male was 13.6% and among female was 9.7%. In Dhaka metropolitan area (capital of Bangladesh) no. of total suspect was 2538 among whom 1219 (48%) were male and 1319 (52%) were female, (Male/female ratio was 1:1.1) and 365 of them were identified as smear positive TB case among whom 196 (53.7%) were male and 169 (46.3%) were female (male/female ratio was 1.2:1). Case positivity among male was 16% and among female was 12%. The mean of positive male and female per quarter per center is not significantly different (0.53, $P = 0.4$, $t = 0.94$, $df = 50$). Details will be shown in presentation.

Conclusion: The gender difference in routine tuberculosis diagnosis is different in different dimension.

PS-1360-21 Trialogue: an extended dialogue approach in the RNTCP, offers a new direction to build partnership with the community

S Raye,¹ A K Nayak,¹ A D Muynck.² ¹IEC, DANTB, Bhubaneswar, Orissa, ²CTA, DANTB, Bhubaneswar, Orissa, India. Fax: (+91) 6742550896. e-mail: santa@dantb.org

RNTCP is expanding DOTS rapidly in India. Yet, despite remarkable progress made so far, the negative social image of tuberculosis persists, leading to sub-optimal performance. To improve the situation, 'Tri-ologue Approach', originally developed in the context

of leprosy control, has been adapted to RNTCP. It is an interaction between the three key players: Patients, Health care providers including DOTS Providers and community. It aims at changing community approach and behaviour through exemplary cases of role models and an open discussion on fear, concerns, prejudices and problems. A classical trialogue session lasts for 4 to 5 hours and ends with a meal arranged by the organizers, usually NGOs. To abolish social distinctions and stigmas all possible measures are adopted. Patients take 'centre-stage' & narrate their 'disease' experiences. This sharing helps in bonding and breaking the barriers of caste, class & gender, in destigmatizing the disease, and in improving patient compliance. Trialogue meeting is easy to implement as its objectives are clearly spelt out, is cost-effective and replicable. It is a sustainable strategic approach as the evolved methodology is gaining approval by all the stakeholders as a very performing approach for community involvement in altering the overall stigma of the disease.

PS-1372-21 Biosocial factors impeding implementation of uninterrupted treatment of tuberculosis

E Berikova,¹ S Ismailov,¹ A Rakisheva,² S Ussembayeva,¹ A Edilbayev,³ A Doskalieva,⁴ R Raikenova,⁵ A Zhanabayeva,⁵ M-K Fawzi,³ G Bukhman,³ P Farmer.³

¹National Center for Tuberculosis Problems, Almaty,

²Kazakh National Medical University, Almaty, Kazakhstan;

³Harvard Medical School, Boston, Massachusetts, USA;

⁴Almaty City Dispensary, Almaty, ⁵Sarkand Dispensary,

Almaty region, Kazakhstan. Fax: (+7) 3272 918658.

e-mail: MDRTBproject@itte.kz

Aim: To determine which biosocial factors, by mind of patients themselves, impede to carry out the uninterrupted therapy of tuberculosis including MDR-TB.

Methods: We took the interview among 26 patients with TB and 6 contact persons from one of the areas of Almaty city and one of districts of Almaty' region during 30–45 minutes through Dictaphone records with their stenography followed. There were 16 men and 10 women out of them. As a result of these interviews with different categories of patients and contacts, we managed to clarify the main problems both of the medical and economic nature which they are forced to occur during and after their treatment. After TB disease development majority of patients lose their job and main sources of income. They become to be dependent on their relations. To successfully complete their treatment they are needy of the financial support from authority bodies for travel expenses, monthly allowances etc. Along with this financial support, they are needy of the psychological support from medical workers. Treatment completed patients are needy of the work rehabilitation. Population and patients have insufficient knowledge on

tuberculosis and, in particular, on MDR-TB. That why methods of sanitary education on TB should be available and effective for all groups of population. Totally, to enhance the adherence of patients to the uninterrupted treatment and make the chemotherapy more effective, it is necessary the State' financial support directed both on medical and preventive policies and resolution of the socio-economic and every day life problems of each patient.

PS-1375-21 Adherence of central and local authority bodies to the programme on TB and MDR-TB in Kazakhstan

S Ismailov,¹ A Rakisheva,² K Baimukhanova,¹ R Agzamova,¹ E Berikova,¹ A Edilbayev,³ S Ussembayeva,¹ A Smailova,⁴ R Raikenova,⁴ P Farmer,³ M-K Fawzi,³ G Bukhman.³

¹National Center for Tuberculosis Problems, Almaty,

²Kazakh National Medical University, Almaty, Kazakhstan;

³Harvard Medical School, Boston, Massachusetts, USA;

⁴Sarkand Dispensary, Almaty region, Kazakhstan.

Fax: (+7) 3272 918658. e-mail: MDRTBproject@itte.kz

Aim: To evaluate the level of the central and local adherence for control TB and MDR-TB in Kazakhstan with evaluation of policy on social defense of TB patients, medical workers. There were analyzed the policies to implementing the first strategy of DOTS, i.e., adherence of central and local management to resolve the problem of TB on a base of evaluation of interviews from some Heads of Ministries, administrative establishments. Study was carried out in the frames of the Project for investigation of biosocial factors in the control of TB and MDR-TB in two areas: in Almaty-city and in a rural country. Study was carried out through funding from WHO, UNDP/World Bank/WHO Special Program for Research and Training in Tropical Diseases (TDR). It is proved that there are the elements of adherence to change TB situation that would lead to decrease the mortality index. However the personal social assistance for needy TB patients is absent. Rather complicate situation on MDR-TB since the controlled general State Programme on MDR-TB is not adopted. Number of Heads of the Region expressed the important opinion where was underlined that some issues on TB can't be resolved on a local level. It is necessary the cardinal changes adopted on the central governmental and legal level in term of the comprehensive entire interdepartmental Programme on TB with concrete step-by step protocols for practical implementing and real, clause-by-clause, long-term and stable funding.

PS-1376-21 Adherence of medical workers to the problem of MDR-TB

A Rakisheva,¹ S Ismailov,² E Berikova,² S Ussembayeva,² A Edilbayev,³ Z Syrymbetova,⁴ A Smailova,⁵ S Sarsembayev,⁵ A Zhanabayeva,⁶ M-K Fawzi,³ G Bukhman,³ P Farmer.³ ¹Kazakh National Medical University, Almaty, ²National Center for Tuberculosis Problems, Almaty, Kazakhstan; ³Harvard Medical School, Boston, Massachusetts, USA; ⁴Almaty City Dispensary, Almaty, ⁵Almaty District Dispensary, Almaty region, ⁶Sarkand Dispensary, Almaty region, Kazakhstan. Fax: (+7) 3272 918658. e-mail: MDRTBproject@itte.kz

To determine the adherence to the problem of TB including MDR-TB among medical workers from urban and rural country in RK discussions in the focus-groups with TB specialists, therapists from PHC Network, bacteriologists and 'himizators' were organized. All participants had the sufficient experience in their work and sincerely expressed their opinion on this issue. Among participants opinion is prevalent on the priority of yearly X-ray in TB diagnostics in a rural country and tuberculin diagnostics among children. Along with it is underlined the significance of the active way of bacterioscopy, and attention is paid to the necessity of surveillance and treatment of patients with concomitant diseases, going-on of the examinations among all ex-prisoners and persons came from other regions. To improve TB situation on MDR-TB mandatory TB treatment should be implemented among defaulters. Necessity of full therapy completion is marked for penitentiary facilities. Especially attention was paid to the need to enhance the living standards of patients that would be useful to resolve many issues rose, to straight the TB advocacy activity. Patients with TB should be included into register of persons gaining the personal social support in term of foodstuffs, travel cards, job places, organization of special facilities for social adaptation and rehabilitation of ex-prisoners. Social support will allow to the majority of patients to enhance the adherence of TB patients to regular visits to the medical institutions and observation of the treatment regimens. Financial motivation of medical workers is necessary as well.

PS-1681-21 Poverty and TB: experience of BRAC in reaching ultra poor populations in selected rural areas in Bangladesh

M A S Sarkar, M I Islam, R Yasmin, F Ahmed, A Alam, A M R Chowdhury. Health and Nutrition Programme, BRAC Bangladesh, Dhaka, Bangladesh. Fax: (+880) 28823614. e-mail: health@brac.net

Introduction: TB program was integrated in BRAC's economic and social development for ultra poor in 2003. The program gradually covers 20 000 ultra poor households with a population of 66 344.

Objectives: To identify and treat TB patients under DOTS program.

Methods: Female health worker visited ultra poor household at least once every 6 weeks. During household visits, she inquires well-being of the family; provide health and nutrition education, and collect basic health information including TB suspects. If any individual has cough more than 3 weeks is referred to the sub-district health complex or NGO clinic for sputum examination. All diagnosed TB patients are referred to nearest community health volunteer (CHV) for ensuring DOT. No deposit money is taken from these patients. Taka 150 (US\$2.5) is given as an incentive to CHV for treating each patient from project fund.

Results: A total of 71 new sputum positive patients were diagnosed between April 2003 and February 2005. Of them, 48 patients were diagnosed in 2004. So the case detection in 2004 was 73/100 000 population.

Conclusions: Specially designed program is required in reaching the poor. Visits by health workers could eventually increase the case detection.

PS-1703-21 Gender analysis of chronic cough cases in three poor settings of urban Lilongwe

M B Nhlema Simwaka,¹ P Nkhonjera,¹ S Theobald,¹ S B Squire,^{1,2} A Willetts,² F M L Salaniponi.¹ ¹REACH TRUST, Lilongwe, Malawi; ²Liverpool School of Tropical Medicine, Liverpool, UK. Fax: (+265) 1 751247. e-mail: bertha@equi-tb-malawi.org

Objective: A household survey to determine help seeking behaviour of people with chronic cough. This was collected as baseline line data for the Extending Services to Communities Project, which aims to improve access to diagnosis through empowering storekeepers and volunteers with referral and health promotion skills.

Method: A Household Survey was conducted in three traditional unplanned settlements in urban Lilongwe. These areas are characterised by poor housing, high density and low secondary school education. Cluster sampling was used to identify 1200 households. Households were screened to assess number of household members suffering from chronic cough. Chronic cough was defined as a cough of three weeks or more.

Findings: 541 chronic cough cases were identified within 1200 households. 250 (83%) of these cases were women. The most common health provider visited by both men and women was storekeepers (48%). Most reported public health facilities as second health provider visited.

Conclusion: In this survey more women reported chronic cough compared to men. The national notification rates are higher for men than women. Past studies have documented longer provider delay for women compared to men. We might be missing a lot of poor women.

PS-1711-21 La prise en charge et le suivi des patients atteints de la tuberculose en Seine-Saint-Denis, France. Responsabiliser les patients pour améliorer les chiffres des « perdus de vue », une solution ?

J Kehr. Département d'Anthropologie Sociale, CRESPE-EHESS, Maison de Sciences de l, St-Denis, France.
Fax: (+33) 04 94785713. e-mail: jkehr@mshparisnord.net

Malgré un système de santé bien développé, il existe en France des groupes de population dans lesquels l'incidence de la tuberculose est proche de celle observée dans les pays du Sud, comme en Seine-Saint-Denis. Une bonne prise en charge et un suivi socio-médical des patients faisant partie d'un groupe à risque est un élément clé dans le contrôle de la maladie. Cette étude analyse la communication entre le personnel soignant et les patients, souvent des migrants, pour comprendre les mécanismes de persuasion et de transfert d'information ainsi que les blocages de compréhension mutuelle pendant les consultations de pneumologie dans un dispensaire. L'étude est basée sur une enquête qualitative, liant des observations et des entretiens semi-structurés. On estime que les consultations de pneumologie sont un moment charnière dans la prise en charge et le suivi, pendant lequel une responsabilisation des patients et une transparence vis-à-vis des mesures de traitement de la part du personnel soignant peuvent améliorer l'adhésion au traitement antituberculeux, qui est difficile à suivre pour les patients. Une analyse de la communication aide à mettre en place des dispositifs de responsabilisation et de transparence, pour exclure les blocages de compréhension mutuelle susceptibles d'augmenter le nombre des 'perdus-de-vue'.

PS-1827-21 L'impact de message éducatif de la prévention TB/VIH à Kinshasa, RDC

B Muma. ACS/AMOCOONGO, Kinshasa, D R Congo.
Fax: (+243) 081 88 18 960. e-mail: benj_muma@yahoo.fr

Introduction: Le projet PNUD/TUBERCULOSE assure la prévention de la population Kinois sur le mode transmission de la tuberculose à l'aide de message éducatif, cette initiative suscite un éveil de conscience au sujet de la transmission de la maladie.

Méthodologie : Identification de canaux de transmission de message éducatif : Les chaînes radios télévision officielle et communautaire ; les panneaux publicitaire ; les théâtres ; identification des couches de la population cible ; usage de la langue française et les quatre langues nationale.

Objectif : Contribuer à la réduction de l'impact sociaux médicale de la TUB/VIH par la diffusion de message éducatif en faveur de la population Kinois pendant 5 ans.

Résultat : 80% des chaînes radios télévisées sont impliquées à l'éducation de la population ; 75% des groupes théâtral diffusent le message TB/VIH ; 65%

des quartiers de la ville de Kinshasa sont couverts par les panneaux publicitaire d'éducation TB/VIH. 75% de la population manifestent l'éveil de conscience et participent à la lutte contre la TB/VIH.

PS-1871-21 Does a rights-based approach to health education make a difference for TB control among the poorest?

J Seeberg,¹ S Raye,² A Bhattacharya.¹ Departments of ¹Health Systems Research and ²Information, Education & Communication, DANTB, Bhubaneswar, Orissa, India.
Fax: (+91) 6742550896. e-mail: jseeberg@hum.au.dk

Background: Orissa is one of the poorest states in India. The Revised National Tuberculosis Control Programme (RNTCP) was introduced in the state in 1996. Over the years, a significant variation of standard TB indicators among districts has been identified. With support from Danida, substantially larger information, education and communication (IEC) component was available to RNTCP in Orissa compared to other states, and a wide range of behaviour change communication (BCC) interventions could be developed in support of RNTCP. Special attention has been given to gender and literacy, and to vulnerable groups, such as scheduled tribes and castes that constitute 39% of the population. This presentation demonstrates how innovative BCC approaches to TB control can be used to generate a demand for health services among low-income populations. The paper discusses related policy issues in light of the rapid expansion of the DOTS programme in India and worldwide.

Objective: To assess the relative success of different BCC activities to effectively support a community demand for free TB services, with special attention to the issue of acceptability of DOTS at community level in selected districts of Orissa.

Methods: The 30 districts of Orissa were stratified according to year of implementation of the Revised National Tuberculosis Control Programme (RNTCP). Districts with very recent RNTCP implementation were excluded. One district from each stratum was randomly selected for the study. BCC activities were classified and mapped in space and time at block-level, and blocks were sorted in three groups according to BCC activity level.

PS-2011-21 Effect on adherence to anti-tuberculosis treatment of measuring risk of treatment default in the state of Chiapas

I Orejel, E Ferreira. Secretaria de Salud, Mexico, Mexico City, Mexico. Fax: (+52) 5 26146436.
e-mail: ivonneorejel@hotmail.com

Default has increases costs, diminishes cure rates and perpetuates transmission. This study modified an instrument used in another country to estimate the risk of treatment default with low costs and straightforward application.

Objective: To measure the risk of treatment default as a strategy to improve the administration of the tuberculosis programme, and implement activities that will improve treatment adherence in the state of Chiapas. **Hypothesis:** Knowledge about each patient's risk of treatment default will allow the implementation of basic activities that can improve adherence to treatment, thus reducing the cost of care and improving its quality.

Elaboration of instrument: The risk for each variable of the instrument was calculated, considering the presence or absence of default. With these results, the variables for the new instrument were selected, considering the degree of association of the presence of the variable with default. Each variable was weighted according to the degree of association indicated by the relative risk of default in order to identify maximum sensitivity and specificity.

Selection criteria for sample: Convenience sampling was used: 50% of the health districts (5 of the 10) in the state of Chiapas.

Conclusions: The instrument is a valuable tool for assessing the probability of default, for orienting remedial action and optimising the work of the health staff.

PS-2189-21 Challenges in implementing community based DOTS in rural communities in South Africa

L L Smith,¹ Z A Arosi,¹ A S Millar,¹ J Mongalo,² T Mabunda.³ ¹TADSA, Cape Town, South Africa; ²Department of Health, Molemole Sub-District, Limpopo; ³TB Control Program, Limpopo Province, Pietersburg, South Africa. Fax: (+27) 0219451758. e-mail: leetadsa@iafrica.com

Objective: To develop methodology to establish and manage Community Based DOTS (CBD) in a rural community.

Background: South Africa's TB epidemic is further exacerbated by the impact of poverty—72% of the country's poor live in rural areas. CBD is one of the national efforts for improving adherence to treatment. The NTCP remains committed to using the DOTS strategy as a means of dealing with the epidemic, yet faces constraints of limited resources and varying degrees of poverty. Molemole is a rural sub-district in Limpopo Province and was selected as a priority intervention district for introduction of CBD.

Methods: CBD introduced using functional TB control as pre-requisite. System for support and monitoring introduced, to highlight immediate challenges to successful implementation of CBD.

Results: CBD introduced in 8 clinics. 8 Health Professionals (local government employees) trained as DOT Coordinators. 5 trainees (63%) have left the sub-district. 34 treatment supporters currently support 84 patients in CBD. Drop-out rate of treatment supporters is 53.5%. Impact on treatment outcomes

of patients in CBD will be presented, as well as perceptions of sub-district carers and caregivers.

PS-2251-21 Informing inhabitants of a town on a contact investigation in a supermarket

H J M De Lange,¹ W M M Dubbink,¹ K Haks,² M van Zoest,³ G Doornenbal.¹ ¹Tuberculosis Control Region Utrecht, Utrecht, ²Municipal Health Service Utrecht, Utrecht, ³Municipal Health Service Midden Nederland, Zeist, The Netherlands. Fax: (+31) 302863485. e-mail: h.de.lange@utrecht.nl

Background: On November 18th 2004 an employee of a supermarket was diagnosed with smear positive pulmonary TB. Among his family and friends an infection rate of 90% was found. An investigation among colleagues of the supermarket showed an infection rate of 60%. Therefore we have decided to perform a large-scale contact investigation among all customers of the supermarket in the year 2004. The screening was done by by Tuberculin Skin Test (TST) or chest X-ray and took 5 days.

Methods: The following means were used, in order to reach all customers: press releases, information corner in the supermarket, call centre free of charge, customer surveys, website with FAQ, home to home spreading of flyers in postcode area of supermarket, flyers in public buildings, announcements in local newspapers.

Results: 14 861 TST were given. 95% of this amount came for reading. 5677 chest X-rays were made. The attendance was higher then statically expected. Visits website became less after 2 weeks. After an initial period of time the number no. of calls to call centre decreased.

Conclusion: It is concluded that the inhabitants of Zeist were well informed about the contact investigation in the supermarket, as the attendance was high and people expressed their appreciation about the way how things were organised.

DOTS: PUBLIC-PRIVATE MIX

PS-1063-21 Role and involvement of private practitioners in TB control in Kabul city, Afghanistan

S J Huseynova,¹ K H Z Zafari,^{2,3} N R Rahimi,⁴ S K H Khaleed,³ A H Haidary.³ ¹WHO Afghanistan, Stop TB Department, Kabul, ²Kabul Medical University, Kabul, ³National Tuberculosis Institute, Kabul, ⁴Chest Clinic, Ibn-Sina hospital, Kabul, Afghanistan. Fax: (+93) 70286327. e-mail: huseynovas@afg.emro.who.int

Introduction: In Afghanistan high proportion of patients affected by tuberculosis seek treatment from private doctors.

Aim: To identify possible interventions to ensure that TB patients seeking care from private doctors are adequately managed according to DOTS.

Objective: 1) To assess private doctors' knowledge on TB case detection and management. 2) To identify the reasons that brings TB patients to seek care in the private sector rather than in PHC facilities.

Methods: Cross-sectional study was conducted among 193 private doctors and 600 patients in 16 districts of Kabul city in February 2004. During one year private practitioners of these 16 districts were trained in DOTS policy and implementation; a two-day workshop was held.

Results: 90% of private doctors are unaware of DOTS program and they have superficial knowledge on TB case management. Shortage of public health facilities providing DOTS services is the main factor which brings TB patients to private sector. Referral of TB cases to public DOTS centers increased by 18% only by providing a 2-day workshop to private doctors.

Conclusions: National TB Control program should expand DOTS and develop a strategy to increase awareness of private practitioners on DOTS policy and implementation based on National TB guidelines.

PS-1095-21 The role of private laboratories in tuberculosis detection, Tehran, Iran

M R Masjedi, R Taghizadeh, L Fadaizadeh. National Research Institute of TB and Lung Disease, Tehran, Iran. Fax: (+98) 21 2285777. e-mail: mrmasjedi@nitld.ac.ir

Objective: To study the participation of the private sector in detection and diagnosis of tuberculosis suspected cases through the private labs.

Design: Cross sectional study.

Method: All cases referring to 4 private labs for AFB examination during 2002–3 were enrolled into our study. The total number of referred cases and the positivity ratio were calculated.

Results: A total of 9037 were enrolled with 44.9% being female and 55.1% being male. The two peak ages of referring patients were 15–25 yrs and >65 yrs and the majority of the patients were Iranian (98.6%). As a whole, 637 cases had positive examination results (7.1%), among which 531 (5.9%) cases were direct smear positive and 489 (5.4%) culture positive. This is comparable to data given by MOH, that is, the total number of cases referred to governmental labs in the Tehran urban area, during the period of study was 9479 with 208 (2.2%) being positive, including 7850 (82.8%) Iranians.

Conclusion: A larger than expected proportion of TB patients are detected and (managed) by the private sector which means a much more intimate cooperation should develop between the public and private sectors.

PS-1111-21 PPMD strategy: an experience worth sharing

W F Cabauatan. Department of Health, Center for Health Development, Tuguegarao City, Philippines. Fax: (+63) 0788467232. e-mail: willie_cabauatan@yahoo.com

The objective of the strategy implemented are: to increase case detection and to synchronize the diagnosis and treatment of tuberculosis. The PPMD GFATM project was implemented in a phased manner, for which Tuguegarao City Health Office was recommended and chosen as a PPMD unit site. The PPMD facility started operations in the first quarters of 2004 after a series of pre-installation activities like: central planning workshop, preparatory visit by central team, initial publicity, DOTS Symposium, DOTS training of private physicians, letter of agreement signing and launching. The official operation of the PPMD shall commence after the Launching. Monitoring shall be part of the post-installation activities. Thirty-eight private referring physicians was trained on DOTS, signed a letter of agreement and actively participated in the NTP through referrals and become active members of the TB Diagnostic Committee. As a result, Case Detection Rate tremendously increased from 40.2% in 2003 to 82.2% in 2004 with a relative increase of 104.5%. Of the 82.2%, CDR from the public is 74.5% while the CDR from the private is 7.7%.

In conclusion, PPMD as strategy really worked and yielded positive results.

PS-1145-21 Knowledge, attitudes and practices of private practitioners in adopting DOTS strategy in pilot areas of Dhaka City, Bangladesh: DOTS expansion among private practitioners

Md. K A Hyder,¹ S Sabera,¹ M Becx,¹ V Begum,² A N Zafar Ullad,³ J Newell.³ ¹World Health Organization, Dhaka, ²National TB Control Program, Dhaka, Bangladesh; ³Nuffield Center for International Health and Development, University of Leeds, UK. Fax: (+880) 2 9884656. e-mail: khyder@dhaka.net

Introduction: Initiatives to involve private practitioners by NTP in Bangladesh are relatively new. In big cities many patients attend the private sector.

Objectives: To review and understand the current practices of private medical practitioners and allied forces in TB Control activities in urban settings of Bangladesh.

Methods: 4 areas in Dhaka city were selected to understand local context through questionnaire, understand where private practitioners can contribute and develop linkages with NTP to increase case detection.

Results: 77% of the private practitioners provide services through clinics in pharmacy in general and rest through polyclinics, freestanding clinics and NGOs. On an average 5 suspects of TB are seen by private practitioners per month in those 4 catchments areas

located in different parts of the city. 23% of the private practitioners prefer chest radiography for diagnosis, 22% for sputum examination and 14% blood for ESR and rest depends on other investigations. Of the total private practitioners included in the intervention 25% knows about the NTP treatment regimens, 13% had concept on DOT. 97% of the providers has positive attitude if NTP is integrated with them to improve case detection and cure rates.

Conclusion: Involvement of private physicians, pharmacists is just starting up in pilot areas through required strategies/ orientation on need base, developing forms and cards in the line of policy of NTP. Lists are already available and some NTP-NGOs facilities implementing DOTS have already or plan to line list private practitioners in the respective catchments areas, policies are modified by NTP to include private practitioners.

PS-1154-21 Partnership an unique example in implementation of DOTS in Bangladesh

M Becx,¹ Md. K A Hyder,¹ S Sabera,¹ V Begum.²

¹World Health Organization, Dhaka, ²National TB Control Program, Dhaka, Bangladesh. Fax: (+880) 2 9884656. e-mail: becxm@whoban.org

Introduction: TB is a major public health problem in Bangladesh. About 300 000 new cases cropping up every year and 70 000 die due to this single disease. Young males are predominant in the society. GoB establishes unique partnership with NGOs in implementation of DOTS through existing facilities.

Objectives: To sustain successful partnership in DOTS in Bangladesh.

Methods: Through Memorandum of Understanding NGOs are linked with NTP Bangladesh adopting its policies and strategies.

Results: Governments effort to improve health service delivery especially for the poor. Through collaboration with NGOs increased case detection to over 46% (2004) and treatment success rate to 85% (2003). Partners operational plan in implementing strategies of NTP will be presented and the collaboration undertaken are the lessons for other countries.

Conclusion: There is increased trend of the Government collaboration with NGOs in implementing TB program in Bangladesh. Government-NGO collaboration is an effective way of improving access and quality of TB and other health care services.

PS-1155-21 Analysis of the study of assessment of quality assurance undertaken by NGO on urban NGO and public sector TB services in Bangladesh

S Sabera,¹ Md. K A Hyder,¹ M Becx,¹ V Begum.²

¹World Health Organization, Dhaka, ²National TB Control Program, Dhaka, Bangladesh. Fax: (+880) 2 9884656. e-mail: sabera_s@yahoo.com

Introduction: TB is complex in urban areas. Quality services to the clients are important perspective to improve referral of suspects, diagnosis and treatment.

Objectives: To analyze whether the study has been taken in right direction to assess quality of DOTS service deliveries by NTP-NGOs and public sector in big cities of Bangladesh.

Methods: The analysis was rapid reviewing the reports that were submitted to the National TB Control Program. The data were crosschecked and reviewed.

Results: NTPs ownership of DOTS still lacking among NGO clinics as most of the cases still diagnosed by public sector. Public sector offers the complete set of TB-DOTS services. Advocacy Communication and Social mobilization on TB is not routine features of NGO clinics rather wide range effort persists on maternal and child health and family planning services. About 20% of the cases are diagnosed by these NGOs. There is contradiction on DOT by NGO clinics rather being provided by family members, on the other hand NTP-NGOs in rural setting use community health workers (Shastho Sebikas), village doctors and public health workers as direct observers of anti TB drugs. Quality of laboratory tests by NGO clinics is certainly below 60% against 84% as most of the NGO laboratories do not have trained medical technologists. The overall composite score on TB knowledge between NGO and government clinics is shown to be 30% and 100% respectively needs justification. Detailed analysis will be presented.

Conclusion: TB is complex in urban areas. Quality services to the clients are important perspective to improve referral of suspects, diagnosis and treatment.

PS-1329-21 TB-DOTS in government and non-government facilities in Bangladesh: an assessment of strengths and weaknesses to develop strategies for delivery of high quality service

S D Parveen,^{1,2} I U Khandaker,^{1,2} S U Ahmed,^{1,2} D R Guda.^{1,2}

¹NGO Service Delivery Program, Dhaka, Bangladesh;

²University Research Co., LLC, Bethesda, Maryland, USA.

Fax: (+880) 29883634. e-mail: sdparveen@urc-chs.com

With 300 000 new TB cases and 70 000 TB-related deaths annually and case detection rate of 41%, Bangladesh faces a challenge in strengthening case detection through increased access to high quality TB diagnosis and treatment. Facility and provider assessments conducted in 5 government and 15 NGO pri-

mary health care clinics through rapid systems analysis. Government clinics relied mostly on referral from other sites for suspect identification, while NGO clinics received active community referrals. Case detection was poor in both GO and NGO clinics but cure rate for former was higher, at 81%. Majority government clinics offered sputum and blood tests, but only 33% and 53% of the NGO clinics did so; government laboratories scored 100% for quality and NGO laboratories, 84%. Government facilities received three-times more referrals from private practitioners than did NGO clinics. GO- and NGO sites should share best practices to ensure timely suspect identification and diagnosis. Major areas for improvement are:

- 1 Strengthen networking among GO- and NGO-sites to improve case detection;
- 2 Increase the range of and improve the quality of diagnostic facilities;
- 3 Strengthen referrals between NGO clinics and private practitioners;
- 4 Strengthen supervision and monitoring.

PS-1338-21 Economic analysis of public-private mix DOTS in Manila, Philippines

M N Voniatis,¹ J Fourier,¹ J Y Lagahid,² R G Vianzon,² F La Puebla,² K Floyd,³ J M Olive.¹ ¹WHO Office of the Representative in the Philippines, Stop TB, Manila, ²National TB Programme, National Center for Disease Prevention and Control, Department of Health, Manila, Philippines; ³WHO Headquarters, Stop TB, Geneva, Switzerland.
Fax: (+63) 2 731 3914. e-mail: voniatism@phl.wpro.who.int

Public-Private Mix DOTS (PPMD) was adopted as national strategy (2003) to increase case detection, and harmonise tuberculosis management. An economic analysis of PPMD was conducted to: (1) identify the average cost per treated patient under PPMD; (2) identify differences in costs among different type of PPMD Units (public, private, non-governmental organizations and health maintenance organizations); and (3) identify the socio-economic class of patients utilizing the PPMD units. Of 16 PPMD units in Metro Manila 8 were selected randomly. Data and information were collected from 90.1% of the patients enrolled for treatment and from the units' staff. Average cost per successfully treated case was US\$382.87 for all units. Private units offered treatment for lower cost (average US\$252.12) serving low-income populations and public the highest cost (average US\$468.58). The median monthly family income was US\$272.30 and 60.70% of the patients were out of work during treatment. Seventy per cent indicated that they used PPMD because of the provision of free drugs. This study demonstrated that PPMD offered relatively low cost DOTS services, particularly by private PPMD units, that were accessed primarily by families with low income.

PS-1439-21 TB knowledge, attitudes and practices (KAP) of private practitioners in clinics, pharmacies and laboratories in Phnom Penh, Capital City of Cambodia

S Saly,¹ K Okada,² Y Uchiyama,² T Miura,² K Kimsan,³ M T Eang.¹ ¹National Center for Tuberculosis and Leprosy Control, Phnom Penh, ²Japan International Cooperation Agency (JICA) National TB Control Project, Phnom Penh, ³Cambodia Anti-Tuberculosis Association, Phnom Penh, Cambodia. Fax: (+855) 23218090.
e-mail: salsaint@yahoo.com

Objective: To examine TB-KAP among private health-care practitioners in Phnom Penh.

Methods: CENAT/JICA conducted a baseline survey in Phnom Penh in December 2004. 193 clinicians, 188 drug sellers and 17 laboratories were interviewed through personal structured questionnaires by well-trained interviewers.

Results: 96% of clinicians referred TB suspects to the public sector. Some clinicians provided TB treatment for patients. Only 25% of clinicians had an experience in receiving training on TB and TB treatment. Most drug sellers had good knowledge of TB symptoms. 62% of pharmacies were selling TB drugs, 42% were selling TB drugs without prescription and 73% have referred TB suspects to medical facilities. 53% of laboratories were performing smear microscopy but the number of sputum slides examined was less than 20 a month and among them, less than 10 slides were totally detected as smear positive.

Conclusion: Private health-care practitioners play an important role in TB care delivery, but they have not officially collaborated with the National Tuberculosis Control Program. It is important to establish a good referral system between the private and public sector, which can contribute to shorter the TB diagnostic delay and increase the TB case detection rate.

PS-1512-21 Involving the private health sector in tuberculosis control in Ghana: the role of laboratory training

K K Addo,¹ G I Mensah,¹ K Owusu-Darko,¹ D K Yeboah-Manu,¹ C Lienhardt,² F A Bonsu.³ ¹Bacteriology Department, Noguchi Memorial Institute for Medical Research, Legon-Accra, Ghana; ²West African TB Research Initiative, Dakar, Senegal; ³National Tuberculosis Control Programme, Ghana Health Service, Korle-Bu, Accra, Ghana. Fax: (+233) 21502182.
e-mail: kaddo@noguchi.mimcom.net

A pilot programme to involve the private health sector to increase tuberculosis (TB) case detection in urban Ghana was initiated in 2003 in the Accra and Kumasi Metropolis with the support of the Global Fund against Tuberculosis, HIV/AIDS and Malaria. A sensitisation programme was organised to brief the private health sector in the two cities about this public-private approach. A situational analysis of interested private health facilities was done and based on loca-

tion, bio-safety etc. some of these facilities were selected strategically to start the programme. Laboratory personnel from the selected laboratories were trained in October–November 2003. In all, 58 laboratory personnel from 50 laboratories in Accra and 16 from 10 laboratories in Kumasi participated. The training course involved theoretical and practical aspects of the TB control. Post-training follow-up visits were made to the participants 6 and 12 months after the course to assess the training impact and also address any constraints. There has been an improvement in TB diagnosis and increase in case detection from 44% to 53% in the two cities, one year after the training. We therefore recommend the extension of this public-private mix to other parts of the country.

PS-1598-21 Scaling up services for urban TB control: Bangladesh perspective

M H Khan,¹ M Bex Bleumink,² T Aziz,³ V Begum,⁴ M K A Hyder,⁵ M A Islam.⁶ ¹Department of Urban TB Control, and ²TB Unit, World Health Organization, Dhaka, ³Mycobacterium Disease Control, Dhaka, ⁴National Tuberculosis Control Programme, Dhaka, ⁵Department of TB Management, WHO, Dhaka, ⁶TB Control Programme, BRAC, Dhaka, Bangladesh. Fax: (+880) 9884656. e-mail: nps@bttb.net.bd

Bangladesh ranks 5th on the list of the 22 high burden countries. The case detection of smear positive tuberculosis (TB) was 46% in 2004. The urban scenario is even worse. The multi-characteristic dwellers living in urban areas make it difficult to impose a single approach for TB control.

Objectives: To develop strategies for urban TB control in Bangladesh.

Methods: A strategic workshop by NTP, NGO partners and WHO was conducted to identify gaps in the TB control activities and develop strategies to overcome these. An important component was expansion of DOTS in urban areas.

Results: A comprehensive plan was developed for DOTS expansion in urban. The four major components are to address private practitioners, pharmacies, workplaces and urban DOTS centres. The models will be piloted in five urban sites during the first year of implementation. Thereafter, based on best practices, the activities will be scaled up to cover the entire urban areas during the following 4 years. The methods will be presented in detail.

PS-1608-21 Assessment of DOTS management of tuberculosis patients among private medical practitioners in Calabar, Cross River State, Nigeria

E E Oyama,¹ A Osibogun,² K A Odeyemi.² ¹National Tuberculosis and Leprosy Control Programme, Department of Health, Calabar, River Cross, ²Department of Community Health, College of Medicine, University of Lagos, Lagos, Nigeria. Fax: (+234) 87238708. e-mail: atiyama@yahoo.com

Objective: To assess DOTS management practices for tuberculosis patients among the private medical practitioners in Calabar, Cross River State, Nigeria.

Methods: A descriptive cross sectional study using self-administered questionnaires was conducted from March to April, 2004 involving all the private medical practitioners (PMPs) consulting within a private health facility. A total of 90 PMPs in 65 private clinics were given the questionnaires to complete. Eighty-seven PMPs participated in the study.

Results: Majority of the PMPs (89.7%) see TB suspects and 87.2% diagnose them. However, most of the PMPs (69.2%) referred both the suspects seen and the cases diagnosed. sputum microscopy (92%) and FBC + ESR (91%) were more preferred investigations conducted for TB suspects followed by CXR (73.6%) and mantoux (72.4%). Usually a combination of investigations was common (8.0%). Furthermore, most PMPs used current NTBLCP recommended regimens for all categories of patients: 45.8% for a newly diagnosed case, 64.3% for re-treatment case and 61.5% recommended child regimen. Only 12.5% use regimens outside those recommended by the NTBLCP. However, duration of treatment varied; 37.5% treated for 8 months, 33.3% for 6 months, 20.8% 12 months and 4.2% for 9 months.

Conclusion: Majority of PMPs (89.7%) see TB suspects and diagnose them. A good number of them are referred to an NTBLCP facility for diagnosis and treatment. There is inadequate awareness of the NTBLCP/WHO recommended DOTS management guidelines by majority of the PMPs. This underscores the need for a workshop or seminar to be organised for PMPs.

PS-1673-21 Private public mix DOTS in urban areas of Bangladesh: BRAC experience

R Karim, M A Islam, B Haque, M Alamin, M A Kayum, I Begum, F Ahmed. Health and Nutrition Programme, BRAC, Dhaka, Bangladesh. Fax: (+880) 2 8823542. e-mail: health@brac.net

Introduction: Beside rural areas, BRAC initiated DOTS services in 2 urban areas as a pilot project in October 2002 in collaboration with National TB Program (NTP).

Objectives: To increase awareness among urban poor people and accessibility of DOTS services to reach the case detection and cure rates of 70% and 85% respectively by 2005.

Methods: Female community health volunteers (CHVs), private practitioners, pharmacists, village doctors and community leaders were trained on TB. They refer TB suspects for examination and provide DOT according to the patients' convenient time and place. Decentralized sputum collection centers are organized in different slums and workplaces.

Results: Till December 2004, a total of 959 patients were diagnosed. Of them, 608 were new sputum positive and 57 re-treatment sputum positive cases. Sputum conversion rate and cure rates of new sputum positive cases were 97.7% and 80.3% respectively. The case detection reached to 63/100 000 population. A total of 322 DOT providers are currently treating TB patients. Of them, 170 are CHVs and 152 are private practitioners, pharmacists, Village Doctor, community leaders.

Conclusions: In urban setting, beside CHVs, a large number of private healthcare providers and community leaders are needed to be involved in DOTS to reach the national targets.

PS-1674-21 Private-public mix DOTS in urban areas of Bangladesh

M H Khan,¹ M Becx Bleumink,² V Begum,³ M K A Hyder.⁴

¹Urban TB Control, World Health Organization, Dhaka,

²TB Control Programme, World Health Organization, Dhaka,

³National TB Control Programme, Directorate General of Health Services, Dhaka, ⁴TB Management, World Health Organization, Dhaka, Bangladesh. Fax: (+880) 2 9884656.

e-mail: nps@btbt.net.bd

Introduction: National Tuberculosis (TB) Program expanded DOTS in 4 major metropolitan cities during 2002–2003 in close collaboration with NGOs.

Objectives: To increase accessibility of DOTS services in urban population to reach the national case detection and cure rates of 70% and 85% respectively by 2005.

Methods: TB care services had been integrated with other health care services of NGOs in their own settings. Community health volunteers, health workers, village doctors, community leaders or reliable persons are assigned for DOT provision. Cohort analysis carried out side by side to see the treatment success.

Results: During 2004 a total of 5601 new smear positive, 411 smear negative pulmonary, 1792 extrapulmonary and 411 retreatment TB cases were diagnosed. The case detection rate for new smear positive was 38%. After initial phase of treatment 3645 cases became negative, out of 4236 cases during the first three quarters of 2004. The treatment success rate was 77%.

Conclusion: To increase case detection and cure rate the programme should be intensified and expanded to un-reached people of urban areas.

PS-1723-21 Public-private mix DOTS experience in Davao City, Philippines

E L R Segura,¹ C A B Naraval Jr,² R G Vianzon.³

¹Department of Health Center for Health Development Davao Region, Davao City, ²Health Management Research Group, Inc, Davao City, ³Department of Health, Infectious Disease Office, Manila, The Philippines. Fax: (+63) 0822216320.

e-mail: das_sru@yahoo.com

This study aims to assess the contribution of Public-Private Mix DOTS (PPMD) strategy to Case Detection Rate (CDR) of new smear (+) TB cases in Davao City, Philippines for CY 2004. Four PPMD units in Davao City participated in this study. Reports submitted quarterly to the Health Office, meetings, on-site observations, records review and interviews with program implementers are tools utilized in assessment. The PPMD units' contribution to Davao City's TB cases detected is 15% (199/1342) with 11% (199/1863) increment to its 72% CDR which surpassed epidemiologic target of 70%. Mean percentage of smear (+) to total PTB cases is 67% with 86% conversion rate. Best practices include the MOA between the PPMD units with local government units and Department of Health, training on DOTS of PPMD staff and private practitioners (PPs) and consultation meetings with PPs which proved effective in gaining their respect. Certification of PPMDs' health care standards is the basis for accreditation with Social Insurance for financial sustainability. In conclusion, the PPMD strategy contributed to the increase of Davao City's CDR and fostered camaraderie with synchronized management of TB cases among the public and private health care providers hence recommended for scaling up.

PS-1872-21 Impact of training of traditional healers on TB case detection in Sikasso region of Mali

M Dara,¹ M Berthé,² A Diallo Naco,² A Konné.²

¹International Unit, KNCV Tuberculosis Foundation, The Hague, The Netherlands; ²Ministry of Health of Republic of Mali, Bamako, Mali. Fax: (+31) 703584004.

e-mail: daram@kncvtbc.nl

In 2003 of 2994 expected sputum smear positive cases in Sikasso region (2 173 635 population) of Mali, only 360 sputum smear positive patients were notified (i.e., case detection of 12%). There has been no seasonal variations in TB case notification. It is believed that traditional healers play an important role in health seeking behavior of Malian society, however their role in TB case detection has not been fully assessed. After a situation analysis and focus group discussion with 65 traditional healers, a training module on local language Bambara was designed and piloted. Traditional healers participated in the training during which importance of early TB case detection was emphasized. In the meantime a basic survey was undertaken

during which patients who have been detected in the previous 2 quarters were interviewed to see whether they have been referred by traditional healers and how long they have been feeling ill before referring to the health system. The result of survey showed that no TB cases had been referred from traditional healers before the intervention. It was proposed that after the training, district TB coordinators meet with each traditional healer on a monthly basis to record cases referred and establish a systemic collaboration. During the first quarter of 2005, TB case detection was increased 5%. This rate is expected to rise exponentially through systemic collaboration of TB coordinators and traditional healers. We have concluded that traditional healers play an important role in TB case detection in Mali and their role in improved adherence to treatment and default tracing is yet to be verified.

PS-1876-21 Public-private mix DOTS initiative in Nigeria: the greater Onitsha experience

A Eligan,¹ J Chukwu,¹ I Ezekpeaku.² ¹German Leprosy and TB Relief Association, Enugu, ²Anambra State TB and Leprosy Control Programme, Onitsha, Anambra, Nigeria.
Fax: (+234) 42 452311. e-mail: drartel@yahoo.com

Objective: To test the feasibility of involving private-for-profit practitioners (PPs) in tuberculosis control in Greater Onitsha, Anambra State, Nigeria.

Methods: Eleven private-for-profit hospitals were recruited as TB treatment centres in a PPM pilot study, starting in April 2004. The process started with dialogues among stakeholders until the Terms of Agreement for the collaboration was reached. Personnel was trained and provided with necessary materials. Training, monitoring and supervision done by government programme.

Results: The cases detected in PPM facilities represent 13.3% (54/407) of all the TB cases found in the study area. The contribution of PPM hospitals vary considerably in each district. In-depth interviews conducted among participating PPs revealed high level of satisfaction and optimism about the initiative. Interviews with 18 TB patients: all said to be happy with the TB services offered in PPM facilities, especially with free drugs. All said that service in these facilities were affordable.

Conclusions: Once the necessary elements are in place, PPs can be successfully involved in delivery of public health interventions like TB DOTS and achieve a comparable improvement in case detection, case holding and treatment outcomes in this pilot project setting in Nigeria.

PS-2067-21 Pharmacies as effective allies of the national TB control program

A E Villanueva,¹ M P Costello,¹ Z Y Mosende,¹
A A Lardizabal,² B T Mangura,² L B Reichman.²

¹Chemonics International, Inc., Pasig City, Metro Manila, Philippines; ²New Jersey Medical School National Tuberculosis Center, Newark, New Jersey, USA. Fax: (+63) 2 687 2195.
e-mail: avillanueva@philtips.com

To demonstrate, through the Philippine TIPS² (Tuberculosis Initiatives for the Private Sector) Pharmacy DOTS Initiative (PDI), the potentials of the pharmacies in TB control in the Philippines, a total of 1170 pharmacy personnel were trained to discourage self-medication, provide correct information about TB DOTS, and referrals to DOTS centers. The pharmacy performance monitoring and clinic data are the main sources for impact analysis. A Mystery Shopper Study (MSS) supplemented these sources to assess changes in dispensing practices. A control group of pharmacies was observed for comparison. From July to December 2004, PDI pharmacies served 3979 TB-related clients, referred 1550 clients to DOTS centers, 575 of which accessed the centers. A total of 169 were diagnosed as TB cases, 83 were smear positives. Contribution to local case detection rate ranged from 0.35% to 7.69%. MSS revealed statistically significant differences between PDI and non-PDI pharmacies: PDI pharmacies more likely to adhere to the 'no prescription, no dispensing of TB drugs' policy. PDI pharmacy personnel know more on TB DOTS, more likely to refer to DOTS centers. The PDI obtained support and recognition from the NTP. PDI demonstrated the feasibility of effectively engaging the pharmacies as private sector stakeholders in TB control.

PS-2206-21 How TB cases are detected in São Paulo State, Brazil

L A R Santos, V M N Galesi. Secretary of Health, São Paulo State, Brazil. Fax: (+55) 11 30822772.
e-mail: lasantos@cve.saude.sp.gov.br

Introduction, objective and methods: In Brazil, only the public services are allowed to treat TB, preferably at ambulatory base. To elucidate TB case-finding, the routine surveillance data on new smear-positive cases notified at São Paulo State during 2004 were analyzed.

Results: From the reported 8435 cases, 6382 indicated the type of health service that first suspected TB. From these, 956 (15%) were discovered at private health services, most of which integrate the Unified Health System: 335 cases at ambulatorial clinics, 422 at hospitals, and 199 at private doctor's offices. For the latter 199, mean total delay between the onset of symptoms until treatment was 11 weeks, while for those discovered by other private services it was 9 weeks and for public services 10 weeks. Emergency and hospital services, both private or public, played an important role and discovered 2685 cases; out of

them, 793 patients were hospitalized by the time TB was diagnosed.

Conclusions: Private sector, relatively strong in medical assistance, has a weak performance in TB detection. TB program should improve TB suspicion at private health sector and organize a good referral system for patients diagnosed at emergency and hospitals services toward treatment centres.

PS-1018-21 Does providing free sputum microscopy service to private practitioners improve TB case notification to the NTP?

J A Khan, S F Hussain. Section of Pulmonology and Critical Care Medicine, Karachi, Pakistan. Fax: (+92) 214932095. e-mail: javaid.khan@aku.edu

Setting: A densely populated area of Karachi, Pakistan. **Objective:** To assess the impact of providing free sputum microscopy services to private practitioners in case notification to the National Tuberculosis (TB) control program.

Methods: A pre-tested questionnaire was administered to all the practitioners working in the designated area. In the first three months, practitioners were asked to fill TB notification cards and their response recorded. An incentive was then provided to the practitioners for the next three months in the form of free sputum microscopy

Results: A total of 103 practitioners participated in the study. Provision of free sputum microscopy did not improve TB notification rate in the community. Half of the practitioners felt that provision of sputum microscopy facility alone was not enough and it should be supplemented with free chest radiograph and blood tests. Severe deficiencies existed in the diagnosis and treatment of TB by practitioners. Sputum microscopy was employed less often than chest radiograph and tuberculin test in the diagnosis of TB.

Conclusion: Practitioners in Pakistan generally do not rely on sputum for diagnosis of TB. Provision of free microscopy did not lead to an improvement in TB case notification by private practitioners.

PS-1152-21 Management of tuberculosis by general practitioners of urban Vadodara, India

A R Shah, R K Baxi. Department of Preventive and Social Medicine, Vadodara, Gujarat, India. Fax: (+91) 02652417739. e-mail: alpeshintown@yahoo.co.in

Objectives: 1) To know the criteria of diagnosis and management & referral rate of TB (Tuberculosis) cases. 2) To know the proportion of General Practitioner giving correct health education for TB.

Design: Cross sectional study.

Setting: Three Treatment Unit (TU) areas of RNTCP (Revised National Tuberculosis Control Programme)

in Vadodara city. Participants: 45 General Practitioners holding MBBS (Basic Medical Degree) degree. **Statistical Analysis:** Percentage & Proportion.

Results: On clinical suspicion of TB all GPs (100%) confirmed diagnosis by CBC/ESR and X-Ray chest, and only 56.66% told for sputum examination. 43.33% of GPs treat patient after diagnosis, all of them treat by their own knowledge which is not confirmed to RNTCP. All GPs didn't categorize the TB patient as per RNTCP guideline. 79% of GPs didn't have records of TB cases of they treated. Only 10% GPs screened family member. Only 46.66% GPs explained safe disposal of sputum.

Conclusion: RNTCP is India's national programme for TB control. Majority of GPs didn't manage patient of TB as per RNTCP guidelines. They did as per their own knowledge which is irrational and affects the health of the TB patient.

CLINICAL TUBERCULOSIS-II

PS-1507-21 Co-occurrence of malaria and tuberculosis in a 42 year male

B Bhushan, N C Kajal, M Singh. Department of Tuberculosis and Chest Diseases, Government Medical College, Amritsar, Punjab, India. Fax: (+91) 1752352899. e-mail: chest_bharatbhushan@yahoo.com

Co-existence of tuberculosis along with malaria is expected to be prevalent in many parts of India, as both the diseases are endemic here. Surprisingly there is hardly any published data available regarding this. More recently, animal studies have indicated that plasmodium infection may result in activation of latent tuberculosis. Recently a 42 year old male farmer presented with a 6-week history of intermittent fever and malaise. He was clinically examined and investigated after admission in the hospital. Chest radiograph showed ill-defined opacities scattered in right lung zones with hilar enlargement. Sputum examination revealed AFB in direct smear and yielded *Mycobacterium tuberculosis* in culture afterwards. He was put on ATT (DOTS) as per WHO guidelines, but the patient did not improve. His fever/malaise persisted even after 2 week treatment. He was re-investigated. This time the blood film revealed the presence of *Plasmodium vivax*. He was administered standard antimalarial chemotherapy along with ATT. The patient's fever subsided in 3 days and was normal afterwards. It is inferred that considering fever as the common presenting symptom, malaria should also be discounted in cases of tuberculosis, particularly in endemic areas.

Scott C P, Kumar N, Bishai W R, Manabe Y C. Short report: modulation of *Mycobacterium tuberculosis* infection by plasmodium in the murine model. Am J Trop Med Hyg 2004; 70 (2): 144-148.

PS-1570-21 Treatment results in a tertiary hospital with WHO based guidelines

H Calisir, A Ongel, S Bilgin, H Arda, H Altinoz, F Kucuker, G Cetintas, A Oztin, E Maden, E Kose, L Yagci, E Yenturel. Sureyyapasa Thoracic Diseases Center, Istanbul, Turkey. Fax: (+90) 2163528532. e-mail: halukcalisir@yahoo.com

We have evaluated the first two quarters of 2004 tuberculosis cases diagnosed and treated in our referral center. We used WHO standardized treatment categorisation and DOT during patients' stay in hospital. After discharge they controlled monthly and distributed drugs without supervision. 171 patients were evaluated. The treatment results of category I and category II cases whose treatment came to an end were given in table. Totally 4 patients out of all category I and II patients' treatments failed and Category IV treatment was given them. 49 patients were category III. In 85.7% of category III cases the treatment completion was achieved while 14.28% left his treatment. Sputum conversion in category I cases was 68.47% in the first month and 89.13% in the second, while in category II cases, was it 56.67% in the first and 83.34% in the second months respectively. In 4 of the 5 category II cases, sputum conversion was achieved before the treatment default. Standardized guidance based categorised approach namely WHO guideline even in tertiary hospitals is working very well.

| | Completion | Cure | Default | Failure |
|-------------|------------|-------------|------------|----------|
| Category I | 92 (100%) | 84 (91.3%) | 7 (7.6%) | 1 (1%) |
| Category II | 30 (100%) | 22 (73.34%) | 5 (16.67%) | 3 (10%) |
| Total | 122 (100%) | 106 (86.88) | 12 (9.83%) | 4 (3.27) |

PS-1581-21 Delays to diagnosis for female patients with pulmonary tuberculosis in a social security system hospital in Istanbul, Turkey

E Aksoy, T Sevim, G Horzum, G Gunduz, G Atac, B Celik, B Bicakci. Sureyyapasa Thoracic Diseases Center, Istanbul, Turkey. Fax: (+90) 2163528532. e-mail: tsevim@ixir.com

Objectives: To compare the delays in tuberculosis diagnosis among women and men and to investigate the factors affecting the delay in females.

Methods: 196 patients [104 (53%) women and 92 (47%) men] were evaluated prospectively.

Results: The mean age was lower among female (31.1 ± 14.2 years) than male patients (38.9 ± 14.2 years) ($P < 0.001$). Female patients had more index case ($P = 0.003$) and the ratio of previously treated patients were higher among male ($P = 0.027$). Women had a longer 'total delay' than men (80.5 ± 60 days for female and 64.5 ± 45.2 days for male, $P = 0.037$). 'Health care system delay' for female and male patients were 40.1 ± 44.9 and 31.1 ± 33.9 days respectively ($P = 0.11$). The difference between the female and male patients with respect to 'patient

delay' and 'delay in our clinic' were not statistically significant. Among smear-positive patients 'total delay' and 'health care system delay' were longer in female ($P = 0.02$, $P = 0.045$). Among female, the total delay were longer in patients above 30 years old ($P = 0.017$) and patients who reach to health facility more than 10 minutes ($P = 0.007$). Women who had no monthly income and above 31 years old had longer 'health care system delay' than other women ($P = 0.016$, $P = 0.01$).

Conclusion: Diagnostic delays are longer among women than men. For the effective tuberculosis control efforts, diagnostic delays had to be reduced.

PS-1647-21 Tuberculose et diabète: à propos de 30 cas

S Bousnina, K Marniche, S El Farhati, H Racil, E Gaies, A Chabbou. UR Insuffisance Respiratoire Ligue Nationale Contre la Tuberculose et les Maladies Respiratoires, Ariana, Tunisia. Fax: (+216) 70850143. e-mail: abdellatif.chabbou@rns.tn

La tuberculose (T) pulmonaire et le diabète (D) occupent une place importante dans la pathologie des maladies associées. Notre étude, a pour but de révéler les particularités cliniques thérapeutiques et pronostiques de cette association. Elle a intéressé 16 patients tuberculeux (TB) et diabétiques (DB) âgés en moyenne de 50 ans, et un groupe comparable de 47 patients TB non DB. 11 étaient connus DB, (7 sous antidiabétiques oraux (ADO) et 4 sous insuline) ; et 5 découverts lors de l'hospitalisation : 2 ont été mis sous ADO, 2 sous insuline et un sous régime. Un déséquilibre du D a été noté dans 7 cas avec 4 passages des ADO à l'insuline. Les symptômes et les délais d'évolution de la T étaient comparables dans les deux groupes. Radiologiquement, les lésions étaient plus importantes chez les patients diabétiques (bilatérales dans 62% des cas contre 23% chez les non DB). Les bacilloscopies étaient positives chez tous les patients. La durée du traitement antituberculeux a varié de 6 à 13 mois avec un délai moyen de négativation des bacilloscopies de 25 jours, comparable dans les 2 groupes. 15 des patients DB sont guéris, au prix de séquelles radiologiques dans 14 cas ; un patient avait une résistance à l'isoniazide et a évolué vers la chronicité. Nos résultats rejoignent ceux de la littérature en ce qui concerne l'âge moyen, l'étendue des lésions radiologiques et le déséquilibre du D par la T, mais nous n'avons pas noté de retard de négativation chez les DB. Les DB TB constituent un groupe de malades à haut risque justifiant une éducation du DB sur sa maladie et son traitement ainsi qu'un contrôle clinique et radiologique régulier.

PS-1677-21 Initiating Category I regimens for pulmonary tuberculosis in never treated adults prior to bacteriological results

E S Garavito, C P Saponara, I H Soto, M C Huamani, J T Chang. Hospital Sergio E. Bernales, Lima, Peru.
Fax: (+51) 1 5472121. e-mail: episaga6@viabcp.com

Objective: To initiate Category I regimens in never treated adults prior to the availability of bacteriologic results.

Methods: Retrospective chart review. Between January 2003 and June 2004, at their first visit to the Hospital Sergio Bernales in Lima, Perú, never treated patients age 15 or over meeting clinical and radiologic criteria for pulmonary TB, without risk factors for MDR-TB, were initiated on the Category I regimen prior to the availability of bacteriologic results.

Results: 95 patients were treated. Smear microscopy results were available in a mean of 3.6 days. At the time of the first visit, 86 (90.5%) of patients had pulmonary symptoms and 86 (90.5%) had a radiograph suggestive of active disease. 56 (58.9%) had a positive smear result; 57 (60%) had a positive culture result; 72 (75.8%) had both a positive smear and culture result; and 23 (24.2%) had a negative smear and culture result but good clinical response to therapy. Outcomes were: 87 (91.6%) cured, 6 (6.3%) failed, 1 (1.1%) defaulted, and 1 (1.1%) died.

Conclusions: In areas with a high incidence of pulmonary TB, it is possible to initiate therapy without bacteriology data in never treated adults based on clinical and radiographic criteria.

PS-1705-21 Results of pulmonary TB treatment in Project HOPE pilot sites in Uzbekistan

S O Tutkysbayev, M B Khodjikhonov. Project HOPE Consortium, Tashkent, Uzbekistan. Fax: (+998) 712 78 19 01. e-mail: s_tutkysbayev@nc.uz

Introduction: Regular cohort analysis of TB outcomes allows assessment of the treatment provided and better planning of activities to improve results.

Purpose: To assess the effectiveness of pulmonary TB treatment in the Project HOPE pilot sites in Uzbekistan.

Methods: Cohort results for 1732 patients registered in 2003 showed 1052 new patients, 493 (46.9%) of whom were smear positive,

Results: The following treatment outcomes for the 493 new smear positive patients were observed: cured – 368 (74.6%), treatment completed – 5 (1.0%), died – 25 (5.1%), failed – 38 (7.7%), defaulted – 36 (7.3%), transferred – 8 (1.6%). A few patients were transferred to the 2nd category treatment regimen due to clinical and X-ray deterioration of their health condition and a few patients was taken out of treatment due to absolute intolerance to TB drugs.

Conclusion: Suboptimal cure and treatment completion rates were due mainly to defaulting due to socio-

economic factors. Deaths and treatment failures due to late case identification are also important. To improve cohort results better understanding of DOTS policies, regular training, monitoring and supervision is required. IEC/BCC activities may improve patients' adherence to treatment and increase the level of knowledge and responsibility of health providers.

PS-1719-21 Surgical treatment of complicated lung echinococcosis

T M Kariev, S P Abulkosimov. Department of Thoracic Surgery, Institute of Phthisiology and Pulmonology, Tashkent, Uzbekistan. Fax: (+998) 712 781901. e-mail: m_khodjikhonov@nc.uz

Surgical treatment of complicated lung echinococcosis was performed in 62 patients at ages of 8 to 63 (43 males, 19 females). Cyst festering was observed in 37 patients, rupture into pleural cavity – in 25 patients. Before hospitalization in a clinic, complicated echinococcosis had not been diagnosed and the patients had received treatment for lung tuberculosis, pleurisy, spontaneous pneumothorax, pleural empyema. Because of diagnostic difficulties, in the clinic the correct pre-surgical diagnosis was not established in 22 patients, in which cyst festering or its rupture into pleural cavity were revealed during operation. Festered echinococcus cyst located in the right lung in 23 patients, in the left lung – in 14 patients. Cyst rupture into the right pleural cavity occurred in 16 patients, left cavity – in 9. At festered cyst the echinococectomy was performed in 16 patients, segmentary resection of lung – in 8, lobectomy – in 12, pulmonectomy – in 1 patient. At the rupture of cyst into pleural cavity the thoracotomy, ablation of shrunken chitinous membrane and lung decortication were performed in 12 patients, echinococectomy of lung and decortication – in 4, lobectomy and pleuroectomy – in 3, pulmon- and pleuropulmonectomy – in 6 patients. In all of the patients good effect was achieved after the operation.

Conclusion: Diagnostics of complicated lung echinococcosis before operation presents significant difficulties and quite often is fallacious. Surgical treatment of mentioned pathology is the basic and highly effective method of treatment.

PS-1790-21 Extreme delay in the diagnosis of pulmonary tuberculosis in Estonia

L Pehme,¹ M Rahu,² K Rahu,² A Altraja.¹ ¹Department of Pulmonary Medicine, University of Tartu, Tartu, ²Department of Epidemiology and Biostatistics, National Institute for Health Development, Tallinn, Estonia. Fax: (+372) 7318905. e-mail: Lea.Pehme@kliinikum.ee

The proportion of less extensive forms of pulmonary tuberculosis (TB) among newly detected cases in Estonia has decreased from 14.5% to 4.7% during 1992–2002 referring to an increased delay between

onset of symptoms and diagnosis. We identified the factors behind an extreme patient delay and extreme doctor delay defined as >75th percentiles of the periods between onset of symptoms and referral to the physician and between patient referral and the diagnosis, respectively. Adult patients with newly-detected culture-positive pulmonary TB ($n = 185$) were interviewed during 01.2002–12.2003 in 6 counties of Estonia. Extreme patient delay was 140 days being shorter in females (OR: 0.30, CI 0.12–0.77). Extreme doctor delay was 40 days appearing shorter in non-Estonians (OR: 0.25, CI 0.03–0.72). Extreme doctor delay was associated with missing chest radiograph at the first visit (OR: 3.39, CI 1.42–8.10), negative smear (OR: 2.24; CI 1.02–4.93), age >60 years (OR: 5.25, CI 1.81–15.25) and absence of health insurance (OR: 5.39, CI 1.77–16.4). The extreme patient delay in Estonia is longer than published elsewhere. The results indicate a need for increasing awareness of both population and physicians on TB to exploit the medical services independently on health insurance.

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PS-1928-21 Surgical treatment effectiveness in new pulmonary tuberculosis cases

G V Volchenkov, V V Skornyakov, L V Tsaplina.
Vladimir Oblast TB Dispensary, Vladimir, Russian Federation.
Fax: (+ 092) 2323265. e-mail: root@tubdisp.elcom.ru

Setting: Department of thoracic surgery of the regional TB facility in the region, implementing DOTS pilot project.

Objective: To assess the effectiveness of surgical treatment of new pulmonary TB cases as the addition to the DOTS and DOTS-Plus protocol.

Design: Retrospective analysis of 2003–2004 medical records of TB patients underwent surgery (sputum smear status, pulmonary destruction, drug susceptibility, histological and bacteriological findings in pathological tissues).

Results: The indications for pulmonary surgery for 96 patients during all phases of DOTS were: progressing infiltrative TB - 5.2%; medium and large tuberculoma - 55.2%; fibrous cavities - 13.5%; chronic fibrous-cavitary TB - 18.7%; chronic TB empyema - 7.3%. At the time of surgery 53.1% of patients were smear positive, 63.5% of patients had destructive cavities, in 32.3% of cases had TB drug resistance. Among all chronic fibrous-cavitary TB patients 33.3% were multi drug-resistant. In the cases with progressing infiltrative TB all patients underwent lobe- or pneumonectomy. In 92.7% of all cases the surgery was clinically effective (smear conversion and absence of cavities). Ineffective cases included: existing (or relapsing) smear positivity (2 cases), reactivation of TB (2 cases), 3 patients died after surgery. Hidden resistance of *Mycobacterium tuberculosis* to 1–3 TB drugs was found in 10% of all smear positive patients.

Conclusions: Appropriate (by indications and time) utilization of surgery can significantly increase the treatment effectiveness of TB patients: regarding smear conversion (by 35%) and closing cavities (by 3 times) comparing the only conservative methods.

PS-1848-21 Association between pulmonary tuberculosis and intestinal nematodes

R Tristão-Sá,¹ R Dietze,² F E P Lima.² ¹EMESCAM - Escola de Medicina da Santa Casa de Misericórdia, Vitória, Espírito Santo, ²Universidade Federal do Espírito Santo, Vitória, Espírito Santo, Brazil. Fax: (+55 27) 33357379.
e-mail: ricardotsa@hotmail.com

Pulmonary tuberculosis and intestinal nematodes are among the diseases with high prevalence in the world. Recently, it has been demonstrated that helminthic infections can predispose to other pathogens infections. We made a case-control study, in which were enrolled 58 patients with pulmonary tuberculosis and 120 controls (without TB) with similar age, sex and proceeding habitation. All cases were confirmed by positive smear or culture. The methods used in the coprologic test were Kato-Katz and Baerman-Moraes. The results show that the frequency of intestinal nematodes is significantly higher in males with pulmonary tuberculosis when compared with a male control group (OR = 3.88, CI 1.54–9.87, $P = 0.002$). The logistic regression, adjusted by age, sex and alcoholism showed that the presence of at least one nematode was independently associated with pulmonary tuberculosis. We assume that the immunomodulation induced by helminthic infection had predisposed the infection by *Mycobacterium tuberculosis*. We do not have a satisfactory explanation for the non-observation of the association between intestinal helminths and pulmonary tuberculosis in females.

PS-2003-21 The effectiveness of clinical audit in improving the quality of care provided to patients with suspected tuberculosis in their diagnostic pathway

K Siddiqi,¹ A Volz,² R Ugaz,³ J Walley,¹ E Guttozzo,³ F Torricco,² R Delgado,² M L Lambert,⁴ P V D Styft.⁴
¹Nuffield Centre for International Health and Development, Leeds, UK; ²Instituto de Investigaciones Biomedicas e Interaccion Social, Universidad Mayor de San Simon, Cochabamba, Bolivia; ³Instituto de Medicina Tropical A von Humboldt, Universidad Peruana Cayetano Heredia, Lima, Peru; ⁴Institute for Tropical Medicine, Antwerp, Belgium.
Fax: (+44) 0113 246 0899. e-mail: hssks@leeds.ac.uk

Methods: This quasi-experimental study, conducted in primary care settings in Peru and Bolivia, evaluated changes in the criteria set by clinical audit committees in respective countries following performance feedback at regular intervals.

Results: In Bolivia, interim results after one audit cycle suggest an improvement in the percentage of

suspected tuberculosis patients delivering a sputum sample (62% to 77%) and the percentage of good quality samples received (49% to 65%) in the local laboratory. In Peru, similar improvement was observed after two audit cycles in the percentage of smear negative TB patients in whom sputum cultures were requested, processed and analysed (54% to 80%). Little improvement was observed in the appropriate timing of chest radiography requests due to lack of professional consensus. Similarly, minimal improvement was observed in limiting the number of smear requests to only TB suspects due to perverse incentive created by NTP targets.

Conclusions: Clinical audit can help health professionals to improve quality where issues are under their direct influence. Quality is less likely to improve in the presence of perverse incentives and other influences. Clinical audit can act as a tool for TB programmes to improve the quality of care of TB patients by influencing process of care provision.

PS-2042-21 Correlation between regional blood flow disorders and changes in the system of hemostasis and fibrinolysis in TB patients

S B A Serebryanaya. Central TB Research Institute, Moscow, Russian Federation. Fax: (+7) 095 9638000. e-mail: citramn@online.ru

101 newly detected patients with different forms of pulmonary TB were investigated. The patients were divided into 5 groups considering the status of hemostasis and fibrinolysis: group 1 – 2 patients without disorders; group 2 – 25 patients with a tendency to hypercoagulation; group 3 – 21 patients with a significant hypercoagulation syndrome; group 4 – 43 patients with prethrombotic state; group 5 – 10 patients with a tendency to hypercoagulation under deficiency of several coagulation factors (consumption coagulopathy). In all the groups, except group 1, we revealed laboratory signs of latent intravascular blood coagulation with IBC markers: reliable growth of soluble fibrinolytic complexes and emergence of blocked fibrinogen, which should be absent in the norm. Changes in the hemostasis system were compared to the lung microcirculation disorders and evaluated by the extent and degree of regional blood flow disorders using lung scintigraphy. We found that in the most patients of groups 1 and 2 changes in the capillary blood flow of the lungs were limited to 2 zones and characterized by 0–1 degree of microcirculation disorders – 14 patients. In contrast, in the most patients of groups 3 and 4 decrease of the regional blood flow indices involved 3–4 lung zones and corresponded to 2–3 degree of capillary blood flow disorders (2 degree in 34 patients and 3 degree in 53 patients). In group 5 microcirculation changes were intermediate to the upper groups. We conclude that the microthrombotic process due to hypercoagulation changes in the he-

mostasis system is a very important component of the lung microcirculation disorders in pulmonary TB patients.

PS-2049-21 Vitamin D status of tuberculosis patients and healthy blood donors in Samara City, Russia

A R Martineau,^{1,2,3} Z J Maunsell,⁴ Y Balabanova,^{5,6} I Fedorin,⁶ F A Drobniowski,⁵ R J Wilkinson,^{2,3} C J Griffiths.¹
¹Institute of Community Health Sciences, Barts and The London, London, ²Wellcome Centre for Research in Clinical Tropical Medicine, Imperial College, London, UK; ³Institute of Infectious Diseases and Molecular Medicine, University of Cape Town, Cape Town, South Africa; ⁴Department of Clinical Biochemistry, Northwick Park Hospital, London, ⁵HPA Mycobacterium Reference Unit, London, UK; ⁶Samara TB Service, Samara Oblast Dispensary, Samara City, Russian Federation.
 Fax: (+44) 2078826396. e-mail: a.martineau@qmul.ac.uk

Introduction: Tuberculosis is a significant public health problem in Samara Region, Russia, where the incidence of new cases was 74.9/100 000 in 2002. Samara City is situated at 52°N; at this latitude, solar radiation only converts the vitamin D precursor 7-dehydro-cholesterol to vitamin D₃ from April to October. This mechanism provides most of the human vitamin D requirement; residents of Samara City may therefore be at risk of vitamin D deficiency in Winter and Spring. Vitamin D deficiency has been associated with susceptibility to tuberculosis in London. We determined the vitamin D status of a group of tuberculosis patients and healthy blood donors in Samara City to explore whether vitamin D deficiency is a clinical problem in this setting.

Methods: We assayed serum 25-hydroxy-vitamin D (calcidiol) in 57 healthy blood donors (11 female, age range 18–52, median age 22) and 49 TB patients on treatment (15 female, age range 17–73, median age 39; 5 HIV sero-positive) in Samara City within a 2-week period in May 2004.

Results: Vitamin D deficiency (serum calcidiol <27.5 nmol/l) was more common among TB patients than blood donors (26/57 vs. 9/49, $P < 0.01$).

Conclusions: This observation may be explained by decreased sun exposure in patients compared to blood donors; effects of anti-tuberculous therapy on vitamin D levels among patients; differences in age distribution between patients and blood donors; or by vitamin D deficiency pre-dating the development of active tuberculosis among patients.

PS-2098-21 The main characteristics of extrapulmonary tuberculosis

R M Rajnoveanu, C M Pop, M A Man. Department of Pneumology, University of Medicine and Pharmacy Cluj-Napoca, Romania, Cluj-Napoca, Romania.
Fax: (+40) 264591263. e-mail: andra_redro@yahoo.com

The aim of this retrospective study was to assess the main characteristics of extrapulmonary tuberculosis (ETB) cases in Cluj County in 2003. We studied 126 new cases of ETB diagnosed in the Pneumology Clinic Cluj-Napoca between 2002–2003. The patients were aged between 20 and 78 years. We analyzed the medical records. Most cases were males (62.7%). The most affected were people between 20–29 years and those of 50–59 years. Patients from urban environment (61.9%) were predominant. In most cases the diagnosis was made on histopathological findings (77.8%), bacteriologically in 16.7% cases and on clinical and radiological methods in 5.5% cases. HIV test was negative in all patients. The most commonly involved sites were pleura (66.6%), bone and joint TB in 10 cases (7.93%), kidney tuberculosis in 5.55% cases, pericarditis and lymph nodes lesions in 2.38% cases. 15.08% patients had ETB located at other sites. In 11.1% cases ETB involved more than one sites. The tuberculin skin test was performed in 82 patients. It was significantly positive (>10 mm induration) in 62.2% patients. In the last years the incidence of extrapulmonary tuberculosis has increased.

PS-2102-21 Clinical and epidemiological features of 100 cases of tuberculosis relapses in a Romanian Pneumology Hospital

C M Pop, R M Rajnoveanu, M A Man. Department of Pneumology, University of Medicine and Pharmacy Cluj-Napoca, Romania, Cluj-Napoca, Romania.
Fax: (+40) 264591263. e-mail: cpop@umfcluj.ro

The aim of the study was to assess the characteristics and the risk factors which lead to these relapses. We performed a retrospective study on 100 patients with tuberculosis relapses hospitalized between 2001–2004 in the Pneumology Clinic Cluj-Napoca. We analyzed the patient medical records. The results showed that the disease affects especially: males (75%), active people (31–40 years: 25%, 41–50 years: 28%) and subjects from urban areas (51%). The workers (46%) and the unemployed (34%) were more exposed. Other causes that influenced the onset of the relapses were: the unfit living conditions (48%), smoking (67%) and alcohol (60%). 32% patients had other concomitant diseases. The morphopathological pattern of the tuberculous lesions were: 63% fibrocaseous cavitory form, 22% had infiltrative lesions and 4% had pleural effusion. At admittance the microscopy was positive in 65% cases. 14% patients presented chemoresistance: 11% secondary and 3% primary chemoresistance. 28 patients were treated

after individualised schemes and 14% had drug intolerance. The noncompliance was the main factor for relapse (55%). In 70% cases we find more than 1 cause for the disease. In 5% cases we could not identify any risk factor for the disease.

PS-2207-21 Smoking and tuberculosis

A Öngel, F Küçük, U Bilgin, H Altinöz, H Çalışır. Süreyyapa Training Thoracic Disease Hospital, Istanbul, Turkey.
Fax: (+90) 21663528532. e-mail: halukcalisir@yahoo.com

430 bacteriologically and histopathologically diagnosed tuberculosis patients in 2004 in our Clinic were evaluated for the effect of smoking on tuberculosis and the parameters affecting the smear conversion in the first and second months of therapy. 220 of the 430 (51.2%) were nonsmokers while 210 (48.2%) were active smokers. 82.9% of the smokers male and 17.1% female. 40% of smokers were under age 45 52.9% were category I, 19.2% were category II and 27.9% were category III. 39.6% of the patients' lesions were bilateral. 73.6% of the nonsmokers was female while 26.4% male. The under 45 aged was 78.6%. 50.5% were categorised as category I and 15.5% as category II and 58% as category III. 32.1% was radiologically bilateral. With the help of chi-square test we concluded that first month conversion of smear of the 279 (+) patients were low in men, in the people aged above 45, in the category II patients, in smokers, in the existence of co-illness. The second month conversion was low in men, over 45 aged, in category II patients, in smokers, in diffuse and bilateral radiology, in the resistants. When evaluated with logistic regression test the first month sputum conversion test was meaningfully affected with male gender, category II patients and with the existence of another illness ($P = 0.028$, $P = 0.015$, $P = 0.023$). The parameters meaningfully affecting the second month conversion were being above 45, the presence of resistance and being radiologically diffuse ($P = 0.005$, $P = 0.013$, $P = 0.008$). Even if it is not meaningful in the logistic regression analyse smoking has to be estimated as a factor in the sputum conversion with the other parameters.

PS-2073-21 Tuberculous empyema necessitatis

G Dabak, F Sungun, M Ozdemir, E Ozturk, A Saygi. Heybeliada Chest Diseases Hospital, Istanbul, Turkey.
Fax: (+90) 216 351 19 94. e-mail: dgdrabak@hotmail.com

Empyema necessitatis is the extrapleural transthoracic extension of an inflammatory process of the pleural cavity mainly caused by mycobacteria, actinomyces and nocardia. It is a rare entity in the postantibiotic era. We report a 26-year-old male patient with complaints of pleuritic pain on the right which started 2 months prior to admission and recent tender swellings on his chest. Except for three slightly tender swellings on his chest with fluctuance (two of them

on parasternal localization and one located laterally), he appeared well without discomfort and was afebrile. Chest X-ray showed pleurisy on the right which was quite dense under ultrasonographic examination. Thoracentesis drained no fluid. Thorax computerized tomography confirmed empyema on the right which extended extrapleurally into the thoracic structures in different locations as seen on patient's chest. Laboratory tests revealed mild leucocytosis with lymphocytic predominance, high erythrocyte sedimentation rate and slightly elevated liver enzymes. Mantoux skin test was 19 mm. Each swelling on his chest was aspirated and then drained surgically. Aspirated material was in the form of pus and cultures were later found to be positive for acid-fast bacilli. Tissue biopsy from one of these swellings yielded the diagnosis of tuberculosis. The patient was started on antituberculous treatment with four major drugs and he is still under treatment with favorable outcome so far. Although quite rare, tuberculous empyema necessitatis is a complication of tuberculosis which requires drainage and proper antituberculous medications.

PS-2279-21 TB in Republic of Chechnya, Russian Federation: information 3-treatment of TB patients

Z K H Kornilova,¹ V A Puzanov,¹ V V Punga,¹ KH Isaev.²

¹Central TB Research Institute, Moscow, ²TB Dispensary, Grozny, Russian Federation. Fax: (+7) 095 9638000. e-mail: citramn@online.ru

Nowadays, in RCh it is available 385 beds for treatment of TB patients, of them 200 beds are in Grozny, which do not correspond to sanitary norms. Of 3004 newly revealed patients with active TB for 2002 – 2004yy. are admitted for treatment only 1069 people because of lack of sufficient bed fond. Supply of TB drugs of the 1st and reserved lines is extremely unsatisfactory. There are lack of drugs for treatment of TB patients, because of which it is needed to interrupt treatment, which is sufficiently decreases its effectiveness. Closing of cavities of decay in newly revealed patients in 2002 y. compiled – 32.7%; in 2003y. – 52.6 (?)% and in 2004y. – 43.4%. Cessation of bacteria discharge (by results of bacteria scopy) composes: in 2002y. – 35.5%; 2003y. – 58.0% and 2004y. – 58.8%. Surgical treatment is done abroad of RCh. Index of clinical recovery of newly revealed patients with TB of respiratory organs composed in 2004 year 20.6%. It is necessary to provide all newly revealed patients by treatment in stationaries; to restore bacteriological laboratory, to train phthisiatricians to conducting of treatment-diagnostic measurements and TB monitoring; provide steady reserve of TB drugs; assist to realization of joint international programs on diagnostic and treatment of TB patients on the territory of RCh.

PS-1714-21 Surgical treatment of fibrous-cavernous TB of lung in women of reproductive age

A A Irgashov, T M Kariev, S P Abulkasimov, E V Samatov. Department of Thoracic Surgery, Institute of Phthisiology and Pulmonology, Tashkent, Uzbekistan. Fax: (+998) 712 781901. e-mail: m_khodjikhonov@nc.uz

Surgical treatment of fibrous-cavernous TB of lung was performed in 137 women. Duration of disease was from 1 to 5 years. It is established, that the tuberculosis was revealed untimely in 86.1%, during pregnancy and after parturition - in 56.2%. 30.6% of patients had tubercular contact. Among accompanying diseases the anemia was diagnosed in 90.5%, chronic bronchitis – 11.7%, gastritis – 5.8%, hepatitis – 29.9%, a diabetes – 2.9%. Unfavorable social and economic conditions were available for 18.2% of patients. The complex of the specified reasons served as the reason of formation of fibrous-cavernous tuberculosis of lung. In 89.8% of patients mycobacteria of tuberculosis were found in phlegm, in 16.8% the lung tuberculosis had been complicated with spontaneous pneumothorax and pleural empyema, in 13.9% - with pulmonary haemorrhage. Because of the disease, the early disablement occurred in 94.9%, disintegration of family occurred in 20.4%. After preoperative treatment during 2–4 months the partial resection of lung was performed in 75 patients (54.7%), pneumonectomy – in 57 (36.5%), thoracoplastics - in 12 (8.8%). Good effect was achieved in 117 patients (85.4%), at lethality in 11 (8.0%). After the operation 99 women (72.2%) have continued normal family life. In 3 years 14 women after partial resections of lung and 4 women after pneumonectomy have given birth and bring up healthy children.

Conclusion: In women of reproductive age the chemotherapy is inefficient because of delayed diagnostics and forming of extensive and complicated fibrous-cavernous lung tuberculosis. Surgical treatment promotes improvement of 85.4% of patients and improvement of quality of life

PS-1718-21 Results of treatment of newly diagnosed pulmonary

S U Sabirov, T M Kariev. Department of Thoracic Surgery, Institute of Phthisiology and Pulmonology, Tashkent, Uzbekistan. Fax: (+998) 712 781901. e-mail: m_khodjikhonov@nc.uz

The first revealed lung tuberculosis and spontaneous pneumothorax was diagnosed in 146 patients (103 males, 43 females) at ages of 14 to 67. Tuberculosis of the right lung was revealed in 25.3%, of the left lung – in 38.4%, of both lungs – in 36.3%, spontaneous pneumothorax correspondingly – 38.4%, 58.9% and 2.7%. The spontaneous pneumothorax has began at disseminative tuberculosis in 37 patients (25.3%), at infiltrative – in 71 patients (48.6%), at cavernous – in

16 (11.0%), at fibrous-cavernous TB – in 22 patients (15.1%). Excretion of bacteria in phlegm was revealed in 67.8%, in pleural contents – in 31.5%. All the patients received chemotherapy with 4–5 preparations (H, R, Z, E, S) and general restorative treatment. After puncture-aspiration treatment and draining of pleural cavity good effect was established in 54 patients (37.0%) from 146, satisfactory results – in 24 (16.4%), unsatisfactory results – in 19 (13.0%). 17 patients (11.6%) have died from progress of pleural TB, pleural empyema and cardiovascular deficit. At ineffectiveness of sanation by puncture and draining of pleural cavity the surgical treatment was performed in 32 patients (21.9%): pneumonectomy – in 21, pleuroectomy and partial resection of lung – in 4, pleuroectomy – in 7 patients. Good results were achieved in 26 patients (81.3%), lethality – in 5 patients (15.6%)

Conclusion: Despite the clinical heaviness of first revealed lung tuberculosis and spontaneous pneumothorax, chemotherapy and consistent puncture aspiration, draining of pleural cavity and surgical treatment promote the achievement of good results in 71.2% of patients with heavy lung and pleural pathology.

THE FIDELIS INITIATIVE: EXPERIENCES FROM THE FIELD

PS-1270-21 Evaluation of a tracing method for tuberculosis cases by an internet-based surveillance system

Z-W Wang, X-Hua Tang, J-L Wu. Tuberculosis Control Dispensary, Sichuan Center for Disease Control and Prevention, Chengdu, Sichuan, China. Fax: (+86) 2887515419. e-mail: kidwei@tom.com

Objective: To explore methods of recruiting tuberculosis cases that reported by internet-based surveillance system, so enhance DOTS detection rate.

Methods: We use FIDELIS funds (Fund for Innovative DOTS Expansion through Local Initiatives to Stop TB) and Set up a tracing system composed of county-town-village network in 50 project counties, and have traced 5014 cases from the Surveillance System, and up-built Township smear-sputum-sites for cases' convenience, and all processes are funded by FIDELIS. We compared the project counties' tracing with other 50 no tracing-network counties, which traced 2746 cases.

Results: Project counties and no-project counties' tracing rates of cases from Surveillance System have statistical significance regardless smear positive, negative or non-smear sputum before traced. Focusing on the tracing back rates of Surveillance System's smear positive cases and non-smear sputum cases, the two groups have analyzed as statistical signifi-

cance, too. Smear positive rates of cases that traced back to DOTS dispensaries have no statistical significance between two groups.

Conclusion: A systemic tracing system of county-town-village network, township smear-sputum-sites and fund for inspiration can enhance the DOTS detection rate of cases from Internet-based Surveillance System.

PS-1354-21 Developing urban DOTS through tertiary and secondary level government hospitals

N Safdar,¹ A Khan,¹ K Shah,² B Darakhshan,³ A Akbar,³ H Ahmed,¹ A Nazir.¹ ¹Association For Social Development, Islamabad, ²National TB Control Programme, Islamabad, ³Provincial TB Control Programme, Lahore, Pakistan. Fax: (+92) 051 2871254. e-mail: asd@asd.com.pk

Introduction: Tertiary and secondary hospitals pose different set of challenges to implement DOTS for majority of poor TB patients in urban areas. Effective DOTS implementation in hospitals would facilitate access and in turn would enhance the case detection and treatment success in public sector.

Objectives: To enhance detection of TB cases and treatment in 43 government hospitals in twelve districts of Pakistan through public-private mix and develop, evaluate and expand innovative approaches to enhance TB case detection.

Method: The feasibility and effectiveness of interventions is being assessed by conducting programme review of implementation experience.

Result: The FIDELIS-II supported project during its one-year of implementation has significantly increased number of smear positive TB cases registered, i.e., 1039 to 3454, smear conversion from 58% to 88% and treatment success from 55% to 80%, i.e., bringing down the default rate from 41% to 8%. It has enabled us to understand the context of delivery and relatively unique TB care implementation process in hospitals.

Conclusion: The project benefited 25.4 million population with free of cost standardized TB DOTS services during period of one year. The approach has been refined and is being expanded to other districts of Pakistan.

PS-1522-21 Enhancing standard of care for tuberculosis patients consulting private practitioners in Jogjakarta and Bali provinces, Indonesia: results from a 2004 FIDELIS project

A Utarini,¹ A Mahendradhata,¹ B Syahrizal,¹ I D Rusen.² ¹Center for Health Service Management, Gadjah Mada University School of Medicine, Yogyakarta, Indonesia; ²Department of Scientific Activities, The Union, Paris, France. Fax: (+62) 547487. e-mail: ymahendradhata@itg.be

Background: In Asia, an estimated 60% of tuberculosis patients consult private practitioners (PP) for

their illness and may receive sub-standard care. Through FIDELIS, we developed a model to optimise the role of PPs in tuberculosis control in Indonesia.

Method: Following a situational analysis, a public-private mix model was piloted in Jogjakarta and Bali provinces. The model included a lunch seminar with expert-facilitated discussions on DOTS and a review of the potential roles for PPs. Participating PPs were followed by academic detailers to discuss operational issues, provide updates and collect data.

Results: In Jogjakarta, 215 of 961 participating PPs were active during the project. Of 510 suspects identified, 123 (24.12%) were smear positive, 121 (23.72%) were smear negative, and results were unknown for 266 (52.16%). In Bali, 121 of 320 participating PPs were active during the project. Of 317 suspects identified, 62 (19.56%) were smear positive, 235 (74.13%) were smear negative, and 20 (6.31%) was unknown.

Conclusions: This public-private mix model was rapidly implemented and could be a model for improving case management in the private sector. Further efforts should focus on increasing number of suspects identified by PPs.

PS-1668-21 Reaching targets through community based DOTS by mobilizing society and maintaining quality of DOTS services in rural Bangladesh

B Roy, M H Khan, I Begum, M A Islam, M K Barua, F Ahmed. Health and Nutrition Programme, BRAC, Dhaka, Bangladesh. Fax: (+880) 2 8823542. e-mail: roy_b60@hotmail.com

Introduction: BRAC strengthened DOTS program in 5 low performing districts in Bangladesh in April 2004 with the support of fidelis and national TB program covering 15.4 million populations.

Objectives: 1) To increase case detection of new smear positive cases from 30/100 000 to 52/100 000 population. 2) To ensure cure rate more than 85% of new smear positive cases. 3) To strengthen one external quality assessment laboratory.

Methods: Female community health volunteers (CHVs), private practitioners, pharmacists, village doctors and community leaders were trained on TB to refer TB suspects. DOT is ensured mainly by CHVs. Decentralized sputum collection centers were organized in remote villages to increase accessibility. Peripheral and external quality assessment laboratories were established to maintain the quality of smear examination.

Results: In 11 months, 7141 new sputum positive patients were diagnosed, of which 6217 from limited access areas. So, the program achieved case detection of 51/100 000 against target of 52/100 000 population. Sputum conversion and cure rates of new sputum positive cases were 96% and 94% respectively.

Conclusions: A concerted effort through mobilizing

CHVs, private practitioners and society found to be effective approach. However, the quality of diagnostic and treatment services is also crucial to reach the targets.

PS-1672-21 Urban DOTS in Bangladesh

M Rifat, M H Mahmud, B Haque, M A Islam, F Ahmed. Health and Nutrition Programme, BRAC Bangladesh, Dhaka, Bangladesh. Fax: (+880) 28823614. e-mail: rifat.m@brac.net

Introduction: BRAC, an NGO expanded DOTS program in urban areas in 5 cities in Bangladesh in October, 2004 with the support of fidelis and national TB program covering population of 8.3 million.

Objectives: To implement a patient friendly DOTS approach by involving workplaces, private and corporate sectors, to increase case detection from 9/100 000 to 40/100 000 and cure at least 85% of them.

Methods: Female community health volunteers (CHVs), private practitioners, physicians of academic institutes, pharmacists, village doctors were trained on TB. They refer TB suspects and provide DOT according to the patients' convenient time and place. Decentralized sputum collection centers are organized in different slums and work places to increase the accessibility of working people.

Results: In 5 months a total of 1281 new sputum positive patients were diagnosed. Of them, 1009 were from limited access areas. Sputum conversion rate was 91%. The program achieved case detection of 15/100 000 in 5 months against target of 40/100 000 population.

Conclusions: DOTS expansion in urban areas is challenging. A concerted effort through mobilizing CHVs, private practitioners and pharmacists is found to be effective. However challenge remains to reach the workplaces and private sectors.

PS-1682-21 Deployment of trained community volunteers to increase tuberculosis case detection in North Sumatra: a FIDELIS initiative

S R Arbaningsih,¹ I D Rusen,² H Delyuzar,³ H Ruswardi,⁴ F Sulani.⁵ ¹Department of Prevention and Eradication for TB, Networking for Community Welfare and Health, Medan, North Sumatra, Indonesia; ²Unit of Scientific Activities, International Union Against Tuberculosis and Lung Disease, Paris, France; ³Department of Pathology, Networking for Community Welfare and Health, Medan, North Sumatra; ⁴Department of Pulmonary Medicine, Networking for Community Welfare and Health, Medan, North Sumatra; ⁵Department of Tropical Medicine and Infectious Disease, Provincial Health Office, Medan, North Sumatra, Indonesia. Fax: (+61) 414 8408. e-mail: arbaningsih@telkom.net

Background: Indonesia remains the world's third highest-burden country with an estimated 282 000 new smear positive cases in 2003. Moreover, the most recent country case detection rate estimate for 2004 was 51.8% (below the 70% global target). A 2004

FIDELIS project trained community volunteers to increase case detection in North Sumatra province.

Method: The target population was 5.6 million people in five districts in North Sumatra. An initial 500 community volunteers were trained to increase community awareness, encourage symptomatic people to attend health centers and support newly diagnosed patients throughout their treatment.

Results: Of 500 community volunteers initially trained, 360 remained active during the project. Between July and December, 2004, 2627 new smear positive cases were detected in the project area compared to 1350 during the same time period of the previous year. Active community volunteers each identified approximately 10 suspects per month and led to the detection of 1–2 new smear positive case per month from each volunteer.

Conclusion: The deployment of several hundred community volunteers coincided with a marked increase in case detection. Careful examination of the case detection trends in surrounding districts will more clearly highlight the impact of these community volunteers.

PS-1692-21 Analysis of establishing sputum microscopy centers in selected township health facilities to increase case detection

X-F Li. Xianyang CDC TB Control Division, Xianyang, Shaanxi Province, China. Fax: (+910) 3217205.
e-mail: jhbfzk@yahoo.com.cn

Objective: To increase case detection of new smear positive (S+) TB by establishing microscopy center (MC) in some township hospitals for easier access of sputum examination of new and follow-up TB patients.

Methods: With the financial support from FIDELIS project, 32 new microscopy centers are established in every 100 000–150 000 population per county with 20 km to accessible health service in addition to the existing 18 MCs in 18 project counties. All necessary facilities are equipped to the newly established MCs with required training for doctors in the department of internal medicine and lab technicians and IEC materials.

Results: Case detection of new S+ patients increases by 277% comparing with the previous year, including 87% patients with limited access to health service. The distance of MCs away from patients decreases from 60 km to currently 20 km. 68% symptomatic seek care within 8 weeks, 50% suspects are diagnosed within 1 week and 64% diagnosed patients start their treatment within 1 week after their diagnosis. Compared with the previous year, the seek-care delay, diagnosis delay and treatment delay was ameliorated.

Conclusion: The access of service and case detection has been improved by establishing new MCs.

PS-1860-21 Tuberculosis laboratory QA/QC: a critical programme factor

C Akoru,¹ S Chobore,¹ N Bhakta,² N Buziba,¹ E J Carter.²

¹Moi Teaching and Referral Hospital, Eldoret, Kenya;

²Brown Medical School, Providence, Rhode Island, USA.

Fax: (+1) 401-793-2266. e-mail: E_Jane_Carter@Brown.edu

Background: The backbone of a TB treatment program lies in the laboratory where diagnosis is confirmed. During the implementation of a FIDELIS funded community based active case finding project in Eldoret, Kenya, strengthening of laboratory services was emphasized.

Methods: To ensure accurate diagnostic results, re-training of all technicians on sputum smear microscopy, staining techniques and Ziehl Neelson methodology was performed and a Quality Assurance/Quality Control (QA/QC) program was instituted.

Results: During January 2005, QA/QC was conducted at six sites. A total of 76 slides were examined: 56 smear positive and 20 smear negative. Of the smear negative slides, 20/20 were in agreement after inspection. Among the positive slides, 47/56 were confirmed positive with three sites reporting two or more false positive results. The most common reasons for disagreement after external review were confusion between artifacts resembling acid fast bacilli, misreporting of acid fast cocci as mycobacteria and unconfirmed initial results where one acid fast bacilli was recorded.

Discussion: Four major factors—no AFB microscopy experience, minimal microscopy practice after formal training, the lack of immediate supervision, insufficient lab specimens to maintain proficiency—may have contributed to a number of false positive results.

PS-1868-21 To explore the impact of incentive mechanisms contributed to the Hunan FIDELIS project

E Y Liu,¹ S M Cheng,¹ X W Jian,² X G He,³ H L Yang.³

¹National Center for TB Control and Prevention, China CDC, Beijing, ²Department of Disease Control, Hunan Health Bureau, Changsha, Hunan, ³Hunan Provincial TB Institution, Changsha, Hunan, China. Fax: (+86) 1063029984.

e-mail: liueryong@chinatb.org

Background: Weak referral system is long been considered a major obstacle in TB control in China. 2000 National survey show: 93% TB suspects have consulted the county general hospital; 86% patients were diagnosed in general hospital; only 30%–50% of TB patients were referred. Workshops participated by high level TB experts in China identified lack of incentive is the main reason for the weak referral system.

Objective: FIDELIS project covered 3 prefectures in Hunan province. The goal is to increase the case detection through strengthening the referral management. It is also an operational research to explore the methodology of designing incentive mechanism.

Methods: Incentive mechanism as follow: If a doctor referred a suspect to TB dispensary, he or she will get \$0.6 as rewarded, if a smear positive, will get \$2.4, if a smear negative, will get \$1.2. Also designed the punishment mechanism: fine and reduced disbursement for hospitals which did not implement the referral system properly and the performance of referral is one of the indicators for annual assessment

Results: Through the implementation of incentive mechanism, greatly mobilized the enthusiasm of doctors and hospitals towards referral, and unified the interests of project and individual doctor. The case detection of new smear positive increased 114%, and referral rate reached 91%. Meanwhile, the case detection in Non-FIDELIS project only increase 19% in Hunan province.

Conclusion: Incentive mechanism is a very crucial factor for ensuring the success of the project, but till now, it is very difficult to isolate the impact of incentive mechanism from the impact of other interventions taking place concurrently.

PS-1869-21 Impact of administration intervention on the public-public mix for DOTS in Hunan FIDELIS Project

S M Cheng,¹ X W Jian,² Y Xie,² Z J Kuang,³ Y F Chen,³ E Y Liu.¹ ¹National Center for TB Control and Prevention, China CDC, Beijing; ²Department of Disease Control, Hunan Health Bureau, Changsha, Hunan; ³Hunan Provincial TB Institution, Changsha, Hunan, China. Fax: (+86) 106 302 9984. e-mail: smcheng@chinatb.org

Background: Nationwide Random Survey for the Epidemiology of Tuberculosis in 2000 in Hunan indicates that only 30–50% TB cases/suspects are referred from general hospital to TB dispensary. Hence, it is important to conduct health administration interventions to strengthen PPM-DOTS.

Objective: To strengthen the commitment of PPM-DOTS and the cooperation between clinical medical system and TB dispensary system through health administration interventions.

Methods: Hunan Provincial Health Bureau issued documentations to clarify the commitment of PPM-DOTS and the main responsibility of DOTS units. Material/spiritual intervention and incentive mechanism for DOTS units were developed. The training course was held for the director and key staff of PPM-DOTS units. M&E to hospitals and TB dispensaries were conducted.

Results: The cooperation mechanism for PPM-DOTS was established. The referral rate increased from 30–50% to 91%, and the number of referral township hospital increased from 230 to 724. For the new smear positive cases, case detection rate increased 114% by Sep. 2004 and cure rate was 93.1% from October 2003 to March 2004.

Conclusion: To strengthen PPM-DOTS commitment in health units through health administration inter-

vention is a very important strategy. The Successful experience of Hunan FIDELIS project has made remarkable contribution to PPM-DOTS expansion in China.

PS-1948-21 Method of studying TB awareness and survey of TB awareness among the general population

G X He,¹ M Xu,¹ H Xing,¹ J P Cao,² L Y Zhang.² ¹National Center for Tuberculosis Control and Prevention, China CDC, Beijing; ²Hebei CDC, Shijiazhuang, Hebei, China. Fax: (+86) 1063029984. e-mail: heguangxue@chinatb.org

Background: The national standard questionnaire and method to study TB awareness among general population are not available.

Objective: To develop standard questionnaire and method to study TB awareness among general population in Hebei FIDELIS project area.

Methods: Standard questionnaire was developed and assessed in terms of reliability and validity; different methods of questionnaire interview were conducted and compared; cluster sampling method was used to study the TB awareness among general population in 45 Hebei FIDELIS counties.

Results: Indicators of reliability and validity were developed; the TB awareness rate among general population in 45 Hebei FIDELIS counties was 85%, among which TB prevention awareness rate was 85%, TB diagnosis and treatment awareness rate was 80% and the awareness rate of free TB treatment policy was 90%.

Conclusion: The questionnaire was high in both reliability and validity and it can be used as a standard questionnaire to study the TB awareness among general population. The questionnaire interview conducted by college students was most objective and scientific. The TB awareness rate among general population in 45 Hebei FIDELIS counties increased from 32% to 85%, indicating the strategy of FIDELIS has effectively increased the level of TB knowledge and should be expanded.

PS-2246-21 Barriers to DOTS implementation in Eldoret, Kenya

E J Carter,¹ N Bhakta,¹ M Kumar,¹ S Kiboi,² J M Chakaya.³ ¹Brown Medical School, Providence, Rhode Island, USA; ²Moi Teaching and Referral Hospital, Eldoret; ³National TB and Leprosy Program, Eldoret, Kenya. Fax: (+1) 401-793-2266. e-mail: E_Jane_Carter@Brown.edu

Background: FIDELIS funding enabled a DOTS strengthening program in Eldoret, Kenya. The objective of the grant was to initiate a community based active case finding intervention to decrease the burden of TB in the community. The project sought to improve all the elements of the DOTS strategy with particular emphasis placed on diagnosis, adherence, and supervision.

Results: Despite the commitment of the National Leprosy and Tuberculosis Program (NLTP) to the DOTS strategy, multiple unforeseen barriers were discovered. First, the lack of systematized supervision in the area resulted in poor record keeping; errors in the registry were common and made tracking difficult. Second, local assumptions that TB and HIV/AIDS were always linked caused many suspects to mistrust screening despite free and immediate availability of tests. The most significant barrier found, however, was the demoralization of Ministry of Health and NLTP staff. Requests for incentive pay and refusal to perform sputum smears were common among lab personnel and slowed program expansion.

Conclusion: Demoralization of work staff remains the most significant hurdle to implementation of TB interventions in the environs of Eldoret, Kenya. Strengthening of the supervisory strategies for the NLTP is underway and will assist in decreasing barriers to DOTS expansion.

PS-2306-21 Community approach to TB control

L Chesire, S Kiboi. Moi Teaching and Referral Hospital, Eldoret, Kenya. e-mail: lucy_chesire@yahoo.com

Background: The success of any TB programme, starts when the community is involved and thus take leadership in contributing to the DOTS strategy. Through FIDELIS, the number of case detection rates has tripled to 500/100 000 within Eldoret municipality (slum areas) which has a population of less than 250 000.

Method: To ensure case detection community involvement and empowerment, through local, district, opinion leaders, identified cough monitors play a major role in the identification process through the TB community centered interventions.

Results: Within a period of 8 months, case detection has increased from 300 smear positive cases to 1500 new smear positive cases with several smear negative from the 10 000 TB suspects screened. Using the fliers approach has been very significant.

Conclusion: It is vital to establish new techniques in case detection to avoid missed/reported cases by the TB Programmes. The community thus has to be empowered and involved in the case finding, DOT support groups and patient adherence issues.

ABSTRACT PRESENTATIONS SATURDAY 22 OCTOBER 2005

THEMATIC SLIDE PRESENTATIONS

TB EPIDEMIOLOGY IN SPECIAL POPULATIONS

TS-1606-22 Universal tuberculosis genotyping experience in six low-incidence states: United States, 2000–2003

M B Haddad,¹ L Diem,¹ J Bettridge,² T Oemig,³ D D Ingman,⁴ C Winkler,⁵ A Lynch,⁶ J T Montero,⁷ M D Cave,⁸ K Ijaz.¹ ¹Centers for Disease Control and Prevention, Atlanta, Georgia, ²Colorado Department of Public Health and Environment, Denver, Colorado, ³Wisconsin Department of Health and Family Services, Madison, Wisconsin, ⁴Montana Department of Public Health and Human Services, Helena, Montana, ⁵West Virginia Department of Health and Human Resources, Charleston, West Virginia, ⁶Iowa Department of Public Health, Des Moines, Iowa, ⁷New Hampshire Department of Health and Human Services, Concord, New Hampshire, ⁸University of Arkansas for Medical Sciences, Little Rock, Arkansas, USA. Fax: (+1) 404-639-8958. e-mail: maryam.haddad@cdc.hhs.gov

Objective: To implement genotyping methods for characterizing *Mycobacterium tuberculosis* transmission in six US low-incidence states (<3.5 cases / 100 000 population).

Methods: During October 2000–December 2003, Colorado, Iowa, Montana, New Hampshire, West Virginia, and Wisconsin submitted isolates to the Centers for Disease Control and Prevention from all available culture-confirmed TB cases. A within-state genotype cluster was defined as ≥ 2 isolates that matched by spoligotyping, mycobacterium interspersed repetitive units, and IS6110-based restriction fragment length polymorphism methods.

Results: Of the 728 isolates submitted, 94 (13%) formed 36 clusters. Within states, the proportion of isolates that clustered ranged from 0% (New Hampshire) to 38% (Montana). Most clusters (i.e., 23 of 36, or 64%) were pairs; 13 included ≥ 3 patients. Epidemiologic links suggesting transmission within the study period could be established for 12 (52%) of the 23 pairs and in 10 (77%) of the 13 larger clusters. In 6 (27%) of these 22 epidemiologic-linked clusters, no links had been suspected until after matching genotype results prompted further investigation.

Conclusions: Most culture-confirmed cases in these low-incidence states were not part of genotype clusters, suggesting either imported infection or remote transmission. Matching genotypes brought about the

discovery of recent transmission that might have otherwise remained undetected.

TS-1615-22 Cost-effectiveness of quantiferon screening for new immigrants to Canada

O Oxlade, K Schwartzman, D Menzies. REU, Montreal Chest Institute, Montreal, Canada. Fax: (+1) 514-843-2083. e-mail: olivia.oxlade@mcgill.ca

Objectives: Controversy exists about what is the best method for prevention of TB in new immigrants. Chest radiography (CXR) is currently used in Canada, however, this method has been criticized. Some have advocated tuberculin screening, and now, several new tests that measure interferon gamma production have been licensed. Our objective is to conduct a formal cost-effective analysis of Quantiferon Gold screening for new immigrants to Canada.

Methods: Markov modeling was employed to compare, using different screening strategies, the cumulative probabilities of TB morbidity and costs over 5 years, for 3 hypothetical cohorts of 10 000 new immigrants arriving in Canada from 3 countries. Probabilities of TB related outcomes and health system costs were derived from the published literature.

Results:

| | USA | Russian Federation | Haiti |
|------------------------------------|-------------|--------------------|-----------|
| No screening: | | | |
| Prevalent cases on arrival | 5 | 20 | 30 |
| Incident cases occurring in Canada | 1.45 | 25.77 | 47.36 |
| CXR screening: | | | |
| Incident cases prevented | 0.08 | 1.4 | 2.59 |
| Cost per entrant | \$35.37 | \$110.57 | \$173.94 |
| Cost per case prevented | \$4 421 300 | \$789 785 | \$671 583 |
| Tuberculin screening: | | | |
| Incident cases prevented | 0.26 | 4.3 | 7.77 |
| Cost per entrant | \$40.24 | \$317.51 | \$416.74 |
| Cost per case prevented | \$1 547 692 | \$738 395 | \$536 344 |
| Quantiferon Gold: | | | |
| Incident cases prevented | 0.23 | 3.78 | 6.83 |
| Cost per entrant | \$46.73 | \$227.20 | \$391.11 |
| Cost per case prevented | \$2 031 739 | \$601 536 | \$572 635 |

Conclusion: For prevention of future incident active TB cases, all strategies for screening of immigrants from all countries are very expensive, on a cost per case prevented basis, and have limited impact.

TS-1909-22 Using geographical information mapping systems to enhance the understanding of trends in TB and support service development

W G Roberts, T Sanghera. NE London TB Network, London, UK. Fax: (+44) 208 5107670. e-mail: william.roberts@homerton.nhs.uk

Reporting of trends in tuberculosis (TB) has historically been based around reporting basic epidemiol-

ogy. With improving technology it is possible to develop new methods of describing changing patterns in TB. Geographical Information Systems (GIS). The NE London TB network used a Geographical Information mapping Systems (GIS) to analyse the epidemiological data for the years 2003 and 2004. The analysis has highlighted 3 main areas of interest. The greater the level of deprivation the greater the rate of TB; non-UK born TB patients live in geographical clusters with other immigrants from their country of origin; TB services are not currently located in geographically appropriate locations for the populations they serve. This information has allowed the redesign of service delivery across parts of NE London. The use of GIS mapping can help to identify population-based changes in TB and offer a means of clarifying the correct geographical placement of TB services. Using novel approaches to analysing epidemiological data, such as GIS mapping, can be a useful tool in service design and redevelopment when used in combination with traditional data analysis methods.

TS-1548-22 Impact of infection control on reducing occupational TB notification in the regional TB dispensary

G Volchenkov,¹ E Vitek,² P Jensen,² I Danilova,³ E Putova,⁴ V Puzanov,⁴ W Jakubowiak.³ ¹Regional TB Dispensary, Vladimir, Russian Federation; ²Centers for Disease Prevention and Control (CDC), Atlanta, Georgia, USA; ³Office of the Special Representative of the WHO Director-General in Russia, Moscow; ⁴Central TB Research Institute of the Russian Academy of Medical Sciences, Moscow, Russian Federation. Fax: (+7 95) 787 2149. e-mail: w.jakubowiak@who.org.ru

Background: WHO strategy has been implemented in Vladimir since 2000. There were lacking effective procedures for infection control (IC) and high TB rates among TB staff. Funding from WHO, CDC and regional budget supported substantial IC improvement. **Objective:** To evaluate the impact of IC on reducing occupational TB.

Design: Analysis of data on new TB cases in TB staff before and after IC improvement.

Results: Annual TB notification among TB staff before the joint DOTS project (2000) was 1083/100 000 vs. 45/100 000 population of Vladimir city. 38.5% TB cases were nurses, 38.5% were paramedics, 7.7% were both among technical and medical staff. In 2001, IC measures and procedures were improved and strengthened after in-patient departments moved to a new building; staff training; obligatory respiratory protection in high risk areas; segregation of infectious and MDR-TB patients; germicidal lamps in all premises. However, ventilation system is still under reconstruction to meet international requirements. As a result, no TB cases were registered among TB staff from 2003.

Conclusion: TB notification in TB staff was 20 times higher than among population. Effective IC practices feasible for Russian TB services can substantially decrease occupational TB risk.

TS-2174-22 Symptomatic respiratory surveillance in an emergency room at a Brazilian hospital

M R Resende,^{1,2} P R Santos,¹ V M Sinkoc,² P M O Papaiordanou,^{1,2} M L Moretti.¹ ¹Faculdade de Ciências Médicas da Universidade Estadual de Campinas, Campinas, São Paulo, ²Núcleo de Vigilância do Hospital de Clínicas da Universidade Estadual de Campinas, Campinas, São Paulo, Brazil. Fax: (+55) 19 3788 7451. e-mail: mresende@hc.unicamp.br

Objective: To implement a symptomatic respiratory surveillance (SRS) at an Emergency Room at a Brazilian University Hospital.

Methods: Intervention study, from January 2000 through December 2001 (pre-intervention), from April 2002 through March 2003 (post-intervention). The SRS consisted on continuous education in early identification of patients with cough superior to two weeks, collection of AFB-smear and institution of airborne precautions.

Results: During the pre-intervention period and the post-intervention period were identified 372 (1.46%) and 170 (1.21%) symptomatic respiratory patients, respectively

| | Pre-intervention <i>n</i> = 372 | | Post-intervention <i>n</i> = 170 | | |
|---|------------------------------------|------|-------------------------------------|------|-------|
| | <i>n</i> | % | <i>n</i> | % | |
| Suspicion of TB | 164 | 44.1 | 92 | 57.5 | 0.006 |
| Collection AFB-smear on sputum | 123 | 74.8 | 62 | 67.4 | 0.192 |
| AFB-smear on sputum positive | 21 | 12.8 | 6 | 6.5 | 0.116 |
| TB confirmed | 27 | 16.5 | 10 | 10.9 | 0.222 |
| Admission until AFB smear collection (median - hours) | 5 | — | 4 | — | — |
| ER permanency (median - hours) | 3:33' | — | 4:24' | — | — |

The ratio between the number of sputum collected at ER and the total samples of sputum collected at hospital increased from 15.2% (124/816) to 16.4% (63/384), comparing the both periods.

Conclusion: SRS was effective to improve the TB suspicion and decreased the interval from admission until AFB smear collection.

TS-2256-22 Does tuberculosis accelerate the course of HIV-infection in a cohort on HAART?

P Garcia De Olalla Rizo,¹ G Flores,¹ D Ochoa,^{1,2} H Knobel,² J A Cayla.¹ ¹Epidemiology Department, Agencia de Salut Publica de Barcelona, Barcelona, Catalonia, ²Department of Internal Medicine, Hospital del Mar, Barcelona, Catalonia, Spain. Fax: (+34) 932182275. e-mail: polalla@aspb.es

Objective: To identify if tuberculosis accelerates the course of HIV-infection in a cohort treated with HAART.

Design: Cohort study of patients, who starting treatment with HAART between 1997 and 1999, followed 7 years.

Methods: Data were analyzed to examine the effect of TB on HIV progression: TB and other AIDS-defining diseases (ADD) were fitted as time-dependent covariates, adjusting for age, sex, transmission category, calendar year at risk, CD4+, and adherence using Cox proportional hazards models.

Results: Of 455 patients, 68% were men, median age 35 years old (range: 46), the median of CD4 basal was 285 (range: 1523), adherence was observed in 62% of the cases, 10% of the patients developing AIDS. AIDS-fatality ratio was 12% (48% of these were AIDS-related). In comparing with AIDS-free subjects, the risk of TB-associated death as an initial ADD (hazard ratio [HR]: 8.50, 95%CI 3.38–21.41), differ from that associated with others ADD [HR]: 17.31, 95%CI 7.98–37.49. The lowest risk of death was seen, as expected, in AIDS-free subjects.

Conclusion: TB predict higher lethality in HIV-infected patients under HAART.

TS-1420-22 Tuberculosis due to *Mycobacterium bovis* in New York City, 2001–2004

M Macaraig,¹ A Winters,¹ C R Driver,¹ C Clark,¹ S S Munsiff.^{1,2} ¹New York City Department of Health and Mental Hygiene, New York, New York, ²Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+1) 212-442-9997. e-mail: awinters@health.nyc.gov

Background: *Mycobacterium bovis* tuberculosis (TB) is rare in industrialized nations. Consumption of cheese produced in Mexico has been identified as a possible risk factor for *M. bovis* TB in New York City (NYC). **Methods:** TB registry data of all culture-positive TB cases from 2001 through 2004 was reviewed to identify features associated with *M. bovis* versus non-*M. bovis* TB.

Results: *M. bovis* accounted for 35 (1%) of 3439 TB cases overall, 20 (13%) of 155 cases among Mexican-born persons, and 11 (15%) of 72 cases among US-born children <18 years old. Compared to all non-*M. bovis* TB cases, *M. bovis* cases were more likely to be younger (median age 23 versus 41) ($P < 0.01$), female, Hispanic, and have extrapulmonary only disease ($P < 0.05$). Compared to Mexican-born non-

M. bovis cases, Mexican-born *M. bovis* cases were more likely to be HIV infected ($P < 0.05$). Compared to US-born pediatric non-*M. bovis* cases, US-born pediatric *M. bovis* cases were less likely to be a contact to a TB case ($P < 0.05$).

Conclusion: *M. bovis* accounted for >10% of culture-positive TB among Mexican-born persons and US-born children. Among Mexican-born persons with TB, those with HIV infection were more likely to have *M. bovis* disease.

TS-2060-22 Epidemiology of transmission of *Mycobacterium tuberculosis* in Southern Mexico

M L Garcia,¹ M E Jimenez,¹ A Ponce de Leon,² J Sifuentes,² L D Ferreyra,¹ M Bobadilla,² A Gamboa,² B Cano,¹ S Canizales,¹ P Small,³ K DeRiemer.⁴ ¹Instituto Nacional de Salud Publica, Cuernavaca, Morelos, ²Instituto Nacional de Ciencias Medicas y Nutrición, Mexico, DF, Mexico; ³Bill & Melinda Gates Foundation, Seattle, Washington, ⁴Stanford University, Palo Alto, California, USA. Fax: (+52) 7773175529. e-mail: garcigar@correo.insp.mx

Objective: To characterize epidemiology of transmission of tuberculosis in Southern Mexico.

Methods: Pulmonary tuberculosis patients were identified by AFB smear and culture, and enrolled in a prospective molecular-epidemiologic study. Patients underwent clinical study (interview, physical exam, chest X ray, anti-HIV antibodies) and mycobacteriologic evaluation (identification, drug-susceptibility testing and IS6110/spoligo based genotyping). Household contacts were evaluated for epidemiological and clinical characteristics and tuberculin reactivity (Mantoux method, PPD RT23). Contacts with negative reactivity were followed for conversion.

Results: Between March 2001–October 2004, we enrolled 443 patients and 1401 contacts. Tuberculin reactivity among contacts 34.80%, conversion in >5 years 13.4%. There were 16 secondary cases among contacts. By multivariate analysis presence of bacilli in AFB smear (OR 2.43, CI95% 1.59–3.85), multidrug resistance (OR 4.1, CI95% 1.1–16.1), default of treatment (OR 2.28, CI95% 1.1–4.7), and age of contact (OR 1.02, CI95% 1.01–1.02) were associated with tuberculin reactivity, controlling for socioeconomic and household characteristics. Severity of symptoms in the index case (OR 6.6, CI95% 2.7–16), clustered genotype of bacterial isolate (OR 2.8, CI95% 1.1–6.9), and cough with phlegms in contacts (OR 3.9, CI95% 1.1–14.2) were associated to tuberculin conversion in >5 years.

Conclusions: We identified bacterial, patient and contact characteristics associated to transmission of tuberculosis to contacts of pulmonary tuberculosis patients.

POSTER DISCUSSION SESSIONS

CLINICAL RESEARCH AND TREATMENT—I

PC-1048-22 Some moxifloxacin-containing regimens are more active than isoniazid in a murine model of latent tuberculosis infection

J H Grosset, E Nuermberger, I Rosenthal, S Tyagi, K Williams, W R Bishai. Johns Hopkins University, Center for Tuberculosis Research, Baltimore, Maryland, USA. Fax: (+1) 410-614-8173. e-mail: jgrosse4@jhmi.edu

Rationale: Prior immunization with *M. bovis* BCG restricts multiplication of *M. tuberculosis* after infection to model LTBI. We used this model to test the activity of alternative M-containing regimens.

Methods: BALB/c mice were aerosol-immunized with BCG (3.5 log₁₀CFU) 6 weeks before aerosol infection with *M. tuberculosis* H37Rv (3 log₁₀CFU). Treatment began 12 weeks post-immunization, with 4.55 ± 0.36 log₁₀CFU in spleen. The following 6-month daily regimens were compared to 6 months of H or pyrazinamide+ethambutol (Z+EMB): M, M+PA-824, M+Z, M+EMB, M+ethionamide (ETH), M+M.leprae hsp65 DNA vaccine (DNA), or DNA alone. Outcomes were CFU counts at treatment completion and proportions of mice relapsing 3 months after treatment.

Results:

| Regimen | 6-mo. CFU count | % relapse |
|-----------|--------------------------|-----------|
| Untreated | 4.83 ± 0.29 | N.D. |
| 6H | 0.85 ± 0.59 | 100% |
| Z+EMB | 1.91 ± 1.03 | 100% |
| M | 2.19 ± 1.26 ^a | 100% |
| M+PA-824 | 0 ^b | 0% (0/9) |
| M+Z | 0.28 ± 0.63 ^c | 67% (6/9) |
| M+EMB | 0.73 ± 0.79 | 88% (7/8) |
| M+ETH | 0.34 ± 0.23 ^c | 100% |
| M+DNA | 0.39 ± 0.73 | 89% (8/9) |
| DNA | 5.32 ± 0.51 | 100% |

^a $P < 0.05$ vs. 6H, ^b $P < 0.01$, or ^c $P < 0.05$ vs. Z+EMB

Conclusion: Combinations of M with PA-824, Z, EMB, ETA or DNA are potential alternatives to 6H for treatment of LTBI and should retain activity against many multidrug-resistant strains. M+PA was especially potent.

PC-1134-22 Humoral response to four *Mycobacterium tuberculosis* antigens

V M C Silva,¹ A H Cavalcanti,² L M Pires,³ M H Saad,⁴ A L A Cunha.¹ ¹Faculty of Medicine of Federal University of Rio de Janeiro, Rio de Janeiro, ²Municipal Care Unit Heitor Beltrão, Rio de Janeiro, ³Microbiology Institute of UFRJ, Rio de Janeiro, ⁴Oswaldo Cruz Institute, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 2293 3703. e-mail: vmcsilva@fastem.com

Objective: To assess humoral response to four MTB antigens: 38kDa, 16kDa, MPT 64, ESAT 6 in a highly

BCG vaccinated population suspected to have active pulmonary tuberculosis (TB).

Methods: Patients from a municipal primary care clinic in Rio de Janeiro, Brazil, suspected to have possible active TB were prospectively studied with a battery of diagnostic tests. Final diagnosis was established from microbiologic, radiologic and clinical response to therapy. The humoral response to the above four antigens was measured using ELISA. ROC analysis was used to establish criteria for a positive test for each antigen.

Preliminary results: 110 patients had serologic testing, 86 completed the battery of diagnostic tests. The per cent of patients with positive response to four antigens is given below.

| | Active TB MTB culture confirmed | Clinical, Radiological Active TB | TB infection | Other pulmonary diseases |
|-------|---------------------------------------|--|-----------------|--------------------------------|
| Total | 33 | 15 | 12 | 26 |
| 38kDa | 87.9% | 73.3% | 75% | 76.9% |
| 16kDa | 84.8% | 86.7% | 58.3% | 50% |
| MPT64 | 90.9% | 73.3% | 75% | 69% |
| ESAT6 | 57.6% | 53.3% | 25% | 50% |

Conclusions: The humoral response to ESAT6 seems to be poor among patients with active TB and it was not increased among those diagnosed as TB infected.

PC-1341-22 Comparison of two short-course regimens of rifampicin, isoniazid, pyrazinamide and ethambutol given as fixed-dose combination or as single tablets in smear-positive pulmonary TB

M Borek,¹ A Bartacek,¹ B Panosch,² D Schuett.¹ ¹Clinical Development and Medical Affairs, Sandoz GmbH, Kundl, ²Fokus KEG, Innsbruck, Austria. Fax: (+43) 5338 200 9145. e-mail: michael.borek@sandoz.com

Objective: To evaluate the efficacy, safety and acceptability of 4-FDC regimen.

Methods: 1159 patients with smear-positive pulmonary TB (mean age 36.7 ± 14.9 years) were included in a randomized, open, multinational (Egypt, India, Pakistan, Thailand, Philippines), multicentre study and treated according to WHO guidelines (2 months initial phase / HRZE, 4 months continuation phase / HR). Assessments were made during therapy (months 2, 4), at end of therapy (EOT, month 6) and at follow-up (months 9, 12). The primary efficacy endpoint was response at EOT defined as success (sputum specimen negative) or failure/ relapse (sputum smear positive after 4 or 6 months of therapy).

Results:

| EOT success | 4-FDC | ST | 4-FDC-ST | 95% CI |
|----------------|-----------------|-----------------|----------|-------------|
| ITT (%) | 469/477 (98.32) | 479/484 (98.97) | -0.64 | -2.11, 0.82 |
| PP (%) | 405/412 (98.30) | 418/422 (99.05) | -0.75 | -2.3, 0.8 |

1122 patients were evaluable for safety. One or more drug-related adverse events (AEs) were reported in 18.8% (105/558) of 4-FDC and 16.8% (95/564) of ST patients. Most frequently reported drug-related AEs were gastrointestinal symptoms (4-FDC 26.4% [38/144]; ST 33.9% [40/118]), mainly of mild or moderate severity.

Conclusion: The study showed non-inferiority of 4-FDC regimen in comparison to the ST regimen. Acceptability was higher with 4-FDC, suggesting improved patient compliance.

PC-1393-22 R207910 is a new diarylquinoline with potent activity in murine tuberculosis

N Lounis,^{1,2} N Veziris,¹ C Truffot-Pernot,¹ K Andries,³ V Jarlier.¹ ¹Pitié-Salpêtrière School of Medicine, Paris, France; ²Center for Tuberculosis Research, Johns Hopkins School of Medicine, Baltimore, Maryland, USA; ³Johnson & Johnson Pharmaceutical Research & Development, Beerse, Belgium. Fax: (+33 01) 45 82 7577. e-mail: bacteriologie@chups.jussieu.fr

Setting: *Mycobacterium tuberculosis* is exquisitely susceptible to R207910 (J), a novel substituted quinoline derivative (MIC 0.03 mg/L). We investigated the activity of J in murine tuberculosis.

Methods: Swiss mice were inoculated intravenously with 7 log colony forming units (CFU) of strain H37Rv. J was administered by gavage 5 days/week from day 1 to day 28 after inoculation (preventive model, PrevMod) or from day 14 to day 70 (curative model, CurMod), in monotherapy or in association with isoniazid (H), rifampin (R), pyrazinamide (Z), ethionamide (Et), amikacin (A), or Moxifloxacin (M).

Results: In CurMod, 8 weeks of treatment with J at 25mg/kg decreased the CFU count from 6 to 0.4 log. The combinations of J with either H+R, H+Z or R+Z were more active in CureMod than HRZ. Both HZJ and RZJ regimens led to negativation of spleen and lung cultures after 8 weeks of treatment, whereas cultures remained positive in the HRZ group. Moreover, J was as bactericidal as the second-line drug combination AEtZM and led to negativation of mice after 2 months when added to AEtZM.

Conclusions: J exhibits a strong in vivo activity in murine tuberculosis when associated with first and second line antituberculous drugs.

PC-1578-22 Treatment of latent tuberculosis infection in children and adolescents: a ten year randomized prospective study comparing monotherapy short course regimens

N Spyridis,^{1,2} M Tsolia,² A Gelesme,² M Valianatou,² D Anastasiou,² F Kirousi,² P Spyridis.² ¹Department of Paediatrics, St Thomas, London, UK; ²Tuberculosis Clinic for Children, 2nd Department of Paediatrics, Aglaia Kyriakou Children's Hospital, Athens, Greece. Fax: (+44) 207 18888218. e-mail: niksp@netbreeze.co.uk

Introduction: The need for shorter and more effective regimens for treatment of LTBI in children and adolescents is imperative in order to fight resistance, improve compliance and decrease the cost of DOTS.

Objective: To compare two short course regimens with the traditional 9 month monotherapy with INH.

Method: A randomized prospective study was performed over a 10 year period (1994–2004) in 778 children diagnosed with LTBI according to the criteria and recommendations of IUATLD and the WHO. The children were divided into 3 groups. Group A included 200 children who received INH for 9 months, group B 441 children who received INH+RIF for 4 months and group C 137 children who received INH+RIF for 3 months. The follow up period ranged between 3–9 years. Compliance and side effects were monitored through frequent clinic attendance, blood tests and urine strips.

Results: Following statistical analysis, Group A had worst compliance ($P < 0.001$), more side effects ($P < 0.001$) and more frequent requirement for a second medication due to a worsening chest X-ray picture ($P < 0.001$). No difference was noted between groups B and C. None of the 737 children developed tuberculosis after the discontinuation of the treatment.

Conclusion: Treatment with INH+RIF for 3 months in children with LTBI is safe and effective.

PC-1588-22 Molecular basis of cross-resistance among ribosome-inactivating antibiotics in *Mycobacterium tuberculosis*

C E Maus,^{1,2} B B Plikaytis,¹ T M Shinnick.¹ ¹Centers for Disease Control and Prevention, Atlanta, ²Emory University, Atlanta, Georgia, USA. Fax: (+1) 404-639-5484. e-mail: tms1@cdc.gov

Objective: To investigate the molecular basis of cross-resistance between capreomycin, viomycin, kanamycin, and amikacin to clarify conflicting reports in the literature.

Methods: Spontaneous mutants were generated by plating *M. tuberculosis* bacteria on agar containing one or two of the drugs. The 16S ribosomal RNA genes (*rrs*) of the mutants were sequenced and MICs for all four drugs were determined.

Results: The frequencies of recovery of mutants on single and dual drug plates were consistent with single-step mutations. Three *rrs* mutations, (A1401G,

C1402T, or G1484T) were found and each was associated with a particular pattern of cross-resistance. A1401G mutants were resistant to capreomycin, kanamycin, and amikacin but susceptible to viomycin; C1402T mutants were resistant to capreomycin, kanamycin, and viomycin, but susceptible to amikacin; and G1484T mutants were resistant to all four drugs. **Conclusions:** Mutations in the *rrs* gene can lead to resistance to some or all of the four drugs and this variability can explain the conflicts in published reports of cross-resistance. The genotypic and phenotypic differences seen in the development of cross-resistance when mycobacteria were exposed to one or two drugs have implications for the selection of therapeutic regimens for patients requiring treatment with second-line antituberculosis drugs.

PC-1626-22 Reduced accumulation of MDR phenotype associated with mutations in the promoter region of the *mabA-inhA* operon in clinical *M. tuberculosis*

C Speake, L L Han, V Naroditskaya, A Sloutsky. State Laboratory Institute, Mycobacteriology Laboratory, Boston, Massachusetts, USA. Fax: (+1) 617-983-6399. e-mail: catherine.speake@dph.state.ma.us

Resistance to isoniazid (INH) in *M. tuberculosis* is commonly attributable to mutations in several genes including mutations in the *katG* gene, which confer resistance to INH specifically, and mutations in the *inhA* gene and its upstream regulatory region, *mabAO*, which produce resistance to both INH and ethionamide (ETH). To elucidate the potential role of these three regions in the accumulation of resistance to other antituberculous drugs in *M. tuberculosis*, we sequenced *inhA*(aa94), *mabAO*, and *katG*(aa315) regions, and performed drug susceptibility testing for 70 INH- and ETH-resistant *M. tuberculosis* isolates obtained from Peruvian patients failing first-line drug treatment. Among 70 isolates, 38 had mutations in *katG*, 22 in *mabAO*, 7 in *mabAO* and *katG*, and two in *inhA*. Among 22 isolates with mutations in *mabAO*, 10 (45%) were resistant to streptomycin, versus 33 (87%) of 38 isolates with mutations in *katG* (OR = 0.13, 95%CI 0.04–0.45, P -value <0.05). Similar differences were observed for kanamycin, capreomycin, and ethambutol. These mutations were not associated with past exposure to INH or ETH, or with susceptibility to other second line drugs tested, including ciprofloxacin, levofloxacin, PAS and cycloserine. Cluster analyses of the isolates are currently underway to assess the potential impact of these mutations on strain fitness and transmission.

PC-1649-22 Sterilizing activity of improved once-weekly rifapentine-based continuation phase regimens after initial phase therapy with rifampin, isoniazid and pyrazinamide in the murine model of TB

I M Rosenthal,^{1,2} E Nuermberger,^{1,2} S Tyagi,¹ K Williams,¹ W Bishai,^{1,2} J Grosset.¹ ¹Johns Hopkins School of Medicine, Baltimore, ²Johns Hopkins School of Public Health, Baltimore, Maryland, USA. Fax: (+1) 410-614-8173. e-mail: irosenth@jhsp.h.edu

Rationale: Previously, addition of 100 mg/kg/d moxifloxacin (M) improved the efficacy of once-weekly continuation phase regimens of P+isoniazid (PH), but did not achieve the efficacy of daily RHZ-based regimens. We subsequently tested improved once-weekly regimens containing higher doses of P (15mg/kg) and/or M (200mg/kg/d).

Methods: BALB/c mice were aerosol-infected with 4 log₁₀CFU of *M. tuberculosis* H37Rv and treated when lung CFU counts reached 8.34 log₁₀. One group received RHZ daily for 2 mo., then RH daily for 4 mo. (daily control). Other groups received initial therapy with RHZ daily for 2 wks and twice weekly for 6 wks, before receiving twice-weekly RH (intermittent control) or once-weekly P15, HP15, M200P15 or M200HP15 in the 4-mo. continuation phase. The primary outcome measure was relapse after 4, 5 and 6 months of therapy.

Results: After 2 months treatment, lung CFU counts were 3.99 ± 0.06 and 4.91 ± 0.16 in daily and intermittent control mice, respectively ($P < 0.0001$). Four months of therapy failed to prevent relapse in any group. After 5 months of treatment, relapse rates were 60% and 93% in mice receiving daily RH and weekly M200P15, respectively; and 100% in other groups. The CFU counts in relapsing mice treated with weekly M200P15 and M200HP15 were lower than those receiving twice-weekly RH. Relapse rates after 6 months treatment are pending.

Conclusion: RHZ is more active when given daily versus twice weekly. Higher doses of P and/or M, that are achievable in humans, may provide once-weekly continuation phase regimens as good or better than current twice-weekly regimens.

PC-1670-22 Retreatment of tuberculosis in Russia: is adding two second-line drugs enough?

J P Cegielski,¹ B Y Kazenniy,² E V Kirianova,² T M Khorosheva,² O Y Polyakov,³ C D Wells.¹ ¹CDC, Division of TB Elimination, Atlanta, Georgia, USA; ²Orel Oblast TB Dispensary, Orel City, Orel Oblast, ³Orel Oblast Department of Execution of Sentences, Orel City, Orel Oblast, Russian Federation. Fax: (+1) 404-639-1566. e-mail: gzc2@cdc.gov

Background: The standard category II regimen adds a single drug to an unsuccessful treatment regimen. After implementing DOTS, Orel Oblast, Russia, received WHO/Green Light Committee approval to use

second-line drugs (SLDs) in a reinforced category II regimen.

Methods: From 1/2000 to 6/2002, 235 cat. II (group A) patients received 2HRZES/1HRZE/5HRE. From 7/2002 to 12/2003, 99 cat. II (group B) patients received 3HRZECmOf/5HREOf. We compared baseline characteristics, culture conversion, and outcomes between the two groups using statistical methods for categorical variables.

Results: The two groups were not similar. Group B patients more often had positive sputum smears (78% > 57%) and cultures (84% > 70%), cavitary lung disease (77% > 61%), prior treatment failure (21% > 17%), and chronic TB (18% > 6%). Drug resistance (DR) and multidrug resistance (MDR) were also more common in group B patients (any DR: 57% > 38%, MDR: 24% > 16%). Among 116 group A and 83 group B patients with serial positive cultures, additional drug resistance developed in 6% of group A but only 2.4% of group B. MDR developed in 3.4% of group A, but none of group B. Group A patients had better treatment outcomes: 72% cured+completed vs. 60% in group B, death in 3% vs. 5%, and treatment failure in 16% vs. 26%. Treatment failed in all MDR patients.

Discussion: This was not a randomized controlled study. TB specialists in Orel treated sicker patients once SLDs became available. Multivariable analysis will be used to control for group differences. In this preliminary analysis, the new regimen prevented acquired drug resistance better than the standard regimen.

PC-2197-22 Pharmacodynamics of isoniazid, tuberculosis treatment failure or relapse, and acquired rifamycin-resistant mycobacteria

M Weiner,¹ A Vernon,² D Benator,³ W Burman,⁴ A Khan,² Z Zhao,² C A Peloquin,⁵ S Weis.⁶ ¹VAMC and University of Texas Health Science Center, San Antonio, Texas, ²Centers for Disease Control and Prevention, Atlanta, Georgia, ³VAMC and George Washington University, Washington, DC, ⁴Denver Public Health and University of Colorado Health Science Center, Denver, Colorado, ⁵National Jewish Medical and Research Center, Denver, Colorado, ⁶University of North Texas Health Sciences Center, Fort Worth, Texas, USA. Fax: (+1) 210-617-5297. e-mail: weiner@uthscsa.edu

Background: In animal models of tuberculosis, bactericidal activity was correlated with area under concentration-time curve (AUC)/MIC over six days. In *post hoc* analysis, isoniazid AUC was examined in 247 patients with tuberculosis enrolled in TBTC pharmacokinetic studies 22 or 23.

Methods: Patients were treated in continuation-phase with once- or twice-weekly isoniazid (15 mg/kg) and rifamycin (rifampin, rifabutin or rifapentine). The isoniazid AUC_{0-inf} was computed for a 7 day period. 128 patients were infected with HIV, 47 developed failure or relapse, and 7 developed failure or relapse associated with acquired rifamycin-resistant mycobacteria (ARR).

Results: The lowest mean isoniazid AUC was identified with ARR-related failure or relapse.

| Failure/ relapse | ARR | HIV | n | Mean AUC (95% CI) | P-value (ANOVA) |
|---------------------|-----|-----|-----|-------------------------|--------------------|
| no | no | no | 81 | 82.7 (70.2–97.3) | |
| no | no | yes | 119 | 65.8 (58.0–74.7) | .02 |
| yes | no | no | 37 | 58.6 (44.3–77.6) | .17 |
| yes | no | yes | 3 | 72.6 (36.2–145.8) | .21 |
| yes | yes | no | 1 | 14.5 | .06 |
| yes | yes | yes | 6 | 26.7 (14.6–48.7) | .06 |

Conclusion: In this large pharmacokinetic analysis, low isoniazid AUC was found in HIV-related tuberculosis, and ARR occurred only in patients with very low isoniazid AUC. These data suggest that isoniazid may play a role in preventing acquired rifamycin-resistant failure or relapse.

PC-2199-22 Paradoxical reactions during tuberculosis treatment in HIV-seronegative patients

A C C Carvalho, G De Iaco, N Saleri, A Pini, S Capone, M Manfrin, L Tomasoni, M Gulletta, A Matteelli. Institute of Infectious and Tropical Diseases, University of Brescia–Italy, Brescia, Italy. Fax: (+39) 030 303061. e-mail: a.carvalho@libero.it

Objectives: To describe the frequency and the clinical characteristics of PR in HIV-TB patients.

Methods: All HIV-TB patients treated from January-03 to December-04 at the study site were analysed. PR were defined as clinical or radiological worsening of previous TB lesions or development of new lesions after 1 month of TB treatment in a patient who initially responded to therapy.

Results: PR were detected in 8% (11/137) of the patients: 8 (73%) were males, the mean age was 38 years (SD \pm 11.5), 4 (36%) had isolated extrapulmonary TB and 7 (64%) disseminated disease. The median time to PR onset was 107 days (range 31–443). Cerebral (6; 54%) and lymphatic TB (5; 45%) were the main sites of PR. TB therapy was changed in 2 patients (18%) and extended in 5 (45%). New bacteriological studies were performed in 6 cases (54%), cultures for MTB were negative in all of them. PR were significantly more frequent in patients with extrapulmonary and disseminated TB ($P = 0.03$).

Comments: PR are not an uncommon phenomenon, especially in patients with extrapulmonary or disseminated forms of TB. Further studies are necessary to understand their physiopathologic basis and improve the clinical management.

LABORATORY AND TB CONTROL

PC-1147-22 Rapid low-cost colorimetric methods, MTT and resazurin assays, for drug susceptibility of *Mycobacterium tuberculosis* to first-line drugs: a multicenter study

A Martin,¹ N Morcillo,² D Lemus,³ E Montoro,³ M A da Silva Telles,⁴ C León,⁵ M Velasco,⁶ L Chacon,⁷ L Barrera,⁸ V Ritacco,⁸ F Portaels,¹ J C Palomino.¹ ¹Institute of Tropical Medicine, Antwerp, Belgium; ²Hospital Dr. A. Centrángolo, Vicente Lopez, Buenos Aires, Argentina; ³Instituto de Medicina Tropical Pedro Kouri, La Habana, Cuba; ⁴Instituto Adolfo Lutz, Sao Paulo, Brazil; ⁵Instituto Nacional de Salud, Bogotá, Colombia; ⁶Instituto de Salud Publica de Chile, Santiago, Chile; ⁷Centro Nacional de Diagnostico y Referencia, Managua, Nicaragua; ⁸Instituto Carlos G. Malbrán, Buenos Aires, Argentina. Fax: (+32 03) 2476333. e-mail: amartin@itg.be

Emergence of multidrug-resistant tuberculosis calls for new rapid drug susceptibility tests (DST). Determination of DST in 8 to 10 days may help in the early detection of drug resistance allowing appropriate management of patients. A multicenter evaluation was performed to assess two rapid low-cost colorimetric methods, MTT and resazurin assays, for DST of *Mycobacterium tuberculosis* to the first-line anti-tuberculosis drugs rifampicin (RMP), isoniazid (INH), ethambutol (EMB) and streptomycin (SM). Thirty coded *M. tuberculosis* strains were sent to seven laboratories located in Latin America (Argentina, Brazil, Chile, Colombia, Cuba, Nicaragua). Each site performed blindly the two colorimetric assays for the first-line drugs and the results obtained were compared to the conventional proportion method on Löwenstein-Jensen medium. Excellent results were obtained for RMP, INH and EMB with a level of specificity and sensitivity between 96% and 99%. Colorimetric methods are easy to interpret visually by a change in colour without any sophisticated equipment and represent a reproducible low-cost technology. The colorimetric methods, MTT and resazurin assays, are very promising and accessible low-cost new alternative methods for middle and low-resource countries to perform rapid DST of *M. tuberculosis* to key anti-tuberculosis drugs.

PC-1150-22 Provisional results of a drug resistance surveillance study among childhood tuberculosis cases in the Western Cape Province, South Africa

H S Schaaf,^{1,2} B J Marais,^{1,2} A C Hesselting,¹ R P Gie,^{1,2} N Beyers,^{1,2} P R Donald.^{1,2} ¹Desmond Tutu TB Centre, Department of Paediatrics and Child Health, Stellenbosch University, Tygerberg, ²Tygerberg Childrens Hospital, Tygerberg, South Africa. Fax: (+27) 21.9389138. e-mail: hss@sun.ac.za

Aim: To determine the prevalence of drug resistance and HIV-co-infection among children with culture-confirmed tuberculosis, and to compare results with a previous survey.

Method: A prospective study conducted from March 2003 to January 2005 at Tygerberg Children's Hospital, a referral hospital in Cape Town, South Africa. Susceptibility testing was done on one isolate from each child <13 years of age with culture-confirmed tuberculosis. Susceptibility tests were done for isoniazid and rifampicin. HIV infection status and demographic information was documented.

Results: 309 children, 165 (53.4%) boys, with median age 31 months were diagnosed with culture-confirmed tuberculosis during the study period. Drug susceptibility test results were available in 264 (85.4%). Thirty (11.4%) isolates were INH-resistant including the 10 (3.8%) that were multidrug-resistant. This is higher, although not significant, compared with our previous survey, conducted between August 1994 and April 1998, where all isoniazid resistance was 21/306 (6.9%) and multidrug resistance was 7/306 (2.3%) [OR 1.73; 95% CI: 0.94–3.25]. HIV infection increased from 7.8% (13/166) among those tested during the first survey to 58/220 (26.4%) in the current survey [OR 4.21; 95% CI: 2.14–8.44].

Conclusion: Drug resistance and HIV infection among childhood tuberculosis cases seem to be on the increase.

PC-1186-22 Analysis of laboratory services of collaborative partners of national TB control programme in Bangladesh

V Begum,¹ A B M T Islam,² M Becx,² Md. K A Hyder.²

¹National TB Control Program, Dhaka, ²World Health Organization, Dhaka, Bangladesh. Fax: (+880) 2 9884656. e-mail: ntpban@cyberbangla.com

Introduction: In Bangladesh direct sputum microscopy remains the most cost effective tool for diagnosis of tuberculosis and for monitoring progress of treatment.

Methods: Annual reporting forms on laboratory services developed to collect information from laboratory register. Analysis of two Divisions represented by NTP-NGOs (BRAC and HEED) were done.

Results: According to the policy of NTP laboratory services, scanty positive to be diagnosed and registered as a case of TB. 8.80% of the scanty positive slides of the total positives are taken up, as a case of TB and the case detection rate is higher in Sylhet Division. On the other hand, scanty positive rate among the total positives in Khulna Division is 4.88% indicate low case detection. Initiatives taken to include scanty positives slides. Standard Deviation for Sylhet Division is 14.1 where as for Khulna is 5.03 and detail statistical significant results will be presented.

Conclusion: Analysis of results indicates performance in all laboratory services of NTP that ensures higher case detection and increased referral of suspects.

PC-1235-22 Comparing the effectiveness of conventional method and new external quality assessment based on lot quality assurance system method

M Win Maung,¹ T Ti,¹ L Thandar,¹ Z Myo,¹ N Phyu,¹ T M Tin,¹ A Fujiki.² ¹National TB Programme Myanmar, Yangon, Myanmar; ²Research Institute of TB, Japan Anti TB Association, Tokyo, Japan. Fax: (+951) 380952. e-mail: klugeh.whomm@undp.org

Objectives: To develop the standardized laboratory quality assurance system and operating guidelines for TB control network.

Design: A comparative study on quality assessment of Acid Fast Bacilli (AFB) microscopy was conducted between the conventional method (to check all positive and 10% of negative slides) and new EQA method employing LQAS. The comparison was made between Yangon and Mandalay divisions and randomly selected two townships from Yangon division. Base line data were collected for calculation of sample slides based on slide positivity rate and annual negative slides volume for new EQA method. A regular supervision was made and on-the-job-training was given as required. Smear preparation was evaluated on specimen quality, staining, cleanliness, size, thickness and evenness. Major and minor errors in smear reading were assessed as well.

Results: The new EQA method reduced significant the workload and major errors at divisional level (0.7% vs. 31% of total slides were checked, $P < 0.0001$) and township level (3.5% vs. 18.7% of total slides were checked, $P < 0.0001$), respectively. The quality of smear slides preparation was improved after training and on the job training.

Conclusion: We highly recommend new EQA method for laboratory quality control net work.

PC-1256-22 Results of proficiency analysis for drug susceptibility testing of *Mycobacterium tuberculosis* in national and regional level TB laboratories from 1995 to 2003

G H Bai,¹ S J Kim,² C H Park,¹ E M Park,¹ Y K Park,¹ Y W Choi,¹ J Y Bai,¹ C H Chang,¹ A Laszlo,³ M A Aziz,³ D I Ahn.⁴ ¹Korean Institute of Tuberculosis, Seoul, Republic of Korea; ²International Union Against Tuberculosis and Lung Disease, Paris, France; ³World Health Organization, Geneva, Switzerland; ⁴World Health Organization Western Pacific Region, Manila, Philippines. Fax: (+822) 573 1914. e-mail: gbai@hotmail.com

Quality assurance for drug susceptibility testing (DST) in the national and regional level TB laboratories (NRL) belonging to a WHO/IUATLD Supranational Reference Laboratory (SRL) network for drug resistance surveillance was conducted to improve techniques and ensure that results of the DST of TB laboratories within a SRL are reliable and comparable. Each set consisted of 30 cultures of *M. tuberculosis* with various resistance patterns to isoniazid, rifampi-

cin, ethambutol (EMB), and streptomycin (SM) was sent to each NRL for the DST. The results gained from NRL were analyzed. The method of the test adopted in each laboratory was proportion or absolute concentration method on Lowenstein-Jensen medium. Eleven laboratories participated more than three rounds through nine rounds of evaluation (1995–2003). Most laboratories participated have significantly improved the quality of their DST through the consecutive rounds of the proficiency testing, while some showed no significant changes. Accuracy was also influenced by the composition of test strains used. Both SM and EMB had low accordance rates in most of laboratories. In conclusion quality assurance for DST of NRL within a SRL has been helpful to improving the quality of the DST for NRL. Thus it should be periodically conducted to maintain a reliable level of accuracy.

PC-1273-22 Characterization of *Mycobacterium tuberculosis* isolates from Iranian and Afghan patients in Tehran, Iran, by spoligotyping

P Farnia, M Masjedi, F Mohammadi, R Ramazanzadeh, B Nasiri, M Mirsaedi, M Douraghei, M Bahadori, S J Tabatabaei, A K Velayati. Iranian National Reference TB Laboratory, National Research Institute Of Tuberculosis and Lung, Tehran, Tehran, Iran. Fax: (+98) 212285777. e-mail: mycopf@hotmail.com

Background: This survey identified the spoligopatterns of *Mycobacterium tuberculosis* strains with an international designation responsible for transmission and prevalence of TB (2000 to 2005) among native and immigrants population of Tehran.

Methods: The spacer oligonucleotides typing were performed on 1742 *Mycobacterium tuberculosis* strains isolated from verified cases of TB.

Results: A total of 133 distinct spoligopatterns were observed. 1679 clinical isolates were clustered in 70 clusters (52.5%) and 63 isolates were defined as orphans pattern (47.3%). Based on international spoligotype database, the East African–Indian (EAI; 24%), Central–Asia (CAS; 20.8%), T clade (20.7%), HaaremI (4.4%), Beijing (3.2%) and shared type 253 (3.1%) were the major identified super families. Although 86.9% of the Beijing genotypes and 100% of shared type 253 strains that was prevalent through Former Soviet Union were isolated from Afghan patients only.

Conclusions: In view of our results, we suggest that the current epidemiological picture of TB in Iran is based on the persistence of ancestral clones of *M. tuberculosis* as well as those emerging recently. In comparison, the TB–bacilli in Afghan-immigrants were more likely to be of ancient origin.

PC-1328-22 Laboratory investigation of a nosocomial outbreak of tuberculosis in a general hospital in Taiwan during the SARS outbreak

R Jou,¹ W L Huang,¹ B F Yeh,² I J Su.³ ¹Reference Laboratory of Mycobacteriology, Center for Disease Control, Taipei, Taiwan, ²Department of Internal Medicine, Cheng Hsin Rehabilitation Medical Center, Taipei, Taiwan, ³Division of Clinical Research, National Health Research Institutes, Taipei, Taiwan, China. Fax: (+886) 2 26531387. e-mail: rwj@cdc.gov.tw

Nosocomial outbreak of tuberculosis is rare and the transmission is usually difficult to trace and confirm because of the long incubation period of the mycobacterial infection. This report depicts a molecular epidemiologic study of a tuberculosis outbreak in a district general hospital in Taiwan during the 2003–2004 SARS period. Of the 17 isolates of *Mycobacterium tuberculosis* (*M. tuberculosis*) collected, 9 out of 10 health care workers' (HCWs) and 7 patients' isolates were identified to be of the same strain by molecular IS6110 restriction fragment length polymorphism (RFLP) and minisatellite interspersed repetitive unit-variable number tandem repeat (MIRU–VNTR) genotyping. The causative isolate was also identified by spacer oligonucleotide typing (spoligotyping) as W-Beijing genotype. The index case was a hospitalized patient who transmitted the bacteria to health care workers on the same floor. Two initially suspected tuberculosis index cases turned out to be non-tuberculous mycobacteria (NTM) colonization in the period of investigation. Consequently, the possible cause of this episode was mainly due to missed or delayed diagnosis of the index case and improper ventilation of the wards. The powerful combination of molecular techniques and epidemiological evidences enabled the laboratory investigation to confirm this nosocomial outbreak of tuberculosis.

PC-1580-22 Development of a biological safety cabinet testing and certification program for TB laboratories in Peru

M Stowell,¹ A Sloutsky,¹ L Vásquez,² L Asencios,² M A Sondrini,³ P Zintl,⁴ J Bayona,⁵ M Yagui,² F Llanos,⁶ A Náquira.² ¹Massachusetts State Laboratory Institute, Boston, Massachusetts, USA; ²National Institute of Health, Lima, Peru; ³Eagleson Institute, Sanford, Maine, ⁴Partners in Health Harvard Medical School, Boston, Massachusetts, USA; ⁵Socios en Salud-Sucursal, Lima, Peru; ⁶Cayetano Heredia University, Lima, Peru. Fax: (+1) 617-983-6399. e-mail: Marcia.Stowell@state.ma.us

The capability and capacity for maintaining acceptable operation of biological safety cabinets (BSC) are not available in many resource-constrained settings. As TB laboratories in developing countries begin to expand their testing, it is essential that they also develop a BSC certification program to ensure both the safety of the laboratory staff and the integrity of the testing. This requires strong administrative commit-

ment, training of personnel, and funding for equipment, supplies and travel for testing and maintaining the cabinets. The National Institute of Health in Peru, with Partners in Health, Socios En Salud, Proyecto Vigía (MINSA/USAID), the Massachusetts State Laboratory Institute, and the Eagleson Institute, developed a national BSC certification program for TB laboratories. This collaboration delivered a practical train-the-trainer program to qualify laboratorians and engineers as certifiers, and provided training for laboratory administrators. Comprehensive protocols are currently being implemented to assure a sustainable program. This project demonstrates the feasibility of developing a BSC certification program, while increasing the testing capacity in resource-limited settings, and can serve as a model in other developing countries.

PC-1740-22 Comparing quality of AFB microscopy in WHO TB program pilot regions and other regions of Russian Federation

V N Malakhov,¹ N S Smirnova,¹ O A Irtuganova,^{1,2} I L Khaidukova.¹ ¹National EQA Centre for Laboratory Medicine, Moscow, ²Central Tuberculosis Research Institute, Moscow, Russian Federation. Fax: (+7 95) 9281863. e-mail: vmalakhov@fsvok.ru

During 2002–2004, 749 Russian clinical laboratories tested five control panels participating in Ziehl-Neelsen AFB microscopy module of Federal EQAS. Fifty participants were from 'pilot' regions of the WHO TB Program, which provided them with adequate equipment, training and supervision. Obtained results presented in the Table leads to following conclusions:

- 1 Rates of false negative results are close for both kinds of the laboratories.
- 2 Rate of false positive results is much higher in regular laboratories comparing to pilot both for scanty and highly loaded unstained control slides in contrast to stained slides, were it is the same for both kinds of laboratories. It shows considerable success of WHO TB Program in improving sensitivity of AFB microscopy, although the problem with staining still exists in all laboratories.
- 3 The results revealed significant contribution of training and equipment of laboratories provided in WHO pilot regions to the quality of AFB microscopy performance.

| Slides in each control panel | Wrong results of regular labs, % | Wrong results of pilot labs, % |
|---|----------------------------------|--------------------------------|
| Two unstained negative | 7.8 | 6.3 |
| Two unstained scanty loaded (5–20 AFB/100 v.f.) | 39.1 | 16.5 |
| Two unstained highly loaded (60–150 AFB/100 v.f.) | 15.4 | 9.7 |
| Two stained highly loaded | 4.3 | 4.0 |

PC-1754-22 Survey of indicators to assess the quality of the Tuberculosis Laboratory Network in Brazil

R Maia,¹ M C S Dantas,¹ D N Sato,² I Kantor.³

¹Coordenação Geral de Laboratórios de Saúde Pública - Ministério da Saúde, Brasília, Distrito Federal, ²Instituto Adolf Lutz, Ribeirão Preto, São Paulo, Brazil; ³Consultora WHO-PAHO, Buenos Aires, Buenos Aires, Argentina. Fax: (+55) 61 226 4314. e-mail: rosalia.maia@funasa.gov.br

Tuberculosis bacteriology is one of the fundamental aspects of a national tuberculosis control program and a key component of the DOT strategy. The objective of this study was to evaluate aspects regarding the diagnosis, management and coordination of the Brazilian Network Tuberculosis Laboratory. A questionnaire was sent to 27 Central Reference Laboratories localized in the Capital of the Brazilian States, related to technical procedures, infrastructure and management. Epi-Info version 6.0 was used for data analyses. The results showed that 85.0% perform direct smear examinations, 89.0% employ culture and 75.0% are prepared to perform drug susceptibility tests. Regarding the quality control procedures for acid-fast bacilli (AFB) microscopy, only 15% of the laboratories evaluated had received quality assessment of their regional network of laboratories, and 46% didn't have any program of quality control implanted. This survey showed several fragilities in the current situation of the Brazilian Tuberculosis Laboratory Network, as limitation in the physical area of the laboratories. Improvements need to be made in the Quality Control Program, and in the readiness of essential laboratory equipments. Results obtained in this survey are being used as bases for planning actions to improve diagnostic performance and for implementation of a national quality assurance system.

PC-2148-22 Spectrum of disease and bacteriologic yield in children with tuberculosis

B J Marais, R P Gie, A C Hesselning, H S Schaaf, N Beyers. Desmond Tutu TB Center, Cape Town, South Africa. Fax: (+27 21) 9389138. e-mail: bjmarais@sun.ac.za

Background: Children contribute a significant proportion of the global tuberculosis caseload, but the spectrum of disease pathology and the level of diagnostic certainly are often poorly recorded. The aims of the study were to comprehensively document the spectrum of disease pathology and the associated diagnostic certainty in children treated for tuberculosis, in a high-burden setting.

Methods: A prospective descriptive study, conducted from February 2003 through October 2004 at five primary health care clinics in Cape Town, South Africa. The study included all children (<13 years of age) treated for tuberculosis.

Results: A total of 439 children received anti-tuberculosis treatment, of whom 85 (19.4%) were treated

inappropriately. Of the 354 children treated appropriately, 307 (86.7%) had intra-thoracic, 72 (20.3%) had extra-thoracic and 25 (7.0%) had both intra- and extra-thoracic tuberculosis. Manifestations of intra-thoracic tuberculosis included; 147 (51.7%) with uncomplicated lymph node disease, 87 (28.3%) with complicated lymph node disease, 15 (4.9%) with disseminated (miliary) disease and 14 (4.6%) with adult-type disease. Bacteriological confirmation was achieved in 120/191 (62.8%) children in whom specimens were collected.

Discussion: Bacteriological confirmation was achieved in a high percentage of children appropriately treated for tuberculosis. The bacteriological yield varied according to the specific disease manifestation documented.

CLINICAL RESEARCH AND TREATMENT-II

PC-1137-22 Comparative bioavailability of rifampicin in anti-tuberculous fixed dose combinations

L T Luyen, H T K Huyen, N T L Huong. Department of Clinical Pharmacy, Hanoi University of Pharmacy, Hanoi, Vietnam. Fax: (+84) 48430015. e-mail: luyenle66@yahoo.com

Fixed dose combination (FDC) formulations became popular in the treatment of tuberculosis because of the better patient compliance, reduced risk of monotherapy and emergence of drug resistance in contrast to treatment with separate formulations. However, poor bioavailability of rifampicin in FDC is concern problem. In this regard, World Health Organization and International Union Against Tuberculosis and Lung Diseases recommend using FDCs only proven bioavailability of rifampicin. Hence, comparative bioavailability study of rifampicin from 2-FDC and 3-FDC (using in Vietnam National Tuberculosis Programme) with standard separate tablets at the same dose level were conducted in 12 healthy volunteers. The study was designed as three periods, cross-over experiment with a washout period of 1 week. Bioavailability of rifampicin was estimated by plasma concentration of rifampicin from 0h to 24h after dosed. Plasma rifampicin concentration was determined by HPLC method. The results revealed that: Cmax and AUC for rifampicin in 2-FDC and 3-FDC formulations were lower, Tmax were higher than the standard separate formulations. It was concluded that 2-FDC and 3-FDC tablets are poor relative bioavailability of rifampicin.

PC-1241-22 Directly observed treatment of different providers in implementation of daily 4-drugs fixed dose combination (4-FDC) regimens in Myanmar

M Win,¹ L Thandar,¹ N Phyu,¹ A Moe,¹ K Osuga.² ¹National TB Programme Myanmar, Yangon, Myanmar; ²Research Institute of TB (RIT), Japan Anti TB Association (JATA), Tokyo, Japan. Fax: (+951) 380952. e-mail: klukeh.whomm@undp.org

Objectives: To identify the effective directly observed treatment (DOT) providers in implementation of daily 4-FDC regimen for new sputum smear positive pulmonary tuberculosis (TB) patients in Myanmar.

Background: Since the adoption of the daily 4-FDC regimen in 2004, direct supervision by health staff daily is deteriorating. There is an urgent need to gather evidence-based information on the alternative methods by DOT providers other than health workers in Myanmar.

Design: A randomized controlled trial is conducting in 6 townships in Myanmar in collaboration with NTP, Myanmar and RIT, JATA in 2005. The outcomes measured are sputum conversion rates, cure rates and treatment success rates of the patients who have been directly observed by potential DOT providers: either community volunteers or family members as intervention groups compared with health staff. Two hundred and forty new sputum smear positive pulmonary TB patients are being recruited for each arm. The TB patients are randomly assigned by using block randomization method whether to be supervised by one of the DOT providers. The monitoring and supervision is conducted from central and Divisional levels. The outcomes will be evaluated after one year.

Conclusion: The study will prove the most effective DOT provider which is appropriate for Myanmar community in applying daily 4-FDC regimen.

PC-1327-22 High efficiency liquid chromatography attached to mass spectrometry for therapeutic monitoring of anti-tuberculosis drugs

F C Q Mello,¹ F S Aguiar,¹ C S M Neves,² A Rezende,¹ L N Santos,¹ A L Kritski,¹ J C S Gonçalves,² K R S Gram.² ¹Unidade de Pesquisa em Tuberculose. Federal University of Rio de Janeiro, Rio de Janeiro, ²Faculdade de Farmácia. Federal University of Rio de Janeiro, Rio de Janeiro, RJ, Brazil. Fax: (+55 21) 25622426. e-mail: fcqmello@hucff.ufrj.br

Introduction: Tuberculosis remains a major public health problem worldwide. Although drugs with high efficacy are available, some patients show slow or no clinical response due to inadequate serum concentrations of prescribed drugs.

Objective: To develop a new method for dosing rifampin, isoniazide and pirazinamide using blood samples. **Methods:** We analyzed human plasma using a High Performance Liquid Chromatography attached to Mass

Spectrometry (HPLC/MSMS). The analytic method was developed considering the intervals of plasma concentrations using enriched plasmas as follows: isoniazide 3–5 mg, n-acetyl-isoniazide 1–3 mg, pirazynamide 31–45 mg and rifampin 5–7 mg. We established detection and quantification limits and response linearity in positive and negative ionization. The advantage of the method is a detection limit within the dosages of the medications and its metabolites in therapeutic and sub-therapeutic zones.

Results: Our limits of detection and quantifications were the following: rifampin 10 ng/mL and 50 ng/mL; isoniazide 1 ng/mL and 5 ng/mL; n-acetyl-isoniazide 2.5 ng/mL and 10 ng/mL and pirazynamide 5 ng/mL and 50 ng/mL, respectively. We were able to distinguish isoniazide from n-acetyl-isoniazide through the monitoring of the transitions M/Z 18–121.

Conclusions: HPLC/MSMS shows to be a novel and promising method for anti-tuberculosis drug monitoring. A study is now starting for analysing its feasibility under clinical routine.

PC-1333-22 Multi-level barriers to treatment for latent tuberculosis infection (LTBI)

L Hill, E Blumberg, N Kelley, M Hovell, C Sipan, K Schmitz, M Ji. CBEACH/GSPH/San Diego State University, San Diego, California, USA. Fax: (+1) 858-505-8614. e-mail: eblumberg@projects.sdsu.edu

Objectives: This study assessed cascading barriers from national policy to individual patient factors.

Methods: As part of an ongoing trial to increase adherence to INH, we examined potential barriers to treatment for LTBI. We screened high-risk multi-ethnic students from 3 high schools in San Diego County.

Results: Of the 5493 adolescents/families offered screening, 1139 adolescents attended the screening and 1113 returned for test results. 157 tested positive and 112 agreed to participate in the study. About 70% required assistance starting medication. Adolescents reported scheduling and transportation problems; families reported limited ability to pay for medical examinations; attendance to provider CME and completion of required CEU exams was low; provider knowledge of CDC guidelines for LTBI treatment was also low (60% correct; and a number of providers prescribed regimens varying from CDC standards. County, State, and National level funding for LTBI care have been discontinued, and standards for targeted screening have been relaxed. These policy changes have delimited services and reimbursement to providers, shifting the burden of care to families who cannot afford it.

Conclusions: National fiscal policies have impeded preventive care and set the stage for active disease epidemics.

PC-1380-22 Community-based DOTS approach achieved over 70% case detection rate and 85% cure rate in Bangladesh

M Bodiuzzaman, M A Islam, M K Barua, F Ahmed, A Alam, A M R Chowdhury. BRAC Health Program, BRAC, Dhaka, Bangladesh. Fax: (+88) 02 8826050. e-mail: health@brac.net

Introduction: BRAC initiated a community based tuberculosis control program through female community health volunteers (CHVs) in one sub-district in 1984. This model was gradually extended to 283 sub-districts by 2004 covering 82 million populations in collaboration with the national TB program (NTP).

Objectives: To increase accessibility of DOTS services to achieve the case detection rate of 70% and cure rate of 85% by 2005.

Methods: CHVs provide education to community, refer TB symptomatic for sputum examination and ensure DOT. Decentralized sputum collection centers are organized in remote villages. As a guarantee of treatment completion, patients are requested to deposit Taka 200 (US\$3.5), which is refunded after completion of the treatment. Taka 150 is given to CHV for treating each patient for her service from project fund.

Results: Data of 60 upazilas where program started 6 years before was analyzed in 2004. Case detection rate reached to 75% in 2004 from 30% in 1999 and maintained a cure rate of 89% among new sputum positive patients diagnosed in 2003.

Conclusions: Community based DOTS through CHVs increased the accessibility of services in achieving the global targets of case detection and cure rates in Bangladesh by 2004 in selected areas.

PC-1603-22 QuantiFERON® TB Gold test for preventive treatment of LTBI in the Slovenia NTP

D Erzen,¹ M Zolnir-Dovc,² S Grm,¹ N Peranovic-Sorli,² J Sorli.³ 1TB Department and National TB Registry, Golnik, ²National Reference TB Laboratory, Golnik, ³NTP Manager, Golnik, Slovenia. Fax: (+386) 4 2569117. e-mail: damjan.erzen@klinika-golnik.si

Slovenia is a small Central European country with low incidence of tuberculosis. Due to rapid decrease of tuberculosis in last years contact tracing and treatment of latent tuberculosis infection (LTBI) are becoming more important activities in Slovenia. Since 2001 6000 contacts were registered for screening of active tuberculosis and LTBI, and 652 contacts were treated for LTBI. The immunological test for LTBI was tuberculin skin test. Since almost all inhabitants until March 2005 were vaccinated with BCG QuantiFERON® TB Gold In Tube was introduced to help in decision on active and latent tuberculosis. In 75 tuberculosis contacts both tuberculin skin test and QuantiFERON® TB Gold test were performed. There were 31 contacts with positive tuberculin test and 22

with positive QuantiFERON® TB Gold test. If treatment of LTBI is given on the basis of positive QuantiFERON® TB Gold test one third of preventive regimens is saved. In 7 cases with active pulmonary tuberculosis both tests are positive, and in 5 cases with treated tuberculosis in the past QuantiFERON® TB Gold test is negative. Since IFN- γ assay is less affected with BCG vaccination and nontuberculous mycobacteria we expect to save on preventive treatment of LTBI to justify for routine use of QuantiFERON® TB Test in Slovenia.

PC-1797-22 Smear positivity at two/three months of treatment: does it indicate MDR-TB?

C Auer,^{1,2} J Lagahid,³ C Roa,⁴ C Ang,⁴ A Van Deun,⁵ M Tanner,² M G Weiss,² I Quelapio,¹ R Orillaza,¹ N Mira,¹ V Belen,¹ T E Tupasi.¹ ¹Tropical Disease Foundation, Makati City, ²Swiss Tropical Institute, Basel, Switzerland; ³Centre for Infectious Diseases, Department of Health, Manila, ⁴TB Research Laboratory, Philippine General Hospital, Manila, Philippines; ⁵Institute of Tropical Medicine, Mycobacteriology Unit, Antwerpen, Belgium. Fax: (+63) 2 888 90 44. e-mail: christian.auer@unibas.ch

The records of 181 new and 226 re-treatment cases (all smear-positive) treated at a private-public hospital-based DOTS program in Manila, Philippines, were reviewed (years 1999 to 2003). DOTS-Plus is also done at this clinic. Also, the records of 715 new and 162 re-treatment cases (all smear-positive) treated in a public DOTS programme of a municipality of Manila were reviewed (years 2001 to 2002). Drug susceptibility tests were done as part of a study.

Results: a) Hospital-based patients: New cases: Thirty-six (20%) were still smear-positive at 2 months of treatment (non-converters). MDR-TB was identified among 2 of them (5.6%). Re-treatment cases: Twenty-two (10%) were non-converters. MDR-TB was identified among 16 of them (73%).

b) Public DOTS patients: New cases: Forty (6%) were still smear-positive at two months of treatment, and of these, two of the 22 patients with drug susceptibility tests (9%) had MDR-TB. Re-treatment cases: Eleven (6.8%) were still smear-positive at 2 months of treatment, and of these, four of the 7 patients with drug susceptibility tests (57%) had MDR-TB.

Conclusion: Among re-treatment cases but not among new cases, sputum non-conversion strongly indicated MDR-TB, especially among the patients of the well-known hospital-based DOTS program that also does DOTS-Plus.

PC-1895-22 Treatment outcomes and two-year follow-up of multidrug-resistant tuberculosis patients, West Coast/Winelands area, South Africa, 1992–2002

K P Shean,¹ T H Holtz,² P A Willcox,^{3,4} S N Siwendu,¹ K F Laserson,² C D Wells.² ¹MDR-TB Clinic, Brooklyn Chest Hospital, Cape Town, South Africa; ²Division of TB Elimination, Centers for Disease Control, Atlanta, Georgia, USA; ³Respiratory clinic, Dept of medicine, Groote Schuur hospital, Cape Town, ⁴University of Cape Town, Cape Town, South Africa. Fax: (+27) 215103898. e-mail: kshean@pgwc.gov.za

Background: An outreach program has operated from the Brooklyn Chest Hospital (BCH) in the West Coast/Winelands area of the Western Cape since 1990, using individualized treatment regimens.

Methods: We retrospectively reviewed records of all patients reported to and treated by the BCH multidrug-resistant tuberculosis (MDR-TB) team between 1992, and the start of DOTS-Plus in 2003. Patients are followed up six monthly for two years post-treatment.

Results: Over 10 years, 642 persons were confirmed with MDR-TB. Of these, 31 did not receive treatment, 13 transferred out, 109 received first-line drugs, and 489 received second-line drugs. Among these 489 patients, 14 of 176 tested were HIV-infected. Treatment outcomes: 243 (50%) were cured or completed therapy, 32 (6%) failed, 73 (15%) died, and 141 (29%) defaulted therapy. Two-year follow up: of the 416 alive after initial therapy, 188 (45%) were still alive, 66 (16%) died, 32 (8%) retreated for TB, and 130 (31%) status unknown.

Conclusions: Despite program conditions only 50% of patients achieved a successful outcome. Although all new MDR-TB patients identified are followed up and treatment initiated, high default rates require better and early recall of patients and interventions to ensure compliance need to be explored.

PC-2059-22 Pulmonary disability secondary to treated tuberculosis

S E Weis,^{1,2} T L Miller,^{1,3} J Pasipanodya.³ ¹Department of Medicine, Texas College of Osteopathic Medicine, University of North Texas Health Science, Fort Worth, ²Tarrant County Health Department, Fort Worth, ³School of Public Health, University of North Texas Health Science Center at Fort Worth, Fort Worth, Texas, USA. Fax: (+1) 817-321-4920. e-mail: sweis@hsc.unt.edu

Objectives: Despite its status as a leading threat to international public health, the residual pulmonary disability secondary to treated tuberculosis has never been measured in the United States or reported in the English language literature. Failure to appreciate the full cost burden of TB, hence the full value of its control, undervalues prevention efforts. Measuring disability secondary to cured pulmonary tuberculosis is important if we are to accurately estimate the cost of tuberculosis. We measured pulmonary impairment of patients completing treatment for pulmonary TB to estimate residual disability.

Methods: A prospective study was conducted with patients achieving clinical cure of TB disease in Tarrant County, Texas. Pulmonary function tests were done at the completion of treatment for patients TB disease and for those with latent TB infection. The latter group was used for control purposes. Records were reviewed for contributory history. Values obtained for FVC and FEV₁ were compared with the normative data to determine abnormal lung function.

Results: Patients with clinical cure of TB were found to have significant loss of lung function when compared to those completing treatment for LTBI, resulting in substantial pulmonary disability.

Conclusion: Cure of tuberculosis is not sufficient to avert significant pulmonary disability and its costs.

PC-2065-22 Quantification of rifampicin in urine identifies patients with low plasma concentrations

H McIlleron,¹ J Norman,¹ P Wash,² P Smith.¹ ¹Division of Clinical Pharmacology, University of Cape Town, Cape Town, ²Brewelskloof Hospital, Worcester, South Africa.
Fax: (+27) 0214066148. e-mail: hmciller@uctgsh1.uct.ac.za

Objective: To evaluate rifampicin in the urine as a tool for predicting plasma concentrations of the drug in tuberculosis patients.

Methods: Urinary rifampicin was quantified from 2 to 8 hours after their daily drug doses in 104 tuberculosis patients. Simultaneously, and in the same patients, serial blood samples were drawn to describe the systemic pharmacokinetics. Validated high performance liquid chromatography methods determined rifampicin in urine and plasma.

Results: The median peak concentration and urinary rifampicin were 5.23 mg/l (interquartile range: 3.26–7.73 mg/l) and 11.67 mg (interquartile range: 6.80–19.19 mg), respectively. The amount of rifampicin in the urine was correlated with peak plasma concentrations (spearman's coefficient: 0.707; $P = 0.000$). Of 33 patients with low (<4 mg/l) peak concentrations, 31 (94%) had less than 15 mg of rifampicin in the urine; they comprised 53% of the 59 patients with less than 15 mg of rifampicin in the urine.

Conclusions: The peak rifampicin concentration could not be accurately predicted from the amount of drug in the urine. However, a high proportion of patients with low plasma rifampicin concentrations had urinary collections of less than 15 mg, indicating that the approach may provide a useful screening test for low systemic rifampicin levels.

PC-2132-22 Quality of care through the eyes of the TB patient in Malawi

M Kagoli, P Kapulula, F Salaniponi. National TB Control Programme, Lilongwe, Malawi. Fax: (+265) 1 757 205. e-mail: mkagoli@yahoo.com

Setting: Two rural districts (Mzimba and Mulanje) and one urban district (Lilongwe).

Objective: To explore patient and stakeholder perception on what is considered good TB service in order to develop a tool to measure client quality of care ratings.

Methods: 18 focus group discussions (FGDs) and 27 individual interviews (IDIs) with patients and stakeholders. FGDs and IDIs included the technique of ranking by participants to indicate five priority aspects of a good tuberculosis service.

Results: Twenty six aspects of quality TB care were mentioned. Seven mostly mentioned aspects were (in order of decreasing importance); supplementary nutrition, good patient-health worker relationship, patient follow-up, effective and readily available drugs, short waiting time at the service delivery point, TB education and transport for patients.

Conclusion: The World Health Organisation's definition of quality of care only meets some of the TB patient's priority aspects of quality care. Patients perceive that, good nutrition, short waiting time at service delivery point and good patient-health worker relationship are important aspects of quality TB care. Instead of focusing on the treatment alone, patients also put priority on social aspects of the service.

TREATMENT AND ADHERENCE

PC-1011-22 Roles of volunteers in adherence and DOT programme

R K M Mwape, N Daka. Community Based TB-HIV Organisation -CBTO, Lusaka, Zambia. Fax: (+260) 255150. e-mail: cbto@microlink.zm

Issues: In Zambia, due to insufficient literacy and education, many patients on TB treatment seems to lack knowledge on the disease and have difficulty understanding treatment instructions that can be complicated. The stigma and discrimination still persist. Therefore it is very important to implement a support system that regularly monitor them to assure treatment success.

Project: Since 1995, a program supporting patients on TB treatment has successfully been conducting DOTS and therapeutic meetings by a group of 60 volunteers at a low-income urban community in Lusaka. An annual average of 350 patients are enrolled in the community based DOTS program. The volunteers include former TB patients who deals with difficulty TB clients on treatment.

Results: The TB cure and completion rates [40% and 55%] respectively, 1998 have dramatically improved [both 80%, 2000] and defaulter rate have dropped to 3% from 20%, 2000.

Lesson learned: Peer support is essential not only in the treatment but also for care, rights, and access to information of the patients. This project is based on peer support, which can easily be transferred to other community based settings.

PC-1215-22 Factors affecting patients' adherence with DOTS in the conflict areas of Kailali District, Nepal

T Bam,¹ K B Chand,² D A Enarson,³ O Aalberg.⁴ ¹College of Public Health, Chulalongkorn University, Bangkok, Thailand; ²Regional Health Directorate Farwest, Dipayal, Nepal; ³International Union Against Tuberculosis and Lung Disease, Paris, France; ⁴Norwegian Association of Heart and Lung Patients, Oslo, Norway. Fax: (+662) 2556040. e-mail: tarabam@hotmail.com

Setting: Conflict areas of the Kailali district, Nepal.

Method: A cross-sectional study was conducted in December 2004 to February 2005, among 130 adherent and 25 non-adherent new patients, purposively selected from four DOTS centres of the Kailali district to identify the factors affecting patients' adherence using a structured questionnaire with face to face interview. Patients were deemed to be non-adherent when they had missed more than 7 consecutive days of treatment.

Results: About half (48%) of non-adherents were more likely to think that treatment could be stopped once they were free of symptoms and thought they were cured. Adherence proportion was high among the higher education group ($P < 0.05$). The overall knowledge scores ($P < 0.001$) were significantly different between the adherent and non-adherent. A significant relationship was found between adherence and availability of health workers at DOTS centre ($P < 0.05$), DOT ($P < 0.001$), mode of transportation, distance and traveling time ($P < 0.001$).

Conclusion: Adherence is affected by educational level, knowledge, availability of health workers, DOT, distance, and traveling time. It could be improved by provision of more information about tuberculosis and expansion of DOTS near to the patient's home.

PC-1249-22 Gender differences in tuberculosis treatment outcome by geographical region in Nepal

T S Bam,¹ D A Enarson,² R S Chapman,¹ O Aalberg.³ ¹College Of Public Health, Chulalongkorn University, Bangkok, Thailand; ²International Union Against Tuberculosis and Lung Disease, Paris, France; ³Norwegian Association of Heart and Lung Patients, Oslo, Norway. Fax: (+662) 2556046. e-mail: tarabam@hotmail.com

Setting: Three geographical regions: mountains, hills, plains.

Objective: To analyze gender differences in tuberculosis treatment outcome by geographical regions.

Methods: We analyzed treatment outcome using routine reporting data from the districts (July 2000–July 2003). Definitions of treatment outcomes were those recommended by WHO/IUATLD.

Results: A total of 27 846 men and 13 632 women new smear positive patients were included in the analysis. The proportion cured was higher in women (mountains; men 79%, women 85%, hills; men 81%, women 85%, plains; men 84%, women 87%). This was partly due to a higher proportion of defaulters among men in more inaccessible areas (mountains; men 7%, women 3%, hills; men 6%, women 4%, plains; men 4%, women 3%). Among 3820 men and 1265 women smear positive relapse patients, the proportion cured was men 80% and women 83% in hills and plains but different in mountains (men 86%, women 90%). Among smear positive patients treated after failure, default was more common in women (mountains; men 5%, women 11%, hills; men 3%, women 10%, plains; men 5%, women 7%).

Conclusion: Encouraging cure rate was achieved among women patients. More research is needed to enhance cure rate among men patients.

PC-1415-22 Microscopic examination of new tuberculosis cases and treatment outcomes of smear-positives in Istanbul dispensarie: 1998–2002

Z Kilicaslan,¹ O Ozturk,² N Sarimurat,³ E Caglar,⁴ T Karagoz,⁵ A Saygi,⁶ M Kurutepe,⁶ G Ongen.⁷ ¹Chest Department Medical Faculty of Istanbul, Istanbul, ²Umraniye TB Dispensary, Istanbul, Turkey; ³Sehremeni TB Dispensary, Istanbul, ⁴Yedikule Chest Hospital, Istanbul, ⁵Sureyyapasa Chest Hospital, Istanbul, ⁶Heybeliada Chest Hospital, Istanbul, ⁷Chest Department Cerrahpasa Medical Faculty, Istanbul, Turkey. Fax: (+90) 212 6352708. e-mail: izakaslan@e-kolay.net

In this study, we retrospectively evaluated microscopic examination of new tuberculosis (TB) cases and treatment outcomes of smear-positive cases in 24 dispensaries of Istanbul between 1998 and 2002. 20 231 new TB cases registered between 1998 and 2002, 78.8% of these ($n = 15 449$) were pulmonary and 21.2% of them ($n = 4782$) were extra-pulmonary TB cases. Of 15 449 new pulmonary TB cases, 9209 (59.6%) were sputum smear-positive, 3425 (22.2%)

were smear-negative and 2815 (18.2%) had no sputum examination. In smear-positive pulmonary cases, treatment outcomes were classified as follows: 4529 (49.2%) cured, 3215 (34.9%) treatment completed, 183 (2%) treatment failure, 760 (8.3%) default, 388 (4.2%) transfer out and 117 (1.2%) died. Treatment success was 84.1% ($n = 7744$). Between 1998 and 2002, the smear-positive case rate raised from 47.5% to 70.5% and the cure rate improved from 41.8% to 52.8%. However there is great improvement at both treatment success and bacteriologic examination, we are still far away from our targets.

PC-1461-22 TB drug use problems in Karaganda prisons, Kazakhstan

M Makhmatov,¹ Z H Zhandauletova,¹ L V Kartashova,² A K Toktabayanov,¹ A A Trusov.³ ¹Project HOPE, Almaty, ²Ministry of Justice, Karaganda, Kazakhstan; ³Project HOPE, New York, New York, USA. Fax: (+327) 2686680. e-mail: mmahmatov@projecthope.kz

Objective: Identify problems of TB drug use in Karaganda prison system.

Methods: Indicators were selected to check diagnostic and treatment processes, and measure elements of the drug use cycle. TB01 forms for 300 cases and outpatient treatment cards for 40 cases were examined and 90 patients were interviewed.

Results: Deviation from the diagnostic algorithm occurred in 55% of cases mainly with reliance on X-ray before smear microscopy. Despite this fact there was correct case definition, and correct treatment regimens according to DOTS categories. All interviewed TB patients reported care-giver observation of every dose of medication. However, adherence to DOT while dispensing TB drugs occurred in only 49% of cases due to attitude problems of dispensers and a poor supervision system. Average of missed dosages for all patients was 6.2%. There were 25% patients who had treatment interruptions between the intensive and continuation phases because of poor coordination between medical workers responsible for the two phases of treatment.

Conclusion: Non-compliance with aspects of protocols, non-supportive attitudes and poor coordination affect drug use and patient compliance.

PC-1464-22 DOTS through community participation

P K Das, M A Hamid Salim, A K J Maug. Damien Foundation Bangladesh, Dhaka, Bangladesh. Fax: (+88) 028810903. e-mail: dfsalim@citechco.net

Background: DOTS service, introduced in Bangladesh since 1993. One diagnostic center presently covers an average 280 KM² and population of 270 000. Daily attending to centre for DOT was difficult for about 80% of patients. Decentralization of

DOT services became utmost important to achieve global target of TB cure rate.

Setting: Nine districts of Bangladesh covered by Damien Foundation (DF).

Objective: To ensure patient's friendly DOT through community participation.

Method: The organization identified 4–6 community volunteers, trained them on DOT, record keeping and indications for referral. Anti-TB drugs were supplied two monthly to these DOT providers. The DF staffs monitor the performances of the DOT providers through on site visiting, inspection of cards and interviewing the patients.

Results: In 2001, out of total 8712 cases, 4807 (56.2%) cases received DOT through Community Volunteers of whom 4265 (88.7%) cases were cured. Besides case holding these volunteers also refer TB suspects for sputum examination. In 2004, they referred 11 322 TB suspects of whom 1301 turned smear positive.

Conclusion: Decentralization of DOT through community participation reduces default rate, limits loss of daily income of patients. DOT is feasible even in difficult geographical settings.

PC-1541-22 Treatment of tuberculosis in Germany

D Sagebiel,¹ S Niemann,² B Hauer,¹ R Loddenkemper,¹ Study Group of Public Health Offices,³ Study Group of Laboratories.⁴ ¹German Central Committee against Tuberculosis (DZK), Berlin, Berlin, ²National Reference Center for Mycobacteria, Forschungszentrum, Borstel, Germany. ³Diel R, Haas W, Heykes-Uden H, Loytved G, Meywald-Walter K, Müller-Meudtner S, Pregler M, Rehder-Schlunbaum E, Schulze A, Thamm W, Zeilinger G; ⁴Feldmann K, Mauch H, Naumann L, Roth A, Rüscher-Gerdes S, Wolf H. Fax: (+49) 30 80022286. e-mail: loddheck@zedat.fu-berlin.de

Aims: Presentation of preliminary data on initial tuberculosis (TB) treatment in six German study regions.

Methods: Since October 2001, epidemiological data of TB patients have been collected and evaluated by the DZK in cooperation with four laboratories and regional public health services. 1906 cases could be evaluated by November 2004.

Results: 83.2% of patients ($n = 1879$) were hospitalized at some point for medical treatment. 63.3% were also treated by their GP during the course of their disease, 57.7% by a pneumologist, 21.7% by some other specialist, and 15.5% by a specialized outpatient service (e.g., public health service). The average hospitalization period was 51.1 days ($n = 1525$; 95% CI 48.6/53.6). 68.2% of those with pulmonary TB and a positive TB culture were initially treated with four or five drugs, 29.8% with three drugs, and 84.5% received a combination containing H, R, and Z. A wide variety of treatment regimens is used initially. The treatment is not only inadequate in a number of cases, but it is also evident that some patients not at risk for drug resistance receive secondline drugs initially.

Conclusion: The majority of TB patients in Germany are hospitalized at some point during their treatment. The initial treatment regimens do not always correspond with national and international guidelines. Wider application of national treatment guidelines would improve the treatment quality.

PC-2034-22 Source and treatment outcomes of tuberculosis re-treatment cases under the revised national tuberculosis control programme in Rajasthan, India

R S Sisodia,¹ D F Wares,² S Sahu,² L S Chauhan.³ ¹Formerly of State TB Cell, Ministry of Health, Jaipur, Rajasthan, India; ²Office of the WHO Representative to India, New Delhi, India; ³Central TB Division, Directorate of General Health Services, Ministry of Health and Family Welfare, New Delhi, India. Fax: (+91) 11 2464 5724. e-mail: waresf@whoindia.org

Background: Three years after state-wide DOTS coverage and achievement of global targets for case detection and cure, the caseload of sputum positive re-treatment cases remained high in the north Indian state of Rajasthan.

Objectives: To determine the source, accuracy of categorization and treatment outcomes in Category II sputum positive re-treatment cases registered in the 1st Quarter of 2003 (January–March 2003) in five districts of Rajasthan.

Methods: 200 consecutive Category II sputum positive re-treatment cases were identified from the TB Register and interviewed using a semi-structured questionnaire.

Results: Categorization was correct in 195 (97.5%) of the re-treatment cases interviewed. Treatment after defaults (TAD) comprised 84.6% (165/195) of those interviewed, with 13.3% (26) relapses and 2.1% (4) failure cases. Of the TAD cases, 84.8% (140) had defaulted from previous treatment in the private sector. Only 6.1% (10) had defaulted from DOTS treatment and all from a Category II treatment. The most common unfavourable treatment outcome seen amongst the interviewees was default, as seen in the national data.

Conclusion: TADs constitute the majority of re-treatment cases (84.6%), and are overwhelmingly being generated by irregular treatment in the private sector. Further involvement of the private sector in the DOTS programme in Rajasthan is needed in order to stop the creation of further re-treatment cases.

PC-2294-22 Progress towards elimination of tuberculosis in Cuba

E Gonzalez Ochoa,¹ L Armas,¹ M J Llanes.² ¹Instituto de Medicina Tropical 'Pedro Kouri', Marianao, Cuba; ²National TB Programme, Ministry of Health, Havana City, Cuba. Fax: (+53) 720 460 51. e-mail: ochoa@ipk.sld.cu

Introduction: The Cuban National Tuberculosis Control Program (NTCP) was implemented in 1962–

1963. From that time onward, a surveillance system has been managed on both, treatment and case finding strategies.

Objective: To assess the short time trend of major indicators towards the elimination goal.

Methods: Data from the National TB Record System of the National Boards of Statistics and the National Division of Epidemiology of the Ministry of Public Health, had.

Results: From 1999 to 2003, 97.5% of patients with cough and expectoration ≥ 14 days identified had sputum smear microscopy investigation and case detection rate was 92.2%. The incidence rate decline from 10.0% to 7.2 per 10 000 population. Two out of 15 provinces reached incidence rates < 5 per 100 000 pop. meaning that it is necessary to reduce 30% in order to the elimination as a public health problem. The overall TB cure rate was 92%.

Conclusions: Low incidence, high detection and cure rates along with both, low TB-HIV co-infection and multidrugresistance currently is a good evidence of progress towards TB elimination goal in an environment of good socio cultural and technological interaction.

POSTER DISPLAY SESSIONS

ASTHMA

PS-1832-22 Patient adherence to asthma treatment

B Paralija. Clinic of Pulmonary Diseases and TB, Clinical Centre Of University Sarajevo, Sarajevo, Bosnia and Herzegovina. Fax: (+387) 33 272 691. e-mail: paralija@yahoo.com

Introduction: Asthma as a chronic disease is a significant global health burden and an increasing problem, particularly for countries with low incomes.

Objectives: To determine asthma severity in patients referred to the University Clinic as well as their adherence to treatment.

Patients and methods: Data of 112 patients with persistent asthma were collected between June 2002–May 2003. Their medical records were reviewed.

Results: In the examined group 62.50% female and 37.50% male had persistent asthma. 40.18% had moderate asthma; 34.82% severe asthma and 2.68% life threatening asthma. 49.11% had inadequate adherence to treatment. Of total number of patients with inadequate adherence to treatment 41.81% declared about high medication costs. Inappropriate inhaler technique was registered in 34.55% patients. 52.78% patients who were prescribed, but not taking medication due to its high cost, had severe attack and 2.78% had life threatening attack.

Conclusion: Wider patient coverage with training as well as finding solutions for lower medication costs are necessary in improving patient adherence to treatment.

PS-1105-22 Training in asthma management: Amargadh experience

A N Mandke, Shri K.J. Mehta TB Hospital, Amargadh, Gujarat, India. Fax: (+91) 02846244079. e-mail: trctbh@yahoo.com

Setting: KJ Mehta TB Hospital, Amargadh, India.

Objectives: 1) To study outcomes of training in asthma management. 2) To find out correctness in using inhaler device. 3) To study compliance with long term prophylaxis with inhalation therapy.

Study design: Between March 2004 to February 2005 189 patients with asthma were enrolled. We used audio visual media and printed educational material for training programme. They were informed about the diseases, avoidance of allergens, use of inhalation device and breathing exercises. They were followed up at 1, 2, 3, 6 and 9 months.

Results: Programme evaluation showed marked decrease in symptoms, exacerbations and hospital admissions. They could enjoy almost normal activities. Clearly there was improvement in PFT and in asthma knowledge.

Conclusion: 1) Timely, consistent and compassionate delivery of key educational messages to the patient is critical to successful management of asthma. 2) Importance of inhalation therapy and demonstration of correct use of inhaler device at every follow up is indispensable. 3) Patient prefer instant relief. They find it difficult to comply with long term prophylaxis treatment. Many patients had miss belief about inhalation therapy that was 'it is habit forming'. 4) Breathing exercise has definite role in asthma management if done regularly.

PS-1128-22 Educational diagnosis in asthmatic schoolchildren

A S Snouber, D B Benatta, M G Guermaz. Faculty of Medicine, Oran, Algeria. Fax: (+213) 41 41 69 10. e-mail: asnouber@yahoo.fr

Asthma is a great issue of public health in the world, to improve its management is necessary. Education of asthmatic patients, a part of treatment of the disease, improve knowledge of patients about asthma, efficacy and efficiency of cares.

Objective: To make educational diagnosis in asthmatic school children.

Methods: A descriptive study concerning seven schools among fourteen of our district. Children were randomly selected. Investigation of knowledge about asthma was done by questionnaire. The data was analysed with user Epi-info system.

Results: 94 asthmatic children were counted. Range age 5-9 yrs and 10-13 yrs, represent respectively,

41.93%, 48.38% of cases, sex ratio 2/1.70% of cases live in difficult conditions of life, 47% have a smoker's father and 10% underwent passive smoking. 70% practice sport and 75% of cases missed school days. 31.18% of cases followed in University Hospital center, 49.46% in public health care, and 19% frequent private sector. 36.55% were known as asthmatic and 63.49% of cases discovered according to criteria of diagnosis established through questionnaire. 51.62% do not know medicament of asthma, 89.24% ignore peak flow meter, 61.29% do not use spray doser and 91.39% of cases do not use inhalation techniques.

Conclusion: We conclude that asthma children school is underdiagnosed in our district and its management is essential taken into account education programme or asthma school.

PS-1786-22 Capsaicine: action sur les voies aériennes

S Bousnina, K Marniche, H Racil, E Hassine, O Rekhis, S El Farhati, E Gaies, A Chabbou. UR Insuffisance respiratoire, Ligue Nationale Contre la Tuberculose et les Maladies Respiratoires, Ariana, Tunisia. Fax: (+216) 70850143. e-mail: saida.c@topnet.tn

La capsaïcine est retrouvée dans la majorité des épices et est à l'origine de la saveur piquante. Elle agit par stimulation préférentielle des fibres nerveuses non myélinisées de type C du système nerveux sensoriel des voies aériennes à l'origine d'une inflammation neurogène. L'hypersensibilité à la capsaïcine définit le syndrome d'hyper réactivité sensitive indissociable de l'hyper réactivité bronchique dans certaines formes d'asthme. Notre travail a pour but d'étudier les manifestations bronchopulmonaires secondaires à une exposition aigue ou prolongée à la capsaïcine en analysant les différents mécanismes physiopathologiques impliqués. Nous nous basons dans ce cadre sur l'étude des observations de deux patients âgés de 40 ans et de 69 ans, ayant une exposition professionnelle à la capsaïcine et qui ont présenté des crises de dyspnée sifflante lors de l'inhalation de cette substance. L'exploration fonctionnelle respiratoire a retrouvé dans les deux cas un syndrome obstructif réversible sous bêta2 mimétiques. Le caractère professionnel est confirmé par un test réaliste positif. L'éviction professionnelle a permis une régression nette des symptômes respiratoires. La capsaïcine est un stimulant des voies aériennes pouvant entraîner différents types de manifestations respiratoires : toux, éternuements, gêne rétrosternale, dyspnée sifflante. Elle doit être retenue comme substance induisant des asthmes professionnels et figurer sur les tableaux des agents étiologiques. Un interrogatoire minutieux des patients est primordial pour détecter une éventuelle exposition professionnelle.

PS-1798-22 Cardiopulmonary response to exercise in adult Nigerian asthmatics

O M Sogaolu,¹ G E Erhabor,² O M Ige.¹ ¹Department of Medicine, University College Hospital (UCH), Ibadan, Oyo State, ²Department of Medicine, Obafemi Awolowo University Teaching Hospital, Ile-Ife, Osun State, Nigeria.
Fax: (+234) 022410088. e-mail: sogee2002@yahoo.com

Cardiopulmonary exercise testing using a treadmill was performed on stable asthmatics subjects of mild to moderate severity of asthma. Baseline pulmonary function (FEV₁, FVC, PEF), blood pressure, heart rate and resting electrocardiogram (ECG) of all subjects was performed pre-exercise. The peak expiratory flow (PEF) was used to monitor pulmonary function post exercise, while the heart rate and blood pressure changes were measured every 5 minutes for a period of 20 minutes post exercise. An immediate post-exercise electrocardiogram was obtained for all subjects and was repeated 30 minutes post exercise for all. 62 subjects (mean age 25.5yrs) completed the full procedure. 71% responded positively to exercise fulfilling criteria for exercise-induced asthma (EIA). Most response occurred within 5–10 post exercise. 24.4% showed some non-positive ST depression following exercise. Blood pressure and heart rate changes post exercise were essentially normal responses. Visual Analogue Scale (VAS) used to test perception of breathlessness, correlated positively with the degree of maximal fall in peak expiratory flow ($r = 0.224$, $P = 0.04$).

PS-1985-22 Asthme aigu grave en milieu scolaire : enquête épidémiologique

A M Moumeni. Département de Pneumo-phtisiologie CHU Setif, Setif, Algérie, Algeria. Fax: (+213) 036 72 16 32. e-mail: hakmoumeni@yahoo.fr

Introduction : L'asthme bronchique est un syndrome chronique de toute la vie dont le diagnostic est facile, mais la difficulté provient des ses différentes composantes étiologiques. L'asthme aiguë sévère est une complication redoutable qui peut tuer.

Patients et méthodes : Notre étude a concerné une population scolaire de 4760 élèves enfants et adolescents de 08 à 20 ans dans deux villes à climat contrasté (marin et altitude)

Résultats : Nous relevons à travers cette étude épidémiologique que l'asthme aiguë grave est retrouvé dans presque le un quart de la prévalence cumulée de échantillonnage. En sachant aussi, que le pourcentage de cette catégorie d'asthme bronchique est distinct en basse et haute altitude dans les 02 villes ceci, est dû très probablement aux différences climatiques, géographiques et certains facteurs de risque environnementaux.

Discussion-Conclusion : Les résultats de notre étude peuvent être comparés aux autres travaux dans le monde, la prise en charge et le suivi de l'asthmatique doit passer avant tout par le médecin généraliste qui doit être le maillon essentiel d'une lutte contre la mal-

adie asthmatique. Par voie de conséquence, nous vous proposons notre travail.

PS-2089-22 Wheezing symptoms and chest X-ray evaluation in Brazilian children

M A R C Santos, M G A Galvão, A J L A Cunha. Department of Pediatrics, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+55) 2122784109. e-mail: marilenecs@terra.com.br

Introduction: Asthmatic patients frequently have chest radiographs (CXR) done during acute exacerbations.

Objective: To determine: 1) CXR rates in the evaluation of wheezing episodes in the last 12 months 2) whether having CXR done relates to asthma diagnosis.

Methods: A questionnaire was administered to 211 parents of 5 to 14-year-old children who had assistance at an inner-city pediatric hospital. Asthma was defined by an increment of 12% in FEV₁ after the use of short acting β_2 agonist. Information about CXR was obtained by asking: 'Did your child have an X-ray done because of wheezing in the chest in the last 12 months?' Diagnosis of asthma was compared in children who had underwent CXR with those who had not.

Results: Distribution by gender showed 40% of boys and 60% of girls with an average age of 8,6 (SD = 2.2) years. Asthma prevalence was 22%. It was identified 38% of asthmatic and 20% of non-asthmatic patients that referred an X-ray done in the previous 12 months with a number of children significantly higher in the group with diagnosis of asthma [OR = 3 (95% CI 1.3–6.2)].

Conclusion: Evaluation of wheezing episodes resulted in ordering CXR frequently. Further studies may explain the clinical indications for this approach.

PS-1423-22 A comparison of salmeterol xinafoate plus beclomethasone dipropionate (BDP) and theophylline plus BDP in the treatment of moderate COPD

M D Filipovic,¹ S S Cekic,² D T Ristic.¹ ¹Allergology, Institute of Pulmonary Diseases Nis, Nis, Serbia, ²Institute of Physiology, Medical Faculty Nis, Nis, Serbia, Serbia and Montenegro. Fax: (+381) 18333355. e-mail: milosfilip@yahoo.com

Objectives: To compare the benefits of adding Salmeterol (SX) and Theo to inhaled BDP in patients with stable moderate COPD.

Methods: Two hundred patients were randomized to receive either SX 50 mcg plus inhaled BDP 1000 mcg ($n = 95$) or oral slow-release Theo 250 mg plus BDP 1000 mcg ($n = 105$). All doses were given twice daily for 5 months. Spirometry and dyspnea level was measured at baseline and after 4, 8, 12, 16, and 20 weeks of therapy. The level of dyspnea was assessed with the modified Borg scale. Also, patients kept records of beta2-agonist use.

Results: Both treatments resulted in improvements in lung function that were sustained throughout the study. Maximum significant increases in FEV₁ over baseline values that were observed after 5 months of treatment were as follows: SX + BDP 0.183 l and Theo+ BDP 0.145 l. SX + BDP experienced significant reductions in beta2- agonist use and greater improvements in dyspnea ($P < 0.05$), than the Theo + BDP group.

Conclusions: As compared with Theo + BDP group, combination of salmeterol plus inhaled BDP provided significant improvement in lung function and symptom control.

PS-1097-22 Asthma mortality in Brazil, 1980–1998

H S Campos. Centro de Referencia Prof. Helio Fraga, Rio de Janeiro, RJ, Brazil. Fax: (+55) 2125529500. e-mail: hisbello@globo.com

Objective: To present data on asthma mortality in Brazil during the period 1980–98.

Method: Data obtained from the Brazilian official mortality system (SIM). For the period 1980–95: ICD 493 (Revision 9 of the International Classification of Diseases (ICD)); for the period 1996–98, ICD J45 (Revision 10 / ICD).

Results: During 1980–1998, asthma was responsible for 2076 (2286 in 1980; 2289 in 1998) deaths per year. The overall mortality rates of asthma (per 100 000 inhabitants) decreased from 1.93 to 1.16/100 000 between 1980 and 1991; from 1992 they increased from 1.36 to 1.58/100 000 in 1995. In 1996 it fell to 1.38/100 000, reaching 1.41/100 000 in 1998. The highest proportions of fatal asthma were in the extremes of the age groups (65 years old or above: 12,75/100 000; <1 year of age: 4.79/100 000). There were no significant gender differences in mortality rates. About 70% of reported deaths occurred in hospital.

Conclusion: During 1980–98, there were on average 6 deaths every day due to asthma. The mortality rates ranged from 1.2 to 1.9 deaths per 100 000 inhabitants, with the highest death rates observed among the elderly population and among children under 1 year of age. One of the major findings from this study was that 70% of the deaths due to asthma occurred in hospitals.

PS-1212-22 Validation of the score for allergic rhinitis and correlation of ARI and asthma in Sudan

A Razig,¹ I Annesi-Maesano,² O A Musa.³ ¹Physiology department, Faculty of Medicine, National Ribat University, Khartoum, Sudan; ²Inserm U, Villejuif, Paris, France; ³Physiology Department, Faculty of Medicine, National Ribat University, Khartoum, Sudan. Fax: (+249) 183263596. e-mail: rismedicine@yahoo.com

A quantitative score for Allergic Rhinitis (SFAR) ranging between 0 and 16 has been developed for assess-

ment of Allergic Rhinitis (AR) in the absence of medical diagnosis and its validation is required by different countries using a specific questionnaire and skin prick tests (SPT) for common allergens. This research aimed at; studying the pattern of Pulmonary Function Tests (PFT) and (SPT) hypersensitivity in AR patients, Asthmatics and Control Sudanese populations to validate the (SFAR) in AR patients and to investigate the correlation of AR and Asthma. The methods were used for 73 patients suffering from AR and/or asthma, referred by Khartoum state hospitals and forty control without any asthma or nasal pathology. They were ranging from 18 to 65 year for both sexes. 97% of both AR asthmatics and non asthmatics have got score for AR ≥ 7 compared to none of control. 55.6% of AR patients and 61.8% of AR Asthmatic patients have positive skin tests, giving a sensitivity and specificity of 60.3% and 90% respectively for the SFAR. 25% of the total AR patients have asthma where 88% of the total asthmatics also have AR.

PS-1601-22 Widal triad: five case reports

B Seabra, R Duarte, A Carvalho. Department of Pneumology, Centro Hospitalar Vila Nova de Gaia, Vila Nova de Gaia, Portugal. Fax: (+351) 227830209. e-mail: i.live@iname.com

The triad of nasal polyps, aspirin intolerance and severe asthma was first described by Widal in 1922. 2–3% of the asthmatic population (20% among severe asthmatics), mostly female, suffers from this triad. This entity is underdiagnosed probably due to its late manifestation: episodes of acute exacerbations on a background of severe chronic asthma. Five cases of Widal Triad were reviewed:

- 1 19 year-old female student; non-smoker; severe persistent asthma. Aspirin Induced Asthma (AIA) diagnosed at age 8. Admitted twice at an ICU. Submitted to nasal polypectomy.
- 2 26 year-old female; teacher, non-smoker; atopic intermittent asthma since age 10. AIA diagnosed at age 14 – angioedema and glottis edema. Submitted to immunotherapy.
- 3 41 year-old female; banker; non-smoker; atopic moderate persistent asthma; AIA diagnosed at age 40;
- 4 57 year-old-female, housewife, non-smoker. Severe persistent asthma. Multiple asthma exacerbations. Submitted to polypectomy at age 45.
- 5 70 year-old female; housewife, non-smoker. Mild persistent asthma. Submitted to polypectomy at age 63.

Authors aim to compare clinical manifestations, severity, analytical, functional and therapeutic particularities of each case. Notwithstanding small sample size, one must point out female predominance, the disparity of age of diagnosis and the impact of polypectomy in symptomatic improvement.

PS-1634-22 Quels pneumallergènes chez les patients asthmatiques allergiques à Bobo Dioulasso, Burkina Faso?

E Birba,¹ M Dembélé,² A Zoubga,¹ M Ouédraogo.³ ¹Service de pneumologie, Centre Hospitalier Universitaire Sanou Sourô, Bobo-Dioulasso, ²Programme National Tuberculose, Ministère de la Santé, Ouagadougou, ³Service de Pneumologie, Centre Hospitalier Universitaire Yalgado Ouédraogo, Burkina Faso. Fax: (+226) 50 33 72 07. e-mail: pnt@cenatrin.bf

Introduction : Au Burkina Faso, les données sur la sensibilisation des patients allergiques sont parcelaires. Notre travail est une étude princeps dans ce domaine. Son but est d'explorer la sensibilisation aux pneumallergènes courants des patients asthmatiques allergiques.

Méthodes : L'étude a concerné 87 patients âgés de 3 à 62 ans ayant consulté au service de pneumologie du CHU Sanou Sourô pour asthme. La classification Global Initiative for Asthma 1992 a été utilisée pour le degré de sévérité de l'asthme. Ces patients ont été soumis à un test cutané allergologique par la méthode de prick -test avec une dizaine d'extraits allergéniques standardisés des Laboratoires Stallergènes - France. Le témoin positif utilisé était l'histamine.

Résultats : Les motifs de consultation étaient : asthme intermittent (41 cas), asthme persistant léger (31 cas), asthme persistant modéré (15 cas), asthme persistant sévère (0 cas). Ces patients étaient sensibilisés à divers allergènes : acariens (65 fois), blattes (29 fois), moisissures (30 fois), la sensibilisation aux allergènes animaux et au latex était rare.

Discussion : Les asthmatiques allergiques sont sensibilisés à trois aéroallergènes principaux : acariens, blattes, moisissures.

Conclusion : La connaissance du spectre de sensibilisation allergénique permettra une meilleure prise en charge de ces patients.

PS-1652-22 Prevalence of smoking habits in an asthmatic population

B Seabra, J M Guimarães, R Duarte, A Carvalho. Department of Pneumology, Centro Hospitalar de Vila Nova de Gaia, Vila Nova de Gaia, Portugal. Fax: (+351) 227830209. e-mail: i.live@iname.com

Prevalence of Smoking Habits (PSH) in Europe is 33% (39% in Males-M, 27% in Females-F). Portugal's PSH is 19.2% (30.5%M, 8.9%F). Being aware of the side effects of smoking, particularly on the respiratory tract, one should not despise its consequences on asthmatic patients. In the absence of recent trustworthy data on the PSH among the Portuguese asthmatic population, the authors analyzed a sample of asthmatic patients, aiming to determine their PSH. These patients were distributed between 3 groups: non-smokers, former-smokers and smokers, and subsequently classified as: Severe Persistent (SPA), Moderate Persistent (MoPA), Mild Persistent (MiPA) and

Intermittent (IA) Asthmics, based on functional and clinical criteria.

Preliminary Results: 110 patients (65% F) aged 18 to 78 years (mean - 38.9); 8% were smokers (10%F, 5%M), 9% former smokers (8%F, 11%M), 83% non-smokers (82%F, 84%M). Among the asthmatic:

- smokers: 0% SPA, 56% MoPA, 33% MiPA, 11% IA.
- former smokers: 10% SPA, 30% MoPA, 50% MiPA, 10% IA.
- non-smokers: 7% SPA, 27% MoPA, 36% MiPA, 30% IA.

This review will be the basis for future studies, namely a comparative (clinical and functional) analysis of the evolution of each subgroup.

PS-1769-22 Assessment of the semantic differential scale of modified Borg Scale with VAS in assessing perceived breathlessness in asthma

G E Erhabor,¹ R A Adedoyin,² A T Aikomo,² M O B Olaogun.² Departments of ¹Medicine and ²Medical Rehabilitation, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria. Fax: (+234) 036 230 705. e-mail: gregerhabor@yahoo.com

Introduction: While substantial evidence confirms the Borg scale to be a valid outcome measure in determining physical exertion in patients with cardiorespiratory dysfunctions, it has not been proved if it will be useful for Nigerian subjects who do not understand English and have to depend on translation from English to vernacular.

Objective: To evaluate the semantic differential scale of Yoruba translated modified verbal rating Borg scale (MVRBS) with visual analogue scale (VAS) in measuring level of exertion in asthmatic patients.

Method: Fifty asthmatic patients and 50 control subjects participated in the study. Mean age for asthmatics was 21.50 ± 2.53 and 21.40 ± 2.20 for normal subjects. Each subjects exercised on bicycle ergometer for 6 mins. Each subject started with a 45 watt load which was increased by 10 watts every 2 minutes. Level of exertion was rated immediately after the exercise using VAS semantic differential scale of MVRBS concurrently.

Results: Results of the correlation matrix revealed high correlation between VAS and semantic differential scale of MVRBS ($r = 0.835$; $P < 0.01$) among the asthmatic patients and also in the normal subjects ($r = 0.932$; $P < 0.01$).

Conclusion: The result implied that semantic differential scale of MVRBS is valid for measuring the level of exertion in Nigerian asthmatic patients.

PS-2221-22 Association of prolonged breastfeeding and allergic disease in poor urban children

C C Obihara,^{1,2} B J Marais,² R P Gie,² N Beyers,² P C Potter,³ E D Bateman,⁴ C J Lombard,⁵ J L L Kimpen.¹ ¹Department Of Pediatrics, University Medical Center, Utrecht, Netherlands; ²Department of Paediatrics and Child Health, University of Stellenbosch, Tygerberg, ³Allergy Diagnostic and Clinical Research, University Of Cape Town, Cape Town, ⁴Department Of Respiratory Medicine, University Of Cape Town, Cape Town, ⁵Department of Biostatistics, MRC South Africa, Tygerberg, Western Cape, South Africa. Fax: (+31) 0302505349. e-mail: c.c.obihara@wvz.azn.nl

Background: The fact that breastfeeding may protect against allergic disease remains controversial, with hardly any reports from developing countries. The increasing prevalence of allergic disease has been linked to reduced microbial exposure in early life. Specific microbial stimuli are thought to stimulate T helper 1 immune responses, thus reducing the activity of the atopy-associated Th-2 response. Breast-milk influences the bacterial flora in the infant gut, which may provide an important immune stimulus in infancy. We investigated the association between allergic disease in children and prolonged breastfeeding.

Methods: Data was collected on children 6–14 years of age from a 15% random sample of households from two poor suburbs. Parents completed a validated ISAAC questionnaire on allergic diseases, breastfeeding duration, maternal smoking and parental allergy. Results were adjusted for possible confounders and for possible clustering within the household.

Results: Of 861 children included, allergic diseases were significantly less frequent in those with prolonged (≥ 6 months) breastfeeding. There was a significant linear inverse association between breastfeeding duration and allergic disease in children without allergic parents, but not in children with an allergic predisposition.

Conclusions: These results suggest a protective effect of prolonged breastfeeding on the development of allergic disease, in children born to non-allergic parents. This protective effect was not found in children with an allergic predisposition.

PS-2286-22 Aspects épidémiologiques de l'asthme en milieu rural

J Rakotomizao, H J A Livaharilantolalao, A C F Andrianarisoa. Service des Maladies Respiratoires, Hôpital Joseph Raseta, Antananarivo, Madagascar. e-mail: jrakotomizao@yahoo.fr

Introduction : L'asthme figure parmi les pathologies émergentes actuellement dans le monde. Pourtant, cette affection reste sous-estimée dans les pays en développement et est négligée par la population en milieu rural. Cette étude prospective menée dans un hôpital de district a pour objectif de rapporter ses aspects épidémiologiques et cliniques.

Résultats : De 2001 à 2002, 94 patients asthmatiques ont été hospitalisés de l'hôpital de district, ils représentent 11.27% des malades admis dans le service de médecine. L'âge des patients varie de 15 ans à 75 ans avec un pic entre 15 et 45 ans, le sexe féminin représente 55.3% des malades. L'asthme est récente chez 65.95% des patients et la crise est modérée dans 41.5% des cas. La variation climatique prend un rôle important dans le déclenchement de la crise (70.2%). Cette étude a permis de constater que l'exposition aux fumées de lampe à pétrole, moyen d'éclairage fréquente dans le milieu, contribue à la constitution d'un asthme persistant. Il a été constaté également que plus l'asthme est récent plus il est intermittent avec une crise modérée. Il est nécessaire de mener une campagne de sensibilisation en matière de lutte contre les polluants domestiques.

MULTIDRUG-RESISTANT TUBERCULOSIS (MDR-TB)–II

PS-1784-22 Managing information for MDR-TB cases in a large country

M A Hijjar,¹ J Keravec,² M G Procopio,¹ M P Dalcolmo,¹ T Moore,² J U Braga,¹ L G V Bastos,² J L Rocha,² M A Sigaud.² ¹Centro de Referência Professor Hélio Fraga- Ministério da Saúde, Rio de Janeiro, ²Projeto MSH/Rational Pharmaceutical Management Plus Program, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 24451773. e-mail: miguel.hijjar@saude.gov.br

Introduction: The TB Reference Center Professor Helio Fraga in partnership with Projeto MSH developed in 2004 a new drug management information system (DMIS) of decentralized control for treating the cases of TB multidrug-resistant in Brazil (1838 notifications between January 2000 and March 2005). The system is designed for federal, state and municipal levels, providing information feedback through regular reports and epidemiologic indicators at all levels, and management tools for drug distribution and control.

Methods/Results: Standardized procedures and therapeutic guidelines using multi-disciplinary teams. Revised existing procedures manual for epidemiological surveillance of MDR-TB. Defined information flows. Modified diagnostic and treatment forms (notification, follow-up, drug distribution and treatment outcomes). Defined indicators and periodic reports. Harmonized data with National Epidemiological Surveillance System. Developed new DMIS database and incorporated data from previously-treated MDR-TB patients. Conducted training workshops for state reference centers treating MDRTB cases. Conducted implementation evaluation.

Conclusion: Validated and implemented a decentralized model for MDRTB case management in 27 states

strengthening: diagnostic capacity, treatment and monitoring of MDRTB cases in all state reference centers; control and management of TBMDR drug distribution; integration and information sharing for all reference centers and TB program management levels.

PS-1795-22 Treatment results of 165 patients with multidrug-resistant tuberculosis

O Tumer,¹ F Sungun,¹ A Saygi,¹ M Kurutepe,¹ N Adiguzel,¹ E Ozturk,¹ A Orki.² ¹Pulmonology, Heybeliada Chest Hospital, Istanbul, ²Thoracic Surgery, Heybeliada Chest Hospital, Istanbul, Turkey. Fax: (+90) 2163511994. e-mail: ozlentumer@yahoo.com

Between 1996–2005 we evaluated 165 (115 male, 50 female) patients with multidrug-resistant tuberculosis (MDR-TB) with an age range 3–69 years in our clinic. The diagnosis of MDR-TB was confirmed with BACTEC technique. The individualized treatment regimens of all patients were approved by the MDR-TB Committee of our hospital with the condition of directly observed therapy by a family member. Patients and their families were educated about the disease. The new regimen with second line drugs was continued for 18 or 24 months after sputum conversion. Primary resistance was detected in 50 patients (30%). Duration of hospitalization was between 3–8 months. Sputum conversion time was between 1–6 months. Culture conversion rate was 96%. Surgical resection was performed in 21 patients. Among 165 patients 121 (73%) completed treatment successfully, 32 defaulted (19%), 6 died (4%), 6 failed (4%). Two patients relapsed after completion of therapy and were receiving retreatment. We concluded that the education and compliance of both the family and the patients, the steadiness of the drug supply and follow-up of the patients by a specialist are the key factors for a successful MDR-TB treatment.

PS-1804-22 Individually tailored tuberculosis treatment in Abkhazia

B Méa,¹ S Galstyan,² M Pardini,³ S Niemann,⁴ C Hewison,¹ F Varaine.¹ ¹Médecins Sans Frontières, Paris, France; ²TB Hospital, Guliripchi, Abkhazia, Georgia; ³Istituto Superiore di Sanita, Rome, Italy; ⁴National Reference Center for Mycobacteria, Borstel, Ghana. Fax: (+33) 1 48 06 68 68. e-mail: fvaraine@paris.msf.org

Setting: Abkhazia, Autonomous Region of Georgia.

Methods: Treatment was tailored according to Drug Susceptibility Testing (DST), using Isoniazid (H), Rifampicin (R), Pyrazinamide (Z), Streptomycin (S) and Ethambutol (E) when susceptible. Multi-Drug Resistant (MDR) TB patients were treated with at least 3 'second line' anti-TB drugs [kanamycin, capreomycin (Cap), ofloxacin (O), ethionamide, cycloserin, para-aminosalicylic acid (PAS)], Z and E when susceptible, including at least 6 months of a parenteral agent. Patients RH susceptible received standard category 1 or

2 regimens. Patient H(S) resistant: 9REZ; HE(S) resistant: 3Cap(K)ROZ/7ROZ. Follow-up smear microscopy, culture and DST were done routinely. DNA fingerprinting was performed.

Results: Success rates: for 256 patients RH susceptible: 84%, for 90 patients H(S) resistant: 74% and for 11 patients HE(S) resistant: 64%. Culture confirmed failure rates: 1.7 and 18% respectively. 9/10 failures had developed MDR. Fingerprinting of HR susceptible failures showed strains from different clusters than at admission suggesting transmission between patients. 79 MDR-TB included, 54 (68%) still under treatment (31 with negative culture, 34 still in intensive phase).

Conclusion: Treatment algorithms for H(S) and HE(S) resistances should be adapted and biosafety measures reinforced.

PS-2106-22 The influence of drug resistance on the results of the DOTS programme in the Arkhangelsk area of the Russian Federation.

A O Maryandyshev,¹ N I Nisovtseva,² A G Samoilova,² E I Nikishova,² V P Panasik,³ K Ovberg,⁴ T Hasler,⁴ E Haldal.⁴ ¹Northern State Medical University, Arkhangelsk, ²Regional Antituberculosis Dispensary, Arkhangelsk, ³Penitentiary System, Arkhangelsk, Russian Federation; ⁴LHL, Oslo, Norway. Fax: (+7) 818 2 2093 60. e-mail: mao@arh.ru

Since 1997 the Health administration of Arkhangelsk oblast in Northwest Russia and 'LHL' Norway have collaborated to strengthen the Tuberculosis Control Program by implementing the DOTS strategy. Introducing cohort analysis based on quarterly reports has allowed to observe changes in registration and treatment results. Registration of new cases and relapses with pulmonary tuberculosis have declined from 1059 new cases and 176 relapses in 2000 to 1194 and 485 patients respectively in 2001, 991 and 358 in 2002, 881 and 294 in 2003 to 773 and 232 patients in 2004. Patients with multi drug resistance (MDR) tuberculosis have however increased. In 2003 among new cases there were 19.9% patients with MDR tuberculosis. Among relapses 86.3% had resistance to any drug and 56.3% had multi drug resistance. Among new patients registered in 2003 the main reason for unsuccessful treatment (20%) was MDR-TB. Death rate from TB was 10.5% and all patients died within 4 weeks of treatment start because of late diagnosis. The DOTS program has been well established, but the high prevalence of MDR demands immediate expansion of DOTS Plus in the Arkhangelsk area.

PS-2120-22 Treatment of 80 patients with multidrug-resistant tuberculosis in Matamoros Tamaulipas, Mexico

H Ramírez,^{1,2} F Mora,¹ R Wing,³ G Crespo,⁴ C Tafoya,³ M García.¹ ¹Departamento de Micobacteriosis, Jurisdicción Sanitaria III Matamoros Tamaulipas, México, Matamoros, Tamaulipas, ²Secretaría de Salud, México, Matamoros, Tamaulipas, México; ³Region Eleven, Texas Health Department, Harlingen, Texas, USA; ⁴Departamento de Micobacteriosis, Secretaría de Salud en Tamaulipas, Ciudad Victoria, Tamaulipas, Mexico. Fax: (+868) 8131515. e-mail: hramirezo@ssa.gob.mx

The elevated rate of tuberculosis infection with multidrug-resistant *Mycobacterium tuberculosis* is a great problem all over the world with different prevalence rates.

Material and methods: We reviewed the EPITb data base and the clinical files of 80 patients with multidrug-resistant tuberculosis that completed their individualized retreatment in the sanitary jurisdiction III in Matamoros Tamaulipas, Mexico in the México-USA binational project called 'Sin Fronteras' (Without Boundaries). The cases were classified according the criteria established by the World Health Organization. All cases were in DOTS Plus in ambulant management.

Results: 44 patients were cured (negative sputum cultures at least three consecutive months) (55%), 19 died, 16 due to tuberculosis (20%) and 3 to other causes (3.75%), 3 were classified as chronic (3.37%) and 2 (2.5%) were referred to other health entities; there were no relapses; the percentage of multidrug-resistance was 6.4%.

Conclusions: Our percentage of response to retreatment is similar to those reported elsewhere, nevertheless the ambulant management improves the patient's quality of life and adherence to treatment, it favors the lack of mayor complaints and a very important decrease in the global cost of treatment.

PS-2146-22 Difficulties in procuring drugs for the treatment of drug-resistant tuberculosis (DR-TB)

S M Scoufflaire,¹ C Macé,² F Varaine.¹ ¹Medical Department and ²Campaign For Access to Essential Medicines, Médecins Sans Frontières, Paris, France. Fax: (+33) 148066868. e-mail: sophie-marie.scoufflaire@msf.org

Method: Review of the difficulties in the procurement of DR-TB drugs in MSF projects (Georgia, Thailand, Côte d'Ivoire, Armenia).

Results:

- erratic availability on international market due to the limited production [Para-Aminosalicylic acid enteric coated (PAS), capreomycin (Cap) and Cycloserine (Cyc)]
- some products are single source (Cap, Cyc, PAS)
- no stock at manufacturer level or at the Green Light Committee (GLC) level
- shorter shelf-life than duration of treatment (Cyc)
- no DR-TB drugs pre-qualified by the WHO

- insufficient guarantees of quality for some generic alternatives (Cyc, PAS, Ofloxacin, Ethionamide)
- High cost when procured outside of the GLC mechanism
- no possibility to purchase Clofazimine for DR-TB (donated to WHO for leprosy programs only)
- obstacle at national level for drug importation

Conclusion: Sustained procurement of quality drugs is essential for proper treatment of DR-TB. However, the current procurement of DR-TB drugs is hazardous. There is a need for pre-qualification of generic sources, for a buffer stock under the responsibility of the GLC to alleviate the consequences of market fluctuations, and for greater political commitment at country level.

PS-2161-22 Profile of patients with MDR-TB who "failed" treatment in Durban, South Africa

N Padayatchi,^{1,2} J Brust,³ A Ramjee,⁴ G L Osburn,⁴ I Master,⁴ H Carrara,¹ M J Ramjee,⁴ R Czarnocki,⁴ J R Quantrill,⁴ Y Moosa,⁵ S A Bamber.⁴ ¹Capriva, University of KwaZulu Natal, Durban, ²Department of Community Health, University of KwaZulu Natal, Durban, KwaZulu Natal, South Africa; ³Division Of Infectious Diseases, Columbia University, New York, New York, USA; ⁴King George V Hospital, Durban, ⁵Department of Infectious Diseases, University of KwaZulu Natal, Durban, KwaZulu Natal, South Africa. Fax: (+27 31) 26004566. e-mail: padayatchin@ukzn.ac.za

Objective: To describe the characteristics of patients with MDR-TB who did not respond to treatment and the public health threat which they present.

Method: Hospital records of patients (between 2000 and 2003) with proven MDR-TB ($n = 1295$) were reviewed. Of these, 166 patients who had completed six to nine months of treatment with susceptible drugs remained culture positive on at least two consecutive cultures at least one month apart. This was compared with the remaining patients who had responded to treatment at the same time point ($n = 1099$).

Results:

| | Patients who had failed MDR-TB N (%) | Patients who had not failed MDR-TB N (%) |
|--------------------------------------|--------------------------------------|--|
| Size of study population | 166 (12.8) | 1099 (84.8) |
| Sex male: female | 1.5 : 1 | 1.5 : 1 |
| Age (years) | | |
| 0-19 | 7 (4.2) | 96 (8.7) |
| 20-29 | 61 (36.7) | 300 (27.3) |
| 30-39 | 59 (35.5) | 347 (31.6) |
| >40 | 60 (36.1) | 349 (31.7) |
| unknown | 0 | 7 (0.6) |
| HIV status | | |
| positive | 57 (34.3) | 328 (29.8) |
| negative | 58 (34.9) | 287 (26.1) |
| unknown | 51 (30.7) | 484 (44.0) |
| No. of resistant TB drugs | | |
| 2 drugs | 18 (10.8) | 313 (28.5) |
| 3 drugs | 56 (33.7) | 357 (32.5) |
| 4 drugs | 26 (15.7) | 203 (18.5) |
| >4 drugs | 66 (39.7) | 226 (20.1) |
| Past history of TB treatment | Data pending | Data pending |
| Employed | Data pending | Data pending |
| Extent of disease (chest radiograph) | Data pending | Data pending |

In the cohort that had failed treatment, 21 patients died whilst in hospital; five refused hospitalization and a further 140 were discharged.

Conclusion: There is a significant cohort of patients who remain smear and culture positive after a course of therapy and they present operational, ethical and legal challenges for their subsequent management.

PS-2283-22 Use of WHO/IUATLD standard MDR-TB national surveillance samples in the development of a standardised-second line regimen for Green Light Application by the National Tuberculosis Programme in Nepal

K B Shrestha,¹ K Feldmann,² K K Jha,¹ P Malla,¹ B Shrestha,³ C Gunneberg.² ¹National Tuberculosis Centre, Kathmandu, Nepal; ²Kuratorium Tuberculosis in der Welt, Gauting Munchen, Germany; ³NATA/GENETUP, Kalimati, Kathmandu, Nepal. Fax: (+977) 1 6630061. e-mail: cgunneberg@wlink.com.np

Introduction: The Nepal NTP decided to introduce a DOTS PLUS PILOT using a standardised second line regimen—approved by the Green Light Committee (WHO)—using low cost quality second line drugs. Nepal, with a link to a Supranational Tuberculosis Reference Laboratory, has repeatedly participated in IUATLD/WHO National Multiple Drug Resistance (MDR) Surveillance Surveys.

Objectives: To develop a rational standardised 2nd line regimen using second line resistant strain analysis from National MDR Surveillance and other data.

Methods: Among re-treatment patients in the 2001–2002 Nationwide drug resistance survey in Nepal MDR 13 resistant strains were tested for second line drugs susceptibility in Kuratorium Tuberculose in Gauting, along with 32 other MDR strains analysed over the last 5 years. The NTP also took into account, side effect information from other pilots, Chest Physician knowledge, drug cost and storage

Results: Strain susceptibility data suggested that in our 5 drug regimen (Kanamycin, Ethionamide, Cycloserine, Ofloxacin Pyrazinamide) 96% of patients would be sensitive to at least three drugs and 83% sensitive to at least 4 drugs, with 36% sensitive to all 5 drug.

Conclusion: MDR-TB surveillance is a useful epidemiological tool in the development of DOTS PLUS Protocols—even in countries lacking routine testing facilities.

PS-1258-22 Estimation of the MDR-TB disease burden in Moldova

V Crudu,¹ V Soltan,¹ O Goliscev,² G Blagodeteleva,² L Carchilan.² ¹American International Health Alliance, Moldova Project, Chisinau, ²Phthysiopneumology Institute, Chisinau, Moldova. Fax: (+373) 22226737. e-mail: valeriu@aiha.moldnet.md

Multidrug-resistant tuberculosis represents one of the major causes of failure of tuberculosis control pro-

grams. Starting in 1997, there was a shortage of anti-TB drugs in Moldova. Less than half, and as little as 10%–15%, of drug requirements was provided. In some territories, anti-TB drugs were periodically completely out of stock. An important number of patients were treated with one or two and, sometimes three drugs. This situation can explain the sharp increase in anti-TB drug resistance in the period reviewed. Overall, the proportion of any drugs resistance had tripled in 2001 compared with 1995 and there was a ten-fold increase in MDR. Anti-TB drug resistance in previously treated cases was at a level of 27.5% in 1995 and had increased with 2.8 times by 2001. The level of MDR was nine times higher in 2001 as compared to 1995. After DOTS implementation (2001), the increase of TB resistance is not marked, but the level is still high. As a result drug resistance increased step-wise with the eventual emergence and transmission of multidrug-resistant strains, which today pose a problem in the implementation and success of the DOTS strategy.

PS-1391-22 High rates and risk factors for MDR-TB in the Republic of Georgia

N G Mdivani,¹ E Zangaladze,² N Volkova,³ T Jibuti,¹ N Shubladze,¹ G N Khechinashvili,¹ C Del Rio,³ H M Blumberg.³ ¹National Centre of Tuberculosis and Lung Disease, Tbilisi, ²National Centre for Disease Control and Medical Statistics, Tbilisi, Georgia; ³Emory University, Atlanta, Georgia, USA. Fax: (+995) 32 91 02 51. e-mail: nmdivani@yahoo.co.uk

MDR-TB is associated with increased morbidity and mortality but there have been little data on rates and risk factors for MDR-TB in the Republic of Georgia. Between 2001–2004, patients with suspected pulmonary TB at 4 sentinel sites (Tbilisi, Zugdidi, Kutaisi and Batumi) in Georgia were enrolled into this study; sputum samples were obtained for AFB smear, culture and susceptibility testing. Clinical and epidemiologic data were collected through patient interview. Among 1422 patients with suspected pulmonary TB, 996 (70%) were culture positive and 426 (30%) were culture negative. Susceptibility testing results were available on *M. tuberculosis* isolates recovered from 922 patients (534 newly diagnosed and 388 retreatment cases). Overall, 63.9% of patients (48.3% of new and 85% of retreatment cases) had isolates resistant to one or more first line antituberculosis drugs. 10.5% of newly diagnosed patients and 53.1% of retreatment cases had MDR-TB. The overall prevalence of MDR-TB was 28.1%. In multivariate analysis, risk factors for MDR-TB included female gender (OR = 1.75, 95%CI 1.18–2.63); being a retreatment case (OR = 11.04, 95%CI 7.47–16.33); and history of injection drug use (OR = 4.70, 95%CI 1.63–13.60). In conclusion, MDR-TB has emerged as a serious public health problem in Georgia and will greatly impact TB control strategies.

PS-1456-22 Drug resistance of *Mycobacterium tuberculosis* to rifampicin in Kyrgyz Republic

A A Aldashev,¹ J T Isakova,¹ O A Pak,¹ E U Usupova,¹
Z A Goncharova,² A F Tumashova,² T C H Chubakov,²
A S H Alisherov,² J K Kojomkulov,² J Friedland.³

¹Laboratory of Molecular and Cell Biology, Institute of Molecular Biology and Medicine, Bishkek, ²National Centre of Phthisiology, Bishkek, Kyrgyzstan; ³Hammersmith Hospital, London, UK.
Fax: (+996) 312660387. e-mail: cardio@elcat.kg

The Kyrgyz Republic is one of the countries with high levels of tuberculosis. The problem is becoming more critical with an appearance and spread of drug resistance of *M. tuberculosis*. The aim of the study was to determine the spread of drug resistance of *M. tuberculosis* to rifampicin in different regions of Kyrgyz Republic. 605 patients from all regions of Kyrgyz Republic with clinical symptoms of tuberculosis were studied. Rifampicin resistance was determined by biological microchip assay. Drug resistance of MBT were found in all regions, but the prevalence of drug resistance of MBT to rifampicin among the tuberculosis patients from the divers regions of Kyrgyz Republic was different, with frequent 28.4% in Bishkek, Chu - 28.4%, Issyk-Kul - 7.5%, Naryn - 9.7%, Talas - 5.3%, Osh - 5.3%, Jalal-Abad - 10.2% and Batken - 4.8%. In Kyrgyzstan the biochip test demonstrated prevalence of 18 types of mutations in 8 codons. The mutations were most frequently in codon 531 (60.8%), 526 (19.1%), 511 (6.3%) and 516 (5.2%). The most frequent mutations were Ser531→Leu, His526→Tyr, Leu511→Pro and Asp616→Val. The mutation profiles of the samples obtained from the eight regions of Kyrgyz Republic demonstrated that mutations in codons 531 and 526 are circulating in all regions of Kyrgyz Republic. MBT with mutations in codons 516, 511, 513, 512, 522 and 533 were more frequent in Bishkek city and Chu region. The mutations in codons 516, 511, 513 and 512 were not found in the samples obtained from Talas, Jalal-Abad, and Batken regions. Thus the profile of *rpoB* gene mutations is different among the MBT samples obtained in different regions of Kyrgyzstan.

PS-1471-22 Drug resistance surveillance with the major anti-tuberculosis drugs in Japan

S Mitarai.^{1,2} ¹Bacteriology Division, Research Institute of Tuberculosis, Kiyose, ²Ryoken, Tokyo, Japan.
Fax: (+81) 424924600. e-mail: mitarai@jata.or.jp

Introduction: The anti-tuberculosis drug resistance surveillance was implemented covering the whole area of Japan in 2002.

Objectives: To evaluate the incidence of anti-tuberculosis drug resistance in Japan.

Methods: The culture positive mycobacterium samples were collected from the collaborating hospitals through June to November in 2002. A total of 3122 *M. tuberculosis* strains were tested for the drug sus-

ceptibility to INH, RIF, STR and EMB. The drug susceptibility testing (DST) data was linked to the clinical information and analysed according to the history of treatment.

Results: The drug resistances to INH, RIF, STR and EMB in the initial treatment cases were 2.8%, 1.0%, 7.0%, and 1.2%, respectively. On the other hand, the resistances in the previously treated cases were 18.9% to INH, 11.0% to RIF, 14.4% to STR, and 10.1% to EB. The corresponding proportions in two categories were significantly different. The multidrug-resistant strains were found in 0.7% in the initial treatment cases.

Conclusion: The data indicated the decreased incidence of resistance to each drug tested in total comparing to 1997.

PS-1655-22 XDR-TB: extreme drug-resistance and treatment outcome under DOTS-Plus, Latvia, 2000–2002

T H Holtz,¹ V Riekstina,² E Zarovska,² K F Laserson,¹
C D Wells,¹ V Leimane.² ¹Centers for Disease Control and Prevention USA, Atlanta, Georgia, USA; ²State Agency of Tuberculosis and Lung Diseases, Riga, Latvia.
Fax: (+1) 404-639-1566. e-mail: tholtz@cdc.gov

Background: Latvia has one of the highest rates of multidrug-resistant tuberculosis (MDR-TB) in the world. Treatment is limited for patients with TB isolates with higher rates of drug resistance, especially resistance to second-line drugs.

Methods: We retrospectively reviewed records of all civilian patients treated under DOTS-Plus between January 1, 2000, and December 31, 2002. We evaluated treatment outcomes of patients with extreme drug-resistant TB (XDR TB): TB with an isolate resistant to at least isoniazid and rifampin and to at least three of the six classes of second-line drugs. We also examined a subset of these patients resistant to all five first-line drugs (resistance to 8 drugs or more).

Results: Patients with extreme drug-resistance from the three successive yearly treatment cohorts included 30 of 204 (15%) in 2000, 46 of 215 (21%) in 2001, and 38 of 185 (21%) in 2002 (χ^2 for trend = 2.25, P = 0.13). Of the 57 patients resistant to all five first-line drugs and at least three second-line drugs, 16 (28%) had never been treated for TB. Assessment of treatment outcome among these patients revealed that 31 (54%) were cured or completed therapy, 17 (30%) failed therapy, 7 (12%) defaulted therapy, 1 (2%) died, and one was still on treatment.

Conclusions: Extreme drug resistance (XDR TB), even among new TB patients, is common in Latvia and compromising treatment success rates. Interrupting primary transmission of multiply-drug-resistant isolates should be a priority.

PS-1829-22 Factors associated with failure of standardized re-treatment for MDR-TB in Peru, 1997–2001

G Ramos. Ministerio de Salud-DISA III LN-Red V, Lima, Peru.
Fax: (+511) 3811788. e-mail: gilbertramos@terra.com

Background: In 1997, the standardized re-treatment for MDR-TB was implemented in Peru, with a duration of 18 months, with application of kanamycin, ciprofloxacin, ethionamide, pyrazinamide, and ethambutol. Between 1997–2001, 1442 patients have completed therapy of which 509 failures (35.3%).

Methods: This is a descriptive, retrospective study. Included in the study were the cases that received standardized re-treatment between 1997–2001. Excluded were the cases in which treatment was modified. A review of medical charts and database of the cases that completed standardized re-treatment, data related with associated factors to failure in an individualized registry. Epi-Info was utilized for the analysis.

Results: From the cases that failed standardized re-treatment, 59% had two or more previous treatments, 32% were contacts to MDR cases in, 35% of the cases treatment irregularities were observed, 96% were resistant to rifampin and isoniazid, 38% were resistant to pyrazinamide, 67% were resistant to ethambutol, 8% were resistant to ciprofloxacin, 11% were resistant to kanamycin and 36% resistant to ethionamide.

Conclusion: Failure of Standardize Re-treatment is an important problem in Perú. Contacts to MDR cases, two or more previous treatments, treatment irregularities and resistance to Pyrazinamide, Ethambutol, Ciprofloxacin, Kanamycin and Ethionamide, are associated factors to failure.

PS-2006-22 Death rate between two cohorts of patients who received standardized retreatment for MDR-TB in Peru, 1997–2001

M R Canales La Rosa,¹ G Ramos Palomino,¹ J C Yamanija Kanashiro,² R A Durand Concha,² V E Soto Calle.² ¹Health Direction Lima City, Lima, Peru; ²Socios en Salud, Lima, Peru.
Fax: (511) 5472121. e-mail: robertocanales@terra.com

- To compare death rates between two different cohorts of patients who received standardized retreatment for multidrug-resistant tuberculosis (MDR-TB).
- Inclusion criteria: Patients who received standardized retreatment for MDR-TB (3KCxEtEZ/15CxEtEZ) in Peru, 1997–2001. Patients who failed the primary regimen (2RHZE/4R2H2) were included in the first cohort and patients who failed more than one previous regimen (2RHZE/4R2H2 y 2RHZES-1RHZE/5R2H2E2 y/o 3RHZES/5R2H2E2S2) were included in the second cohort.
- Exclusion criteria: Patients who had their retreatment regimen for MDR-TB changed and who are not discharged because they did not complete their regimen.

- Death is defined here as: A patient who dies during the MDR-TB retreatment.
- Information from individual records was saved in Access®, after quality controls.
- Excell® and EpiInfo® v6.04 have been used for analysis.

Findings: The death rate in the first cohort was 5.6% and in the second one was 16.2% ($P < .001$).

Conclusion: The death rate in the cohort of patients with several previous regimens was significantly higher than the cohort with only one previous regimen.

PS-2014-22 Meta-analysis of the status and trend of tuberculosis drug resistance in China

H Y Yao,¹ J J Liu,¹ L Y Shi.² ¹National Center for Tuberculosis Control, China CDC, Beijing, ²Tongji Medical college, Huazhong Science and Technica University, Wuhan, Hubei, China.
Fax: (+86) 10 63167543. e-mail: yaohongyan@chinatb.org

Objective: To understand the status and trend of tuberculosis drug-resistance in China and providing evidence for TB control measures making.

Method: Using Meta-analysis method to synthesize the TB drug-resistance testing results from 1981 to 2001 in China.

Results: From 1981 to 2001, total 14 753 cases were tested, among them number of general drug-resistance case were 6263, general drug-resistance rate was 42.45%. Among the drug-resistance cases, initial drug-resistance rate was 27.90%(2627/9417), acquired drug-resistance rate was 68.14%(3636/5336). Among the initial drug-resistance cases, drug-resistance rate for only one drug and for two or more drugs is 15.84%, 13.36% respectively; among acquired drug-resistance cases, drug-resistance rate for only one drug and for two or more drugs is 22.5%, 45.99% respectively. The increasing order of drug-resistance rate for different drug is H,S,R,E. From 1981 to 2001, although there was some fluctuations, the TB drug-resistance rate showed a decreasing trend in Chinese population.

Conclusion: Accompanied by implement of TB control program, the status of TB drug-resistance has been ameliorated, but the situation is still serious.

PS-2238-22 Profile of multiresistant TB patients registered in the State of Sao Paulo Database during 2003

M L V Oliveira, M C Santos, V M N Galesi. TB Control Program-Epidemiological Surveillance Center, São Paulo, SP, Brazil. Fax: (+55) 30822772. e-mail: viudeoli@usp.br

Introduction: The emergence of multidrug-resistant is a worldwide concern. In Brasil to establish the surveillance of tuberculosis multidrug-resistant (TB-MR).

Objective: To draw a profile of TB patients registered as MR in the State of São Paulo multidrug-resistance surveillance database system in 2003.

Method: Record analysis of the patients entered as TB-MR cases in the TB Control Program Epidemiological Surveillance System.

Results: During 2003, 94 TB-MR patients were notified and presented the following epidemiological profile: 64 (68.1%) were male; 37 (39.4%) pertaining to the 30–39 years and 25 (26.6%) of the 40–49 age groups, respectively, and, regarding HIV testing, 74 (79.6%) patients were HIV-negative. According to clinical forms, 97.8% (90 casos) were pulmonar cases and 96.6% (86 cases) have had three previous treatments, on average.

Conclusion: According to the data, TB-MR incidence is higher in HIV-negative male young adults that had, at least, three previous tuberculosis treatments.

PS-2074-22 MDR-TB in special TB hospital, Ozren, Soko Banja

M Jevtic,¹ D Stanojevic,¹ D Pesut.² ¹Special TB Hospital Ozren, Soko Banja, ²School of Medicine University of Belgrade, Belgrade, Serbia and Montenegro. Fax: (+381) 11 2681 591. e-mail: yata.tbc@verat.net

Introduction: Serbia and Montenegro (SCG) is an intermediate TB burden country and MDR-TB is not considered major problem in TB control.

Aim: To analyze some epidemiological features of drug-resistant TB in hospitalized patients of a large regional facility in 1999–2003 period.

Methods: Hospital records and mycobacterium laboratory (level 3) data were analyzed.

Results: Total of 256 patients with pulmonary TB were treated; in 42 (16.4%) of them MDR-TB was diagnosed. This latter number includes 14 (33.3%) previously treated patients - relapses, and 28 (66.6%) newly diagnosed cases, predominantly males. Chronic alcoholism is the most frequent associated condition/disease, especially in relapses. Total number of hospitalized MDR-TB patients is of increasing tendency, as well as number of primary resistant cases. Sputum smear + findings ranged from three months duration to 'still +'. The initial phase of therapy varied from six months to 'still under treatment'. High percentage of unfavourable treatment outcome was found.

Conclusion: As the second-line antituberculosis drugs are not produced in SCG, the majority of patients cannot afford this expensive medication at all. Further efforts should be done in MDR-TB primary prevention, including implementation of measures for reduction of TB transmission in the hospitals.

PS-2284-22 Therapeutic pathways of pulmonary tuberculosis patients before acquisition of MDR-TB in Cameroon

J Noeske,¹ C Kuaban.² ¹German Technical Cooperation (GTZ), Douala, ²Department of Medicine, Yaounde, Cameroon. Fax: (+237) 3433360. e-mail: juergennoeske@yahoo.fr

Setting: Referral centres of the National Tuberculosis Programme (NTP) in Cameroon.

Objective: To determine, among a group of patients with multidrug-resistant pulmonary tuberculosis (MDR-PTB), what psychological and socio-economic factors and what management practices had contributed to the acquisition of multidrug resistance.

Patients and methods: A series of seven MDR-patients presenting consecutively in two referral centres (Douala, Yaounde) were interviewed with a semi-structured questionnaire about to their personal and medical history. All patients had been notified as 'Failures' after one or several re-treatments according to the NTP's technical guidelines and their MDR-status had been confirmed by the National Referral Laboratory. Additional information was searched for in the medical records of the patients and by interviews of the treating physicians. The patients' different therapeutic pathways are reconstructed and compared. Factors associated with the acquisition of MDR-TB are analysed.

Results: In all patients interviewed, the diagnosis of MDR-TB as the final result in a history were subjective factors as lack of information and knowledge about TB and its consequences, social and pecuniary poverty—often related to unforeseen life events, perception of medical services and their availability, and erroneous decisions of treating physicians were intermingled in a complex of causalities not easy to be weighted one against another.

Conclusions: Intensified, spirited and repeated health education about TB and the NTP, aggressive professional education and monitoring of TB management practices are necessary to prevent MDR-TB.

PS-1870-22 What happens to DOTS treatment failures if DOTS-Plus is not available?

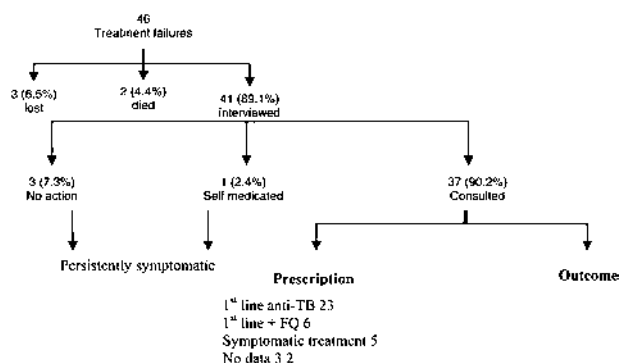
M I D Quelapio,¹ V Belen,¹ J Lagahid,² A Medina,³ E Dimatatac,¹ T E Tupasi.¹ ¹Tropical Disease Foundation, Makati City, ²Infectious Disease Office, Department of Health, Manila, ³Center for Health Development - Metro Manila, Mandaluyong City, Philippines. Fax: (+632) 8889044. e-mail: mameldquelapio@tdf.org.ph

Background: DOTS in the Philippines started in 1996 and has attained nationwide coverage. The DOTS-Plus pilot project at Makati has a limited cohort. To inform policy, it is important to describe what happens to DOTS failures if DOTS-Plus is unavailable.

Objective and methods: TB Registers from 2000–2001 of public DOTS centers in three Metro Manila

cities, selected purposively based on population size and good DOTS program performance, were reviewed to identify DOTS failures. Utilizing a structured questionnaire, DOTS failures and/or their families were interviewed regarding patients' health-seeking behavior, drugs taken after failure, and current health status.

Results:



Of 46, 41 (89%) DOTS failures and/or families were interviewed: 3 (7.3%) took no action; 1 (2.4%) self-medicated, all of whom have remained symptomatic; and 37 (90.2%) consulted physicians. Among the latter, 29 (78%) continued to take first-line anti-TB drugs, with 6 (21%) adding an over-the counter fluoroquinolone. Status during study were 11 (30%) death, 22 (59%) with persisting symptoms, 3 (8%) without symptoms, and 1 (3%) without data.

Conclusion: DOTS-Plus is essential as DOTS treatment failures die or continue to have chronic disease and are infectious. Majority continue inadequate treatment including first line drugs and a fluoroquinolone prescribed by physicians.

PS-2166-22 Detection of MDR-TB in chronic cases of pulmonary tuberculosis in Makati, Philippines

M T G Gler, R B Orillaza, L M Macalintal, V A Belen, L Raymond, N R Mira, M I D Quelapio, T E Tupasi. Tropical Disease Foundation, Makati City, Philippines.
Fax: (+632) 8102874. e-mail: tarcelasg@yahoo.com

Setting: DOTS-Plus pilot project in a high burden country.

Objective: To detect MDR-TB in patients referred with chronic tuberculosis.

Materials and methods: This is a descriptive study of 431 MDR-TB suspects. The characteristics of these patients, cultures and DST were studied.

Results: Two hundred forty-three (57.4%) had bacillary disease. Of these, DST was available in 219 isolates; 193 (88.1%) were MDR-TB, 11 (5%) were drug-resistant TB other than MDR, and 15 (6.8%) were pansusceptible. The average number of previous treatment was 3, 2.4, and 2 times, respectively. None

of these patients were treated under DOTS. The average time from consultation to start of treatment was 5.51 months. Sixty-nine (35.7%) of the MDR-TB were enrolled on DOTS-Plus, 21 (10.8%) died while awaiting treatment, 90 (46.6%) are still awaiting treatment and 14 (7.5%) were lost or refused treatment. Among the pansusceptible cases, 5 (30%) died while awaiting DST and the remaining 10 are ongoing treatment.

Conclusion: A rapid detection of MDR-TB is essential to make timely treatment decisions so that those with pansusceptible strains could be identified and first line drugs could be given. An enhanced absorptive capacity to treat these highly infectious cases of MDR-TB is urgently needed.

TUBERCULOSIS DIAGNOSIS: CULTURE AND RAPID DETECTION METHODS

PS-1287-22 Non-tuberculous mycobacterial infections among patients suspected of tuberculosis

H Grubek-Jaworska, R Walkiewicz, A Safianowska, M Nowacka-Mazurek, R Krenke, T Przybyłowski, R Chazan. Department of Pneumology, The Medical University of Warsaw, Warsaw, Poland. Fax: (+48) 22 599 1560.
e-mail: hgj@amwaw.edu.pl

Infections caused by nontuberculous mycobacteria (NTM) have been reported to be increasing in developed world. In our laboratory during 5 years (1999–2003) all the AFB (+) or culture positive patients were analysed from the view point of NTM infection. The speciation of isolates was performed with molecular method and HPLC (high pressure liquid chromatography) technique for mycolic acid analyse. Retrospective analysis of the diagnostic significance of the first NTM positive culture in the 212 suspected of tuberculosis was performed. *Mycobacterium tuberculosis* was identified in 69 (33%) and NTM in 143 (67%) cases. Because of clinical symptoms, diagnostic procedure was continued only in 91/143 (63.6%) NTM culture (+) patients. NTM infection according to ATS criteria was confirmed in 15/91 patients (16.5%). The 10 patients were infected with *M. kansasii*, 3 patients with *M. xenopi*, 1 patient with *M. fortuitum* and 1 subject was infected with *M. avium*. Retrospective analysis of 86 patients AFB (+) revealed tuberculosis in 42 (49%) patients. Among the other 44 AFB (+) patients: 8 cases (10%) were NTM infections, in 7 cases it was environmental contamination, 29 specimens were culture negative, but tuberculosis was excluded with PCR.

In conclusion: 15/91 (16%) patients suspected of mycobacterial infection with one NTM positive culture was finally diagnosed as NTM infections. Among the

nontuberculous AFB (+) cases, NTM infections were finally diagnosed in 8/44 (18%) patients.

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PS-1345-22 Comparison of an assay based on RD1 selected peptides with commercially available assays based on RD1 overlapping peptides to identify subjects with active TB

D Goletti,¹ D Vincenti,¹ S Carrara,¹ O Butera,¹ F Bizzoni,¹ M Amicosante,² C Saltini,² E Girardi.¹ ¹INMI, Rome, ²Università Torvergata, Rome, Italy. Fax: (+39) 0655170904. e-mail: d.goletti@tiscali.it

We set up an ELISPOT assay for IFN-gamma based on RD1 selected peptides that appears specific for active tuberculosis (A-TB). Objectives of this study in subjects enrolled with suspicious pulmonary TB are: 1) to evaluate if this assay based on RD1 selected peptides and intact proteins identifies subjects with A-TB in a clinical setting; 2) to compare these results with those based on commercially RD1 overlapping peptides. A microbiological TB diagnosis was performed in 23 and ruled out in 32. Sensitivity and specificity of the assay based on RD1 selected peptides for active TB is 70% and 91% respectively. In contrast a response to RD1 intact proteins was found in 83% patients with A-TB and in 44% without A-TB (specificity 66%) and these 44% subjects resulted tuberculin skin test (TST) positive. Similarly 91% and 83% patients with A-TB showed a positive response by T SPOT-TB and QuantiFERON-TB Gold assays respectively, whereas in those without A-TB 41% showed a positive response by both assays (specificity 59%) and these 41% subjects resulted TST positive. These results suggest that our test based on RD1 selected peptides may be useful for diagnosing A-TB.

PS-1412-22 Preliminary results from an evaluation of a whole-blood, interferon-gamma assay in individuals with tuberculosis infection and disease in a rural Indian hospital

M Pai,^{1,2} R Joshi,² S Dogra,² M Bandopadhyaya,² D K Mendiratta,² P Narang,² S P Kalantri,² A L Reingold,¹ J M Colford,¹ L W Riley.¹ ¹Division of Epidemiology, University of California, Berkeley, Berkeley, California, USA; ²Mahatma Gandhi Institute of Medical Sciences, Sevagram, Maharashtra, India. Fax: (+1) 510- 643-4927. e-mail: madhupai@berkeley.edu

Objectives: 1) To evaluate the sensitivity of the QuantiFERON-TB Gold® In Tube (QFT) assay in patients with culture-confirmed tuberculosis, and 2) to determine changes in QFT results in individuals before and after latent tuberculosis (LTBI) treatment.

Methods: We recruited 24 HIV-negative patients with culture-positive TB (median age 26 years, 67% male, untreated for TB or <4 weeks treatment). The QFT assay measured interferon-g response to ESAT-6, CFP-10, and TB7.7 antigens (cut-point for positiv-

ity was >0.35 IU/mL). In a separate study, we repeated QFT in 24 QFT-positive health workers (HCWs) who had received 6 months of INH for LTBI. The second QFT assay was done about a year after the first.

Results: Twenty of 24 active TB patients were QFT-positive (sensitivity 83%; 95% CI 64%, 94%). Among the 24 HCWs who received LTBI treatment, 19 (79%) remained QFT-positive after treatment.

Conclusions: In this preliminary analysis, QFT assay had a sensitivity of 83% in active TB patients, an estimate consistent with other studies. In previously QFT-positive HCWs (with potential for re-exposure), INH therapy did not result in reversion to QFT-negativity in most individuals. Larger studies are required to evaluate QFT in high burden countries.

PS-1416-22 Cost-benefit analysis of a lateral flow immunochromatographic system for the diagnosis of active pulmonary tuberculosis

J Gonzalez-Canudas,¹ J Paniagua,¹ A Olguin,¹ L Uribe,¹ M Ramirez,² R Galindo.² ¹Silanes, Mexico, ²TI Salud, Mexico, DF, Mexico. Fax: (+52) 54883761. e-mail: jogonzalez@silanes.com.mx

The objective of our study was to evaluate a rapid immunochromatographic diagnostic system which consists of a mixture *M. tuberculosis* antigens. 144 subjects were included in the study; 72 had active pulmonary tuberculosis and, 72 had the infection. The test detected 57 of the active TB patients and, only 1 healthy contact got a positive result. Sensitivity of 79%, specificity of 98.6%. The positive predictive value was 98% and the negative was 0.82%. Sequential use of the diagnostic systems in respiratory symptomatic patients bacilloscopy only for negative patients and diagnostic strip for the rest- enables tuberculosis coverage to rise up to 98%. Financially, the difference between the Situation Today and the New Situation Approach represents saving approximately 7.5 million dollars. The Cost-Benefit Analysis under the New Approach would save approximately 158 040 DALYs and, a VPN of \$159 million dollars in 3 years. Based on these results, this test can be used as a support for the existing methods in the timely detection of active TB cases in locations where a bacilloscopy is unavailable, or when it is impossible to obtain a culture or bacilloscopy sample due to the patient's condition. It also increases the positive detection rate in developing countries.

PS-1446-22 Comparison of BACTEC 12B and 7H10 media as markers for response to therapy

M L Joloba,^{1,2,3} S Ogwang,^{2,3} P Orikiriza,² A E Assegghai,^{2,3} K D Eisenach,⁴ R D Mugerwa.^{1,3} ¹Makerere University, Kampala, ²Joint Clinical Research Centre, Kampala, ³Uganda-Case Western Reserve University Collaboration, Kampala, Uganda; ⁴University of Arkansas for Medical Sciences, Little Rock, Arkansas, USA. Fax: (+256) 41 342632. e-mail: micro@jcrc.co.ug

Tuberculosis (TB) is the leading cause of death of a single infectious agent. Culture conversion of sputum samples is considered as a marker for response to TB therapy. Currently both solid and liquid culture conversions can be used to determine response to therapy. We investigated whether the Bactec 460 liquid culture system was more likely to remain positive after the solid culture had converted to negativity during follow-up on anti-TB therapy. Sputum specimens collected from 110 HIV-noninfected adult patients aged 15–50 years with initial episodes of smear-positive culture-confirmed drug-susceptible pulmonary tuberculosis were processed using the NALC/NaOH method and simultaneously inoculated on Middlebrook 7H10 agar and BACTEC 12B medium. Sputum specimens were analyzed on days 0, 2, 4, 7, 14, 21 and then monthly up to 1 year following initiation of drug treatment. Out of the 110 enrolled patients, 101 had complete data. From day 0 to 2 months, the 7H10 and BACTEC results for MTB detection were comparable. Beyond month 2, BACTEC was more likely to remain positive; whereas, the solid medium culture had converted to negative. These data indicate that BACTEC 12B conversion is a more sensitive marker of response to therapy than the solid medium culture.

PS-1462-22 Introduction of rapid identification of *Mycobacterium tuberculosis* complex in Bactec® 12B vials by PCR into routine practice

J Muhumuza,¹ B B Asimwe,¹ S Kayes,² H W Boom,^{2,3} K D Eisenach,^{2,4} L M Joloba.^{1,2} ¹Department of Microbiology, Makerere University Medical School, Kampala, ²Uganda-CWRU Research collaboration, Kampala, Uganda; ³Department of Infectious Diseases Case Western Reserve university, Cleveland, Ohio, ⁴Department of Anatomy and Pathology, University of Arkansas for Medical Sciences and John L. McClell, Little Rock, Arkansas, USA. Fax: (+256) 41533531. e-mail: jmuhumuza@med.mak.ac.ug

Identification of *Mycobacterium tuberculosis* (MTB) complex by conventional methods requires culturing to isolate the organisms and subsequent biochemical methods that are often cumbersome and expensive. We evaluated a PCR assay based on detection of IS6110 for identification of MTB Complex in Bactec® 12B cultures with the aim of reducing the reporting time and cost of TB identification. Routine specimens submitted for Bactec® radiometric culture method were processed by the standard NALC/NaOH method and

inoculated into 12B vials and monitored daily using the Bactec® 460 reader. At a growth index (GI) ≥ 10 , 0.5ml aliquot of the 12B broth was removed and assayed with PCR. In addition the same 12B vial was analyzed by Bactec® NAP method at a GI ≥ 500 as a gold standard. 71 specimens were analyzed and of these, 62 were NAP positive while 63 were PCR positive for MTB complex. The use of PCR resulted in a mean reduction in identification time by 11 days and a 90% reduction in cost for a single test compared with Bactec® NAP. Therefore, PCR is a rapid, reliable and cheaper alternative for identification of *M. tuberculosis* complex in Bactec® 12B cultures.

PS-1465-22 Inhibition of adenosine deaminase activity in undiluted pleural effusions

A Safianowska, R Krenke, R Chazan. Department of Pneumology, The Medical University of Warsaw, Warsaw, Poland. Fax: (+48) 225991560. e-mail: asafian@amwaw.edu.pl

We noticed alinearity of the assay when performed on pleural effusion samples according to Giusti* method because of an inhibition effect. The effect of the inhibition could be eliminated by a mere eight-fold dilution of the effusion sample with physiologic saline. The ADA in pleural effusions obtained from 11 patients with tuberculous pleuritis and 15 patients with malignant pleural effusion was determined using the colorimetric method of Giusti modified by the authors. The ADA level reached the diagnostic cut-off for tuberculosis (40 U/l) in 100% tuberculous cases and in none malignant case (mean values were 85.3 ± 47.1 and 10.6 ± 7.7 respectively). Determination of '2'-deoxyadenosine/adenosine ratio', although already done, was of no importance in these circumstances.

Conclusion: We recommend that pleural ADA should be performed with 1:8 dilutions of pleural effusion with physiologic saline, which allows to diminish an inhibition effect affecting the deaminase level obtained by activity measurements. There was no necessity to determine '2'-deoxyadenosine/adenosine ratio'. The investigation compulsory needs to be continued on the more numerous groups of patients.

* G. Giusti, Adenosine Deaminase in: Bergmeyer HU, ed. Methods of Enzymatic analysis, New York, Academic Press 1974, ss. 1092–99.

PS-1502-22 GenoType Mycobacterium CM/AS and GenoType MTBC assays for rapid identification of mycobacteria

M Müllerová. Clinical Laboratories Veleslavín, Head of Department of Microbiology TB, KlinLab.Ltd., Prague, Czech Republic. Fax: (+420) 235 366 161. e-mail: m.muellerova@klinlab.cz

Introduction: The Czech republic is a small country situated in the centre of Europe. It has a low incidence of TB. Increasing numbers of migrants and immigrants

from countries with high incidence of TB and mycobacterioses can soon alter this situation. The objective of this study evaluates a new commercial assays of the GenoType Mycobacteria (Hain Lifescience, Nehren, Germany).

Materials and methods: A total of 204 mycobacteria were isolated from L-J media, Bactec MGIT960, BacT/ALERT were identified by GenoType. The CM for identification of 13 different mycobacteria including *Mycobacterium tuberculosis* complex a new AS of 16 species. Differentiation of the *M. tuberculosis* complex using GenoType MTBC. GenoType tests takes only 7hrs, conventional methods 3–6 weeks.

Results: CM panel of 152 strains: *M. fortuitum* (24), *M. gordonae* (18), *M. avium* (16), *M. chelonae* (13), *M. intracellulare* (11), *M. xenopi* (11), and following. AS panel of 33: *Mycobacterium* species (24), non determinate (5) were identified by conventional methods, *M. kansasii* (2), *M. lentiflavum* (1), *M. mucogenicum* (1). MTBC panel of 19 strains: by *M. tuberculosis* complex (12), *M. BCG* (6), *M. bovis ssp. bovis* (1).

Conclusion: All commercial tests are useful in routine diagnostics. Identification of mycobacteria is more rapid.

PS-1706-22 Utility of two different primer sets for diagnosis of tuberculosis.

U B Singh, T Rana, V N Suresh, J Arora, D S Rao.
Department of Microbiology, AIIMS, New Delhi, Delhi, India.
Fax: (+91) 11 26588663. e-mail: urvashi00@hotmail.com

Molecular diagnosis of tuberculosis has become inevitable. We used two primer sets, corresponding to MPT64 gene and insertion element IS6110, the two most commonly used targets for routine diagnosis of tuberculosis by Polymerase Chain Reaction (PCR). In this study 260 clinical specimens including pulmonary and extra pulmonary, from patients suspected of tuberculosis were investigated for the presence of *Mycobacterium tuberculosis* DNA by PCR. 56 (21.53%) samples were positive for MPT64 gene, whereas 20 (7.69%) were positive for IS6110. IS6110 primers missed 43 samples positive by MPT64 primers while being positive in 7 samples negative by MPT64. 197 (75.76%) samples were negative both for IS6110 and MPB64. PCR amplification of MPB64 gene fragment was found to be more sensitive than that of IS6110 insertion element.

PS-1816-22 Interferon-gamma assay for the detection of tuberculosis infection among children in a rural Indian hospital

S Dogra,¹ P Narang,¹ D K Mendiratta,¹ P Chaturvedi,¹ A L Reingold,² J M Colford,² L W Riley,² M Pai.^{1,2}

¹Mahatma Gandhi Institute of Medical Sciences, Sevagram, Maharashtra, India; ²University of California, Division of Epidemiology, Berkeley, California, USA.

Fax: (+1) 510-643-4927. e-mail: madhupai@berkeley.edu

Objectives: To compare the QuantiFERON-TB Gold® In Tube (QFT) assay with the tuberculin skin test (TST) for the estimation of latent tuberculosis infection among children.

Methods: Eighty children (median age 5 years, 83% BCG scar+) underwent TST (Mantoux, using 1 TU PPD-RT23) for a variety of indications. QFT assay measured interferon-gamma response to ESAT-6, CFP-10, and TB7.7.

| | QFT Positive (=>0.35 IU/mL) | QFT Negative | |
|------------------------|-----------------------------------|-----------------|----|
| TST Positive (=>10 mm) | 4 | 3 | 7 |
| TST Negative | 3 | 70 | 73 |
| | 7 | 73 | 80 |

Results: Tuberculosis infection was detected by either TST or QFT in 10 of 80 children (12.5%). Seven of 80 (9%) children were positive by TST, whereas 7 of 80 (9%) were also positive by QFT (Table). In 74 of 80 children, the TST and QFT results were concordant (agreement 93%; kappa = 0.53 [95% CI 0.20, 0.86]). BCG scar-positive children had similar rates of TST-positivity (8% in scar-negative vs. 9% in scar-positive; $P = 0.87$) and QFT-positivity (8% in scar-negative vs. 9% in scar-positive; $P = 0.87$) as BCG scar-negative children.

Conclusions: In this preliminary analysis, the agreement between TST and QFT was high. BCG vaccination had little impact on TST and QFT results. The number of children with positive test results was too small to make any inferences about risk factors and discordance.

PS-1855-22 The role of induced sputum for the diagnosis of pulmonary tuberculosis in the Evandro Chagas Clinical Research Institute, FIOCRUZ

M J Martins Da Costa, S de Souza Carvalho, F Marinho Sant'Ana, E Queiroz, L B Paz, F Barreto, R Silveira Reis, M C Lourenço, V Rolla. Research Clinic Institut Evandro Chagas - FIOCRUZ, Rio de Janeiro, RJ, Brazil. Fax: (+55 021) 38659607. e-mail: marlijane@ipef.fiocruz.br

Introduction: Almost half cases of pulmonary tuberculosis (TB) are sputum negative what makes necessary the implementation of new techniques to improve diagnosis.

Objectives: To evaluate the contribution of induced sputum in a TB research center.

Methods: A retrospective study was conducted from 7 November 2003 to 20 March 2005 to evaluate the role of induced sputum in the diagnosis of pulmonary TB. Induced sputum was indicated in cases of three negative smears, lack of sputum for smear or the need of hospitalization.

Results: In our study 91 patients were treated for TB, 79 were pulmonary. Co-infection with HIV was detected in 33 cases. Fifteen (16.48%) patients were treated without a positive smear or culture. Sputum smears were positive in 42 (46.15%) cases; 39 of them were induced, in 10 cases smears were positives (25.64%) and culture were positives in 22 cases (56.41%). Induced sputum resulted in 66.66% positive specimens. In 3 hospitalized patients this procedure helped the drop out of isolation.

Conclusion: Induced sputum in centers that care for TB patients contributes to improve pulmonary TB diagnosis and health care workers safe.

PS-1890-22 Diagnobact: a 99mTc-ciprofloxacin radiopharmaceutical for the detection of tuberculosis.

R Sharma,¹ K N Tewari,² A Bhatnagar.³ ¹Department of Medicine, INMAS, Delhi, ²Department of Health, MCD, Delhi, ³RBTB Hospital, Delhi, Delhi, India. Fax: (+91) 1123962308. e-mail: kntewari@yahoo.com

Objective: To evaluate role of radionuclide scintigraphy with technetium-99m-radiolabeled ciprofloxacin (Diagnobact) as a means to detect tuberculosis.

Methods: Twenty two patients with known or suspected tuberculosis underwent scans with Diagnobact. Almost all were also subjected to a 99mTc-methylene diphosphonate bone scan plus computerized tomography or magnetic resonance imaging or both. Clinical laboratory criteria for the presence of tuberculosis were based on the definitions of the Centers for Disease Control and Prevention.

Results: Based on the CDC clinical laboratory criteria as well as on conventional scan results, Diagnobact was characterized in eleven studies as 'true positive', in nine as 'true negative', in one as 'false positive' in one as 'false negative'.

Conclusions: It is concluded that Diagnobact is a cost effective diagnostic tool for detection of tubercular infection.

PS-2071-22 Antibody response against 38kDa and lipoarabinomannan mycobacterial antigens in extrapulmonary tuberculosis in adults and children

U Demkow,^{1,2} J Ziolkowski,² T Zielonka,² B Bialas-Chromiec,¹ M Filewska,¹ D Michalowska,¹ J Kus,¹ M Nowak,³ E Rowinska-Zakrzewska.¹ ¹Department of Laboratory Diagnostics Institute of Tuberculosis and Lung Diseases, Warsaw, ²Department of Laboratory Diagnostics and Clinical Immunology of Developmental Age, Warsaw Medical School, Warsaw, ³Department of Orthopedics TB Public Hospital, Otwock, Poland. Fax: (+48) 22 43 12 358. e-mail: u.demkow@igichp.edu.pl

Diagnosis of EXTB is difficult and remarkable diagnostic delay is often present. Therefore reliable serological test would have considerable advantage. The aim was to compare IgG, IgA, IgM immune response against 38kDa and LAM in different forms of EXTB. Serum samples from 414 subjects: 51 A and 22 CH (EXTB), 181 A and 160 CH (non-TB). Mean IgG level for A was 325 ± 412 U/ml (EXTB), 180 ± 70 U/ml (control). Mean IgM OD index for A was 0.73 ± 0.23 (EXTB), 0.4 ± 0.32 (control, for CH: 1.01 ± 0.78 (EXTB) and 0.35 ± 0.56 (control) ($P < 0.01$). In primary EXTB IgM level significantly increased ($P < 0.01$), in postprimary IgG increased. Sensitivity for A and CH respectively was: IgA 29% and 13%, IgG 44% and 17%, IgM 10% and 14%. Specificity IgA 94% and 87%, IgG 97% and 98%, IgM 92% and 88%. Sensitivity increased in children over 10 years old. IgG based test anti 38kDa and LAM can be useful in diagnosis of postprimary EXTB in adults. Examined tests do not achieve adequate sensitivity in EXTB in children.

PS-2136-22 An evaluation of the QuantiFERON®-TB Gold assay in an Australian hospital

B C Mayall,¹ J Geddes,¹ J Bywater,¹ B Howden,^{1,2} P D R Johnson.² ¹Microbiology Department, Austin Health, Heidelberg, VIC, ²Infectious Diseases Department, Austin Health, Heidelberg, VIC, Australia. Fax: (+61) 03 94572590. e-mail: barrie.mayall@austin.org.au

A commercial assay, QuantiFERON®-TB Gold (QTBG) which assesses gamma interferon response to two antigens, ESAT-6 and CFP-10 (not found in BCG), was evaluated. 651 blood samples from 459 subjects in 2 patient and 2 health care worker (HCW) groups were tested over 16 months. 13 of 16 (81.3%) patients with current *Mycobacterium tuberculosis* (Mtb) infection had a positive QTBG test. Of 194 patients investigated to exclude Mtb or prior to chemotherapy, 24 (12.4%) had positive QTBG tests: six of 11 with positive Mantoux tests had a positive QTBG result. Four of 93 health care workers (HCWs) with occupational exposure to Mtb had positive QTBG tests. Four HCWs who Mantoux converted remained negative by QTBG. Another HCW had positive

QTBG testing that became negative after three months. Eight of 155 (5.2%) HCWs evaluated for past Mtb exposure had positive QTBG tests: four of 47 with positive Mantoux tests had positive QTBG tests. There is moderately good correlation between QTBG testing and acute Mtb infection. Further work is needed to demonstrate the value of QTBG in latent Mtb infection. The present test format may need modification before it could be applied to low cost screening.

PS-1104-22 Effect of cigarette smoking on radiological and bacteriological features of tuberculosis patients

N Cimen Ozisik, Z Arslan, O Malas Oruc, G Yurteri, S Sarac. Heybeliada Chest Diseases and Thoracic Surgery Training and Research Hospital, Istanbul, Turkey. Fax: (+90) 216 351 19 94. e-mail: zeliha_arslan@hotmail.com

Objectives: To evaluate effect of cigarette smoking on radiological and bacteriological features of pulmonary tuberculosis (TB) patients.

Methods: Records of 232 TB cases hospitalised between January 2003–2004 were reviewed. They were divided according to the existence of cavitory lesions or not on chest X-ray, and sputum smear positivity. Cigarette smoking status were compared accordingly.

Results: Cigarette smoking is found to be statistically higher in males than in females ($P < 0.05$). There were no statistical relationship between cigarette smoking and existence of cavitory lesions on chest X-rays but there were statistically significant relation between cigarette smoking and parenchymal lung disease ($P < 0.05$). Also sputum smear positivity was statistically higher in patients with smoking habit. ($P < 0.05$).

Conclusion: Regarding these results it is possible to say that cigarette smoking increases tuberculosis progression, but to understand mechanisms of cigarettes' effects, other studies should be conducted.

PS-1084-22 Physiotherapy technique of bronchial clearance (ELTGOL) as an alternative method for the diagnosis of pulmonary tuberculosis

V Souza Pinto, R Bammann. Emilio Ribas Infectious Diseases Institute (IIER), Sao Paulo, SP, Brazil. Fax: (+55) 11 3896.1241. e-mail: valdirpinto@uol.com.br

Objective: Evaluating the feasibility of physiotherapy technique of bronchial clearance (ELTGOL) as a diagnostic method to obtain sputum samples from patients with suspect of pulmonary tuberculosis (PTB).

Methods: It was included 235 adult inpatients at IIER identified for AFB smear (ZN) in sputum sample. It was excluded 75. Thus, five samples were consecutively collected from each of 160 inpatients to know: (1) 'spontaneous' technique; (2) ELTGOL; (3)

'spontaneous'; (4) sputum induction with hypertonic saline; and (5) 'spontaneous' (3rd sample). All samples were seeding into culture medium (LJ).

Results:

| Symptoms | Sensitivity (%) | Specificity (%) | PPV (%) |
|-----------------------------------|-----------------|-----------------|---------|
| Cough >2 weeks | 97.2 | 99.5 | 92.0 |
| Cough >3 weeks | 84.8 | 99.7 | 93.2 |
| Fever >2 weeks | 57.9 | 95.4 | 41.0 |
| Fever >3 weeks | 50.0 | 96.1 | 41.6 |
| Fever >2 weeks and cough >2 weeks | 55.1 | 100.0 | 99.0 |
| Any 2 symptoms | 92.7 | 89.6 | 32.8 |

There's an apparent superiority of results obtained by ELTGOL, specially if it's compared to a only one sample by 'spontaneous' or by hypertonic saline. However, there wasn't significantly statistic difference among different studied methods when they have been opposed with the gold standard (LJ medium) concerning sensitivity, specificity and predictive values.

Conclusions: ELTGOL technique reaches similar results from those obtained by three sputum samples ('spontaneous') and hypertonic saline. Collecting only one sample from each patient, ELTGOL seems to be the best option as a practicable and promising alternative in favoring the diagnosis of PTB.

PS-2203-22 Results of the diagnostic monitoring in patients with respiratory symptoms with suspected pulmonary tuberculosis

D Zavala,¹ A Torres,² R Rodriguez,² V Alarcon,³ J Cardenas.² ¹Canadian Lung Association - Ecuador, Quito, Pichincha, Ecuador; ²Dirección de Salud II Lima Sur - MINSA, Lima, ³Dirección de Salud Lima Este - MINSA, Lima, Peru. Fax: (+511) 3320496. e-mail: dzavala@ec-red.com

Aim: Know the non-tuberculous respiratory pathology after carrying out the diagnostic monitoring in patients with respiratory symptoms with clinical suspicion of tuberculosis pulmonary, who have previously negative smear and X-ray of lungs abnormal. A descriptive study conducted in 107 patients of Lima, Peru, that were suspicious of pulmonary tuberculosis, whose initial examinations were negative, there was practiced them the procedure of diagnostic monitoring with various auxiliary examinations, being demonstrated: that thorax radiology is not determining in the diagnosis of tuberculosis; that a third and fourth microscopic examination, with its respective culture for mycobacterium, help in 10.28% diagnose tuberculosis in these cases; that the leukocyte count, the sputum smear with Gram and the culture for common germs of sputum demonstrate infectious respiratory pathology different from tuberculosis in these cases in 93.7%; that the bronchial endoscopy, the cytological examination of sputum, and the search for *Pneumocystis carinii* in this study do not contribute to diagnostic monitoring.

Conclusion: Thus, in these patients, suspicious of tuberculosis, in order to make its differential diagnosis before making a therapeutic decision, the procedure of proposed 'diagnostic monitoring' was of assistance in 97.19% of the cases to define a respiratory pathology.

PS-2275-22 Place de la fibroscopie bronchique dans le diagnostic de la tuberculose thoracique

S M Mathurin,¹ E Birba.² ¹Programme Tuberculose, Burkina Faso, Ouagadougou, ²CHU Sanou Sourô, Bobo Dioulasso, Burkina Faso. Fax: (+226) 50317979. e-mail: pnt@cenatrin.bf

Introduction : La fibroscopie bronchique est un des moyens diagnostiques de la tuberculose thoracique.

But : Décrire la place de cet outil dans la confirmation du diagnostic de tuberculose.

Matériel et méthodes : Il s'est agi d'une étude de dossiers de tuberculeux diagnostiqués par l'analyse des produits d'aspirations bronchiques, l'étude des lésions endobronchiques, les biopsies bronchiques.

Résultats : Le diagnostic de tuberculose a été posé 17 fois (12 VIH +) parmi 115 patients tuberculeux soit 14.8% des cas. Le diagnostic a été posé devant les situations suivantes : positivité du liquide d'aspiration bronchique, 6 fois ; granulations endo bronchiques : 4 fois ; fistules gangliobronchiques, 3 fois ; positivité des expectoration post fibroscopiques, 2 fois ; granulome tuberculeux, 2 fois.

Discussion : La fibroscopie bronchique a permis d'améliorer la qualité de la prise en charge des tuberculeux. Ce moyen diagnostique, malgré son coût prohibitif en pays pauvre demeure un outil indispensable.

Conclusion : La fibroscopie bronchique occupe une place de choix dans le diagnostic de la tuberculose thoracique.

DRUG SUSCEPTIBILITY TESTING FOR TUBERCULOSIS

PS-2118-22 Comparative contamination rates in the microscopic observation drug susceptibility assay (MODS), MBBacT and Löwenstein-Jensen cultures

N M Bowman,¹ J Coronel,² R H Gilman,^{1,2,3} A R Escombe,^{1,2,4} L Caviedes,² J Friedland,⁴ J-C Saraaviva,⁵ C A Evans,^{1,2,4} D A J Moore.^{1,2,4} ¹Asociación Benéfica Prisma, Lima, ²Universidad Peruana Cayetano Heredia, Lima, Peru; ³Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA; ⁴Wellcome Centre for Clinical Tropical Medicine, Imperial College London, London, UK; ⁵DISA Lima Norte, Ministerio de Salud, Lima, Peru. Fax: (+511) 4640781. e-mail: davidajmoore@msn.com

In an operational evaluation of the performance of the microscopic observation drug susceptibility assay (MODS) we compared the culture contamination

rates of MODS, MBBacT and LJ culture for 3760 sputum samples decontaminated by the NaOH-NALC method and cultured in parallel by all three methods. Median delay from obtaining sample to processing was 3 days—samples were generally but not universally refrigerated. Overall at least one culture method was contaminated in 659 of 3760 samples (17.5%); contamination of all three methods was only seen in 45 (1.2%). Contamination of LJ, MODS and MBBacT cultures was noted for 12.7%, 6.9% and 3.5% of samples, of which 69%, 45% and 33% respectively were uniquely contaminated in each method. A definitive result after re-decontamination and re-culture was achieved for 92%, 99% and 98% of all 659 samples by LJ, MODS and MBBacT; a positive culture was retrieved in 5%, 8% and 6% of all samples by LJ, MODS and MBBacT. Median delay to definitive result for contaminated LJ, MODS and MBBacT cultures was 48, 24 and 32 days (positive cultures), 82, 58 and 56 days (negative cultures) and 32, 19.5 and 29.5 days for cultures finally designated as contaminated.

PS-1163-22 Rapid DNA based assay for improved *Mycobacterium tuberculosis* complex resistance testing in high and medium prevalence countries

M Weizenegger,¹ H Hoffmann,² K Feldmann.² ¹Labor Dr. Limbach, Heidelberg, ²Institut für Laboratoriumsdiagnostik, Asklepios-Fachkliniken, München-Gauting, Germany. Fax: (+49) 6221 303689. e-mail: weizenegger@docnet.de

Introduction: The problem of drug-resistant *Mycobacterium tuberculosis* (MTB) is of great public health concern. Rapid drug susceptibility testing and early targeted therapy may be crucial to inhibit the further spread of multidrug-resistant (MDR)-TB.

Objectives: 103 MTB samples were collected from patients of the former soviet union, mainly Ukraine and Bolivia and Nepal. Aliquots from cultures were investigated with the new Genotype@MTBDR (Hain Lifescience, Nehren, Germany). All of them are characterized as drug resistance either to Rifamycin (RMP) or Isoniazid (INH) or both (MDR). The Genotype test is the first nucleic acid based assay for multiplexed analysis of the rpoB-gene (RMP) and the katG-gene (INH) associated resistance.

Results: All strains tested with the Genotype assay showed high concordant results compared to the phenotypical characterisation.

Conclusion: The Genotype@MTBDR assay is an appropriate alternative to conventional drug resistance methods in high prevalence countries to shorten time to result from weeks to one day. When susceptibility testing is performed in supporting laboratories outside of these high prevalence countries e.g., for quality control, only inactivated culture material have to be sent and transportation of high infectious bacteria is avoided.

PS-1278-22 Comparison of Malachite Green and Alamar Blue Colorimetric Methods for *Mycobacterium tuberculosis* susceptibility

P Farnia,¹ M R Masjedi,² A K Velayati.² ¹Iranian National Reference TB Laboratory, Tehran, ²National Research Institute of Tuberculosis and Lung Diseases / WHO collaborating Center for TB, Tehran, Iran. Fax: (+98) 212285777.
e-mail: mycopf@hotmail.com

A colorimetric method for susceptibility of *Mycobacterium tuberculosis* to first line antimicrobial agents was evaluated. The MICs of isoniazid, rifampin, streptomycin, and ethambutol were determined for 50 strains of *M. tuberculosis*. The assay was based on oxidation-reduction of Alamar-Blue and Malachite Green dyes that change their color in response to MTB growth. The accordance of Malachite green culture tubes with proportional method was lower than Alamar blue but the differences was not statistically significant ($P > 0.05$). The mean time required for reporting the MICs by colorimetric methods was 9 days versus 42 days by proportional method. Overall, interpretive agreement between colorimetric and proportional method was 97% for isoniazid, 96% for rifampin and ethambutol and 93% for streptomycin. Both Malachite green and Alamar Blue culture tube have the potential of becoming the method of choice for assessing chemotherapeutic efficacy in TB patients.

PS-1554-22 Detection of rifampin resistance mutations in clinical isolates of *M. tuberculosis* by dot blot hybridization: a surrogate marker for MDR-TB

M Bose,¹ V Kumar,¹ M Varma- Basil,¹ A Bhatnagar.²
¹Department of Microbiology, V P Chest Institute, University of Delhi, Delhi, ²Rajan Babu TB Hospital, Kingsway Camp, Delhi, India. Fax: (+91) 1127667420.
e-mail: mridulabose@hotmail.com

A Dot-Blot hybridization assay that detects all mutations occurring in the *M. tuberculosis* rpoB hot-spot region has been developed and evaluated. Five probes A,B,C,D and E have been designed to cover the 81 bp hot spot region of the rpoB gene of the wild type *M. tuberculosis* (H37Rv) genome. Absence of hybridization with any of the five probes would indicate Rifampin resistance. One hundred and twenty four culture isolates from same number of patients were taken for the study. Here we report the results of first 76 isolates tested. Susceptibility testing was done by BACTEC 460 TB system and the proportion method. 26 (34.21%) isolates were resistant to Rifampin, 32 (42.10%) to Isoniazid, 35 (46.05%) to Streptomycin and 27 (35.52%) to Ethambutol. Dot-Blot hybridization assay was carried out on 67 of the 76 isolates, with probe E, because mutation detectable by probe E was the commonest mutation within the hot spot. The results demonstrate that 40 out of 41 Rifampin sensitive isolates ($n = 67$) were showing hybridiza-

tion with probe E, indicating 97.5% correlation with Rifampin sensitivity. Among the 26 Rifampin resistant isolates 15 showed no hybridization (57.7% Correlation). In the remaining Rifampin resistant isolates we observed hybridization with probe E, indicating mutations at other positions within the 81 bp hot spot. Probe A,B,C and D are being used to locate additional mutations within the hot spots in these isolates.

PS-1591-22 Reliability of susceptibility testing of *Mycobacterium tuberculosis* in the Brazilian laboratory network

A M W Barreto, F M Martins, P C S Caldas. Centro de Referencia Prof. Helio Fraga, Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+55) 24414715.
e-mail: angela.werneck@saude.gov.br

As an activity of the quality assurance programme of susceptibility testing to the antituberculosis drugs, the reliability of the tests to the following drugs—Isoniazid (INH), Rifampin (RMP), Streptomycin (SM) and Ethambutol (EMB)—performed by the Central Laboratories (LACENs) in 19 states, was analysed between 2000 to 2004 by the National Reference Laboratory. The economic variant of the Canetti's method has been used routinely in Brazil. The Kappa's coefficient showed maximum agreement (83%) for both drugs RMP and INH at 95% confidence interval in 659 cultures tested. The drugs EMB and SM showed results with moderate concordance (48% and 55%, respectively). We have analysed 2% of the exams accomplished to the period and the compliance of the states to this project should be reinforced to the next round. However this activity has allowed the improvement of the some laboratories, as well as the implementation of others for the effective participation in the epidemiologic surveillance of tuberculosis resistance.

PS-1594-22 In vitro activities of levofloxacin and moxifloxacin in Bact Alert System against susceptible and resistant clinical isolates of *Mycobacterium tuberculosis*

A M W Barreto, R F M Medeiros, P C S Caldas, F L O Mota. Centro de Referencia Prof. Helio Fraga/SVS/Ministério da Saúde, Rio de Janeiro, RJ, Brazil. Fax: (+55) 2124414715.
e-mail: angela.werneck@saude.gov.br

Among several fluoroquinolones with in vitro activity against *Mycobacterium tuberculosis* Levofloxacin is currently preferred for the treatment of drug-resistant tuberculosis, but Moxifloxacin is one of the most potent. By using the BactAlert (MB/BacT system) methodology the inhibitory activity of the Levofloxacin and Moxifloxacin were evaluated against *M. tuberculosis* including the sensitive type strain H37Rv and a panel of 14 drug-susceptible and 16-resistant clinical isolates to Ofloxacin at 2.0 µg/ml, some of them multidrug-resistant strains from our routine. Levofloxacin and

Moxifloxacin MICs range from 0.5 to 2.0 µg/ml. Results showed that Levofloxacin concentrations of 2.0 µg/ml inhibited the growth of all susceptible strains while permitting the growth of all levofloxacin-resistant strains. The MIC of Moxifloxacin that inhibited all the strains was 1.0 µg/ml. Clinical trials suggest that fluoroquinolones might permit substantial shortening of tuberculosis treatment used in combination with first- and second-line antituberculous drugs regimens and laboratory has an important role to clarify these questions.

PS-1641-22 Résistance aux antituberculeux dans la région de Tunis

N L Slim-Saidi,¹ D Belhabib,² F Tritar,² R Mahouachi,² S Taktak,² I Drira,² R Fourati,³ R Djbeniani,³ R Chouchene,³ H Ghedira,² H Bouacha,⁴ L Megdiche.² ¹Laboratoire de Microbiologie, et ²Service de Pneumologie Hôpital A.MAMI, Ariana, ³Direction des Soins et Santé de Base de Tunis, ⁴Service de Pneumologie, Hôpital Charles Nicolle, Tunis, Tunisia. Fax: (+216) 71821184. e-mail: leila.saidi@rns.tn

Cette étude prospective réalisée sur une période de 15 mois inclut les patients bacillifères ayant une culture positive commençant ou recommençant un traitement antituberculeux et consultant dans les différents services de pneumologie et dispensaire antituberculeux de Tunis. Un questionnaire établi au préalable a servi à identifier l'origine des patients ainsi que leurs antécédents thérapeutiques de façon précise permettant de classer les malades en 2 groupes : Groupe 1 : patients n'ayant pas reçu de traitements antituberculeux : nouveaux cas Groupe 2 : patients ayant déjà été traités. Tous les échantillons prélevés chez ces patients ont bénéficié d'un examen microscopique après coloration de Ziehl et d'une culture sur milieu de Lowenstein-Jensen. L'étude de la sensibilité aux antituberculeux est réalisée selon la méthode des proportions modifiée par Canetti ; les antibiotiques testés sont l'isoniazide (0.2mg/l), la rifampicine (40mg/l), la streptomycine (4mg/l), l'éthambutol (2mg/l). Une souche par patient est étudiée. Au total 304 patients sont inclus sur 380 cas de tuberculose bacillifères répertoriées à la même période. 262 nouveaux cas de tuberculose sont ainsi étudiés. Le taux de résistance primaire est de 11.45%. Les souches sont monorésistantes dans 9.5% des cas et multirésistantes dans 1.4% des cas. La résistance à l'isoniazide est de 3.8%, à la rifampicine de 1.14%, à la streptomycine de 8.7% et à l'éthambutol de 0.76%. La résistance acquise déterminée chez 42 patients est de 47.6%. La multirésistance est de 31% si on considère tous les patients de ce groupe ; elle est de 12% dans le sous-groupe des patients faisant une rechute ou un échec thérapeutique. La surveillance de la résistance aux antituberculeux doit être établie de façon continue afin d'évaluer l'efficacité de la prise en charge des patients atteints de tuberculose. Une étude complémentaire devrait inclure l'ensemble des gouvernorats tunisiens.

PS-1715-22 *rpoB* gene sequencing and spoligotyping of multidrug-resistant *Mycobacterium tuberculosis* isolates from India

U B Singh, V N Suresh, J Arora, T Rana. Department of Microbiology, AIIMS, New Delhi, Delhi, India. Fax: (+91) 11 26588663. e-mail: urvashi00@hotmail.com

The characteristics of multidrug-resistant tuberculosis (MDR-TB) in the community with high endemicity such as India have not been well investigated. The knowledge of spread of drug-resistant clones within the community will help to estimate the problem and optimize the strategies for control and prevention. Mutations in the 81-bp rifampin resistance determining region (RRDR) of the *rpoB* gene were analyzed by DNA sequencing of 214 *Mycobacterium tuberculosis* clinical isolates (176 resistant and 38 sensitive) from different parts of India. One hundred seventy four mutations of 13 distinct kinds involving 7 codons, 171 point mutations, and 3 insertions were found in 171 of 176 resistant isolates. The most common mutations were in codons 531 (59.7%), 526 (21%), and 516 (11%). Mutations were not found in five (2.8%) of the resistant isolates. Sequencing of N-terminal sequencing in these isolates found no mutation at codon V176. One hundred and forty six MDR *M. tuberculosis* isolates were spoligotyped and identified a total of 79 different spoligotypes. A unique pattern was found in 64 (43.8%) isolates, whereas 82 (56.2%) were clustered in 15 clusters. Comparison with an international spoligotype database showed type 26, Delhi type (17.8%), type 1, Beijing type (9.6%), and type 11 (4.6%), as the most common. Majority of isolates in Beijing type (13/14) were associated with mutation 531TTG and similar drug-resistance patterns while other major clusters showed that the nature and frequency of occurrence of mutations in the *rpoB* gene were independent of spoligotyping patterns.

PS-1824-22 Evaluation of an indirect colorimetric method: tetrazolium reduction assays (MTT) for detection of MDR-TB in smear-positive patients in Lima, Peru: preliminary report

N Quispe,¹ L Ascencios,¹ L Vasquez,¹ C Pantoja,¹ G Henostroza,² C Seas,² H Guerra,² J Saravia,³ R O'Brien,⁴ M Perkins,⁴ L Llanos,² E Gotuzzo.² ¹Instituto Nacional de Salud, Lima, ²Instituto de Medicina Tropical Alexander Von Humboldt - UPCH, Lima, ³DISA III Lima Norte, Lima, Peru; ⁴FINN Diagnostics, Geneva, Switzerland. Fax: (+511) 4823404. e-mail: 03093@upch.edu.pe

MTT is an indirect colorimetric method based on the oxidation-reduction changes of the salt tetrazolium bromide produced by growth of *Mycobacterium tuberculosis*. Drug resistance is detected by the reduction of the dye from yellow to dark purple at serial dilutions of first line treatment drugs (HSER), after at least 7 days from inoculation. A multicenter prospective

observational study was designed in the north area of Lima to evaluate the accuracy of the indirect MTT method for detection of MDR-TB compared to the proportion method on Löwenstein-Jensen medium as the gold standard. Patients with smear positive pulmonary TB were included. We report here the preliminary results on the first 364 patients tested. Resistance to both Rifampin and Isoniazid was detected in 9.6% and 89.4% were susceptible. Sensitivity and specificity of the MTT assay were 74.42% and 99.07%, with a positive predictive value of 91.43% and a negative predictive value of 96.66%. MTT method is a reliable and accurate method for the diagnosis of MDR-TB. It is faster than the gold standard, but further analysis is needed for its ease of implementation in terms of laboratory capabilities and cost.

PS-1825-22 The costs of four alternative methods for drug susceptibility testing of *Mycobacterium tuberculosis* with gold standard in patients with smear-positive pulmonary tuberculosis in Lima, Peru

G Henostroza,¹ A Vassal,² C Acuna,¹ C Seas,¹ H Guerra,¹ L Vasquez,³ J Saravia,⁴ R O'Brien,² M Perkins,² L Llanos,¹ E Gotuzzo.¹ ¹Instituto de Medicina Tropical Alexander von Humboldt-UPCH, Lima, Peru, ²Find Diagnostics, Geneva, Switzerland; ³Instituto Nacional de Salud, Lima, ⁴DISA III Lima Norte, Lima, Peru. Fax: (+511) 4823404. e-mail: 03093@upch.edu.pe

Resistance to commonly used anti-tuberculosis drugs is emerging worldwide. National TB Control Programs are increasingly looking for cost-effective strategies to detect and specifically treat patients at risk to fail conventional therapy. There are various MDR treatment guidelines, and strategies to provide second-line drugs at concessionary prices to qualified programs. However, consensus on the best identification strategy for patients needing special treatment in resource-poor settings, and guidelines addressing the laboratory support required for DOTS-plus implementation are still missing. Conventional tests are slow and demanding. Alternative, rapid, cost-effective methods for assessing in vitro antibiotic susceptibility would be valuable to TB control programs considering prompt use of second line drugs. Recently, several advantageous methods, probably appropriated for routine use in developing countries, have been proposed. As part of a phase III clinical trial, this study reports on costs of four alternative methods for Drug Susceptibility Testing of *M. tuberculosis* with gold standard in patients with smear-positive pulmonary tuberculosis: indirect phage replication assay (FastPlaqueTB-MDRi); Direct amplification and reverse hybridization of *rpoB* gene (INNO-LiPA Rif TB); Indirect colorimetric MIC (MTT); Direct proportion method on Löwenstein-Jensen. The study estimates the average costs of each test and provides an indication of the costs of establishing them in other countries.

PS-1892-22 Comparison of susceptibility pattern of first-line drugs against *Mycobacterium tuberculosis* in pulmonary and extra pulmonary specimens

K Jabeen,¹ R Hasan,¹ M Qadir,² I Azam.² ¹Department of Pathology and Microbiology, Aga Khan University, Karachi, ²Community Health Sciences, Aga Khan University, Karachi, Pakistan. Fax: (+922) 4934294. e-mail: kausar.jabeen@aku.edu

Background and objective: Pakistan is a high TB burden country with estimated incidence of TB in Pakistan is about 171 cases/100 000 population. Along with pulmonary TB, extra pulmonary tuberculosis is also common. The treatment of such cases is often difficult and prolonged. However there is limited data on extra pulmonary TB available from this region. The objective of this study was to compare susceptibility pattern of 1st line drugs against *Mycobacterium tuberculosis* in pulmonary and extra pulmonary specimens.

Material and methods: This study was conducted at the clinical microbiology laboratory of Aga Khan University, a tertiary referral hospital in Karachi, Pakistan. The laboratory receives specimens from both inpatients and out patients through its satellite collection points from all over the country. All samples (pulmonary and extra pulmonary) yielding the growth of *Mycobacterium tuberculosis* were included in the study. During the study period the isolation and identification of *M. tuberculosis* was done using standard methodology. The susceptibility tests were performed on Middlebrook 7H10 agar using proportion method as recommended by NCCLS.

| | Isoniazid | Rifampicin | Pyrazinamide | Ethambutol | Streptomycin |
|------------------------------|-----------|------------|--------------|------------|--------------|
| Pulmonary n = 7707 | 52 | 29.5 | 34 | 18 | 18 |
| CSF n = 106 | 6 | 1 | 6 | 3 | 5 |
| Peritoneal fluid n = 1030 | 17 | 4 | 6 | 4.5 | 7 |
| Pleural Fluid n = 280 | 22 | 7.5 | 10 | 6 | 6 |
| Lymph Node n = 152 | 16 | 3 | 9.5 | 5 | 6 |
| Endometrium n = 93 | 23 | 10 | 16 | 2 | 6.5 |
| Urine n = 153 | 19 | 6.5 | 15 | 5 | 13 |
| Others n = 233 | 22 | 7 | 11 | 3 | 7 |

Results: During the study period (1990–2004) it was observed that the resistance in MTB isolates was significantly higher in pulmonary TB cases as compared to extra pulmonary cases. The table shows percentage resistance of MTB isolates in pulmonary and extra pulmonary cases.

Conclusion: A high resistance to all first line antituberculous drugs in pulmonary TB cases was noted as compared to the extrapulmonary TB cases.

PS-2082-22 Simplifying sputum transport for *Mycobacterium tuberculosis* drug resistance surveillance

R Lumb,¹ M Ardian,^{2,3} G Waramori,⁴ H Syahril,⁵ E Tjitra,⁵ G P Maguire,^{6,7} N M Anstey,^{6,8} P M Kelly.^{6,8} ¹Institute for Medical & Veterinary Science, Adelaide, SA, Australia; ²District Ministry of Health, Timika, Papua; ³International SOS, Timika, Papua; ⁴Public Health & Malaria Control, PTFI, Timika, Papua; ⁵National Institute of Health Research & Development, Jakarta, Indonesia; ⁶International Health Program, Menzies School of Health Research, Darwin, NT; ⁷Western Australian Country Health Services - Kimberley Region, Broome, WA; ⁸Institute of Advanced Studies, Charles Darwin University, Darwin, NT, Australia. Fax: (+618) 89275187. e-mail: paulk@menzies.edu.au

Setting: A district level tuberculosis program in Papua Province, Indonesia.

Objective: To evaluate whether a single sputum specimen could be stored by refrigeration for an extended period of time, then transported to a reference laboratory and successfully cultured for *Mycobacterium tuberculosis*.

Methods: Over a 10-month period, a single sputum specimen was collected from each newly diagnosed smear-positive pulmonary TB patient. The specimens were refrigerated at the study site without decontamination and then batched and sent to the reference laboratory where they were decontaminated and inoculated into BACTEC MGIT 960 liquid media.

Results: A total of 107 patients were enrolled. The median time from specimen collection until processing was 18 days (range 4–42). Despite the prolonged time delay, only 4 (3.7%) failed to grow a *Mycobacterium* species after 6 weeks incubation. *M. tuberculosis* was isolated from 101/107 (94.4%) specimens with another two yielding rapidly growing environmental mycobacteria. All six specimens with breakthrough contamination successfully grew *M. tuberculosis* after a second decontamination procedure.

Conclusions: A simplified method can yield a high positive culture rate despite considerable delayed transportation. These findings offer potential cost savings for drug resistance surveys in low-resource countries.

PS-2201-22 Results of multicentral proficiency testing for *Mycobacterium tuberculosis* drug susceptibility testing in Russia

S A Popov,¹ M V Badleeva,¹ T P Sabgaida,¹ V A Puzanov,² V I Golyshvskaya,² V V Erokhin.² ¹Department of Microbiology, Research Institute for Phthisiopulmonology, Moscow; ²Department of Microbiology, Central TB Research Institute, Moscow, Russian Federation. Fax: (+7) 095 6810233. e-mail: popov_s55@mail.ru

There are 340 TB laboratories in Russia performing DST. Since 2003 international standardized methods are implemented in the territories of RF but quality of tests is unknown. To estimate annual DST data we selected 14 territories for proficiency testing by means of two identical MTB strain panels received from

European SR Lab. 10 territories received multiplied panel from Federal Institutes. 4 territories received re-cultivated panel from two regional labs. Each strain was resistant or susceptible to anti-tuberculosis drugs: Streptomycin, Isoniazid, Rifampicin, Ethambutol. We estimated drug susceptible spectrum strictly in frame of absolute concentration method. According data for the first Institution the efficiency of DST was for S -0.93; I -0.90; R -0.96; E -0.76. Regarding data for the second Institution (9 labs in total) the efficiency of DST was for S -0.88; I -0.82; R -0.90; E -0.82. We found that part of cultures had very slow growth rate and 7 cultures among first 5 labs had not growth. The second Institute and his 5 labs had similar problems (9 cultures had not growth) that were reflected for 4 subtested laboratories. After additional 2 week cultivation 5 laboratories detected 7 strains with a latent resistance for I and 16 strains for E. Finally it means that using these strains for other conditions or methods we can expect a high deviations for estimated accuracy (10–15%) that may be impermissible for I and R tests.

Conclusion: MTB test strains must be suitable for the declared criteria of all DST methods. The simple cascade method for proficiency testing may result in accumulation of mistakes and be applicable in a limited number of cases.

PS-2285-22 Improved contamination control using a new antimicrobial supplement developed for rapid phage-based rifampicin susceptibility testing

R J Mole, A P Trollip, T Seaman, C Abrahams, H Albert. Biotec Laboratories Ltd, Cape Town, South Africa. Fax: (+27) 21 425 9857. e-mail: richard.mole@bioteclabs.co.za

The *FASTPlaque-Response* test is a phage-based test to determine rifampicin resistance of TB strains directly from sputum within 2 days. The method uses smear-positive sputum samples that have been decontaminated using the NALC-NaOH method and then incubated in nutrient rich medium. The decontamination process may in some cases be ineffective in inhibiting growth of certain contaminating organisms found in respiratory specimens. This may lead to uninterpretable results in culture-based methods, as well as in the phage-based *FASTPlaque-Response* test. Smear-positive sputum, as used for the *FASTPlaque-Response* test, appears to have higher rates of contamination than smear-negative specimens. An antimicrobial formulation has been specifically developed for use with the phage-based test. In experimental studies, the formulation of aztreonam, oxacillin and nystatin was found to have no detrimental effect on the test's ability to detect rifampicin resistance in *M. tuberculosis* strains, but was effective in controlling the growth of the bacterial and fungal organisms commonly causing contamination in respiratory specimens.

We compared the performance of the *FASTPlaque-Response* test with and without antimicrobial supplement in 500 smear-positive sputum samples. Antibiotic supplementation resulted in comparable sensitivity and specificity but substantially increased the number of interpretable results.

PS-1730-22 Fluoroquinolone susceptibility among multidrug-resistant *Mycobacterium tuberculosis* isolates from a high TB burden country

K Jabeen,¹ R Hasan,¹ Q Hasan,¹ M Qadir,² I Azam.²

¹Department of Pathology and Microbiology, Aga Khan University, Karachi, ²Department of Community Health Sciences, Aga Khan University, Karachi, Pakistan.

Fax: (+92) 21 493 4294. e-mail: kausar.jabeen@aku.edu

Background: The frequency of multidrug-resistant *Mycobacterium tuberculosis* (MDR-TB) in an endemic country like Pakistan is increasing over the years. Fluoroquinolones are often recommended as 2nd line drug in such cases. Owing to the widespread and irrational use of this drug in various infections in Pakistan the resistance to these agents could be high.

Objective: To determine the Fluoroquinolone susceptibility among multidrug resistant *Mycobacterium tuberculosis* isolates from Pakistan, a high TB burden country.

Material and methods: This study was conducted at clinical microbiology laboratory of Aga Khan University, a tertiary referral hospital in Karachi, Pakistan. The laboratory receives specimens from both inpatients and out patients through its satellite collection points from all over the country. All samples yielding the growth of MDR-TB were included in the study. During the study period the isolation and identification of *M. tuberculosis* was done using standard methodology. The susceptibility test to ciprofloxacin was performed on middle brook 7H10 agar using proportion method as recommended by NCCLS.

Results: During the study period (1998–2004) the over all resistance to fluoroquinolone in MDR-TB isolates was 23% ($n = 1895$). This resistance have been fluctuating from 63% ($n = 35$) in 1998 to 48% ($n = 139$) in 1999, 39% ($n = 186$) in 2000, 40% ($n = 238$) in 2001, 28% ($n=207$) in 2002, 10% ($n=627$) in 2003 and 13% ($n = 463$) in 2004.

Conclusion: Despite the increased fluoroquinolone use in multiple infections in Pakistan the resistance rate is comparatively lower in MDR-TB isolates. This drug can be used as a 2nd line agent in the treatment of MDR-TB cases.

PS-1546-22 Drug susceptibility pattern of *M. tuberculosis* isolates in Addis Ababa (ongoing)

D Asmamaw,^{1,2} B Seyoum,^{1,2} H Atsebiha,^{1,2} D Wolde-Meskel,² L Yamuah,² H Addus,² E Makonnen,¹ A Aseffa.²

¹Addis Ababa University, Addis Ababa, ²Armauer Hansen Research Institute, Addis Ababa, Ethiopia.

Fax: (+251) 1211563. e-mail: dasmamaw@yahoo.com

Background: Ethiopia is a country with a high burden of TB-HIV and implementing DOTS. The last survey in Addis Ababa, conducted 10 years ago, suggested a possible association b/n drug resistance & HIV. Other small-scale studies also suggested an increasing trend of drug-resistant TB in Addis Ababa.

Objectives: To determine the susceptibility of *M. tuberculosis* isolates from new & previously treated PTB+ patients to first line anti-TB drugs, and to determine association with HIV infection.

Method: New & previously treated PTB+ patients visiting any of 19 (out of 21) diagnostic and treatment health centers and all 3 Hospitals under the city Health Bureau were included in the study. Questionnaires were used to determine history of previous treatment and archives were checked. Pooled morning and spot sputum from each patient was cultured on Lowenstein Jensen media. Sensitivity to anti-TB drugs (RMP, INH, STM and EMB) was determined using 7H10 with OADC. Patients were tested for HIV.

Result: So far 350 samples were cultured and the result shown here, for the time being, is only for new TB patients. HIV prevalence was 30%. Sensitivity result is available for 120 isolates. Total sensitivity for all the four drugs tested was 78%. Single drug resistance was 18% for STM, 13% for INH, 5% for EMB and 1.7% for RMP. Only 1 (0.8%) MDR strain was isolated. Combined resistance to STM and INH is 10%. Possible association of drug-resistant TB with HIV infection and the impact of drug resistance on smear conversion after two months of chemotherapy will be discussed.

Conclusion: It seems that prevalence of MDR-TB and resistance to RMP is similar to the study done 10 years ago. Resistance to STM, INH and EMB appear to be higher than in previous reports.

PS-2081-22 Tuberculosis drug sensitivity surveillance in Papua Province, Indonesia

P M Kelly,^{1,2} M Ardian,^{3,4} G Waramori,⁵ N M Anstey,^{1,2} H Syahril,⁶ E Tjitra,⁶ I Bastian,⁷ G Maguire,^{1,8} R Lumb.⁷

¹International Health Program, Menzies School of Health Research, Darwin, NT, ²Institute of Advanced Studies, Charles Darwin University, Darwin, NT, Australia; ³District Ministry of Health, Timika, Papua, ⁴International SOS, Timika, Papua, ⁵Public Health & Malaria Control, PTFI, Timika, Papua, ⁶National Institute of Health Research & Development, Jakarta, Indonesia; ⁷Institute for Medical & Veterinary Science, Adelaide, SA, ⁸Western Australian Country Health Services–Kimberley Region, Broome, WA, Australia.
Fax: (+618) 89275187. e-mail: paulk@menzies.edu.au

Setting: A district level tuberculosis control program in Papua Province, Indonesia.

Objective: To determine the nature and extent of drug-resistant tuberculosis (TB) in newly diagnosed sputum smear positive patients in Timika, Papua Province, Indonesia.

Methods: Sputum was collected from patients diagnosed in the district over a 10 month period. Sputum specimens were processed and inoculated into a BACTEC MGIT960 tube. Isolates were identified by Ziehl-Neelsen staining, hybridisation with nucleic acid probes and biochemical investigations. Susceptibility testing was performed using the radiometric proportion method. Pyrazinamide testing was performed using the Wayne indirect method.

Results: 107 patients had sputa sent to a reference laboratory. 101 (94.4%) were culture positive for *Mycobacterium tuberculosis*, with 87 (86.1%) fully sensitive to first line anti-tuberculosis drugs. Two per cent had multiple drug resistance (MDR-TB) and 12 (11.9%) had other drug resistance. Each of the MDR-TB isolates were susceptible to amikacin, capreomycin, ciprofloxacin and PAS but resistant to rifabutin and ethionamide.
Conclusions: MDR-TB is present in Indonesia but is not a major problem for TB control in this district. Generalisability to other districts in Indonesia, particularly large urban areas, needs to be confirmed by future studies.

CLINICAL RESEARCH, TREATMENT AND CARE

PS-1997-22 Application of reptilase through the bronchial artery to treat massive hemoptysis in patients with pulmonary tuberculosis

P X Lu. Department of Radiology, Shenzhen, Guangdong, China. Fax: (+86 755) 25604034. e-mail: lupuxuan@126.com

Objective: To understand feasibility and therapeutic effects of bronchial intra-arterial application of Reptilase in treating massive hemoptysis with pulmonary tuberculosis.

Methods: 34 patients of hemoptysis were included in this study group composed of 20 males and 14 females with their ages ranged between 17–79 (mean 31.26). All patients had their amount of blood loss ≥ 1000 ml/day. Simple Reptilase was used in the target artery in 13 cases (2–3 kU/time); 21 patients accepted local injection of Reptilase + gelfoam granules embolism.

Results: Application of simple Reptilase therapy was practiced in 13 cases, among them this therapy was effective in 12 of them with the effective rate of 92.3%; 21 cases were included in the double-regime group and the therapy was effective in 20 out of them with an effective rate reaching as high as 96%; but statistically there was no significant difference ($P > 0.05$) between these two groups. Of the 34 cases there was no embolism of the artery of the spinal cord with symptoms of paralysis. All patients were followed up over 6 months, 32 of them did not suffer from a recurrence, 2 cases had hemoptysis recurred 30–45 days later, however, they obtained a cure after receiving a surgical operation.

Conclusion: This therapeutic measure of intra-arterial application of Reptilase is safe, effective and possesses a wider range of indications, particularly radiological contrast examination shows existence of risks in performing bronchial artery embolism through the common stem of spinal cord artery. Local injection of Reptilase by the target artery will be a procedure of the best choice.

PS-1071-22 Social consequences of pulmonary tuberculosis

E V Soukhova, V M Soukhov, S V Smirnov. Medico-Social Rehabilitology Institute, Samara, Russia, Russian Federation.
Fax: (+7) 8462 35 56 00. e-mail: suchova@mail.radiant.ru

Introduction: Researches showed, that the majority of patients with tuberculosis has social consequences.
Objectives: 200 patients, 112 male and 88 female (aged from 22 to 56).

Methods: Questioning of the social status.

Results: 86% of patients with pulmonary tuberculosis didn't get enough emotional support from their relatives and friends, 83% were afraid that people may see them coming into the hospital, 82% noted the deterioration of work conditions, 80% - the necessity of material support, in 80% of cases life was changed, 78% of patients were ashamed of their disease, 68% noted the deterioration of a social attitude, in 68% interests were narrowed, 64% noted the deterioration of a financial position, 60% - the restriction of social contacts, 48% of patients noted the deterioration of a social status 40% - the deterioration of relatives' attitude, in 24% of cases the divorce was noticed, in 100% vital plans were broken.

Conclusion: The majority of patients has social consequences of the disease.

PS-1623-22 Tuberculose compliquant la silicose

S Bousnina, K Marniche, H Racil, S El Farhati, E Gaies, A Chabbou. UR Insuffisance respiratoire, Ligue Nationale contre la Tuberculose et les Maladies Respiratoires, Ariana, Tunisia. Fax: (+216) 70850143. e-mail: abdellatif.chabbou@rns.tn

Le risque de développement d'une tuberculose pulmonaire chez un silicotique est beaucoup plus élevé que dans la population générale. Nous rapportons dans ce travail rétrospectif, les particularités cliniques, paracliniques, évolutives et thérapeutiques de l'association silicose-tuberculose tout en discutant la pathogénie. Cinq dossiers ont été colligés entre 1996 et 2001. Tous nos patients sont de sexe masculin, âgés de 60 ans en moyenne. Parmi eux, il y avait 3 mineurs, 1 agriculteur et 1 ouvrier dans une fonderie. La durée d'exposition à la poussière de silice était de 15 ans en moyenne. 3 patients sont tabagiques à 40 PA. Tous nos malades présentaient une gêne respiratoire avec des signes francs d'imprégnation tuberculeuse. La radiographie du thorax a montré des lésions nodulaires diffuses et bilatérales dans tous les cas. Des images d'excavations étaient associées dans 3 cas. Le diagnostic de tuberculose pulmonaire a été confirmé bactériologiquement dans tous les cas. Tous les patients ont reçu un traitement antituberculeux quadruple pour une durée de 6 à 8 mois. L'évolution a été bonne dans 2 cas, un patient est devenu oxygénéonécessitant et 2 décès ont été déplorés par cachexie et insuffisance respiratoire. Différentes études ont montré l'élévation de la prévalence et de l'incidence de la tuberculose chez les silicotiques. Du fait de certaines similitudes cliniques et radiologiques qu'il faut connaître entre la silicose et certaines formes de la tuberculose, le diagnostic peut être retardé, aggravant le pronostic immédiat et ultérieur. Une pathogénie impliquant les lymphocytes T concentrés dans l'alvéole en cas de silicose est proposée.

PS-1650-22 Tuberculose du sujet âgé. Particularités cliniques et thérapeutiques

S Marniche,¹ K Marniche,¹ O Rehis,¹ H Racil,¹ S El Farhati,¹ E Gaies,¹ S Yaalaoui,² A Chabbou.¹ ¹UR Respiratoire, Ligue Nationale Contre la Tuberculose et les Maladies Respiratoires, Ariana, ²Laboratoire Immunologie, Hôpital A. Mami, Ariana, Tunisia. Fax: (+216) 70850143. e-mail: saida.c@topnet.tn

En Tunisie, l'incidence de la tuberculose (TB) est importante chez les sujets âgés (SA), de l'ordre de 40.8/100 000 habitants contre 19.6/100 000 habitants dans la population générale. Le but de notre étude est de déterminer les particularités cliniques, radiologiques, thérapeutiques et évolutives de la tuberculose chez les sujets de plus de 65 ans. Notre étude est comparative entre 2 groupes de patients : le groupe A de 30 malades de plus de 65 ans (moyenne de 70 ans) et le groupe B de 47 malades de moins de 65 ans (moyenne

de 34 ans). Le tabagisme est plus important dans le groupe A (35 PA versus 25 PA). Des antécédents de TB pulmonaire ont été retrouvés chez 25% des (SA) contre 10% chez les sujets jeunes. Les modes d'installation et les délais de consultation sont similaires dans les deux groupes. Les lésions radiologiques étaient peu évocatrices de tuberculose dans 25% des cas du groupe A (siégeant aux bases). Dans le groupe B, les images étaient toutes typiques. La positivité des bacilloscopies et des cultures était de 100% dans les deux groupes. Tous les patients ont été mis sous traitement (T) anti tuberculeux (ATB), avec streptomycine chez seulement 38% des SA. Les effets indésirables étaient plus fréquents dans le groupe A (72% contre 8%) dominés par les troubles hépatiques et digestifs. Le T a été poursuivi pendant 6 à 8 mois. L'évolution dans le groupe A a été marquée par un décès et les autres patients ont été considérés comme guéris au prix de lésions séquellaires dans 80% des cas. Les SA représentent une population à risque pour la TB. L'aspect radiologique peut être trompeur, les effets indésirables sont plus fréquents et peuvent être graves.

PS-1781-22 Le syndrome cave supérieur, étiologies et prise en charge thérapeutique

S Bousnina, K Marniche, H Racil, S El Farhati, E Gaies, S Yaalaoui, A Chabbou. UR Oncologie Thoracique Ligue Nationale Contre la Tuberculose et les Maladies Respiratoires, Ariana, Tunisia. Fax: (+216) 70850143. e-mail: saida.c@topnet.tn

Le syndrome cave supérieur est le résultat d'une obstruction complète ou partielle de la veine cave supérieure (VCS). Notre étude vise à en revoir les aspects cliniques ainsi que les moyens diagnostiques et thérapeutiques. Nous avons entrepris une étude rétrospective basée sur des dossiers de patients hospitalisés entre 1998 et 2004 pour syndrome cave supérieur. Dix cas ont été colligés, tous de sexe masculin avec un âge moyen de 49.8 ans. Tous étaient tabagiques à 38 PA en moyenne. La symptomatologie clinique était variable, dominée par la dyspnée, la cyanose et l'œdème en pèlerine. Une dysphonie était présente chez 3 patients et une dysphagie dans 2 cas. La radiographie du thorax a montré dans tous les cas un syndrome médiastinal associé à une opacité pulmonaire proximale qui siégeait à droite dans 9 cas sur 10. Le scanner thoracique a objectivé une compression avec envahissement partiel de la lumière de la VCS chez 9 patients et une thrombose dans 1 cas. A l'étude anatomopathologique, il s'agissait d'un carcinome à petites cellules disséminé dans 5 cas et d'un carcinome non à petites cellules chez les 5 autres patients. Tous nos patients ont été mis sous corticoïdes et anticoagulants. 7 d'entre eux ont bénéficié d'une radiothérapie seule ou associée à une chimiothérapie dans 2 cas. Une régression du syndrome cave a été obtenue chez 5 patients. Les étiologies du syndrome cave supérieur sont mul-

tiples. Dans 90% des cas la compression est extrinsèque et 70% sont d'origine tumorale ; dans ce cadre l'association radio-chimiothérapie est proposée. L'évolution dépend de l'étiologie avec une survie à 1 an de 20%.

PS-1800-22 Pneumothorax sur séquelles de tuberculose

A Chabbou, S Bousnina, K Marniche, I Ben Jerad, S El Farhati, E Gaies, M Soussi, S Yaalaoui, M L Megdiche, A Chabbou. UR Insuffisance Respiratoire Ligue Nationale Contre la Tuberculose et les Maladies Respiratoires, Ariana, Tunisia. Fax: (+216) 71850143. e-mail: abdellatif.chabbou@rns.tn

Le pneumothorax post tuberculeux, devenu rare, connaît une recrudescence parallèle à celle de la tuberculose. La prise en charge et l'évolution des pneumothorax sur séquelles de tuberculose diffèrent de celles des autres types de pneumothorax spontanés dits idiopathiques. L'objectif de notre travail est de préciser les mécanismes étiopathogéniques et d'évaluer les modalités thérapeutiques et évolutives du pneumothorax chez les patients ayant des séquelles de tuberculose pulmonaire. Nous rapportons une étude rétrospective de 7 observations de malades de sexe masculin, anciens tuberculeux, qui ont présenté un pneumothorax, colligés sur une période de huit ans de 1996 à 2004. L'âge moyen est de 47 ans et tous sont tabagiques. Le pneumothorax est survenu en moyenne 4 ans après la tuberculose. Tous les patients ont eu un drainage thoracique. L'évolution était favorable chez 2 patients, marquée par la récurrence et une difficulté de réexpansion pulmonaire chez les 5 autres. Le délai moyen du retour du poumon à la paroi était de 16j. Une pleurodèse chirurgicale a été pratiquée chez un malade. L'évolution des pneumothorax sur séquelles de tuberculose est caractérisée par un risque moins important de récurrence à cause des symphyses pleurales plus fréquentes, mais reste plus conditionné par l'état du du parenchyme pulmonaire et l'étendue des séquelles fibreuses. L'intoxication tabagique, le nombre et le volume des bulles d'emphysème observées au scanner, le nombre d'épisodes antérieurs, le type de traitement réalisé et les affections respiratoires associées conditionnent aussi le pronostic.

PS-1801-22 Immunologie du poumon dans le SIDA

J M Kayembe. Département de Médecine Interne, Université de Kinshasa, Kinshasa, RD Congo, e-mail: dr12jmkayembe@yahoo.com

Introduction : L'expectoration induite (EI) permet l'étude cytotuberculeuse du poumon. Les marqueurs sanguins (CD4+, CD8+) plus accessibles ne traduisent qu'imparfaitement l'immunodépression tissulaire; d'où l'intérêt de développer des marqueurs tissulaires spécifiques.

Objectif : Valider analyse EI comme alternative possible de l'étude immunologique pulmonaire dans le SIDA.

Méthode : EI chez 26 sujets VIH+ ; induction EI par solution saline (3%) ; typage lymphocytaire sanguin ; dosage β 2-microglobuline ; traitement des cellules de l'EI selon technique décrite (Pin I, 1992) ; marquage par anticorps monoclonaux, Facscan ; étude corrélations entre marqueurs sanguins et tissulaires (EI).

Résultats : 19 H et 7 F, âge moyen 40 ans. La corrélation est faible entre lymphocytose CD4 relative sanguine et de l'expectoration ($r = 0.35$; $P = 0.07$). Corrélation significative entre CD4 absolus sang et CD4 de l'EI ($r = 0.44$; $P = 0.02$). Corrélation inverse entre β 2 microglobuline et CD4 de l'EI ($r = 0.4$; $P = 0.04$).

Conclusion : L'absence de corrélation stricte entre marqueurs sanguins et tissulaires justifie le développement d'autres marqueurs de substitution. L'EI est une alternative possible pour l'étude immunologique pulmonaire.

PS-1802-22 Bronchial artery embolization in the treatment of massive hemoptysis: experience from a developing country

A B S Zubairi,¹ M Irfan,¹ K Fatima,² M A Zubairi,¹ M Azeem,² T Haq.² ¹Pulmonary Section, Aga Khan University Hospital, Karachi, ²Department of Radiology, Aga Khan University Hospital, Karachi, Pakistan. Fax: (+92) 493 4294. e-mail: muhammad.irfan@aku.edu

Objectives: To evaluate the efficacy of bronchial arteriography and bronchial artery embolization (BAE) in the management of massive hemoptysis in a developing Asian country

Materials and methods: A retrospective review of clinical files was done to evaluate the demographics, clinical presentation, radiographic studies, bronchoscopy, results and complications of bronchial artery embolization (BAE) at a tertiary care hospital in Karachi, Pakistan.

Results: Fourteen (9 male, 5 female) with a median age of 54 years underwent bronchial arteriography and BAE for massive hemoptysis. Hemoptysis was caused by bronchiectasis (10 patients), active pulmonary tuberculosis (3 patients) and lung malignancy (1 patient). CT scan of Chest was done in 11 patients. Bronchoscopy was performed in all patients. Bleeding lobe or segment was identified in 12 patients. Bronchial arteriography revealed hypervascularity (93%), bronchial artery hypertrophy (36%), hypervascularity with shunting (patients), dense soft tissue staining (50%), pseudoaneurysm (7%), and extravasations of contrast (7%). BAE was attempted in all patients. Re-bleeding occurred within 24 hours in 2 patients who underwent surgery, and within one week in another 2 patients managed with repeat BAE. The complication of embolization occurred in one patient (transverse myelitis). Thirteen patients improved and discharged, and one patient died due to asphyxia.

Conclusions: BAE is an effective method for management of massive hemoptysis especially in post TB bronchiectasis. It is very effective in those who are not good surgical candidates and has a low rate of complications.

PS-2219-22 Formulation and in vivo results for a porous nanoscale drug delivery platform for tuberculosis

J C Sung,¹ L Garcia-Contreras,² Y Liu,³ J Fiegel,¹ J VerBerkmoes,¹ K Elbert,¹ A Hawi,⁴ R Prudhomme,³ A Hickey,² D A Edwards.¹ ¹Division of Engineering and Applied Sciences, Harvard University, Cambridge, Massachusetts, ²School of Pharmacy, University of North Carolina, Chapel Hill, North Carolina, ³Department of Chemical Engineering, Princeton University, Princeton, New Jersey, ⁴MEND, Cambridge, Massachusetts, USA.
Fax: (+1) 617-495-8534. e-mail: jsung@fas.harvard.edu

A unique approach is being developed for the delivery of drugs and vaccines via inhaled, oral and other routes of delivery. This general formulation platform, based on porous powders of nanoscale dimension, allows a range of characteristics that are desirable for treating infectious diseases in the developing world. We have recently produced rifampicin dry powders for oral and inhalation delivery, with fast and sustained release characteristics. These formulations include rifampicin porous particle (PP) formulations formed by spray drying (geometric diameter = 4.4 μm , aerodynamic diameter = 1.2 μm (based on tap density), fine particle fraction of the total dose less than 5.8 μm = 50% using an Andersen-type cascade impactor and Aerolizer® dry powder inhaler). Preliminary experiments have been performed in guinea pigs with bioavailabilities for oral unformulated rifampicin = 0.38, oral PP formulations = 0.60, aerosol PP formulations = 0.72 with doses ranging from 10–40 mg/kg. We have also formulated porous nanoparticle-aggregate particles (PNAPs) with sustained release characteristics, where the nanoparticles are formulated by a novel flash precipitation technique. These rifampicin nanoparticles are coated with a polymeric biocompatible layer (size range 10–100 nm). We will be delivering these formulations to guinea pigs by inhaled, oral and injection routes.

PS-1411-22 Deaths among tuberculosis patients, Campinas, Brazil

H B Oliveira, L Marin-León. Social and Preventive Department, State University of Campinas, Campinas, São Paulo, Brazil. Fax: (+55) 1937888036.
e-mail: helenice@unicamp.br

To analyze the profile of deaths among tuberculosis patients in Campinas, Brazil, between 2001 and 2003. A descriptive study of deaths was conducted in a city with nearly one million people. Data from the TB-Registry were utilized. Patients being treated for

tuberculosis as well as those who were reported as having TB after death were included. Statistical analyses were performed using EPIINFO version 6.4. In the period 2001–2003 there were 1418 patients, 157 deaths and a fatality rate of 11.1%. Male deaths predominated (76.4%). TB-AIDS was diagnosed in 49% of death cases and it was more frequent at the 20–49 age-group (84.4% vs. 37.5% without AIDS $P < 0.001$) while for 50 and over an inversion was observed (14.4% with AIDS vs. 58.8% without AIDS $P < 0.001$). Patients who were being treated for the first time represented 77.1% with no difference between AIDS and non-AIDS. Among 22 patients (14%) diagnosed after death, 16 (72.7%) did not present AIDS. Comparing with the last decade there was a reduction in number of deaths and in lethality; however diagnoses after death increased in this period.

PS-1429-22 Introducing the Thailand TB Active Surveillance Network: a new model for enhanced case finding and treatment to improve TB control

J K Varma,^{1,2} D Viriyakitja,³ S Nateniyom,³ S Rienthong,³ N Yamada,⁴ W Ngamprasert,⁵ S Komsakorn,⁶ W Sattayawuthipong,⁷ S Akksilp,⁸ T Siraprasiri,^{2,3} C D Wells,¹ J W Tappero.^{1,2} ¹US Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ²Thailand MOPH - US CDC Collaboration, Nonthaburi, ³Thailand Ministry of Public Health, Nonthaburi, Thailand; ⁴Research Institute of Tuberculosis - Japan Anti-Tuberculosis Association, Kiyose, Tokyo, Japan; ⁵Bangkok Metropolitan Administration, Bangkok, ⁶Chiang Rai Provincial Public Health Office, Chiang Rai, ⁷Phuket Provincial Public Health Office, Phuket, ⁸Office of Disease Prevention and Control #7, Ubon-ratchathani, Thailand. Fax: (+66) 25915443. e-mail: jvarma@cdc.gov

Background: In high-burden TB countries, WHO's DOTS strategy may be insufficient to address HIV, MDR-TB, and private sector expansion. We developed the Thailand TB Active Surveillance Network to address these challenges.

Methods: Beginning January 2004, a partnership between three provinces, one metropolitan area, two international agencies, and Thailand's Ministry of Public Health developed a project protocol, conducted a survey of healthcare facilities in four project sites, and negotiated participation from facilities. Beginning October 2004, project staff began visiting facilities monthly to collect data about persons diagnosed with TB, assist with patient care and directly observed therapy, refer patients for HIV counseling and testing, and obtain sputum for culture and susceptibility testing.

Results: The catchment area includes 3.5 million persons. The healthcare facility survey identified 50 public and 279 private facilities. In 2003, public facilities in this area registered 4859 TB cases; an estimated 28% were HIV-infected. Of 226 facilities refusing to participate in surveillance, all were private clinics and only five reported treating TB (56 cases in 2003). In

the first four months of active surveillance, data have been collected on 1693 cases.

Conclusions: Diligent monitoring and evaluation are needed to determine whether this new TB control model will improve disease control.

PS-1431-22 Public-private partnerships improve case detection in Bangkok: the Thailand TB Active Surveillance Network

P I Naayuthaya,¹ J K Varma,^{2,3} P Charusuntornsri,¹ W Ngamprasert,¹ W Subhachaturas,¹ D Viriyakitja,⁴ T Siraprasiri,^{3,4} C D Wells,² J W Tappero.^{2,3} ¹Bangkok Metropolitan Administration, Bangkok, Thailand; ²US Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ³Thailand MOPH - US CDC Collaboration, Nonthaburi, ⁴Thailand Ministry of Public Health, Nonthaburi, Thailand. Fax: (+66) 25915443. e-mail: jvarma@cdc.gov

Background: TB control may be improved through collaboration with health care facilities that do not routinely participate in national TB programs. We conducted active surveillance in two Bangkok districts to evaluate this hypothesis.

Methods: We negotiated agreements with and conducted training for all health care facilities in two Bangkok districts. At least monthly, project personnel contacted facilities to complete standardized case report forms and assist with case management for any person diagnosed with TB.

Results: In 2003, passive surveillance detected 87 new, smear-positive cases from 8 facilities in the two districts; active surveillance from May 2004–January 2005 detected 104 new, smear-positive cases from 10 facilities, a 60% increase in annual reporting. For all forms of TB, 266 cases were identified, 127 (48%) from private facilities. Private sector patients were less likely than public sector patients to be male, to report prolonged cough, to have a prior TB history, to be smear-positive, to undergo HIV testing, to receive a WHO-recommended treatment regimen, and to have directly observed therapy ($P < 0.05$, all comparisons).

Conclusions: In Bangkok, active surveillance increased case finding, detected cases with characteristics different than those in the public sector, and identified treatment deficiencies in the private sector.

PS-1443-22 Treatment outcomes after 1 to 2 years in patients who successfully completed treatment in Northern Vietnam

M Vree,^{1,2} N T Huong,³ B D Duong,³ D N Sy,³ L N Van,³ N V Co,³ F G J Cobelens,^{1,2} M W Borgdorff.^{1,2} ¹KNCV Tuberculosis Foundation, Den Haag, ²University of Amsterdam, Amsterdam, The Netherlands; ³National Tuberculosis Programme Vietnam, Hanoi, Vietnam. Fax: (+31) 70 358 4004. e-mail: vreem@kncvtbc.nl

Preliminary results: Final results presented in October 2005.

Setting: 32 randomly selected District Tuberculosis Units in Northern Vietnam.

Objective: To evaluate long-term outcomes among patients treated for new smear-positive pulmonary tuberculosis with reported cure or completed treatment.

Methods: A cohort of patients who started treatment between April 2002 and April 2003 were followed up after 12 to 24 months with sputum collection (2 spot samples) and interview. Sputum samples were examined microscopically and cultured.

Results: 309 patients were included. No information could be obtained of 31 patients (10%); 19 (6%) patients had died. Of 259 patients available for follow-up (84%), interview data were available of 258 and culture results of 248. The median interval between end of treatment and follow-up was 19 months. Eleven (4.4%) patients were smear-positive and an extra 3 (1.2%) were culture positive. Thirteen (4.2%) patients had started tuberculosis re-treatment after a median interval of 8 months. Relapse was observed in 21/258 patients (8.1%).

Conclusion: Thirteen per cent of patients had unfavourable long-term treatment outcomes (death or relapse). Although not significantly higher than reported by the National Tuberculosis Programme (8.8%), the relapse rate is relatively high, possibly related to the use of a treatment regimen that does not contain rifampin in the continuation phase.

TOBACCO USE AND PREVENTION

PS-1220-22 Feasibility and effectiveness of cotinine biofeedback to prompt secondhand smoke counseling from pediatric clinicians

M McLemore,^{1,2} D Wahlgren,¹ S Meltzer,¹ M Hovell,¹ L Hill.^{1,2} ¹Graduate School of Public Health, SDSU, San Diego, California, ²Preventive and Family Medicine, UCSD, La Jolla, California, USA. Fax: (+1) 858-279-6471. e-mail: lhillbaird@aol.com

Background: Despite the documented health effects of secondhand smoke (SHS) in children, only 1.5% of pediatric ambulatory care visits incorporate tobacco cessation counseling.

Objective: To evaluate the feasibility of obtaining urine cotinine results on pediatric patients, and to determine their effects on anti-tobacco counseling.

Methods: 102 participating families, with at least one smoking parent, were randomized to intervention/control conditions. Urine cotinine, a biomarker for SHS exposure, was obtained from participating children. Cotinine results were delivered to intervention pediatric care providers. The providers were surveyed to verify that cotinine results were received, and to confirm the provision of anti-tobacco counseling for participants.

Results: Of 32 surveys completed to date, 6 providers received cotinine biofeedback, 15 did not see it, and

11 were study controls. All with feedback recommended smoking cessation and bans in the home; 5 recommended car bans. Of the 15 providers who didn't see feedback, 10 recommended cessation and home bans. In the control group of 11, only 6 were aware of patient exposure and provided anti-tobacco advice and home bans.

Conclusions: Urine cotinine is well accepted by parents and providers as a tangible marker for SHS exposure. Cotinine biofeedback prompted anti-tobacco counseling.

PS-1685-22 A tobacco control intervention for low-income families with young children: combined counseling for passive smoking and smoking cessation

J M Zakarian, S T Liles, M F Hovell, L L Hill. Center for Behavioral Epidemiology and Community Health, San Diego State University, San Diego, California, USA.
Fax: (+1) 858-505-8614. e-mail: jzakarian@projects.sdsu.edu

Objective: To test a behavioral counseling intervention designed to reduce environmental tobacco smoke exposure (ETS) and parents' smoking among 150 low-income families with children younger than four years.

Methods: Families were randomized to an experimental group that received up to 10 in-home and 4 telephone counseling sessions over 6 months, and free nicotine patches and gum for all adults' quit attempts. Controls received measures only. Parent reports, children's urine cotinine, and environmental nicotine measures were obtained at baseline, 3, 6, 12, and 18 months (86.7% participant retention at 18 months).

Results: Children's ETS exposure (from mothers in the home and total) and mothers' smoking rate (overall and indoors) declined in both groups through 6 months, with significant group by time interactions and the counseling group decreasing more than controls ($P < 0.05$). During follow-up, group differences remained significant and mothers' overall smoking rate increased in both groups. Fifteen mothers who completed counseling reported 7-day smoking cessation at one or more study measures, versus five controls ($P = 0.019$).

Conclusion: ETS counseling combined with smoking cessation counseling was effective in helping families reduce children's ETS exposure, and in increasing mothers' point prevalence quits.

PS-2057-22 Smoking cessation: 3 years experience of a pneumology department

G Fernandes, C Damas, I Gomes. Serviço de Pneumologia, Hospital São João, Faculdade de Medicina Porto, Porto, Portugal. Fax: (+351) 225512215.
e-mail: gabrielafer@netcabo.pt

Smoking cessation is one important measure to reduce morbidity and mortality associated with cardio-

vascular, respiratory and cancer diseases. The authors report their experience in the pneumology department of a central hospital. Cessation programme includes: complete tobacco and medical history, dependence assessment with Fagerstrom test and exhaled CO, motivation evaluation with Richmond test, individual adjusted treatment (bupropione and/or nicotine substitutes), behaviour support since 2003 and follow-up. A retrospective study (Jan 2002–Jul 2004) was done that included 160 patients, with median age of 46 years, 72% were male, with median consumption of 37 UMA. Most patients were referred from primary care, most had median/high scholarship and associated diseases. According to Fagerstrom test, most had high nicotine dependence, with median exhaled CO of 23 and were well-motivated (Richmond test). Pharmacologic therapy: nicotine substitutes in 62% and bupropione in 42% (isolated or in combination). In 2002 and 2003 were abstinent at least 12 months 17.8% and 31%, respectively. In 2004, with at least 6 months abstinence, there were 31.5% patients. The univariate analysis found that motivation was statistically associated with abstinence. Our results are similar to others described and success seems to be influenced by patient motivation.

PS-1019-22 Smoking rates and related diseases among members of Iranian National Medical Association, 2005

G H R Heydari. National Research Institute of TB & Lung Diseases, Tehran, Iran. Fax: (+98) 212285777.
e-mail: ghrheydari@nritld.ac.ir

Background: Medical society potentially could have great influence on tobacco control and prevention. Performed studies in most countries showed that there is a relation between physicians' smoking rate and general population smoking rates. In Iran we have not had a similar study and we decided to perform this project at the national level.

Material & method: This study evaluated the smoking behavior and its related disease among the all members of Iranian NMA who are 80 000. It is a descriptive cross-sectional study by a questionnaire based on WHO which was matched with IUATLD questionnaire. The project has been carried out in autumn 2003 by sending the questionnaires through the NMA journals for the members.

Results: 3270 returned questionnaires show that 13.1% of NMA members are smokers. Among NMA members, 19.6% of male and 5.5% of female are smokers. According to the job, 16.6% of general physicians, 12.5% of dentists, 12.5% of pharmacologists, 10.6% of specialist, 1.4% of midwives, 18.2% of nurses and 4.7% of other professions are smokers. The most common age of starting smoking is 18 years (31%). Among whole population, 39.6% have diseases which is respectively 37.2%, 46.4% and 45% in non smokers,

ex-smokers and smokers. 28.2% of smokers who smoke less than 10 cigarettes a day and 44.6% of smokers who smoke more than 20 cigarettes a day have diseases.

Conclusion: The smoking rates in NMA members is close to the general population rates and is higher in comparison of women. Tobacco use and its diseases have a dose related response. These results are profitable in training of medical society about smoking control cross the country.

PS-1098-22 COPD mortality in Brazil, 1980–1998

H S Campos. Centro de Referencia Prof. Helio Fraga, Rio de Janeiro, RJ, Brazil. Fax: (+55) 2125529500. e-mail: hisbello@globo.com

Chronic obstructive pulmonary disease (COPD) is an increasing major public health problem all over the world. There is a close association between the size of the problem and the prevalence of smoking.

Objective: To present data on COPD mortality in Brazil during the period 1980–98.

Method: Data obtained from the Brazilian official mortality system (SIM) for the period 1980–98. ICD (490, 491, 492, 496), Revision 9 of the International Classification of Diseases has been used to gather data related to the period between 1980 to 1995; for the period 1996–98, ICD J45, Revision 10 / ICD was used (J40, J41, J42, J43, J44).

Results: During 1980–98, respiratory diseases were responsible for 8 to 10% of the deaths, and COPD accounted for 11–15% of these respiratory deaths between a 1980 and 1985, and for one third of them during 1996–98. From 1980 to 1998, the total number of deaths due to COPD increased 3.3 times, from 9.358 (7.88 per 100 000 people) to 30.801 deaths (19.04 per 100 000 people). Higher rates were found among men and in the >64 age group.

Conclusions: Mortality from COPD is significantly increasing in Brazil. Differently from others countries, there is no gender difference in trend.

PS-1108-22 Smoking among physicians and control measures

I M Campean. Departament of Pneumology, Municipal Hospital Medias, Medias, Romania. Fax: (+40) 0269842198. e-mail: puiu@birotec.ro

Health staff play a central role in distribution of knowledge about injurious effects of tobacco influencing habits of the population. Anti-smoking legislation has been implemented in several countries. The aim of this study was to identify the extent of smoking among practicing doctors and other professional health staff. We have worked on a group of 300 physicians and nurses. They were handed self-administered questionnaires conformed to the World Health Orga-

nization standard questionnaire on smoking among professional health staff. It came out that 40% are current smokers (30% of surgeons and anesthetist, 25% of radiologists, 10% of internists and pediatricians, of which 85% began to smoke after entering medical institutes. The smokers were 67 (22.5%) males and 56 (18.5%) females. 10% of smokers showed a very strong nicotine dependence, 6% showed a strong nicotine dependence and 20% showed a moderate nicotine dependence. The doctors are aware of the detrimental effects of smoking. The caption agreed by the professional health staff for preventing smoking included a ban of tobacco advertising, restrictions on smoking in public places, especially in hospitals.

PS-1174-22 Smoking habits in an international cohort of adults followed up to 10 years (on behalf of the ECRHS II Steering committee)

C Janson. Department of Medical Sciences: Respiratory Medicine, Uppsala University, Uppsala, Sweden. Fax: (+46) 186110228. e-mail: christer.janson@medsci.uu.se

The aim of this investigation was to study changes in smoking since the early 1990s in an international cohort of adults. The study included 9053 adults from 14 countries that participated in the European Community Respiratory Health Survey II. Smoking was assessed through structured interviews at the start and end of the follow-up period. Change in the prevalence smoking was expressed as absolute net change (95% CI) standardised to a 10 year period. Current smoking declined by 5.9 (5.1–6.8)%. The decline in current smoking was lower in women than in men ($P = 0.001$) and lower in the youngest age group than the oldest ($P = 0.002$). Women (OR (95% CI): 0.82 (0.69–0.97) and low socio economic groups (OR: 0.70 (0.56–0.86)) were less likely to quit. Women, but not men, who were over-weight (body mass index 25–<30 kg/m²) were also less likely to quit smoking (OR: 0.57 (0.39–0.81)). In conclusion smoking has declined in this international cohort. Male gender and a high socio-economic status were positive predictors of quitting. Concerns relating to weight increase should be tackled especially in women in order to increase quitting rates.

PS-1292-22 Tobacco addiction among HIV infected patients: dependence, depression and motivation to quit, Aquitaine Cohort, France, 2004

A Bénard,¹ F Bonnet,² J F Tessier,¹ H Fossoux,² M Dupon,² J M Ragnaud,² J F Viallard,² P Mercié,² J Rambeloarisoa,² F Dabis,¹ G Chêne.¹ ¹INSERM U593 ISPED, Bordeaux, ²Centre Hospitalier Universitaire de Bordeaux, Bordeaux, France. Fax: (+33) 5 57571172. e-mail: benard.antoine@isped.u-bordeaux2.fr

Objective: To estimate nicotine dependence, depressive symptoms and motivation to quit smoking among HIV infected patients.

Methods: During a cross-sectional survey (May–June 2004), all HIV-infected out-patients of the Aquitaine Cohort were asked to complete a self-questionnaire including: questions about tobacco consumption, the Fagerström Test for Nicotine Dependence, a visual scale to estimate motivation to stop smoking, the Center for Epidemiologic Studies (CES)-Depression scale and a questionnaire on the consumption of drugs and alcohol.

Results: Among 621 out-patients during the study period, 509 (82%) returned the self-questionnaire. 257 patients (51%, 95% confidence interval 46–55) were regular smokers. Among them, 60% were strong nicotine dependent and 62% presented depressive symptoms. 70% have already tried to quit smoking, 25% declared to be motivated to stop smoking and 52% were only considering quitting. 34% of former smokers had quit smoking since less than 6 months. Furthermore, 23% of regular smokers were daily cannabis consumers.

Conclusions: Although smokers among HIV-infected patients are motivated to quit smoking, the prevalence of tobacco consumption remains high. This observation seems to result from the high degree of dependence and the frequency of depression symptoms among these patients. An appropriate assistance to quit smoking must be implemented in this population.

PS-1501-22 ETS as risk factor of asthma occurrence in Iraqi patients

M Natic, ¹ S Kasim, ² Primary Health Care Centre M.O.H, Baghdad, ² Tuberculosis Institute M.O.H, Baghdad, Iraq. Fax: (+964) 17199287. e-mail: natic964@yahoo.co.uk

Background: There is evidence that exposure to both allergens and irritants early in life including air pollution and tobacco smoking may play a pivotal role in the development of asthma rather than genetic factors.

Aim: To highlight the issue of exposure to cigarette smoking and its relation to asthma occurrence. Also to identify if cigarette smoke acts as risk factor.

Material and method: Cross-sectional study was conducted in Baghdad on 2262 primary school children interviewing of students parents was carried-out, using well structured questionnaire, concentrating on the issue of tobacco exposure during intrauterine life as well as current life of the index child.

Result: Asthma prevalence was significantly higher, among children with history of intrauterine exposure to cigarette smoking by their mother (60.2%) or father (39.%). As well as among children whom were currently exposed to cigarette smoking by either mother (45.2%) or father (40.3%). Moreover an evidence was obtained that, exposure to cigarette smoking from both parents, whether intrauterine or currently, was acting as a risk factor for asthma development.

Conclusion: Premature exposure to tobacco smoke significantly be act as risk factor for asthma occurrence in children. Therefore quitting smoking is recommended.

PS-1757-22 Prevalence of smoking among secondary schools students in Ile-Ife, Nigeria

G E Erhabor, O O Adewole, T Folorunso, O Adesina, D Obaseki, T Olajubu, O Awopeju. Department of Medicine, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria. Fax: (+234) 036 230 705. e-mail: gregerhabor@yahoo.com

Introduction: There is little information on tobacco use, its perception and effects among high school students in Ile-Ife, Nigeria.

Objective: To elicit this information and to provide a rationale for more education on this issue.

Method: A cross-sectional questionnaire study was administered to randomly selected from five secondary schools in Ile-Ife. All students who consented to participate in the study filled out a questionnaire with core items from the Global Youth Tobacco Survey.

Results: The prevalence of current smoking was 16 (5.3%) with a male to female ratio was 2:0.1. Age of responded ranged from 16 to 18 years. More females chewed tobacco rather than smoking it. There was a positive family history of smoking in 8 respondents. The main motivation for smoking was the effect of peer pressure (65%). Knowledge of the health impact of smoking was generally low among the students smokers and non-smokers alike. About 10% of non-smokers were aware of the negative effects of smoking while only 3% of the smokers were aware of the effects of smoking on health.

Conclusion: There is need to introduce health education on the harmful effects of smoking into our schools' curriculum.

PS-1838-22 Increasing trends of lung cancer in females in Serbia

D P Pesut, M Z Basara, L M Nagorni-Obradovic. Department of Research and Epidemiology, Institute of Lung Diseases and TB CCS, Belgrade, Serbia and Montenegro. Fax: (+381) 11 2681 591. e-mail: dppesut@verat.net

Background: Tobacco smoking (TS) is the most important risk factor for developing lung cancer (LC). Serbia and Montenegro ranks to the first several European countries by tobacco use of its inhabitants without significant difference by sex (48%).

Aim: To analyze LC trends in females in Serbia in a ten-year period in regards to patients' TS status.

Methods: Lung diseases referral institution's notification data were analyzed with respect to patients' TS status: smokers, ex smokers and non smokers.

Results: Increasing trend of LC in females in Serbia was found in 1994–2003 period in all the three categories of TS status: smokers, ex smokers, and non smokers (RR: 0.524, 0.601, and 0.084, respectively).

Conclusion: There is an urgent need for increasing peoples' awareness towards TS harmful effects on human health both in active and passive smoking, and especially in females. Further efforts should be done in developing smoking cessation services and tobacco control policies.

PS-1844-22 Smoking prevalence among health professionals at Dr Luis Eduardo Aybar Hospital, Dominican Republic

A Rodríguez, J Cordero, N T Estella, D R Padilla, D de la Cruz Luzón, I P Jiminian Mata, T O Antigua, B Marcelino, L Reyes, M Domínguez. SESPAS/PNCT/DOR, Santo Domingo, Distrito Nacional, Dominican Republic. Fax: (809) 18095413422. e-mail: programatuberculosisrd@mail.com

Background: Smoking is a sanitary problem of increasing gravity in many poor countries like Dominican Republic. Among the factors that make easy the smoking beginning, is perception that smoking is normal. Industry exacerbates that perception, and many times social reality reinforces it.

Objectives: To know the prevalence of smoking habits among health professionals, to evaluate the attitude and sensibility about tobacco consumption and analyze possible factors that determine the beginning or desertion in the consumption.

Method: Descriptive-Transversal studies on 300 doctors (graduated and internal) at Dr. Luís Eduardo Aybar Hospital. The method was a voluntary and anonymous questionnaire con 29 closed and one only answer question. It was divided in 3 parts: one for all the people who was the general sample, other for people who never smoked and the other for current smokers.

Results: The proportion aft smokers are not different among men and women, over 50% in male smokers and the same for female smokers. Statistically, smoking habits among health professionals was distributed as it follows: 51% of smokers and 49% of non-smokers.

Conclusions: Tobacco consumption among the doctors evaluated was excessively high, we can say that there is a higher prevalence of smoking habits among graduated doctors, that sanitary professionals must be taught to avoid, smoking in sanitary ambient or when they are with a patient, because they are, social models.

PS-1865-22 Comparison of nutritional knowledge, attitudes and practice (KAP) of smokers and non-smokers in Iran: a case control study

M S Saber, H Emami, G R Heidari, M R Masjedi. Department of Epidemiology, National Research Institute of Tuberculosis and Lung Disease (NRITLD), Tehran, Iran. Fax: (+98) 2285777. e-mail: marjansaberus@yahoo.com

Background: We aimed to assess the associations between smoking habits, nutritional knowledge, attitude and practice in an Iranian population.

Methodology: In an ongoing case control study 93 smokers and 81 non-smokers, aged 18 years and over were compared for these objectives. A Likert type KAP questionnaire including 36 items was used. Knowledge and attitude scores were compared between smokers and non-smokers using Mann-Whitney test. Practice pattern was compared by χ . Differences were significant at $\alpha = 0.05$.

Result: In smokers 57 (61%) and in non-smokers 21 (26%) were male ($P = 0.00$). In men, mean age of smokers and non-smokers were 38 ± 8.4 years and 34 ± 19 respectively ($P = 0.000$). In women the picture was 43 ± 10 and 37 ± 16 respectively ($P = 0.000$). In males average score of the knowledge among non-smokers was higher than that of smokers (48 vs. 36.3) ($P = 0.04$) and average score of attitude in non-smokers was less than that of smokers (36 vs. 41) ($P > 0.05$). About 17 (30%) smokers and 12 (57%) non-smokers reported having regular physical activity ($P = 0.03$). Fifty one (89.5%) male smokers and 15 (71.4%) non-smoker used to have dinner every night ($P = 0.005$). For women knowledge average score among non-smokers was higher than that of smokers (50 and 45 respectively) ($P > 0.05$). Attitude score of non-smokers was higher than smokers ($P = 0.000$). Among female non-smokers, 30 (50%) reported daily meat consumption and the picture for female smokers was 24 (68%) ($P = 0.007$). Female non-smokers consumed daily breakfast more than female smokers (51 (85%) vs. 21 (58%)) ($P = 0.01$).

Conclusion: As it was expected from similar studies, our data also showed significant difference of nutritional KAP between smokers and non-smokers in an Iranian population.

PS-1954-22 University students' knowledge about smoking-related diseases

S S Saleiro, C D Damas, I G Gomes. Serviço de Pneumologia, Faculdade de Medicina do Porto, Hospital de S. João, Porto, Portugal. Fax: (+351) 225512214. e-mail: sandrasaleiro@portugalmail.pt

Smoking habits increase the risk for different diseases, some of which are broadly mentioned by the media. To evaluate university students knowledge about smoking consequences, we studied medical ($n = 172$) and engineering students ($n = 166$), (median age 21 yrs,

173 male), which filled in a questionnaire with 12 tobacco-related diseases, and were asked to tell which of them they thought to be associated with tobacco use. They also stated their perception about cigarette dependence and whether they were smokers. Positive answers for the different diseases were: lung cancer (100%), COPD (81.7%), myocardial infarction (68%), stroke (55.9%), laryngeal cancer (85.5%), oral cancer (77.8%), oesophageal cancer (65.4%), gastric cancer (43.2%), gingivitis (38.5%), bladder cancer (33.4%), peptic ulcer (30.5%), and Crohn's disease (23.1%). Except for lung cancer, medical students showed a better knowledge about these smoking consequences, which was statistically significant. Smoking may induce psychological dependence for 333 students (98.5%), and nicotine dependence for 285 (84.3%) (difference between medical and engineering students statistically significant in the latter). Being smoker did not modify the amount of knowledge ($P = 0.313$). In conclusion, knowledge about cigarette smoking risks is deficient among university students, although, as expected, medical students have a better (but not complete) knowledge about tobacco risks.

PS-2069-22 Tobacco smoking and respiratory symptoms in patients with diabetes mellitus

V Miloskovic,¹ D Pesut,² L Ciobanu,³ L Nagorni-Obradovic.²

¹Dispensary for Lung Diseases and TB, Health Centre, Kragujevac, ²Institute of Lung Diseases and TB, Research and Epidemiology, Belgrade, Serbia and Montenegro; ³University of Medicine and Pharmacy 'Gr T. Popa', Iasi, Romania. Fax: (+381) 11 2681 591. e-mail: dppesut@verat.net

Background: Diabetes mellitus (DM) is a mass disease of increasing trends worldwide. Tobacco smoking (TS) is a risk factor for type-2 DM. Patients (Pts) with DM have proven susceptibility to a variety of infectious diseases and/or cardiovascular complications. **Study group:** 145 Pts, 58 males and 87 females (60.9 years on average) consisted of subgroups: 1) 39 Pts with type-1 DM, 15 (38.45%) males and 24 (61.54%) females; 2) 106 Pts with type-2 DM, 46 (40.57%) males and 63 (59.43%) females. Subgroups' mean ages (53.2 vs. 63.8 ys) differed significantly ($P < 0.05$).

Results: We found 42 (28.96%) active smokers, 26 (17.93%) ex-smokers and 77 (53.10%) non smokers in total, without significant difference between subgroups ($P > 0.05$). Ex-smokers of the subgroup 2 had significantly higher TS index (50.5 pack/ys) compared to that in subgroup 1 (16.7 pack/ys) ($P < 0.01$). Respiratory symptoms were more frequent in subgroup 2 ($P < 0.05$): wheezing ($P < 0.005$), expectoration ($P < 0.01$), and shortness of breath ($P < 0.05$). Incidences of pneumonia, tuberculosis, idiopathic pulmonary fibrosis, COPD, sarcoidosis and bronchiectasis differed significantly from those in general population.

Conclusion: DM Pts should be aware of TS as an additional harmful but avoidable risk factor for devel-

oping a variety of respiratory system diseases and/or complications.

PS-2096-22 Profile of smokers attending a smoking cessation program

M I Gheorghiu-Branaru,¹ M C E Gheorghiu-Branaru.²

¹'Dr Marius Nasta' Institute, Pneumology center nr. 6, Bucharest, ²'Carol Davila' Medicine University, Bucharest, Romania. Fax: (+40) 216104187. e-mail: manuelagb@cmb.ro

Objective: To establish the profile of smokers opting for a smoking cessation treatment. The study followed a strong mass-media anti-tobacco campaign.

Material & method: We studied 106 patients, with ages between 19 and 70, tobacco-smokers for more than 5 years. Each patient filled-in a simple questionnaire on tobacco habits, clinical signs, social status and motifs for smoking cessation and the test Fagerstrom file. The patients received antitobacco counseling together with two booklets, on how to quit smoking. All the patients agreed with smoking cessation after being explained all the risks that smoking implies. The majority had pulmonary and/or cardiovascular problems and knew the danger for their health. The medication proposed being very expensive, only 57 patients (50.9%) accepted anti-tobacco intensive treatment (bupropion hydrochloride) and the rest of 49 (49.1%) agreed only with psychological support; 20 of them followed homeopathic treatment.

Conclusions: There is a high disponibility of smokers for quitting smoking tobacco, after adequate explanations, but there is a lack of health education on smoking cessation, which does not face the aggressive concurrence of the tobacco advertising. The compliance in quitting smoking is proportional with the patient's age. Physicians must increase their efforts in smoking cessation among their patients. Addressability to the doctor would increase in case of a well conducted educational programme at national level.

PS-2149-22 L'organisation de la lutte anti tabac en Tunisie

I Harrabi,¹ H Ghannem,¹ F Lazreg,² R Gaha,¹ J F Tessier.²

¹Laboratoire d, Sousse, Tunisia; ²ISPED, Bordeaux, France. Fax: (+216) 73 224 899. e-mail: imed_harrabi@yahoo.fr

En Tunisie comme dans les autres pays en developpement, les barrières psychosociales qui se dressent contre l'expansion du phénomène tabagique sont en train de disparaître. D'où l'importance des actions préventives intégrées dans un programme national de lutte contre le tabagisme en Tunisie.

Informations sociodémographiques : Population : 9 924 742 habitants ; Surface : 164 418 km². Prévalence du tabagisme : 61.4% chez les hommes et 4.2% chez les femmes. L'industrie du tabac : une seule usine du tabac située à Kairouan et qui fournit la majorité du besoin. La lutte anti tabac a démarré il y'a plu-

sieurs années en Tunisie avec des actions d'éducation sanitaire à large échelle accompagnées par des mesures législatives et réglementaires. La Tunisie a signé la convention cadre de l'OMS de lutte contre le tabac en 2003. Les consultations d'aide à l'arrêt du tabagisme se trouvent actuellement dans la majorité des services de pneumologie des hôpitaux universitaires. Tout doit être mis en oeuvre pour consolider ces actions de lutte contre le tabagisme en Tunisie.

PS-2281-22 High prevalence, under-diagnosis and under-treatment of chronic bronchitis in South Africa—an example of differing risk factors in developing countries

A Jithoo,¹ N W White,¹ N Beyers,² E Irusen,² S van Lill,¹ E D Bateman.¹ ¹University of Cape Town Lung Institute, Cape Town, ²Respiratory Unit and Desmond Tutu TB Centre, Stellenbosch University, Cape Town, South Africa. Fax: (+27) 21 4066902. e-mail: ajithoo@uctgsh1.uct.ac.za

This analysis assesses the prevalence of self-reported chronic bronchitis and its associated risk factors from a comprehensive respiratory survey* performed in two low-to-middle income urban communities of Cape Town, South Africa. A cross-sectional random sample of 833 addresses, representing 15% of this population was studied. A questionnaire that included previously validated groups of questions on symptoms of lung diseases, their risk factors and healthcare utilisation was completed by 3512 persons ≥ 15 years of age. Current smoking was reported in 58.9% of males and 42.9% of females, and 25.3% of individuals reported cough with sputum. The British MRC definition of chronic bronchitis was met in 12.6% of males and 9.2% of females ≥ 40 years. Doctor-diagnosed chronic bronchitis was reported in 5.6% with 1.0% receiving treatment. The impact of risk factors in this population is compared with data from a national survey (see table). Chronic bronchitis in South Africa shows multiple associations that are different when compared to first world counterparts. Symptoms of chronic bronchitis are frequent, but the proportion of individuals receiving medication suggests both under-diagnosis and under-treatment. Better surveillance of the magnitude and causes of chronic bronchitis is required to facilitate improvement in prevention and management.

| | Percentage exposed to risk factor | Prevalence Odds Ratio | Population Attributable Fraction (%) in this study* | Population Attributable Fraction (%) in a national survey (SADHS) ^a |
|--------------------------|-----------------------------------|-----------------------|---|--|
| 1–14 cigarettes/day | 37 | 2.2 | 30.7 | 23 |
| ≥ 15 cigarettes/day | 10 | 2.7 | 14.5 | 13 |
| Occupational exposure | 26 | 2.1 | 22.2 | 14 (men) |
| Cannabis smoking | 12 | 3.0 | 19.3 | — |
| Past tuberculosis | 9.8 | 1.6 | 5.5 | 10 |

^aSADHS = South African Demographic and Health Survey

PS-1886-22 Role of passive smoking in asthma in children

A D Sandevski, M S Trajcevska, E L J Sandevska. Institute for Lung Diseases and Tuberculosis - Skopje, Skopje, Macedonia. Fax: (+389) 232229166. e-mail: doctoraco@hotmail.com

The passive smoking at domestic conditions enlarges the bronchial irritation at children with bronchial asthma. The aim of this study was to establish the influence of the passive smoking on the values of the respiratory parameters and seasonal difference of severity of asthma in children. 101 nonselective children have been tested, 67 (66.3%) from mothers-nonsmokers (I-st group), and 34 (34.7%) from mothers-smokers (II-nd group). 9 (13%) have been eliminated from the study. The examined children were from 9 till 18 ($X = 14.6 \pm 3$) years old. VC, FEV₁, FEV50 and gas analysis in arterial blood had been controlled. The children from II-nd group had lower values: FEV₁%, $X = 72 \pm 2$; FEV50, $X = 54 \pm 3$ (with $P < 0.003$), than children from I-st group: FEV₁%, $X = 88 \pm 2$; FEV50, $X = 77 \pm 1$ (with $P < 0.004$). At children in II-nd group PaO₂ was $X = 89 \pm 4$ mmHg, with $P < 0.01$. These results suggest that the passive smoking enlarges the bronchial irritation, particular in winter season.

PS-2094-22 Le tabagisme dans les programmes de santé en Syrie

Y M Mohammad, B A D Abou Dahab. Tishreen University, Lattakia, Lattakia, Syrian Arab Republic. Fax: (+41) 414635. e-mail: mohamyou@scs-net.org

La Syrie, 19 millions, 9 million moins de 15 ans. 48% des hommes, 9% des femmes fument les cigarettes. A coté il y a le Narghileh, traditionnelle chez les femmes, en expansion surtout chez les jeunes. La Syrie cultive le tabac, L'industrie de tabac joue un rôle pour limiter le chômage. Le gouvernement Syrien, considère la lutte anti-tabac comme une priorité, un comité anti-tabac au ministère de la Santé, dont le directeur est Dr. Abou Dahab, regroupe des représentants des divers secteurs. Avec édition des guides en Arabe, pour les jeunes, les femmes et les enfants. Des sociétés civiles, et les associations professionnelles sont impliquées. Des organisations internationales aident: IATH. Depuis 1996, Une loi interdisant toute publicité pour le tabac est largement respecté. Fumer est interdit dans les lieux de travail, dans les moyens de transport et les vols aérien. C'est indiqué sur tout paquet de cigarette, de marque internationales ou nationales, que le tabac est dangereux. Education anti-tabac dans les 1500 centres de santé primaire en Syrie. Dans le curriculum en médecine, les méfaits de tabac sont inclus sans aborder le control.

PS-2104-22 Experiencing bupropion hydrochloride in smoking cessationM I Gheorghiu-Branaru,¹ M C E Gheorghiu-Branaru.²¹Dr. Marius Nasta' Institute, Pneumology Center nr. 6, Bucharest, ²'Carol Davila' Medicine University, Bucharest, Romania. Fax: (+40) 216104187. e-mail: manuelagb@cmb.ro

Objectives: This study represents a first experience with B-HCL for smoking cessation, in a pneumology service, in Bucharest. The aim of the study is to establish landmarks for further utilization.

Material & methods: Among 106 smokers studied, (with ages between 19 and 70, tobacco-smokers for more than 5 years), 57 agreed anti-tobacco intensive treatment with bupropion hydrochloride. Only the 27 persons, 6 women and 21 men, ages between 28 and 58, in healthy condition, smokers for more than 20 years were the actors of our study. Each patient filled-in a simple questionnaire on tobacco habits, clinical signs, social status and motifs for smoking cessation and performed the test Fagerstrom. Patients received antitobacco counseling, two booklets about quitting smoking and were advised to consult some web-sites about smoking cessation.

Results: 18 patients renounced at smoking tobacco after 8 weeks of treatment, 2 persons restarted smoking after 4 weeks and renounced at the treatment, 2 persons quitted smoking after less than 8 weeks of treatment, 3 persons restarted treatment within a year. There were observed 2 cases of severe allergic skin eruption, which required treatment interruption. Medication was generally well tolerated. The most common adverse reactions were insomnia and dry mouth. Improving of sexual performances was reported in 2 cases. After 8 months, one of 16 treated people restarted smoking. After another year, 5 persons restarted smoking.

Conclusions: Preliminary results indicate that Bupropion hydrochloride could represent a useful method in smoking cessation fight, but not enough.

PS-2151-22 Smoking habits and beliefs of future physicians of Pakistan

J A Khan, H Nawaz, S Z Imam, A H Pabaney, Y J Sepah.

Section of Pulmonary Medicine, The Aga Khan University Hospital, Karachi, Pakistan, Karachi, Sindh, Pakistan.

Fax: (+92) 0515774561. e-mail: javaid.khan@aku.edu

Smoking among medical students is a cause of serious concern. In this study we evaluated smoking habits, beliefs and attitudes of Pakistani medical students. A cross-sectional study was conducted in 2004/2005 at three medical colleges using a self-administered WHO questionnaire. A total of 1024 students participated in the study. 217 (21%) had smoked at least once, while 105 (10%) were current smokers and had smoked at least 100 cigarettes in their lifetime. Eighty-seven per cent of smokers were males while only thirteen per cent were females. Forty-seven per

cent of smokers had tried to give up smoking at least once. Majority believed passive smoking is harmful to health. Students were generally supportive of legislative measures to reduce tobacco use such as restriction of smoking in public places and prohibition of tobacco sale to children. Lesser but significant numbers thought that there should be a complete ban on smoking advertisements and that the price of tobacco products should be increased sharply. The study shows a high prevalence of tobacco use in future physicians even though knowledge and attitude of students towards smoking was deemed to be satisfactory.

PS-2295-22 Behavior of smoking addictions in a community, Cespedes, Municipality, Camaguey, Cuba

M Cedeno Donet, M A Rodriguez Betancourt, D Perez Morelles, R Peraza Morelles. Community Polyclinic 'TTE: Tomas Rojas', Camaguey, Cuba. e-mail: marisel@shine.cmw.sld.cu

Introduction: The increase of addiction to smoking is closely related to the increment of tobacco industrializations, sensibility of the product and propaganda.

Objective: Knowledge of the addiction to smoking in population belong to the #37 health clinic of Cespedes Polyclinic.

Methods: A descriptive and cross-sectional study about the behavior of addictions to smoking in the #37 Health Clinic of Cepedes Polyclinic from January to the July 2003 was carried out. The study universe was composed of adult population 434 subjects. Descriptive statistic and inferential measures were applied.

Results: Feminine sex represented 52.3% of the studied populations; the 36.8% had ages from 41 to 60; the 60.9% of smokers belong to masculine sex; the prevalence of the addiction to smoking and sex was found that 39.1% of smokers were masculine, and that 41.1% of exsmokers were feminine with a relevant statistic significance ($\chi^2 = 31.1$ $P = 0.005$), the 32.2% referred that they like smoking, 20.2% of smokers had received informations about the topics. The most frequent diseases in smokers were pulmonary emphysema (47%), Bronchitis with 57.7% and Ischemic Cariopathy (2.2%).

Conclusion: Smoking addiction prevailed in the masculine sex, in ages from 21 to 30 the main motive was that they like this habit. Pulmonary Emphysema prevailed, Bronchitis was the disease most frequently found among smokers.

HUMAN RESOURCE DEVELOPMENT AND TUBERCULOSIS

PS-1917-22 Strategy of long-distance capacitation: TB actualization

A Hernandez, E Ferreira, A Avena. Mexico National Tuberculosis Program, Mexico CITY, DF, Mexico.
Fax: (+52) 5526146436. e-mail: micobacteriosis@salud.gob.mx

To address training needs of local health personnel, in coordination with the Nursing-Obstetric School of the University of Mexico, a long-distance course was realized, utilizing communication by television and Internet as a tool of work.

Objective: Capacitate and actualize in the strategies developed in the NTP. Emphasize the importance of participation for TB control.

Methodology: 5 programs transmitted by national TV and internet: the public participated by phone and 15 experts, one in each theme. Internet and Chat were used for registration and feedback respectively. Home-works were weekly sent by e-mail and revised by one of 40 tutors, feeding back On Line. The course was also evaluated on line.

Results: Intangibles and tangible results can be obtained from a capacitating course. First, we can say that communication through the media, with general population to know the disease, as well as telephone call from health workers, having this chance of discussing work and particular items from remote areas are not usual in Mexico. The tangible part can be seen by diffusion to general population and 1200 health Workers participation from the private sector and curricular accreditation for approved students.

PS-1950-22 Outcomes measurement of DOTS nursing net in Mexico

A Avena, E Ferreira, A Cruz. Mexico National Tuberculosis Program, Mexico City, DF, Mexico. Fax: (+52) 5526146436.
e-mail: micobacteriosis@salud.gob.mx

Background: In 2003, Mexico integrated the DOTS Nursing net with 60 nurses in 32 states, which were capacitated in human and technical development, community organization to develop abilities, spread capacitation to local level, sensibilise population to obtain therapeutic adherence, diminish treatment and avoid TB deaths and drug resistance.

Method: A Second National invitation and course on human and technical development, community organization (with innovator material), distance capacitation, evaluation, and a national meeting for performance evaluation were done.

Advances and results: In 2004, 32 states with regional NET have already capacitated 7200 nurses and allied health professionals in 211 sanitary jurisdictions, with 120 local courses, 4 regional workshops on human and technical development, com-

munity organization, directory of NET and nursing faculties, 50 state and jurisdictional TB coordinators meetings and a long distance course.

Conclusions: This pioneer model of gestion and attention indicators in the Americas, measures effort realized in the DOTS NET, and patients satisfaction related to tuberculosis health attention gived, and preliminary results will be offered shortly.

PS-2037-22 Knowledge about tuberculosis transmission and self-protective attitudes among undergraduate medical students in Rio de Janeiro State, Brazil

E G Teixeira,^{1,2,3} A J L Cunha,² A Kritski,² L C P Soares,⁴ E Bethlem,⁵ G Zanetti,⁶ A Ruffino-Netto,⁷ M Belo,^{1,3} M M Castello Branco,^{1,3} M Scartozzoni,¹ D Menzies,⁸ A Trajman.^{1,2,3} ¹Gama Filho University, Rio de Janeiro, ²Rio de Janeiro Federal University, Rio de Janeiro, ³Souza Marques Foundation Campos School of Medicine, Rio de Janeiro, ⁴Campos School of Medicine, Rio de Janeiro, ⁵Rio de Janeiro State Federal University, Rio de Janeiro, RJ, ⁶Petrópolis School of Medicine, Ribeirão Preto, São Paulo, ⁷Ribeirão Preto School of Medicine, São Paulo University, Rio de Janeiro, Rio de Janeiro, Brazil; ⁸Montreal Chest Institute, Montreal, Canada.
Fax: (+55) 2125321661. e-mail: elenygt@centroin.com.br

Setting: Five medical schools in cities with different tuberculosis (TB) incidence rates (28, 63 and 114/100 000 inhabitants) in Rio de Janeiro State.

Design: Cross-sectional survey among medical students (MS) in preclinical, early and late clinical years. Information on use of respiratory protective masks by patients and students and knowledge on TB transmission were obtained by a self-administered questionnaire.

Results: Among a total of 1094 students who answered the questionnaire, 77 (7%) did not know how TB is transmitted and 111 (10%) thought that cough does not transmit TB (77% in pre-clinical, 16% in early and 7% in late clinical years). Among 597 who had already TB lessons, 582 (98%) knew that TB is transmitted by cough. Among 332 (30%) who examined TB patients, 138 (42%) always used masks; 303 (91%) had had TB lessons, 132 (44%) of whom used masks. Thirty-five (11%) of TB patients used masks.

Conclusions: Most MS know that TB is transmitted by cough. Yet, knowledge does not result in changing attitudes. Despite awareness of their potential risk, MS engage in risky behaviour. Students in clinical years should be aware of the risk and protect themselves from nosocomial TB transmission.

PS-2061-22 Tuberculosis teaching in nursing school

E Ferreira, E Alarcon, A Avena. Mexicana National Tuberculosis Program, Mexico City, DF, Mexico.
Fax: (+52) 5526146436. e-mail: micobacteriosis@salud.gob.mx

They summarize Are analyzed the educational contents of tuberculosis in schools and Schools of Nursing of the country in order to know the grade of education

tuberculosis and forge ties that make it possible to introduce into the curricula an integrated approach in comprehensive care to tuberculosis.

Methodology: During 9 months from 2004 to 2005, with support of the TAES Network of Nursing of the country a census of the schools and Schools of Nursing was conducted with level degree in the 21 states and conducting of individual survey to the personnel of the Network of Nursing throughout the country.

Results: Survey to 27 schools, 8071 students, and curriculum of 8 semesters. 89% consider the subject of tuberculosis, however 78% of them are not linked with the health services of the Program of tuberculosis.

Conclusions: The coordination and linkage among the health services and the institutions that train human resources in nursing will strengthen the teaching of tuberculosis comprehensively through the training and sensitization of the teaching staff in the universities and thus the control of the disease.

PS-2097-22 TB and health education

M I Gheorghiu-Branaru,¹ M C E Gheorghiu-Branaru.²

¹'Dr. Marius Nasta' Institute, Pneumology Center nr. 6, Bucharest, Romania; ²'Carol Davila' Medicine University, Bucharest, Romania. Fax: (+40) 216104187.
e-mail: manuelagb@cmb.ro

Objective: To study the health education of TB patients, correlated to socio-economic conditions.

Methods: 200 TB patients answered a 30 items questionnaire on: TB (transmission, implications, treatment, protection, ways of information and socio-economic status. Patients between 18 and 70 years old, 54% women and 46% men, most of them workers or retired persons, had low monthly incomes, with periods of unemployment, or performing illegal work to face familial problems. A third of them had precarious hygienic/dietetic conditions of life (alcoholism, lack of current water) Although all of them had the lyceum as minimum study, the test showed differences in basic knowledge for TB according to age, gender, social/educational statuses.

Women, younger and people with high school education were more informed than the others. There are some preferences for speaking about their disease with the specialist doctor, instead of GP, who never discuss with them about TB. As sources of information, they preferred any kind of leaflets, magazines and TV news. People under 50, having a medium level of understanding prefer to obtain information from the web.

Conclusions: There is a strong connection between TB epidemiology and socio-economic factors. People have a lower level of health education than expected. Prevention and treatment of TB means more specific health education.

PS-2127-22 Data management training course: an appropriate tool for increasing TB control programme effectiveness

A D Muynck,¹ D N Naik,¹ P Satpathy,¹ D N Nayak.²

¹DANTB, DANIDA, Bhubaneswar, Orissa, India; ²State TB Cell, Bhubaneswar, Orissa, India. Fax: (+91) 674 2550896.
e-mail: aime@dantb.org

In the state of Orissa, India the district and subdistrict officers under RNTCP are implementing the national programme guidelines and instructions. During the first year of the programme, the RNTCP performance, measured through detection and treatment success indicators was excellent and was even the highest in the whole of India. From 2003 onwards the rapid extension of the programme has produced a serious decline in the outcome parameters. It is felt that the field officers are not able to interpret the field data correctly, detect problem areas rapidly and adjust programme priorities in line with the changing field needs. The knowledge and even the skills to analyse and interpret their own RNTCP performance data is felt to be missing. A data management course of 4 months duration that puts heavy emphasis on fieldwork could give the necessary knowledge and skill and induce a kind of evidence based management attitude. An assessment of the programme performance by TB field officers is being carried out before and after the data management course. The assessment is still going on. The results will be presented at the Paris meeting.

PS-2183-22 Impact de la communication par les médias sur l'amélioration du taux de détection des cas suspects et de guérison des malades tuberculeux

B Kabuya, G Mabeluanga. Ligue Nationale Antituberculeuse et Antilépreuse du Congo, Kinshasa, D R Congo.

Fax: (+243 1) 77 52 44 43 51.

e-mail: kabuyabarth@hotmail.com

Objectif : Evaluer l'impact des messages de sensibilisation par les médias sur le niveau de connaissance, les attitudes et pratiques des patients, et de la communauté face à la tuberculose.

Méthodes : 1) -Enquête dans les ménages de Kinshasa sur base d'interviewes. 2) Utilisation d' un questionnaire standard dans un échantillon de 300 ménages tirés suivant un plan de sondage stratifié.

Résultats : La campagne a débuté en mars 2004 et l'enquête en janvier 2005. Sur les 300 ménages interrogés, 60% possèdent une radio ou une télévision. La radio est la plus utilisée. Près de 100% de ménages ont suivi les messages de sensibilisation dont 60% avec le chef de ménage. 60% des ménages reconnaissent la clarté et la compréhension des messages diffusés. 100% des ménages affirment que les comportements y recommandés sont faisables.

Conclusion : Au quatrième trimestre 2003, 4.424 suspects ont consulté un centre de santé sur 4.811 en

2004 ; pour une toux ou un problème respiratoire. Le taux de guérison est passé de 79% en 2003 à 80% en 2004.

PS-2186-22 Enquête sur les connaissances, attitudes et pratiques sur la tuberculose par la population dans les ménages de Kinshasa, République Démocratique du Congo

P D Kimpanga,^{1,2} E Bahati,² A Ndongosieme,² B De Coster,² W Okitolonda,¹ M Kiyombo,¹ P K Kayembe,¹ M Malengreau.³ ¹Ecole de Santé Publique, Université de Kinshasa, Kinshasa, ²Programme National de la Tuberculose, Kinshasa, DR Congo; ³Ecole de Santé Publique, Université Catholique de Louvain, Bruxelles, Belgium.
Fax: (+202) 478 1775. e-mail: kimpanga@yahoo.fr

Objectif: Déterminer le niveau des Connaissances, Attitudes et Pratiques sur la tuberculose dans la population. **Méthodes:** Les interviews structurées par questionnaire ont été conduites auprès de 766 personnes de 18 ans ou plus, au cours d'une étude transversale, dans un échantillon de ménages tirés systématiquement suivant un plan de sondage stratifié selon la résidence et le statut socioéconomique.

Résultats: La TB est causée par les microbes pour 16% des hommes et 9% des femmes ($P < 0.01$). Les modes de transmission cités sont la poussière (83%) et les ustensiles (50%). La toux dépassant 15 jours est reconnu par 48% des personnes et l'amaigrissement par 31%. La clé du diagnostic est l'examen de crachat (84%) ou la radiographie (74%). La TB est guérissable (98%) entre autre par la prière selon 52% de femmes et 42% d'hommes ($P < 0,001$), ou par le traitement traditionnel (24%). Trente pour cent auraient honte de se soigner au centre de santé et 62% cacheraient leur maladie. La source d'information la plus citée est la discussion entre amis.

Conclusion : Le niveau des connaissances sur la TB est bas dans les ménages. La stigmatisation représenterait une barrière à la prise en charge. La sensibilisation améliorerait le dépistage et le traitement.

PS-2192-22 Closing the caps to DOTS in Uganda: a comprehensive approach to behavior change

L Tawfik,¹ P G Suarez,¹ F Aduat-Engwau,² A Nankunda Babihuga.³ ¹Center for Health Outcomes, Management Sciences for Health, Arlington, Virginia, USA; ²NTP, Ministry of Health, Uganda, Kampala, ³Communications for Development Foundation Uganda, Kampala, Uganda.
Fax: (+1) 703-524-7898. e-mail: ltawfik@msh.org

Introduction: In many high-burden TB countries, IEC interventions have received insufficient attention. Therefore, behavior change among providers and clients remains a challenge. To maximize the impact of TB case detection and treatment, the Ugandan MOH with USAID-funded technical assistance from MSH and CDFU, is developing an IEC/BCC strategy.

Objective: To develop a National IEC/BCC Strategy to increase case detection, treatment success, and DOTS coverage in Uganda.

Methods: Social science research identified gaps in provider and client behavior to develop a comprehensive approach to TB control. The methodology included a literature review, formative research, IEC/BCC framework, communication channels and audiences, behavioral change objectives and indicators, message and material development.

Results: Stakeholders will use results to reach a consensus on the IEC/BCC strategy and implement the plan to reach eight language groups across Uganda. The primary focus will be on health facilities and CHV's in 'hot zones,' but the strategy will be long-term and national. Regular monitoring and evaluation of the IEC/BCC intervention will be carried out to determine the impact on case finding and case treatment.

Conclusion: A comprehensive national approach to TB control which uses evidence-based research to change behavior can accelerate progress in closing the gaps to DOTS expansion.

PS-2241-22 Education in tuberculosis control actions in asylum: experience of the Rio de Janeiro State, Brazil

L M R Freitas,¹ R Siqueira-Batista,^{1,2} A A T Bevilacqua,¹ M Martins,¹ A G M Guedes,¹ A P Gomes,^{1,2} E D Sucupira,¹ M S Nacif,² M C Carneiro,² L Selig.^{1,2} ¹Secretaria de Estado de Saúde - RJ, Rio de Janeiro, ²Fundação Educacional Serra dos Órgãos, Teresópolis, RJ, Brazil. Fax: (+55) 21 22999750. e-mail: tuberculose@saude.rj.gov.br

Introduction: Tuberculosis (TB) remains a serious problem of public health. In this panorama, some special situations are ending up to be important to plan and to develop the TB control strategies, especially in confined peoples.

Objective: To present our experience in the implementation measures of TB control in the resident's of an asylum, using the education strategies.

Methods: Benfica's Shelter Center (BSC), RJ, with the capacity for approximately 400 people, develops actions to help the street population. About two thousand people are assisted each year. The present investigation was accomplished in the second semester of 2004. The initial educational measures used for TB control in BSC were training the health professionals and teaching the users to recognize respiratory symptomatic.

Results: Two trainings were accomplished for the 38 professionals of BSC foccusing the general aspects of the tuberculosis and the search of multiresistant TB. One lecture to the users, with 200 participants, was done too. After doing this, we identify in a first evaluation of the residents, six new cases of pulmonary tuberculosis. The following step will be the imple-

mentation of the protocol to search for TB suspects, identification of new TB cases, and start the correct treatment with supervised treatment.

PS-2243-22 The nucleo de estudos em tuberculose of the fundação educacional serra dos Orgaos, Teresopolis, RJ, Brazil

A P Gomes,^{1,2} R Siqueira-Batista,^{1,2} M S Nacif,¹ J B Bisaglia,¹ S S Santos,¹ M C Carneiro,¹ L M R Freitas,² P C Oliveira,¹ L Selig.^{1,2} ¹Fundação Educacional Serra dos Órgãos, Teresópolis, ²Secretaria de Estado de Saúde - RJ, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 26417000. e-mail: tuberculose@saude.rj.gov.br

Introduction: Tuberculosis in Rio de Janeiro state can rightly be considered one of the most important local healthy treatable problem. Because of this unacceptable state, being tuberculosis one treatable disease we, students, researchers and medical teachers of the Serra dos Órgãos Educational Foundation (FESO) sated out to do one tuberculosis study nucleus (NET). The NET-FESO is one space for debates, learning, teaching and researching about this relevant medical topic.

Methods: Analysis of the events and the investigations made at NET-FESO since its creation.

Results: The NET-FESO foundation occurred in September of 2002. The developed activities was: two Mountains Tuberculosis Conference, two Tuberculosis research seminary and the following research lines. 1) Clinic and imaging diagnosis of tuberculosis, 2) Epidemiology of tuberculosis in the Rio de Janeiro state, 3) Tuberculosis and AIDS co-infection, and 4) History, literature and tuberculosis. With this three researches lines we had forty three posters in national and international congresses, having seven articles in national periodic.

Conclusions: The NET-FESO foundation corresponded to the needs of broaden tuberculosis study in the Rio de Janeiro state, being the students and medical teachers of the nucleus extreme determine in the control of this serious healthy disease.

PS-2304-22 Red TAES tuberculosis

M Gonzalez Gonzalez. President Nacional of Network TAES of Enfermeria in Tuberculosis, Durango, Mexico. e-mail: mc_glez@yahoo.com.mx

I represent the TAES-Nurses Network for Tuberculosis (TB) control in Mexico. The National Health Plan for 2001–2006 includes the National TB control programme (NTP) which consists of nine different components, three organizational and six strategic. The Coordination and Organization component establishes the formation of alliances as one of its strategies. In Durango State, 62% of the Nursing Staff from 4 Health Jurisdictions has been trained; in addition, other health care provider institutions such as some sectors of the Mexican Institute of the Social,

the Institute of Security and Social Services for State Workers, and the National Defense Secretariat. The principal characteristic of this new concept of training goes beyond the technical and normative aspects emphasizing the social and human issues and taking into account the organization of the communities they serve. It has also been possible to coordinate the training activities with other health care and health related allies such as Doctors, Social Workers, Health Promoters and Psychologists. Similarly, this initiative has established a link between high schools and Nursing Faculties in the State. The NETWORK has also implemented strategies for reviewing and innovating approaches to health promotion/education printed materials such as leaflets, posters. Specific innovative health education materials have been developed for World TB Day including public representations, marches, public discussions, etc, involving the local communities.

PS-1092-22 Web-based survey of HIV-testing counselling skills of tuberculosis nurses working in London clinics

E Castro Sanchez,¹ V Drennan,² A Goodburn.¹

¹Tuberculosis Service, Islington Primary Care NHS Trust, London,

²Primary Care Nursing Research Unit, Department of Primary Care & Population Sciences, UCL, London, UK.

Fax: (+44) 207 6360687. e-mail: enrique.sanchez@uclh.org

Background: TB continues rising in England with London diagnosing and treating 40% of the cases. The changing epidemiology of HIV and the association with tuberculosis has impacted on the delivery of healthcare services. London health authorities recommend that all tuberculosis patients are offered HIV testing. Nurse-led case management suggests a pivotal role for specialist nurses regarding HIV-testing offer and recommendation. However, HIV-testing skills and practices of London tuberculosis nurses have not been analysed yet.

Methods: A web-based questionnaire will map the current practical and theoretical skills and training that London tuberculosis nurses have regarding HIV-testing. Relations will be drawn between nurse factors (educational level, experience with infectious diseases and HIV, specific counselling training, years of experience and else) and HIV-testing offering.

Results: It is expected that results will inform policy regarding the HIV-testing training needs of London tuberculosis nurses. The study will be replicated at national scale and results disseminated locally, nationally and internationally.

Conclusion: Tuberculosis nurses have been recognised as fundamental in providing quality, patient-centred care including HIV testing. However, the resources and skills they have for integrating HIV-testing into routine tuberculosis care have not been mapped and analysed, therefore preventing health services from identifying possible gaps.

PS-1743-22 Formation Régionale en Santé en Afrique de l'Ouest (RORESA): une approche novatrice de la formation continue des agents de santé pour l'amélioration de la qualité des soins aux tuberculeux

M Drabo,¹ S Ibrahima,^{1,2} M Ouendo,³ I Sani,⁴ A K Traore,⁵ M S Dembele,⁶ M Berthe,⁷ K M San,⁸ C Dauby,⁹ N Lambion,⁹ J Macq,⁹ B Dujardin.⁹ ¹Institut de Recherche en Sciences de la Santé, Ouagadougou, Burkina Faso; ²ISED, Dakar, Senegal; ³Institut Régional de Santé Publique, Ouidah, Benin; ⁴Département de Santé Publique, Université de Niamey, Niamey, Niger; ⁵CNAM, Bamako, Mali; ⁶PNT, Ouagadougou, Burkina Faso; ⁷PNT, Bamako, Mali; ⁸PNT, Dakar, Senegal; ⁹School of Public Health - Université Libre de Bruxelles, Bruxelles, Belgium. Fax: (+32) 25554049. e-mail: jmacq@ulb.ac.be

Le patient tuberculeux est confronté à des problèmes dont la résolution nécessite des systèmes de santé locaux performants. Nous rapportons une expérience pilote de formation s'appuyant sur le processus de recherche-action dont le thème était 'L'approche centrée sur le patient tuberculeux'. Elle était destinée aux prestataires de soins, aux gestionnaires des systèmes de santé locaux, aux chercheurs des institutions académiques et aux agents de la coopération au développement. Elle a été organisée en 5 différentes étapes: la phase de préparation, le séminaire d'échanges et de formulation des protocoles de recherche, la mise en oeuvre et le suivi des interventions de terrain, le séminaire de restitution et la diffusion des résultats. Le caractère régional de la formation a permis de mieux analyser et capitaliser les résultats des projets, et de mieux comprendre pourquoi certaines interventions ont un plus grand potentiel de réussite que d'autres. Les différents profils et expériences au sein des différentes équipes a créé de nouvelles dynamiques positives et les participants possèdent maintenant une meilleure connaissance des expériences positives ou non de chacun des pays en matière de soins aux tuberculeux.

PS-1894-22 TAES network of nursing of the health sector in Tamaulipas, Mexico

G C Solis. Mycobacteriosis Department, Tamaulipas Health Service Mexico, Ciudad Victoria, Tamaulipas, Mexico. Fax: (+834) 834 31 5 68 83. e-mail: tbtamaulipas@hotmail.com

Was integrated in the first quarter of the 2004. Integrate 445 nurses and 37 related professionals of the sector health.

Mission: To maintain the cover TAES to the 100% of the Tamaulipeca population, involve to the community, diminish the mortality and abandonments to more of a 5% annual, to improve healing to more of 90% besides of obtaining nutritious supports and to promote the humane attention and I try worthy to all the patients with tuberculosis.

Social mobilization: In 2004 8 white flags in priority municipalities were hoisted participating the Network TAES, the jurisdictional coordination, as well

as active participation of civil associations, club rotarios, and not governmental businesses.

Activities for strengthening detection: The medical units of the Secretary of Health and sector health delivers of thermoses hielera for the smear samples transportation.

Fortifying treatment adherence: The network motivates to the Club TAES so that they abandon not its processing and arrive at the healing through food baskets delivery monthly for the patient and its family. As for the family education gives itself and sensibilizability which marked the difference among the success, failure or abandonment of the processing.

Creativity: TB TON, Marathon of food, group AmisTAES, uniform and printed material, recording of song 'Tell me if you have TB', lottery of the tb, letters soup play, play patrols of the bacillus, all this as an amusing and practical way to learn playing. Another activity of education is in the CERESOS where the network benefits the inmates.

DOTS EXPANSION-II

PS-1334-22 Success of tuberculosis control in the SAARC (South Asian Association for Regional Cooperation) region

K K Jha, M M Rahman, R M Piryani. SAARC Tuberculosis Centre, Thimi, Bhaktapur, Nepal, Kathmandu, Nepal. Fax: (+977) 16634369. e-mail: drkkjha@hotmail.com

Introduction: The SAARC region bears disproportionate burden of tuberculosis (TB). To control this disease every Member State has adopted DOTS between 1993 and 1996.

Objective: To highlight the success of DOTS in TB control in SAARC Region.

Methods: Collection and compilation of data received from Member States and review of secondary sources.

Results: DOTS services were accessible to over 70% of the regional population by December 2003. The available data also suggest that by end of 2004 at least 87% of the region's population were covered by DOTS. Overall regional treatment success rate of registered new smear positive TB patients in 2002 was 86%. The quality of diagnosis has been good; however the number of cases detected is still low with only 48% of the estimated new smear positive cases having been detected in 2003.

Conclusion: DOTS strategy is showing a remarkable success in control of TB in the SAARC Region. For the success to continue and to achieve the target of case detection the region must overcome the present challenges such as TB-HIV coinfection, MD-R TB and expansion of DOTS to hard to reach areas maintaining the quality in diagnosis and treatment.

PS-1753-22 Evaluation I study cohort new cases of bacilloscopy positive pulmonary tuberculosis, Dominican Republic, 2000-1er semester 2004

J J Cordero, B Marcelino. National TB Program, Dominican Republic. Fax: (+809) 5413422.
e-mail: programatuberculosisrd@mail.com

Introduction: To treat 85% of the new diagnosed cases is one of the goals of the strategy DOTS. In the year 2000 45.7% of the new cases pulmonary tuberculosis with bacilloscopy positive was recovering and in the year 2002 there expands the strategy DOTS.

Objectives: To evaluate the cohort of new cases of bacilloscopy positive pulmonary tuberculosis during 2000 up to the first semester of 2004.

Methods: There checked the reports of evaluation of cohort of new cases of pulmonary tuberculosis positive bacilloscopías deposited to the PCT during the period 2000 to the first semester of 2004, low agreement scheme of treatment 2RHZE/4RH3 and I analyze the condition of expenditure.

Results: The percentage of treatment (healing) I increase of 45.7% in 2000 77.1% in the first semester of the year 2004 and this owed principally to a decrease in the cases finished from 29.9% to 11% in equal period. The percentage of abandon I diminish from 14.9% to 9.8% in the studied period.

Conclusion: The expansion of the strategy DOTS has contributed When positive bacilloscopy increases the percentage of treatment (healing) in the new cases with pulmonary tuberculosis. The percentage of abandon to the treatment and of the finished cases, they have diminished.

PS-1758-22 Preventing acquired RMP resistance and achieving expanded supervised treatment when universal DOT is not possible

T S Moulding. Harbor UCLA Medical Center, Torrance, California, USA. Fax: (+1) 310-373-4599.
e-mail: tmoulding@earthlink.net

Objective: Isoniazid (INH) and ethambutol (EMB) have been recommended for continuation phase treatment when DOT cannot be given to avoid rifampin (RMP) resistance. Recently, WHO suggested self-administered INH and RMP could be given in the continuation phase, since the IUATLD found this regimen to be superior. To prevent RMP resistance, alternative means of supervising self-administered treatment are needed.

Methods: Two engineers and 4 companies involved in developing electronic compliance monitors that determine when medication is removed from containers were consulted. Ways of using monitors to solve treatment delivery problems in different settings were carefully studied.

Results: Four portable monitors suitable for anti-TB medications with built in displays to provide adher-

ence data without computers have been designed. When mass-produced the estimated cost/reusable device is <\$10.00. These monitors would help clinics and community workers provide more cost effective treatment supervision. Patients with poor adherence records could be managed with counseling, DOT, and extending the treatment duration. Monitors could provide supervision of family DOT, and when used by pharmacies badly needed supervision of private patients.

Conclusion: Companies and engineers working on compliance monitors should be encouraged and supported to create inexpensive monitors suitable for treatment of TB.

PS-1771-22 Implementation of a national program for TB drug quality assurance in Brazil

J Keravec,^{1,2} A L Gemal,² M A Hijjar,³ J R P Santos,⁴ M G Hofmeister,⁵ J B Oliveira,⁶ M C Miranda,² M Lemos,² K M P Menezes,² R F Silva,² T Moore,¹ M G Procopio.³ ¹Projeto MSH/Rational Pharmaceutical Management Plus Program (RPM Plus), Rio de Janeiro, ²Instituto Nacional de Controle de Qualidade em Saúde – Fundação Oswaldo Cruz, Rio de Janeiro, ³Centro de Referência Professor Hélio Fraga- Ministério da Saúde, Rio de Janeiro, ⁴Programa Nacional de Controle da Tuberculose - Ministério da Saúde, Brasília, ⁵Agência Nacional de Vigilância Sanitária - Ministério da Saúde, Brasília, ⁶Departamento de Assistência Farmacêutica - Ministério da Saúde, Brasília, Distrito Federal, Brazil. Fax: (+55) 21 24486805. e-mail: jkeravec@msh.org

Introduction: The National TB Program (PNCT), the National Institute for Health Quality Control (INCQS), the Reference TB Center Professor Helio Fraga (CRPHF), the Pharmacy Department/MoH, and the National Agency for Sanitary Surveillance (Anvisa, Food and Drugs National Regulatory Authority) created a multi-disciplinary working group facilitated by Projeto MSH for investigating the quality of TB drugs frequently questioned by TB and lung physicians.

Methods: For all TB drugs, first and second line, sustainable sampling procedures were established. All tests were performed at the laboratories of the INCQS according to the Brazilian Pharmacopoeia and/or USP standards.

Results: 26 samples representing 8 different drugs and 9 different producers were collected during the first phase. 23 samples analyzed, of which 15 were approved and 8 considered as non-satisfactory. Of these 8 samples, 5 were found with labeling non-conformities, 3 for not meeting product quality standards.

Conclusion: A healthy environment was created where agencies interact with producers for improving drug quality, defining concerted legal actions without risk of creating shortages, and reporting the % of good quality products in the public sector for all stakeholders. A scheme to continuously monitor quality was implemented by decentralizing TB drug quality testing capacity to the state level.

PS-1774-22 Mainstreaming DOTS-Plus to DOTS: when is culture indicated in DOTS?

M I D Quelapio, C Auer, R Orillaza, N Mira, V Belen, G Egos, T E Tupasi. Tropical Disease Foundation, Makati City, Philippines. Fax: (+632) 8889044. e-mail: mameldquelapio@tdf.org.ph

Background: Mainstreaming DOTS-Plus to DOTS is planned in the DOTS-Plus pilot project in the Philippines.

Objective and Method: Treatment outcome and DST of smear-positive patients whose sputum failed to convert to negative (non-converters) at month two or three of treatment were analyzed to determine whether this non-conversion could be an early predictor for failure or MDR-TB. A retrospective review of the 1999–2003 TB Registers was done.

Results: There were 36 (20%) non-converters among 181 new cases and 22 (10%) of 226 previously treated patients. Treatment success was noted in 32 (88.9%) of the former, failure 1 (2.8%), death 1 (2.8%), default 1 (2.8%), and 1 (2.8%) MDRTB and shifted to DOTS-Plus before month 5. Four (18%) of 22 previously treated were treatment success, 4 (18%) failure, 1 (5%) transfer out, 2 (9%) default (one was MDRTB), and 11 (50%) MDR-TB and shifted to DOTS-Plus. All treatment failures were MDR-TB.

Conclusion: Smear non-conversion to negative after 3 months treatment was an early predictor of failure and/or MDR-TB in previously treated patients. Sputum culture could be done in these patients for early mainstreaming of DOTS-Plus into DOTS. A larger cohort is needed to validate the programmatic implication of this finding.

PS-1854-22 Expansion of the DOTS strategy for tuberculosis control in the Dominican Republic

B Marcelino, A Rodriguez. National TB Program, Distrito Nacional, Dominican Republic. Fax: (+809) 5413422. e-mail: belkys_tb@yahoo.es

Introduction: Dominican Republic is included between (among) 10 countries of The Americas by TB's major load, his (her, your) control is a priority for the authorities. A year 2000, 9% of the population was covered by DOTS; in 2002 the expansion begins, with a percentage of treatment (healing) 60% there being detected 48% of the awaited cases, 2003 66% (791) and 2004 77% (925) of the establishments of health was applying DOTS with a coverage of population in 75%.

Objectives: To measure the advances achieved in the Expansion of the DOTS.

Methods: There was analyzed information given by the System of Information of the PNCT comparing the information before and after initiating the expansion DOTS.

Results: 75% of the population at the end of 2004 was covered under the strategy DOTS; the symptomatic identified respiratory ones increased from 27 856 (2002) to 54 695 (2004) examining 67% (2002) and 88% (2004), managing to detect 61% of the awaited cases. The percentage of treatment (healing) of new cases I increase from 60% (2002) to 77% in the first semester of 2004.

Conclusion: With the expansion DOTS one expects to reach for 2005 the goals WHO of treating 85% of the new cases and detecting 70% of the awaited ones.

PS-2013-22 Analysis of the relationship between TB case detection and DOTS coverage in China

J J Liu, H Y Yao, S W Jiang, X I N Du. National Center for Tuberculosis Control, China CDC, Beijing, China. Fax: (+86) 10 63167543. e-mail: liujj@chinatb.org

Objectives: To analyze influencing factors of TB case detection and predict the case detection trend in 2005.

Methods: Describe the trend of new smear-positive TB case registration rate and DOTS coverage from 1996 to 2003 and analyze correlative relationship between them. Regression equation was built to predict the case registration rate in 2005.

Results: The case registration rate and case detection rate showed an increasing trend from 1996 to 1998 and kept a platform between 1999 and 2002, followed by a zooming change in 2003. Smear-positive TB case registration rate and DOTS coverage showed a high correlative relationship ($r = 0.849$, $P = 0.008$). The regression equation is: $y = b_0 + b_1 X = 1.754 + 0.217X$, (95%CI $\beta: 0.082-0.352$), $F = 15.43$, $P = 0.008$, $R^2 = 0.72$. When the DOTS coverage rate reach 100% in 2005, the national new smear-positive registration rate will be 23.5/100 000 (95%CI 10.0–37.0/100 000) and the national new smear-positive case detection rate will reach to 51.8% (95%CI 22.0–81.5%).

Conclusion: Not only the expansion of DOTS could promote the TB case detection but also the quality of DOTS plays a more important role in TB control. Thereby, to realize the TB case detection rate of 70% in 2005, besides accelerating the DOTS expansion to increase DOTS coverage, we should still pay more attentions to the DOTS quality and other control measures.

PS-2027-22 Enhancing governance to improve access to tuberculosis services in Western Kenya

N J O Otwoma,¹ E O N Nyambedha,² A O K Kombo,³ P O O Ofware,¹ P O O Otieno.¹ ¹Multifaceted Development and Research Institute, Research and Dissemination Division, Kisumu, Nyanza, ²Maseno University, Kisumu, Nyanza, ³African Medical and Research Foundation, Nairobi, Nairobi, Kenya. Fax: (+254) 05722902. e-mail: otwomatom@yahoo.com

Governance and equity have been suggested as two crucial factors that determine health outcomes in resource limited settings. We proposed to identify and strengthen health facility management structures and community social support networks for improved equity in access to directly observed short therapy in western Kenya. We intervene both at the community and the health facility level focusing on health management boards and existing social support networks. Based on quasi-experimental design, five districts were selected and assigned different arms of the intervention taking into account confounding factors such as differences in income levels, closeness to the fish landing beaches and select demographic factors that could blur the observation of certain evaluations. Both qualitative and quantitative information has been documented. There is clear evidence of enhanced collaboration, linkages and partnerships between community and facility-based health care providers. This improves equity in access to tuberculosis through a working community owned DOTS program. The capacity of community own resource persons has been enhanced and facility based professionals skills enhanced thereby forming the basis for effective TB early-case finding, treatment and management. Results from this intervention could inform policy formulation in the area of TB control.

PS-2052-22 DOTS strategy in Central-West Region, Brazil, 1998–2001

A de Albuquerque Gomes, E M Hamann, J Laguardia, R R Cruz. PAHO/OMS/Brazil, Brasilia, DF, Brazil. Fax: (+55 61) 426 9591. e-mail: ademir@bra.ops-oms.org

Introduction: DOTS strategy was implemented in 1998 in Central-West Region as a pilot area which includes 27 municipalities considered of priority for tuberculosis. This area is responsible for almost 75% of all cases of tuberculosis in this region.

Methodology: Exclusively new cases of tuberculosis BK+ notified from 1998 to 2001. It was recommended to make the supervision of the intake of the medication from Monday to Friday in the first phase of treatment and at least once a week at the second phase. The same regime 2RHZ/4RH and daily routine of the services recommended by the Ministry of Health was adopted. From 3,544 new BK+ cases, 644 (18.2%) made the supervised treatment and 2,900 (81.8%) self-administered.

Results: From the total of 3,544 cases the age varied from 15 to 97 years (average = 39.1; standard deviation = 16.1; median = 36.0). On average were realized about two and three bacilloscopies to follow-up the treatment (average = 2.5; standard deviation = 1.73; median = 3.0) From 644 patients on supervised treatment 84.5% were cured and 94.7% were success of treatment. It was not registered failure of the treatment. From 2,900 patients with self-administered treatment 56.6% were cured and 69.7% were success of treatment.

Conclusion: The DOTS strategy showed its effectiveness in all the variants versus non DOTS.

PS-2080-22 Incentives for DOT adherence: experience of the tuberculosis control program in Sao Paulo City, Brazil, 2004

V L B Hiratani, S M Figueiredo, N K Komatsu, N Goldgrub, M T Maia. Diseases Control Center, Tuberculosis Team, Health Secretariat, São Paulo, Brazil. Fax: (+55) 11 3350 6740. e-mail: vhiratani@prefeitura.sp.gov.br

Introduction: Sao Paulo city had 6858 new TB cases (all clinical forms): incidence rate of 64.21/100 000 inhabitants in 2004. Cure and default rates were 60.92% and 11.83% respectively. WHO's recommendation of DOTS implementation to increase cure rates is supported by the distribution of incentives: transportation tickets, food basket and snacks after medication intake.

Objectives: A. To describe the incentives distribution experience in Sao Paulo city; B. To compare DOT adherence in 2003 vs. 2004; C. To compare cure and default rates between DOT and NON-DOT patients in 2004.

Methods: Food basket distribution monitoring by checking and correlating with database system tuberculosis data and data consolidation from 31 regions of Sao Paulo city.

Results and conclusions: 1. Free basket of basic foods distribution to DOT patients resulted in an important increase of adherence in 2004 (27.24%) vs. 2003 (12.60%). 2. Different adherence results were seen across the city: Pinheiros (wealthy region) vs. Campo Limpo (poor region) DOT coverage was 1.4% and 90.67%, respectively. 3. DOT patients cure rate was 69.12% while NON-DOT patients cure rate was 43.28%.

PS-2110-22 The Nigerian DOTS expansion experience and the challenges of meeting the global targets for TB control

K Samson,¹ M Kabir.² ¹WHO, Bauchi, Bauchi State; ²National Tuberculosis Programme, Abuja, FCT, Nigeria. Fax: (+234) 77541873. e-mail: samsonkefas@hotmail.com

Nigeria has an estimated population of 130m people and ranks 4th among the 22 highest TB burden countries of the world. A National Tuberculosis Control programme has been operational since 1991. WHO

estimates about 380 000 (293/100 000 population) all forms of TB occurring in Nigeria annually. The TB-HIV co-infection rate rose from 2% in 1992 to 19.1% in 2001 and an estimated 1.7% MDR rate. From July 2002 to date, DOTS expansion increased DOTS coverage by state from 58% to 100%, and from 58% to 65% by LGA. This translates to increased DOTS population access from about 45% in 2002 to about 65% by end of 2004. Expansion of services to states hitherto without DOTS was responsible for a substantial increase in TB Case Detection Rate (CDR) since the DOTS expansion commenced (CDR 16% in 2002 to 23% in 2003; and 26% in 2004 equivalent to about 60% increase between 2002–2004). The 16 DOTS-expansion states contributed 41% of total case notification and 40% smear positive case detection, with Lagos State alone contributing a substantial part. In contrast, the CDR in previously supported DOTS maintenance states has remained largely unchanged. This paper attempts to illustrate graphically the impact of the DOTS expansion strategy implementation on the TB case detection vis-a-vis the past and challenges for the future. The Nigerian experience has demonstrated that increasing population access to DOTS has direct positive influence on TB case detection. It is unclear to what extent inadequate access to DOTS account for the gross difference between the country's CDR and the WHO estimates.

PS-2181-22 Building a national tuberculosis control program in Kosovo: a post-war success story

B Tigani,¹ X H Kurhasani,² G Zhuri,³ R Mehmeti,² D Cirillo,⁴ M Salfinger,⁵ L Ditiu,⁶ A Dev,⁷ L V Adams,⁸ G B Migliori.⁹

¹Kosovo TB Control Program, Prishtina, ²Doctors of the World-USA, Prishtina, ³Clinic for Lung Diseases, Prishtina, Kosovo; ⁴Emerging Bacterial Unit, San Raffaele Hospital, Milan, Italy; ⁵Wadsworth Center, NY State Department of Health, Albany, New York, USA; ⁶TB Medical Officer, World Health Organization, Bucharest, Romania; ⁷Doctors of the World-USA, New York, New York, USA; ⁸Section of Infectious Disease and International Health, Dept of Medicine, Dartmouth Medical School, Hanover, New Hampshire, USA; ⁹WHO Collaborating Centre for TB and Lung Diseases, Fondazione S. Maugeri, Tradate, Italy. Fax: (+381) 38245797. e-mail: btigani2000@yahoo.com

Introduction: Following the 1999 war, Kosovo rebuilt its health care system and infrastructure, including establishing a DOTS-based national TB control program (NTP).

Methods: Doctors of the World-USA, an American non-governmental organization, led the process in close collaboration with the NTP: identifying and equipping facilities, training clinical and laboratory staff, and establishing a laboratory network, a recording-reporting and a drug management system.

Results: Eleven dispensaries and eight microscopy laboratories were established to increase coverage. The

TB Technical Commission was formed to guide the NTP. The 2000–2005 TB Action Plan was drafted and international funding obtained through inter-agency collaboration. Training in DOTS and laboratory techniques was conducted. Due to Kosovo's transitional status, DOW provided long-term management support and technical assistance to the NTP. Between 2001 and 2004, TB case notifications decreased by 40% (from 1674 to 1009). Between 2001 and 2003, decreases occurred in the TB death rate (78%), defaulters (13%) and retreatment cases (33%). Treatment success rates have remained high since the initiation of the NTP.

Conclusion: Amid a complicated political backdrop, the re-establishment of the Kosovar NTP and inter-agency collaboration are success stories emerging from Kosovo. Kosovo's example may have implications for post-war transitional settings such as Afghanistan and Iraq.

PS-2223-22 DOTS strategy impact in the Americas Region

C V Montero, P Ramon-Pardo, M Granado, R Rodriguez, E Echegaray, V Jacquet. Regional Tuberculosis Program - PAHO, Washington, DC, USA. Fax: (+211) 202 9743656. e-mail: monteroc@paho.org

Introduction: DOTS expansion has been started in the Americas in 1994. Since this year, the strategy has been progressively expanded up to 78% of population coverage in 2003. The decrease of TB incidence during this decade and the TB operational indicators towards the Millennium Developing Goals are in process of assessment.

Objective: To quantify the possible impact of DOTS strategy in the Americas, considering the TB incidence, detection and success rates.

Methodology: Epidemiological and operational data were collected from the National Tuberculosis Programs, from 1994 to 2004 (WHO collection forms). Statistical analysis was done with EPI DATA EG.

Results: From 1994 to 2003, all TB cases incidence decreased from 31.5 to 26 cases / 100 000 pop; incidence rate ratio = 0.346 (CI 95% 0.344–0.348), $P < 0.0000$. Sputum smear positive cases incidence also decreased from 18.53 to 14 cases / 100 000 pop; incidence rate ratio = 0.521 (CI 95% 0.517–0.525), $P < 0.0000$. Under DOTS, success rate has increased from 71% (1993-cohort) to 81% (2002-cohort) and detection rate increased from 21% in 1995 to 50% in 2003.

Conclusion: The decrease of the TB incidence and the improvement of the success and case detection rates in the Americas can be considered as consequence of DOTS implementation.

PS-2239-22 Mesure de la qualité dans l'interaction entre prestataire et patient tuberculeux

J L Abena Foe. Douala, Cameroon. Fax: (+237) 2214435.
e-mail: jlabena@iatld.org

Après la confirmation du diagnostic de la tuberculose, l'entretien avec le responsable du traitement est une étape capitale dans la prise en charge du patient. Dans le PNT il n'existe pas d'outil standard pour la mesure de la qualité de l'interaction patient /prestataire.

Objectif : Valider la méthode RIAS pour mesurer la qualité de l'interaction patient- responsable du traitement dans les CDT.

Devis d'étude : Etude prospective utilisant l'observation et l'enregistrement des entretiens patients prestataires dans les CDT de Jamot, Mvolyé et CPP Akwa. 50 interviews à enregistrer.

Méthode : L'interaction patient /prestataire est mesurée par la méthode RIAS (Roter Interaction Analysis System).¹

Résultats attendus : Amélioration de la communication patient prestataire. Sur la base de l'analyse du manuel du PNT et des données collectées, un guide d'entretien standard se proposé afin de minimiser les éventuelles lacunes dans la communication.

Conclusion : L'interaction patient/prestataire de soins doit être mesurée objectivement pour améliorer l'observance du traitement et la prise en charge du patient.

¹ Roter D, Larson S. The Roter interaction analysis system (RIAS): utility and flexibility for analysis of medical interactions. Patient Educ Couns 2002; 46(4):243-251.

PS-2264-22 Challenges of implementing TB DOTS in the setting of health reforms: the Zambian experience

L M Kafwabulula. Ministry of Health, Lusaka, Zambia.
Fax: (+260) 1253173. e-mail: mwape77@yahoo.com

Setting: NTP, Zambia.

Method: Zambia had a TB programme that was running very effectively until 1992 when the health reforms were introduced. The result was that Zambian TB programme collapsed due to over-integration. The years following, 1997-1999, no reports were shared with the international community. In 2000, a National TB Review was held which recommended that a Focal person be recruited at the Central Unit to revamp the TB programme.

Result: The Zambia TB programme began sending reports to World Health Organization and the DOTS coverage has reached 81% for all forms of TB. It has been shown that there is need to have a strong vertical structure at the Central and Provincial level to provide leadership in order to have a functional TB programme. Over horizontalisation only leads to over-recruitment of support at the expense of core

staff that are providing health services. Lessons from Zambia wish to remind the international community that systems of over integration are good but may be impossible to implement. Zambia provides that model.
Conclusion: There is a way in which the Zambian model is now wishing to share its experience with the rest of the world on the lack of feasibility of health reforms.

PS-2307-22 Increasing case-detection in poverty and remote areas of Gansu Province: collection of sputa at village level and active suspect identification

S Jiang, X Q Liu, X J Wang, H D Wang, H C Xu, Q Lu, J J Liu.
National Centre for TB Control and Prevention, China CDC, Beijing, China. e-mail: jiangsw@chinatb.org

Background: According to WHO, China had a case-detection rate of 36% and a DOTS detection rate of 33% for new smear-positive cases in 2000. In the 2000 National TB Prevalence Survey, 43% of the prevalent TB cases actually had not been diagnosed. Gansu is one of Chinese western provinces with a total area 454 000 square kilometers. Its overall population is 26 million among which rural population is 74%, and 63.8% of total population living in poverty. The registration rate of new SS+ cases was only 15/100 000 population⁷. The project was implemented in 51 counties located in the poverty and remote areas with highland and Gobi.

Objectives: To identify the innovative approach to increase case-detection in poverty and remote areas according to the local characteristic.

Methods: The sputa from TB suspects were collected and transported to the township hospital/clinic by the village doctors, and the trained laboratory staff in township level made the sputum smears and transported them to the county level for reading. The TB patients detected would be treated with DOT by NTP.

Results: There were 4592 new cases with smear positive detected from 31055 TB suspects with smear made at the township level in one project year, occupying 55.9% of all new SS+ cases. Compared with 4242 new SS+ cases detected in the previous year, it increased 93.6% additionally in the project year. The proportion of TB patients with limited access to health service was 79.6% within all the new SS+ cases detected, furthermore, it was 89.7% and 68.5% respectively within all the new SS+ cases detected by smears made at township level and diagnosed directly at county level. It was the positive correlation between the number of TB suspects and the number of new SS+ cases detected in every county. The sputa conversion rate with two months was 96.3% among 8121 new SS+ cases registered, and the cured rate was 94.8% by the cohort analysis of 2685 new SS+ cases registered in the first quarter.

Conclusion: The approach was easily operational, feasible and effective. It directly supplied health service for the patients with limited access to health service in the remote areas, and increased the case-detection rate.

TUBERCULOSIS CONTROL IN SPECIAL POPULATIONS AND INSTITUTIONS

PS-1222-22 Organization of TB care in penitentiary units of Russia

A S Kononets, S V Sidorova, S G Afonova. Medical Department, Federal Service of Corrections, Moscow, Russian Federation. Fax: (+7 95) 2002504. e-mail: oksana@pih.ru

Currently more than 50 000 TB patients are incarcerated in the Russian penitentiary system. We realize that the rise of TB prevalence can only be stopped by creating a modern TB control and prevention system using new technologies in medicine, pharmacology and laboratory diagnostics. Collaboration between TB facilities and international organizations encourages integration with regional health institutions. Target allocations of funds for TB control allowed to improve drug procurement and initiate diagnostic re-equipment of TB facilities. Decrease of TB incidence and mortality rates for the last five years is encouraging. In 2003, TB incidence declined 2.3 times and mortality - 3.7 times. High prevalence of polyresistant TB became a major threat. Primary drug resistance for the last three years is stable. In 2004 primary drug resistance was 49% and MDR-TB - 15%. Acquired drug resistance was 62% and MDR-TB - 49%. At the end of 2003 several facilities of the penitentiary system initiated MDR-TB treatment. The preliminary results show sufficient effectiveness. Treatment of drug resistance requires specialized wards, trained specialists, sufficient stock of second line drugs and ancillary medicines. A loan from the International Bank for Reconstruction and Development will become a supplementary financial aid to expand control, prevention and treatment of MDR-TB.

PS-1455-22 TB in slums: reaching the unreachable

S Bandyopadhyay. German Leprosy & TB Relief Association, Kolkata, West Bengal, India. Fax: (+91) 3322164339. e-mail: SudhakarB@glra-ales-india.org

Introduction: Tuberculosis in Urban slums in developing and underdeveloped countries is a major problem area of TB Control program relating to occurrence, detection, morbidity, transmission, dropout and death leading to socio-economic implications and vicious cycle. For occupational reasons, a vast popula-

tion remains unreachable while occupation-specific health communication and service delivery system has not been developed. The analysis of Kolkata slums covering 100 000 population has been presented and suggestions accorded emphasizing the strategy to reach the unreachable.

Objectives: To provide the need, significance and effect of identification of unreachable Population, group/occupation-specific communication and client-friendly service-delivery to achieve program goal.

Methods: A Socio-economic and service-outreach analysis considering the occupation-factor reveals that around 70% population with varied working hours can't access to the existing services who were identified along with the strategy modification inputs.

Results: The main unreachable groups are daily labourers, maidservants, salesmen & Hawkers, rickshaw pullers, drivers and sex workers. Modified Program planning and service approach would ensure total coverage, quality enhancement and check in transmission.

Conclusion: Development of Group/occupation-specific and need-based communication strategy considering the daily-life-culture, language and service-outreach with time, place and proximity has been suggested including Evening-DOTS involving the existing NGOs and local service network.

PS-1481-22 Rapid assessment for TB control in the elderly persons in rural areas of Siem Reap Province, Cambodia

K Kimsan,¹ S Saly,² S S Rith,² K S Try,³ S Thim,⁴ K Okada.⁵

¹Cambodia Anti-Tuberculosis Association, Phnom Penh,

²National Center for Tuberculosis and Leprosy Control, Phnom Penh, ³Siem Reap TB Control Program, Siem Reap Province, ⁴Cambodian Health Committee, Phnom Penh,

⁵Japan International Cooperation Agency (JICA) National TB Control Project, Phnom Penh, Cambodia.

Fax: (+855) 23218090. e-mail: kimsankong@yahoo.com

Background: National TB prevalence survey 2002 showed that TB smear (+) in elderly was higher than another age group (3.2 times).

Objective: To have basic information related to TB in elderly in order to introduce TB control for special age group in an impoverished rural setting.

Methods: 20% of villages were selected. Family books were used to get number of existing people aged ≥55 years and 1 in 3 was selected for interviewing.

Results: 4.7% (348) out of 7371 were elderly. Death rate among elderly is 7% annually. Causes of death due to respiratory illnesses like TB was 42%. Illnesses like TB described by the respondents was 64%. TB proven cases was 9%. 13% of respiratory symptoms were diagnosed as TB. Only 28% visited health centers (HC) in the last 2 years. 96% preferred private health care services plus traditional medicines and commonly self-medication. It was 55% who answered

'no comment or don't know' about activities in HC. 60% expressed 'unaffordable travel cost' to HC.

Conclusion: Result demonstrated that TB problem among elderly was lightly addressed. It is dangerous for those children to hang around if old people have active TB. Special attention and actions must promptly be made.

PS-1654-22 Economic analysis of the implications of BCG discontinuation in the Canadian First Nations population

M E Lem,¹ I Zverev,² D Harvey,³ D Tardif,¹ E Ellis.⁴

¹Communicable Disease Control Div., First Nations and Inuit Health Branch, Health Canada, Ottawa, ²Applied Research and Analysis Div., Information, Analysis and Connectivity Branch, Health Canada, Ottawa, ³Dan Harvey Associates, Ottawa, ⁴TB Prevention and Control, Community Acquired Infections Div., Public Health Agency of Canada, Ottawa, Ontario, Canada. Fax: (+1 613) 948 9254. e-mail: marcus_lem@hc-sc.gc.ca

Objectives: The objective of this study was to evaluate strategies for bacille Calmette-Guérin (BCG) vaccine discontinuation in the Canadian First Nations population in terms of costs and morbidity.

Methodology: Markov models were created for three alternative tuberculosis (TB) containment strategies: (1) universal BCG, school age Mantoux test screening (ages 6 and 11 years) and treatment (of latent TB infection); (2) no BCG and no active screening; and (3) no BCG and enhanced pre-school screening (ages 2, 3, 4, 5, 6 and 11 years) and treatment. The models were implemented for an eleven-year period and outcomes and costs calculated.

Results: Enhanced pre-school TB screening is the most expensive strategy; however it is expected to result in the lowest number of active and latent TB cases, as well as deaths. A strategy of universal BCG and school age screening is expected to result in fewer latent and active cases than a strategy of no active screening, but the total number of expected deaths is higher due to BCG-associated adverse events.

Conclusions: Enhanced pre-school TB screening is a more expensive strategy than universal BCG and school-age screening, but is predicted to decrease latent and active TB cases and deaths.

PS-1664-22 Tuberculosis in urban slums—approach to identify and minimize defaulters during DOTS

D G Jain. German Leprosy and TB Relief Association—India, Mumbai, Maharashtra, India. Fax: (+91) 22 26487813. e-mail: dineshjaindr@yahoo.co.in

Introduction: In disease burden countries like India, poverty, lack of knowledge, health seeking behavior, negligence by health staff are major problems faced by poor TB patients dwelling in urban slums. This

often results in treatment dropouts, defaulters and drug-resistant cases.

Objective: To minimize number of defaulters by offering needy slum TB patients comprehensive care during DOTS.

Materials and methods: Regularity of 630 patients attending 7 DOTS clinics in urban slums of Maharashtra, India, was studied. Patients missing drug doses consistently were considered as high risk group, likely to default. This group was interviewed and assessed to find reasons for irregularity.

Common findings were: Poverty lack of food—unable to tolerate medicines; timing, proximity of DOTS clinics; improvement in symptoms; social stigma.

Intervention: Counselling, need based support was offered to irregular patients by simple cost effective methods, for temporary period.

Results: This approach led to marked improvement in treatment compliance and outcome.

Conclusion: Supportive interventions like Nutrition, Counselling, Motivation, proper timing of DOTS clinics are urgent interventions required for needy patients so as to achieve treatment success, minimize Defaulters and prevent drug resistance.

PS-1737-22 Evidence of marked improvement in follow-up treatment of newly released prisoners with active TB in St-Petersburg, Russia

K Khoshnood,¹ V F Zhemkov,² J V Granskaya,^{3,4} E A Vdovechenko,^{3,5} M V Zhemkova,^{2,3} L R Shpakovskaya,² A P Kozlov.^{3,4} ¹Yale School of Public Health, New Haven, Connecticut, USA; ²City TB Center, St. Petersburg, Leningrad, ³Biomedical Center, St. Petersburg, Leningrad, ⁴St. Petersburg State University, St. Petersburg, Leningrad, ⁵Medical Department - GUIN, St. Petersburg, Leningrad, Russian Federation. Fax: (+1) 203-785-3260. e-mail: kaveh.khoshnood@yale.edu

Background: In a study conducted in 2003–4, our team established that post-release treatment for prisoners with active TB in St. Petersburg was 28% (21/80). In May 2004, we established a new program at Central TB dispensary that offered free food, legal and other services to released prisoners with TB. Center staff visited TB wards of all prisons and informed soon-to-be released prisoners (STBRP) about the program.

Results: In the period May 2004 to March 2005, 44 prisoners with active TB were released from St. Petersburg prisons (26 residents of St. Petersburg). 32 prisoners (all men, average age 31) contacted our center since May 2004. These included both newly released prisoners and already released prisoners who learned of our center after their release from our staff or by word of mouth. 21 (66%) selected to receive treatment at our center and 11 (34%) opted to receive treatment at other TB dispensaries near their residence. All 32 received food packets, and 10 (31%) also received legal services.

Conclusion: There is evidence of a marked improvement in post-release follow up TB treatment among released prisoners by contacting STBRP with TB and offering them modest incentives.

PS-1775-22 TB in prison hospital in Belgrade in 2002

R Curcic,¹ B Savic,² G Stefanovic,³ D J Komazec.⁴

¹Department of Epidemiology, Municipal Institute for Lung Disease and Protection Against TB, Belgrade, ²Institute of Microbiology, School of Medicine, University of Belgrade, Belgrade, Serbia, ³Department of Microbiology, Institute for Pulmonary Disease, Clinical Center of Serbia, Belgrade, ⁴Prison Hospital, Belgrade, Serbia and Montenegro.

Fax: (+381) 112411348. e-mail: atdbgd@eunet.yu

In Serbia, the first data about TB in prisons were obtained for the year 2002. In 2002, 2820 TB cases were notified in Serbia (incidence rate 37.6). Officially, all TB patients from all prisons in Serbia have been treated in Central Prison Hospital in Belgrade. 41 cases of TB were reported. Incidence rate was 683. 38 were pulmonary-22 of them were new and 16 cases with unknown previous history. Bacteriological investigations for patient from Prison Hospital was done at Laboratory of Institute for Pulmonary diseases of Clinical Center of Serbia. Based on hospital data, 29 of all TB cases were bacteriologically confirmed (76%) but if we look at laboratory registrar, only 16 patients from Prison Hospital had positive culture results (42%). It is necessary to include Prison hospital in civilian recording and reporting system in order to have reliable data and introduce an action according to them.

PS-1910-22 DOTS strategy outcomes in Tamaulipas, Mexico jails, 1998–2004

G C Solis. Mycobacteriosis Department, Tamaulipas Health Service, Victoria, Tamaulipas, Mexico.

Fax: (+52 834) 834 31 5 68 83.

e-mail: tbtamaulipas@hotmail.com

There are 13 jails (Centros de Readaptación Social, CERESOS) in Tamaulipas. These jails take care of an average population of 10 000 prisoners per year. Inmates yearly turn over is 20%. The ratio of men to women is 9 to 1. Tuberculosis education, detection and supervised treatment has been taking place since 1998 in Tamaulipas jails. On June 1, 2001, the state health services coordination program in CERESOS was formally initiated. This program follows the protocols established by the Secretary of Health. In March 2002, the state TB Prevention and Control Program staff participated, together with other priority health programs, in a training organized for all jail medical services personnel for the 13 CERESOS. The 152 participants included physicians, nurses, psychologists, odontologists, and social workers. The table below shows cohort outcomes of diagnosed cases in jails from January 2000 to February 2005.

| Year | N of Patients | Cured | Failure | Abandonment | Deaths | Transfer | On Tx | Efficiency (%) |
|-------|---------------|-------|---------|-------------|--------|----------|-------|----------------|
| 2000 | 82 | 64 | 5 | 7 | 1 | 5 | 0 | 78 |
| 2001 | 70 | 51 | 5 | 7 | 4 | 3 | 0 | 73 |
| 2002 | 87 | 66 | 2 | 10 | 5 | 4 | 0 | 76 |
| 2003 | 72 | 58 | 1 | 2 | 4 | 7 | 0 | 81 |
| 2004 | 57 | 36 | 0 | 3 | 0 | 3 | 15 | 86 |
| 2005 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 100 |
| Total | 305 | 275 | 13 | 29 | 14 | 22 | 15 | 90 |

For a total of 305 cases, 90% were cured, corresponding to 95% treatment efficacy.

PS-1922-22 DOTS in complex emergency situation: Somalia experience

A Munim, I Betelmal. ¹WHO Somalia, Nairobi, Kenya.

Fax: (+254) 20623200. e-mail: aaiydmunim@yahoo.com

Somalia has a high incidence rate of TB, the estimated incidence rate of all TB cases 324/100 000 population while the incidence of Smear positive cases is 162/100 000 population. Every year about 21 000 people are estimated to develop TB in Somalia, 80% of the cases occur in the productive age group (15–44 years). TB is therefore an important public health problem. Given the importance of TB in the community, WHO, and partners mainly Health Authorities, WFP, and NGOs have given priority to TB Control. The TB Program started implementing DOTS in 1995, and achieved the Regional targets of DOTS ALL OVER in 2000, based on the presence of at least one TB center in each of 18 regions of Somalia. However, the presence of vast regions with the nomadic lifestyle of Somalis may contribute to the inaccessibility of these centers, therefore expansion of the TB centers to have more than one center in the big regions/towns are expected to contribute to improving the case detection rate. 'In 2004 11 775 cases were notified in NTP/MOH health facilities working under DOTS, of which 6479 were smear positive new cases. DOTS case detection rate was 60% in 2004. Treatment success rate was 90% in 2003. To accomplish the national target (70% case detection rate in 2007), and to maintain the achieved target of the treatment success rate (currently over 89%) the NTP is trying to involve all possible Partners including other health care providers (DOTS comprehensiveness). Progress is made in the private sector where MoH/WHO organized in Nov. 2002 a meeting for about 50 private practitioners and at end of the meeting it was agreed that there should be collaboration.

PS-2023-22 Management and improvement of tuberculosis services in community hospitals along Thailand–Myanmar and Thailand–Cambodia border areas

P Khortwong,¹ S Jittimane,¹ S Nateniyom,¹ P Akarasewi.²

¹Bureau of AIDS, TB and STIs, Department of Disease Control, Ministry of Public Health, Nonthaburi Province, ²The Principal Recipient Office-GFATM, Department of Disease Control, Ministry of Public Health, Nonthaburi Province, Thailand.
Fax: (+662) 5903313. e-mail: pornsakk@health.moph.go.th

Tuberculosis (TB) becomes a major health problem associated with HIV epidemic, poor compliance, high mortality and risk of drug resistance. The dramatic burden increases tremendously threaten all community levels especially in the border areas where highly mobile and migrant population. This study was a descriptive cross-sectional study of border community hospitals along Thailand–Myanmar, Thailand–Cambodia border areas supported by the Principal Recipient Office-GFATM. Data were collected during 2004, using a checklist and questionnaire, report and record, monitoring and evaluation, a provincial and district statistics for 2003–2004. Of the 32 community hospitals along the both borders, 28 districts significantly managed and registered TB patients in terms of TB screening, detection and treatment, DOTS services by outreach workers or front liners, referral and co-operation with local NGOs. Reportedly, 30–60 TB cases were received treatment in each setting. Detection rate was increased 20–30%, Cure rate was reported 65–70% for Thai and 20–50% for non-Thai through the border. This border-wide programme was an opportunity to manage and integrate the collaboration, attention to DOTS services in the border community hospitals. An improvement of TB case management, health education, counseling, motivation, supervision of DOTS workers and implementation of HIV-TB care are needed to improve this programme.

PS-2191-22 Tuberculosis long term hospitalization: hospital discharge monitoring

V M N Galesi, N Goldgrub. Tuberculosis Division, Health Secretary São Paulo-Brasil, São Paulo, Brazil.
Fax: (+55) 11 30822772. e-mail: veragalesi@uol.com.br

Introduction: Tuberculosis treatment in São Paulo State, Brazil is mainly ambulatorial and under DOT strategy. A number of cases require long term hospitalization for social reasons. In 2003, 64 homeless patients were hospitalized, with a 62% cure rate.

High defaulting and death rates during hospital stay, and end-treatment low cure rates motivated hospital discharges monitoring.

Objective: Hospital discharge monitoring of tuberculosis patients during 2004.

Methods: A database was built monitoring hospital discharge from 6 State Hospitals.

Results: The 500 patients evaluated yielded the following results: 381 (76.2%) were cured, 1.4% defaulted, 14.2% were referred to ambulatorial treatment, 5% died and 3.2% had miscellaneous results.

From the total studied, 22.8% (114) were homeless, well above the previous year's value, and activities favoring a 6 months treatment period were provided. They remained hospitalized during the entire treatment period, with a 90.4% cure rate.

Conclusions: Hospital discharge monitoring showed that hospitalization during the whole treatment, providing healthier life conditions is a good solution to improve cure rate of socially excluded tuberculosis patients.

PS-2214-22 Tuberculosis profile in homeless people in Sao Paulo State

N Goldgrub, M L V Oliveira. Secretary of Health, São Paulo State, Brazil, São Paulo, Brazil. Fax: (+55 11) 30822772.
e-mail: nechagg@hotmail.com

Introduction: The SPS registered 19951 TB new cases during 2003, despite of being the highest socio-economically developed and most populated (38 709 339 inhabitants) state in the country. In the study period, 20 500 homeless people—concentrating in the larger cities of the state, approximately half of which in São Paulo City, and showing a growth trend—were recorded, representing 0.05% of the entire state population. Higher TB incidence, more advanced and severe complications, increase hospital and other health service demands.

Objective: To delineate the tuberculosis profile of the homeless population based on the ESC information system.

Method: Analysis of EPI-TB 2003 database.

Results: A total of 257 (1.5%) of TB new cases were notified in 2003, with the following distribution: 233 (90.7%) male adults between 20–40 age-group, 162 (63%) smear positives; 107 (45.3%) cures, 58 (24.5%) defaults, 31 (13.2%) transfers, 30 (12.7%) TB deaths, and 10 (4.3%) Non-TB deaths. During treatment, 169 (65%) were hospitalized.

Conclusion: Representing 0.05% of the state population, homeless TB patients overburden the hospital network and health system requiring TB Control Program improvements in this population share.

PS-2224-22 TB screening in prisoners, São Paulo State, Brazil

L A R Santos, V M N Galesi, C V Montero. Secretary of Health, São Paulo State, Brazil, São Paulo, Brazil.
Fax: (+55 11) 30822772. e-mail: lasantos@cve.saude.sp.gov.br

As in other countries, TB control in prisons is a difficult task in Brazil. To improve TB detection, active case-finding was implemented at a network of 115 prisons in São Paulo, a State with almost 100 000 pris-

oners. Together with health surveillance teams, some penitentiary facilities staffs conducted case-finding screening campaigns, and all them introduced the questioning about respiratory symptoms as a routine at admission inquiry. Respiratory symptomatics for more than 15 days were submitted to sputum smear examination and, when possible, to X-Ray examination. In 2004, 8591 respiratory symptomatics were reported, which represented 17% of the detainees. Of 618 individuals (7.2%) were smear-positive. Compared to first trimester, when 147 positive cases were found among 1473 respiratory suspects, with a positivity of 8.3%, the last trimester had a better performance, detecting 170 positive cases out of 2484 suspects.

Conclusion: Routine admission inquiries, as well as periodic campaigns, are possible activities to be conducted and yielded good results in São Paulo State. Active TB case-finding, fundamental to control tuberculosis, has to be complemented with a good treatment program, to avoid a more intense TB transmission at prison settings.

PS-2267-22 Experience of international project to fight TB in Tomsk Oblast implementation

G V Yanova,^{1,2} A Y K Strelis,^{2,3} G G Peremitin.³ ¹Tomsk Oblast Clinical TB Hospital, Tomsk, Tomsk Oblast, ²Siberian State Medical University, Tomsk, Tomsk Oblast, ³Tomsk Oblast TB Dispensary, Tomsk, Tomsk Oblast, Russian Federation. Fax: (+7) 3822 911260. e-mail: yanova@mail.tomsknet.ru

Goal: To develop an organizational model capable to detect and treat TB patients of Tomsk Oblast in terms of international experience.

Methods: TB Service of Tomsk Oblast was reorganized. DOTS and DOTS(+) programs were implemented into the civil and penitentiary systems.

Results: An effective laboratory service in the general healthcare services was created. A concept to detect TB applicable for the new social and economic conditions was developed. For eleven years (1994–2005), the patients have been provided with the 1–2 line drugs on a regular basis. Positive results, 15–20% higher than the average national indices, were achieved in treating the patients. TB patients undergoing the DOTS and DOTS(+) treatment were additionally provided with social support. Since 1991 the Russian Red Cross program 'RRC Against TB and AIDS' has been put into practice. Additional financial support for the phthisiathry service has been gained through mutual international grants with the colleagues in the UK, the USA. The opportunity of training abroad became an option for the medical personnel of the TB services to study the experience of the colleagues in other countries. The gained experience of international cooperation in fighting TB is being shared with the other territories in Russia.

TB-HIV PROGRAMME LINKAGES

PS-1051-22 Improving the diagnosis of smear-negative pulmonary TB in high HIV settings: analysis of policy and practice

H Getahun,¹ M Harrington,² P Norval,¹ P Nunn.¹ ¹Stop TB Department, World Health Organization, Geneva, Switzerland; ²Treatment Action Group, New York, USA. Fax: (+41) 227914268. e-mail: getahunh@who.int

HIV has been associated with a significant increase in incidence of smear negative pulmonary TB in HIV positive patients. Analysis of WHO TB notification data showed that case notification of smear negative and extrapulmonary cases combined exceeds that of smear positives. There was significant association between proportion of notified smear negative pulmonary cases and adult HIV prevalence among selected sub-Saharan African countries ($R^2 = 0.16$; $P = 0.02$). Analysis of international and national TB treatment guidelines showed less attention is given by national TB control programs to documenting treatment outcomes of smear negative and extrapulmonary cases. Although countries officially adapt the internationally recommended diagnostic algorithm for smear negative pulmonary TB, national guidelines are implemented very differently with a wide range of interpretations. Even if the best performance is assumed, between 11–34 days are required to establish the diagnosis of smear negative pulmonary TB. The current recommended diagnostic algorithm must now incorporate the need to speed up the diagnosis of smear negative pulmonary TB. In the absence of any better alternative for high HIV and resource constrained settings, the bleach method should be explored and encouraged. The technique of the method needs urgently to be standardized. Fluorescence microscopy should be encouraged in high HIV settings where resources and expertise are available. Countries should generate quality data for smear negative patients under routine programme conditions. Strong advocacy is important to expand access to existing tools (e.g., culture) and hasten the development of new tools.

PS-1156-22 Collaboration between the National TB control Programme and an NGO in TB-HIV care at sub-district level: experience from Bangladesh

Md. K A Hyder,¹ S Sabera,¹ M Becx,¹ V Begum.² ¹World Health Organization, Dhaka, Bangladesh; ²National TB Control Program, Dhaka, Bangladesh. Fax: (+880) 2 9884656. e-mail: khyder@dhaka.net

Introduction: The WHO Directly Observed Treatment Short Course (DOTS) strategy has shown to be effective for achieving TB Control; however, in settings where low or rising Human Immunodeficiency Virus

(HIV) prevalence is driving the Tuberculosis (TB) epidemic. It is recognized that DOTS alone may be insufficient to achieve TB Control.

Objectives: To integrate TB-HIV at centers of Bangladesh where bordering countries has high prevalent of HIV/AIDS.

Methods: A center of National TB Control Program partner-NSDP NGO identified who is providing Sexually Transmitted Infection (STI) Services and DOTS strategy implemented.

Results: After adequate orientation on DOTS to the service providers of STI/AIDS clinic staff, implementation of DOTS strategy started since March 2004. Till the end February 2005 a huge TB suspects were tested having STI and considerable number of smear positives registered for treatment, however among the TB cases none were HIV positive. A total of 135 suspects among STI were examined and 11 were smear positives, and 124 were smear negative TB. HIV suspects are further referred to higher centers for Vocational Counseling and Treatment (VCT). It is eminent that TB-HIV co infection cases will be available in this area, as Myanmar, a bordering country of Bangladesh, has high prevalence of HIV/AIDS. Detailed results of treatment outcome and process of integration as pilot will be presented.

PS-1288-22 Joint TB-HIV prevention and control projects at township level in Myanmar

M Win,¹ L Thandar,¹ M M K Tin,¹ S S San,¹ T Min,² H H Kluge.³ ¹ National Tuberculosis Programme Myanmar, Yangon, ²National AIDS Programme, Yangon, ³World Health Organization, Yangon, Myanmar. Fax: (+951) 380952. e-mail: klugeh.whomm@undp.org

Objectives: To improve the health status of TB-HIV patients and to prevent TB and HIV transmission in high HIV prevalence townships.

Background: The National Tuberculosis Programme (NTP), Myanmar reported 4.5% HIV sero-prevalence among TB patients (TB-HIV sentinel surveillance (1995–1997) in 20 townships). TB-HIV prevention and control activities were introduced in 5 of these townships with a high HIV prevalence (>10%) among TB patients in 2000–2001.

Project activities: NTP and the National AIDS Programme (NAP) in collaboration with WHO, re-introduced TB-HIV collaborative projects in the townships of Myitkyina (Kachin State) and Taunggyi (South Shan State). The activities consist of the establishment of a TB-HIV working group at state level, advocacy meetings, cross training for TB and Sexually Transmitted Disease (STD) teams, patient education, cross referral between TB and STD clinics, Voluntary Confidential HIV Counseling and Testing (VCCT), condom promotion and supply, partner and contact tracing, direct observation of anti-TB treatment and prophylaxis. Activities are being monitored

through a proper recording and reporting system and supervised by the NTP/NAP central unit team.

Conclusion: The projects are preparing for introduction of Anti-Retro Viral Therapy for co-infected patients soon available.

PS-1414-22 Epidemiological aspects of tuberculosis–HIV coinfection in Ribeirão Preto, SP, 1998–2003

M Yamamura,¹ J N Muniz,^{2,3} M F Oliveira,¹ T C S Villa.^{1,4} ¹College of Nursing, University of São Paulo at Ribeirão Preto (USP), São Paulo-Brazil, Ribeirão Preto, ²Ribeirão Preto School of Nursing, University of São Paulo, Ribeirão Preto, ³Program for Tuberculosis Control, Municipal Health Office, Ribeirão Preto-SP, Ribeirão Preto, São Paulo, ⁴TB Operational Research Area of Brazilian TB research network, Ribeirão Preto, São Paulo, Brazil. Fax: (+55 16) 6333271. e-mail: mellinayamamura@yahoo.com.br

Goals: To characterize the epidemiological profile of the tuberculosis cases notified in the city of Ribeirão Preto, in the period of 1998 to 2003, in terms of their serologic condition for HIV, sex, age and treatment result.

Methodology: It is a descriptive epidemiological investigation using the instrument EPI-TB Data Bank. The study's population was entirely composed by TB-HIV coinfection cases, all residing in Ribeirão Preto-SP, notified in the period of 1998 to 2003.

Results: In the studied period, 1273 cases of tuberculosis were notified, being that 377 presented positive serology for HIV, meaning a coinfection rate of 30%. Regarding sex, it was observed in this group that 76% of the notified cases were men, ages ranging from 20 to 59 years. In terms of therapeutic result, the average healing for these patients was 52%, 11% abandoned treatment, and 32% deceased. The prevalent clinical form was pulmonary, with 58% of the cases.

Conclusions: A high prevalence of coinfection was observed for the studied city, pointing out that the therapeutic conclusion for these cases shows the need of adopting special strategies for following these clients. As to sex and age range, it shows to be the same for the tuberculosis cases non-infected by HIV.

PS-1558-22 A curriculum for training health care providers in diagnostic HIV testing and counseling for TB patients

J Moore, N N Bock, M Rogers, M A Fenley, A Miranda, P Nadol, B Miller. Centers for Disease Control and Prevention-Global AIDS Program, Atlanta, Georgia, USA. Fax: (+1) 404-639-6499. e-mail: neb2@cdc.gov

Background: In July, 2004 the UNAIDS/WHO Policy Statement on HIV Testing issued guidance on provider initiated HIV diagnostic testing and counseling (DTC), which focuses on getting HIV-infected persons into treatment. Integration HIV DTC into TB

clinics requires that healthcare providers (HCP) have the skills to provide quality HIV CT.

Methods: A curriculum to train TB HCP in DTC was developed through an iterative process among education specialists, international TB-HIV experts, national TB and HIV/AIDS program managers, and HCP in the field.

Results: The HIV DTC training curriculum involves all levels of health-care facility staff. HCP are trained to offer DCT as part of routine care; the pre- and post-test counseling adds ~15 minutes to patient visit; prevention messages are reinforced through follow up visits to VCT or HIV care centers; rapid HIV testing is done in the TB clinic. It is anticipated that this curriculum, while containing standard elements, may be easily adjusted for use with a variety of health care settings.

Conclusion: This curriculum provides essential human-resource and program development components to programs looking to expand HIV DTC into medical settings.

PS-1584-22 Use of thioacetazone/isoniazid in the national TB control programmes

I Toskin, L Blanc, P Nunn. Stop TB, World Health Organization, Geneva, Switzerland. Fax: (+41) 022 791 4268. e-mail: toskini@who.int

Background: Thioacetazone (T) is a member of the thiosemicarbazone family. Since the early 1960s thioacetazone has been widely used in combination with isoniazid as a fixed dose combination (TH, or Thiazina). However, since the HIV pandemic a strong relationship between severe toxic skin reactions and thioacetazone use has been demonstrated in HIV-infected patients.

Method: 1) Survey all WHO regions through e-mail communication in order to evaluate the current status of TH use in the national TB control programmes. 2) Comprehensive search for related studies through PUBMED and other databases.

Results: Many countries have abandoned the use of TH for divers reasons, one reason being the limited capacity to provide routine HIV testing of TB patients. Only 7 countries in the world continue to use the TH containing regimens in their TB control programs. These countries represent 1.5% of the global TB incident burden and two of them are going to abandon the use of TH in the near future. Although ethambutol (E) is available as a thioacetazone substitute. EH has not been sufficiently evaluated for efficacy, particularly in high HIV prevalence settings.

Conclusions: Most of surveyed countries/regions have abolished the use of TH in their TB control programmes. Additional studies for evaluation of substitutes for TH in the continuation phase of TB treatment within context of high HIV prevalence need to be considered.

PS-1639-22 The epidemiology of HIV-infected TB patients in Banteay Meanchay Province, Cambodia

K P Cain,¹ N Kanara,² C Vannarith,³ M L Qualls,² K F Laserson,¹ C D Wells,¹ J K Varma.^{1,4} ¹Centers for Disease Control and Prevention, Division of Tuberculosis Elimination, Atlanta, Georgia, USA; ²Centers for Disease Control and Prevention, Global AIDS Program, Phnom Penh, ³Provincial Health Department, Banteay Meanchay Province, Cambodia; ⁴Thailand Ministry of Public Health - US CDC Collaboration, Nonthaburi, Thailand. Fax: (+1) 404-639-1566. e-mail: kcain@cdc.gov

Background: In Cambodia, TB is a major cause of mortality in HIV patients. The epidemiology of HIV-infected TB patients is not well described.

Methods: We analyzed data about all persons diagnosed with TB or HIV from 11 healthcare facilities participating in a TB-HIV project in Banteay Meanchay province, which has a population of 700 000.

Results: From October 2003 to February 2005, 959 persons were diagnosed with TB, 1500 with HIV, and 216 with both. Among HIV-infected TB patients, the median age was 36 years, 125 (58%) were men, and 91 (42%) were smear-positive. In 423 patients with equivalent follow-up time, 34 (8%) died and 15 (4%) defaulted. Compared with HIV-uninfected TB patients, HIV-infected TB patients were more likely to be younger, have >1 self-reported HIV risk factor, not be smear-positive, and die or default during treatment ($P < 0.05$, all comparisons). Rates of death and default were significantly higher for HIV-infected TB patients cared for at health centers with limited diagnostic services (42%) compared with health centers having expanded diagnostic services (20%) ($P < 0.05$). HIV-uninfected TB patients had identical death and default rates (9%) across health centers.

Conclusion: Banteay Meanchay has a high burden of TB-HIV, and mortality rates for HIV-infected TB patients are high. Enhancing diagnostic services may reduce mortality rates among these patients.

PS-1656-22 Evaluation of TB-HIV collaborative activities in Banteay Meanchay Province, Cambodia

N Kanara,¹ K P Cain,² C Vannarith,³ M L Qualls,¹ K F Laserson,² C D Wells,² J K Varma.^{2,4} ¹Centers for Disease Control and Prevention, Global AIDS Program, Phnom Penh, Cambodia; ²Centers for Disease Control and Prevention, Division of Tuberculosis Elimination, Atlanta, Georgia, USA; ³Provincial Health Department, Banteay Meanchay Province, Cambodia; ⁴Thailand Ministry of Public Health - US CDC Collaboration, Nonthaburi, Thailand. Fax: (+1) 404-639-1566. e-mail: kcain@cdc.gov

Background: Cambodia's Ministry of Health (MOH) recommends that HIV patients receive TB disease screening and that TB patients receive HIV counseling and testing.

Methods: We analyzed data about persons diagnosed with TB or HIV from October 2003–February

2004 in 11 healthcare facilities implementing MOH's guidelines in Banteay Meanchay province.

Results: Of 959 TB patients, 144 (15%) had a pre-existing HIV diagnosis; of the remaining persons, 441 (55%) were HIV tested, and 85 (17%) of tested persons were HIV-infected. Compared with patients not referred for HIV testing, referred patients were more likely to be smear-positive (RR 1.4, 95% CI 1.2–1.4) and come from a health center with a voluntary confidential counseling and testing center (VCCT) on site (RR 1.7, 95% CI 1.6–2.0). Of 576 persons newly diagnosed with HIV, 311 (54%) were screened for TB; 66 (21%) of these had TB disease. Compared with patients not referred, patients referred for TB screening were more likely to have attended VCCT because they were ill (RR 1.2, 95% CI 1.0–1.4).

Conclusions: Screening for TB and HIV was high yield. To improve referral, we should educate TB staff to refer all patients for HIV testing regardless of smear status, facilitate transportation from TB clinics to VCCT sites, and educate VCCT staff to refer asymptomatic HIV-infected persons for TB screening.

PS-1717-22 Results of tuberculosis screening among HIV-infected individuals in Battambang Province, Cambodia

P Chheng,¹ C Eang,² A Kem,³ S Mak,³ S Kuy,³ C Natpratan,² M E Kimerling.⁴ ¹Gorgas TB Initiative, Phnom Penh, ²FHI/Cambodia, Phnom Penh, ³Provincial Health Department, Battambang, Cambodia; ⁴Gorgas TB Initiative, Birmingham, Alabama, USA. Fax: (+855) 23 211 913. e-mail: cphalkun@yahoo.com

Objective: To assess and define optimal approach for screening active TB cases among, improve TB case finding, and provide early TB treatment access for HIV-infected persons referred from Voluntary Counseling and Testing (VCT) centers to Battambang and Moung Russey hospitals.

Methods: All HIV positive persons referred to the hospitals are screened for active TB through CXR, and smear microscopy and culture on 3 sputum samples of each patient. Those with active TB disease are put on DOTS, and those without active TB are considered for Isoniazid Preventive Therapy (IPT).

Results: Since program initiation (Sep 2003–Feb 2005), 1621 HIV positives were screened for active TB and 264 (16.3%) were identified as and treated for active TB. Only 70 without active TB were eligible and put on IPT.

Conclusions: Culture is very critical for screening TB among HIV-infected persons whom smear negative and extra-pulmonary TB are the most frequent. There are potential benefits of integrating early screening and preventive therapy for TB into VCT center, a key entry point linking HIV/AIDS and TB services, in high burden countries where all HIV-infected persons should be considered TB suspects, regardless of symptoms.

PS-1789-22 Comparing three models of HIV counseling and testing for TB patients in Kinshasa: a quantitative analysis

N M Jarrett,¹ M Sabue,² M Tabala,² P Kimpenga,³ M L Mbulula,⁴ E Bahati,⁴ F M Behets,¹ A Van Rie.¹

¹Department of Epidemiology, School of Public Health, University of North Carolina–Chapel Hill, Chapel Hill, North Carolina, USA; ²University of North Carolina–Democratic Republic of Congo, Kinshasa, ³Ecole de Sante Public, University of Kinshasa, Kinshasa, ⁴National TB Control Program, DRC Ministry of Health, Kinshasa, D R Congo. Fax: (+1) 919-966-2089. e-mail: nikki@email.unc.edu

Objective: To compare three approaches to HIV Testing and Counseling (CT) for TB patients.

Methodology: Three HIV CT models were implemented at three TB clinics in Kinshasa, DRC. Models 1 and 2 represented opt-in models with referral to an off-site or on-site CT service. Model 3 was an opt-out CT model. Patients were offered CT at time of TB diagnosis and one and two months post-treatment. Cotrimoxazole was offered to HIV+ patients.

Results: 664 TB cases (median age 29, 48% women) were diagnosed between August 2004 and January 2005. At time of TB diagnosis, 97% of patients were pre-test counseled, of whom 96% received post-test counseling. No substantial difference in pre-test and post-test uptake rates was observed between the models. In all models, the majority of patients received pre-test counseling within 5 days of TB diagnosis, and their HIV test results within one day of testing. HIV seroprevalence was 16% overall, 23% in women, 13% in men, 16% in new TB cases, 30% among retreatment cases. Cotrimoxazole acceptance was >90%. **Conclusions:** Integration of provider-initiated HIV CT into routine TB care at the time of TB diagnosis is feasible. Uptake rates were high, even for the model that required patient travel.

PS-1831-22 Rapid scale-up of HIV and TB care, prevention and ART through a decentralized service delivery model: the IMAI training component

S G Gove, F C Celletti, S K Seung. HIV Department, World Health Organization, Geneva, Switzerland. Fax: (+41) 22 7913537. e-mail: goves@who.int

WHO 3by5 supports country introduction of IMAI (Integrated Management of Adult Illness) as backbone of a public health approach to rapid scale-up of HIV care, prevention and ART through a decentralized service delivery model. The IMAI package consists of simplified, guidelines, training materials, and patient education aids. These address clinical care, counselling, patient monitoring, and district ART coordination. The IMAI training courses address different target audiences. TB case detection and TB-HIV co-management are integrated within IMAI Acute and Chronic HIV care with ART; these can be delivered by nurses, clinical officers, and other health

workers in a district outpatient clinic or peripheral health centres in low resource settings. Training lay provider to provide counseling, patient education and adherence support allows much of increase in human resources for ART to be provided by PLHA and other community members who both join clinical teams and support treatment (as treatment supporter or CHW) and provide other care in the community. Second-level ART and OI training (including TB-HIV) uses a case-based approach to prepare this doctors or medical officers who provide clinical support to the clinical team. Clinical mentoring helps more specialized physicians in backing-up doctors.

PS-1837-22 Improving HIV-TB control through an integrated public health approach

S Gove, K Seung, F Celletti. HIV Department; World Health Organization, Geneva, Switzerland. Fax: (+41) 0227913537. e-mail: goves@who.int

In high HIV burden countries, an integrated public health response is important to address the TB-HIV co-infection which is straining the health care system in countries where ART and HIV care services are lacking and TB control requires further strengthening. WHO IMAI (Integrated Management of Adolescent and Adult Illness) builds on previous horizontal approaches to disease-specific interventions, particularly integrated management of childhood illness (IMCI), pregnancy and childbirth (IMPAC) and adult lung health (PAL). At the core of the IMAI approach are standardized, simplified clinical guidelines with training, patient education and district management materials for country adaptation. IMAI supports the introduction of an effective approach to chronic care (including a clinical team approach with involvement of PLHA on the team, community-based treatment support, and patient self-management). In the Chronic HIV Care with ART guidelines, health workers learn to check TB status on every visit. The IMAI Acute Care guidelines teach health workers when to suspect TB and HIV infection, based on a syndromic approach to the most common adult illnesses; this supports improved TB case detection by assessing and classifying cough or difficult breathing, undernutrition, lymphadenopathy, persistent fever. Work is ongoing to strengthen TB-HIV co-management.

PS-2090-22 Refusal of HIV negative status by surviving spouse in discordant couples: Zambia experience

L M Kafwabulula. Ministry of Health, Lusaka, Lusaka, Zambia. Fax: (+260) 1253173. e-mail: mwape77@yahoo.com

Setting: TB and HIV programme in Zambia.

Methods: This paper is reliving an experience of five (5) female clients whose husbands died of AIDS disease and thereafter opts to begin a process of selling

the assets of the family as they are sure that they are HIV positive and will soon face their death. Further, they seek to test for HIV. The result is negative and there is denial of the HIV negative status. The clients take to taking the test in different places to verify the results. This proves to be negative.

Discussion: The current methods of training in counselling has always emphasised the need to ensure that clients accept their HIV positive status but unintentionally ignores the role to care for clients who deny the HIV negative status.

Conclusion: It is key that the HIV counselling begin to address the issues that arise in cases such as the above. To tackle the HIV epidemic, we should ensure that no group is left out and the training needs urgent adaption to answer issues such as these.

PS-2210-22 Applying the management and organizational sustainability tool for improved TB and HIV/AIDS collaboration in two South African provinces

C M Whalen,¹ E Mhlope,¹ L Kopsch,¹ M Partilla,¹ R Matji.²
¹Management Sciences for Health, Cambridge, Massachusetts, USA; ²URC, South Africa. Fax: (+1) 617-250-9090. e-mail: cwhalen@msh.org

Introduction: Recognizing the need for a coherent health service response for TB and HIV, WHO's Global Working Group on TB-HIV has developed policies, frameworks and guidelines to help TB and HIV/AIDS programs better collaborate to decrease the burden of TB in PLWHA, and decrease the burden of HIV in TB patients.

Objective: To pilot a process for improving collaboration between TB and HIV/AIDS programs.

Methods: The USAID-funded TASC TB project conducted the MOST for TB-HIV Collaboration process in Northwest and Eastern Cape provinces. This structured, participatory process guides participants to determine their status in different collaboration components, prioritize the components for improvement, and create an action plan.

Results: Participants completed a baseline assessment of their collaboration, and created a plan for increased joint activities that will provide an integrated package of services to patients with TB and/or HIV/AIDS. Progress towards these goals will be measured by process indicators, such as conducting joint monitoring, evaluating and planning, as well as service delivery indicators.

Conclusion: MOST for TB-HIV is an effective process to help TB and HIV/AIDS programs progress from talking about collaborating, to actually implementing joint activities to improve services and health outcomes for TB and HIV/AIDS patients.

PS-2236-22 Conseil et dépistage volontaire VIH chez les patients tuberculeux au Burkina Faso

S L Savadogo,¹ D M Dembélé.² ¹Institut de Recherche en Sciences de la Santé, Ouagadougou, ²Programme National de Lutte contre la Tuberculose, Ouagadougou, Burkina Faso. Fax: (+226) 50360394. e-mail: gueswende@hotmail.com

L'avènement de la pandémie de l'infection par le VIH/SIDA a donné un coup d'accélérateur à la propagation de la tuberculose. La lutte contre ces deux fléaux doit être menée en même temps. Il apparaît alors primordial d'armer efficacement les agents de santé. Pour répondre à cette nécessité, le programme national anti tuberculeux (PNT) a initié une recherche action. Au total 460 cas de tuberculose toutes formes confondues ont été diagnostiqués durant la période d'étude. Les agents ont proposés le test de dépistage à 375 patients: soit 81.5% de proposition. Sur ces 375 patients, 365 ont accepté de faire le test: soit 97.33%. Sur ces 365 cas (toutes formes confondues) testés: 119 étaient HIV +, soit 32.6%. Des 365 cas, 281 étaient des TPM+, de ces 281 TPM+, 86 étaient HIV+, soit une séroprévalence de la co-infection TB-VIH de 30.6%. On note que près de 96% des patients sont revenus pour l'annonce des résultats au cours de leur traitement.

PS-1307-22 Suivi de la dispensation des soins à base communautaire et à domicile des patients atteints de la co-infection TB-VIH

J L Muyanga. Comité Sanitaire Pour Assistance des Hommes Plus 'COSAHO+', Kinshasa, D R Congo. Fax: (+243) 813010945. e-mail: cosaho81@hotmail.com

Objectifs: Réduire le taux de propagation et améliorer la qualité de vie des patients atteints de la co infection TB-VIH.

Méthodologie : La PEC de la co infection TB-VIH est installé dans la zone de santé de Bumbu et appuyé par l'OMS depuis janvier 2004 et s'occupe du dépistage volontaire et gratuit de toutes personnes suspectées de la TB et bénéficient du traitement gratuit et sont référés au COSAHO+ pour le continuum des soins.

Résultats : En 2004 832 visites à domicile sont effectuées 61 patients dont 39 femmes soit 63.3% et 22 hommes soit 36.6% ont bénéficiés des visites. Ces patients 30 soit 47.5% étaient atteints de la co infection VIH-TB et 31 soit 52.5% étaient atteint du VIH 28 patients soit 93.3% ont bénéficié des soins à domicile et du traitement médical gratuit et sont en vie.

Conclusion : La TB chez le porteur de VIH entraîne des décès si la découverte est tardive et l'insuffisance de la PEC. Le traitement par les ARV reste une préoccupation pour les PVV.

POLICY AND PROGRAMME IMPLEMENTATION: OTHER

PS-1185-22 Assessment of results of chemotherapy in smear-positive pulmonary patients in 2003

I M Campean, L Fischer. Department of Pneumology, Hospital Medias, Medias, Romania. Fax: (+40) 0269842198. e-mail: puiu@birotec.ro

Our study aims the assessment of our one year activity. Definition and the methodology used to analyse data were derived from WHO, IUATLD. In 2003 at the ambulatory Medias were registered 127 new cases of pulmonary tuberculosis from which 108 were smear positive patients (85.03%) and 19 relapses from which 18 were smear positive (94.73%). Immediate efficacy of the TB chemotherapy was analyzed as the two months smear conversion rate. For new cases the conversion rate was 62.74%, 12% were uncontrolled and the rest of 25.26% were smear positive. The relapses followed the WHO treatment regimen in 95% of cases. The conversion rate was 79.5%, the other 20.55% remained smear-positive. Evaluation after one year of TB chemotherapy of new cases reveals: 70.54% cured, 8.79% completed treatment, 8.2% failures, 2% deceased, 6.02% abandoned treatment prematurely, 1.25% patients lost, and 3.2% transferred. The rate of success was 80.95%, under the purpose of National TB Program. The assessment of TB chemotherapy of the relapses shows: 63.18% cured, 15.78% completed treatment, 10.52% failures, 5.26% abandoned treatment, 5.26% deceased. The rate of success was 78.94%. The global incidence was 115.19 per 100 000, the global prevalence was 154.19 per 100 000.

PS-1289-22 Automatized information system designed to notify and monitor patients with TB to assist service in the Republic of Kazakhstan

G B Rakishev, K K H Baimukhanova, V I Lavrentieva. National Center for TB Problems, Almaty, Kazakhstan. Fax: (+327) 918658. e-mail: medeubek@hotmail.com

Implementation of WHO principles of TB fighting greatly influences on improving the indices on TB. AIS functioning at all anti-TB institutions is the supplementary instrument to improve the surveillance of patients and ensure the control of timely examinations, treatment and monitoring. In 2004 it was revealed, on a base of the computer system, that among groups of TB patients percentage of adults constituted 93.1%, while children and adolescents 3.1% and 3.8% accordingly. It is stated that in 66.0% of new TB cases there were the aggravating factors leading to TB disease development. Pulmonary TB constituted 96%, while extrapulmonary TB 4%. High indi-

cator of *M. tuberculosis* resistance was determined during testing the first line anti-TB drugs, especially among patients suffered from TB for a long time. It should be noted that percentage of resistance is especially high to drugs with long duration of implementing in the public health practice, namely streptomycin, isoniazid, and in the high per cent, rifampicin. It is the reason for emergence of treatment failure influencing on the treatment effectiveness. Meanwhile new anti-TB drugs of the first line are absent in the medicine market and WHO don't propose them, too. Thus, computer monitoring allows to carry out the poly-factor' analysis of causes of TB emergence and factors decreasing the treatment effectiveness, especially if TB patients have the resistant *M. tuberculosis* strains.

PS-2053-22 Décentralisation du traitement directement observé dans la ville de Cotonou

M Pio, M Gninafon. Programme National Contre la Tuberculose du Bénin, Cotonou, Bénin. Fax: (+229) 33 70 57. e-mail: mongermainpio@hotmail.com

Pour déconcentrer la prise en charge des malades tuberculeux dans la ville de Cotonou 09 centres de traitement directement observé sont ouverts dans la ville de Cotonou. Cette étude a permis d'évaluer cette activité. Le cadre d'étude est le Centre National Hospitalier de Pneumologie de Cotonou. La méthode de travail a été d'abord en l'identification et l'ouverture des Centres de traitement directement observé, suivi de leur approvisionnement en médicaments et en support de données suivi de la référence des malades tuberculeux dépistés dans le centre de dépistage et de traitement de Cotonou. Les résultats montrent que de 1998 à Décembre 2004, 279 malades tuberculeux ont été référés dans les 03 premiers centres de dépistage et de traitement. L'analyse des résultats des crachats à la fin des 02 mois de traitement montre 02 malades sur 78 n'ont pas fait leur contrôle. L'analyse de cohorte définitive montre un taux de guérison de 71% au niveau des 02 premiers centres contre 59% au niveau du Centre de dépistage et de traitement qui a référé. le taux de perdu de vue est de 8% au niveau des centres de traitement directement observé contre 11% au niveau du centre mère.

Comme difficultés : La prise en charge des malades tuberculeux est considérée comme un surcroît de travail pour lequel des primes sont, des stocks de produits sont remis aux patients pour deux jours et parfois plus.

Conclusion : Cette activité sera donc poursuivie avec bien entendu, un encadrement renforcé et une supervision régulière des structures impliquées.

PS-1442-22 Factors leading to tuberculosis diagnostic drop-out and delayed treatment initiation in urban Lusaka, Zambia

A Nota,¹ H Ayles,^{1,2} M Perkins,³ J A Cunningham.⁴

¹Zambart Project, Dept of Medicine, UNZA School of Medicine, Lusaka, Zambia; ²London School of Hygiene and Tropical Medicine, London, UK; ³Foundation for Innovative New Diagnostics, Geneva, ⁴UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases, Geneva, Switzerland. Fax: (+260) 1 257 215. e-mail: amosnota@yahoo.com

Objectives: To determine: 1) The frequency and timing of diagnostic drop-out among a cohort of pulmonary tuberculosis suspects. 2) The factors associated with drop-out.

Methods: A prospective observational study of respiratory symptomatics ≥ 15 years presenting to government clinics with cough ≥ 3 weeks or haemoptysis. Contact information and duration of cough were recorded. Respiratory symptomatics were followed for records of request for sputum smear microscopy; serial specimen delivery; results notification and treatment registration. Symptomatics who did not deliver sputum specimens or collect test results within 2 weeks of original request were interviewed regarding reasons for drop-out.

Results: 997 respiratory symptomatics were recruited. 596 (60%) were requested to submit sputum for smear microscopy. Only 3 (0.5%) completed the diagnostic process. Among the 348 drop-outs interviewed, 129 had a chest X-ray requested and 117 (91%) complied. Unavailability of sputum containers at clinics was the main reason for drop-out.

Conclusion: Drop-out from the tuberculosis diagnostic process is a problem in urban Lusaka. It compromises case detection and delays treatment initiation. In this study, health workers failure to request smear microscopy and provide free sputum collection containers were the most significant factors causing diagnostic drop-out.

PS-1447-22 Specifics of TB case detection in PHC facilities

A K Toktabayonov,¹ Z H Zhandauletova,¹

M M Makhmatov,¹ A A Trusov,² R Bumgarner,³

K K H Baimukhanova.⁴ ¹Project HOPE, Almaty, Kazakhstan;

²Project HOPE, New York, New York, ³Project HOPE,

Washington, DC, USA; ⁴National TB Center, Almaty,

Kazakhstan. Fax: (+7 327) 2918747.

e-mail: atoktabayonov@projecthope.kz

Objectives: To improve TB case detection and treatment outcomes through adherence to TB diagnostic algorithm among suspects according to WHO recommendations in Kazakhstan.

Method: Detailed case and records review of TB case detection practices was conducted in PHC facilities during monitoring visits by the authors to 4 oblasts in 2003.

Results: Monitoring results indicated that X-ray was the predominant method of TB case detection in the PHC centers. In 50% of diagnostic work microscopy was performed only 5 days on average after X-ray examinations despite guidance in the Prikazes and training. Compliance with the TB diagnostic algorithm was achieved on average in only 25% of all cases. These findings relate directly to poor infectious TB cases detection rates in PHC facilities.

Conclusions: Inadequate detection of TB cases and incorrect classification of TB cases is directly caused by poor compliance with the diagnosis algorithm by PHC doctors. In order to increase the rate of TB case detection at the PHC level and ensure that detected cases are properly classified so that they receive an adequately strong treatment regimen and achieve good final outcomes it is essential to review, clarify and disseminate the requirements of the national Prikaz to PHC centers and physicians and reinforce their understanding and use of it through on-the-job training.

PS-1543-22 Improvement of TB detection in the general health care service of Vladimir city

M Bachurinsky,¹ G Volchenkov,¹ I Danilova,² N Kaunetis,¹ E Putova,³ W Jakubowiak.² ¹Regional TB Dispensary, Vladimir, ²Office of the Special Representative of the WHO Director-General in Russia, Moscow, ³Central TB Research Institute of the Russian Academy of Medical Sciences, Moscow, Russian Federation. Fax: (+7 95) 787 2149. e-mail: w.jakubowiak@who.org.ru

Background: WHO strategy has been implemented in Vladimir region since 2000. Before, there was a lack of effective cooperation between TB and GHC services.

Objective: Evaluate the effectiveness of steps taken for improvement of TB detection in GHC.

Design: Retrospective analysis of 1999–2004 data; number of three sputum samples microscopy for TB diagnosis; number of inadequate sputum samples; number of identified pulmonary smear-positive TB patients.

Results: Before 2000, TB detection by sputum smear microscopy was low (28%). Only one smear was used for microscopy disregarding sample quality. GHC laboratories lacked equipment and quality control. The regional TB control programme deployed internal and external quality control in GHC laboratories, trained laboratory technicians, physicians and managers, established and equipped microscopy centers. From 1999 to 2004, TB detection using three sputum samples microscopy increased from 10% to 83%, inadequate sputum samples reduced from 35% to 6.8%, microscopy mistakes decreased from 15.2% to 3.1%. The proportion of pulmonary smear-positive TB detected in GHC has reached 70.2% of all new cases.

Conclusions: These interventions within the programme based on DOTS strategy substantially in-

creased the effectiveness and results of TB detection in GHC and cooperation between the services.

PS-1805-22 Re-treatment TB patients treated in a public DOTS programme: who among them is likely to have poor treatment outcome?

C Auer,^{1,2} J Lagahid,³ C Roa,⁴ C Ang,⁴ L Montejo,⁵ A Van Deun,⁶ M G Weiss,² M Tanner.² ¹Tropical Disease Foundation, Makati City, Philippines; ²Swiss Tropical Institute, Basel, Switzerland; ³Centre for Infectious Diseases, Department of Health, Manila, ⁴TB Research Laboratory, Philippine General Hospital, Manila, ⁵College of Public Health, University of the Philippines Manila, Manila, Philippines; ⁶Institute of Tropical Medicine, Mycobacteriology Unit, Antwerpen, Belgium. Fax: (+63) 8889044. e-mail: christian.auer@unibas.ch

The records of 162 smear-positive re-treatment cases treated in a public DOTS programme of a municipality of Manila, Philippines were reviewed to identify factors associated with poor treatment outcome and with multidrug-resistant TB (MDR-TB). Drug sensitivity tests were done as part of a study.

Results: The number of previous courses of anti-TB treatment was found to be a significant risk factor for poor treatment outcome. Among the 20 patients with at least two previous treatment episodes, 5 (25%) got cured. Five (25%) defaulted from treatment, 4 (20%) died, 4 (20%) failed treatment and 2 (10%) relapsed. Ten of these 20 patients underwent drug susceptibility tests: 60% (6/10) harboured MDR-TB, whereas 20% (13/65) of those with only one previous treatment harboured MDR-TB ($P = 0.01$). MDR-TB was more common among those whose last previous treatment was at a public health centre compared to those whose last previous treatment was at other health facilities (39 vs. 16%; $P = 0.02$). Length and date of latest previous treatment, degree of smear-positivity at treatment start, age, and bodyweight were not significant risk factors.

Conclusion: Patients presenting to DOTS programmes with at least two previous courses of anti-TB treatment should be referred to DOTS-Plus.

PS-2137-22 Challenges of tuberculosis case detection in Uzbekistan

G T Uzakova, A A Yuldashev, D D Ulmasova, N A Abdieva, A D Jalolov, I Butabekov. Republican DOTS center Ministry of Health, Tashkent, Uzbekistan. Fax: (+998) 780730. e-mail: tbinstitutuz@mail.ru

The realization of the DOTS strategy in Uzbekistan began since 1990 year, in April 2005 all population of Uzbekistan have been covered by DOTS. But TB case detection in the country still small and reach only 30%. There are many challenges that national experts revealed in the process of DOTS implementation in Uzbekistan: 1) Rigidity of TB doctors for the new system. Small trust of population to the health-care system's effectiveness as a whole. 2) Weak infra-

structure of the anti-tuberculosis establishments, unprotected system of infection control, bad heating, water supply and sewerage. 3) Lack of the leadership among TB doctors, especially in rural areas. Doctors are not interested in researching new patients, because they have a large burden of the chronic patients. One of the 14 regional TB hospitals had only 9% new smear positive patients in 2004 year among all hospitalized TB patients. Republican DOTS center Ministry of Health Republic of Uzbekistan in collaboration with national and international organizations established plan of increasing effectiveness of National TB program, took into account all revealed challenges and opportunities.

PS-2233-22 La DOTS communautaire: quel apport dans la prise en charge des TPM+ par les ONG?

E Aka-Danguy, A K Kobenan Kouman, A Kouassi Boko, K Horo, T H Chamran, K N'Goran, A S N'Gom. Service de Pneumo-Phthisiologie CHU de Cocody, UFR/ Sciences Medicales, Abidjan, Côte d'Ivoire. Fax: (+225) 22440412. e-mail: akadanguy@yahoo.fr

Objectif : Evaluer la prise en charge communautaire des patients TPM+ selon la stratégie DOTS.

Méthodologie : Etude rétrospective de type cas témoins, portant sur les TPM+ suivis au CDT de Yopougon du 02 Janvier au 31 Décembre 2003. soit 520 patients. Cas = patient TPM+ suivi par l'ONG (G1 = 380). Témoin = patient TPM+ du suivi classique (G2 = 120). L'ONG Sidalerte a supervisé le traitement à domicile.

Résultats: 70% des patients avaient entre 15 et 35 ans ; 53% étaient de sexe masculin, 47% de sexe féminin. Au plan du suivi bactériologique : au 2^{ème} mois de traitement, concernant le contrôle, il était mieux observé et on notait que 96.63% des patients du G1 contre 89% du G2 étaient présents; desquels 90.45% avaient un frottis négatif vs. 75.19% ($P = 0.000$, $\chi = 19.377$). Au 4^{ème} mois, 84.22% des patients du G1 contre 61.24% du G2 étaient présents au contrôle; 82.14% ont eu un frottis négatif. contre 56.59%. La différence observée était significative ($P = 0.000$, $\chi = 232.542$). Au 6^{ème} mois, 262 malades soit 77.98% étaient devenus négatifs, 1.79% restaient positifs, 20.24% n'avaient pas encore fait leur contrôle dans le G1. Dans le G2, 55 malades soit 43.65% ont eu un frottis négatif; 3.17% restaient encore positifs et 53.17% n'avaient pas fait leur contrôle. Les taux d'abandon ou de perdu de vue étaient moins importants, 6.58% pour le G1 et 17% pour le G2. Le taux de succès était de 77.79% pour le G1 et de 68% pour le G2. La différence observée était significative.

PS-1337-22 Barriers in seeking health care among tuberculosis suspects: a community-based pilot study in Kathmandu valley

M M Rahman, K K Jha, R M Piryani, B P Rijal. SAARC Tuberculosis Centre, Thimi, Bhaktapur, Nepal, Kathmandu, Nepal. Fax: (+977) 6634379. e-mail: saarctb@mos.com.np

Introduction: Evidence suggests that there is under-reporting of TB suspects (TS) especially among the females.

Objectives: To identify TB suspect and to explore their health seeking behaviour and barriers with gender differentials.

Methodology: SAARC TB Centre conducted a community based cross-sectional study in Bhaktapur (rural) and Kathmandu (urban) districts. Data were collected during July–August 2004 through household survey, using pre-tested questionnaires. A total of 3830 households were surveyed covering 18 947 populations irrespective of age and sex.

Results: Compared to Kathmandu significantly lower number of pucca houses, lower literacy rate and lower income were found in Bhaktapur. Overall prevalence of TS was 7.5/1000 population; it was significantly higher in Bhaktapur. Gender difference in prevalence was not found. Duration of cough was higher in Bhaktapur than that in Kathmandu ($P = 0.043$). Over 73% of the total TB suspects did not seek any advice for their symptoms. The commonest cause (72% male, 76% female) for not seeking health care was that they did not perceive TB symptoms as a serious problem. Other causes were lack of money and time.

Conclusion: Common TB symptoms are not perceived as a serious problem. Awareness programmes need to be strengthened.

PS-1274-22 An incentive program for TB patients in Bishkek city, Kyrgyzstan

A S H Alisherov,¹ M B Omurzakov,² K R Mamatov.²
¹General Director of the National Center of Phthisiology, Bishkek, ²Project HOPE Kyrgyzstan, TB Control Program, Bishkek, Kyrgyzstan. Fax: (+996) 312 511937. e-mail: momurzakov@projecthope.kg

Introduction: In 2003 Project HOPE Kyrgyzstan TB Control Program and National Red Crescent Society of the Kyrgyz Republic conducted incentive program for TB patients in Bishkek city. Within 2003, there were 96 TB patients involved into the incentive program for TB patients in Bishkek. National Red Crescent Society organized canteen and provided TB patients with hot meal, Project HOPE Kyrgyzstan TB Control Program subsidized funds for transportation of TB patients. Project HOPE staff in cooperation with nurses from the National Red Crescent Society conducted patient education sessions for TB patients. At the sessions, the patients were provided with information about TB: TB symptoms, ways of TB trans-

mission, TB detection, TB treatment, anti TB drugs, treatment course completion. Patient education sessions (20–30 min) had an interactive form and were conducted in an informal condition with 8–10 individuals involved in it.

Objective: to evaluate the success of the incentive program.

Method: Analyzing the treatment results of TB patients enrolled to the incentive program.

Findings: Ninety-one patients completed treatment (cured or treatment completed), one patient died, and four had treatment failure.

Conclusion: well-designed incentive program combined with patient education program enables to reach good results in TB treatment.

PS-1301-22 Prise en charge du patient tuberculeux à Bruxelles : évaluation opérationnelle des difficultés rapportées par les professionnels

N Moreau, J Macq. School of Public Health - Université Libre de Bruxelles, Bruxelles, Belgium. Fax: (+32) 25554049. e-mail: jmacq@ulb.ac.be

Depuis 1999, le nombre de nouveaux cas de tuberculose déclarés à Bruxelles est en hausse. Nous avons exploré l'itinéraire thérapeutique du patient tuberculeux et rencontré les différents acteurs y intervenant, afin de relever des éventuels problèmes rapportés par les professionnels. Sur base des informations recueillies auprès de la Fondation des Affections Respiratoires (FARES), nous avons modélisé le parcours thérapeutique du patient tuberculeux à Bruxelles. Nous avons identifié les structures intervenant à chaque étape du parcours. Des professionnels de chaque structure furent interviewés afin de connaître la nature, les conditions de leur travail et les difficultés rencontrées. Les problèmes rapportés par les professionnels de la santé au cours de la prise en charge du patient tuberculeux à Bruxelles sont : utilisation maximaliste du principe de précaution durant le traitement du patient, problème de communication entre patient et professionnel, peur de la contagion chez certains professionnels, manque de structure formelle de soutien psychologique du patient. Ces difficultés ne sont pas sans conséquence sur le ressenti du patient et devraient faire l'objet d'une étude plus approfondie pour améliorer leur prise en charge.

PS-2046-22 An assessment of guardian-based community DOT in Malawi

T E Nyirenda,¹ M Gondwe,² J Kwanjana,² F Gausi,² J R Kemp,³ B S Squire,³ J van Gorkom,⁴ F L M Salaniponi.²
¹European & Dev Countries Clinical Trials Partnership (EDCTP), Cape Town, South Africa; ²National TB Control Program, Lilongwe, Malawi; ³Liverpool School of Tropical Medicine, Liverpool, UK; ⁴KNCV, Den Haag, The Netherlands.
 Fax: (+27) 938 0569. e-mail: nyirenda@edctp.org

Setting: Nine districts in Malawi with hospitals providing guardian DOT supervision as an option in the initial phase of treatment for newly diagnosed TB cases.

Objectives: To describe patients and guardians, assess how guardian DOT is done and home usage of TB drugs.

Method: Enrolled patients registered in April 2004 and conducted home visits with a questionnaire.

Results: 201 patients, of whom 14% were children, most with newly diagnosed TB were enrolled. 60% were women. 98% of the patients and 92% of the guardians were located during the visits. All guardians were relations of patients and mostly female. For the 182 patients followed 158 (87%) had correctly filled DOT forms. 80% of the guardians were within 1 kilometre proximity with their patients, 12% between 2 and 5 kilometres and 8% between 10 and 25 kilometres respectively. 70% of the guardians kept the drugs and 72% kept the DOT monitoring form. TB drugs were kept in items like travellers' bag (38%), shopping bag (19%), suitcase (13%), cupboard (7%) and tins (6%). 38 (21%) patients possessed either excess or inadequate doses.

Conclusion: Guardian based DOT in the community in Malawi is generally successful with some problems that still need attention.

PS-1873-22 New approach to hospital/TB dispensary collaboration in Hubei Province: county general hospital as main diagnostic site

J J Liu, H Y Yao, C Chen. National Center for TB Prevention and Control, China CDC, Beijing, China.
 Fax: (+86) 01063167543. e-mail: liujj@chinatb.org

Background: Most TB patients in China initially seek care in the hospital system when they become ill. But little hospitals were involved in DOTS implementation.

Objectives: To increase case detection through improving collaboration between TB dispensary and general hospitals.

Methods: The strategy is that general hospitals were involved in DOTS implementation by enhancing hospital sputum smear laboratory diagnosis. Main activities included (a) design the program whereby the TB suspects are examined at the county general hospital using sputum microscopy. (b) Train the microscopists of the county general hospital and re-train townships

and county hospitals to refer TB patients to TB dispensary. (c) Conduct quality assurance of sputum microscopy in the general hospital. (d) Conduct quarterly meeting to discuss project progress. (e) Regular monitoring and supervision. (f) Follow-up of on all referral defaulters.

Results: During the project period, the number of additional new smear positive cases found and cured is 4214, among of them, 65.8% with limited access to health care. The 2 month sputum negative conversion rate is 97.2%. The referral rate of hospitals increased from 18.1% to 28.8%.

Conclusion: Case detection can be increased through involving more health facilities in DOTS Implementation.

PS-1900-22 Strengthening DOTS delivery in the public sector through community mobilization

A Noor,¹ S U Khan,¹ S K Shah,² K Moseley,³ F Janmohamed.¹ ¹Mercy Corps, Islamabad, ²National TB Control Programme, Rawalpindi, Pakistan; ³Mercy Corps, Portland, Oregon, USA. Fax: (+92) 51 287 8081. e-mail: anoor@mercycorpsfield.org

The goal of this project is to use an effective DOTS strategy to increase tuberculosis case detection by strengthening government health facilities and mobilizing communities in eight districts of Sindh and Balochistan provinces of Pakistan, targeting 5.7 million people. Project methodology involves: strengthening public sector's diagnostic centers, community mobilization through education and organization, and involvement of private practitioners. Results include identification of 2,298 new smear positive cases, compared to 690 before the start of project, 85% of which are defined as hard to access. Sputum conversion during treatment is more than 90%, and treatment success for the first month is 88%. Average cost per patient over 10 months is USD 70.95, with population density accounting for a cost per patient difference of USD 84.34 between the provinces. In first three quarters, case detection in Sindh has increased from 18% to 57% and in Balochistan from 16% to 86%. Sputum conversion has increased from 80% to 97% in Balochistan, and from 83% to 91% in Sindh during the same time. Health facility strengthening combined with community mobilization, necessarily involving CHWs, is an effective means to increase case detection and sputum conversion even in hard to access cases of tuberculosis in Pakistan.

PS-2299-22 La lutte contre la tuberculose dans un contexte de crise sociale : la région de Ziguinchor

M Sarr. Région Médicale e Ziguinchor, Ziguinchor, Senegal. e-mail: remzig@sentoo.sn

Au Sénégal plus de huit milles cas sont diagnostiqués dont 563 cas dans la région de Ziguinchor en 2004. C'est la région la plus touchée après celle de Dakar qui abrite la capitale et les structures de référence. Comme partout ailleurs certaines raisons sont évoquées : l'absence ou la mauvaise gestion des programmes de lutte, la propagation du VIH/SIDA, la pauvreté croissante, les crises sociales qui entraînent l'insécurité. La mise en cause de cette insécurité trouve toute sa justification ici. Cette crise est un élément fondamental qui différencie la région de Ziguinchor des autres régions. Cette région vit une crise sociale depuis 1982. Son impact est perceptible dans tous les domaines avec des difficultés en amont et en aval pour la tuberculose. Les facteurs favorisent s'aggravent d'où augmentation des cas. Le suivi du traitement est perturbé par le déplacement des populations et la fermeture des postes de santé. Les résultats suivent l'évolution des événements. Pendant les périodes de troubles les services offerts diminuent et le taux de guérison chute. En cas d'accalmie les résultats s'améliorent. C'est le cas depuis 2002 avec la dynamique de paix. Nous assistons à un retour des populations et à la réouverture des postes de santé. Cela se traduit par une amélioration de la notification et de l'issue du traitement.

EPIDEMIOLOGY: TUBERCULOSIS IN LOW-BURDEN COUNTRIES

PS-1085-22 Tuberculosis in Chahaar-Mahaal province of Iran from 2000 to 2003 and comparison with neighboring provinces

H Moshtaghi. Dept. of Food Hygiene, Shahrekord University, Shahrekord, Chahaar-Mahaal, Iran. Fax: (+98 381) 4424427. e-mail: hmoshtaghi@yahoo.com

Tuberculosis is the most important zoonosis which distributed across the world. Mycobatrium is the causative agent. Infected animals and man are the most important carriers of the infection. The provinces of Chahaar-Mahaal, Esfahan and Khoozestan are the endemic areas in our country. The aim of this investigation was to study the tuberculosis in Chaar-Mahaal province and comparing with the condition of infection in neighboring provinces (Esfahan and Khoozestan from 2000 to 2003). Khoozestan provinces with 3 837 334 population about 874 were infected which 229 were positive Smear. It means 229 had pulmonary tuberculosis and 211 were negative Smear. Out of the total infected 25 had reinfection. Esfahan

province with 3 674 086 population, about 375 were infected which 155 had positive and 64 had negative smears, that 149 had extrapulmonary tuberculosis. Out of the total infected only 7 had reinfection. Chahaar-Mahaal province with 779 546 population about 67 were infected which 22 had positive and 15 had negative Smears. Thirty had extra pulmonary tuberculosis. In this province there was no reinfection during these years.

PS-1314-22 Design and implementation of a representative study of tuberculosis among the foreign-born in the United States and Canada

A L Davidow,¹ R Reves,² D J Katz.³ ¹Preventive Medicine & Community Health, New Jersey Medical School, Newark, New Jersey, ²Denver Public Health, Denver, Colorado, ³Centers for Disease Control & Prevention, Atlanta, Georgia, USA.
Fax: (+1) 973-972-7625. e-mail: davidowal@umdnj.edu

Background: Tuberculosis (TB) in low burden TB countries is increasingly concentrated among immigrants and refugees from high burden countries. Research and control activities among such populations share similar challenges, including language and cultural barriers. For researchers, an additional difficulty is assembling enough participants from individual world regions to draw generalizable conclusions.

Methods: A consortium of academic and public health agencies designed a large research study (recruitment goal 1500) in 17 states and 2 provinces of the United States and Canada that addressed those challenges.

Results: (1) 24 sites with access to representative foreign-born populations agreed to participate; 2) a standardized questionnaire was developed, piloted, and translated into 10 languages; 3) arrangements for questionnaire administration were made for an additional 17 languages; and 4) 50 interviewers were trained in cultural competency and the uniform use of interpreters. Demographic and linguistic characteristics of subjects recruited through the midpoint of data collection will be presented.

Conclusion: A study of tuberculosis among the non-native born was facilitated by extensive training, attention to cultural and language issues and the use of non-governmental organizations. This model can be applied to other low burden countries.

PS-1365-22 Setting the agenda: a new model for collaborative tuberculosis epidemiologic research

R Albalak, D Katz, B L Bouler, R E Bailey, C J Kissler, T R Navin. Division of Tuberculosis Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA.
Fax: (+1) 404-639-8604. e-mail: rka3@cdc.gov

We describe the structure, mission, and research of the Tuberculosis Epidemiologic Studies Consortium (TBESC), a new approach to applied collaborative research. TB research in the United States faces a para-

dox: because of the nation's success in reducing TB incidence, there are too few cases in any one jurisdiction to support the research needed to maintain and accelerate the decline. Our solution, the TBESC, pools the expertise and TB cases from 21 academic, clinical, and governmental sites across the United States and Canada. The TBESC, established by the Centers for Disease Control and Prevention, conducts programmatically relevant epidemiologic, behavioral, economic, laboratory, and operational research for TB prevention and control. It also builds the research capacity in TB programs and promotes local and regional collaboration. To date, the TBESC has launched 16 studies on topics ranging from the evaluation of new diagnostic tests to the epidemiology of tuberculosis among persons born outside the United States. The TBESC's research looks for breakthroughs that will dramatically accelerate the decline in TB incidence. It also focuses on programmatic needs for more effective TB control. We hope researchers will improve upon this model and adapt it to other important public health problems.

PS-1398-22 Overview of the Selangor State tuberculosis control programme, Malaysia, 2004

B Venugopalan, R Prema, S Anita. Selangor State Health Department, Ministry of Health, Malaysia, Klang, Selangor, Malaysia. Fax: (+603) 55186252.
e-mail: venubalan@hotmail.com

Tuberculosis (TB) is the second highest communicable disease notified in Selangor state over the last 5 years. This was a descriptive study of the epidemiology and management of TB cases among residents of Selangor state. In 2004, the state TB notification rate was 42/100 000 population (1912 cases) and this was an increasing trend over the last 5 years. Pulmonary TB accounted for 94% of the total TB cases notified of which 43% were sputum smear positive. The age specific incidence rate was highest in the older population >65 years (116/100 000 population) with a male preponderance (59/100 000 population). The TB treatment defaulter rate was 5.6% with directly observed treatment (DOT) coverage of 89%. The human immunodeficiency virus (HIV)-TB co-infection rate in the prisons/drug rehabilitation centers (DRC) was 8.4%. The private health care sector managed 16% (300 cases) of the total TB cases notified but these patients were not included in the current national TB Information System. The recommendations were for increased emphasis on addressing the challenge of HIV-TB co-infection in prisons/DRC and the active engagement of the private health care sector in managing TB patients according to the national TB control programme guidelines.

PS-1409-22 Treatment outcome of pulmonary tuberculosis in district of Lahad Datu Sabah, Malaysia

J F Dony. Health Department of Sabah, Ministry of Health Malaysia, Kota Kinabalu, Sabah, Malaysia.
Fax: (+60) 88718637. e-mail: jloris@jksabah.gov.my

Objective: To review treatment outcomes of PTB registered in 2003.

Setting: All cases of documented PTB treated by government clinics.

Methods: PTB defined as lesion in the lung parenchyma and PTB smear negative microscopy identified with at least three smear microscopy done and the chest X-Ray reading consistent of Tuberculosis characteristics. Second data entry and surveillance audit in outcome analysis were performed to all registered patients. Demography, cases by month, frequency of smear microscopy and treatment outcome were analyzed.

Results: Two hundred and twenty four (224) PTB were identified. One hundred and thirty two cases (59%) identified as negative smear microscopy. Forty two (61%) of PTB smear microscopy negative found to have two or less smear done upon diagnosis. One hundred and thirty three (62%) patient were successfully treated, nineteen (9%) were treatment after interruption, thirty four (15%) were lost to follow-up, three died (1%) and twenty eight (13%) were changed diagnosis.

Conclusion: The success rate is low and significant findings of 15% lost to follow-up, 13% change diagnosis and 9% treatment after interruption.

PS-1510-22 Tuberculosis in Galicia, Spain. Epidemiology, 1996–2003

E Cruz-Ferro,¹ J A Taboada-Rodríguez,¹ A Fernández-Villar,² A Rodríguez-Canal,³ A Castro-Paz.³
¹Directorate General for Public Health of the Galician Government Health Department, Santiago de Compostela-A Coruña, ²Unidad de Tuberculosis, Servicio de Neumología, Complejo Hospitalario Universitario de Vigo, Vigo-Pontevedra, ³Unidad de Tuberculosis, Servicio de Neumología, Complejo Hospitalario de Ourense, Ourense, Galicia, Spain.
Fax: (+34) 981542970. e-mail: elena.cruz.ferro@sergas.es

In 1995 Galicia starts a tuberculosis prevention and control programme. Since 1996 exist a registry of tuberculosis (TB) cases diagnosed in Galicia. The cases proceed from the notification at TB units and from search unreported cases that these units realize.

Objective: To know the TB evolution in Galicia since 1996 to 2003.

Methods: Descriptive analysis of the registered cases.

Results: In this period the incidence descended from 72.33/100 000 to 45.33/100 000. In Pulmonary and Bacilliferous cases the decrease was from 44.66 to 30.64 and 25.30 to 17.48/100 000, respectively, between 1996–2003. Maximum incidence was detected among persons 15–44 years of age. Localization: Pulmonary: 60%. Pulmonary+extrapulmonary: 8%.

Extrapulmonary: 32%. Coinfection HIV and TB: 9.5% of all cases of TB were HIV(+) persons, in 1996. In 2003 were 4.9%.

Conclusions: 1) Incidence of TB in Galicia is higher than expected for its social and economic level. 2) High incidence of TB in younger age groups suggests a historical lack of long term effective measures of control of TB infection. 3) From the putting in March of the tuberculosis prevention and control programme, the evolution of this disease in our region is satisfactory.

PS-1513-22 Follow-up of tuberculosis cases diagnosed in Galicia, Spain between 1996–2002

E Cruz-Ferro,¹ E Fernández-Nogueira,¹ V Tüñez-Bastida,² E Vázquez-García-Serrano,³ M I Ursúa-Díaz.⁴
¹Directorate General for Public Health of the Galician Government Health Department, Santiago de Compostela - A Coruña, ²Unidad de tuberculosis. Servicio de Medicina Preventiva. Complejo Hospitalario Universitario de Sant, Santiago de Compostela - A Coruña, ³Unidad de tuberculosis. Servicio de Medicina Preventiva. Complejo Hospitalario Arquitecto Marcide-No, Ferrol - A Coruña, ⁴Unidad de Tuberculosis. Servicio de Medicina Preventiva, Complejo Hospitalario Universitario de A Co, A Coruña, Galicia, Spain.
Fax: (+34) 981542970. e-mail: elena.cruz.ferro@sergas.es

A Galician Plan for Tuberculosis Control and Prevention (GPTCP) was established in 1995. Its main goal is to record every new case of tuberculosis (TB) and to ensure that every patient adheres to therapy.

Objective: To know the final situation of every patient who was diagnosed of TB in 1996–2002.

Methods: Data analysis of recorded cases in the GPTCP.

Results: Registered cases: 2030; 1814; 1723; 1600; 1609; 1360 and 1303 respectively.

Final situation:

- Satisfactory result (bacteriological healing + completed treatment): 82.61%; 84.95%; 87.17%; 83.94%; 86.76%; 89.12% and 87.95% respectively.
- Potentially unsatisfactory result (not recovered abandons + losses + movement of region + no data): 8.67%; 7.50%; 4.99%; 5.19%; 5.47%; 4.34% and 5.22% respectively.
- Death for TB: 1.97%; 2.04%; 1.57%; 1.94%; 1.24%; 0.81% and 0.92% respectively.
- Death for other reasons: 6.75%; 5.51%; 6.27%; 5.94%; 6.53%; 5.74% and 5.91% respectively.
- DOT: 4.88%; 7.72%; 9.52%; 11.81%; 14.11%; 17.21% and 16.42% respectively.

Conclusions: 1) The percentage of satisfactory results super 85% of all the cases that initiated treatment anti-tuberculosis in this period. 2) The establishment of DOT was done in all those cases in which it was considered to be necessary.

PS-1520-22 Possible indicators for tuberculosis treatment outcome in low-incidence countries

C E French, D Antoine, J Jones, J Crofts, J M Watson.
Respiratory Diseases Department, Health Protection Agency
Centre for Infections, London, UK. Fax: (+44) 20 8200 7868.
e-mail: clare.french@hpa.org.uk

Background: The proportion of successful treatment outcome among tuberculosis cases is a key indicator to assess tuberculosis control efforts. Outcome monitoring was introduced in England, Wales and Northern Ireland in 2002 for cases reported in 2001.

Objective: To suggest additional treatment outcome indicators for low tuberculosis incidence countries.

Methods: Outcome was assessed at 12 months after start of treatment. Treatment completion was used to indicate a successful outcome.

Results (preliminary): 67% of all new pulmonary sputum smear positive cases reported in 2002 completed treatment, but the proportion was 76% if calculated among those for whom outcome was reported (85% of all cases). The proportion completing treatment decreased with increasing age. Among cases aged below 60 years: 73% of all cases, and 81% of cases for whom outcome was reported, completed treatment.

Discussion: Results are comparable with other European countries, but below the World Health Organization success target (85%). This is mainly due to missing outcome information, and the impact of death in the elderly (not necessarily linked to tuberculosis). The proportion of treatment completion among cases aged below 60 years (in whom outcome has been reported) would be a useful additional treatment outcome indicator for low tuberculosis incidence countries.

PS-1978-22 Patient and health care system delays in the commencement of tuberculosis treatment

M G Farah,^{1,2} J H Rygh,^{1,2} T W Steen,³ R Selmer,¹ E Haldal,¹ G Bjune.² ¹Norwegian Institute of Public Health, Oslo, ²Institute of General Practice and Community Medicine, Faculty of Medicine, University of Oslo, Oslo, ³Health And Welfare Agency, Oslo, Norway. Fax: (+47) 22042513.
e-mail: m.g.farah@medisin.uio.no

Aims: To assess the delays in commencement of treatment for tuberculosis (TB) patients in Oslo / Akershus region, Norway and to analyze risk factors for the delays.

Methods: This study was based on information from the National TB Registry, clinical case notes from hospitals and referral case notes from primary health care providers. The association with sex, birthplace, site of the disease and age group was analyzed by multiple regression.

Results: Among the 83 TB patients included in this study, 71 (86%) of them were born abroad. The median patient, health care system and total delays were

28, 33 and 63 days respectively, with range 1–434 days. Patient delay and health care system delay did not vary significantly between men and women, according to birthplace or age group. Only patients with extra-pulmonary TB had a significant longer patient, health care system and total delay compared to patients with pulmonary TB. Median total delay was 56 and 81 days respectively, in the two groups of TB patients.

Conclusion: A high proportion of patients had delays in commencement of TB treatment exceeding two months. Efforts should be made to increase awareness of TB both among health care providers and patients to reduce delays.

PS-2047-22 Tuberculosis among health care workers in a Western European city: an increasing problem

P D O Davies, S J Jamieson, C S D Williams, P Jones.
Tuberculosis Research Unit, Liverpool, UK.
Fax: (+44) 151 293 2254. e-mail: peter.davies@ctc.nhs.uk

In Liverpool (UK) from January 2000 to 2003 (36 months) there were only 7 cases of tuberculosis (TB) in Health Care Workers (HCWs) (3.5%) of total cases. Of these 7, one had been born in the UK and one, of Nigerian origin, had been in the UK for 35 years. In the next 18 months, 16 cases of TB in HCWs were notified (15%) of total cases, all were foreign born. Over the next 6 months from October 2004 to March 2005 a further 12 cases of TB in HCWs were notified, (25%) of the total. The proportion who were sputum smear positive was similar (30%) in each time period. Extensive contact tracing failed to show any transmission within this country. The rise in TB in HCWs is almost entirely related to ethnicity and foreign birth and shows that the UK health system is increasingly dependant on overseas workers. It also highlights the need for vigilance in pre-employment screening and to be alert to the possibility of the development of TB within the first five years of entry to the UK.

PS-2108-22 Is the DOTS strategy a useful tool for tuberculosis control in a medium incidence area of Buenos Aires Province?

N M Morcillo,¹ M C Chirico,² A B Kuriger,² M E Etchevarria,² M L Casamajor.² ¹Reference Laboratory TB Control Program of Buenos Aires Province, Vicente Lopez, Buenos Aires, ²TB Control Program of North Buenos Aires Province, Vicente Lopez, Buenos Aires, Argentina. Fax: (+54) 1147219153.
e-mail: nora_morcillo@fullzero.com.ar

To evaluate the usefulness of DOTS (directly observed therapy short course) for tuberculosis (TB) treatment in North Buenos Aires area (NBA), a cohort study of the cases produced during 2003 was performed. The treatment success was evaluated by comparing two different sub-cohorts: 'A' (*n*: 610),

districts with at least 65% of DOTS application, and 'B' (n : 720) with less than 65%. A mortality comparison of patients with and without HIV association was also performed. Cohort 'A' showed a treatment success of 85.7% (523/610) for both global and those bacteriological proved respiratory cases, whereas cohort 'B' showed figures of 67.6% (522/772) ($P < 0.0001$). The mortality rate was 5.4% (72/1328). In cohort 'A', 55.6% (15/27) of HIV co-infected patients received DOTS and 7 died while in cohort 'B' 16.0% (8/50) received DOTS and none died (P : 0.0519). DOTS strategy has demonstrated to be a useful tool for TB treatment. Maintenance of DOTS strategy activities along the time as well as its extension to most of the healthcare settings, will be crucial to reach the goals proposed by international and national organizations devoted to fight against TB.

PS-2150-22 Emergence of *Mycobacterium tuberculosis* of the Beijing family in a country with a low incidence of TB

S Ghebremichael,¹ T Koivula,¹ R Petersson,¹ E Andersson,¹ A Lindborg,¹ A Tesfay,² B Petrini,³ S Hoffner,¹ V Romanus,² G Källénus.¹ ¹Departments of ¹Bacteriology and ²Epidemiology, Swedish Institute for Infectious Disease Control, Solna, ³Department of Clinical Microbiology, Karolinska University Hospital, Stockholm, Sweden. Fax: (+46) 8 30 17 97. e-mail: Solomon.ghebremichael@smi.ki.se

Background: Sweden has 9 million inhabitants, about 10% being foreign born. The TB incidence is low, and drug resistance (DR) about 10%. More than two thirds of new TB cases are foreign born.

Aim: To investigate the presence and possible transmission of Beijing genotype strains in Sweden in relation to DR.

Methods: All DR *M. tuberculosis* complex isolates between 1994 and 2004 were investigated at the Swedish Institute for Infectious Disease Control. DR was defined as resistance at least to one of the drugs streptomycin, rifampicin, isoniazid or ethambutol. For comparison isolates from 671 consecutive patients isolates were typed with RFLP and spoligotyping.

Results: Forty (11%) of the DR isolates and 26 (4%) of the drug susceptible isolates were of Beijing genotype. Of the resistant Beijing strains 9 were MDR. Eight clusters were found. The largest cluster comprised five patients, three of them coming from the former Soviet Union.

Conclusions: The majority of the patients with Beijing strains were foreign born, mainly coming from countries with high prevalence of DR Beijing strains. So far no extensive spread of DR Beijing genotype has occurred within Sweden.

PS-2232-22 Pleural and pleuropulmonary tuberculosis in São Paulo State, Brazil: a review from 1998 to 2004

M Seiscento,¹ V Galesi,² M J P Rujula,² L Santos,² S Bombarda,¹ F S Vargas.² ¹Pulmonary Division, Heart Institute (InCor), University of São Paulo, São Paulo, ²Centro de Vigilância Epidemiológica, São Paulo, São Paulo, Brazil. Fax: (+55) 11 38154075. e-mail: 600@uol.com.br

The epidemiology, HIV comorbidity, diagnosis methods and pleural (TBpl) and pleuropulmonary tuberculosis (TBpp) treatment outcomes information of all TBpl and TBpp notified at the Epidemiological Surveillance system of São Paulo State, Brazil, from 1990 to 2004, was analyzed. Of all TB cases (20.006 ± 512 SD) 1.6% had TBpp and 8.2% TBpl. Male patients predominate in pleural diseases (Male/ Female ratio = 2:1) and in the 20–49 age group (70%). Positive HIV serology was observed in 17.1% of TBpp and 9.2% TBpl patients. Sputum or pleural fluid testing for acid-fast, culture and histological analyses improved the diagnosis rate, which was positive in 35.5%, 7.2% and 13% for TBpp; and 3%, 5% and 34% for TBpl, respectively. Of those patients (85%) whose treatment outcome was informed, 80% cured, 11% defaulted, 2.4% were TB deaths, 4% non-TB deaths, and 2.6% diagnosis changes. It seems that the majority of cases may have been empirically treated, since the diagnosis not always was based on bacteriology or histology. Therefore, it is recommended that pleural fluid adenosine deaminase be implemented as an effective screening tool to diagnosis pleural tuberculosis.

SYMPOSIA ABSTRACTS ADDED IN PROOF

SYMPOSIUM THURSDAY, 20 OCTOBER STRATEGIES TO PREVENT LUNG DISEASE IN CHILDREN

Weekly zinc supplements prevent pneumonia, diarrhoea and reduce mortality in children less than 2 years old in a Dhaka urban low-income population: a randomised controlled trial

W A Brooks. ICDDR, B: Centre for Health and Population Research, Dhaka, Bangladesh. Fax: (+1 503) 210 0453. e-mail: abrooks@icddr.org

Background: Pneumonia and diarrhoea are leading causes of morbidity and mortality in children 5 years old. Most deaths occur during infancy and in developing countries. Daily zinc regimens have reported prevention of acute lower respiratory tract infection and diarrhoea and child mortality reduction. Children 2 years are at high risk due to both disease burden and lack of options for non-conjugate vaccine strategies. We hypothesised that weekly zinc administration could prevent clinical pneumonia and diarrhoea in children 2 years old.

Methods: In a double-blind placebo-controlled trial, we administered zinc (70 mg) once weekly to poor urban children. Outcomes included rates of pneumonia and other respiratory tract infections, diarrhoea, growth, final serum copper, final haemoglobin and death.

Results: Between 21 April 1999 and 29 August 2000, 1655 children 60 days to 12 months old were enrolled and randomised to zinc or placebo groups until they completed 12 months of administration. Overall pneumonia was reduced by 17% (RR 0.83, 95% CI 0.73–0.95), severe pneumonia by 49% (RR 0.51, 95% CI 0.30–0.88), otitis media by 42% (RR 0.58, 95% CI 0.41–0.82), diarrhoea by 6% (RR 0.94, 95% CI 0.88–0.99) and mortality by 85% (RR 0.15, 95% CI 0.03–0.67). There were no pneumonia-related deaths in the zinc group vs. 10 in the placebo group ($P = 0.013$). The zinc group had a small height gain ($P = 0.022$) but not weight. Serum haemoglobin and copper concentrations were not adversely affected after 10 months of administration.

Conclusion: 70 mg of zinc weekly reduces pneumonia, severe pneumonia and mortality in young children.

SYMPOSIUM FRIDAY, 21 OCTOBER SCALING UP TB CONTROL TO MEET THE NEEDS OF THE POOR

TB-HIV: comments and discussion

R A Dlodlo. International Union Against Tuberculosis and Lung Disease (The Union), Bulawayo, Zimbabwe. Fax: (+263) 9 243 809. e-mail: rdlodlo@iuatld.org

Major barriers faced by the poor and other vulnerable and disadvantaged population groups in accessing effective tuberculosis services include geographical, economic, socio-cultural and health system related barriers. These obstacles will be discussed in relation to TB-HIV co-infection and provision of additional services that are required to address management of individuals with the co-infection. They include, first, HIV testing of patients with tuberculosis. Second, tuberculosis patients found to be infected with HIV should be offered, in addition to tuberculosis treatment, treatment of other opportunistic infections, cotrimoxazole preventive treatment and reliable access to long-term HIV/AIDS care, including antiretroviral treatment with appropriate monitoring. Conversely, HIV-infected individuals should be screened for active tuberculosis and offered necessary follow-up services. Based on the current literature, it will be argued that the poor with TB-HIV co-infection face similar barriers as poor individuals with tuberculosis only. The degree of severity of constraints and obstacles may be further aggravated by slow speed of rolling out of HIV-related services and therefore, limited geographical accessibility of HIV counselling, testing and treatment facilities. Services may not be affordable and treatment adherence may be adversely affected due to payments demanded for life-long treatment, HIV tests and loss of income caused by chronic ill-health associated with HIV infection. Health systems may view HIV care, particularly antiretroviral treatment, as a specialist-led, central hospital-based intervention rather than an activity that can be decentralised to, for example, district-level health units. In several settings, stigma, fear of discrimination, rejection and violence, especially affecting women, surrounding HIV/AIDS pose serious socio-cultural obstacles in accessing TB-HIV diagnosis and care. Collaborative TB-HIV services have several challenges, including reaching out to the poor and marginalised population groups with safe, sustainable and free of charge services for all who require them, and planning and acting in an integrated, multi-sectoral and flexible manner that is sensitive to the local context and incorporates working partnership with communities.

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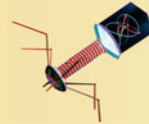
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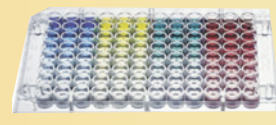
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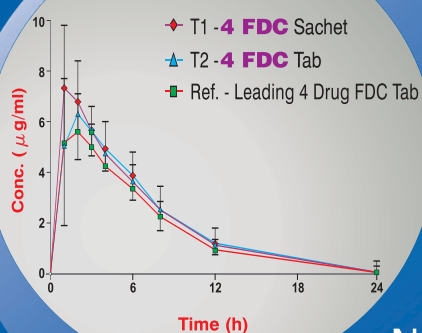
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