performed in Epidata version 3.1 and analysed in Epidata Analysis V.2.2.1.171.

Results: 1702 patients were recruited out of an intended 1800. Of these 1451 grew *Mycobacterium tuberculosis*. Any resistance to isoniazid (H) was 20% (95%CI 17.7–21.8) while any resistance to rifampicin (R) was 9% (95%CI 7.5–10.5). Resistance to H and R in retreatment cases was 38% (CI 33.5–43.6) and 22% (CI 18.0–26.6) respectively. Any multidrug resistant (MDR) TB was 6.9% (95%CI 5.7–8.3) while MDR–TB in new and retreatment cases was 3.8% (95%CI 2.8–5.1) and 16.5% (95%CI 13.8–20.8), respectively.

Conclusion: Resistance levels to H and R (including MDR-TB) among SSP patients are high. Namibia should consider rapid H and R testing for all SSP cases TB cases regardless of treatment history. In the absence of this testing, category 1 continuation phase should use R, H and Ethambutol due to initial high H resistance. A similar study should be considered using culture positivity as the inclusion criteria to give a more generalisable picture.

PC-101508-13   The true costs for patients to receive free TB and MDR-TB care

A Gavino,[1,2,3,4] R Montoya,[1,3,4] J Alva,[1,3] J Franco,[1,3] B Valiente,[1,3] M Rivero,[1,2,3] C Acosta,[3] C A Evans.[2,3,5] [1]Asociación Benéfica Prisma, San Miguel, Lima, [2]Universidad Peruana Cayetano Heredia, San Martín de Porres, Lima, Peru; [3]Innovation For Health And Development, London, UK; [4]ADRA Perú, Miraflores, Lima, Peru; [5]Imperial College of London, London, UK. e-mail: arquimedesgavino@gmail.com

Background: Tuberculosis (TB) treatment is ostensibly free to the population of Peru. However, TB patients often cite difficulty affording treatment as their main obstacle to treatment adherence. We investigated this paradox quantifying direct expenses incurred through treatment and indirect costs of lost income due to time spent away from work.

Methods: This was a prospective cohort study conducted in high TB incidence shantytowns in Lima, Peru. Patients who completed treatment between 2002 and 2009 ($n = 876$) were interviewed using a structured questionnaire regarding costs before and during treatment. Direct costs were defined as treatment-seeking expenditures. Indirect costs were defined as loss of household productive labour time for patients and family. Results were stratified between patients with drug susceptible ($n = 841$) and multidrug-resistant TB (MDR-TB) ($n = 35$). The unit of measurement used was the average per capita monthly income (MI) in TB-affected families, which was $36 US.

Results: The average total direct expenses prior to diagnosis were 4.5 MI, which comprised of 31% medicines, 5.8% natural remedies, 15% travel, 31% medical care, 17% food and 4.6% other costs. During treatment, average direct expenses were 4.6 MI and had a similar distribution except for greater
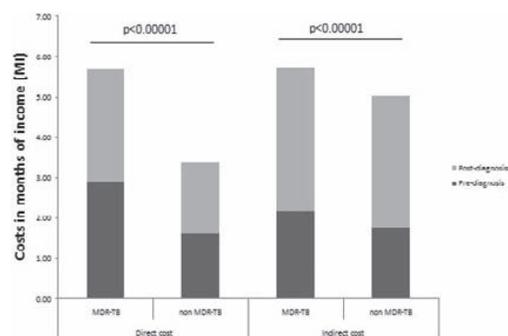

Figure   The costs for patient to receive free TB and MDRTB care.

travel expenses. The indirect cost of lost income was 3.9 MI prior to and 6.9 MI during treatment. Thus, the total direct expenses plus indirect costs of lost income prior to and during treatment combined was on average 19.9 MI per patient. Total costs were significantly greater for MDR-TB patients (11.5 MI) compared to patients with drug-susceptible TB (8.4 MI, $P < 0.0001$).

Conclusion: Even when diagnostic testing and TB treatment are provided free of charge, the direct and indirect costs to patients are high, especially for patients with MDR-TB. Economic support is likely to be necessary for poorer patients to be able to afford free treatment.

PC-100570-13   MDR-TB is bad enough: impact of second-line drug resistance on TB treatment outcomes in the US

S Althomsons,[1] P Cegielski.[2] [1]Northrop Grumman, CDC Contract, Atlanta, GA, [2]Division of TB Elimination, CDC, Atlanta, GA, USA. e-mail: salthomsons@hotmail.com

Background: The worldwide emergence of XDR-TB focused attention on treatment with second-line drugs (SLDs), however, the impact on treatment outcomes of resistance to individual SLDs is unknown.

Methods: We analyzed treatment outcomes among drug-resistant TB cases in the US national TB surveillance system, 1995–2006. We defined 3 patterns of first line drug (FLD) resistance: INH alone, INH+RMP, INH+FLDs other than RMP. We also defined 3 patterns of SLD resistance: fluoroquinolones (FQs) alone, injectables alone, and other SLDs. Using 2-way and stratified frequency tables, we compared treatment outcomes of cases having each pattern of FLD+SLD resistance with cases having the same FLD resistance but no SLD resistance. We used the χ^2 test, Fisher's exact test, and Mantel-Haenszel methods to determine statistical associations.

Results: Cases with resistance to INH or INH+FLDs other than RMP had signficantly better outcomes than cases with additional resistance to SLDs, e.g., INH resistant+FQ susceptible: 76% success vs. INH