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ABSTRACT BOOK

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on Lung Health of the
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The International Journal of Tuberculosis and Lung Disease

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

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PLENARY SESSIONS

SATURDAY, 10 NOVEMBER 2007

Robert Koch and the discovery of the tubercle bacillus: the challenge of HIV and tuberculosis 125 years later

A D Harries.^{1,2} ¹HIV Unit, Ministry of Health, Lilongwe, Malawi; ²Family Health International, Arlington, Virginia, USA; London School of Hygiene and Tropical Medicine, UK.
e-mail: adharries@malawi.net

In 1882, Robert Koch discovered the tubercle bacillus, and paved the way for the modern scientific and programmatic management of tuberculosis (TB). Good progress in TB control was achieved until the arrival of the human immunodeficiency virus (HIV) and the subsequent start of the AIDS pandemic in 1981. These have created new challenges which need to be addressed if the Millennium Development Goals of halving TB prevalence and TB deaths by 2015 are to be realised. The great battleground to control HIV and TB is in sub-Saharan Africa. Here, HIV is associated with a large increase in the number of new and recurrent cases of TB; diagnosis is more difficult due to more cases of smear-negative and extra-pulmonary TB; case fatality is increased as a result of serious HIV-related disease; and HIV facilitates transmission of MDR- and XDR-TB. Strategies have been devised to decrease the joint burden of HIV and TB. First, there needs to be better collaboration between HIV/AIDS and TB programmes, particularly in joint monitoring and evaluation. Second, the burden of TB in people living with HIV/AIDS can be reduced by: i) intensified TB case finding; ii) isoniazid preventive therapy; and iii) TB infection control in health care and congregate settings. Third, the burden of HIV in TB patients can be decreased by: i) ensuring that all TB patients are HIV tested and counselled through an opt-out approach; and ii) providing cotrimoxazole preventive therapy and antiretroviral therapy (ART) to HIV-infected TB patients. The many difficulties of combining anti-tuberculosis treatment and ART have to be resolved if ART is to have

its anticipated impact in reducing TB case fatality. The challenge ahead lies in translating these TB-HIV strategies into action at the country level, and this requires accountability, efficient flows of funds, monitoring, supervision and leadership.

SUNDAY, 11 NOVEMBER 2007

Strengthening laboratory services for today and tomorrow

P M Small. Bill and Melinda Gates Foundation, Seattle, Washington, USA.
e-mail: peter.small@gatesfoundation.org

Antiquated and inadequate tools for preventing, diagnosing and treating tuberculosis are among the major impediments to global TB control. Furthermore, it is apparent that current systems for delivering these services are woefully inadequate. While rapid progress is being made in the development of improved tools, even the most optimistic scenarios suggest that better tools will not be available in time to help tens of millions of patients. Thus, it is imperative that the world vigorously pursues a two pronged strategy of continuing to scale up laboratory services for existing diagnostic tests while simultaneously developing, testing and implementing novel diagnostic tests. Together, these activities have tremendous synergistic potential to maximize the impact of existing and future technology to save lives today and tomorrow.

MONDAY, 12 NOVEMBER 2007

Eero Tala Lecture Health systems that serve: what's the bottom line?

D A Enarson. International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+33) 1 43 29 90 87.
e-mail: DEnarson@iuatld.org

Poor health is a challenge for the poorest: it makes poor people poorer. Health services must have a high

priority. Why are health services of poor quality and do not serve? One of the main reasons is inadequate human resources. This is because: First, they are improperly prepared for the tasks for which they are responsible. Numerous evaluations of medical students' and new graduates' knowledge about priority conditions and their management, such as is the case for tuberculosis, HIV and tobacco prevention. Inadequate curricula, which do not take account of national policies, train health care workers who are qualified in many instances to provide health care in industrialized countries, but who know nothing about their own national policies. Second, international organizations give mixed messages to Ministries of Health. On the one hand, they push the adoption of international standards of care that necessitate a certain level of health services personnel for their implementation and on the other hand, they promote policies of human resource management that are incompatible with the needs of the programmes that they promote. Finally, health services personnel are frequently undervalued in their own environments and consequently they migrate to areas of greater economic opportunity at the same time that many of their colleagues succumb to the very diseases they are meant to care for. The bottom line is that health services cannot serve if human resources are not cherished and developed.

SYMPOSIA: SATURDAY 10 NOVEMBER 2007

WHAT HELPS, WHAT HURTS: CLIENT AND FRONTLINE PROVIDER PERSPECTIVES ON TB-HIV SERVICE INTEGRATION

Beyond pills: how to support clients in TB and HIV treatment

E T Santos Filho.¹⁻⁴ ¹Stop TB Coordinating Board, Geneva, Switzerland; ²Brazilian CCM Vice-Chair, Rio de Janeiro, RJ, Brazil; ³Consultant, Public Health Watch, Open Society Institute (PHW-OSI), New York, New York, USA; ⁴Independent consultant, TB-HIV social mobilization expert, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 2285 2029. e-mail: tbhiv@eziocon.net

People facing TB and HIV treatment have necessarily to deal with several difficulties which became common place in the last decades; nevertheless they remain unsolved. What hurts: pill burden, high toxicity of concomitant TB and HIV schemes, malnutrition, limitations to access services and general issues related to living conditions in low income or poverty settings. What helps: anything that aid overcoming those obstacles. Although progress is being made: to develop new drugs; offer better schemes; reduce treatment length, and introducing new diagnostics, novelties will take time. However, direct practical support to patients to complete successful treatments is permanently needed. The traditional approach in medicine tends to reduce treatment to provision of services and medication. These practices do not consider listening to patients or taking their limitations seriously into consideration, especially in low income countries where therapeutic schemes are limited. Accessing patients' needs, limitations and satisfaction can be scientifically performed by operational research. They can effectively propose changes in service delivery and methodologies. Moreover, practical support to people living with the diseases can be efficiently performed not only by health or social workers, but also by empowered community members. Both operational research and community initiatives are already in course in many places in the world, but they need to be systematically incorporated to the day-to-day practice in order to change the overall picture. To widely support clients, i) awareness raising activities about the diseases and the patients' role are needed; ii) empowering community members and encourage peer support by people living with the diseases is critical; iii) incorporate regular civil society monitoring and participation in policy making levels will accelerate the change. We need in TB—and revitalize in AIDS—the concept of the GIPA Principle.

Improving integrated care for HIV-positive people with TB

C Eang,¹ P Chheng,² M E Kimerling,² N Song.¹ ¹Family Health International Cambodia, Phnom Penh, Cambodia; ²Gorgas TB Initiative, Birmingham, Alabama, USA. Fax: (+855) 23 21 19 13. e-mail: chanthol@fhi.org.kh

Issue: TB is the most common life threatening opportunistic infection in HIV/AIDS patients. 1/3 of deaths among PLHA is due to TB, especially in developing countries. Earlier TB screening and treatment among PLHA is very crucial. The lack of linkage between disease control efforts for TB and HIV, impacts the outcomes for both diseases.

Description: In late 2003, a pilot TB-HIV project and a model of Continuum of Care (CoC) for PLHA was introduced in Battambang. The project developed the linkage between TB and HIV activities in referral hospitals (RH), provided opportunities for HIV infected persons to have access to early TB diagnosis and treatment, and TB patients to have access to HIV counseling and testing. In 2004–2005 and 2006–2007, 83% and 98% of HIV positive clients were referred for TB screening, respectively. In addition, 26% (2004–2005) and 55% (2006–2007) of active TB patients were referred for HIV testing. Those who were found to have active TB were provided TB drugs using DOTS strategy. At the site, other OI treatment and prophylaxis is also provided. In addition, ARV drugs are given to eligible PLHA regardless of TB status. Patients receive intensive drug education and counseling performed by RH staff and PLHA coordinators to improve adherence. Defaulter tracing is performed by health staff and/or home based care teams.

Lessons learned: Linkages between TB-HIV services with other CoC services, improves access to early interventions among TB patients and HIV infected persons for TB diagnosis and treatment, prophylaxis and treatment against other OI, and access to ART.

QUALITY MANAGEMENT SYSTEMS FOR LABORATORY SERVICES

Performance indicators for the effectiveness of TB screening programmes for migration of persons from countries of high TB prevalence to low TB prevalence settings

C M Gilpin. Queensland Mycobacterium Reference Laboratory, Brisbane, QLD, Australia. Fax: (+617) 3 636 1336. e-mail: chris_gilpin@health.qld.gov.au

In most developed countries the combination of high living standard and public health measures has reduced the incidence of tuberculosis (TB) to historically low levels. However, migration of persons from high TB prevalence countries is contributing to the disease prevalence in low prevalence settings such as Australia,

North America and Western Europe. Evaluating the incidence of TB among amongst newly arrived migrants provides a measure of the effectiveness of any pre-migration screening for TB. As pre-migration screening protocols vary depending on the country of resettlement performance indicators for the sensitivity of AFB microscopy performed should be correlated with culture particularly when AFB microscopy is used as the sole tool to screen for prevalent cases of active TB. Many developed countries allow migrants with Class B1 active TB (AFB sputum smear negative) or Class B2 inactive TB to migrate on the condition that they self notify to a regional health authority shortly after arrival. Monitoring the proportion of cases that are lost to follow-up after migration will be an important indicator of effectiveness of migration policy in different country settings. Molecular epidemiological tools such as MIRU analysis can be used to evaluate the effectiveness of TB control measures in the countries of resettlement by monitoring the degree of clustered strains among native and foreign born persons.

Validation of AFB smear microscopy quality indicators: experience from Kinshasa, Democratic Republic of Congo

A Van Deun,^{1,2} M Zwahlen,³ V Bola,⁴ R Lebeke,⁴ E Bahati,⁴ P Lubamba,⁵ H L Rieder.¹ ¹International Union Against Tuberculosis and Lung Disease, Paris, France; ²Mycobacteriology Unit, Institute of Tropical Medicine, Antwerp, Belgium; ³Department of Social and Preventive Medicine, University of Bern, Bern, Switzerland; ⁴Programme National de Lutte contre la Tuberculose, Kinshasa, ⁵Fondation Damien, Kinshasa, Congo (Democratic Rep.). Fax: (+32) 3247 6333. e-mail: avandeun@iuatld.org

Setting: Kinshasa Province, Democratic Republic of Congo, with a well developed TB programme including microscopy rechecking, but no means to solve the problems.

Objective: To validate indicators of acid-fast bacilli (AFB) microscopy quality obtained from register counts.

Design: Selection of eleven laboratories with good registration and sufficient variation in rechecking. Calculation of sensitivity compared to recheckers (RS) and its correlation coefficient (R) with four candidate indicators in several variations.

Results: The proportion of positive follow-up smears correlated well [R median 0.81, 95% credibility interval (CI) 0.58–0.93], and the proportion positive cases with already the first smear positive fairly well (R median 0.70, 95%CI 0.38–0.89) with RS. Other candidate indicators showed a poor correlation, among them the proportion of positive suspect smears.

Conclusions: Also from experience visiting laboratories it is clear that the proportion positive follow-up smears is a sensitive indicator of AFB-smear quality. The often monitored proportion of positive suspects is not a good lab quality indicator, but may be more

indicative of accessibility and suspect selection. The data needed for both together also allow calculation of workload, and could be obtained from a very basic and badly needed standard laboratory report. They can be used to guide supervision. Proportion of low positive suspect smears and consistency within case series should be used only on-site by laboratory professionals, since their interpretation must take into account several factors and needs experience. All indicators require more research to define their optimal range in various settings.

Quality control systems for TB culture

S Siddiqi. BDDS, Sparks, Maryland, USA.
e-mail: salman_siddiqi@bd.com

Implementation of a quality control (QC) program is extremely important in the laboratory testing and it should be an integral part of good laboratory practices (GLP). The QC measures should help in overall improving the quality of work, better and faster recovery of mycobacteria from clinical specimens and in reducing the contamination rates in a laboratory. For mycobacterial culture work, there are several ways to monitor quality of routine laboratory testing. QC of each batch of a lab-prepared medium is necessary to make sure that every batch is performing according to the established specifications and the quality is consistent from batch to batch. For commercially prepared medium it is not necessary to carry out QC testing but a QC certificate should be obtained from the manufacturer and should be kept in files. Some large volume labs prefer to do QC testing of each new batch of commercially supplied media and reagents. Besides culture media, all the lab prepared reagents should be periodically checked for sterility and quality. There should be established protocols on how to monitor quality of laboratory procedures. During processing of clinical specimens, negative and positive controls should be included and these controls should be processed in exactly the same way and should be inoculated into the same media as the routine clinical specimens. If a QC test fails, results on all the clinical specimens tested in that batch become invalid. The QC and consistency of laboratory processing may be checked by monitoring and analyzing laboratory results periodically. Details of QC procedures will be covered in this presentation.

Towards laboratory accreditation in resource-limited settings: integration of TB and HIV laboratory services

J R Ridderhof. Centers for Disease Control and Prevention, Atlanta, Georgia, USA. e-mail: jcr0@cdc.gov

Increased support for laboratory capacity, especially for HIV diagnosis and treatment, has resulted in im-

proved facilities, new technologies and equipment and increasingly stable supply chains. As laboratory networks implement new technologies and integrate testing services there is a need to combine different TB and HIV quality assessment methods. This has focused interest in developing integrated laboratory accreditation programs similar to those found in many high resource countries. Laboratory accreditation programs are based on quality frameworks such as the Clinical and Laboratory Standards Institute (CLSI) GP26-A3, application of a quality management system model for laboratory services, and internationally ISO 15189, medical laboratories—particular requirements for quality and competence. National reference laboratories may seek external ISO-based accreditation, but this is not a practical solution for intermediate and peripheral level laboratories where HIV and TB testing services are provided. NTPs and NAPs should work with national authorities to support development of country level accreditation or regulatory standards that can be implemented across the national laboratory system. To be successful any laboratory accreditation program should have: 1) a process for developing standards that includes key stakeholders; 2) assure there is organizational structure and a mandate to implement and monitor compliance with standards—this includes people and transport; 3) integrate key performance indicators for TB, HIV, malaria and other critical testing services. Accreditation might be implemented with a government mandated NGO or be embedded in the MoH. Trained surveyors should be placed at the intermediate level to visit, monitor, and support peripheral level testing services.

MDR-TB AND TB-HIV CONTROL IN PRISONS: ACHIEVEMENTS AND CHALLENGES

Challenges of MDR-TB control in Arkhangelsk Russian Federation penitentiary system

A Mariandyshev,¹ N Nizovtseva,² V Panasiuk,³ T Hasler,⁴ E Heldal.⁴ ¹Northern State Medical University, Arkhangelsk, ²Regional Antituberculosis Dispensary, Arkhangelsk, ³Medical Department Penitentiary System, Arkhangelsk, Russian Federation; ⁴LHL, Oslo, Norway. Fax: (+7) 818 2 263226. e-mail: mao@arh.ru

Background: The fastest rates of the MDR TB distribution occurs in the penitentiary system owing to the presence of the unfavorable sanitary-and-hygienic conditions and density of prisoners.

Objective: Studying of the MDR TB prevalence in the Arkhangelsk region and influence of the DOTS + program implementing on the prevention of the occurrence of the drug resistance epidemic tuberculosis in the penitentiary system.

Methods: Quarterly reports of the registration and MDR TB treatment.

Results: In 2000, 60 MDR TB new cases has been registered, in 2001—80, in 2002—127, in 2003—185, in 2004—239, in 2005—269, in 2006—265. In 2000 the budget of this infection has made 177 patients, in 2001—229, in 2002—327, in 2003—357, in 2004—406, in 2005—513, in 2006—565. The increase of the quantity of MDR TB patients is observed in the civil sector and in the penitentiary system. In connection with the fast increase of MDR TB we created 2 reference laboratories, 2 departments for MDR TB treatment in the Regional Antitubercular Dispensary and in the Regional Hospital of the Penitentiary System. The uniform of the central medical commission supervises treatment of the MDR TB patients in the civil sector and in the penitentiary system. The introduction of the DOTS-Plus program in the Arkhangelsk region including the penitentiary system have allowed to reduce MDR TB among new cases of the disease from 27% in 2005 up to 22% in 2006.

TB-HIV control in prisons of the Dominican Republic

B Marcelino,¹ J J Cordero,¹ J Heredia,¹ A Rodriguez,¹ A Roa,² J J Mendez,¹ J Almonte,² S Santana,² L Reyes,¹ R Valerio.² ¹National TB Program, Distrito Nacional, ²Provincial TB Program, Distrito Nacional, Dominican Republic. Fax: (+1809) 541 3121. e-mail: programatuberculosisrd@mail.com

Introduction: Dominican Republic is included among 10 countries of the Americas that are designated as having a high burden of TB, estimated at 85 cases per 100 000 population, and 1% of the sexually active population has HIV; in some population groups this figure is 5%. The population of the Dominican Republic is 9 249 970. Of the approximately 15 000 Prisoners Lacking Freedom (PPL) in the 39 penitentiary centers (PC), 68.6% have access to medical services. The health establishments that apply the DOTS strategy have incorporated activities of TB prevention, diagnosis and treatment among HIV/AIDS patients.

Objectives: To analyze the TB-HIV epidemiology situation in penitentiary centers in the Dominican Republic.

Methods: The information analyzed was obtained from: 1) National of Penitentiary Centers Survey, 2) the System of Information of the National TB Program and 3) the National HIV/AIDS program.

Results: The annual rate of TB in the PC is 1118/100 000, well above the general population rate for the Dominican Republic (53/100 000). The prevalence of HIV infection is 14.6%, also higher than that in the general population (1%) and TB-HIV co-infection is 14%. Activities are being developed in the prisons.

Achievements: An agreement was signed between the management of the PC and that National TB Program and the National HIV Program. 26 (66.7%) PC have

implemented the DOTS Strategy for TB treatment and two have started integral care for treatment and follow-up of patients living with HIV. Humans Recourse of PC Trained on TB and HIV. PPL Involved in TB and HIV prevention activities. Joint Actions between the programs of TB and HIV/AIDS in all the levels it is fundamental to diminish the co-infection TB-HIV/AIDS.

Challenges: To consolidate the Stop TB strategy in the 100% of the Penitentiary Centers in Dominican Republic. To strengthen and keep political support given to the Stop TB Strategy, included the Penitentiary Centers.

TB, MDR-TB and HIV management in prisons: Moldavian experience

V Burinschi,¹ V Taranu,² A Corlateanu,³ D Sain,⁴ V Crudu,⁵ S Gheorghita,⁶ V Morosanu,⁷ P Sari,⁷ S Catanoi,⁷ L Severin,⁷ S Plamadeala,⁷ R Seicas.⁸ ¹TB/AIDS Project Coordinator, PCIMU TB/AIDS Programme GFATM and WB, Chisinau, ²Head of Medical Service, Penitentiary Department, Ministry of Justice, Chisinau, ³TB Coordinator, Penitentiary Department, Ministry of Justice, Chisinau, ⁴Manager NTP, Institute of Phthysiopneumology, Chisinau, ⁵National TB Reference Laboratory, Institute of Phthysiopneumology, Chisinau, ⁶Head of National AIDS Centre, Chisinau, ⁷NGO 'Carlux', Chisinau, ⁸MSH Moldova, Chisinau, Moldova. Fax: (+373) 22 20 24 37. e-mail: vburinschi@ucimp.md

Objective: To evaluate TB, MDR-TB and HIV management in prisons of Republic of Moldova.

Methods: Retrospective record review of Prison Health Service, National AIDS and TB Control Programmes.

Results: The DOTS implementation started in prisons of Moldova in 2001 and full DOTS coverage has been achieved by the end of 2003. The TB control in prisons is seen as an integral part of the TB control programme in the country. The national TB guidelines are followed in and outside the prisons in Republic of Moldova. MDR-TB is a growing health problem, both in civil and prisons, the number of cases increasing a lot during last years. The implementation of DOTS-Plus Project has been started at the end of 2005, covering patients from both sectors. AIDS control activities include needle exchange programmes, methadone substitution treatment, and distribution of condoms, disinfectants, peer education and informational materials. HAART is available for all those who need it. The number of co-infected TB-HIV cases is increasing and TB-HIV co-infection becomes one of the most important causes of deaths of TB patients in prisons in Republic of Moldova. A comprehensive TB-HIV approach is being a priority in service delivery to TB-HIV co-infected patients. The funding of TB and HIV/AIDS control activities is still heavily dependent on the donors support, which cover from 50–70% of needs.

TB-HIV initiative in prison settings of Central Asia Republics

M S Dara,¹ J van der Meer,² M Borgdorff,¹ N Vezhnina.² ¹KNCV Tuberculosis Foundation, International Unit, The Hague, Netherlands; ²AIDS Foundation East West, Moscow, Russian Federation. Fax: (+31) 70 358 40 04. e-mail: daram@kncvtbc.nl

Background: Since the early 1990s, TB and HIV outbreaks in prisons have been reported in many countries of Eastern Europe. TB is often several times more common in prisons than in the communities. A survey conducted by KNCV Tuberculosis Foundation in 2000 revealed that while Former Soviet Union countries comprise 66% of prison population of Europe, they contribute to 93% of all TB cases among prisoners in Europe. HIV/AIDS is a serious problem for prison populations across Europe and central Asia, particularly due to increased rate of HIV among drug users. In 2005, injecting drug users accounted for more than two thirds (68%) of the 964 new HIV cases reported in Kazakhstan (one third more than the 699 reported in 2004). An estimated 1200 prisoners are living with HIV in Kazakhstan. In a survey among 774 prisoners in 4 Central Asian prisons 54 (7%) had HIV and 273 (35%) had TB. Of those with TB, 24 (9%) were co-infected with HIV.

Challenges: Due to vertical structure of TB and HIV programmes and shortfalls in coordination between two programmes, collaborative TB-HIV activities have not been fully implemented. TB and HIV are highly stigmatized among health staff and the general population. Prevention and management of drug resistant tuberculosis are major challenges.

Conclusion: KNCV Tuberculosis Foundation and AIDS Foundation East West have established a strategic partnership to assist Central Asian Republics in TB-HIV control. Under this joint partnership, continuity in HIV and TB prevention and care for risk groups and increased access to adequate medical care for patients with TB-HIV co-infection are expected. Close collaboration of NGOs working on TB and HIV with national health authorities can set an example for more extensive collaboration, strengthening partnership and increased effectiveness in addressing the TB and HIV epidemics.

Implementation of MDR-TB treatment in prisons in Georgia and Azerbaijan

R Mehdiyev,¹ F Huseynov,¹ A Hajiyev,¹ I Jahangirov,¹ N Karimova,² A Jafarov,² R Montanari,² Z Hatamova,² S A Ahkmedova.² ¹Main Medical Department, Ministry of Justice, Baku, ²International Committee of the Red Cross, Azerbaijan Delegation, Baku, Azerbaijan. Fax: (+994) 1 2465 6519. e-mail: bakou.bak@icrc.org

Background: MDR-TB represents a significant threat to TB control in Azerbaijan. DRS survey results for 2006, demonstrate high levels of MDR-TB among new (15.6%) and previously treated cases (44.9%) in pris-

ons. In April 2007, the Main Medical Department of the Ministry of Justice started the implementation of the DOTS-plus project in prisons.

Objective: To describe the profiles of MDR-TB patients enrolled to the DOTS-Plus project and to evaluate the most common side effects observed during treatment.

Methodology: While in the foreseeable future, MDR-TB treatment remains unavailable in the civilian sector, it is not possible to ensure the follow-up of MDR-TB detainees after release. Because of this constraint,

Characteristics of MDR-TB patients/ detainees enrolled in treatment in 2007 and common side effects observed	Patients <i>n</i> (%)
Use of first and/or second line anti-tuberculosis drugs	
Only first line	10 (38.5)
First and second line	16 (61.5)
Frequency of Category II treatment in the past	
1	9 (33.3)
2	13 (48.1)
3	5 (18.5)
Frequency of treatment interruptions in the past	
0—Never	16 (59.3)
1—Once	10 (37)
2—Twice	1 (3.7)
Bacteriological status	
SS+/CC+	27 (100)
SS-/CC+	0 (0)
X-ray findings	
Cavitary + infiltrate	21 (77.7)
Infiltrate	6 (22.3)
BMI	
<18.5	13 (48.1)
≥18.5	14 (51.9)
Hepatitis C	
Yes	13 (48.1)
No	10 (37.0)
Not done	4 (14.9)
Hepatitis B	
Yes	0 (0)
No	27 (100)
HIV status	
Positive	1 (3.7)
Negative	26 (96.3)
DST profile on enrolment in treatment	
SHR	4 (14.8)
SHZ	1 (3.7)
SHRE	6 (22.2)
SHREZ	9 (33.3)
SHRE _{Pto}	1 (3.7)
SHREZ _{Pto}	4 (14.8)
SHRO _{fx}	1 (3.7)
Common side-effects of second-line TB drugs	
Vomiting	8 (29.6)
Diarrhoea	7 (25.9)
Nausea	20 (74)
Headache	7 (25.9)
Dizziness	1 (3.7)
Peripheral neuropathy	7 (25.9)
Psychotic changes	4 (14.8)
Depression	9 (33.3)
Arthralgia	7 (25.9)
Allergic reactions	2 (7.4)
Hypokalaemia	3 (11.1)

SS = sputum smear; CC = culture; BMI = body mass index; DST = drug susceptibility testing; S = streptomycin; H = isoniazid; R = rifampicin; Z = pyrazinamide; E = ethambutol; Pto = prothionamide; Ofx = ofloxacin.

only patients/detainees, who can be fully treated prior to release (i.e. for at least two years) are enrolled into the prison DOTS-Plus pilot program. All patients on treatment are screened regularly for common adverse effects of 2nd line-anti-TB drugs.

Results: Up to 12 June 2007, 27 patients have been enrolled on MDR-TB treatment. Treatment regimens for detainees consist of at least five drugs with either certain, or almost certain, effectiveness. The Table details profiles of patients integrated into treatment and the most common side effects observed during the reported period.

Conclusion: Since 2004, when the first MDR cases have been isolated in the special MDR ward of the penitentiary system, an MDR 'waiting list' has been kept. In spite of releases this list has been lengthening and with time, resulting in case studies with increasing co-morbidities. In particular, detainees with advanced stage of TB disease have been monitored for co-infections and TB long-term multi-organ adverse effects on liver, kidney functionalities and metabolic disorders. Some of these patients are now enrolled in MDR-TB treatment for the first time. The three most common side effects observed were nausea 20 (74%), depression 9 (33.3%) and vomiting 8 (29.6%).

SCALING UP PUBLIC-PRIVATE MIX

Evidence base for PPM: effects, costs and cost-effectiveness

K Floyd. Stop TB Department, Geneva, Switzerland.
Fax: (+41) 22 791 1589. e-mail: Floydk@who.int

Background: Public-private and public-public mix (PPM) approaches to TB control are being implemented by a growing number of countries. Evidence on their effects, costs and cost-effectiveness is important for assessing the impact of PPM on case detection and treatment success rates, for developing budgets for PPM as a core component of annual and medium-term plans, and to assist resource mobilization if PPM can be demonstrated to be affordable and cost-effective.

Methods: Published and unpublished data from studies in which effects, costs and cost-effectiveness had all been considered were reviewed and used to prepare comparable analyses for standard indicators, such as the cost per patient treated, the cost per patient successfully treated, and the impact of PPM on the total costs of TB control.

Results: Studies from India, Indonesia, the Philippines and South Africa were identified. Treatment success rates in PPM schemes were similar to those in existing public sector services, and much better than those in the private sector. The cost per patient treated and the cost per patient successfully treated in PPM schemes were generally similar to or lower than costs in existing

public sector services, and much lower than costs in the private sector. Shifting treatment from purely private sector provision to PPM schemes substantially reduced the financial burden on patients, though total costs to the public sector increased.

Conclusions: PPM schemes can be affordable and cost-effective compared to treatment provided through existing public sector services and especially in relation to non-DOTS treatment in the private sector. The evidence base is improving but is still limited, and more data for PPM schemes implemented at a large scale are needed.

Hospital involvement in DOTS, MDR-TB and HIV programmes: strategies and guidelines

A Ohkado. Department of Research, Research Institute of Tuberculosis, Kiyose, Tokyo, Japan. Fax: (+81) 42 4928 258. e-mail: ohkadoa@jata.or.jp

Background: Most hospitals, both in public and private sectors, are actually seeing a large number of tuberculosis (TB) patients, MDR-TB patients, and HIV co-infected TB patients but still, they have not adopted DOTS (Directly Observed Treatment Short-Course) as the strategy to care for TB patients.

Objective: To develop guidelines for public and private hospitals, in particular tertiary large hospitals, for the implementation of DOTS strategy in the hospital.

Methods: Published and unpublished documents of currently available models of hospital DOTS implementers and non-implementers were searched, collected and reviewed. In some selected countries, interview with hospital TB coordinators and staff regarding the involvement of hospital on DOTS implementation was conducted.

Findings: A general guideline with practical tools for hospital involvement in DOTS has been developed. Essential for its implementation is a strongly motivated and committed hospital NTP coordinator or point person together with very keen and supportive hospital director. Establishing and maintaining the basic DOTS components and creating internal as well as external TB patient referral mechanisms are critical for ensuring the continuum of TB patient care. Building a mechanism for a sustainable hospital DOTS in the context of a local public-private mix DOTS program (PPMD) is a big challenge. Some additional mechanisms required for expanding MDR-TB programme and HIV co-infected TB patient care programme need to be further specified.

Conclusion: The hospital DOTS implementation guideline being developed is expected to expand DOTS in public and private large hospitals that are providing care for TB patients as well as MDR-TB and HIV co-infected TB patients.

TB AND OTHER RISK FACTORS IN COPD

Smoking (including cannabis) and tuberculosis as risk factors for COPD

A Jithoo,¹ E D Bateman,¹ N White,¹ C J Lombard,² N Beyers,³ P G J Burney,⁴ W Vollmer,⁵ S Buist.⁵ ¹Division of Pulmonology, Department of Medicine and UCT Lung Institute, University of Cape Town, Cape Town, ²Biostatistics Unit, Medical Research Council, Cape Town, ³Desmond Tutu TB Centre, Stellenbosch University, Cape Town, South Africa; ⁴Respiratory Epidemiology and Public Health, National Heart and Lung Institute, Imperial College, London, UK; ⁵Kaiser Permanente Centre for Health Research, Oregon Health and Sciences University, Portland, Oregon, USA. Fax: (+27) 21 4066902. e-mail: anamika.jithoo@gmail.com

Aim: The Burden of Obstructive Lung Disease (BOLD) study aimed to examine prevalence and risk factors for chronic obstructive pulmonary disease (COPD) using standardised methods.

Methods: We conducted a home-based survey of a random sample of 15% of adults aged ≥ 40 years from a predominantly low-income urban area of Cape Town (total population 36,334). A standardised questionnaire was used to collect information on age, sex, tobacco smoking, history of tuberculosis, occupational exposures, family history of COPD, biomass fuel exposure, socioeconomic status and Body Mass Index. Pre and post bronchodilator spirometry were performed with strict quality control. COPD was staged using the Global initiative for chronic Obstructive Lung Disease (GOLD) criteria.

Results: The prevalence of GOLD Stage I and higher COPD was 23.8% ($n = 847$). Half (49.2%) of all persons with a history of tuberculosis had COPD. Of all persons with COPD, a third (32.1%) had a history of tuberculosis. There was an association of past tuberculosis with both Stage I/II COPD (adjusted OR 2.6; CI: 1.5–4.6) and Stage III/IV COPD (adjusted OR 8.9, 95%CI: 4.2–18.9). Tobacco exposure of 10–20 pack years was associated with Stage I/II disease (adjusted OR 2.7, 95%CI: 1.3–5.6) and Stage III/IV disease (adjusted OR 13.8, 95%CI: 3.8–50.3). Cannabis smoking was associated with COPD, but did not retain its significance in the fully adjusted logistic regression model.

Conclusion: In addition to tobacco smoking, past tuberculosis is a significant risk factor for COPD.

Occupation and environmental pollution as risk factors in COPD

R I Ehrlich. School of Public Health and Family Medicine, Cape Town, South Africa. Fax: (+27) 21 406 6163. e-mail: ehrlich@cormack.uct.ac.za

Occupation: After early uncertainty, occupational exposure has joined tobacco as an accepted cause of COPD. While some of the effects are dust specific

(e.g., grain dust), many of the associations described are by occupation (e.g., welding, spraypainting) or industry (e.g. textiles, construction). A number of positive studies have characterized exposure only generically as 'dusts, gases, vapours or fumes'. Using a 'median' estimate approach, recent reviews have estimated the population attributable risk percent of occupation for COPD as 15%.

Environmental pollution: Chronic bronchitis has been a consistent finding in populations, mainly women in developing countries, exposed to products of combustion of biomass fuels (wood, charcoal, grasses or dung). There are also a number of case control studies of COPD or community studies measuring lung function that have confirmed an association of biomass exposure and airflow obstruction. With regard to modern urban air pollution, including traffic related pollution, a clear COPD induction effect has been slower to emerge given the difficulties of exposure characterization, the heterogeneity of outcomes making induction and exacerbation difficult to distinguish and the consequent need for very large samples. Notable is a large Californian study of lung growth in adolescence showing a strong adverse effect on lung growth of the highest compared to the lowest exposure stratum. However, it is in developing countries that the combination of increasing tobacco use, poorly controlled occupational exposure and the pollution accompanying spiralling urban growth will produce the greatest increase in COPD burden.

The role of gender and socio-economic status in COPD

M R Becklake. Epidemiology, Biostatistics and Occupational Health, McGill University, Montreal, Quebec, Canada.
Fax: (+1) 514 843 2083. e-mail: Margaret.becklake@mcgill.ca

Biological (sex-based) determinants: The lungs of girls and women are smaller than those of boys and men, yet they exhibit structural and functional advantages throughout life. These include higher flow rates in relation to lung size which are evident pre-natally and persist through adulthood and old age.

Gender (socio-cultural) determinants: Breathlessness is more commonly reported, and cough, sputum and snoring less commonly reported in women than in men. Health selection by those with larger lungs occurs into the smoking habit ('healthy' smoker effect) and into dusty occupations ('healthy' worker effect) and lead to underestimation of ill health effects from both exposures.

Socio-economic determinants are difficult to separate from other life style determinants such as smoking, occupation, social class and education level. **Socio-economic status should be regarded as an independent determinant of COPD.** Analysis of clinical and epidemiological studies by sex should always precede

pooled analysis in order to clarify the role of sex in the occurrence, risk factors and natural history of COPD.

THE WORKFORCE CONFRONTED WITH TB-HIV AND MDR CHALLENGES

Performance improvement approaches in the African setting

C Puta,¹ J Van den Broek.² ¹Regional Centre for Quality of Health Care, Kampala, Uganda; ²Dutch Tuberculosis Foundation, Amsterdam, Netherlands. Fax: (+256) 41 530876. e-mail: cputa@rcqhc.org

Aim: To improve the performance of health workers in the African setting using the performance improvement approach (PIA).

Design: Quasi-experimental.

Methods: Kenya, Malawi, Uganda and Zambia were introduced to PIA through a regional training of trainers (Kenya, Malawi and Uganda) and through post-graduate and short course training for Zambia. Countries were guided through the steps of the PIA namely: context analysis; agreement with stakeholders; definition of desired performance; measurement of actual performance; root cause analysis; selection and design of interventions; implementation of interventions; monitoring and evaluation. In addition the participants were introduced to analytical and other problem solving tools.

Results: Countries were able to improve the performance of the health workers in intervention areas. Example: Zambia reported an improvement in health worker performance in intervention areas vis-à-vis knowledge of methods of case detection, case detection and defaulter rate from 20% to 86.6%, 13.3% to 73.3%, and 20% to 10%, respectively. All four countries have reported interventions and results based on the use of PIA, a detailed discussion of which will form the content of this paper.

Conclusion: PIA improves health provider performance in the African setting. The challenge is taking it to scale and institutionalizing the practice.

Health system strengthening in TB care

K A Hyder. World Health Organization, Dhaka, Bangladesh.
Fax: (+880) 2988 4657. e-mail: khyder@dhaka.net

Strengthening TB services will necessarily require investing in health systems since successful TB control strategies rely on well-functioning primary health care systems. However, many of the challenges in health systems strengthening are beyond the influence of TB control program alone. NTP and partners can contribute through documenting the public health impacts of failure to improve systems, financing and human resource development frameworks. The NTP, Bangladesh

is primarily responsible for pertaining training on DOTS and beyond DOTS activities. It plans all aspects of training and work with government and NGOs entities to determine training content, develop materials, identify health staff (including NGO participants) to be trained, ensure training course implementation and follow up for new hires and maintenance training. Different course curriculum prepared by NTP for government and NGOs since 1998. TB management course, laboratory course, mid and field level courses and several orientation courses are in place that strengthened health system in integrated approaches. On job supervision facilitates to follow up the training assessment, capacity building and competencies at all levels. With the introduction of DOTS-Plus project by the end of this year at the National Institute of Diseases of Chest and Hospital, Dhaka by NTP will ensure training of its staff; training on monitoring and supervision by the Civil Surgeon and Chest Consultants at district level, and training of medical doctors and field workers at implementation level. Further TB-HIV collaborative approaches are planned to build capacity of HIV counselors to identify and refer TB suspects, referring patients for HIV testing included in HRD-TB Plan. Details will be presented. Major challenges in strengthening health system in TB care and lessons learnt will be presented and discussed.

WE'RE ALL IN THIS TOGETHER: COMMUNITY INVOLVEMENT IN TB AND MDR-TB PREVENTION AND CARE

Participation of ex-TB patients in support of TB care services in Kinshasa, DRC

M Lunga. Club des Amis Damien & World Care Council, Kinshasa, Congo (Democratic Rep.). Fax: (+243) 81 519 0773. e-mail: lunga@conseilmondialsoins.org

Cadre : La RD Congo est parmi le 22 pays qui portent le fardeau de la tuberculose au monde, la tuberculose y constitue un problème de santé publique. Les ex-patients de Kinshasa sont regroupés au sein de l'Association Club des Amis Damien créée le 29 décembre 1999.

Mission : Accompagner les malades sous traitement, éduquer et informer la population sur la tuberculose.

Méthode : Approche communautaire centrée sur les ex-patients.

Objectif principal : Contribuer à la réduction de l'incidence tuberculeuse dans le pays.

Organisation : Structurée en niveaux central, intermédiaire et périphérique, ses activités sont mises en oeuvre par les antennes implantées dans les structures sanitaires sous 2 volets : l'accompagnement médico-psychosocial et la mobilisation sociale.

Résultats : Son intervention dans le soins des nou-

veaux cas positifs est soldée par un impact considérable sur les résultats tant des structures sanitaires que de la coordination provinciale de la tuberculose, Tels que :

- la structure Molende : 37% de taux de guérison et 7% d'abandon en 1999, passe à 92% de taux de guérison et 0% d'abandon en 2005 ;
- la coordination provinciale : 65% de taux de guérison et 5% d'abandon en 1999, passe à 86% de taux de guérison et 4% d'abandons en 2005.

L'apport considérable des ex-patients dépend du niveau de collaboration qui existe entre ces derniers, le personnel médical et les autorités sanitaires.

Care and support to persons living with HIV/AIDS: the experience of 'Meeting Point' Kitgum, Uganda

V Frigerio,¹ K Opoka,² C Pierotti,¹ F Ciantia.¹

¹AVSI-Uganda, ²Meeting Point Organization, Kitgum, Uganda. e-mail: meetingpoint.kitgum@yahoo.com

Description: Elly Ongee was the Principal of Farm Institute (Kitgum). In 1990 he was found to be HIV-infected. When he died, he had a smile on his face, because there were people next to him. His last desire was that all PLWHAs could live positively with AIDS, as happened for him. This is the way Meeting Point (MP), a local NGO, is working in Kitgum. It started from a friendship among people belonging to CCL, a Catholic Movement, and from the recognition that the real need of PLWHAs is not just for material goods or health-assistance, but for a longing company, able to break down the wall of despair the disease brings. Starting from 12 PLWHAs in 1990, today MPs takes care of 2383 patients through Home Visit/HBC, OIs treatment, food/non-food items provision, OVC support, sensitization on HIV/AIDS involving PLWHAs, promotion of positive living, follow up of ART-patients, group formation and promotion of IGAs.

Experiences: 'I was surprised that they were coming every week to my home', John says. After the encounter with MP, John started ARVs and he was weekly visited by MP-staff, helping him in adherence to treatment. 'They were making me aware of being still able to do something in my life. Here in Kitgum there are a lot of organizations (. . .) but it is just MP following the patients, helping them to survive, not just distributing condoms (. . .) and then disappearing: any advice is not important if you do not teach how to get it in use.'

Conclusion: The symbol of MP is Icarus, painted by Matisse. The painting represents the man: whatever may happen to his body, he has as a heart, that, as long as exists, is always worth to be taken care of. MP is aware that the only way to deal with HIV/AIDS is to start from the man in his completeness and uniqueness, and to take care both of his body and his heart.

INTENSIFIED TB CASE FINDING IN HIV CARE SETTINGS AND/OR AMONG HIV-INFECTED PERSONS

Developing a clinical algorithm to diagnose TB in HIV-infected persons in SE Asia

K P Cain,¹ K D McCarthy,¹ J K Varma.^{1,2} ¹Division of Tuberculosis Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ²Thailand Ministry of Public Health-US CDC Collaboration, Nonthaburi, Thailand. Fax: (+1) 404 639 1566. e-mail: bvz1@cdc.gov

Tuberculosis (TB) is the most common cause of death among HIV-infected persons worldwide; TB screening is recommended for all HIV-infected persons. However, the most appropriate methods for screening are not known. We began enrollment in the Improving the Diagnosis of TB in HIV-Infected Persons Study in late 2006. The study will enroll a total of 2000 HIV-infected persons in Thailand, Cambodia, and Vietnam. All HIV-infected persons over the age of 7 years without recent TB diagnosis or screening are eligible. For all enrolled patients, we collect standardized data on signs and symptoms, 3 sputum specimens for smear and culture, urine, stool, and blood for TB culture and smear, and a lymph node aspirate for smear and culture for any patient with an enlarged node, and perform CBC and CD4 testing, along with chest radiography. We compare signs and symptoms to the final diagnosis to develop an evidence-based algorithm for TB screening in HIV-infected persons. As of June 30, 2007, approximately 1000 patients have been enrolled in the study. Culture results are pending. Preliminary results on these patients will be presented. We believe that this study will provide much needed evidence for the approach to TB screening in HIV-infected persons in Southeast Asia. Similar studies are urgently needed in sub-Saharan Africa.

Testing different TB screening strategies: intensified TB case finding among HIV-infected persons at a voluntary counselling and testing centre, Addis Ababa, Ethiopia

M D Demissie,¹ S S Shah,^{2,3} L L Lambert,² S L Leulseged,¹ J A Ahemed,¹ Z T Tadesse,⁴ E L Lemma,⁵ T K Kebede,¹ Z M Melaku,⁶ C D Wells,² T W Wuhib,¹ L N Nelson.⁷

¹United States Centers for Disease Control and Prevention, GAP Ethiopia, Addis Ababa, Ethiopia; ²United States Centers for Disease Control and Prevention, Division of Tuberculosis Elimination, Atlanta, Georgia; ³Albert Einstein College of Medicine, Bronx, New York, New York, USA; ⁴Ethiopia Ministry of Health, National TB and Leprosy Control Program, Addis Ababa; ⁵Ethiopian Health and Nutrition Research Institute, Addis Ababa; ⁶Columbia University Mailman School of Public Health, International Center for AIDS Care and Treatment Programs, Addis Ababa, Ethiopia; ⁷United States Centers for Disease Control and Prevention, GAP, Mozambique, Maputo, Mozambique. Fax: (+251) 1 1618 3499. e-mail: demissiem@et.cdc.gov

Background: Prompt, accurate diagnosis of tuberculosis (TB) is critical to reduce early mortality among HIV-infected TB patients, and is recommended before initiating antiretroviral therapy.

Methods: HIV-infected persons were prospectively enrolled at an urban voluntary counseling and testing clinic (VCT) in Addis Ababa. Symptom screening and physical exam, three sputum specimens for smear microscopy, and chest radiograph were performed on all regardless of symptoms. Sputum was also sent for concentrated smear and mycobacterial culture at a reference laboratory. TB diagnosis was defined as a positive sputum culture or smear.

Results: From 24 November 2005 to 17 June 2006, we screened 438 HIV-infected persons for TB: 265 (61%) female, median age 34 years (range 18–65). TB was diagnosed in 32 (7%) persons, of which 3 (9%) were smear-positive by direct Ziehl-Neelson method, 14 (44%) by concentrated method, and 27 (84%) by culture. Nine (28%) patients were positive by smear and culture. Cough >2 weeks was reported in 12 (38%) TB patients. Maximum achievable sensitivity of screening for up to 8 symptoms was 84%, but specificity was 23%; CXR improved sensitivity to 91%, but at the cost of decreased specificity. Three (9%) patients were asymptomatic, smear-negative, had normal CXR, and were only detected by sputum culture.

Conclusions: VCT clinics may serve as excellent entry point to facilitate TB diagnosis. Symptom screening appears to be high-yield for identifying TB suspects, but still misses cases. The yield of smear microscopy improved with concentration, but remained low.

Implementing intensified TB case finding guidelines at country level: the Kenya example

J Odhiambo. Centers for Disease Control and Prevention (CDC), KEMRI, Nairobi, Kenya. Fax: (+254) 202 714 745. e-mail: jodhiambo@ke.cdc.gov

Promotion of HIV counseling and testing for TB patients in Kenya has resulted in 74% coverage by July 2007. Due to this increase in testing, a considerable proportion of HIV-infected TB patients now access vital HIV services. In contrast, except in limited pilot projects, patients receiving HIV services are not routinely screened for TB, often the first opportunistic infection in persons living with HIV/AIDS (PLWHA). A stakeholders' workshop to provide policy guidelines on intensified TB case finding (ICF) and TB preventive therapy was held in May 2007 to assist bridge this gap and expand ICF from pilot projects to full scale implementation. PLWHA without active TB will be considered for TB preventive therapy. Kenya (population: 33 million) has 1.2 million PLWHA; of these, about 273 000 are eligible for antiretroviral therapy, 80 000 HIV+ pregnant women attend at least 1 antenatal clinic visit annually and thousands either receive home-based care or visit hospitals, VCT and

STI clinics. To strengthen integrated TB-HIV activities, the National AIDS and STI Control Program plan to implement routine TB screening for PLWHA receiving HIV services and provide access to TB diagnostic services. Present activities include formulation of ICF policy guidelines and development of TB screening and patient tracking tools and systems. Besides, resources are being mobilized to support training, commodities and infrastructure. Potential challenges include identifying appropriate ICF tools for different levels of care, development of tools to detect atypical TB manifestations, rationalizing the frequency of TB screening, standardizing pediatric TB screening and coping with inadequate manpower and infrastructure. Kenya will share experiences and outcomes in the next phase.

Intensified TB case finding among PLWHA attending care and treatment services in Rwanda

M Gasana,¹ G Kabanda,¹ K Turinawe,² R Sahabo,² J Mugabo,³ G Vandebriel.² ¹Programme National Intégré de lutte contre la Lèpre et la Tuberculose, Ministry of Health–Rwanda, Kigali, ²Columbia University Mailman School of Public Health, International Center for AIDS Care and Treatment Programs–Rwanda, Kigali, ³Treatment and Research AIDS Center, Ministry of Health–Rwanda, Kigali, Rwanda.

Background: HIV and tuberculosis (TB) are closely interrelated. HIV infected individuals are at substantial risk for development of TB and TB is a major cause of death in HIV-infected patients. In 2005, the Rwandan Ministry of Health approved a National Policy on TB-HIV collaborative activities to improve care of people with HIV and TB which includes screening all HIV-infected patients for active TB disease and linking all HIV-infected TB suspects to TB diagnosis and therapy.

Methods: A symptom-based 5 question checklist was developed to screen all HIV-infected patients attending HIV care and treatment services for TB. The TB screening questionnaire was designed for ease of use, and to favour sensitivity over specificity, although its exact operating characteristics still need to be evaluated. Patients who screened positive on the questionnaire are considered TB suspects and referred for further workup and evaluation per national guidelines for the diagnosis of active TB. Program data were reviewed from health facilities involved in early implementation.

Results: From 1 January to 31 December 2006, of 5839 PLWHA newly enrolled in HIV care at 20 ICAP supported health facilities, 4841 (83%) underwent TB screening at enrolment, of whom 100 (2%) were diagnosed with active TB disease and started TB treatment. Of 10 028 patients enrolled into care and who were still in the programme at 24 ICAP supported sites on 31 December 2006, 5135 (51%) were screened for TB at least once between 7 January 2006 and 31 December 2006 by use of the questionnaire, 55 (1%) had

active TB disease and started TB treatment. Programme challenges include systematising TB screening for all HIV-infected patients during follow-up visits as part of routine HIV care and adequate diagnostic workup to confirm or exclude active TB according to national guidelines.

Conclusion: Implementation of a national guideline to screen PLWH attending HIV care and treatment services for TB has begun to improve early diagnosis and treatment of TB in this high-risk population. Effective referrals between TB and HIV services, accurate recording and reporting of TB-HIV data and establishing adequate human resources to supervise and monitor the programme are priorities as intensified TB case finding in PLWHA is scaled up.

WAYS FORWARD ON HEALTH SYSTEM STRENGTHENING AND THE STOP TB STRATEGY

Top health system strengthening initiatives and how the TB community can engage

D E C Weil,¹ P Gondrie.² ¹WHO Stop TB Department, Geneva, Switzerland; ²KNCV Tuberculosis Foundation, The Hague, Netherlands. Fax: (+41) 22 791 4199. e-mail: weild@who.int

Without the urgent strengthening of health systems, the health-related Millennium Development Goals are in peril worldwide and especially in Africa. With the creation of major financing mechanisms to support scale-up of prevention and control of major epidemic diseases, the weaknesses in the basic support systems for public health delivery are more acutely apparent. This presentation provides an overview of several critical new global partnerships and initiatives to address key building blocks of health systems, including the Global Health Workforce Alliance, the Health Metrics Network, Global Fund and GAVI Alliance health systems financing, as well as new initiatives coming from G8 governments. Some are relatively well-established and others have only recently emerged. The Stop TB Partnership provides one strong model for how they can thrive. Stop TB partners have much to offer through their experience in collaboration and in field implementation and addressing system bottlenecks. Strategies for how the TB community can engage productively within these initiatives are discussed, with the expected impact for TB and for the broader efforts outlined. Joint in-country support, participation in working groups, sharing of strategies and evidence, and high-level cross-participation in policy, technical and advocacy meetings are addressed. First priority will be increasing practical networks at country level for quality integrated service delivery involving all providers, strong support systems and programs, and community empowerment. Communicating

the results can promote replication and adaptation of best practices and support collaborative, rather than competitive, advocacy and resource mobilization in global health.

Approaches within the Stop TB Strategy that can improve systems and TB outcomes

K Lonnroth. Stop TB Department, Geneva, Switzerland.
Fax: (+41) 227914268. e-mail: Lonnrothk@who.int

The Stop TB Strategy was developed partly in response to health systems barriers for successful TB control. For example, many countries have weak laboratory infrastructure, which has led to a strong emphasis on laboratory strengthening. Similarly, the emphasis on effective drug supply and TB surveillance systems stem from a realization that many health systems fail to secure these essential functions. Limited general human resource capacity for health is the backdrop for the push for better human resource development strategies (beyond just training) within TB programmes. Suboptimal integration of services and public health programmes has stimulated the development of TB-HIV collaborative activities and the Practical Approach to Lung health (PAL) strategy. Public-private mix (PPM) approaches were developed because there is insufficient public health engagement of the often disorganized private health sector, community DOTS approaches because of lack of engagement with civil society and a insufficiently decentralization of health services. The Stop TB Strategy emphasizes that all these activities can contribute to general improvement of the health systems (beyond improved TB control functions), provided they are carried out with appropriate concern for the need to coordinate and harmonize them with other efforts to improve the health system. The strategy also stresses that TB programmes need become more proactively involved in national and system-wide efforts to address underlying systems weaknesses. Guiding principles for how national TB programmes should contribute to health systems strengthening have been developed by WHO, which will be shared in this presentation.

PATIENT AND PROVIDER EDUCATION: SUCCESSFUL MODELS AND LESSONS LEARNT

Training to integrate HIV testing and counselling into the Kenyan NTP

J S Sitienei. NLTP, Nairobi, Kenya. e-mail: jsitienei@nltp.co.ke

Tuberculosis and HIV cases notified in Kenya continue to increase despite all control efforts. To effectively fight the dual epidemic, Health Care Workers

(HCW) working in the clinics need knowledge, skills and correct attitudes to offer comprehensive care to dually infected patients and to provide consistent standard service throughout the country. The process began in third quarter of 2005 with the goal of creating a comprehensive training program in TB and HIV for TB clinic staff. The objectives of the program were to standardize the TB HIV training materials, form regional training teams, provide a cadre of HCWs skilled in providing TB and HIV Diagnostic Testing and Counseling (DTC) to patients in TB clinics and provide follow-up supervision to ensure that the health care workers improve their performance by transferring skills learned in the training to their jobs. The course has seven modules, targeting trainers from three different disciplines that will always train together as teams (from TB, HIV and laboratory programs) using teach back methodology. More than 3000 health care workers have so far been trained with 67% of TB patients getting tested for HIV by the end of 2006. Testing for HIV has gone beyond TB clinics and is now being conducted in STD clinics. Consequently the VTC sites are less busy because some clients want to be tested without a lot of counseling. Interest has been generated for using a generic version of the curriculum in other settings. With proper training tools and regional teams for trainings, it is possible to rapidly scale up HIV testing amongst patients but the biggest challenge will be to ensure that dually infected TB patients' access HIV treatment.

Educational efforts to build foundation for scaling up Stop TB Strategy in Russia

E Yurasova, W Jakubowiak, O Kosheleva, L Rybka. WHO TB Control Programme in the Russian Federation, Moscow, Russian Federation. Fax: (+7) 495 787 21 49.
e-mail: e.yurasova@who.org.ru

Training and education (TE) have been prioritized in TB control in Russia since international collaboration started in 1999. The 1st stage (1999–2003) included advocacy and training in TB programme management in pilot regions at the federal (advanced) and district level aiming to build political commitment, revise the national TB control policy and develop a regional model of effective TB control based on the WHO strategy. In total 954 persons attended 5 regional events and 5235 persons participated in 114 regional trainings. At the 2nd stage (2004–2007) expansion of the revised national TB control strategy countrywide through the World Bank loan and GFATM grant was implemented. TE activities covered multiple areas—TB management, laboratory management and diagnostics, general management and logistics, supervision and monitoring, infection control, social support, operational research, MDR-TB control, TB-HIV, TB control for primary health

care providers, advocacy and media training. For curricula development a systemic approach to the TE process was applied by adapting WHO standard materials or developing new ones, for basic training courses and trainings of trainers. Since 2007 WHO and NTP have incorporated modern TB control into the curricula of involved graduate and postgraduate medical institutions. In 2004–2007 at the federal level 8887 persons participated in 368 TE events and at the regional level 39 604 persons were involved in 2530 TE events. The major challenges were conservatism and diversity of the target audience; scale of activities in terms of scope, number of trainees and geographical coverage; introduction of a public health approach in traditional TB curricula. Partners are working to sustain TE efforts by tailoring the Global Stop TB Strategy to training curricula. The next step is to evaluate the impact of training, identify drawbacks and prepare a human resource development plan.

Health communication and patient empowerment: methods, experiences and results

T Hasler,¹ N E Kaplata,² E Wandwalo,^{1,2} V Gajauskiene,³ L Davidson,⁴ E Kamenje,⁵ J Mapunda,⁶ K Røhme,¹ H Amdal,¹ E Davidaciene,⁷ S Lusambi,² A Haaland.^{1,8}

¹LHL–The Norwegian Heart and Lung Patient Organisation, Oslo, Norway; ²Temeke Municipality, Dar Es Salaam, Tanzania; ³Siauliai TB Hospital, Siauliai, Lithuania; ⁴Penduka, Windhoek, ⁵Ministry of Health, Katutura District, Windhoek, Namibia; ⁶Mukikute TB Patient Organisation, Dar es Salaam, Tanzania; ⁷NTP Lithuania, Vilnius, Lithuania; ⁸University of Oslo, Department of Community Medicine, Oslo, Norway. Fax: (+47) 22 22 38 33. e-mail: th@lhl.no

Objective: To develop, test and evaluate methods for effective health communication and patient empowerment. The aims are:

- To strengthen the curricula to improve health communication knowledge and skills of health workers within TB control and to train trainers.
- To develop methods for health workers to practice and teach empowerment—with the aim to do effective DOT provision.
- To stimulate user involvement in the development of information and communication materials.

Methods:

- Process training of health care workers in Tanzania, Namibia and Lithuania in communication skills, with—baselines to assess knowledge and communication practises before training—observation tasks to create awareness on their own communication practises and to identify training needs—endlines measuring results
- Training former TB patients in communication skills and fieldwork techniques
- Use of Most Significant Change story technique to measure change

Results: Analysis of endlines and MSC stories show that:

- Training health workers and treatment supporters in communication skills enable them to acknowledge the importance of emotions in communication, to listen and care for the needs of the patients, i.e., practise a patient centered approach. Training health workers in communication skills also enable the patient to take better care of his or her own treatment and own health, i.e., less conflicts and defaults.
- The patient centered booklets developed by TB patients are tools to enable patients to speak openly about the disease, to improve knowledge and reduce stigma.

Conclusion: A key to facilitate empowerment is the health worker that practise good communication skills—through direct contact with and treatment of the patient, through training of family members and care takers, through training of former patients to become treatment supporters and to engage with the community.

Training Botswana's TB District Coordinators

A Khan,¹ V M Gammino,¹ J Mboya,² G Nkubito,² T Steen,² N Makubate,² G Banda.² ¹Division of TB Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ²Botswana National TB Programme, Ministry of Health, Gaborone, Botswana. Fax: (+1) 404 639 8960. e-mail: ajk5@cdc.gov

Background: To strengthen tuberculosis (TB) control and TB-HIV collaborative activities, the Botswana National TB Programme (BNTP) hired 22 dedicated-TB Coordinators (TBCs) for 24 health districts in 2006. Thirteen of these new hires were health educators and nine were nurses; none had prior TB-specific work experience. Comprehensive, performance-based training was needed to ensure these new staff could effectively manage a district TB program.

Methods: We conducted a task analysis to determine key topics for which the TBCs would require knowledge and skills to perform their job duties. For each topic area, we developed new materials and adapted existing CDC, WHO and KNCV Tuberculosis Foundation training resources. Training materials consisted of slide sets, interactive skill-building exercises, and field exercises. Pre course, post course, and 6-month follow-up assessment tools were developed to evaluate the training and to identify additional TBC training needs.

Results: In January 2007, 24 TBCs were trained in 13 key topic areas. These included epidemiology, diagnosis, treatment, TB-HIV, drug resistance, health education, laboratory functions, infection control, and reporting and recording. As part of the curriculum, the TBCs utilized management tools to develop an action plan for monitoring and supervising TB activities in their respective districts. Course assessment results will be available in the fall of 2007.

Conclusions: A comprehensive, TB skills-based training curriculum is essential to provide TBCs with the knowledge and skills needed to supervise, implement, monitor, and evaluate district-level TB program activities. The TBCs' ongoing training needs should be periodically assessed and addressed to continue to strengthen TB control activities. Content from this training will be revised and tailored for a national TB training curriculum which will include job-specific modules for nurses, medical officers, and laboratory staff.

CHALLENGE OF ASTHMA MANAGEMENT IN DEVELOPING COUNTRIES

Experience of asthma management in South Africa

E D Bateman. Division of Pulmonology, Department of Medicine, University of Cape Town, Cape Town, South Africa. Fax: (+27) 21 406 6902. e-mail: ebateman@uctgsh1.uct.ac.za

The programme for asthma management developed by the National Department of Health in consultation with professional societies, coupled with provision of essential drugs, creates the opportunity for all asthma patients in South Africa to receive acceptable care. However, the twin epidemics of tuberculosis and HIV are severely threatening the capacity of state health services to deliver this care. Strategies for strengthening health services and enabling primary care clinics to provide for the needs of asthmatic patients are urgently needed. Two promising developments are a cross-sectoral programme involving outcome mapping that seeks to co-ordinate the activities of all parties involved in, or with potential to assist with the delivery of guideline-compliant management of asthma, and a programme called PALSAPlus designed for nurse-led primary care facilities that provides for the integration of asthma care with that for other chronic respiratory diseases, tuberculosis and HIV/AIDS. PALSAPlus, which has been accepted for implementation in primary care clinics in several provinces, is based upon the Practical Approach to Lung Health (PAL) approach developed by the Stop TB Alliance of the WHO. It comprises a guideline customised for use by primary care nurses and physicians containing a syndromic algorithm for diagnosis, and a 'control-driven' approach to treatment, as recommended in the latest revision of the Global Initiative for Asthma (GINA) guideline. The effectiveness of this programme has been demonstrated in a pragmatic randomised controlled trial performed in the Free State province of South Africa.

The Union reply: Asthma Drug Facility

K Bissell. Coordinator, Health Policy Unit, International Union Against Tuberculosis and Lung Disease Paris, France. Fax: (+33) 1 43 29 90 87. e-mail: KBissell@iuatld.org

Problem: The majority of asthma and COPD cases live in developing countries. Yet, priority is still given to communicable diseases. Health services are not organised for long-term quality care of asthma or COPD. The Union studies demonstrate that most asthmatics cannot afford essential asthma medicines. So, people are not receiving care or being enabled to manage their own asthma. Also, costs increase when asthma is not treated or incorrectly treated: there are unnecessary expenses from emergency visits, hospitalisation, ineffective and inappropriate medicines, and indirect costs for patients, families, governments. Therefore, these countries cannot afford to not treat asthma.

Response: The Union has established an Asthma Drug Facility (ADF) to allow countries to purchase good quality essential asthma medicines at low prices. ADF promotes a standardised approach to asthma management and offers The Union's technical package: Asthma Guide, training materials and information system.

Challenges: Countries have different purchasing procedures and are at different stages of asthma policy-making and implementation.

Bringing about change: Respiratory specialists among others must convince their governments to allocate budget for essential medicines and produce appropriate asthma guidelines. ADF's services should be accompanied by country efforts to strengthen health systems, improve quality assurance, and implement rational drug purchasing and distribution policies. Advocacy should aim to increase funding for chronic respiratory diseases, referring to Millennium Development Goal 8, and to recent projects by WHO (PAL, GARD), The Union and GINA.

How to ensure the quality of care in asthma

D A Enarson. International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+33) 1 43 29 90 87. e-mail: DEnarson@iuatld.org

Quality assurance and quality improvement of asthma care is key to improving the health of those living with asthma and of reducing unnecessary expenditure by the patient and by the health services. Improvement in quality of health services depends on clarifying the objectives of treatment, measuring progress toward the objectives and identifying challenges and obstacles to delivering high quality care (most of which are locally specific). The information system developed for tuberculosis services has the most extensive and results-oriented distribution in public health. The system is based on monitoring progress toward a set of management objectives that are standardized, systematically evaluated and appropriate for implementation even in the most basic health services. Based on

this experience, The Union has developed a similar system to monitor standard case management of persistent asthma cases in low-income countries. This system has been evaluated in a wide variety of settings and has provided the information to determine and address the key obstacles to effective care of asthma patients. The experience gained at the international level demonstrates that this system has every promise of providing similar results at the local level, empowering the basic health service personnel to guide their own service implementation and to address issues specific to their local situation.

ISSUES INVOLVED IN CULTURE IMPLEMENTATION

An overview of various methods of processing samples and their relative merits

V H Balasanghameshwara. Head, Healthcare, Manipal Universal Learning Private Ltd, Bangalore, Karnataka, India. Fax: (+91) 80 2344 0795. e-mail: vhbs@vsnl.com

Culture of specimens for tubercle bacilli remains a gold standard even today since it indicates viability of organisms, a property which most other tests including the newer ones do not possess. It is also a time-tested procedure with well defined standards. Various methods have been described for processing of specimens for culture. Methods commonly used for processing for culture include, specimen collection from pre-selected patients with symptoms suggestive of tuberculosis, smear prepared for identification of AFB, subjected to procedures that include digestion, decontamination, concentration and inoculation on to appropriate culture media. The procedures for sputum specimens differ from procedures used for paucibacillary specimens from extrapulmonary sites. Combinations of chemical and physical methods, which are used to achieve digestion, decontamination and concentration of specimens, aim at increasing the case detection in paucibacillary disease status. Assessment of sensitivity and specificity of these combinations has been made in large numbers to identify methods that are less deleterious, rapid and cost effective. The presentation will deal with the known methods of processing samples and their relative merits in terms of rapidity, cost, ease of procedure, number of steps to be followed before their inoculation and their compatibility with the solid and liquid culture media.

Practical issues including bio-safety measures in establishing culture laboratories in developing countries

K F Feldmann. Kuratorium, Gauting, Germany. Fax: (+49) 89 850 8412. e-mail: feldmann@gsf.de

Biosafety measures for TB-culture laboratories depend on the specimens handled and the methodologies applied. It will gradually increase from decontamination of clinical specimen with direct (without centrifugation) inoculation on solid media over techniques with centrifugation and the use of liquid media to handling TB-cultures for identification and drug susceptibility testing. All TB-culture laboratories must be designed for Biosafety Level 2 or above. Written practices and procedures basic to good microbiology techniques (GMT) for safe laboratory operations shall be available as well as instructions on measures for laboratory emergency. Concepts should include regulations about access, personal protection, procedures, biosafety management, health and medical surveillance, training, decontamination, waste handling. Special attention should be given to laboratory facilities and design features. Laboratory equipment and essential biosafety equipment is a supplement but can not replace GMT procedures. Biosafety cabinets (BSC) are essential for all TB-culture laboratories and should be equipped with HEPA filter (H14) and ducted out. In areas with inconstant current BSCs should be connected through an uninterrupted power supply with a capacity to run the BSC for 15 min. The width of a BSC for a culture laboratory should be at least 120 cm, better 150 cm. Stainless steel for the interior and screws used is a minimal requirement and the outer housing could be coated with zinc and epoxy resin. Several other design features and indication of correct function may improve biosafety. Maintenance required. Smear positive specimen (DST survey) need no centrifugation after decontamination with NaOH before inoculation on 'acid' egg based media. Centrifugation (to increase diagnostic sensitivity) has to be performed in aerosol tight closed buckets at ≥ 3000 g. In countries with limited resources the use of disposables vs. reuse of laboratory equipment needs careful discussion.

Rapid culture methods and their impact on TB control

N T Ngoc Lan. National TB Reference Laboratory, Ho Chi Min City, Vietnam. Fax: (+84) 8 857 4264. e-mail: ngoc.lan@hcm.vnn.vn

Despite concerted efforts, control of tuberculosis poses a major challenge in many developing countries. The current global estimate indicates about 8.7 million new cases and 2 million deaths annually and a gradual increase in the level of drug resistant cases. Early detection and providing standardized treatment require the availability of rapid culture and drug susceptibility testing methods. However, conventional egg based culture and DST methods are slow and most often do not benefit individual patients in getting early and correct treatment. This means an increased morbidity and mortality and continuous transmission to close family contacts. In this context, simple and rapid

culture and DST test results are needed. Sputum swab culture method, direct DST on LJ media for a few key anti-TB drugs including rifampicin has been successfully demonstrated. Although direct DST using 7H10 or 7H11 agar media are in wide use in US, this method could not be undertaken in high burden countries since this method requires CO₂ incubator and expensive OADC enrichment. Besides, it is difficult to contain batch to batch variation. Additionally, solid based media do not enjoy high sensitivity for smear negative cases. Few of these disadvantages can be overcome by liquid media. However, home made liquid culture and DST requires rigorous inbuilt quality assurance to contain batch to batch variation. Although initial costs are high with commercially available liquid based culture and DST methods, their low turn around time and inbuilt automated quality assurance make these methods more appropriate for current public health requirements.

TB, HIV AND TOBACCO: FROM EPIDEMIOLOGY TO POLICY

Tobacco and HIV

A Benard. INSERM, Unité 593, Bordeaux, France.
Fax: (+33) 557 571 172.
e-mail: Antoine.Benard@isped.u-bordeaux2.fr

When treated with combination Antiretroviral Therapy (cART), human immunodeficiency virus (HIV) infection is now considered as a chronic disease and current prognosis results from interactions between the disease itself, treatments and host specificities like co-morbidities and addictions. Indeed, over the past ten years, the proportion of death causes related to non-AIDS defining malignancies (especially lung cancer), non-AIDS bacterial infections and cardio-vascular diseases has currently reached 25 to 30 percent of all deaths among HIV-infected patients. These disease conditions have at least one important modifiable risk factor in common: tobacco smoking. The prevalence of tobacco smoking among HIV-infected patients is usually reported at higher levels than in the general population, around 50%. Tobacco consumption has been identified as a major risk factor of cardiovascular diseases, bacterial pneumoniae, oral candidiasis and hairy leucoplakia which affect survival and quality of life in HIV-infected individuals. Pneumocystosis, tuberculosis and lung cancers also appear to be associated with tobacco consumption in this population. Determinants of tobacco cessation such as motivation, nicotine dependency, co-addictions and depression have been studied in HIV-infected individuals. It appears that an important proportion of HIV-infected smokers are motivated enough to benefit from behavioural support or medication but a specific approach,

taking into account co-addictions and depression as well as nicotine dependency is recommended. Tobacco cessation interventions among HIV-infected patients are relevant and must be based on interdisciplinary collaboration, it is now the time to set up and evaluate specific tobacco cessation programs in this population.

Global obligations in international law to improve lung health: the WHO Framework Convention on Tobacco Control

J M Mackay. Project Coordinator, World Lung Foundation, component of the Bloomberg Global Initiative to Reduce Tobacco Use, Kowloon, Hong Kong. Fax: (+852) 2719 5741.
e-mail: jmackay@pacific.net.hk

The WHO Framework Convention on Tobacco Control (FCTC) is the first global health treaty negotiated under the auspices of the World Health Organization. The FCTC was developed in response to the enormity of the global tobacco epidemic, currently responsible for at least 3 million deaths annually, with predictions of 10 million deaths annually by 2030. This convention is an evidence-based treaty that places countries under international obligation to curb tobacco use, by implementing tobacco control laws, taxation policies and programmes. It represents a paradigm shift in developing a regulatory strategy to address addictive substances by asserting the importance of demand reduction strategies, for example, price, tax, and non-price measures such as health education, although some supply issues such as smuggling are also included. The FCTC came into effect on 27 February 2005. It has been signed by 168 countries, and has now been ratified by about 140. This makes it one of the fastest-tracked international treaties of all time, enjoying widespread support from around the world. It indicates that tobacco control is universal, timely and unstoppable, and it will make it more difficult for the tobacco industry to obstruct tobacco control measures in the future. Supporting the FCTC, the World Lung Foundation (WLF) is a partner in the Bloomberg Global Initiative to Reduce Tobacco Use in low and middle income countries. The WLF, working closely with the Union, is tasked with establishing regional resource centres, implementing a grants programme, mass media advocacy programmes, and management and financial training courses.

The Bloomberg Global Initiative to Reduce Tobacco Use

K H Henning. Project Director, Bloomberg Foundation, New York, New York, USA. Fax: (+1) 610 525 7979.
e-mail: kjhenning@aol.com

Each year, nearly 5 million people—14,000 every day—are killed by tobacco, more than are killed by any other single agent. Tobacco now accounts for more than one in 10 adult deaths. Unless urgent action is taken,

the number of people killed by tobacco will double in the coming decades and one billion people will be killed in this century. To reverse the global tobacco epidemic, the Bloomberg Initiative is supporting **key interventions** that are proven to be effective:

- 1 **Tax** tobacco to increase price, and also prevent smuggling;
- 2 Change the **image** of tobacco by banning direct and indirect advertising and conducting hard-hitting anti-tobacco public education campaigns;
- 3 Protect nonsmokers from **exposure** to other people's smoke; and
- 4 Help smokers **quit**.

The initiative does this through four **key components**:

- 1 Supporting **public sector** efforts to implement the key interventions listed above.
- 2 Supporting civil society's efforts to educate communities and **advocate** for policy change.
- 3 Rigorously **monitor** global tobacco use and countries' progress implementing key interventions.
- 4 **Optimize** tobacco control interventions.

Work is conducted in low- and middle-income countries, particularly China, India, Indonesia, Russia, and Bangladesh, which account for approximately half of the world's smokers.

Key partner organizations include:

- World Lung Foundation
- Campaign for Tobacco-Free Kids
- World Health Organization
- Centers for Disease Control and Prevention Foundation
- Johns Hopkins Bloomberg School of Public Health

Tobacco use in the world

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

There are a number of ways to look at the phenomenon of tobacco use in the world. First, we can look at the mortality attributable to tobacco, particularly cigarettes, to see the effects of past tobacco use and, based on that, expected effects in future. We can look at prevalence rates over time to see where tobacco control has been having success, as opposed to areas that do not see diminishing rates of use. Another way to look at tobacco use in the world is via the tobacco industry activities, the variety of products on the market and how they are being used. We can look at the various methods of tobacco control and their impact on tobacco use. Finally we can look at current consumption and the various future scenarios of expected rates based on the ability of the FCTC and national tobacco control programmes to have an effect on people's behaviours. Any of these ways of looking at tobacco use should impart a strong sense of urgency in getting more done to help people stop tobacco use, convinc-

ing more people of the need for strong measures to combat the tobacco epidemic, encouraging more governments to act against the tobacco industry and to work to develop national and international tobacco control.

Smoking cessation: limitations and practical approaches

C T Bolliger. Department of Medicine, Faculty of Health Sciences, University of Stellenbosch, Tygerberg/Cape Town, South Africa. Fax: (+27) 21 932 3105. e-mail: chris.bolliger@bluewin.ch

Most long-term regular smokers (>10 cigarettes/day) smoke because they must (nicotine addiction), not because they want to (nice ritual). Nicotine provides a variety of pleasant effects, the withdrawal from nicotine results in intense craving. Although many smokers are aware of the ill effects of smoking, they usually underestimate the magnitude of the threat. Smoking is the most important preventable cause of disease! And 50% of long-term smokers will be killed by it! Smokers' motivational situation must be assessed (Prochaska model). The smoking history has to be taken (pack-years, cigarette brand, concomitant diseases), and the degree of nicotine dependence assessed (FTND). Important base-line measurements are: CO in exhaled air, weight, BP, spirometry, if doctor available: physical exam. Counselling as a team approach by doctor and specialised health care worker is probably the most important component of any intervention. A thorough initial visit is essential: discuss plan of action, coping strategies, follow-up visits, and medication. First line pharmaceutical aids which roughly double the long-term success rate are: various forms of nicotine replacement therapy, the antidepressant bupropion (ZybanTM), and most recently a partial nicotine agonist varenicline (ChantixTM). A good success rate defined as sustained abstinence from smoking at 1 year after quit date and CO-controlled is 20–30%. The clear limitation is that even in the best of hands about 70% of smokers fail the first time round. Doctors should be familiar with the modern methods of counselling and the increasing range of pharmaceutical aids to smoking cessation.

SYMPOSIA: SUNDAY 11 NOVEMBER 2007

MAKING INTEGRATED TB-HIV CARE WORK: OPERATIONS RESEARCH EXPERIENCES IN DELIVERING JOINT TB-HIV SERVICES IN LOW-INCOME SETTINGS

Addressing the barriers to the implementation of combined TB-HIV activities in Uganda

R Okot-Chono,¹ J Sekandi,² F Adatu,³ E Madraa,⁴
I D Rusen,¹ R Dlodlo,¹ M Elliott,¹ P Fujiwara,^{1,5} F Mugisha.⁶
¹International Union Against Tuberculosis and Lung Disease
(The Union), Paris, France; ²Makerere University, Institute of
Public Health, Kampala, ³National Tuberculosis and Leprosy
Programme, Kampala, ⁴National AIDS Control Programme,
Kampala, Uganda; ⁵Centers for Disease Control and Prevention,
Atlanta, Georgia, USA; ⁶Makerere University, Regional Centre
for Quality Health Care, Kampala, Uganda.
e-mail: rokotchono@iatld.org

Context: In 2006, the International Union Against Tuberculosis and Lung Disease, in collaboration with the National TB and AIDS Control Programmes, launched a multi-phased operational research (OR) programme aimed at identifying barriers to implementing TB-HIV collaborative services in 5 districts in Uganda. Phase 1 of the programme was a qualitative study that used focus group discussions, key informants and in-depth interviews with TB and HIV patients, health providers and community members to identify barriers to TB-HIV collaboration. Barriers identified were: poor coordination between TB and HIV clinics; limited provider knowledge on TB-HIV; staff shortages and increasing workloads; lack of counselling rooms compromising patient privacy in facilities; frequent shortages of HIV test kits, antiretroviral drugs and co-trimoxazole; and, high patient costs for CD4 testing, X-ray services and transport. In addition, stigma of HIV and male partners inhibiting women from HIV testing were reported. These qualitative results informed the development of a quantitative cross-sectional study (Phase 2). Results from Phase 1 and 2 are expected to guide the implementation of national guidelines for TB-HIV collaboration and the development of intervention evaluation studies, in Phase 3.

Methods: The quantitative study examined patient, health provider and health system factors affecting HIV testing among TB patients aged ≥ 18 years. The study utilized structured questionnaires to interview 13 health workers in-charge of TB clinics and 384 registered TB patients on follow-up treatment in 13 health facilities that provided both TB and HIV services. Univariate analysis using a multi-variate logistic model will be used to identify factors influencing uptake of HIV testing at 0.05 level of statistical significance.

Findings and recommendations: Results from Phases 1 and 2 and related policy and/or interventions recommendations will be presented.

The impact of TB-HIV activities on health systems and scaling up of ART programmes: Benin's experience in integrated TB-HIV care

D C Capo-Chichi, P Wachinou, S Akpona, E Akinocho,
S Y Anagonou, M Gninafon. Programme National contre la
Tuberculose, Cotonou, Afrique, Benin. Fax: (+229) 21 33 80 30.
e-mail: cadria2005@yahoo.fr

Impact de la mise en place des activités TB-VIH sur le système de santé au Bénin.

Contexte : L'amélioration de la qualité des soins aux co-infectés a été possible grâce à la mise en place des activités TB-VIH au Bénin suite à un accord avec L'Union.

Objectifs : Décrire l'impact de l'introduction du diagnostic et la prise en charge des 2 affections au PNT, au PNLS, et dans le système général de santé ; dégager les contraintes et problèmes de cette prise en charge.

Méthode : Mise en place d'un comité de pilotage chargé de planifier et d'évaluer les activités; analyse des rapports de supervisions.

Résultats : Le renforcement des compétences par la formation généralisée de toutes les catégories de personnel socio sanitaire a permis d'accroître le nombre des cas de TB-VIH dépistés. Le taux d'acceptation du test VIH est de 96% en 2006 contre 74% en 2005. Le tiers des malades co-infectés n'aurait pas été dépistés si le personnel sociosanitaire n'avait pas reçu la formation dans le cadre des activités TB-VIH. Concernant la prise en charge, tout malade co-infecté bénéficie d'un traitement anti tuberculeux et d'une prophylaxie au cotrimoxazole systématiques, et conformément aux directives du guide de prise en charge élaboré et validé par les deux programmes, 20% ont bénéficié d'ARV. Les réunions des membres du comité de pilotage permettent de discuter des problèmes importants qui se posent (bilans d'inclusion gratuits, soins aux PV/VIH en général et aux co-infectés en particulier, décentralisation de la numération des CD4 non encore effective dans tous les CDT malgré la mise en place de la méthode alternative de Dynabeads par IHC, motivation des agents impliqués . . .).

Conclusion : L'impact des activités TB/VIH se mesure à travers une meilleure organisation du dépistage et de la prise en charge des co-infectés, comme en témoigne leur nombre croissant.

Facing the challenges of providing joint TB-HIV care in rural health centers: experiences from Bas Congo and North Kivu in the Democratic Republic of Congo with a special emphasis on supply chain

J P Kabuayi. International Union Against Tuberculosis and Lung Disease, Kinshasa, Congo (Democratic Rep.).
e-mail: jpkabuayi@yahoo.fr

Ce projet a pour objectifs de mesurer la faisabilité et l'efficacité des soins intégrés pour le VIH dans les centres de diagnostic et de traitement (CSDT) prenant en charge les tuberculeux. Le projet a été mis en place dans 23 CDST de 2 provinces de RDC Nord Kivu et Bas Congo en 2006 et 2007. Sur les 2107 tuberculeux dépistés depuis le début du projet, 1732 (82%) ont été testés, 262 étaient VIH (15%), 122 malades soit 47% ont reçus du cotrimoxazole et 86 (33%) ont reçus des ARV. Le circuit d'approvisionnement pour les ARV est le même que celui utilisé pour les antituberculeux. La distribution de tous les médicaments se fait sous la responsabilité du PNT selon le circuit suivant : dépôt central du PNT → dépôt de coordination provincial → dépôt zone de santé → CSDT. La demande des médicaments se fait selon le même schéma que pour les tuberculeux en se basant sur le nombre de patients à soigner au cours du trimestre écoulé et du stock de réserves. Un rapport régulier (trimestriel par dépôt provincial et mensuel par CSDT) permet de suivre l'utilisation des médicaments et éviter le sur stockage et péremption. Il n'y a pas eu des ruptures de stock dans les centres de diagnostic et de traitement.

Difficultés pour l'approvisionnement : Médicaments en provenance d'autres sources : formes et présentation différentes ; usage de fiches de stock différentes selon les donateurs pour les autres patients ; faible recrutement des patients au début de l'activité pouvant conduire à la péremption des médicaments ; personnel sous payé. La prise en charge des patients VIH en utilisant comme porte d'entrée les soins aux tuberculeux est faisable. Parmi les difficultés à surmonter celles liées à l'approvisionnement nécessitent les principales actions suivantes : achat centralisé au niveau national auprès du même fabricant ; utilisation de la même molécule ; ouverture de deux nouveaux sites : 1 dans le Nord Kivu et un autre dans le Bas Congo ; extension de la prise en charge des membres de famille au 1^{er} degré.

CONTACT INVESTIGATION IN THE HOUSEHOLDS OF MDR- AND XDR-TB PATIENTS: YIELD IN NEW CASES OF TB AND IMPLICATIONS FOR EVALUATION AND MANAGEMENT OF EXPOSED CONTACTS

Yield of household contact investigations for MDR-TB cases in Lima, Peru

M C Becerra,^{1,2} S C Appleton,^{2,3} K Chalco,² C D Mitnick,^{1,2} J Bayona,^{1,2} L Lecca.² ¹Department of Social Medicine, Harvard Medical School, Boston, Massachusetts, USA; ²Socios En Salud/Partners In Health, Lima, Peru; ³Harvard School of Public Health, Boston, Massachusetts, USA.
Fax: (+1) 617 432 2565. e-mail: mbecerra@post.harvard.edu

Setting: After identifying scores of patients with multidrug-resistant tuberculosis (MDR-TB) in the northern cone of Lima, Peru, in 1996, our group partnered with the National Tuberculosis Program of Peru to initiate treatment of MDR-TB. This program has provided individualized regimens tailored to the drug-susceptibility profile of each patient's infecting TB strain. Patients enrolled had frequently been labeled 'chronics' and had been treated with three or more failed regimens prior to receiving this MDR-TB regimen. MDR-TB therapy was delivered on an ambulatory basis and health workers referred symptomatic household members for TB diagnosis. The program has grown to cover all of metropolitan Lima and has been replicated in major urban centers in Peru's provinces.

Methods: This was a retrospective cohort study. In 2004–2006, a study team visited the households of the MDR-TB patients in metropolitan Lima who had been enrolled in an individualized regimen between September 1996 and August 2002. The first person in the household to enroll in an individualized MDR-TB regimen was defined as the 'index' patient. Study workers interviewed the patient and/or household members about any TB diagnosis and TB therapy received by any of the household members since the time the index patient enrolled in the individualized regimen. Study workers also asked if anyone in the home had TB symptoms currently. Individuals with TB symptoms were referred for smear microscopy and culture.

Results: Between September 1996 and July 2002, 972 MDR-TB patients living in metropolitan Lima were enrolled in an individualized treatment regimen, of which 3.8% had XDR-TB. From 2004 to 2006, the study team visited the households of these MDR-TB patients. The study team enrolled 6747 household contacts of the 972 index patients. Analysis of the risk of active TB in household members during the two years after the index patient was enrolled in MDR-TB treatment is underway and will be reported.

Management and treatment outcomes for child contacts of MDR-TB patients in South Africa

H S Schaaf.^{1,2} ¹Department of Paediatrics and Child Health, Stellenbosch University, Tygerberg, ²Tygerberg Children's Hospital, Tygerberg, South Africa. Fax: (+27) 21 938 9138. e-mail: hss@sun.ac.za

Chemoprophylaxis for contacts of MDR-TB cases is controversial. No randomised controlled studies are available. The WHO 2006 guidelines for the management of MDR-TB recommend isoniazid only for the possibility of a drug-susceptible contact, and further recommend close clinical follow-up only. Failures of isoniazid +/- rifampicin to prevent MDR-TB in child contacts have been reported. In a prospective study of contacts of MDR-TB source cases, 2/41 (5%) children who received 6-month chemoprophylaxis with 2 drugs for which the adult case's strain was susceptible vs. 13/64 (20%) children who did not receive appropriate chemoprophylaxis developed TB ($P = 0.05$). This implies that MDR chemoprophylaxis could be effective in preventing MDR-TB. We currently manage our young, high-risk MDR-TB contacts with high-dose isoniazid (possible low-level isoniazid resistance) plus two drugs to which the source case is susceptible given for 6 months. Close follow-up (two-monthly for the first 6 months and then 6-monthly for up to 24 months) remains important. In case of known extremely drug-resistant TB, this probably will not do, and high-dose isoniazid together with close follow-up is most likely the only current option available.

CHILDHOOD PNEUMONIA AND HIV IN AFRICA

Overview of incidence, causes and outcome of pneumonia in HIV-infected African children

H J Zar. School of Child and Adolescent Health, Red Cross Children's Hospital, University of Cape Town, Cape Town, South Africa. Fax: (+27) 21 689 1287. e-mail: hzar@ich.uct.ac.za

Globally there are approximately 2.3 million HIV-infected children, of whom almost 2 million reside in sub-Saharan Africa. Pneumonia is the leading cause of death in children younger than 5 years in Africa, accounting for approximately 20–25% of childhood deaths. The HIV epidemic has increased the incidence, severity and mortality due to childhood pneumonia. This has been compounded by poor access and unavailability of preventative strategies and of HAART. Moreover, HIV-exposed but uninfected children may be at increased risk of pneumonia and of more severe disease compared to unexposed children. Concomitant malnutrition worsens the outcome from pneumonia. Bacterial infections remain a major cause of pneumonia mortality, with *Streptococcus pneumoniae* predominating. *Mycobacterium tuberculosis* is an

important cause of acute pneumonia in both HIV-infected and uninfected children. Additional pathogens such as *Pneumocystis jirovecii* and gram negative bacteria occur in HIV-infected and to a lesser extent in HIV-exposed children, associated with a high mortality. Polymicrobial disease occurs frequently. WHO case management guidelines, with timely use of antibiotics or hospital referral, can substantially reduce pneumonia mortality; however, current guidelines may be inadequate for HIV-infected or exposed infants. Available preventative interventions including nutritional support, micronutrient supplementation, immunization as contained in the EPI program and use of cotrimoxazole prophylaxis are effective. Newer conjugate vaccines against *S. pneumoniae* and *Haemophilus influenzae* are not widely affordable nor available in Africa. Despite a lower efficacy in HIV-infected children, vaccination protects against disease in a significant proportion. HAART is effective for reducing the incidence and severity of pneumonia.

Antibiotic therapy for childhood pneumonia in HIV-endemic settings

M English. Child and Newborn Health Group, Nairobi, Kenya. Fax: (+254) 20 271 1673. e-mail: menglish@nairobi.kemri-wellcome.org

Approximately 32 million children are born annually in sub-Saharan Africa where they are exposed to the dual risks of HIV and pneumonia. Alone both diseases result in considerable mortality and morbidity in childhood while their interaction considerably increases these risks. Current empiric antibiotic guidelines recommended by the WHO for the management of pneumonia suggest that the severity of disease is first assessed and classified before severity-specific antibiotic regimens are selected. Successful, population based implementation of these guidelines can result in all-cause mortality reductions of approximately 20%. However, the technical basis for these guidelines largely precedes the HIV era in Africa. The emergence of *Pneumocystis jirovecii*, tuberculosis and other 'atypical' pathogens as causes of acute pneumonia and treatment failure in HIV infected children and concern over the emergence of antibiotic resistance in common pathogens have therefore re-invigorated debate on the content of empiric treatment guidelines. However, in an age when health policy decisions are expected to be evidence based we find we are paying the price for having neglected key areas of clinical pneumonia research. As a result, for the clinician and the public health policy maker, there are many more questions than answers in the search for optimum treatment approaches.

MDR-TB, XDR-TB SECOND-LINE DST

What are the difficulties and problems from the NTP perspective in the management of patients infected with an MDR/XDR strain?

Y Kebede. Medecins Sans Frontieres, Amsterdam, Netherlands. Fax: (+31) 20 697 0609.
e-mail: yared.kebede@amsterdam.msf.org
kebedeyared@yahoo.com

The emergence of MDR/XDR strains has posed a challenge to global tuberculosis (TB) control. Results from global surveys conducted by the World Health Organization (WHO) and Center for Disease Control (CDC) in 2006 showed 20% of isolates were multi-drug-resistant (MDR). Of these MDR isolates 10% were extensively drug resistant (XDR) and were identified in 17 countries in all geographical regions. While National Tuberculosis Programs (NTPs) are focusing on global targets for case detection and cure, the emergence and rapid increase of drug resistant cases raise the need to improve the existing control strategies to effectively manage new as well as drug resistant cases according based on the specific contexts. High rates of HIV co-infection, poor treatment adherence, lack of new drugs and diagnostics further compound the challenge posed on NTPs to optimally manage drug resistant cases. The inherent shortage of trained and motivated health professionals in high burden countries and their migration continue to severely strain the capacity of health systems to effectively implement tuberculosis control programs and the growing problem of drug resistance. Difficulties NTPs encounter in maximizing management capacity to ensure early detection and treatment of MDR/XDR tuberculosis, while maintaining optimal treatment of new patients and prevent further development of drug resistance are discussed. Opportunities for NTPs to collaborate with private and academic institutions based on experiences from existing DOTS-Plus programs on MDR/XDR management as well as strategies for optimal laboratory, treatment adherence, drug quality, human resources development and integrating research priorities are discussed.

Alternative tools for detection of multidrug-resistant tuberculosis in resource-limited settings

C C Boehme. Foundation for Innovative New Diagnostics (FIND), Geneva, Switzerland. Fax: (+41) 22 710 05 99.
e-mail: catharina.boehme@finddiagnostics.org

Only a small fraction of the estimated 400 000 multi-drug-resistant TB cases occurring each year have access to drug susceptibility testing (DST). Key obstacles to DST expansion over the past years were 1) the complexity of available tools and the laboratory infrastructure required for their implementation; 2) the un-

affordable price of better (but equally complex) technologies; and 3) the unavailability of rapid and simple tools for identification of resistance. At the moment, new diagnostic tools are appearing at the horizon that may allow National TB Programs to improve patient outcomes and limit transmission as well as development of further resistance. Promising data have become available for simplified culture methods such as MODS, and first attempts for the introduction in routine settings are underway. Liquid culture systems—standardized for first and second line drugs and expected to decrease in price—have been successfully introduced in resource-limited settings. Existing phage-based assays, although laborious, are inexpensive alternatives for detecting rifampicin resistance within 48 h. The third and most promising alternative with respect to speed is novel nucleic acid amplification testing: the Genotype MTBDRplus assay, for which a large-scale demonstration project is currently underway in South Africa, detects mutations in the *rpoB*, *inhA* and *katG* genes and can be performed directly from smear-positive sputum. Cepheid and FIND are developing a fully-automated multiplexed assay with integrated sample processing for MTB and rifampicin detection within 2 h. Compared to culture methods, such rapid tests also have the advantage of a minimized infection risk for laboratory staff. None of these commercial approaches currently allows assessing resistance to gyrase inhibitors or aminoglycosides as predictors for XDR. Such tests should be developed along with new drugs to fight XDR with the most powerful weapons: early diagnosis and effective cure.

SUCCESSFUL MODELS OF COMMUNITY INVOLVEMENT AND WORKING WITH PARTNERS IN TB PREVENTION AND CARE

Social mobilisation and communications activities in Central Asia

J Ismoilova,¹ S Kasymova,¹ A Beisembaev.^{1,2} ¹Project HOPE CAR TB Program, Dushanbe, Tajikistan; ²Project HOPE CAR TB Program, Bishkek, Kyrgyzstan. Fax: (+992) 372 214708.
e-mail: ismoilova@projecthope.kz

Background: The Small Grant Program supported by USAID is one of the key components of Project HOPE's work on TB social mobilization. Project HOPE supports proposals of local non-governmental organizations (NGO) and community groups aimed of increasing population awareness on TB and decreasing stigma.

Methods:

- Technical assistance during proposal writing
- Trainings on DOTS, grant management and monitoring

- Provision of technical expertise during implementation
- Provision of information materials for dissemination

Results: Eight local NGOs from Tajikistan and Kyrgyzstan received funds to implement projects on TB. Initiative groups of community leaders were trained on TB and work with population. In their turn, the leaders conducted meetings with population. Such community-based approach found support of local governments. Project HOPE developed and provided informational materials to NGOs. Other activities included: developing information billboards on TB, theater and music performances, puppet shows. The sustainability of the activities was enhanced by producing CDs with the shows. The program in such was successful and the effect on case finding and treatment success still needs to be verified.

Conclusion: Involving local NGOs in TB social mobilization allows addressing community needs by shaping the message to specific target group. Moreover, a small grant program brings the TB message to population in cost-effective way giving the opportunity to the National TB Program and Project HOPE to increase community knowledge on TB and decrease TB stigma.

Working with communities on TB in Africa

J Syed. Treatment Action Group, New York City, New York, USA. Fax: (+1) 212 253 7923. e-mail: javidattag@gmail.com

Background: TB incidence is increasing around the globe at about 1% each year. TB-HIV is a leading factor contributing to this increase. Africa carries the greatest burden of TB-HIV.

Approach: **Goal:** Growing a cadre of science-based activists that have a deep understanding of how TB impacts their community, but are also equipped with sound science and can use those two elements for advocacy. We do this by organizing annual trainings for TB/TB-HIV activists as well as presenting at activist conferences on TB-HIV issues to highlight the priority issues and what can be done about them. TAG is also partnering with ICW-East Africa to provide training and support Africa-based TB-HIV activist initiatives. **Goal:** Have community play a significant role in global and national level policy discussions. We do this by working with the global Stop TB Partnership to create community representative (CR) seats on the Partnership and by providing the CRs with training and support. TAG has also partners with OSI to support national level work. OSI funds and TAG provides technical support to activist organizations working to improve TB-HIV services and policies.

Goal: To facilitate community and research working together to ensure that research is resourced, efficient, addresses community priorities, and leads to smooth uptake of new tools. We do this by supporting participatory mechanisms into the research process and to highlight the role that activists can play in increasing

the political will, resources, and demand for new tools and research.

Results:

- Activist engagement in Stop TB Partnership has contributed to the change in TB control strategies to include TB-HIV, MDR TB, research, and community empowerment.
- Activist persuaded TB-HIV scale up to be in line with UNAIDS goals of universal access by 2010 and an expedite M/XDR plans.
- National level activism has strengthened TB-HIV programs and policies.

OVERCOMING BARRIERS IN PROVIDING TB AND HIV CARE FOR PERSONS WITH POLY SUBSTANCE USE

What to do when alcohol use among TB-HIV patients is considered a habit and not disease

T A Mathew.^{1,2} ¹Division of Infectious Diseases, University of Mississippi Medical Center, Jackson, Mississippi, ²Division of Social Medicine and Health Inequalities, Brigham and Women's Hospital, Boston, Massachusetts, USA. Fax: (+1) 601 815 4014. e-mail: tmathew@partners.org

Alcohol use is a norm in many societies. It may be used to celebrate important milestones such as weddings, births, and deaths, and can be an integral part of a person's lifestyle. Therefore people may consider alcohol use a choice of lifestyle or habit. Many are unaware that excessive alcohol use and abuse is one of the many facets of a disease characterized by periods of remission and exacerbation, similar to other chronic diseases. Given that poor TB and HIV treatment outcomes are associated with excessive alcohol use, it is imperative for health care providers (HCP) to address this. HCP can help patients determine if an individual's alcohol use can lead to alcohol use disorders or chronic disease by using a screening tool such as the Alcohol Use Disorders Identification Test (AUDIT) established by World Health Organization. This initial AUDIT score at intake for TB and or HIV treatment can then be linked to subsequent care and management of underlying alcohol use disorders. Subsequent steps include: determining if the patient is in the precontemplative stage of change, or in any of the following stages of contemplation, preparation, action and maintenance; linking the TB and or HIV patient to appropriate care of alcohol use disorders; and finally ensuring long term rehabilitation for alcohol use disorders while patients continue TB and HIV treatment. Shifting the paradigm of approach and management of alcohol use from that of a habit or lifestyle to that of a disease model may help both the health care provider and the TB-HIV patient address excessive alcohol use and prevent adverse TB and HIV treatment outcomes.

Integration of HIV-TB care with the harm reduction programmes in Iran and neighbouring countries

A Alaei,¹ K Alaei,^{2,3} A Zarabi,⁴ M R Masjedi.¹ ¹National Research Institute of TB and Lung Dis. (NRITLD), Tehran, ²Global Health in the Middle East and Central Asia, Tehran, Tehran, Islamic Rep. of Iran; ³Harvard School of Public Health, Boston, Massachusetts, ⁴Brown University, Providence, Rhode Island, USA. Fax: (+98) 212 241 5567. e-mail: alaei@nritld.ac.ir

Tuberculosis (TB) and HIV/AIDS are epidemics that have contributed to the deaths of millions of people throughout the world, and due to the severe nature of these diseases, the Millennium Development Goals (MDG) has sought to halt and begin to reverse the spread of these diseases. In the many Middle Eastern countries, TB indicators have not yet been met, and XDR-TB and MDR-TB have been reported as existing in some countries in the region. Due to the presence of stigma in many Middle Eastern countries, there has been limited reporting regarding HIV/AIDS, but several reports have indicated that HIV/AIDS is also on the rise. The existence of wars, refugees and the destruction of infrastructure in several parts of the Middle East have contributed to the increase of HIV/AIDS and TB among the populace. Considering the fact that an individual with TB-HIV has two diseases, we must forge a way to bridge the care for both diseases and create a unified medical system in which they can be properly treated together. Much of the Middle East lacks proper human and financial resources coupled with separated medical structures pertaining to TB and HIV/AIDS, and considering that both diseases are stigmatised, it may be more pragmatic to design a collaborative programme to effectively control them. With attention to the fact that opium and opium-products are produced, consumed and trafficked widely throughout the Middle East, and currently the major mode of HIV transmission in most Middle Eastern countries is from injection drug use, it is crucial to promote harm reduction activities that would work in conjunction with controlling TB and HIV/AIDS in the region.

Providing care using outreach workers and the peer support model of Tomsk, Russia

A V S Sasarov. Tomsk-AntiAIDS, Tomsk, Russian Federation. Fax: (+382) 2420629. e-mail: t_aids@mail.ru

Medical Young Centre 'Our Clinic' has been running project 'Providing care by using a realistic model to control TB and HIV in population with high risk' since 2004.

Aim of project: Controlling TB/HIV in group of population with high risk:

- Developing cooperation between such services as fighting against HIV infection, TB and project 'Harm reduces'.

- Improving quality of information regarding HIV/TB among injection drug users, sex workers, homeless children by using peer support technique.
- Extending spectrum of service of project 'Harm reduce' by providing counselling, testing, diagnostic, prophylaxis and treatment TB/HIV for injection drug users, sex workers and homeless children.

Methods of approaching the aim:

- Arranging events which help to develop cooperation between organisation providing controls TB/HIV.
- Organising training and seminars for outreach workers and peer specialists.
- System outreach work:
 - Providing information regarding TB/HIV using peer support method.
 - Motivating patients to get examination for TB/HIV.
 - Counselling patients before testing for HIV, and diagnostic of TB in places where drug users, sex workers and homeless children normally are gathered, by doing and reading Mantoux test, taking sputum for microbiology, providing social worker to accompany patient to go to radiological department.
 - Working to develop responsibility in patient to follow prescribed medication, chemoprophylaxis, and High-active antiretroviral therapy.
- Participating in directly observed therapy and chemoprophylaxis of TB in patients with HIV using injection drug.

Obtaining experience is justified that the potential of program 'Harm reduce' gives a good result to develop responsibility following HAAV and using DOT.

Using the prevention and access to care and treatment (PACT) model to improve TB-HIV outcomes in patients with poly substance use

H L B Behforouz. Division of Social Medicine and Health Inequalities; Department of Medicine, Dorchester, Massachusetts, USA. Fax: (+1) 617 474 8546. e-mail: hbehforouz@partners.org

For the past ten years, the PACT Project has employed community health workers (CHWs) to improve health outcomes and health care utilization patterns for underserved HIV/AIDS patients in the city of Boston. Almost all of these patients are Black or Latino, impoverished, on Medicaid, and clinically ill. Most are mentally ill and 40% are active substance users (with heroin, cocaine, and alcohol the primary drugs of choice). Providers across the city refer these patients because of poor adherence to antiretroviral therapy as well as frequent hospitalizations for opportunistic illnesses. Over a six to nine month period, CHWs provide extensive health promotion and adherence education and counseling in the home via a 25 module health promotion curriculum. CHWs also accom-

pany patients to their appointments and follow up with them to ensure that treatment recommendations are actualized. They help coordinate the care of their patients and have close and regular communication with health and mental health care providers, case managers, and social service agency personnel. For the 25% of PACT patients needing more intensive adherence support, PACT offers a directly observed therapy (DOT) program. Patients enrolled into this program receive standard health promotion services as well as daily visits via a DOT specialist (a different brand of CHW) who helps them take their medications. Results to date have been promising with clinically significant improvements in CD4 count, viral load, and health care utilization patterns. We have found that substance users (who receive additional harm reduction support) respond equally well to our intervention. We believe that the PACT CHW model can be easily adapted to the care of patients with tuberculosis as well as to other chronic diseases, such as diabetes, heart disease, and mental illness. On average, PACT expends \$3600/patient/year.

HUMAN, LIVESTOCK AND WILDLIFE INTERFACE AND ZONOTIC TUBERCULOSIS

Mycobacterium bovis infections in animals and humans in Tanzania

R Kazwala,¹ S Cleaveland,² G Mfinanga,³ Sokoine University of Agriculture, Faculty of Veterinary Medicine, Morogoro, Tanzania; ²CTVM, University of Edinburgh, Edinburgh, UK; ³National Institute for Medical Research, Dar es Salaam, Tanzania. Fax: (+255) 23 2604647. e-mail: kazwala@suanet.ac.tz

A molecular epidemiological study to determine the zoonotic importance of bovine tuberculosis was carried out in Tanzania. Specimens from human cases of tuberculosis as well as from slaughtered cattle were collected from regions with a high proportion of extrapulmonary tuberculosis. Genetical finger printing was determined using spoligotyping. There were 13 different spoligotypes found in this study, whose genetic relatedness was also high (79%). The diversity of the spoligotype patterns observed in Tanzania probably reflects the extensive internal movements of cattle belonging to pastoralists in and out of wildlife livestock human interfaces of Tanzania. Adjunct to the above studies, a human case-control study was conducted in northern Tanzania, involving 27 villages, with 622 herds. *M. bovis* was confirmed in 10.8% of 65 human cases. *M. bovis* in human patients was associated with families in which a confirmed diagnosis of tuberculosis had previously been made ($P < 0.001$). In cattle, overall prevalence was widespread in herds tested (11.8%). Risk factor for positive herds were:

>50 cattle in the herd ($P = 0.024$); herds housed inside at night ($P = 0.021$) and herds in contact with wildlife ($P = 0.041$). Furthermore, villages that experienced annual flooding had a higher prevalence of infection ($P = 0.043$).

Human *Mycobacterium bovis* tuberculosis: United States, 1995–2005

P LoBue, M Hlavska, P Moonan, L Cowan, T Navin, J S Kammerer, G Morlock, J Crawford. Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+1) 404 639 8959. e-mail: Pgl5@cdc.gov

While tuberculosis (TB) is nationally reportable in the US, the causative agent is usually not specified. Thus *Mycobacterium bovis* and *M. tuberculosis* TB are studied as a single disease. Except for what has been reported in a few local studies, the epidemiology of *M. bovis* TB in the US is unknown. The objectives of our study were to 1) assess the utility of linking genotyping and surveillance data to study *M. bovis* TB, 2) describe patient and disease characteristics of *M. bovis* TB, and 3) compare epidemiology of *M. bovis* and *M. tuberculosis* TB. *M. bovis* isolates collected between 1995–2005 (majority were from 2004–2005) were identified from the US National Tuberculosis Genotyping Service by characteristic spoligotype and MIRU patterns. Case numbers were used to link isolates to demographic, epidemiologic, and clinical information in the US national TB surveillance database. Of 14 157 isolates, 2283 were excluded because they could not be linked to a patient in the surveillance database or they represented additional isolates submitted for the same patient. Of the remaining 11 874 isolates, 11 697 were *M. tuberculosis* and 177 were *M. bovis*. Ten *M. bovis* isolates were excluded because they were BCG leaving 167 *M. bovis* isolates. In a multivariate analysis, compared with *M. tuberculosis* TB patients, *M. bovis* TB patients were more likely to be foreign-born (adjusted odds ratio with 95% confidence interval: 2.5 [1.1–5.9]), of Hispanic race/ethnicity (10.2 [2.3–45.0]), HIV-infected (2.4 [1.1–5.1]), have extrapulmonary disease (10.8 [6.1–19.2]) and be in the 0–4 years old (7.0 [1.2–42.9]) or 5–14 years old (14.0 [3.9–50.8]) age groups. In conclusion, linking national TB genotyping and surveillance data was found to be useful and enabled the first national US epidemiologic study of *M. bovis* TB. In the future, it may be possible to use this system to establish routine surveillance for *M. bovis* in the US.

Establishing the disease ecology of tuberculosis in meerkats at the wildlife-domestic animal-human interface

J Drewe,¹ G Pearce,¹ T Clutton-Brock,² G Dean,³ A Michel.⁴

¹Wildlife Health & Conservation Medicine Research Group, Department of Veterinary Medicine, University of Cambridge, Cambridge, ²Department of Zoology, University of Cambridge, Cambridge, ³Veterinary Laboratories Agency, Weybridge, UK; ⁴Onderstepoort Veterinary Institute, Pretoria, South Africa. Fax: (+44) 1 223 764 667. e-mail: Jad65@cam.ac.uk

Background: Investigation of socially-mediated infectious disease transmission in wild animals is frequently constrained by lack of empirical data on social interactions. We present data from a long-term study of behaviour and bovine tuberculosis transmission (bTB; *Mycobacterium bovis*) in a population of wild meerkats (*Suricata suricatta*) living in the South African Kalahari.

Aim: To quantify the role of social interactions and social networks in the transmission of bTB within a population of wild animals at the human-livestock-wildlife interface.

Study design: Cross sectional and longitudinal (prospective cohort) studies of wild meerkats from 15 social groups.

Methods and Results: We conducted field anaesthesia and live sampling of meerkats approximately every 3 months from 2005 to 2007. We established the bTB status (negative; exposed; or infectious) of individually-identifiable meerkats through serology and mycobacterial culture of tracheal washes and submandibular lymph node aspirates. We undertook detailed daily observations of meerkats' intra- and inter-group social interactions throughout the study period. We applied Social Network Analysis (SNA) in a novel way to elucidate the role of specific behaviours in generating spatial and temporal differences in bTB transmission both within and between meerkat social groups. We used epidemiological modelling to demonstrate the importance of variations in levels of intra-group social interactions in explaining differences in bTB transmission rates.

Discussion: This is the first study of bTB in free-living wildlife to empirically measure disease status and behavioural interactions simultaneously. We demonstrate the value of using SNA to determine the role of social interactions in disease transmission within a wild animal population, and discuss its application to the study of bTB transmission risk at the human-livestock-wildlife interface.

CHALLENGES OF XDR-TB MANAGEMENT IN HIGH-BURDEN HIV SETTINGS

Screening for XDR-TB in high-burden HIV settings

T Holtz, J P Cegielski. Division of TB Elimination, Atlanta, Georgia, USA. Fax: (+1) 404 639 1566. e-mail: tkh3@cdc.gov

Aim: The top priority in evaluating and screening patients for extensively drug-resistant tuberculosis (XDR TB) in high-burden HIV settings is to identify those patients with increased risk for drug-resistant TB and target them for first-line and second-line drug susceptibility testing.

Design: Review of peer-reviewed literature.

Results: Epidemiological studies, such as anti-TB drug resistance surveillance and surveys have identified risk factors for resistance to first-line drugs to include: failure of category I and category II regimen, chronic TB cases, exposure to a known multidrug-resistant (MDR) TB case, failure of anti-TB treatment in private sector, relapse and return after default without recent treatment failure, potential exposure in institutions that have MDR TB outbreaks or high MDR TB prevalence, history of using anti-TB drugs of poor quality, treatment in programs that operate poorly, and HIV infection in some settings. In settings with high HIV prevalence, previous hospitalization or incarceration are risk factors associated with acquiring MDR TB. Risk factors for resistance to second-line drugs are currently not well characterized.

Conclusions: Given the important interaction between HIV infection and drug-resistant TB, HIV testing among persons suspected of having TB and evaluation for TB among HIV-infected persons, including rapid identification of drug resistance (rapid cultures/drug susceptibility testing), is critical. Drug susceptibility testing should be performed as quickly as possible using liquid-based media for both culture and DST. To improve case detection, countries should move quickly to establish nucleic acid-based detection for rifampicin resistance in high risk patients. Although rifampicin resistance may be an imperfect predictor of multidrug-resistance, this will allow program managers to better target those at higher risk of mortality for treatment with second-line drugs and for more efficient use of existing resources.

Implementing rapid XDR-TB diagnostic capacity in resource-limited settings

R O'Brien. FIND Diagnostics, Cointrin, Switzerland. Fax: (+41) 22 710 0599. e-mail: rick.obrien@finddiagnostics.org

In response to the emerging epidemics of MDR/XDR-TB and HIV-associated TB, there has been a call for significant expansion of capacity for mycobacterial

culture and drug susceptibility testing (DST). Recent estimates of this need, developed by WHO and its partners, call for nearly 15 million cultures and over 4 million DSTs to be performed annually. With full scale-up by 2015, these numbers reach 60 million cultures to be performed in up to 10 000 laboratories. As this need is driven largely by the demand for DST, alternate methods to diagnose MDR and XDR-TB need to be established. Recent advances in molecular testing have resulted in an assay that can be performed directly on AFB smear-positive sputum specimens with highly accurate results within one day. This assay is amenable to high-throughput at a cost that is significantly less than standard DST. Use of the assay has the potential to significantly reduce the requirement for standard culture and DST, as results indicating absence of MDR-TB do not require further laboratory testing. Work is underway to develop alternate specimen processing methods to permit collection and transport of specimens from the periphery to a central facility for testing and to adapt the assay for the rapid detection of XDR-TB.

A COMPREHENSIVE APPROACH TO RESPIRATORY ILLNESS PREVENTION AND LUNG HEALTH PROMOTION

Rationale of a comprehensive approach to respiratory illness prevention and lung health promotion

E Baris. Human Development Unit, World Bank, Washington, DC, USA. Fax: (+1) 202 477 0036. e-mail: ebaris@worldbank.org

Respiratory diseases account for about 10 million avoidable deaths per year—approximately 4 million children die of pneumonia; 2 million young adults die of tuberculosis; under 3 million people die from tobacco-related illnesses (expected to rise to 10 million in the coming years); at least 1 million persons die prematurely because of air pollution in the large cities of Asia; about 1 million die from the effects of indoor air pollution. Moreover, the prevalence of Chronic Obstructive Pulmonary Diseases is vastly underestimated in the low- and middle-income countries. At any rate, respiratory diseases are among the five most frequent causes of seeking care in the health services in every location. Many of the respiratory diseases cut across several MDGs: either directly, i.e., Reducing Child Mortality (MDG 4); Ensuring environmental sustainability (MDG 7), or indirectly, i.e., Promoting gender equality and empowering women (MDG 3) and Eradicating extreme poverty and hunger (MDG 1). Addressing these issues requires adoption of multi-sectoral policies aimed at promoting lung health (e.g., tobacco control and alleviating ambient and indoor

air pollution). However, these challenges could be overcome if interventions to prevent respiratory disease and promote lung health are designed with a thorough understanding of the complex causality, the underlying human ecology, and the country settings. For instance, a program to reduce indoor air pollution through behavioral modification and improved stoves will not only reduce pneumonia in children or COPD occurrence in women, the most vulnerable, but will also improve fuel efficiency, result in savings due to decrease in healthcare and fuel expenditures, and improve the environmental sustainability due to reduced use of fuelwood/coal and/or increased use of renewable energy. This presentation will highlight potential synergies across sectors for lung health promotion and disease prevention for multisectoral interventions.

Mathematic modeling on the impact of a comprehensive approach

H L Lin,^{1,2} M M Murray,^{1,3,4} T C Cohen,^{1,4} C C Colijn,^{1,5} M E Ezzati.⁶⁻⁸ ¹Department of Epidemiology, Harvard School of Public Health, Boston, Massachusetts, USA; ²Community Health Society, Mennonite Christian Hospital, Hualien, Taipei, China; ³Division of Infectious Disease, Massachusetts General Hospital, Boston; ⁴Division of Social Medicine and Health Inequalities, Brigham and Women's Hospital, Boston; ⁵Broad Institute, Cambridge; ⁶Department of Population and International Health, Harvard School of Public Health, Boston; ⁷Department of Environmental Health, Harvard School of Public Health, Boston; ⁸Initiative for Global Health, Harvard University, Cambridge, Massachusetts, USA. e-mail: majid_ezzati@harvard.edu

Background: Smoking and indoor air pollution (IAP) are risk factors for lung cancer, chronic obstructive pulmonary disease (COPD) and tuberculosis (TB). China has high levels of tobacco consumption and solid fuel use. The two risk factors have led to very high mortality from lung cancer and COPD and are contributing to the current, and possibly future, TB epidemic among Chinese adults. We conduct a study to quantify the effects of multiple scenarios of integrated management of lung disease to investigate the mortality reduction benefits of reducing risk factor exposure at the population level or coupled with tuberculosis treatment.

Method: Using multiple publicly available data sources, we establish current and past levels of smoking and solid fuel use as well as lung cancer, COPD and TB, by province or groups of provinces when possible. For lung cancer and COPD, the effects of interventions are estimated using the population attributable fraction. For TB, where disease incidence is dependent on prevalent TB cases, we use dynamic models to take into account both the direct and indirect effects of interventions.

Result: At the population level, significant proportions of attributable risks can be avoided by reducing the two risk factors with various interventions, with

the level of benefits dependent on the coverage and timing of interventions. Smoking cessation and IAP reduction can complement the effect of DOTS (directly observed therapy, short-course) in TB control. Sensitivity analysis reveals that the estimated effects of aggressive tobacco and IAP control are substantial. **Conclusion:** Integrated management targeting at tobacco smoking and IAP has the potential of curbing and reducing the epidemics of chronic and infectious respiratory diseases. The quantitative evaluation can be used to guide systematic and evidence-based choice of interventions for integrated management of lung disease in China.

Role of a competent centre at country/regional level in lung health promotion

A El Sony,^{1,2} M Ziyada.¹ ¹Epi-Lab, Khartoum, Sudan; ²International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+249) 224496. e-mail: aelsony@yahoo.com

Introduction: Competence centers display high performance, superior capabilities, strong sharing and learning capacities in operational and strategic work modes. All stakeholder needs and interests are considered, prioritized, and transformed into integrated goals and strategies. The Epi-Lab experience as competence center is used here as demonstrating example. **Background information on Epi-Lab:** Epi-Lab is a national centre of competence created to develop, guide and support national public health projects and programs to produce efficient and successful outputs. It was established in 1997 as a non-governmental, nonprofit organization based in Khartoum, Sudan.

Utilizing the TB model: The Epi-Lab was inspired by the success of the NTP in Sudan where research has led to rapid scaling up and establishment of TB service units throughout the country in record time. Epi-Lab aims to use the successful TB example as a template for other public health problems. Its main methodology is linking on-going research to service delivery, building effective partnerships along the way. Routine data and work sites in various health programs are made accessible to research institutions with analytical skills. Challenges are prioritized and translated to researchable hypotheses and research projects and postgraduate training enjoys great benefits from solving problems for the public health sector.

Achievements: Epi-Lab has produced a consistent programme of scientific publications in reputed International journals; has established a field of operations that consistently collects and manages information on tuberculosis and its management; has carried out pilot projects in the management of asthma, CLH, the assistance for people stopping smoking and for tuberculosis patients living with HIV/AIDS; Its staff have been engaged in international technical assistance and review activities.

Components of a comprehensive approach

D A Enarson. International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+33) 1 4329 9087. e-mail: DEnarson@iatld.org

A comprehensive approach to lung health services is valuable in that it can improve efficiency, provided it does not reduce quality. Monitoring and maintaining quality are key. This is accomplished by several means. First, a well-developed and hierarchical system of care must be in place. This implies, as a first step, that the most vulnerable cases are cared for in such a way that they are most likely to survive and be cured. This is usually the task of the first-level of referral (the District Hospital, in many countries of Africa). Second, services need to be provided through standard case management, based on the best available evidence for public health practice. Standard case management implies agreed definitions, methods and procedures. Evidence-based standard case management packages are available for most lung health programmes. Third, these services must be monitored systematically to provide the information upon which to base decisions about implementation that is appropriate to local conditions. Information systems that provide this feature have been developed, based on the vast experience gained in provision of tuberculosis services in low-income countries. The information systems that have been adapted from the tuberculosis services have shown themselves capable of providing key information and of empowering local health services personnel to monitor and improve the quality of the services they provide.

Results of a comprehensive approach to date

M Hamid,¹ U Kamal,¹ M El Tigani,¹ A Osman,¹ A Hassan,¹ H Hussein,¹ P Enarson,² N Aït-Khaled,² K Slama,² A El Sony,¹ A Bassili,³ D Enarson.² ¹Epilab, Khartoum, Sudan; ²The Union, Paris, France; ³WHO, Eastern Mediterranean Regional Office, Cairo, Egypt. Fax: (+20) 0222765414. e-mail: bassilia@emro.who.int

Aim: This project aimed at improving the quality of lung health services in Khartoum, Sudan. Registers and treatment cards for asthma, pneumonia and smoking cessation intervention (SCI) for TB patients were introduced in 5 district hospitals to be filled by their health care providers who were also trained on case management of these diseases and on giving a brief advice for smoking cessation to TB patients.

Results: A total of 113 asthmatic patients and 98 children with pneumonia were enrolled from the 5 hospitals. Examples of inadequacies in case management were lack of diagnosis or categorization of asthma severity by the frequency of symptoms and PEF; underuse of beclomethasone inhaler and misuse of prednisolone tablets. In childhood pneumonia, inadequacies included deficient categorization of cases by signs and symptoms; and over reliance on benzyl penicillin.

For both conditions, there was deficient recording and reporting of information. These inadequacies were rectified resulting in better diagnosis, drug prescription according to the extent of severity as per the guidelines, and improved recording and reporting of data. Of the 52 smokers with TB subjected to SCI, around half recorded motivation score of 10, but only 39% were 100% confident that they will be able to quit. The majority discussed quitting and strategies for coping, and 52% set target dates.

Conclusion: This study provided a successful model for enhancing access to and quality of existing lung health services. The expansion of this model at the country level is expected to produce a significant impact on the morbidity and mortality of lung diseases.

LESSONS LEARNT: COMMUNITY PARTICIPATION IN PROVISION OF TB SERVICES AND IN OPERATIONAL RESEARCH ON TB-HIV

Case of village health volunteers in Thailand

A Soonthornhdada. Population and Social Research, Mahidol University, Phuthamontol, Nakornpathom, Thailand.
Fax: (+66) 24419333. e-mail: prast@mucc.mahidol.ac.th

Background: In many districts throughout Thailand, the NTP and community-based programmes rely on family members and village health volunteers to assist professional health workers in the administration of Directly Observed Treatment (DOT). Village health volunteers also provide a wide range of primary health services, including health education. This study explores the efficacy of a community-based strategy for TB service delivery.

Method: This study analyzes data from desktop research and fieldwork, including interviews and site visits. Informants include national TB experts, activists, government officials and other key stakeholders.

Results: In theory, village health volunteers act as a two-way link between communities and the health care system. In addition to providing health education and DOT, village health volunteers are well positioned to provide feedback to health authorities on community health issues and priorities. The initiative to offer DOT through village health volunteers is one attempt to respond to the health staffing shortage. However, there is an important missing link between health personnel and village health volunteers. The NTP needs to develop better strategies for motivating village health volunteers to provide high quality TB services, including the identification of new TB patients and monitoring treatment adherence.

Conclusion: To improve TB services at the community level, the government should support and provide adequate training for village health volunteers in

order to strengthen their skills, capacity, commitment, and confidence to reach out and to work positively with poor and excluded groups.

Case of Shastho Shabeikas in Bangladesh

A Jalaluddin,¹ R Alam,¹ M A Islam,¹ F Ahmed,¹ N Ishikawa,² A M R Chowdhury.^{1,3} ¹BRAC Health Programme, BRAC, Dhaka, Bangladesh; ²The Research Institute of TB, Tokyo, Japan; ³JPG School of Public Health, BRAC University, Dhaka, Bangladesh. Fax: (+880) 2882 3542.
e-mail: jalaluddin_a2003@yahoo.com

Setting: BRAC, an NGO providing two-thirds of TB control services in Bangladesh, has been implementing a community-based TB program in rural and urban areas since 1984. The BRAC approach revolves around Shasthya Shebikas, or female community health volunteers, who help to diagnose and treat TB patients in the communities in which they live.

Objectives: To create a sustainable model for TB control that builds community capacity and reach the MDGs by 2015.

Method: Each of the more than 65 000 Shebikas provides basic healthcare services to an average of 250 households. She receives 18 days of residential training, and subsequently attends a review meeting once a month. During household visits, Shebikas disseminate TB information, identify and refer people for sputum examination, monitor drug side effects, and provide DOT.

Result: BRAC's case detection rate rose from 68% in 2005 to 80% in 2006. Treatment success rate of new sputum positive TB patients diagnosed in 2005 was 93%, compared to 91% in 2004. Shebikas diffuse stigma by providing services on a range of health issues, and not just to people with TB symptoms, but to the entire community. BRAC offers Shebikas an opportunity to earn extra income; many also gain personal satisfaction and prestige.

Conclusion: The BRAC model has achieved high case detection and treatment results at a cost of 50 percent less than the equivalent services in areas not covered by BRAC. BRAC's program has also reaped social dividends. That BRAC's TB services are implemented in collaboration with the government reinforces governmental leadership on TB control.

The experience of the 'THRio' project (CREATE Consortium) in implementing a TB-HIV operational research project by municipal health care services providers in collaboration with community activists

B Durovni,^{1,2} V Vellozo,^{1,2} G Israel,^{1,2} A DeLuca,^{2,3} L Eldred.^{2,3} ¹Head, Transmissible Diseases Dept, Rio de Janeiro City Health Department, Rio de Janeiro, ²CREATE Consortium, Rio de Janeiro, RJ, Brazil; ³Johns Hopkins Center for Tuberculosis Research, Baltimore, Maryland, USA. Fax: (+55) 21 2293 3210. e-mail: bdurovni@rio.rj.gov.br

HIV infection dramatically increases the risk of developing active tuberculosis (TB) in individuals with latent TB infection and increases the probability of primary TB following new infection. The impact of combined ARV and IPT programs is not known, but together these strategies could potentially reduce TB risk to extremely low levels. Tuberculosis remains a major public health problem in Brazil. Approximately 35% of HIV-infected adults in Rio de Janeiro are co-infected with latent TB. The Brazilian policies for the provision of treatment to HIV-infected people are among the most progressive in the world, but the use of IPT, however, has been very limited. THRio is a cluster randomized trial (CRT) to determine if the routine detection of latent TB in HIV-infected patients identified at 29 HIV clinics in Rio de Janeiro, followed by treatment with isoniazid, will reduce TB incidence in those clinic populations. This study will determine if implementing a policy of widespread IPT use in HIV-infected patients with access to antiretroviral therapy reduces the incidence of active tuberculosis disease in the HIV clinic population. THRio established close collaboration with the community since the beginning of the study through the community advisory board (CAB) in all the steps of the implementation. Their members were trained in different subjects including good clinical practices and TB-HIV; developed educational materials and have been following the interim results periodically. After two years the CAB was renovated with a broader participation of other community organizations. Organizing a productive collaboration with the community in a complex operational research where over 14 000 patients are followed is a complex task; nevertheless it has proven to be essential for the good implementation and the dissemination of the results as the research progresses.

The Global Fund grant for DOTS expansion in Brazil: operational research on TB-HIV experience with community involvement

E T Santos Filho,¹⁻³ C Basilia,⁴⁻⁶ M Kramer,⁶⁻⁸ V Brant.^{6,9}

¹Brazilian CCM Vice-Chair, Rio de Janeiro, RJ, Brazil; ²Stop TB Coordinating Board, Geneva, Switzerland; ³Public Health Watch, Open Society Institute (PHW-OSI), New York, New York, USA; ⁴Brazilian Partnership Against TB, Rio de Janeiro, ⁵Forum of NGO fighting TB in Rio de Janeiro State, Rio de Janeiro, ⁶Rede TB-TB Research Network, Rio de Janeiro, ⁷Medical School, Rio de Janeiro Federal University (UFRJ), Rio de Janeiro, ⁸Program for TB Control, Rio de Janeiro State Health Dept (PCT-SES-RJ), Rio de Janeiro, ⁹Dept for Technology on Health Education-Rio de Janeiro Federal University (NUTES-UFRJ), Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 2285 2029. e-mail: tbhiv@eziocn.net

Background: Methods and methodologies applied in TB related health services are hardly evaluated in Brazil, and DOTS implementation was very reduced until quite recently ago. Moreover, users' satisfaction and issues related to treatment adherence are also poorly known. In order to expand DOTS and improve related areas, the Brazilian CCM had a project approved by the Global Fund; the project components, which are transversal, include education and research, TB-HIV and community mobilization.

Proposal: In the education and research component of the CCM project, operational research has a specific item where it is intended to fund studies on attitudes and practices in TB services, and on patients' satisfaction. The objective is to evaluate usefulness in services, and to access how people with TB reach services, how they consider treatment compliance, and how they deal with difficulties related to treatment.

Development: The three projects on attitudes and practices on services and five projects on patients' satisfaction should be not only targeted to the health care workers and patients but also proposed by them. Since the CCM DOTS' expansion project will promote a series of parallel initiatives related to social mobilization, health care workers capacity building, TB-HIV and DOTS training, the operational research projects shall be conceived according to the necessities and demands raised by those involved in the diverse activities.

Expected results: The research intends to build a sense of partnership and co-responsibility on the control of TB, improving it consistently by the active participation of patients and service providers.

POTENTIAL IMPACT OF INFORMAL COMMUNITY-BASED PROVIDERS IN TB PREVENTION AND CARE

REACH Trust working creatively with informal providers in establishing community referral system to TB diagnosis and sputum collection centres in Malawi: lessons learnt, challenges

P N Nkhonjera,¹ B S Simwaka,¹ S T Theobald,² L S Sanudi.¹

¹Research for Equity and Community Health Trust, Malawi,

²Liverpool School of Tropical Medicine, Malawi.

e-mail: pnkhonjera@yahoo.co.uk

Background: Malawi National Tuberculosis Control programme has adopted the World Health Organisation directly observed short course treatment (DOTS) for TB control and is decentralizing TB care to the community country-wide. REACH Trust involved existing community groups in operational research projects to promote TB management.

Aim: To assess the impact of involving community-structures in TB case-finding in poor urban settings in Lilongwe-Malawi.

Methods: Used participatory approaches to identify and train community based structures in conducting community awareness meetings, identification and referral of TB suspects and transportation of sputum specimen to microscopy centres from a community sputum collection point.

Findings: Increased awareness and establishment of sputum collection point within the community increased early access to TB services. TB case identification increased from an average of 58 cases in the previous 3 years to 105 cases between September 2005 and August 2006 representing case detection increase from 208 to 376 per 100 000 population. TB services are now accessed from within the community and hence reduction in costs that patients face when accessing services.

Conclusion: Participatory involvement of community groups in TB control is critical in addressing many of the barriers faced by poor women and men accessing TB services in resource poor settings. It brings services closer to the users and enhances community ownership of projects, which leads to commitment and sustainability.

Turning liabilities into resources: informal village doctors and TB control in Bangladesh

M A Hamid Salim,¹ M Uplekar,² P Daru,¹ M Aung,¹

E Declercq,³ K Lönnroth.² ¹Damien Foundation Bangladesh, Dhaka, Bangladesh; ²TB Strategy and Operations, Stop TB Department, World Health Organization, Geneva, Switzerland;

³Damien Foundation Brussels, Brussels, Belgium.

Fax: (+88) 02 8810903. e-mail: dfsalim@citechco.net

Introduction: Since 1998, Damien Foundation Bangladesh started to involve semi-qualified, private 'vil-

lage doctors' aiming to decentralize the implementation of Public-Private Mix (PPM) DOTS in a population of 26 million.

Methods: Source of referral and place of DOT was recorded as part of the standardized TB recording and reporting system. Periodic random checking of urine-INH in treated patients was performed as a test of treatment compliance. Non-monetary incentives include: access to free training, free microscopy services and free TB drugs etc. used as a means of motivation.

Results: The organization trained 15 194 'village doctors' to refer TB suspects for free diagnosis. In 2006, 'village doctors' referred 28 376 TB suspects, among whom 2330 were diagnosed as Sm +ve TB, which contributes 15% in total cases detected by the project. The positivity rate for the suspects referred by the 'village doctors' was 8%. Between 1998 and 2005, a total of 34 567 patients received DOT from 'village doctors' and treatment success rate was about 90% throughout the period. Urine samples were positive for INH in 98% of patients treated by 'village doctors'.

Conclusion: Formal involvement of semi-qualified private health care providers in DOTS implementation is a feasible and effective way to improve access to affordable high quality TB treatment for poor rural populations. This category of providers can make important contributions to TB control within the framework of PPM DOTS. A large informal health work force that exists in resource poor countries can be effectively used to achieve public health goals.

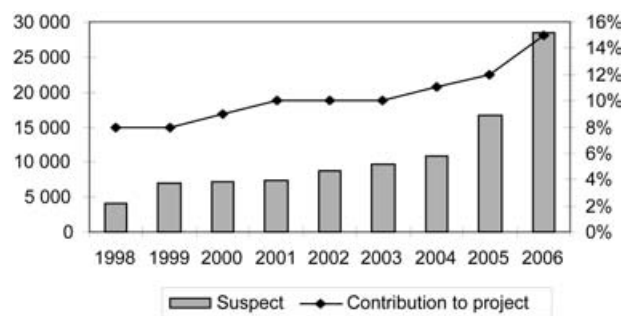


Figure Damien Foundation Bangladesh: number of suspects referred and percent of contribution to the overall case detection.

Integrating TB services and livelihood activities to enhance adherence for poor men and women on TB treatment

A Nyirenda,¹ T Torfoss.² ¹Copperbelt Health Education Project, Kitwe, Zambia; ²Norwegian Heart & Lung Patient Organisation, Oslo, Norway. Fax: (+260) 222 2723. e-mail: alick@chep.org.zm

Objective: To increase adherence to TB treatment in the Copperbelt province of Zambia in very low income settings.

Methodology: A total of 10 support groups of people living with HIV/AIDS and/or co-infected with TB

were observed and followed up over a three year period. These groups had received financial support for initiation and sustainability of income generating projects, training in micro-enterprises, and skills in use of local food supplements. Monitoring visit reports were kept; and group reports submitted were also studied and analyzed. Group discussions on coping methods in environments of food poverty were held.

Results: Treatment support that includes a well designed and sustainable food security strategy is an important poverty reduction strategy. By providing treatment literacy and therapeutic food supplements for those more desperate, the conventional TB DOTS process is enhanced. Providing micro-finances through structured, results linked sub-grants, agricultural inputs and other small business ventures among former TB patients, clients and other carers helped improve treatment adherence. Strengthening entire family coping strategies assisted them develop beneficial competencies. Supported patients were more helpful to their own family member(s) on treatment. Traditional healers have important skills and knowledge on local foods with therapeutic benefits for opportunistic infections. These and other TB competent communities have learnt and benefited by involving the poor but respected former TB patients in facilitating effective local responses.

Conclusion: Traditional care structures need support and additional skills strategic repositioning so that support to former TB patients and those on ART is enhanced. Treated clients become more energetic and will require more different support to enable them become food secure and economically empowered. Reduced poverty levels are effective facilitators of TB therapy and ART adherence.

Policy perspectives on informal health workers' involvement in TB prevention and care

J M Chakaya. Centre for Respiratory Diseases Research, KEMRI, Nairobi, Kenya. Fax: (+254) 20 219187. e-mail: chakaya@todaysonline.com

The 2007 WHO Global TB report indicated that TB incidence was stable or in the decline in all six WHO regions in 2005. However the total number of new cases was still rising slowly as a result of continued growth in the case load in Africa, the East Mediterranean region and South-East Asia. The Stop TB Strategy outlines the key interventions that need to be undertaken to achieve the targets outlined in the Second Global Plan to Stop TB. While an increasing number of countries are achieving the medium term TB control targets of 70% case detection and 85% treatment success for the detected cases, a large number of countries, especially in the African region are not making adequate progress towards these targets and are at risk of missing the MDG and Stop TB Partnership targets. Many of these countries have weak health care

systems that are constraining the implementation of TB control activities. In particular the scarcity of adequately trained human resources is making it difficult for these countries to adequately and effectively implement the Stop TB Strategy. There is evidence that the weak health care systems and scarcity of qualified human resources for health can be mitigated by the engagement of informal health care workers and communities. This presentation will review the evidence for the engagement of informal providers in TB care and prevention, describe experiences gained in Kenya with these providers and outline the measures that may be taken to scale up and sustain such initiatives.

BIO-SAFETY IN THE MYCOBACTERIAL LABORATORY

Microbiological risk assessment—according to the needs

C M Gilpin. Queensland Mycobacterium Reference Laboratory, Brisbane, Queensland, Australia. Fax: (+61) 7 3636 1336. e-mail: chris_gilpin@health.qld.gov.au

Addressing the challenges posed by MDR and XDR-TB warrants urgent scale-up of laboratory capacity for performing culture and drug susceptibility testing (DST). Biosafety Level 3 (BSL3) laboratories have now been adopted by many TB reference laboratories in developed countries, where the prevalence of disease is relatively low, as a prerequisite for bio-safety containment. These facilities have a dedicated inlet air supply which is exhausted through HEPA filters to the outside. Additionally, the BSL3 facility is separated from outer BSL2 laboratory areas via an airlock with a pressure differential of 50kPa between the laboratories to prevent any flow of air from the lower pressure BSL3 laboratory to BSL2 laboratory areas. These laboratories are both expensive to construct and require expertise and significant funds to maintain. Insisting on BSL3 laboratories as a prerequisite for resource-limited settings for culture and DST will mean scale-up to meet the challenge of diagnosing MDR/XDR-TB would be delayed. As the risk of infection is exponentially increased a minimum set of standards for laboratory infrastructure is recommended to balance risk of infection with infrastructure costs. Laboratory facilities used for culture and DST must be minimally BSL2 facilities dedicated for TB work with restricted access to personnel not working in the TB laboratory. All manipulation of cultures must be performed within an operating Biological Safety Cabinet (BSC) which is vented outside the laboratory area thus creating some negative pressure. N95 duckbill masks should be worn by all personnel in the laboratory when cultures are being manipulated. It is critical that BSCs are regularly maintained and that all TB

work ceases if operational performance of the BSC is compromised.

Safety precautions for tuberculosis microscopy

C N P Paramasivan. Foundation For Innovative New Diagnostics, Geneva, Switzerland. Fax: (+41) 22 710 05 99. e-mail: cn.paramasivan@finddiagnostics.org

Sputum smear microscopy from suspected tuberculosis patients is usually the method of choice for diagnosing infectious pulmonary tuberculosis in disease endemic, high-burden countries. The NTPS of various countries prepared sputum smear microscopy manuals and training materials based on several publications of the WHO, the Union, the CDC and similar such organizations. These manuals described safety precautions that are to be adhered to strictly. This has been vigorously advocated as a mandatory requirement in order to avoid infection with *Mycobacterium tuberculosis* from potentially infectious specimens in the microscopy laboratories. Though tuberculosis microscopy is a very safe procedure, which is usually carried out without any bio-safety cabinets, minimum safety requirements with regard to personnel and specimen manipulations practice cannot be overlooked. These safety precautions begin with organization of the microscopy laboratory, positioning the doors and windows according to the wind flow, specimen collection practice, safe handling of samples for the preparation of smears, fixing of the smears by the use of flame, staining, secure disposal of specimens and smears, choice of disinfectants, use and protection of microscope, among others. The various steps that are recommended to make this simple procedure a safer technique will be presented.

The containment laboratory: biosafety level 3, design, equipment, maintenance, costs

K F Feldmann. Kuratorium Tuberkulose in der Welt e.V., Gauting, Germany. e-mail: feldmann@gsf.de

Diagnosis of MDR-(XDR)-TB is based on laboratory results. Work with Risk Group 3 microorganisms (e.g., *M. tuberculosis*), especially in high concentrations with an increased risk of aerosol spread, must be performed in containment laboratory—Biosafety Level 3 (BSL 3), located separately from general traffic flow with limited access of trained personnel, through a basic laboratory BSL 2 or an anteroom with self closing, interlocking doors. A controlled ventilation system maintaining an inward directional airflow and an alarm system indicating dysfunction has to be established. Walls, ceilings and floors (slip-resistant) should be easy to clean, smooth, impermeable to liquids and resistant to the chemicals and disinfectants. Laboratory furniture should be sturdy, open spaced under benches. Benches and tops should be impervious to water and resistant to disinfectants, acids, alkalis, or-

ganic solvents and moderate heat and sealed to the wall. Windows (also vision panels) should be sealed and of break-resistant glass. Laboratory room must be sealable and air-ducting systems constructed to allow gaseous decontamination. A hand-washing station near each exit door with hands-free controls should be provided with wall mounted dispensers for liquid soap and disinfectants. The laboratory equipment should be suited to reduce the risk when dealing with biohazards. Biosafety cabinets with UPS (15 min), ducted out, should be placed away from air turbulences (walking areas, cross currents from doors). Centrifuges need to be strong enough (>3000g) and equipped with aerosol tight buckets. Autoclaves for waste decontamination should be equipped with a bacterial filter and preferably placed in the containment laboratory. Validation before use of this equipment and recertification should take place at regular intervals. Equipment used in a biosafety cabinet, should be built compact, small and should be disinfectable. Facility design and operational procedures must be documented.

Occupational transmission of TB in laboratories

A G Gumusboga. AERAS Global TB Vaccine Foundation, CDC, Rockville, Maryland, USA. Fax: (+1) 404 639 1287. e-mail: agumusboga@aeras.org

Objective: To assess the risk of *Mycobacterium tuberculosis* transmission in TB laboratory workers.

Introduction: With the increasing incidence of drug-resistant *M. tuberculosis* strains among TB patients, there is an increased need for culture facilities for isolation and characterization of mycobacteria and such facilities are becoming more accessible in many countries. The procedures used to liquefy, decontaminate, and culture specimens involve techniques that create aerosols which, if not contained, can infect laboratory workers. The risk is greater when manipulating liquid cultures containing large numbers of tubercle bacilli. How big is that risk?

Method: A review of the literature on the risk of acquiring tuberculosis in clinical laboratory settings was conducted. Few publications were available and most studies were conducted more than 20 years ago in developed countries. However, because these studies were conducted prior to consistent emphasis on and implementation of state-of-the-art biosafety measures, aerosol containment measures, and personal protective equipment, the studies are relevant for countries considering developing culture facilities. As part of this review, the procedures that pose the greatest infection risk to laboratory workers were also identified.

Conclusion: Workers in medical TB laboratories have a 2- to 9-fold increased risk of acquiring tuberculosis compared to the general population. Careful attention to biosafety principals, particularly with respect to containing potentially infectious aerosols, can reduce this risk.

TOBACCO INDUSTRY TACTICS IN LOW-INCOME COUNTRIES

Tobacco producers: an argument in the hands of big tobacco

L K Kagaruki. Tanzania Tobacco Control Forum (TTCF), Dar es Salaam, Tanzania. Fax: (+255) 22 2864369. e-mail: lutgardk@yahoo.com

Tobacco growing in low income countries has been designed to feed the growing demand of the multinational cigarette companies. While production in developed countries has declined by 50% since the 1960s, production has increased threefold in developing countries and, if the trend continues as projected by 2010, more than 85% of the world tobacco will be grown in developing countries. Despite the increased production, tobacco farmers have continued to be poor, as they are often given high priced loans from tobacco companies, for inputs like seeds, fertiliser and pesticides, with the view of recovering these loans from tobacco sales. Unfortunately, tobacco companies normally downgrade the crop and, pay farmers far less money, insufficient to repay the loan, hence subjecting them to perpetual debt bondage. Tobacco companies also come out with all sorts of tricks, like sponsorship of important events, particularly for youths, offering grants to students, participating in developing projects and, at the same time, manipulating government leaders and the public, to make them believe that, they are working for a just cause and that they care about the well being of the people. The story is similar in all low income countries, as tobacco companies operate under well organised syndicates, to ensure maximum profits from tobacco sales at minimum costs; while capturing new markets everyday, to compensate for diminishing business in their developed countries. Global concerted efforts are thus required, to rescue low income countries, particularly tobacco farmers, from this lifetime enslavement and catastrophe subjected by the multinational companies.

Smuggling as a way to introduce multinationals into closed tobacco markets

J M Mackay. Bloomberg Global Initiative, WLF component, Kowloon, Hong Kong. Fax: (+852) 2719 5741. e-mail: jmackay@pacific.net.hk

Billions of cigarettes are smuggled each year, equal to about 10% of the global cigarette trade, or one third of all legally imported cigarettes. Cigarettes are the world's most widely smuggled legal consumer product. They are smuggled along constantly changing routes across almost every national border, even in regions where taxes are low. Tobacco smuggling has become a critical public health issue because international brands become affordable to low-income consumers and to image-conscious young people in developing coun-

tries. According to the World Bank, economic theory suggests that the tobacco industry itself will benefit from smuggling, especially in markets closed to imported brands, as it helps to increase the demand for those brands, and hence increase their market share. Illegal cigarettes undermine national pricing policies, evade legal restrictions and health regulations such as packet warnings and sales to minors; and while the tobacco companies reap their profits, governments lose tax revenue. Some governments are suing tobacco companies for lost revenue due to smuggling activities allegedly condoned by the companies. Measures needed to control smuggling should include licensing of tobacco retailers, monitoring cigarette routes, using technologically sophisticated tax paid markings on tobacco products, printing unique serial numbers on all packages of tobacco products, and increasing penalties. Smuggling will be the first protocol of the WHO Framework Convention on Tobacco Control (FCTC). WHO states: '... the elimination of all forms of illicit trade in tobacco products, including smuggling, illicit manufacturing and counterfeiting, and the development and implementation of related national law, in addition to subregional, regional and global agreements, are essential components of tobacco control.' Work on the FCTC smuggling protocol is being supported by the World Lung Foundation from a grant from the Bloomberg Global Initiative.

Local experiences: West Africa

I S Saouna. Président, Niamey, Niamey, Niger. Fax: (+222) 20732459. e-mail: Inoussa_saouna@yahoo.fr

Depuis quelques années, le tabagisme prend de plus en plus des proportions inquiétantes dans le monde en général et dans les pays en développement en particulier. Actuellement 1,1 milliard de personnes fument à travers le monde dont 850 millions vivent dans les pays du tiers monde. De sorte que, sur les dix (10) millions de décès par an imputables au tabac projetés sur 2030, sept (7) millions frapperont les pays en voie de développement. Actuellement, la consommation du tabac est responsable de cinq (5) millions de décès par an. Concernant l'Afrique, l'OMS dit également que l'industrie du tabac prévoit une augmentation de 16% de son marché dans les dix (10) années à venir. L'augmentation de la consommation du tabac a connu véritablement une croissance vertigineuse à partir du XIXe siècle l'industrie du tabac a utilisé plusieurs moyens pour une acceptation sociale des produits du tabac. Entre autre moyen on peut citer:

- les campagnes de relations publiques,
- l'achat des services scientifiques et autres expertises afin de mettre en doute les recherches scientifiques,
- le financement des partis politiques,
- le recours à des sociétés écrans et des industries alliées pour contrer les mesures antitabac,

—les interventions en faveur de codes facultatifs ou de lois faibles pour éviter les lois plus contraignantes. Le tabagisme croît de manière exponentielle dans les pays en développement parce que dans les pays industrialisés, les pouvoirs publics, sous la pression des ONG et des médias se sont organisés et s'organisent encore pour contrer l'avancée de ce phénomène. Face à l'avancée macabre de l'épidémie du tabagisme et aux stratégies agressives utilisées par l'industrie du tabac quelle action pour sauver de l'Afrique. Tel est l'objet de notre présentation.

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ROUTINE PROGRAMMATIC MONITORING OF MDR IN LOW-INCOME SETTINGS

Experience and results of routine MDR surveillance in Vietnam

N Huong, B Duong, N Sy. National Hospital of Tuberculosis and Respiratory Diseases, Hanoi, Vietnam.
Fax: (+84) 4 83 16 162. e-mail: nthuong139@gmail.com

Among the 22 countries with the highest burden of TB cases, Vietnam has reported case detection rates and cure rates above the WHO targets since 1997. The surveillance of *M. tuberculosis* drug resistance, which was established in Vietnam in 1996, is a part of the WHO and Union global programme of drug resistance surveillance. The aims of this surveillance are to determine the prevalence of resistance to major anti-tuberculosis drugs and its trend. Among 640 new patients in the survey in 1996–1997, 32.5% were resistant to any drug, 19.2% to isoniazid, 2.7% to rifampin, 1.1% to ethambutol, 23.9% to streptomycin and 2.3% to both isoniazid and rifampicin (multidrug resistance, MDR). The data in 2001–2002 in the southern part of the country showed among 888 new patients, 26% were resistant to any drug and 1.8% to MDR. Among 136 previously treated patients, any resistance was observed in 63% and MDR in 23%. In 2004–2005, among 1619 new patients, resistance to any drug was observed in 30.7%, to isoniazid in 19.1%, to rifampin in 3.3%, to ethambutol in 2.6%, to streptomycin in 23.2% and to MDR in 2.7%. Among 207 previously treated patients, 58.9% were resistant to any drug, 19.3% to MDR. Over a 10 year period (1996–2005), the surveillance of *M. tuberculosis* drug resistance has been established and developed. The surveillance data showed a relatively low and stable level of MDR prevalence.

Routine MDR surveillance: an essential component of national TB control

A Van Deun.^{1,2} ¹International Union Against Tuberculosis and Lung Disease, Paris, France; ²Mycobacteriology Unit, Institute of Tropical Medicine, Antwerp, Belgium. Fax: (+32) 3247 6333. e-mail: avandeun@iuatld.org

National TB Control Programs (NTP) have to detect and cure as many infectious cases as possible, without creating tuberculosis drug resistance. This last 'detail' is often forgotten, and it must for instance be feared that under routine conditions the massive switch towards rifampicin-throughout regimens based on the

results of one controlled clinical trial will provoke a rapid increase of multidrug-resistant TB (MDR). Priorities for NTP bacteriology services thus increasingly include monitoring of drug resistance trends. So far, emphasis has been mainly on periodic random studies among new cases, which is fine for epidemiological purposes. However, it has become clear that these are not suitable for accurate and timely evaluation of NTP activities as drug resistance trends. This is better done through continuous monitoring of drug resistance among failure and relapse cases after the first-line NTP treatment. If resistance was acquired, it will be concentrated and early visible in this group. Even if continuous surveillance can not cover the complete territory, systematic sampling from a number of well-chosen sentinel facilities may be sufficient. Also the choice of drugs to be tested needs to be more rational. With the 6-month regimens, only rifampicin decides on outcome and must be monitored as accurately as possible, so that results will serve also for treatment management of MDR-TB. Moxifloxacin and the injectables defining incurable MDR disease should always be monitored. Questions remain as to which injectables to test, and how to define the best indicator for resistance monitoring.

The role of supranational laboratory support in routine MDR surveillance

C M Gilpin. Queensland Mycobacterium Reference Laboratory, Brisbane, Queensland, Australia. Fax: (+61) 7363 61336. e-mail: chris-gilpin@health.qld.gov.au

The Supranational Reference Laboratory (SRL) in Brisbane, Australia has been providing technical assistance to the Central TB Reference Laboratory (CRL) in Nairobi, Kenya since 2003. The initial focus for the support was in strengthening the AFB microscopy network in Kenya through training on external quality assessment (EQA) and with the development of a standardised checklist for use during supervisory visits. Concurrently, the Brisbane SRL has been performing proficiency monitoring of drug susceptibility testing (DST) performed at the CRL by repeating DST in Brisbane on a sample of strains tested at the CRL each year. To date satisfactory proficiency in DST at the CRL has not been demonstrated necessitating alternative approaches. It is essential that the expansion of culture and DST needs to be introduced in a stepwise fashion. Firstly, for the reliable detection of multidrug-resistant (MDR) TB and subsequently for patients co-infected with HIV, children, and patients with extrapulmonary disease. Re-treatment cases are at greatest risk for MDR-TB, hence introducing culture with MGIT DST and molecular strategies for the reliable detection of MDR-TB among this group of patients has been recommended as a key priority. Essential to the success of any SRL support is full and open disclosure of laboratory results which can be shared with

partners agencies such that all technical assistance is provided in a co-ordinated and systematic way. Additionally, ongoing strengthening of the AFB microscopy network through EQA remains essential for programme success and in meeting the challenges of the StopTB strategy targets.

RECENT ADVANCES IN TB DRUG DEVELOPMENT

Key issues in TB drug development: a regulatory perspective

L Sacks. Office of Critical Path Programs, US FDA, Silver Spring, Maryland, USA. e-mail: leonard.sacks@fda.hhs.gov

The discovery of new drugs for TB has been neglected since the most recent US approvals of rifampin in the 1970s and rifapentine in 1998. A revival of research in this field faces new challenges for TB drug registration in the modern regulatory environment. Hurdles in the demonstration of clinical efficacy include the very high efficacy rates of existing regimens, the need to demonstrate efficacy within combinations of drugs, the unknown effect size of existing drugs, prolonged periods of clinical follow-up, and the biological complexity of dormancy. US regulations require substantial evidence of clinical efficacy based on adequate and well-controlled trials. Such trials permit a valid comparison with a control to provide a quantitative assessment of drug effect. Various options are considered in the design of phase 3 clinical trials and the choice of clinical endpoints. Traditional 'early bactericidal activity' studies may help with the selection of agents for further study and the choice of dosage, but have limited value in supporting regulatory actions. Substitution of a drug within a regimen with the investigational drug is a simple approach but may not provide convincing evidence of clinical efficacy when the effect size of the 'replaced' drug is not clear. In this setting, very large studies may be needed to power the demonstration of superiority or non-inferiority of the investigational drug. It may be possible to show the ability of a new drug within a regimen to allow shortening of treatment, knowing the inferior efficacy of short-course therapy in the past. The effect of a new agent may be easier to demonstrate in patients with multidrug-resistant disease where the effect of companion drugs is minimal. This approach has its appeal in addressing a pressing medical need and culture conversion as an endpoint may be defensible given the reduction in transmissibility and possible impact on patient mortality, even if temporary. This strategy has been successful in developing new drugs for combined use in the treatment of HIV infection. Clinically meaningful endpoints require periods of follow up of 18 months or more, as clinical failure is usually limited

to a relapse of disease. Sputum culture conversion provides some evidence of bactericidal activity, but limited evidence of sterilizing activity. To expedite the development of drugs for TB there is a need for reliable biomarkers, particularly those indicating dormant or latent infection, and those identifying drug resistance rapidly. As for other drugs, the principles for determining the safety of new drugs for TB are dictated by risk/benefit considerations.

COMMUNITY MONITORING OF NATIONAL TB AND TB-HIV POLICIES IN AFRICA

Treatment advocacy and literacy campaign (TALC) experience in Zambia: monitoring TB-HIV collaborative activities in Mongu, Kapiri Mposhi and Lusaka, Zambia

C N Maimbolwa. Treatment Advocacy & Literacy Campaign (TALC), Lusaka, Zambia. Fax: (+260) 21 123 6278. e-mail: carolnawina@yahoo.com

Background: In 2004, the Zambian National TB Program agreed to implement the WHO Interim Policy on Collaborative TB-HIV Activities. 3 years later, a community-based research conducted by TALC revealed the policy is not having an impact in Zambia, despite its potential to radically improve TB and HIV treatment.

Methods: TALC is a Zambian NGO formed to fight for equitable and sustainable access to HIV treatment, care and support for people living with HIV (PLHA), including TB treatment. In 2006, TALC carried out a community-based monitoring project using the WHO policy to evaluate the state of TB-HIV collaborative activities in Mongu, Lusaka and Kapiri Mposhi, Zambia. Across the 3 provinces, TALC identified and interviewed a total of 53 key informants, including TB and HIV policymakers, clinical staff, NGO representatives and PLHA and/or TB.

Results: Through its research TALC documented that the separation of TB and HIV treatment services persists at all levels in the health system in Zambia. From the Ministry of Health to the community clinics, TB and HIV programs are planned and implemented separately. Though a Joint Coordinating Body (JCB) was established to respond to the needs around TB-HIV coinfection, no concrete steps have been taken to implement collaborative activities to reduce the burden of TB in PLHA and vice versa.

Conclusion: To strengthen the performance of the JCB, TALC will engage a 12 month advocacy campaign to build capacity of TB and HIV activists to participate in the JCB and advocate for the greater involvement in the formulation and implementation of TB and HIV policies and programs, by creating demand through

affected communities. Without active representation and the inputs of affected communities in the JCB, TB and HIV programs in Zambia will be less equipped to respond to the needs of people affected by TB and HIV.

Multi-face development and research centre experience in Kenya: monitoring TB-HIV collaborative activities in Suba, Kenya

N Juma Otwoma, A Oduor, P Owuor, P Obonyo. Multiface Development and Research Centre, Kisumu, Kenya. Fax: (+254) 57 202 3149. e-mail: otwomatom@yahoo.com

Background: Suba district, located in the Lake Victoria region has one of the worst TB-HIV co-infection burdens in Kenya. Latest estimates place HIV/AIDS prevalence in adult population at 24.4% and TB-HIV a co-infection rate between 70 to 80%. Reducing this burden requires enhanced TB-HIV collaborative activities.

Approach: In 2006, Multiface Development and Research Centre (MDRC) undertook a qualitative community-based monitoring project to assess the quality and accessibility of collaborative TB-HIV activities in Suba district. The goal was to assess the successes and gaps in the implementation of the TB-HIV collaborative policy as recommended by the WHO and then using that information to strengthen TB-HIV collaboration by building on existing successes or addressing the gaps. Using the World Health Organization's (WHO's) Interim Policy on Collaborative TB-HIV Activities as a framework, MDRC conducted 35 key informant interviews with health care workers, government officials and members of affected communities to evaluate the state of TB-HIV collaborative activities.

Results: Interviews revealed that TB-HIV collaboration at the local level is weak. HIV/AIDS projects lack monitoring and reporting guidelines on TB specific issues and pay scant attention to TB-HIV collaboration. Besides, there is minimal engagement of affected communities in TB-HIV collaboration as stipulated by the WHO's policy.

Next steps: Successful integration of TB-HIV services requires more meaningful involvement of affected communities. MDRC will undertake advocacy activities aimed at strengthening TB-HIV collaboration while at the same time enhancing the greater involvement of people living with HIV, including those co-infected with TB in Suba district.

VUKA Tanzania experience: monitoring TB-HIV collaborative activities in Temeke, Tanzania

J Kayombo. Vuka Tanzania, Dar es Salaam, Tanzania. e-mail: jackayombo@yahoo.com

Background: The World Health Organization (WHO) states that one-third of the world's population is infected with tuberculosis (TB) and that it is the leading cause of death for people living with HIV. In 2004,

WHO estimated that there were over 130 000 new cases of TB detected in Tanzania and 36% of adults diagnosed with TB were HIV positive.

Approach: Since October 2006, VUKA Tanzania, an NGO based in Dar es Salaam, has engaged in TB-HIV monitoring efforts to evaluate TB and HIV collaborative activities within the municipality of Temeke. Over the course of 6 months, VUKA staff conducted over 25 key informant interviews to evaluate whether TB-HIV services were being provided in accordance with the WHO TB-HIV collaborative policy. The goal of the monitoring of collaborative TB-HIV activities by affected communities was to identify important gaps in service provision and provide useful recommendation for program improvement.

Results: One of the key findings from this research was the importance of nutrition for patients on TB and HIV treatment. According to health care providers and TB-HIV patients, lack of nutritional support is the primary reason for patients defaulting on their TB and HIV treatments. This key finding underscores an emerging risk of greater disease progression. Because the lack of adequate food is a major obstacle to adherence for TB-HIV patients on therapy, they are at risk for developing MDR-TB and faster progression to AIDS, resulting in greater negative social and economic impact on Tanzanians.

Next steps: To ensure patients are able to adhere to TB and HIV treatments, national HIV and TB programs need to address and improve provision of nutritional care and support to patients during DOTS and ARV treatment. In response to this key finding, the research team plans to conduct a year long advocacy campaign with the goal of ensuring all people on TB and HIV treatment have adequate nutritional support in Temeke, Tanzania.

Journalists against AIDS (JAAIDS) experience in Nigeria: monitoring TB-HIV policy and partnering with government

O Akanni, K Obom Egbulem, O Eronini. Journalists Against AIDS (JAAIDS) Nigeria, Lagos, Lagos State, Nigeria. Fax: (+234) 93146156. e-mail: olayide@nigeria-aids.org

Background: Journalists Against AIDS (JAAIDS) Nigeria is a media-based non-governmental organization focused on HIV, AIDS, and TB advocacy. JAAIDS works to overcome public information, communication, policy and advocacy obstacles that limit an effective and results-driven response to these epidemics. **Method:** JAAIDS provides support to the National and African regional TB control efforts in the following areas:

- 1 Media capacity-building, mobilization and engagement: training and capacity-building of journalists on TB at national, and state levels, media monitoring of TB reporting, and promoting objective coverage of TB activities;

- 2 Development of behaviour change communication materials: production of resource materials for dissemination among the media, people living with HIV and AIDS, state and government and civil society stakeholders;

- 3 Building community and civil society capacity on TB and TB-HIV advocacy: working with key civil society constituencies and community groups to organize sensitization meetings, educational workshops to promote greater participation, interest and engagement on TB and TB-HIV issues;

- 4 Strengthening African regional commitment to TB and HIV/AIDS: by participating in regional civil society coalitions, JAAIDS presses for change at the regional level.

Conclusions: These behavior change and advocacy interventions are contributing to greater public awareness about TB among relevant audiences. However, such interventions need to be rapidly scaled up in order to address myths, misconceptions and stigma surrounding TB and TB-HIV and ultimately, to reduce the burden of both diseases, in Nigeria and within the continent.

Experiences of a local NGO in Tanzania: monitoring TB-HIV policy and partnering with government

J M Mwanjisi,¹ E B Bell.^{1,2} ¹MediaBank Tanzania, Dar es Salaam, Tanzania; ²Public Health Watch, New York, New York, USA. Fax: (+880) 281 22786. e-mail: samara2001@yahoo.com

Background: For years, TB patients in Tanzania were forced to take and complete their TB treatment at a health facility under DOT. With the spread of HIV and AIDS, health facility-based DOT has become an impediment in accessing TB treatment, especially for people infected with the 'twin disease'. Recently a few NGOs in Tanzania have begun to use former TB patients to provide home-based care and treatment to TB patients as a way of bringing TB treatment closer to the people. This study explores the efficiency of this approach and the multiple roles former TB patients play in urban poor communities.

Method: This study analyzes data from desktop research and fieldwork, including interviews and household visits. Informants include former TB patients, TB patients, TB and HIV and AIDS experts, and other key stakeholders.

Results: Although the aim of using former TB patients in TB services was to meet the challenges of accessing TB treatment at health facilities, the use of former TB patients as community volunteers has proved to be very significant. Apart from supporting TB patients to take their medication, the volunteers also provide the right information, support and counsel family members. As a result, former TB patients have become TB activists in communities where poverty, stigma and lack of proper information prevent many people—

especially women—from accessing TB treatment. However, this program is only being implemented in Dar es Salaam. In many other parts of the country where TB and HIV continue to outstrip the ability of public health systems, TB patients still depend on health facilities or other health volunteers who lack basic information on TB.

Conclusion: To meet the challenges of accessing TB treatment and care services in Tanzania, especially among disadvantaged population, the government should invest in former TB patients with training and other motivation schemes in order to strengthen their skills and commitment.

COMPETENCY DEVELOPMENT FOR THE MANAGEMENT OF MDR-TB

Task analysis to determine essential MDR-TB competencies for NTP staff

K Bergström. Stop TB Department, World Health Organization, Geneva, Switzerland. Fax: (+41) 22 791 4268. e-mail: bergstromk@who.int

No educational system can be effective unless its purposes are clearly defined. The members of the health team must be trained specifically for the tasks they will have to perform, taking into account the circumstances under which they will work, to enable professional competence to be developed. A task analysis is an informal assessment technique in which a task is broken down into its essential components or subtasks. A task analysis in the context of training and education is a method to determine the essential components of professional competence which should define the educational objectives for a training course or training material. Competence in this context is defined as the ability to carry out a certain function/task. Defining professional tasks is a precondition for ensuring that training programmes are really designed to meet the populations health needs. Task analysis information can be used as the foundation for: developing instructional objectives, identifying and selecting appropriate instructional strategies and media, sequencing instructional content, and designing performance evaluation tools. For example, a task analysis of the management of MDR-TB consist of determining which tasks and subtasks needs to be performed to detect and treat a case of MDR-TB and the knowledge and skills necessary to perform these tasks. A first key task is to 'Detect cases of MDR-TB'. This task can be broken down into subtasks, e.g., identify MDR-TB suspects; refer MDR-TB suspects to a treatment centre providing the patient's history of treatment, and results of previous sputum tests; register the MDR-TB suspect in the Suspect register, etc. A task analysis is also a key quality assurance tool.

Determining the MDR-TB training needs in a high-burden country

T E Tupasi. Tropical Disease Foundation, Makati, Philippines. Fax: (+632) 8889044. e-mail: tetupasi@yahoo.com

Background: Programmatic MDR-TB management (PMTM) in the Philippines was privately initiated by

Hierarchy, agency	Competency required
PMTM Implementation	
Central Level	
National Tuberculosis Program	Policy development
Infectious Disease Office	Supervision
National Centers for Disease Prevention and Control	Monitoring and evaluation Training of implementing HCWs
Department of Health	Drug procurement and distribution
Regional Level	
Centers for Health Development	Monitoring supervision
Department of Health	Training of implementing HCWs Reporting Drug distribution
Peripheral Level	
Provincial or City Health Office	Monitoring and Supervision
Local Government Units	Reporting Drug distribution Case management and DOT
PMTM Treatment centers	Management and referral of adverse events Default tracing Recording and reporting Management and referral of adverse events Recording and reporting Drug forecasting, storage and inventory
DOTS and PPMD	DOT Management and referral of adverse events Default tracing Recording Drug storage and inventory
PMTM Treatment Sites	
Community treatment partners	
Laboratory Network	
Level III	
National TB Reference Laboratory	Drug Sensitivity Test
Research Institute for Tropical Medicine	Quality assurance of culture and microscopy centers
Department of Health	SNRL assured drug sensitivity test
Tropical Disease Foundation TB Laboratory	Recording and reporting
Level II	
Regional Culture Centers	Quality assured cultures
Tropical Disease Foundation TB Laboratory and other private and academic culture centers	Recording and reporting
Level I	
Microscopy Centers	Microscopy
Barangay Health Centers	Recording and reporting
Local Government Units	
PPMD Microscopy Centers	

the Tropical Disease Foundation (TDF) in the DOTS Clinic at Makati Medical Center (MMC), a private-public Mix DOTS, and was the first Green Light Committee-approved project in August 2000.

Objective: To describe the training needs for mainstreaming PMTM into the National TB Program (NTP).

Methods: Task analysis in implementing PMTM was initially carried out. A series of consultations with the public health care workers (HCWs) of the NTP in all levels, including the National TB reference laboratory was undertaken to discuss the training needs for PMTM. Training modules were developed based on the objectives for the training required and the task analysis.

Results: Training is required of HCWs at 1) central and regional levels for policy development, supervision and monitoring, drug management; 2) in treatment centers for case management including management of adverse events; 3) in treatment sites including community treatment partners on directly observed therapy (DOT), managing and identifying adverse events requiring referral to higher level facilities, and tracing of treatment interrupters or defaulters. A three-level laboratory network comprising microscopy centers at level I, culture centers at level II, and drug sensitivity testing (DST) at level III with their appropriate training needs was defined (Table). A training center responsible for human resource development has been recommended as a role that the TDF could play in the spirit of private-public collaboration.

Conclusion: The lack of expertise and appropriate human resources is a barrier to scale up in order to increase absorptive capacity for MDR-TB management.

Development of MDR-TB training modules

J Creswell. WHO, Guatemala City, Guatemala.
Fax: (+502) 2365 8010. e-mail: zup7@cdc.gov

As part of the scale-up for MDR-TB treatment in the Philippines, a series of training modules were developed using task analysis. The modules will be used to train staff at local DOTS facilities to detect, receive and manage MDR-TB patients as the Philippines expands MDR-TB services from a pilot project at a few private sites to 2500 patients managed in conjunction with the public sector. Task analysis for the development of training material involves a 10 step process including defining the target audience, listing tasks to be performed, grouping them into suitable teaching units, writing, and field-testing and revising the modules. The development of training material to support implementation of the program in the Philippines will be the basis for generic standardized training material for tasks that should be performed by health facility staff to identify clients with suspected MDR-TB, diagnose them, and manage patients with confirmed MDR-TB. Using

task analysis to produce training modules ensures that the final product is relevant and useful.

Ensuring laboratory competencies for diagnosing MDR-TB

J Ridderhof. Centers for Disease Control and Prevention, Atlanta, Georgia, USA. e-mail: jcr0@cdc.gov

Laboratory testing for MDR-TB, including culture, DST, and molecular methods, requires higher level skills and a quality management systems (QMS) approach for accurate and timely results. Successful implementation and expansion of DST requires a competency-based approach to training to assure that staff have all the necessary skills for conducting testing and monitoring performance. Competency-based training is a systematic approach to examining all the requisite skills for quality testing that combines actual performance of the test in addition to trouble shooting, interpretation, quality control, reporting, and all documentation of performance measures. Competency assessment of laboratory staff is an international quality standard that recognizes the need to periodically monitor the competencies of individual staff through direct observation and other methods. Successful training programs will require ongoing support and strategies that employ traditional workshops, placing laboratory consultants onsite for extended periods, and monitoring standards and performance through EQA and accreditation. WHO is working with partners to develop standard training materials for culture and DST. There is also a need to expand and extend consultant training to country-based staff and facilitate global tools on standards, documentation, and SOPs. The advent of molecular screening for MDR-TB will also require innovative approaches of partnering MoHs with research institutions that have in-country expertise and experience. The challenge to expand drug resistance surveillance combined with addressing the alarming rates of XDR- and MDR-TB provide ample evidence that the laboratory community must partner with training specialists and embrace systematic approaches to building laboratory competencies.

CHILDHOOD TB WITH MDR-TB

Anti-tuberculosis drugs in children: is change necessary?

P R Donald. Paediatrics and Child Health, Tygerberg, South Africa. Fax: (+27) 21 938 9138. e-mail: prd@sun.ac.za

The treatment of tuberculosis in children follows the same principles as in adults. However the metabolism of any agent, especially in young children, tends to differ from that in adults. Children have a larger volume of extracellular fluid and a relatively larger liver,

and due to these and other factors will thus experience a more rapid fall in the serum concentrations of many agents. Despite these differences the guidelines for tuberculosis management often recommend the same doses and range of doses in mg/kg body weight for adults and children. Several studies and literature reviews have now shown clear differences between the serum concentrations reached by adults and children after receiving the same mg/kg dose of certain agents such as isoniazid and ethambutol. In other studies conducted amongst children very low concentrations of other anti-tuberculosis agents have been reported. In many instances childhood tuberculosis is of a limited paucibacillary nature and these deficiencies may not be of great clinical importance. However, in those children with more extensive serious forms of tuberculosis, exposure to less than optimal serum concentrations of anti-tuberculosis agents may become of clinical importance. Thus change is needed, but should be preceded by studies of the influence of age on the pharmacokinetics of anti-tuberculosis agents in children in order to place the management of childhood tuberculosis on a better scientific foundation.

MDR-TB in children: diagnosis and management

H S Schaaf,^{1,2} ¹Department of Paediatrics, Stellenbosch University, Tygerberg, ²Tygerberg Children's Hospital, Tygerberg, South Africa. Fax: (+27) 21 938 9138. e-mail: hss@sun.ac.za

Multidrug-resistant (MDR)-TB has important implications for affected children and TB control programmes. Children mainly have paucibacillary disease, which means that when a child is diagnosed with MDR-TB, it points to recent transmission in the community and a failure of the TB control programme. At Tygerberg Hospital, Western Cape Province, South Africa, 31/573 (5.4%) children had MDR-TB from March 2003–December 2006. Drug-resistant tuberculosis was not more common in HIV-infected children. MDR-TB is a microbiological diagnosis. The diagnosis is often delayed because a history of MDR-TB contact was not obtained or cultures and drug susceptibility testing was not done. Treatment should be aggressive with ≥ 3 drugs to which the isolate (or source case's isolate) is susceptible. Important second-line drugs are ethionamide, fluoroquinolones, aminoglycosides and cycloserine. High-dose isoniazid (15–20 mg/kg) could be added to a MDR-TB regimen because low-level isoniazid resistance is common. Para-aminosalicylic acid, capreomycin and other reserve drugs are used for the management of extremely drug-resistant tuberculosis. Follow-up cultures are important: duration of treatment should be 12–18 months after the first negative culture depending on severity of disease. Second-line anti-tuberculosis drugs have more serious adverse effects and these should be managed appropriately, but in our experience these are rare in children.

THE IMPORTANCE OF ETHICAL REFLECTION IN UNION ACTIVITIES

Ethics and tuberculosis: mapping the terrain

M J Selgelid,^{1–3} P Kelly,^{3,4} A Sleigh.^{3,4} ¹Centre for Applied Philosophy and Public Ethics, Australian National University, Canberra, ACT, Australia; ²Menzies Centre for Health Policy, Australian National University, Canberra, ACT, Australia; ³National Centre for Biosecurity, Australian National University, Canberra, ACT, Australia; ⁴National Centre for Epidemiology and Public Health, Australian National University, Canberra, ACT, Australia. Fax: (+61) 02 6125 6579. e-mail: michael.selgelid@anu.edu.au

Because TB kills nearly as many people as AIDS each year, one would expect TB to receive a proportional amount of attention by those concerned with ethics. Because TB treatments normally provide cure, TB treatment is much less expensive than AIDS medication, and TB is contractible via casual contact, there are reasons for thinking that TB is, ethically speaking, especially in the context of XDR-TB, even more important than AIDS (which is not to say that AIDS is not itself one of the most important ethical issues of the contemporary world). Searches on the Internet, however, reveal that ethics discussion of AIDS dwarfs that of TB. Ethical issues associated with TB in need of further research and analysis include the following: (1) health workers' duty to provide treatment when this places them at risk of infection; (2) the standards of care that should be provided in international clinical TB research involving human subjects; (3) patient exclusion from treatment; (4) individual obligations to avoid infecting others; (5) domestic surveillance; (6) migrant screening; (7) isolation and quarantine; (8) DOTS; and (9) justice implications of developing countries' lack of access to preventative, therapeutic, and diagnostic interventions for TB. Many of these issues involve conflict in values such as liberty, equality, and utility. Rather than giving absolute priority to any one of these values, ethical public health policy seeks balance between them—and avoidance of conflict to begin with.

Strengthening capacity for ethical review in research

S Benatar. Bioethics Centre, Department of Medicine, University of Cape Town, Cape Town, South Africa. Fax: (+27) 21 448 6815. e-mail: solomon.benatar@uct.ac.za

In recent decades there has been considerable expansion of clinical research in middle and low income countries. However, only about 40% of countries in Latin America and about 36% of WHO African Regional Member countries have research ethics committees. Most of the members of these committees have inadequate training in research ethics.¹ This has given rise to concern that exploitative research can easily be undertaken by powerful groups in wealthy

countries. The US NIH Fogarty International Center, in partnership with several US National Research Institutes, has initiated and supported capacity building in research ethics in low and middle income countries in order to reduce the possibility of exploitation and to empower local scientists and their communities to promote relevant and ethical research. This is currently being achieved through a range of educational activities within 15 training programmes in 9 countries.² Two of these programmes are in South Africa.^{3,4} Their goals and achievements will be described in this presentation.

1 Kass N E, Hyder A A et al. The structure and function of research ethics committees in Africa: a case study. <http://medicine.plosjournals.org/perlserv/?request=get-document&doi=10.1371/journal.pmed.0040003>

2 Fogarty International Center. International Research Ethics Education and Curriculum Development Award <http://www.fic.nih.gov/programs/training-grants/bioethics/index.htm>

3 International Research Ethics Network for Southern Africa <http://www.irensa.org/>

4 Southern African Research Ethics Initiative <http://shsph.up.ac.za/sareti/sareti.htm>

The way forward for ethical reflection in the Union

D Miller, M Edginton. Union Ethics Advisory Group, Paris, France. Fax: (+44) 208 421 1232. e-mail: miller.dl@virgin.net

The Union has long been a pathfinder in devising and promoting effective lung health services, particularly in low income countries. It exercises this role through participation in research, health service planning, technical assistance, education and advocacy. It is expected that the need for such a role will continue for the foreseeable future. Contemporary values require that those engaged in such pursuits accept that their activities should conform to the highest ethical standards. The Union Ethics Advisory Group (EAG) is charged with advising the Union on meeting this responsibility whenever it is involved in relevant pursuits directly or by association. The Group has developed a set of operational procedures and standards to guide its activities and decisions which are subject to periodic review. The EAG seeks to engage Union members and its partner agencies in this process with a view to ensuring that the Union's ethical standards meet those set by relevant international agencies and that the criteria adopted in evaluating its activities are beyond reproach.

Some of the issues that require attention include:

- the relationships between donors and research participants, especially where there is a significant disparity in power between them
- the benefits that can be expected to accrue to the subjects of research
- the validity of methods of obtaining 'informed consent', especially the use of language that is accessible to subjects
- the involvement of local communities in identifying health care needs and appropriate service provision

A critical aspiration of the EAG is the promotion of a climate of ethical reflection within all Union research, planning, educational and advocacy activities. The components of this ideal will require sensitive and creative exploration in partnership with all stakeholders. Their routine incorporation into relevant activities will present a significant challenge.

TB-HIV DIAGNOSIS IN THE XDR-TB ERA

Assuring HIV screening and care for TB patients

J M Chakaya. Centre for Respiratory Diseases Research, KEMRI, Nairobi, Kenya. Fax: (+254) 2021 9187. e-mail: chakaya@todaysonline.com

Although the TB incidence was stable or in the decline in all six WHO regions in 2005, the total number of new cases was still rising slowly as a result of continued growth in the case load in Africa, the East Mediterranean region and South-East Asia. In Africa the main factor that has been driving the growth in the TB case load is the HIV epidemic. Africa is home to over 60% of the estimated global total of HIV infected persons and has the highest estimated TB incidence. Tuberculosis has emerged as the major 'opportunistic infection' in HIV infected persons in Africa and is often the index HIV diagnosis. Generating knowledge of the burden of HIV in TB patients is essential to justify the institution of TB-HIV interventions, including intensified case finding, and provision of cotrimoxazole preventive therapy (CPT) and anti-retroviral treatment (ART) to HIV infected TB patients. In 2005, only 14% of the estimated HIV infected TB patients in the world were tested for HIV and Africa, the region with the highest incidence of TB-HIV had the lowest testing rate. However some countries in Africa, including Kenya, Rwanda and Zambia, have achieved impressive HIV testing rates. This presentation will describe the factors that have contributed to this success and outline additional measures that may be taken to rapidly scale up and sustain HIV screening of TB patients to mitigate the impact of HIV on TB patients.

Integrating TB and HIV diagnostics for improved care and treatment support in Zambia

B M Madison. Global AIDS Program, Centers for Disease Control and Prevention, Lusaka, Zambia. Fax: (+260) 1 251142. e-mail: madisonb@cdc.zm

Integration of rapid laboratory diagnosis in national programs for tuberculosis (TB) and human immunodeficiency infection (HIV) is crucial because of increasing TB-HIV co-infection rates. National programs are seeking new strategies and algorithms for integrating

TB-HIV data collection, client counseling and laboratory testing. Rapid TB smear microscopy results, culture and drug susceptibility test turn-around time are the most relevant quality improvement factors in early diagnosis of co-infection. Seven Zambian laboratories implemented fluorochrome smear microscopy for improving detection of turn around time in diagnosis of tuberculosis. These laboratories have shown rates as high as 40% in improved detection of acid fast bacilli and decreased turnaround times compared to the previously used Zeihl Neelsen smear microscopy method. Tuberculosis and HIV control programs are further challenged with the need for implementing rapid culture for treatment failure and TB smear negative HIV positive cases. Tuberculosis specimen courier, rapid TB culture, identification, drug susceptibility testing and quality assurance activities have been implemented to provide rapid TB-HIV care and treatment support. Algorithms, technical support, TB laboratory partner coordination activities in implementing these rapid diagnostic activities in low resource settings will be shared in this presentation.

New diagnostics for MDR- and XDR-TB: what is in the pipeline?

R O'Brien. FIND Diagnostics, Cointrin, Switzerland.
Fax: (+41) 22 710. e-mail: rick.obrien@finddiagnostics.org

This presentation will review mycobacterial growth detection methods, including mycobacterial phage replication assays, and molecular methods for the rapid determination of MDR and XDR TB. Direct DST on solid media, such as the Greiss method, permits reliable detection of DR in two to three weeks. Growth detection on liquid media, such as direct MGIT testing, or the recently described MODS method shortens detection time to 10–14 days. The only non-molecular, truly rapid test for MDR-TB diagnosis, a mycobacterial phage replication assay, detects MDR-TB in only two days. Highly reliable testing for MDR-TB is possible with a PCR line-probe assay that detects mutations associated with both rifampin and isoniazid resistance in one day. This assay is presently being adapted for the rapid detection of XDR TB. Finally, FIND is working on a single-step amplification assay for MDR-TB that provides results in less than 2 hours. These assays, and in particular molecular assays, have the potential to revolutionize tuberculosis and MDR-TB detection.

URBANISATION, INTERNAL MIGRATION AND TB CONTROL

Experiences from Vietnam

H Nguyen Thi Thuy, S Y Dinh Ngoc. National Hospital of Tuberculosis and Respiratory Diseases, Vietnam National TB Program, Hanoi, Vietnam. e-mail: nthuyha@gmail.com

Vietnam is experiencing a transition from a rural society with a primarily agriculture-based economy to a urbanized society with a more industry and service-based economy. This transition results in rapid expansion of urban areas such as Hochiminh City (HCMC), Hanoi. In the period 1994–1999, more than 4.5 million people in Vietnam were moving residents. This development continued after 1999. This population presents special challenges for TB control due to higher (although not exactly known) TB incidence, poverty, insecurity, mobility, and difficulties in identifying and providing them with regular TB/health services.

The results from some pilot projects have shown that:

- The rate of new AFB(+) pulmonary TB among immigrants in big cities is high, but patients are not detected early and cured in time. In HCMC from 2000 to 2004, 17–21% of new AFB(+) TB cases notified were immigrants.
- The prevalence rate of new AFB(+) pulmonary TB in the workers of 4 enterprises were twice as high as those in the community.
- The results of TB treatment are poor among the homeless. Among a total of 55 homeless TB patients on DOTS in HCMC, only 24 (44%) completed treatment, 25% defaulted, 13% died and 16% remained smear-positive after a full course of treatment.

Solutions

- Building intersectoral network with NGOs, mass media organization, police, local authorities.
- Concentrating on IEC about TB and outreach for this vulnerable group.
- Establishing a suitable model for examination, detection, treatment mode and change of treatment place for this special subject group, particularly in worker-intensified, private enterprises, and foreign joint ventures.

TB control in metropolitan cities/megacities of Bangladesh: unique partnership with NGOs

K A Hyder. World Health Organization, Dhaka, Bangladesh.
Fax: (+880) 2 988 4657. e-mail: khyder@dhaka.net

More than half of the TB patients in Bangladesh first seek treatment in the private for-profit sector, including high proportions among the poor. However, the treatment outcomes in the private sector are generally poor; increasing the burden on TB patients and promoting multidrug resistance. Until the end of 2002,

two Chest Clinics in Dhaka, and one each in the other five City Corporations of the country provided DOTS services. Detection of new smear-positive patients was below 30% and treatment success about 60%, with over 30% defaulters and transfers out. To establish and gradually increase access for the urban poor, climate refugees and migratory populations to DOTS services, the National TB Control Program concluded partnership with two NGOs that coordinated the primary health care services delivered by NGOs working in metropolitan and megacities of the country. So far 245 centers, both microscopy and DOT, are functioning in the country through unique partnership. Details will be presented. The number of smear-positive patients diagnosed increased from less than 30% to 48% in 2006 and treatment success from 60% to over 83% in 2005. Major constraints in TB control in metropolitan, megacities include unsuitable clinic hours for its work force; migratory population groups consisting mainly of factory workers and daily laborers, and unstable populations. Measures to establish and expand DOTS services in the work place and observation of treatment by community members and through local pharmacies are being piloted and expanded. Studies indicate that the majority of TB patients in urban areas, including slum populations, attend private qualified or unqualified health providers. NTP management in collaboration with NGO partners has taken initiatives to establish linkages between public, private and NGO health care services that will be presented and discussed.

RAPID DETECTION OF DRUG RESISTANCE

Liquid culture techniques for DST: gold standard for first- and second-line drugs?

A Kruuner. Mycobacterium Reference Unit, HPA, London, United Kingdom. Fax: (+44) 207 539 3489.
e-mail: a.kruuner@qmul.ac.uk

Continued spread of multidrug-resistant tuberculosis (MDR-TB) defined as tuberculosis caused by a strain resistant to isoniazid and rifampicin, and the appearance of extensively drug-resistant TB (XDR-TB), defined as resistance to at least rifampicin and isoniazid, in addition to any fluoroquinolone, and to at least one of the three following injectable drugs used in anti-TB treatment (capreomycin, kanamycin and amikacin) are complicating tuberculosis control efforts. Consequently, laboratories are challenged to provide reliable (and ideally rapid) drug susceptibility testing not only for first- but also to second-line drugs to ensure i) effective treatment of tuberculosis, and to prevent further development of drug resistance; ii) prompt and adequate public health measures to prevent or reduce the spread of MDR-/XDR-TB. The first liquid culture sys-

tem (MGIT 460) has been widely validated for approximately 20 years and is regarded as the best method in clinical laboratories for reliable and rapid testing of susceptibility of *M. tuberculosis* isolates to front-line drugs. In recent years liquid culture systems (e.g. BACTEC MGIT 960) have also been evaluated and validated for testing susceptibilities of *M. tuberculosis* to classical second-line drugs and newer antimicrobials including amikacin, capreomycin, ethionamide, prothionamide, ciprofloxacin, ofloxacin, moxifloxacin, rifabutin, linezolid.

Nitrate reductase and colorimetric indicator assays

J C Palomino. Mycobacteriology Unit, Institute of Tropical Medicine, Antwerp, Belgium. Fax: (+323) 247 6333.
e-mail: jcpalomino@itg.be

During the last years several methods to detect drug resistance in *Mycobacterium tuberculosis* have been proposed. Colorimetric methods based on the use of redox indicators and the nitrate reduction assay have received increasing attention due to their simplicity and the lack of requirement for specialized equipment or highly skilled personnel. Several studies have evaluated their accuracy and performance in comparison with reference standard methods, especially for the detection of resistance to rifampicin and isoniazid, two key drugs in the treatment of tuberculosis. This review describes the development, evaluation and implementation of the nitrate reductase and colorimetric indicator assays as rapid alternative tests for the detection of multidrug resistance in *M. tuberculosis*. Based on published evidence and the high accuracy shown for detecting drug resistance in *M. tuberculosis*, these methods seem to be appropriate for implementation in high-burden low-resource countries.

Phage-based assays for detecting rifampin-resistant TB

H Albert. Foundation for Innovative New Diagnostics, Cape Town, South Africa. Fax: (+27) 21 791 1009.
e-mail: heidi.albert@finddiagnostics.org

Phage-based assays use two main methodologies to detect viable *M. tuberculosis*; (1) phage amplification, in which phage are amplified following infection and usually detected by formation of plaques in a sensor cell lawn, and (2) detection of light produced by luciferase reporter phages (LRP) after TB infection. Rifampicin (RMP) resistance is detected by the ability of phage to replicate in TB which remain viable following incubation with rifampicin. Commercial and in-house methods exist. Phage assay procedures are of comparable complexity to manual TB culture and require similar facilities; results are available in 2–3 days. Most published studies have assessed performance of phage assays from TB cultures, although recent work

has focused on testing directly from smear-positive sputum. Sensitivity of phage assays for detection of RMP resistance varies from 81% to 100%, and specificity from 73% to 100% in published studies. A commercial phage amplification assay for RMP resistance directly from sputum has recently been evaluated in 1100 multidrug-resistant TB (MDR-TB) suspects in Lima, Peru. Sensitivity and specificity of 95% were reported. A high initial rate of contamination was reduced in a follow-on study by addition of an antimicrobial supplement to the phage assay medium. This test is now being evaluated for feasibility, impact and cost-effectiveness in large-scale demonstration projects in several high-burden countries. Issues such as the level of contamination and un-interpretable and false positive results will be important in defining the potential utility of phage-based assays.

Possibilities and limits of molecular assays

D Hillemann, E Richter, S Rüscher-Gerdes.

Forschungszentrum Borstel, Borstel, Germany.

Fax: (+49) 45 3718 8311. e-mail: dhillemann@fz-borstel.de

Increasing drug resistance in tuberculosis is a global problem. The rapid determination of drug resistance in clinical isolates of *Mycobacterium tuberculosis* is a prerequisite for the onset of an effective antimicrobial therapy and thus preventing further spread of drug resistant isolates. Because *M. tuberculosis* is slow growing, combined primary isolation and conventional drug susceptibility testing is time-consuming and may take weeks after referral of a sample to the laboratory. Therefore, it is not surprising that a multitude of different resistance assays based on molecular techniques were specifically developed for *M. tuberculosis*. All these techniques are based on the knowledge that random genetic mutations in particular genes confer drug resistance to *M. tuberculosis*. Several genes and genomic regions of *M. tuberculosis* have been identified to be involved in the development of resistance: Mutations associated with drug resistance occur in *rpoB* for rifampicin, *katG* and the promoter region of *inhA* for isoniazid, *embB* for ethambutol, *pncA* for pyrazinamide, *rpsL* and *rrs* for streptomycin, and *gyrA* for fluoroquinolones. Various molecular methods have been used to identify the mutations in these genes such as DNA sequencing, several PCR-based techniques and line-probe assays. The majority of assays assess the detection of multidrug resistance, which means the resistance at least against rifampicin and isoniazid. The main advantages of molecular techniques such as the high sensitivity and rapidness are obvious. However, the disadvantages should also be kept in mind, since these techniques are limited in their applicability and their execution requires extra care.

Implementation of DST techniques in high-incidence, low-income countries

K F Feldmann. Kuratorium, Gauting, Germany.

Fax: (+49) 89 850 8412. e-mail: feldmann@gsf.de

For in-vitro drug susceptibility testing (DST) techniques using viable *M. tuberculosis* strains a laboratory Biosafety Level 3 (at least Biosafety Level 2 with major improvements) is essential. Implementation of first-line drug testing on solid media will be basic and only after well-documented competency in performing these tests, testing for second-line drugs should be considered. Using liquid media the with indicator systems for the detection of growth, the time to report DST results can be reduced to less than 20% compared to solid media. These tests can be performed with a manual system or in an incubator with automatic detection system and data evaluation. In areas with inconsistent current, precautions have to be taken to ensure a separate supply for the instrument. The safe handling and the cross checks of positive liquid cultures require an intensive training of personnel in a well equipped safe laboratory. Newer techniques with a short duration to receive DST results necessarily use inoculations with extremely high concentrations of *M. tuberculosis* sometimes in 'open systems'. When these techniques are applied a Biosafety Level 3 for the laboratory will be obligatory. Molecular biological techniques are suited to provide results within a few hours. They are less dangerous concerning biosafety but very sensitive to cross contamination with DNA or amplicons. Separation of working areas have to be planned and a special training on preparation and handling of DNA specimens, amplification products, hybridization reagents with the aim to teach how to prevent or minimise spread has to be given before starting any work. Special waste handling and cleaning procedures destroying DNA will be part of that training. Nucleic amplification tests for DST can be performed from cultures. It is also possible to start amplification from direct material. Transport of specimen on filter paper to diagnostic centres is under evaluation with first promising results.

VULNERABLE POPULATIONS AFFECTED BY TB AND TB-HIV

Hidden barriers in accessing TB care for women in Tanzania

J M Mwanjisi. Mediabank Tanzania, Dar es Salaam, Tanzania.
e-mail: samara2001@yahoo.com

Background: In Tanzania, as is the case for many other countries in Africa, there are a lot of barriers that hinder poor people from accessing health care. Poverty, lack of proper information, and stigma are among the many

challenges that negatively impact health seeking behaviour of poor people. In most cases, these barriers and challenges affect women much more than they affect men. TB care and treatment is no different; women tend to seek diagnostic and treatment services later than men. This presentation explores factors influencing women's health seeking behaviour and the challenges it brings for TB treatment.

Method: This study analyzes data from desktop research, fieldwork and interviews. Informants include TB patients, TB and HIV/AIDS experts, and other key stakeholders.

Results: Even though TB treatment is free in Tanzania, many hidden costs and challenges prevent women from accessing TB diagnostic and treatment services. Poor women are burdened with tough choices of providing for their families or accessing health care. Stigma, associated TB, HIV and AIDS also prevents many women from seeking TB services as always the blame of 'who brought the disease home' is often on women. As a result, women are more likely to delay seeking care for TB than men. The median delay for women is about 8 weeks compared to 6 weeks among men.

Conclusion: It is therefore critical for TB programmes to address TB care and treatment with a gendered perspective, including in the design of programs that specifically address the challenge for women and children. Certain approaches, such as home-based care and family-focused responses, have shown promising results.

TB-related stigma in Bangladesh: repercussions of social disapproval

F Ahmed,¹ M A Islam,¹ F Karim,¹ R Alam,¹ A M R Chowdhury,^{1,2} N Ishikawa.³ ¹BRAC Health Programme, BRAC, Dhaka, ²JPG School of Public Health, BRAC University, Dhaka, Bangladesh; ³The Research Institute of TB, Tokyo, Japan. Fax: (+880) 2882 3542. e-mail: faruque.a@brac.net

Introduction: Despite a reported 99% DOTS coverage in Bangladesh, the national case detection rate is still about 70%, mostly due to a lack of awareness about the basic symptoms and information about TB, and TB-related stigma. To gain a better understanding of stigma and other barriers to TB diagnosis and treatment, BRAC implemented studies.

Objectives: To explore the existing stigmas associated with TB and its influence on health-seeking behavior.

Methods: BRAC conducted two studies using both questionnaire survey and focus group discussions in 1998 and 2002 in rural Bangladesh.

Result: Fear of becoming infected with TB and stigma associated with the disease lead TB patients to hide their disease and delay in seeking treatment. Exaggerated concerns about the risk of spreading the disease to others often make TB patients feel socially marginalized and isolated. The most commonly perceived ways

of spreading TB are physical contact, food, smoking, airborne exposure, physical exertion and sexual contact. TB-related stigma also can lead to discrimination that interferes with marriages and conjugal life. In the workplace, fear of losing one's job prevents people from seeking TB health care. For women, this stigma and discrimination are often more acute and make them more vulnerable.

Conclusions: Greater efforts through awareness campaigns, social mobilization, and community-based TB care and support can be effective in decreasing stigma experienced by TB patients and increasing awareness about TB.

TB INFECTION CONTROL IN THE WORKPLACE

Infection control in Kenyan prisons

R Shitabule,¹ J Sitienei.² ¹Ministry of Health, Nairobi, ²NLTP, Nairobi, Kenya. Fax: (+254) 271 3198. e-mail: rushim2005@yahoo.com,

Background: Transmission of TB is a problem in Kenya prisons. Congestion and poor hygiene in prisons offer conducive environment for transmission of TB.

Objectives: To increase the effectiveness of current TB control and treatment activities in prisons.

Methods: Simple random technique. Purposively Nakuru prison was picked because of poor infrastructure.

Results: TB control in prisons is supervised by the National TB control Program staff. Kenya has 94 prisons with a population of 140 000, inclusive of staff and families. There are 50 000 inmates, of whom 44% are remanded. Nakuru prison, designed for 800 inmates, currently accommodates 2000. A poorly ventilated cube for 30 inmates accommodates 90 inmates. 1000 inmates were interviewed and it was found that 50% had contracted TB. Sources to determine MDR-TB was not significant. TB patients had little knowledge about coughing and spitting hygiene. TB patients are referred to the regional facility 4 km away for sputum tests and chest X-rays depending on availability of transport and escorts, causing diagnostic delays. Post-mortem reports for Jan 2006 and April 2007 indicate 20 deaths due to TB. Five nurses managing the prison have not been trained in TB control.

Conclusion and Recommendations: TB is a health issue in Kenya prisons. There is a need to support the diagnosis and treatment of TB in prisons. Surveillance, active case finding, HIV testing and appropriate use of preventive therapy may reduce TB incidence in prisons.

Infection control and MDR-TB in the slums

J Ongango,¹ E Amukoye,¹ P Omondi.² ¹Kenya Medical Research Institute, Nairobi, ²International Medical Corps, Kenya, Nairobi, Kenya. Fax: (+254) 272 9308. e-mail: jongango@kemri-nuitm.or.ke

Background: Factors that may contribute to MDR-TB in Kenya include low quality anti-tuberculosis drugs, poor or non-existent TB control programmes in strife torn neighbouring countries, non-compliance of health care providers and non-compliance of TB patients. The country has an estimated 1% MDR among smear-positive pulmonary TB, and a TB case notification rate of 324/100 000 population with 55% TB-HIV coinfection. The purpose of this paper is to report the infection control measures put in place in a Primary Health Care out-patient health facility serving a slum population characterised by poverty, overcrowding and unhygienic conditions.

Methods: In 2006, continuous infection control measures were implemented routinely by the health facility. This included provision of an outdoor waiting area for out-patients, specific weekly clinic day for confirmed TB cases on treatment, provision of HIV screening for all TB cases, routine surveillance of MDR, triage of patients to allow coughers for rapid TB screening, a designated area for sputum collection, community awareness/mobilisation activities, promotion of patient treatment literacy, establishment of referral links for ARV treatment and staff information/training.

Results: A total of 364 TB cases were registered during the year. The treatment success rate rose to 84% from the previous year's rate of 79%. Self referrals of TB symptomatics to the laboratory for screening rose to 72% from 52%. There was 95% DTC uptake among TB patients and 100% cotrimaxazole preventive therapy provision for the TB-HIV co-infected. One MDR case was reported.

Conclusions: Infection control measures should be maintained at health facilities to reduce the risk of nosocomial transmission of TB, especially to PLWHA.

Health education on self prevention of TB in the village

J Okiror. BOX 60 Amagro, Kenya. e-mail: joanokiror@yahoo.com

TB infection remains a great challenge for both children and adults, although health education mainly targets adults. These trends leave children at the mercy of TB disease, particularly in villages with lowest immunization coverage. Health education on self prevention of TB infection is challenged by varied poor shelters with little or no ventilation. For example, according to teso culture and beliefs in villages, houses are built without windows but just the door for entry. Women and girls sleep in small houses with about 10–15 people, and men and boys have the same conditions. In the villages TB is higher due to people sharing

beds on the floor. Approximately 70% of people are infected by TB and some have lost their lives due to TB. Poverty equally prevents 60% of patients from accessing and completing their TB treatment, due to lack of means of transport to health facilities, inability to afford warm clothes and ideal nutrition. Low educational levels prevent understanding of TB messages often in print media and written in foreign languages. Villages in Teso District are mainly occupied by illiterate persons. The strongly held belief that TB infection is HIV infection promotes poor health seeking behaviour by TB suffers. The result is high stigmatization and discrimination of TB patients. It is also a fact that around 90–92% of people living with HIV/AIDS have TB infection. Health workers and HBC givers have equally suffered TB infections contracted from patients, particularly during provision of home based care.

The Brazilian tuberculosis research network and tuberculosis control activities: state of the art

A Kritski,^{1,2} A Ruffino-Netto,^{2,3} R Dietze,^{2,4} T Scatena-Villa,^{2,5} J R Lapa e Silva,^{1,2} R Medronho,^{2,6} V Rolla,^{2,7} C Basilia,^{2,8,9} D Santos,² M Palaci.² ¹Medicine School, TB Res Unit, Rio de Janeiro Federal Univ (UFRJ), Rio de Janeiro, RJ, ²Rede TB-TB Research Network, Rio, Sao Paulo, Vitoria, Rib Preto, RJ-SP-ES, ³School of Medicine by the Sao Paulo University (FMRP-USP), Ribeirao Preto, SP, ⁴Infectious Diseases Dept, Espirito Santo Federal University (UFES), Vitoria, ES, ⁵Ribeirao Preto Nurse School at USP (EERP-USP), Ribeirao Preto, SP, ⁶Collective Health Dept, Rio de Janeiro Federal Univ (NESC-UFRJ), Rio de Janeiro, ⁷Evandro Chagas Research Institute—Oswaldo Cruz Found (IPEC-FIOCRUZ), Rio de Janeiro, ⁸Forum of NGO fighting TB in Rio de Janeiro, Rio de Janeiro, ⁹Brazilian Partnership against TB, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 2550 6908. e-mail: kritskia@gmail.com

Introduction: In Brazil, which has an estimated 124 000 cases of TB per year, there has been a significant gap in communication and understanding between TB programmatic experts, academics, the community, and NGO. A National TB Research Network was established in 2002 to bring these constituencies together to promote an integrated, multi-disciplinary and multi-institutional strategy for TB control in Brazil.

Objectives:

- To facilitate and coordinate vaccine and drug development efforts among academia, the pharmaceutical industry, and regulators as well as beneficiaries of TB services.
- To develop new vaccines and drugs for the prevention and cure of TB, including MDR-TB, and develop improved, therapeutic alternatives with the renewal of drugs, new formulations, drug associations, use of drugs already available in the market, and immunotherapy.
- To perform pre-clinical and clinical studies of new vaccines, new drugs and diagnostic tests against TB using adequate ethical standards and to capacitate clinical sites for explanatory and pragmatic trials.

- To perform bioequivalence studies of antimicrobials for the treatment of TB in the macro-regions of the country and on different populations, e.g., aging people or HIV-infected patients.
- To perform pragmatic clinical trials and cost-effective analysis of alternative interventions for TB control that include drug regimens, diagnostic methods and health service strategies.
- To improve case detection by changing health behaviour and mobilizing communities.
- To create demand for DOTS services through grassroots participation.
- To reduce stigma by helping TB patients and health care workers to be influential voices.

Conclusions: The Brazilian TB Research Network has established a solid relationship among the constituencies involved and has helped to foster Brazilian leadership and competency in the development and evaluation under field conditions of new vaccines, new drugs, new diagnostics and new strategies for TB.

WOMEN AND TOBACCO IN LOW-INCOME COUNTRIES: A PREVENTABLE EPIDEMIC?

Women and tobacco in Tunisia, where smoking has been adopted by a small elite among women

I Harrabi. Service of Epidemiology and Biostatistics, University Hospital Farhat Hached, 4000 Sousse, Tunisia.
Fax: (+216) 73 224 899. e-mail: imed-harrabi@yahoo.fr

Tobacco use is one of the greatest burdens to the health and well-being of women around the world. At present it kills over half a million women each year, but this is expected to double by 2020. In some countries, lung cancer has already surpassed breast cancer as the main cause of cancer deaths among women. In Tunisia, every year, tobacco kills about one thousand women. In the 1920s, smoking among Tunisian women was still considered a habit of scandalous or lower class women, but the period was a time of great change as many women began to move towards social and civic equality. By exploiting ideas of liberation, power and other key values for women, the tobacco industry is accelerating this process. The same marketing techniques that have been used to promote smoking among women in developed countries are now being applied to women and girls in developing countries, such as Tunisia. There is a need to frame women's tobacco use and exposure as a major health and social problem in Tunisia, and to build consensus around this issue. Women's organisations, as well as other members of society could be activated to address the problem.

Can we make generalisations about women and smoking? Are there any common characteristics across populations?

K Slama. International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+33) 146337144.
e-mail: KSlama@iatld.org

In a world where we can find over 50% of women smoking in some Pacific Island nations and less than 2% in other Pacific Island nations, it may seem foolhardy to make generalisations about women and smoking, but this presentation will do just that, because smoking appears to be a phenomenon explained by cohorts. Smoking by both men and women follows a social evolution, so any prevalence rate must be examined in light of the socio-cultural values associated with smoking and the accompanying differences in access to cigarettes. Over time, as tobacco use grows or as tobacco control grows, attitudes and access evolve as well. Also, trend data from many populations show that when the population of smokers is younger, there is less cessation than when the average age is older. Thus we can expect that women's cessation rates in some countries will not correspond to those of women in other countries if there is wide disparity in the mean age or duration of smoking between them, but indeed will do so later in time. The effects of smoking on health are also a function of this cohort effect because of the time lag in seeing large numbers of tobacco-caused diseases, recognised as such, among women as compared to men. Women everywhere are endangered by the toxic elements of tobacco smoke. If they are enticed into smoking, most women will become addicted, and they will respond in similar ways to tobacco control according to the evolution of the population.

TRANSMISSION DYNAMICS OF MDR AND XDR-TB

Molecular epidemiology of drug-resistant tuberculosis in areas of high HIV prevalence

T Victor,¹ A Calver,² A Falmer,¹ O Strauss,¹ E Streicher,¹ G Louw,¹ R Johnson,¹ A Trollip,³ A Jordaan,¹ P D van Helden,¹ R Warren.¹ ¹Biomedical Sciences, Div Molecular Biology and Human Genetics, Tygerberg, ²Anglogold Ashanti Health, West Vaal Hospital, Orkney, North West Province, ³Biotec Laboratories, Cape Town, South Africa.
Fax: (+27) 21 9389476. e-mail: tv@sun.ac.za

Background and Aim: There have been many reports on co-infection with HIV and tuberculosis, but little is known about the dynamics of drug resistant *Mycobacterium tuberculosis* strains in areas of high HIV prevalence. The aim is to investigate the drug resistant strain population structure in areas of high HIV prevalence in South Africa.

Methods: A molecular epidemiological approach (IS6110-RFLP, spoligotyping, MIRU-typing, drug re-

sistance genotyping, phylogenetic tree analysis) was used to study the dynamics of drug resistant strains in different settings with different HIV prevalences.

Results: Cluster analysis demonstrate extensive transmission of drug resistant strains in all settings. Traditional epidemiological investigations and phylogenetic analysis showed over time how strains develop MDR and XDR-TB phenotypes in a stepwise manner. The repertoire of mutations conferring resistance in clinical isolates correlate with those seen in in vitro generated mutants, confirming the relationship between frequency and fitness cost. We demonstrate the spread of so called 'avirulent' strains, which have drug resistant causing gene mutations with a high fitness cost, in a high HIV setting.

Conclusion: The results raises concern for the spread of all drug-resistant strains in vulnerable populations. Greater vigilance is required to contain the drug-resistant TB epidemic in high HIV prevalence settings. This can be achieved by the development and implementation of rapid diagnostics, ensuring treatment adherence and intensified screening of contacts. However, in order for diagnosis and treatment to be effective it is essential that communities are educated to improve health seeking behavior.

MDR-TB in Vietnam

F G J Cobelens,^{1,2} T N Buu,^{2,3} N T N Lan,³ M N Huyen,³ H T Quy,³ M W Borgdorff,^{1,2} D van Soolingen.⁴ ¹KNCV Tuberculosis Foundation, The Hague, ²Center for Infection and Immunity, Amsterdam, Netherlands; ³Pham Ngoc Thach Hospital of Tuberculosis and Lung Disease, Ho Chi Minh City, Vietnam; ⁴National Institute of Public Health and the Environment, Bilthoven, Netherlands

Background: Vietnam is a high TB burden country with moderate levels of MDR-TB among new patients and high prevalence of Beijing genotype infections. We report on an ongoing population-based study that aims to assess the relative fitness of MDR strains in relation to genotype, as well as the role of genotype in failure/relapse and acquisition of drug resistance.

Methods: We assessed pre-treatment drug resistance patterns, spoligotype and DNA fingerprint (by IS6110 RFLP and/or VNTR) of all smear-positive TB patients diagnosed since 2003 in three adjacent districts in rural south Vietnam. All patients included since 2005 are also followed-up for culture-based failure and relapse including drug resistance testing and fingerprinting.

Results: Of the 1978 patients registered until end 2005, complete data were available for 1744 (92%). Analyses show strong association of MDR with Beijing genotype among new patients (adjusted odds ratio 6.6, $P < 0.001$) but not among retreatment patients (aOR 1.4, $P = 0.661$). The prevalence of Beijing genotype (35% overall) is associated with young age (aOR 2.8 for age groups 15–24 versus ≥ 65 years, $P < 0.001$) and previous treatment (aOR 2.4, $P < 0.001$).

Discussion: Results thus far suggest increased transmission fitness of MDR Beijing strains, but this needs to be confirmed by forthcoming analyses of fingerprint clustering.

ABSTRACT PRESENTATIONS SATURDAY 10 NOVEMBER 2007

THEMATIC SLIDE PRESENTATIONS

CHALLENGES TO DIAGNOSIS OF TUBERCULOSIS TREATMENT

TS-71775-10 Rapid detection of MDR-TB by the thin layer agar method applied directly on microscopy positive sputum samples

J A Robledo,^{1,2} G I Mejia,^{1,2} L Paniagua,¹ A Guzman,¹ A Martin,³ E Zapata,¹ F Montes,⁴ C Montes.⁴ ¹Corporación para Investigaciones Biológicas, Medellín, ²Escuela de Ciencias Biológicas, Universidad Pontificia Bolivariana, Medellín, Colombia; ³Institute of Tropical Medicine and Médecins Sans Frontières, Antwerp, Belgium; ⁴Liga Antituberculosa Colombiana, Medellín, Colombia. Fax: (+32) 3 247 63 33. e-mail: amartin@itg.be

Current methods for DST of *Mycobacterium tuberculosis* are slow or too expensive. Multidrug-resistant strains are increasing worldwide and fast, reliable, and inexpensive methods that can be applied in settings with limited-resources are urgently needed. We evaluated the TLA method for the detection of resistance to INH and RIF and compared the cost of its utilization in a population with a high risk of MDR-TB. One hundred patients with smear-positive pulmonary TB and risk factors for MDR-TB were included in the study. All specimens were decontaminated and inoculated onto LJ media and the MGIT960 system and inoculated directly into TLA/INH/RIF (7H11 agar in a four quadrant dish, growth control quadrant, 7H11 plus PNB, 7H11 plus INH and 7H11 plus RIF). DST was done using the reference proportion method. Cost of care and time to render a result were calculated according four algorithms comparing with LJ, MGIT960 and TLA/INH/RIF. The average number of days for resistance detection using TLA/INH/RIF was 12 days for INH and RIF, and for the indirect proportion method it was 46 days. The TLA showed 100% agreement with the proportion method. Using TLA/INH/RIF for MDR-TB detection decreased the cost of care. This is the first study using the TLA/INH/RIF method for MDR-TB applied directly on sputum samples. This fast method is reliable and gives rapid results, reducing the cost related to detection of resistance in these patients.

TS-72073-10 Rapid detection of rifampin resistance using the direct MGIT method in Africa

F Portaels,^{1,2} D Affolabi,^{1,3} S Anagonou,^{1,3} B Kledjo,^{1,3} J Allen,^{1,4} F Ba,^{1,5} O Bah-Sow,^{1,6} M Barry,^{1,6} H Diop,^{1,5} W Githui,^{1,7} M Gninafon,^{1,8} J Odhiambo,^{1,7} R Rustomjee,^{1,4} C Merle,^{1,9} C Lienhardt.^{1,10,11} ¹Gatifloxacin for TB trial (OFLOTUB), Paris, France; ²Mycobacteriology Unit, Institute of Tropical Medicine (ITM), Antwerp, Belgium; ³Laboratoire de Référence des Mycobactéries, Cotonou, Benin; ⁴Medical Research Council, Durban, South Africa; ⁵Programme National de Lutte contre la Tuberculose, Dakar, Senegal; ⁶CHU IGNACE Deen, Conakry, Guinea; ⁷Kenya Medical Research Institute, Nairobi, Kenya; ⁸Programme National de Lutte contre la Tuberculose, Cotonou, Benin; ⁹London School of Hygiene and Tropical Medicine, London, UK; ¹⁰International Union Against Tuberculosis and Lung Disease, Paris, France; ¹¹Institut de Recherche pour le Développement, Montpellier, France. Fax: (+32) 32 47 63 33. e-mail: portaels@itg.be

Setting: Great vigilance is imperative when new drugs are used in the treatment of tuberculosis (TB). Due to amplification of resistance, these new drugs could rapidly become ineffective if administered in combination with first-line drugs to partially resistant or multidrug-resistant TB (MDR-TB) patients. The use of a rapid test is therefore indispensable to exclude such patients from the trial. The performance and practicability of the rapid test used in the frame of the 'Gatifloxacin for TB project (OFLOTUB)' are presented.

Material and Methods: Rapid detection of MDR-TB was performed on two smear-positive sputa from 1067 patients by means of the manual Mycobacteria Growth Indicator Tube (MGIT) method (Becton Dickinson, USA) in Benin, Guinea, Kenya and Senegal and with the MGIT 960 in South Africa. Decontaminated sputum specimens were directly inoculated in one control MGIT and one rifampin (R) containing MGIT tube. Indirect drug susceptibility testing (DST) was also performed on isolates using the proportion method. Quality control of DST was performed at the ITM.

Results: A total of 992 (93.0%) R sensitive (Rs) patients were included in the trial, while 75 patients (7.0%) were excluded due to R resistance (Rr) (1.8%), invalid (4.4%) or contaminated results (0.8%). Comparing direct MGIT and indirect DST results, 3 discordant results (0.3%) were obtained. Three patients were Rs by MGIT and Rr by DST. The median turnaround time for reporting Rs or Rr was 8–10 days (3–15) with the manual MGIT and 4 days (2–14) with the MGIT 960 system.

Conclusion: The direct MGIT test gave excellent results within 2 weeks. No false Rr results were observed and only 0.3% false Rs results were detected. Moreover, the manual MGIT method is convenient for performing direct DST in low resource settings. Supply of MGIT tests in low-income countries is, however, critical and easy access to consumables should be available in those countries.

TS-71372-10 Actions to increase treatment success rate of new smear-positive pulmonary TB patients in Mongolia

N Naranbat,¹ L Tumurbaatar,² P Yanjindulam.¹ ¹TB Department, National Center for Communicable Disease, Ulaanbaatar, ²Mongolian Anti-Tuberculosis Association, Ulaanbaatar, Mongolia. Fax: (+976) 11 450492. e-mail: pnbat@yahoo.com

Background: The DOTS service was first introduced in Mongolia in 1994. We found a high association between poverty, malnutrition and TB. Therefore, since 2003 the NTP has designed three kinds of DOT (ambulatory DOT: patients receive TB treatment at TB dispensaries, free lunch DOT: patients receive TB treatment after free meals, and voluntary DOT: trained volunteers visit patients homes and observe TB treatment) supported by the GFATM.

Setting: 2469 new smear-positive pulmonary tuberculosis patients were diagnosed in Mongolia from 2003 to 2005. All patients received standard TB treatment (2HRZE/4RH).

Objective: To analyze outcomes of three different kinds of DOT service.

Method: To collect information about all treatment outcomes, and to conduct date and cohort analyses of patients diagnosed in 2003–2005.

Results: In total 1212 (49.1%) patients received ambulatory DOT, 978 (39.6%) patients received voluntary DOT, and 279 (11.3%) patients received free lunch DOT. Success rates for ambulatory DOT, voluntary DOT, and free lunch DOT were 82.4%, 93.0% and 95.0%, respectively, and default and transferred out rates were 9.1%, 3.0% and 1.5% respectively.

Conclusion: Free lunch DOT and voluntary DOT reduced the transferred out and default rates. Therefore these methods can help in preventing the development of MDR-TB in developing countries.

TS-71894-10 Predictors of sputum culture positivity among smear-negative patients presenting to the TB clinic in Kampala

J E Nankya Mutyoba,¹ C King,¹ M Schluchter,¹ D Tisch,¹ A Okwera,² R D Mugerwa,^{2,3} C C Whalen.¹ ¹Case Western Reserve University, Cleveland, Ohio, USA; ²Makerere University–Case Western Reserve University Research Collaboration, Kampala, ³Makerere University Faculty of Medicine, Kampala, Uganda. Fax: (+1) 216 368 0883. e-mail: joanmutyoba@hotmail.com

Background: The contribution of smear-negative pulmonary tuberculosis (PTB) to the overall tuberculosis (TB) burden and mortality has continued to rise, and delayed diagnosis and treatment initiation are recognised reasons for the observed increase in mortality among smear-negative patients. There is a need to study clinical criteria that are associated with sputum culture positivity among smear-negative patients in different local settings, to provide evidence that will

enhance diagnosis of smear-negative PTB where sputum culture is absent.

Objective: To determine prevalence and clinical predictors of culture-positive PTB among AFB sputum smear-negative patients.

Methods: A cross-sectional study using secondary data of patients referred to the TB Clinic of the National TB and Leprosy Program in Mulago Hospital, Kampala, with symptoms suggestive of PTB. Prevalence and predictors of sputum culture positivity were determined using logistic regression.

Results: 2541 patients were screened between September 2004 and October 2006. Of these, 654 had 2 or more sputum smears negative. Prevalence of sputum culture positivity was 22.23% (95%CI 19–25.5). Of these, 64.14% were HIV-infected and 66.67% of those with HIV infection had advanced HIV disease. Wasting at presentation (OR = 2.69, 95%CI 1.48–4.89, $P = 0.001$) and chest X-ray abnormality consistent with active PTB (OR = 2.42, 95%CI 1.23–4.77, $P = 0.011$) were associated with a positive sputum culture. Among the HIV infected smear-negative patients, abnormal chest X-ray (OR = 2.21, 95%CI 1.12–4.37, $P = 0.022$), wasting (OR = 2.36, 95%CI 1.29–4.34, $P = 0.006$), CD4 counts < 200 cells/ml (OR = 1.96, 95%CI 1.00–3.84, $P = 0.05$) and total lymphocyte counts < 1200 cells/ml (OR = 2.02, 95%CI 0.99–4.14, $P = 0.05$) predicted having culture-positive PTB.

Conclusion: Use of a chest X-ray and measurement of wasting could enhance clinical evaluation of PTB suspects whose sputum smears are negative in this setting.

TS-71788-10 Lack of hepatotoxicity in patients on isoniazid preventive therapy (IPT) and antiretroviral therapy (ART)

J E Golub, L Eldred, S Dorman, R E Chaisson, R D Moore. Johns Hopkins University School of Medicine, Baltimore, Maryland, USA. Fax: (+1) 443 287 7955. e-mail: leldred1@jhmi.edu

Background: TB is the most common HIV-related opportunistic infection. Many clinicians avoid using IPT because of concerns about hepatotoxicity (HT). We assessed the risk of HT in patients on IPT/ART or ART alone in an HIV clinical cohort with high levels of hepatitis C virus (HCV) co-infection.

Methods: Patients on IPT/ART were matched to ART-only patients by ART start date. Hepatotoxicity during follow-up was assessed as Grade 2 (AST/ALT 3–5 × ULN) or Grade 3/4 (> 5 × ULN).

Results: 70 patients on IPT/ART with pre- and post-AST/ALT data were compared to 95 controls. 5/70 IPT/ART patients (7.1%) had Grade 2 HT vs. 4/95 controls (4.2%; $P = 0.41$). 2/70 IPT/ART patient had Grade 3/4 HT (2.9%) vs. 4/95 controls (4.2%; $P = 0.65$). HCV status was known for 143 patients: 47/48 (97%) IPT patients had HCV and 58/95 (61%) ARV patients.

Among HCV patients, 3/105 (2.9%) had Grade 3/4 HT vs. 3/38 (7.9%) non-HCV patients ($P = 0.18$).

Conclusions: IPT was not associated with mild or severe HT in this cohort. HCV infection may be a more important risk factor for HT in patients on ART than IPT, but neither was statistically significant in this study. Clinicians can consider broader use of IPT in patients on ART without major concerns about HT.

TS-71362-10 Development of ofloxacin resistance and XDR-TB during MDR-TB treatment in Karakalpakstan, Uzbekistan

H Cox,¹ S Niemann,² S Kalon,³ V Sizaire,⁴ Z Tigay,⁵ S Rusch-Gerdes,² C Mills.⁶ ¹Macfarlane Burnet Institute for Medical Research and Pu, Melbourne, VIC, Australia; ²National Reference Center for Mycobacteria, Borstel, Germany; ³Médecins Sans Frontières, Nukus, Karakalpakstan, Uzbekistan; ⁴Médecins Sans Frontières, London, UK; ⁵Ministry of Health, Nukus, Karakalpakstan, Uzbekistan; ⁶Médecins Sans Frontières, Amsterdam, Netherlands. Fax: (+61) 39 282 2144. e-mail: hcox@burnet.edu.au

Background: A pilot project to treat multidrug-resistant tuberculosis (MDR-TB) was started in 2003. The first treatment outcomes were acceptable (62% success), although extensively drug-resistant TB (XDR-TB) emerged during treatment, particularly amongst treatment failures. This study aims to identify factors potentially contributing to the development of ofloxacin resistance and XDR-TB during MDR-TB treatment.

Methods: Drug susceptibility was measured at baseline and regularly throughout MDR-TB treatment.

Results: Among 87 patients, 24% showed baseline resistance to either kanamycin or capreomycin, but no ofloxacin resistance was seen prior to treatment. Ofloxacin resistance was observed during treatment in 16% of patients. Factors contributing to ofloxacin resistance on univariate analysis were baseline kanamycin or capreomycin resistance, resistance to ethionamide at baseline or during treatment, and severe clinical condition. These factors remained significant on multivariate analysis. Neither poor adherence nor treatment interruptions contributed to ofloxacin resistance prior to the emergence of resistance. Five patients remained alive and harbouring XDR-TB after stopping treatment due to treatment failure.

Conclusion: The creation of XDR-TB from a best-practice MDR-TB treatment program is of concern. Further work is required to identify any potential pre-existing resistance mutations that may contribute to ofloxacin resistance and XDR-TB during MDR-TB treatment. Additionally, the risk of super-infection of XDR-TB strains during hospitalisation needs to be urgently assessed.

TS-71967-10 Tuberculosis among household contacts of infectious multidrug-resistant TB patients

G I Balane, J S R Pancho, M S Gler, M I D Quelapio, T E Tupasi. Tropical Disease Foundation, Makati City, Metro Manila, Philippines. Fax: (+632) 81202874. e-mail: tarcelasg@yahoo.com

Background and objective: This is a descriptive study on the prevalence of TB disease among household contacts (HCs), people sharing the same house for >3 months with infectious MDR-TB patients treated from January 2000 to December 2006 in the Programmatic MDR-TB Management project at the Makati Medical Center DOTS Clinic, Philippines.

Methodology: 1810 (82%) of 2201 household contacts of 460 consecutively enrolled MDR-TB index cases had symptom screening and chest X-ray. Those with radiographic findings consistent with TB submitted sputum for examination.

Results: Among 874 (48%) symptomatic HCs, radiographic evidence of PTB was noted in 144 (17%); among 936 asymptomatic HCs, there were 107 (12%). Bacillary PTB was in 32 (27%) of 125 and in 10 (16%) of 86 examined, respectively. Of the total 42 bacillary patients, MDR was noted in 24 (55.8%), drug resistance (DR) in 7 (16.3%) and pansusceptibility (PS) in 11 (27.9%). Except for four cases, all these patients received treatment appropriate to their drug sensitivity test findings.

Conclusion: Overall, radiographic TB was 14% among HCs, bacillary TB was 17% among those with radiographic TB and 10% of them were MDR. While the yield in symptomatic HCs was substantial, PTB was likewise noted even in asymptomatic HCs. Without genotyping, transmission of secondary MDR-TB cases from within the household is not possible to determine. However, transmission from within the community is a possibility with the finding of DR and PS strains in the MDR-TB HCs.

	Symptomatic <i>n</i> = 874 <i>n</i> (%)	Asymptomatic <i>n</i> = 936 <i>n</i> (%)
Chest X-ray coverage	847 (97)	902 (96)
CXR consistent with TB	144 (17)	107 (12)
Sputum coverage	125 (87)	86 (80)
Available culture results	118 (94)	63 (73)
Culture positive	32 (27)	10 (16)
MDR	18 (56)	6 (60)
MDR treated	17 (94)	5 (80)
DR	5 (16)	2 (20)
DR treated	4 (80)	2 (100)
Pansusceptible	9 (28)	2 (20)
Pansusceptible treated	8 (89)	2 (100)

TS-71644-10 Treatment outcomes from nine projects approved by the Green Light Committee between 2000 and 2003

F Mirzayev,¹ M Zignol,¹ M Danilovitz,² N Hurtado,³ V Leimane,⁴ P Malla,⁵ B Kazeonny,⁶ S Mishustin,⁷ C Bonilla,⁸ M Quelapio,⁹ V Sizaïre,¹⁰ E Jaramillo.¹ ¹World Health Organization, Geneva, Switzerland; ²GLC-approved project Estonia, Tallinn, Estonia; ³GLC-approved project Abkhazia, Sukhumi, Georgia; ⁴GLC-approved project Latvia, Riga, Latvia; ⁵GLC-approved project Nepal, Kathmandu, Nepal; ⁶GLC-approved project Orel, Orel, ⁷GLC-approved project Tomsk, Tomsk, Russian Federation; ⁸GLC-approved project Peru, Lima, Peru; ⁹GLC-approved Project Philippines, Manila, Philippines; ¹⁰GLC-approved project Uzbekistan, Nukus, Uzbekistan. Fax: (+41) 22 791 1589. e-mail: zignolm@who.int

Introduction: Controlling multidrug-resistant tuberculosis (MDR-TB) is one of the six components of the new Stop TB Strategy. To help programmes develop and implement programmatic management of drug-resistant TB, the Green Light Committee (GLC) for access to quality assured second-line anti-tuberculosis drugs was created in 2000. Since then 48 countries have benefited from this initiative and here we describe notification and treatment outcomes from 9 of them. **Methods:** Aggregated notification data and treatment outcomes of MDR-TB patients enrolled in the following countries from 2000 to 2003 were analyzed in line with international definitions: Estonia, Georgia, Latvia, Nepal, Russian Federation, Peru, Philippines and Uzbekistan.

Results: Of the total 3230 MDR-TB patients reported, 17.6% were classified as new, 22.0% relapse, 9.6% return after default, 12.1% failure, 0.4% extra-pulmonary and 38.4% other cases. 2.2% of the patients were still on treatment. Of those who completed treatment ($n = 3128$) treatment success, death, failure and default rates were 64.1%, 13.1%, 7.7% 14.7%, respectively.

Discussion: The considerably high proportion of 'other' cases of all cases enrolled shows that the backlog of chronic cases was prioritized in all countries. Treatment success rates were consistently above 62% throughout the years and are expected to improve as the backlog of chronic cases is cleared and coverage of the MDR-TB programmes scales up. In order to improve the treatment outcomes of patients with MDR-TB, new diagnostic tools and more effective drugs are urgently needed.

POSTER DISCUSSION SESSIONS

TB-HIV: 1

PC-71202-10 Risk factors for mortality in HIV-infected and non-infected patients with pulmonary tuberculosis

P Nahid,^{1,2} L C Gonzalez,¹ I Rudoy,^{1,2} B C de Jong,³ A Unger,¹ L M Kawamura,^{1,2} D H Osmond,¹ P C Hopewell,^{1,2} C L Daley.⁴ ¹University of California, San Francisco, San Francisco, ²The Tuberculosis Control Section, Department of Public Health, San Francisco, ³Stanford University, Stanford, California, USA; ⁴National Jewish Medical and Research Center, Denver, Colorado, USA. Fax: (+1) 415 695 1551. e-mail: pnahid@ucsf.edu

Background: Mortality during treatment among HIV-infected patients with tuberculosis has been predominantly associated with advanced HIV disease, particularly in resource-limited settings.

Objective: To evaluate characteristics associated with mortality during TB treatment in a setting that is not resource limited.

Methods: Retrospective chart review of all HIV-infected and non-infected patients with drug-susceptible pulmonary tuberculosis reported to the San Francisco Tuberculosis Control Program from 1990–2001.

Results: Of 700 patients meeting eligibility criteria, 56 (8.0%) died during the treatment period, 12 (21.4%) of whom were in part due to TB. By serostatus, 39/264 (14.8%) HIV-infected patients and 17/436 (3.9%) HIV-uninfected/unknown patients died ($P < 0.001$). In multivariate analysis, three characteristics were independently predictive of mortality; HIV infection (OR = 5.1, 95%CI 2.4–10.8, $P < 0.001$), adverse reaction to TB medications (OR = 2.4, 95%CI 1.3–4.6, $P = 0.01$) and older age at TB diagnosis (OR = 1.23 per 5 years, 95%CI 1.10–1.37, $P = 0.001$). In the HIV infected, only experiencing an adverse reaction to TB medications was associated with increased risk of death (OR = 3.0, 95%CI 1.2–7.3, $P = 0.02$), controlling for opportunistic infection, use of HAART, and patient adherence to therapy. CD4 count < 200 reached borderline significance (OR = 3.1, 95%CI 0.8–11.7, $P = 0.09$).

Conclusion: Other than HIV-infection and older age, experiencing an adverse reaction to TB medications was also independently associated with mortality. In HIV-infected individuals, experiencing an adverse reaction to TB medications was the only predictor of death during the treatment period. These findings have implications for the concomitant initiation of HAART and TB medications as potential adverse drug reactions may counteract any survival benefit.

PC-71216-10 Intensified case finding of TB in a high HIV setting: towards expansion of integrated TB-HIV services

J Nabbuye Sekandi,¹ C C Whalen.² ¹Makerere University Institute of Public Health, Kampala, Uganda; ²Case Western Reserve University, Cleveland, Ohio, USA.
Fax: (+256) 41533531. e-mail: jsekandi@iph.ac.ug

Background: In the past decade, the growing tuberculosis (TB) epidemic is largely fueled by the HIV co-infection especially in Sub-Saharan Africa. This presents a challenge to provide comprehensive and timely health care for the TB-HIV co-infected individuals. In Uganda, where about 50% of TB cases are HIV infected, HIV testing is a critical point for early entry into integrated TB-HIV care for the dually infected.

Methods: In a community-based door-to-door survey of 930 adults aged ≥ 15 years residing in a slum area in Kampala, Uganda, we estimated the proportion of active TB cases and the corresponding proportion of self-reported HIV testing. Individuals who reported chronic cough (≥ 2 weeks) submitted 3 sputum specimens for smear microscopy. Two positive smears led to a TB diagnosis and referral for TB treatment.

Results: Among 930 adults, 189 (20%) had chronic cough, 128 (69%) of those submitted sputum and 33 (26%) were smear positive for TB. The prevalence of undiagnosed smear positive TB among persons with chronic cough was 18.3%. Among the identified TB cases, only 15 (44%) had ever tested for HIV infection.

Conclusion: The low prevalence of HIV testing among the identified TB cases supports the need to emphasize HIV testing of TB patients in the integration of TB-HIV services. The high TB case yield from the intensified case finding approach using simple cough inquiry highlights its potential value in the expansion of the integrated TB-HIV services at community level.

PC-71329-10 Comparing TB-HIV collaborative activities in two TB control intervention areas in Zambia

B Mwangelwa,^{1,2,3} H Ayles,^{1,2} N Beyers,^{2,4} P Godfrey-Faussett,^{1,2,4} R Mkandawire.³ ¹University of Zambia, School of Medicine, Lusaka, Zambia; ²London School of Hygiene & Tropical Medicine, London, UK; ³Choma District Health Office, Choma, Zambia; ⁴Stellenbosch University, Capetown, South Africa. Fax: (+26) 01254710. e-mail: boydmwangelwas@yahoo.com

Background: The WHO policy on TB-HIV collaborative activities recommends that HIV testing is offered to all patients with tuberculosis in order to facilitate uptake of ARVs. The ZAMSTAR study, a community randomized trial to reduce the prevalence of tuberculosis in 24 communities in Zambia and South Africa aims to deliver improved TB-HIV collaborative activities in its study sites.

Methods: We compared uptake of HIV testing (CT) and ART among TB patients in the two ZAMSTAR

communities in Choma District, Zambia. Shampane is predominantly urban with a population of 23 397 and Pemba is rural with a population of 34 784.

Results: In 2006, TB notification rates were higher in Shampane than Pemba (975/100 000 vs. 280/100 000 $P < 0.0001$). The CT rate was higher in Pemba (51/98, 52%) than Shampane (40/228, 18%, $P < 0.0001$). HIV prevalence among those tested in the sites was similar (73% vs. 80%, $P = 0.4$), but the proportion of HIV-TB patients starting ART was higher in Shampane than Pemba (31% vs. 14%, $P = 0.07$).

Discussion: TB-HIV collaborative activities have recently started in both sites. Differences in uptake of CT may be due to the inadequate counseling space and counselors in Shampane. ART is currently distributed via the district hospital, which is 10 km from Shampane and 60 km from Pemba. Adequate counseling space and counselors, more accessible ART services and good referral systems between services are required for the collaboration to work.

PC-71382-10 Dissemination sur le terrain de la méthode de comptage des CD4 par dynabeads, Nord Kivu, RD Congo

A Kambale,¹ J P Kabuayi,¹ R Dlodlo,² P Fujiwara.^{2,3} ¹IHC Programme Nationale de Lutte Contre la Tuberculose, Kinshasa, Congo (Democratic Rep.); ²Union Internationale Contre la Tuberculose et les Maladies Respiratoires, Paris, France; ³US Centers for Disease Control (CDC), Atlanta, Georgia, USA. Fax: (+33) 143299087. e-mail: kiputsu_alain@yahoo.fr

Contexte : La prise en charge des malades coinfectés tuberculose/VIH se réalise au Nord Kivu dans 12 centres de diagnostic et de traitement de la tuberculose (CSDT) dans le cadre du projet des soins intégrés TB/VIH (IHC en sigle) exécuté par le Programme National de la Tuberculose sous l'initiative de L'Union Internationale de lutte Contre la Tuberculose et les Maladies Respiratoires. L'approche comprend le conseil et le dépistage du VIH dans le CSDT, l'application des méthodes de prévention du VIH, et la mise en place d'un traitement au cotrimoxazole (CTM) et antirétroviraux (ARV) en utilisant la technique de comptage des CD4 par la méthode optique des Dynabeads, qui est plus faisable dans les pays aux ressources limitées.

Résultats : Les 22 techniciens de laboratoire formés en octobre 2006 exécutent la méthode et s'y adaptent sans problème. La méthode est bien adaptée au contexte de ressources limitées (personnel, infrastructure; matériel). Elle utilise le microscope binoculaire déjà disponible dans les centres, et un matériel souple, non encombrant, conservé dans une armoire. Au mois de décembre 2006, 45 examens de comptage des CD4 avaient été réalisés sur les 123 attendus. Parmi eux, 29 avaient un résultat inférieur à 350 cellules/mm³, et étaient donc éligibles pour les ARV. Les problèmes opérationnels constatés sont l'absence d'une source d'énergie électrique permanente et de matériel de

chaîne de froid pour conserver les réactifs dans certains sites, et un mode opératoire long : maximum 5–6 échantillons/1,5 heure.

Recommandation : Vu les avantages qu'offre cette méthode, nous encourageons le Programme National de Lutte contre le SIDA de la RDC de l'adopter, si possible, dans les sites périphériques de prise en charge du SIDA.

PC-71857-10 Access to and uptake of HIV testing among TB patients in Burkina Faso

M Dembele,¹ N Saleri Nuccia,^{1,2} H Ouedraogo,³ A Matteelli,² M Sawadogo.¹ ¹Ministère de la Santé, Ouagadougou, Burkina Faso; ²Infectious and Tropical Diseases Institute, University of Brescia, Italy, Brescia, Italy; ³National Research Institute, Ouagadougou, Burkina Faso. Fax: (+226) 50 33 72 07. e-mail: mathurin_dembele@hotmail.com

Introduction: The HIV epidemic is generalised in Burkina Faso with an HIV prevalence of 2% in the general population. The incidence of tuberculosis (TB) is estimated at 191 cases per 100 000. In 2004 the National TB Program (NTP) endorsed a policy of generalised offer of the HIV test to all TB patients. In 2004 and 2006, 130/166 nurses working at TB clinics were trained on HIV counselling; at least 1 trained nurse was present in any of the 80 TB clinics in the Country.

Purpose: To assess the implementation of HIV counselling and testing policy in terms of percentage of TB patients being offered the HIV test; percentage of TB patients being tested for HIV, and percentage of TB patients being positive to the HIV test.

Methods: Data of two consecutive years, 2005 and 2006, were analysed to describe trends. In 2005, information was collected through the TB treatment outcome form at quarterly intervals. In 2006 the forms were modified and TB-HIV information was collected through the TB case registration form at quarterly intervals.

Results: In 2005, 3663 TB patients were registered in the Country. Out of these, 1764 (53.1%) were counselled for HIV, and 848 (25.5%) were tested for HIV. Of these, 267 (31.5%) tested positive. In 2006, of 4455 TB patients registered, 2483 were counselled for HIV (64.5%), 931 (23.4%) were tested and 311 (33.4%) had a positive result.

Conclusions: In Burkina Faso, the policy of a generalised offer of the HIV test to TB patients has been associated with an increase in the proportion of TB patients being counselled for HIV, though the proportion of persons accepting the test is still low. In order to reach the target of at least 80% of TB patients being tested for HIV, counselling need further expansion and acceptance rate need to be substantially increased. The major challenges are dual stigma, stock-outs of HIV test kits and lack of human resources, specially caused by poor retention of trained staff.

PC-71953-10 Soins intégrés TB-VIH aux centres de diagnostic et de traitement (CSDT), Bas Congo, RDC

M Ngoma,¹ J P Kabuayi,² F Boillot,¹ R Dlodlo,¹ P I Fujiwara.^{1,3} ¹Department of HIV, International Union Against Tuberculosis, Paris, France; ²Programme National de Lutte contre la Tuberculose, Kimpese and Kinshasa, Congo (Democratic Rep.); ³Division of TB Elimination, US Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+33) 1 43 29 90 87. e-mail: pfujiwara@iatld.org

Objectif : Depuis juin 2006 au Bas Congo, dans le cadre du projet des soins intégrés TB/VIH (IHC en sigle), en collaboration avec les Programmes Nationaux de la Tuberculose (TB) et le SIDA (PNT et PNLS), et L'Union Internationale contre la Tuberculose et les Maladies Respiratoires, la prise en charge (PEC) intégrée de la coinfection est mise en marche dans 9/94 CSDT, pour étudier, évaluer et apprécier la qualité de la PEC et le degré d'acceptation du test VIH chez les malades tuberculeux.

Méthode : Une recherche-action sur le dépistage du VIH chez les malades tuberculeux.

Résultat : Entre juin et décembre 2006, 652/722 (90%) des malades tuberculeux diagnostiqués étaient conseillés, dont 606 (93%) testés ; 125 (21%) des malades tuberculeux étaient VIH+. 105/125 (84%) étaient sous cotrimoxazole et 63 (50%) sous traitement antirétroviral (ARV).

Contraintes :

Les contraintes sont :

- difficile collaboration entre le PNT et le PNLS
- activités limitées aux certains CSDT retenus comme sites pilotes
- ruptures des stocks (tests VIH et autres consommables de laboratoire)
- manque de formation des médecins prescripteurs impliqués dans la gestion des activités de coinfection
- absence de PEC nutritionnelle pour les coinfectés
- problèmes de financement (absence des moyens conséquents et efficaces pour bien faire le suivi)

Recommandations :

En utilisant un comité de pilotage à travers le PNT et le PNLS, il est recommandé :

- d'étendre la PEC dans d'autres CSDT
- d'assurer un ravitaillement régulier en tests VIH avec bonne validité
- d'assurer une formation des médecins prescripteurs des ARVs ainsi pour des infirmiers dans la gestion des coinfectés
- d'assurer une PEC nutritionnelle au besoin
- d'assurer tous les aspects financiers à temps pour faire la supervision et avoir des réunions de validation des données

PC-71961-10 Le système d'information TB-VIH dans le projet des soins intégrés TB-VIH (IHC) en RDC

J P Kabuayi,¹ A Kambale,¹ M Ngoma,¹ F Boillot,² R Dlodlo,² P Fujiwara.^{2,3} ¹Programme National de Lutte contre la Tuberculose, Kinshasa, Congo (Democratic Rep.); ²Dept of HIV, The Union, Paris, France; ³Division of TB Elimination, US Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+33) 1 43 29 90 87. e-mail: pfujiwara@iatld.org

Contexte : IHC est une recherche-action visant à mesurer la faisabilité et l'efficacité de l'intégration des soins pour le VIH dans les services de santé prenant en charge la tuberculose (TB). On décrit l'utilisation de supports d'information mis en place pour les patients VIH+ dans les services TB : Bon de demande de test VIH, CD4 et charge virale, Registre de laboratoire, Fiche de traitement TB-VIH, Registre VIH, Formulaire de rapport trimestriel et Bon de commandes de médicaments et intrants de laboratoire. Ces supports sont calqués sur les supports TB auxquels le personnel est habitué.

Méthodes : Ces outils ont été placés à la consultation dans les services TB et dans les laboratoires, des responsables désignés pour leur maintien, et le personnel formé à leur tenue. Ils ont été utilisés en 2006 dans 12 sites du Nord Kivu (NK), où aucun support d'information du PNLS n'est en place, et dans 9 sites du Bas Congo (BC) où certaines structures disposent déjà d'une Fiche de traitement PVVIH.

Résultats : La gestion des supports TB-VIH s'est révélée aisée. Outre les données épidémiologiques, ces supports informent sur la provenance des malades et leur accès aux structures.

Conclusion : Ces supports sont des outils supplémentaires pour faciliter le travail quotidien et sont aisés à remplir et à exploiter. Le principal problème constaté dans leur mise en œuvre reste une certaine duplication entre les supports TB et TB-VIH, d'où un besoin d'harmonisation supplémentaire. Nous espérons qu'à l'issue de cette harmonisation, le PNLS jugera utiles ces supports et les adoptera.

	BC n (%)	NK n (%)	Total RDC n (%)
Tuberculeux dépistés	1163 (100)	944 (100)	2107 (100)
Tuberculeux testés	647 (56)	1085 (115)	1732 (82)
VIH+	134 (21)	128 (12)	262 (15)
CD4 faits	17 (13)	45 (35)	62 (24)
CD4 <200	7 (41)	18 (40)	25 (40)
Sous cotrimoxazole	70 (52)	52 (41)	122 (47)
Sous ARV	62 (46)	24 (19)	86 (33)

PC-72090-10 Multi- and extensively drug-resistant tuberculosis in KwaZulu-Natal

P Moodley,¹ T Moll,² N S Shah,² N Gandhi,² G Friedland,² U G Laloo,³ J Andrews,² A W Sturm.¹ ¹Department of Medical Microbiology, Nelson R Mandela School, Durban, ²Church of Scotland Hospital, Tugela Ferry, ³Department of Pulmonology, Nelson R Mandela School, Durban, South Africa. Fax: (+27) 312604431. e-mail: Sturm@ukzn.ac.za

Background: In 2005 a large number of extensively drug resistant tuberculosis (XDR TB) was found in the Tugela Ferry area in KwaZulu-Natal. Analysis of the database of one of the diagnostic laboratories in the province indicated that XDR TB cases were not restricted to this area. The concentration of TB diagnosis by culture in one laboratory in 2006 offered the opportunity to analyse all data for the province.

Methods: All patients with a positive culture for tuberculosis from which specimens were received in 2006 were included. Drug susceptibility testing (DST) for isoniazid, rifampicin, kanamycin and ciprofloxacin was done on all isolates. MDR was defined as resistance to isoniazid and rifampicin with or without resistance to one of the other drugs, XDR as resistant to all four. Specimens from patients admitted to the provincial MDR referral hospital were excluded.

Results: A total of 2634 MDR cases was found of which 158 (6%) were diagnosed at the Church of Scotland Hospital (COSH), Tugela Ferry. These MDR cases included 239 (9%) were XDR of which 104 were from COSH. The XDR cases were distributed over 42 health care facilities. This number of facilities involved rose gradually over the year from 18 to 42. The average number of XDR cases per facility (excluding COSH) was 3.3 (range: 1–15).

Conclusions: In this setting TB cultures are performed on patients that do not respond to treatment or present with a second episode of tuberculosis. Therefore, the data presented do not indicate the total number of MDR and XDR cases for the province. The high numbers found at COSH reflect the fact that at that hospital specimens from all patients suspected of tuberculosis are sent for culture. Even without universal screening, and missing many cases, there were nearly as many cases of MDR-TB identified in this province alone as had been previously estimated for all of South Africa (~3500).

PC-72108-10 Performance of response-to-therapy parameters in out-patient South African smear-negative TB suspects

D Wilson,¹ C Morroni,² J Nachega,³ L Mbhele,¹ R Chaisson,³ G Maartens.² ¹Department of Medicine, Edendale Hospital, Pietermaritzburg, KwaZulu-Natal, ²Department of Medicine, University of Cape Town, Cape Town, Western Cape, South Africa; ³TB Research Unit, Johns Hopkins University, Baltimore, Maryland, USA. Fax: (+33) 3954155. e-mail: wilsond1@ukzn.ac.za

Background: Diagnosis of sputum smear-negative tuberculosis is challenging in high HIV-prevalence settings. Changes in clinical parameters with rifampicin-based TB therapy may be a useful diagnostic tool.

Methods: We evaluated 397 symptomatic smear-negative TB suspects: culture positive TB meeting at least one smear-negative clinical case definition was diagnosed in 129 patients who received TB therapy; TB was excluded in 92 patients who did not meet a case definition and did not receive TB therapy. Changes in weight, haemoglobin, C-reactive protein, Karnofsky Performance Score and Symptom Count Ratio were compared between these two groups.

Results: 54.1% of the patients tested HIV-positive, 10.8% were HIV-negative and 35.1% declined HIV testing. Weight, haemoglobin, and C-reactive Protein improved significantly ($P < 0.001$) by at week 8 in the TB group and were unchanged in the not-TB group ($P \geq 0.1$). However the Karnofsky Performance Score and Symptom Count Ratio improved significantly in both groups ($P < 0.001$). Using previously defined response to therapy criteria for any three parameters for the diagnosis of TB the sensitivity was 79% and specificity 70%. When any two of weight, haemoglobin or C-reactive protein were used the sensitivity was 61.% and specificity 94%. Change in C-reactive protein performed best as an individual marker of TB with sensitivity 77% and specificity 86%.

Conclusion: Changes in simple clinical parameters are reasonable predictors for the diagnosis of TB in a high HIV-prevalence setting, and may be useful in the evaluation of new TB diagnostic tests.

PC-72132-10 AIDS afflicted household assessment of TB transmission

L Watetu,¹ K Kamle,¹ N Bhakta,² N G Buziba,¹ E J Carter.³ ¹Moi University School of Medicine, Eldoret, Kenya; ²University of Cincinnati College of Medicine, Cincinnati, Ohio, ³Warren Alpert School of Medicine at Brown University, Providence, Rhode Island, USA. Fax: (+1) 401 793 2266. e-mail: E_Jane_Carter@Brown.edu

Background: The effect of HIV status on contagiousness of index pulmonary TB cases is unclear. Although HIV infected TB cases often present with high grade smears, their course is often accelerated, rendering the time of exposure shorter.

Methods: To evaluate the effect of HIV status on

household transmission, we conducted a pilot case control study of HIV positive and negative index cases (matched by smear grade status), screening household members for Latent TB Infection (LTBI), TB Disease, and HIV.

Results: 13 HIV positive and 13 HIV negative pulmonary TB cases matched for smear status were enrolled for household visits. All household members were offered enrollment to receive: PPD, chest radiograph (CXR), sputum smears if symptomatic, and HIV testing. See table below.

	HIV(+) index case	HIV(-) index case
Household contacts (No.)	62	47
Average No. per household	4.7	3.6
Age (years) of contacts (mean)	14	17
PPD size <5 mm	8	11
PPD size 5-9 mm	3	3
PPD size 10-14 mm	4	9
PPD size >15 mm	42	17
'Positive' PPD*	49 (85%)	29 (72%)
Symptomatic†	14 (22%)	14 (29%)
Abnormal CXR	24 (40%)	22 (46%)
Accepting HIV testing	41 (66%)	26 (55%)
HIV positive	8 (19.5%)	0 (0%)

* Defined as >5 mm due to known contact to active case.

† Defined as having at least one positive answer on cough questionnaire.

Discussion: Household screening of contacts to contagious cases discovered a higher than expected percentage of latently infected individuals as well as a high percentage of abnormal chest radiographs that may represent secondary cases. In this preliminary, small pilot, we did not discover differences between HIV positive and negative source cases in incidence of TB infection/disease but did discover a higher number of HIV infected household members in the HIV source case homes. Larger studies of household transmission are needed.

CLINICAL TUBERCULOSIS

PC-72061-10 Assessing the risk of testing for drug-resistant tuberculosis

R McNeerney, K Mallard. London School of Hygiene & Tropical Medicine, London, UK. Fax: (+44) 20 7637 4314. e-mail: Ruth.Mcnerney@lshtm.ac.uk

Background: There is an urgent need to strengthen laboratory capacity to screen for MDR-TB. A number of technologies are now available to assist with the rapid detection of drug resistant disease, either by screening cultured isolates or through direct testing of clinical specimens. The emergence of XDR-TB has heightened awareness of the need to avoid nosocomial transmission. However, whereas the rapidity and expense of new laboratory tests is frequently reported

the risks associated with the technology are not often discussed.

Study design: A review of tests for detection of MDR-TB was undertaken. A theoretical risk assessment was undertaken for each of the technologies. Assessment included risks associated with sample collection, sample processing and disposal. Risk to patients, clinical/nursing staff and laboratory personnel were considered.

Main findings: There is a paucity of data on the risk of nosocomial infection relating to laboratory testing for drug resistance in endemic countries. Tests that require collection of smear positive sputum specimens may involve increased risk for patients and clinical staff. Molecular tests that do not require viable organisms have intrinsically lower risks than traditional phenotypic methods. Tests that require repeated handling of infectious materials have intrinsically higher risk of infection for laboratory personnel.

Conclusions: The safety of testing for drug resistant tuberculosis in endemic countries is a neglected topic in the international literature that warrants increased attention. Molecular tests may be more appropriate than phenotypic methods in low resource settings with poor laboratory infrastructure.

PC-71180-10 A population-based study of relapsed tuberculosis and post-treatment follow-up

M Bhutani, J Bretton, R Long. Division of Pulmonary Medicine, University of Alberta, Edmonton, Alberta, Canada. Fax: (+1) 780 407 6384. e-mail: mbhutani@ualberta.ca

Introduction: Public health programs dedicated to the diagnosis and treatment of *Mycobacterium tuberculosis* have had a positive impact on the outcomes of this disease. These programs vary with respect to their approach to follow-up of incident cases after discontinuation of active treatment. In the province of Alberta, Canada, directly observed therapy (DOT) was administered to most patients between 1990–2004, and virtually all patients thereafter. The standard treatment regimen included rifampin. After discontinuation of treatment, patients are required to undergo two routine follow-up visits to identify early relapse. We evaluated this post treatment policy.

Method: We retrospectively reviewed all new cases of active TB diagnosed and treated between 1990–2004, and followed to 2006. Data sources included the TB registry and public health records. We determined the rate of relapse and described risk factors associated with relapse.

Results: During the study period, 1718 new cases of active tuberculosis were diagnosed. By the end of 2006, only 10 (0.6%) of these patients were on record as having relapsed. No relapse occurred during the first year following completion of therapy. Amongst the relapsed patients, 8 were very non-compliant and

2 were immunosuppressed. One of these 10 cases involved XDR-TB. The relapsed case isolates of *Mycobacterium tuberculosis* are being DNA fingerprinted to rule out re-infection.

Conclusion: From our study, TB patients that receive rifampin based DOT management had a very low rate of relapse. Patients who did relapse after their treatment regimen were very non-compliant, severely immunocompromised or had a drug resistant organism. None of the cases were identified within the first year. A policy of selective follow-up is adequate in patients treated with rifampin based DOT. Resources allocated to routine follow-up, may be better utilized elsewhere within the program.

PC-71312-10 Effect of an interventional strategy to increase the return rates for TST in an Indian tertiary care hospital

Z Udawadia, S Jain, M Pathak, T R Bhatt, C Rodriguez, A Mehta. Hinduja Hospital & Research Centre, Mumbai, India. Fax: (+91) 22249641. e-mail: zfu@vsnl.com

Aim: The TST is a 2 step procedure that requires a return visit for reading 72 hours later. Return rates tend to be very low; ranging from 35–45%. The impact of an interventional strategy on improving these poor rates was assessed.

Design: All patients who were referred for TST to our hospital during a 2 year period from April 2003 to March 2005 were included. Patients were randomly divided into study and control groups. All study group patients were given printed instructions in 4 regional languages about the TST and the importance and timing of the return visit. Control group patients were given verbal instructions only. The return rate in both groups were calculated and compared at the end of the study.

Results: A total of 1994 patients were included; 966 in the study group and 1028 in the control group. 633 patients (68.6%) returned for reading of the TST in the study group, while 598 (58.17%) patients returned in the control group. Thus there was 10.43% improvement ($P < 0.001$) in the return rates by using this strategy.

Conclusion: This simple cost effective strategy can significantly improve return rates for TST.

PC-71432-10 Pharmacokinetic interaction between gatifloxacin and FDC of rifampicin, isoniazid and pyrazinamide

H McIlleron,¹ J Norman,¹ P B Fourie,² J Horton,³ T P Kanyok,⁴ P J Smith.¹ ¹Division of Clinical Pharmacology, University of Cape Town, Cape Town, ²Medical Research Council, Pretoria, South Africa; ³Tropical Projects, Hitchin, UK; ⁴Tropical Diseases, Special Programme for Research and Training, World Health Organization, Geneva, Switzerland. Fax: (+27) 21 4481989. e-mail: helen.mcilleron@uct.ac.za

There is an urgent need for more effective antitubercular regimens that will allow reduced treatment dura-

tions. Four-month regimens including fluoroquinolones in combination with established first-line antitubercular drugs are currently being evaluated in patients. We investigated the potential for pharmacokinetic (PK) drug-drug interactions between gatifloxacin and a fixed dose combination (FDC) of rifampicin, isoniazid and pyrazinamide in a 3-way cross-over study of single doses (gatifloxacin, the FDC and both together) amongst 22 healthy normal volunteers. The sequence of treatments was randomized. Intensive sampling was used. Plasma concentrations of gatifloxacin, rifampicin, isoniazid and pyrazinamide were quantified by tandem mass spectrometry. PK measures were computed using noncompartmental analysis. Elimination of gatifloxacin was reduced when it was given together with the FDC (median half life 7.17 hours, IQR: 6.24–8.09 vs. 6.74 hours, IQR: 5.77–8.13; $P = 0.023$) and exposure (AUC_{0-48}) was increased from 29.86 (IQR: 27.19–33.28) to 33.58 (IQR: 29.13–41.12) $\mu\text{g.h/mL}$; $P = 0.0001$. Conversely, rifampicin exposure ($AUC_{0-\infty}$) was reduced from 93.12 (IQR: 80.82–111.94) to 79.65 (IQR: 66.66–104.48) $\mu\text{g.h/mL}$ when the FDC was taken with gatifloxacin; $P = 0.003$. PK studies in patients including PK evaluation at steady state, efficacy and toxicity are required to determine the importance of the modest but potentially important interactions. The study was initiated and sponsored by Tropical Diseases, Special Programme for Research and Training, World Health Organization.

PC-71611-10 Does antibiotic trial carry any value in diagnosing smear-negative TB even in low HIV prevalent settings?

K Siddiqi,¹ J D Walley,¹ N Safdar,² N Shams,² M A Khan.²
¹Nuffield Centre for International Health and Development, Leeds, UK; ²Association of Social Development, Islamabad, Pakistan. Fax: (+44) 113 343 3470. e-mail: hssks@leeds.ac.uk

Aim: Guidelines to diagnose pulmonary TB in low-HIV prevalent and resource-constraints settings have advocated the use of an antibiotic trial to exclude other bacterial infections in patients suspected of smear-negative pulmonary TB. We aimed to estimate the proportion of patients with high likelihood of TB who may not return after an antibiotic trial and investigate potential reasons for this loss to follow-up.

Methods: We followed 497 patients with chronic cough, suspected of pulmonary TB with negative sputum smears who were given a course of antibiotic trial in a district hospital in Peshawar, Pakistan (a low-HIV prevalent setting). Chest X-rays were also taken at the first appointment to determine the likelihood of pulmonary TB. We also interviewed a smaller sample of patients (15) who failed to return after the antibiotic trial.

Results: 80 patients (16% CI 13–19%) did not return for an assessment after the antibiotic trial. 53 of

these patients had a chest X-ray consistent with TB (66% CI 56–76%). Interviews revealed that partial improvement after the antibiotic trial was the main reason for non-attendance. Other reasons included inability to purchase antibiotics, dissatisfaction with the advice given and consultation with a private doctor.

Conclusion: A sizeable proportion of patients suspected of smear negative TB do not return for a subsequent visit after an antibiotic trial despite strong likelihood of pulmonary TB mostly due to a transient improvement in their symptoms. Use of antibiotic trial as a diagnostic step risks losing potential TB cases to follow-up.

PC-71831-10 Risk factors for delay in diagnosis of tuberculosis at a reference hospital in Rwanda

N Lorent,^{1,2} P Mugwaneza,¹ J Mugabekazi,¹ M Gasana,³ S Vanbastelaere,² J Van den Ende,⁴ J Clerinx.⁴ ¹Department of Internal Medicine, Kigali University Hosp, Kigali, ²Belgian Technical Cooperation, Kigali, ³National Tuberculosis and Leprosy Control Programme, Kigali, Rwanda; ⁴Department of Clinical Sciences, Institute of Tropical Medicine, Antwerp, Belgium. Fax: (+250) 576638. e-mail: natalielorent@yahoo.com

Objectives: To evaluate delays in the diagnosis of tuberculosis (TB) at the Kigali University Hospital (KUH) and to investigate the factors associated with these delays.

Methods: All patients consulting the Internal Medicine department between the 1st July and 1st September 2006, having recently been started on antituberculous treatment for pulmonary (P) or extrapulmonary (EP) TB, were included. Prospective data collection was done through review of medical notes and patient interviews.

Results: One hundred and four patients were recruited, 57% of which were male. The mean age was 35 (17–84 years). Thirteen percent was of rural residence, 45% were employed, 65% had a health insurance. Sixty-two percent was HIV positive. Of 104 patients, 60 had EPTB.

The median total, health system and patient delay was 57 (Pct10-90: 23–140), 28 (Pct10-90: 4–78) and 25 (Pct10-90: 6–61) days, respectively. The health system delay before transfer to our institution was significantly longer compared with the delay at our institution (18 vs. 6 days, $P < 0.0001$). Risk factors for a longer health system delay at the KUH are smear-negative PTB or EPTB (adjusted OR 5.12) and a trial of antibiotics (adjusted OR 2.96). The latter was also found to significantly prolong the total delay (adjusted OR 2.85), as was a rural residence (adjusted OR 4.86). No significant association was found between patient delay and age, sex, profession or health insurance status.

Conclusion: This study is the first study to analyse diagnostic delay in PTB and EPTB in Africa. Smear-negative

PTB and EPTB were associated with longer health system delays, reflecting the difficulty of diagnosis in resource limited settings. A trial of antibiotics increased significantly the diagnostic delay. This strategy, advocated by WHO in smear-negative TB in developing countries, has been nuanced in the latest WHO-guidelines but remains food for discussion.

PC-71885-10 Theoretical outcomes of four screening and treatment strategies for LTBI among HIV-infected persons in Russia

E Nardell,^{1,2,3} T A Mathew,^{1,2} A Golubkov,² G G Peremitin,⁴ E N Pronina,⁵ R Mazitov,⁶ M L Rich,^{1,2,3} I Gelmanova,^{2,6} S S Shin,^{1,2,3} J Mukherjee,^{1,2,3} J J Furin,^{1,2,3} S Keshavjee.^{1,2,3}
¹Brigham and Women's Hospital, Boston, Massachusetts, ²Partners in Health, Boston, Massachusetts, ³Harvard Medical School, Boston, Massachusetts, USA; ⁴Tomsk Oblast TB Dispensary, Tomsk, ⁵Tomsk Oblast TB Services, Tomsk, ⁶Partners in Health Russia, Tomsk, Russian Federation.
 Fax: (+1) 617 432 6958. e-mail: enardell@pih.org

Setting: The official Russian strategy (RS-1) for treating latent TB infection (LTBI) among HIV-positive persons uses a 15 mm TST positive cut-off, and 3 months of isoniazid (3H). A second 3 months of H is recommended if the TST remains positive (RS-2). An alternative strategy (AS-1) being considered uses a 5 mm cut-off and 3 months of both H and rifampin (3HR). A fourth strategy (AS-2) would eliminate TST testing and treat all HIV patients for LTBI with 3HR.

Methods: We used modeling to estimate the efficacy of each strategy and number of patients needed to treat in order to prevent one TB case, based on drug resistance data and TST-stratified risk assumptions and treatment outcomes from the literature. We assumed a high (75%) of acceptance and completion of therapy through direct supervision.

Results: RS-1 and RS-2 would have estimated efficacies of 11% and 19%, respectively, and 41 and 24 patients would be treated to prevent one TB case. AS-1 and AS-2 would have estimated efficacies of 48% and 67% respectively, and 19 and 50 patients would be treated to prevent one case. Considering the added incremental protection, numbers of cases needed to be treated, and duration of treatment, AS-1 would be the most efficient treatment strategy.

Conclusions: These results demonstrate the importance of: 1) a TST cut-off that includes most preventable cases, 2) a short regimen that treats H-resistant cases, and 3) full treatment supervision to achieve even modest levels of TB prevention.

PC-71762-10 Etiology and clinical implications of COPD exacerbations during metatuberculosis pneumofibrosis

E Mishustina,¹ T Ageeva,¹ S Mishustin.² ¹Siberian State Medical University, Tomsk, ²Tomsk Oblast TB Dispensary, Tomsk, Russian Federation. Fax: (+7) 3822 514298.
 e-mail: sergeymish@inbox.ru

Objectives: To study clinical implications and etiology of COPD during metatuberculosis pneumofibrosis depending on condition severity.

Material and methods: We evaluated 233 patients with COPD exacerbation admitted to a general hospital: 33 patients with metatuberculosis pneumofibrosis (group I) and 200—without metatuberculosis pneumofibrosis (group II). COPD diagnosis, severity and exacerbation were verified based on common criteria. TB diagnosis had been previously verified in a specialized hospital where patients completed treatment with cure outcome.

Results: In group I, patients with COPD exacerbation of any severity often had: dry rales (100%) and moist rales (75%); intoxication symptoms (50%); fever (30%) and ESR (30%). Patients with severe COPD more often had: decreasing body weight (by 20%); increasing box-year rate (by 30%); increasing dyspnea period with similar disease history (by 40%). Exacerbation etiology was identified in 85% of cases. Gramnegative enterobacteriaceae (73%) prevailed in the structure of bacterial exacerbations in patients with severe COPD, and *S. pneumoniae* (75%)—with mild COPD. We did not identify significant difference of evaluated symptoms and etiology of exacerbations with COPD patients from group II.

Conclusions: Clinical symptoms and etiology of COPD exacerbations in patients with metatuberculosis pneumofibrosis were significantly different depending on COPD severity.

PC-71236-10 Analysis of TB prevention and treatment effect in the minority autonomous counties in Guangxi

F Y Liu. Tuberculosis Department of Guangxi Center for Disease Control, Nanning, Guangxi, China.
 Fax: (+86) 7715315803. e-mail: liufeiying@163.com

Objective: To know the prevention and treatment effect after implementing World Bank Loan and Global Fund Round One TB Control Projects in 12 minority autonomous counties of Guangxi in the past 3 years.

Method: Analyze the monthly, quarterly and annual report forms of 12 minority autonomous counties of Guangxi from 2003 to 2005.

Result: The proportion between male and female of new sputum smear positive TB patient in 12 minority autonomous counties was about 2.5:1. Both male and female patients between 15 and 55 years account for about 88% of all patients from 2003 to 2005. The proportion of seeing a doctor in TB dispensary because of TB suspicious symptom among sputum smear positive TB patient was decreased year by year from 77.73% in 2003 to 52.94% in 2005. The proportion of sputum smear positive TB patient through referral from hospital, polyclinic, township hospital and village doctors and so on was increased year by year from 22.27% in 2003 to 46.48% in 2005. The regis-

ter rate of new sputum smear positive TB patients in minority autonomous counties was increased from 11.14/100 000 in 2003 to 32.34/100 000 in 2005. The case detection rate of new sputum smear positive TB patients was increased from 29% in 2003 to 85% in 2005. The cure rates of new sputum smear positive TB patients in minority autonomous counties were increased from 77.52% in 2003 to 87.85% in 2004. The default rate was decreased from 5.37% in 2003 to 1.52% in 2004.

Conclusion: After implementing World Bank Loan and Global Fund Round One TB Control Projects in Guangxi minority autonomous counties, the case-detection rate and cure rate of new sputum smear positive TB patients were increased significantly, they were reached 80.87% and 87.85% respectively and exceeded the target of WHO in 2005.

DRUG RESISTANCE IN TB

PC-71412-10 Extensively drug-resistant (XDR) tuberculosis in Japan

S Mitarai,^{1,2} H Yamada,¹ K Otomo,¹ K Mizuno,¹ S Maeda,³ Y Murase.³ ¹Bacteriology Division, Research Institute of Tuberculosis, Kiyose, Tokyo, ²RYOKEN, Kiyose, Tokyo, ³Molecular Epidemiology Division, Research Institute of Tuberculosis, Kiyose, Tokyo, Japan. Fax: (+81) 424924600. e-mail: mitarai@jata.or.jp

Objective: Extensively Drug Resistant (XDR) tuberculosis is a recently introduced concept and recognised as a new life-threatening issue. RYOKEN (Tuberculosis research committee) conducted anti-tuberculosis drug resistance survey (DRS) in Japan in 2002, and reported 60 multidrug-resistant (MDR) tuberculosis strains. This study was conducted to assess the magnitude of XDR in Japan.

Design: A total of 60 MDR-TB strains were subjected to DST for second line drugs, including streptomycin, ethambutol, pyrazinamide (PZA), ethionamide, kanamycin (KM), cycloserin, para-amino salicylic acid, and levofloxacin (LVFX). The proportion method by 1% Ogawa medium was used mainly for DST, and the DST for PZA was performed using MGIT AST. Considering the WHO definition of XDR and the usage of drug in Japan, XDR was identified as the strain with resistances to isoniazid, rifampicin, LVFX and KM. RFLP analysis was performed, additionally.

Results: Five strains were excluded from the subjects because of insufficient growth in the medium for PZA. Among 55 MDR, 17 strains (30.9%) were identified as XDR. Five and twelve strains were isolated from new cases and previously treated cases, respectively. The strains showed six clusters by RFLP analysis.

Conclusion: XDR strains were identified in Japan as of 2002. The distribution was nationwide and they

were found even in new cases. It will be necessary to strengthen TB control activities.

PC-71492-10 Clinical outcomes of extensively drug-resistant (XDR) tuberculosis patients in New York City

S D Ahuja,¹ S S Munsiff,^{1,2} D Nilsen.¹ ¹Bureau of Tuberculosis Control, New York City Department of Health and Mental Hygiene, New York, New York, ²Division of Tuberculosis Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+1) 212 788 9836. e-mail: sahuja@health.nyc.gov

Aim: Determine NYC burden of XDR-TB and describe outcomes of initial and acquired XDR-TB patients.

Methods: We reviewed NYC patients diagnosed from 1992–2006 to identify XDR-TB (isolates resistant to isoniazid, rifampin, plus a fluoroquinolone and a second-line injectable drug). Data was abstracted from existing TB Bureau databases. Isolates were genotyped via IS6110 restriction fragment length polymorphism and spacer oligonucleotide typing.

Results: We identified 66 XDR-TB patients, 36 (55%) were from 1992–1993 and 30 (45%) from the last 13 years. Of the 66, 25 (38%) were initial XDR based on first drug susceptibility test and 41 (62%) acquired XDR while on treatment in NYC. Thirteen of 47 (28%) US-Born were initially XDR compared to 11/18 (61%) non-US born patients from China (2), Colombia (1), Dominican Republic (1), El Salvador (1), Indonesia (1), India (2), Malawi (1), Trinidad & Tobago (1) and Ukraine (1). Median time in NYC for non-US born patients was less than one year.

Of the 43 HIV-infected patients, 10 (23%) had treatment success and 33 (77%) died while on treatment. Among 19 HIV-uninfected patients, 12 (63%) had treatment success and 3 (16%), all who acquired XDR, died. Three patients are still on treatment.

Genotype was available for 63 (95%) patients: 28 (42%) isolates were strain W, 5 (8%) strain W1, 3 (4%) strain H, 2 (3%) strain P (all NYC MDR-TB outbreak strains) and 25 (38%) had unique strains.

Conclusion: XDR-TB, a hallmark of poor TB control, has been in NYC since the 1990s multidrug-resistant TB outbreaks. Following implementation of effective TB control measures, cases have been sporadic and mostly from high-TB burden countries. Over 75% of HIV-infected patients died; however, most of the HIV-uninfected patients completed treatment and none, with initial XDR, died.

PC-71533-10 Testing pyrazinamide resistance among South African multidrug-resistant *Mycobacterium tuberculosis* isolates

M T Mphahlele,^{1,2} H Syre,¹ H Valvatne,¹ R Stavrum,¹ T Mannsaker,³ T Muthivhi,² K Weyer,² B Fourie,² H M S Grewal.^{1,4} ¹Section of Microbiology and Immunology, Bergen, Norway; ²TB Epidemiology and Intervention Research Unit, Pretoria, South Africa; ³National Institute of Public Health, Oslo; ⁴Department of Microbiology and Immunology, Haukeland University Hospital, Bergen, Norway.
Fax: (+27) 12 321 0861. e-mail: matsie.mphahlele@mrc.ac.za

Background: Pyrazinamide is important in tuberculosis (TB) treatment, as it is bactericidal to semi-dormant mycobacteria not killed by other antituberculosis drugs. PZA is also one of the cornerstone drugs retained in the treatment of multidrug-resistant tuberculosis (MDR-TB). However, due to technical difficulties, routine drug susceptibility testing of PZA is not performed and consequently the level of resistance is currently unknown.

Objective: To generate information on pyrazinamide susceptibility among South African multidrug-resistant (MDR) and susceptible *M. tuberculosis* isolates from pulmonary TB patients.

Methods: Seventy-one South African MDR and 59 fully susceptible *Mycobacterium tuberculosis* isolates collected during the national surveillance study were examined for PZA susceptibility by the radiometric BACTEC 460 TB system, Wayne's assay and sequencing of the *pncA* gene.

Results: The frequency of PZA resistance (by BACTEC) among the MDR *M. tuberculosis* isolates was 37/71 (52.1%) and 6 out of 59 (10.2%) among fully sensitive isolates. A total of 25, of which 23 are previously unreported, unique mutations in the *pncA* gene were detected.

Conclusion: In this study, a high proportion of South-African MDR-TB isolates were resistant to PZA, suggesting a reconsideration of its role in patients treated previously for TB as well as in MDR-TB treatment.

PC-71625-10 External quality assessment of drug susceptibility testing for *Mycobacterium tuberculosis* in Taiwan

M-H Wu, W-L Huang, R Jou. Ref Lab of Mycobacteriology, Centers for Disease Control, Taipei, Taipei, China.
Fax: (+886) 26531387. e-mail: rwj@cdc.gov.tw

Background: The key components of external quality assessment program are panel testing, rechecking, and on-site evaluation of the laboratory. The objective of this study is to evaluate the performance of drug resistance testing (DST) in the laboratory.

Methods: A panel of 20 *Mycobacterium tuberculosis* strains was sent to 9 contract mycobacteriology laboratories of Centers for Disease Control (CDC) for proficiency testing. Meanwhile, a feasible algorithm for DST rechecking, including strain identification, pu-

riety check and DST confirmation, was established. In this evaluation, 100% any resistant and 15% susceptible *M. tuberculosis* strains deposited in the CDC reference laboratory were sampled for rechecking. Supervision visit was conducted to find out the causes of the discrepancy and to recommend corrective actions.

Results: The results of panel testing revealed that 3, 1, 3 and 5 laboratories, respectively, did not reach the 95% accuracy for isoniazid (INH), rifampin (RIF), streptomycin (SM) and ethambutol (EMB). The overall accuracies were 91.6% (65.0%–100%) and 96.1% (70.0%–100%) for INH and RIF, respectively. Of 593 isolates rechecked, the overall accuracies were 94.4% (81.6%–100%) and 97.2% (89.9%–100%) for INH and RIF, respectively.

Conclusions: Standardization of protocol, quality control of medium, long-term technical supervision and monitoring were suggested to improve the laboratory competence of DST.

PC-71635-10 Ex-vivo activity of anti-tuberculosis agents in sputum from patients with untreated smear-positive TB

A H Diacon,^{1,2} M Kawasaki,³ A Venter,² P D van Helden,² P R Donald,⁴ M Matsumoto.³ ¹Department of Internal Medicine, University of Stellenbosch, Tygerberg; ²Department of Medical Biochemistry and MRC Centre for Molecular and Cellular Biology, University of Stellenbosch, Tygerberg, South Africa; ³Microbiological Research Institute, Otsuka Pharmaceutical Co. Ltd, Tokushima, Japan; ⁴Department of Paediatrics and Child Health, University of Stellenbosch, Tygerberg, South Africa. Fax: (+27) 21 933 3591. e-mail: ahd@sun.ac.za

Background: The 2-day fall in colony forming units (CFU) in sputum from patients under monotherapy establishes an agent's early bactericidal activity (EBA). INH has high, RMP moderate and PZA no EBA, which does not reflect the sterilizing properties of these agents. In this study we investigated the potential of ex vivo admixture of drugs to sputum in exploring the activity of antituberculosis drugs.

Method: Sputum collected over 16 hours from 9 untreated patients with 2+ and 3+ smear positive tuberculosis was decontaminated using various protocols. Mimicking achievable serum levels, INH 3 µg/ml, RMP 3 µg/ml, PZA 20 µg/ml, and a combination of INH-RMP 3–3 µg/ml were added to portions of sputum and incubated for up to 3 days. CFU counts from serial dilutions on agar plates were expressed in log₁₀ CFU/ml sputum.

Results: Initial CFU counts from untreated sputum were higher when NaOH was not used for decontamination (6.51 vs. 5.75, $P = 0.02$). Averaged across all sputa, mean daily CFU falls over 2 days were 0.18 for controls, 0.27 for INH, 0.93 for RMP, and 1.53 for INH-RMP, and over 3 days 0.67 for controls, 0.48 for PZA, 0.92 for INH, and 1.10 for RMP. Compared to controls, RMP-INH ($P < 0.01$) and RMP ($P =$

0.04), but not INH or PZA had significant activity over 2 or 3 days.

Conclusion: Ex vivo measurement of the activity of standard antituberculosis agents at plasma concentration levels in sputum is feasible. Admixed to sputum, RMP has significantly higher early activity than INH and PZA.

PC-71724-10 Controlled decentralised management of multi- and extensively drug-resistant TB: an alternative model of care

N Padayatchi,¹ G Friedland.² ¹CAPRISA, University of KwaZulu-Natal, Congella, KwaZulu-Natal, South Africa; ²AIDS Program, Yale University School of Medicine, New Haven, Connecticut, USA. Fax: (+27) 0312604566. e-mail: padayatchin@ukzn.ac.za

Introduction: The high number of extensively drug resistant (XDR) TB cases recently uncovered in one area in KZN with high mortality and that such organisms are present throughout the country, suggests that it is necessary to implement new strategies to control the spread of these organisms. Previous literature focused on new drugs, diagnostics, and vaccines. Whilst these are critical and offer long term solutions, we propose an alternate (additional) model to deal with this in the short term.

Methods: We propose decentralizing management for patients with multi- and extensively drug-resistant (M(X)DR) TB by establishing local treatment facilities. Patients should continue to be admitted to specialised treatment centres with smaller decentralised institutions used as step down facilities, and finally discharged home-based care. At each point of transition decision making is best done in a collaborative way by the discharging facility and the local providers. The decentralisation should be implemented in a phased manner with local facilities which have displayed interest, prioritized. This model requires M(X)DR TB specialists to provide training at the point of care to the multi-disciplinary team to make these centres independent.

PC-71846-10 Development of extreme drug resistance in multidrug-resistant tuberculosis patients

C Hewison,¹ V Sizaïre,² S Kalon,³ H Cox,⁴ N Hurtado.¹ ¹Médecins sans Frontières, Paris, France; ²Médecins sans frontières, London, UK; ³Médecins sans frontières, Amsterdam, Netherlands; ⁴Burnet Institute for Medical Research and Public health, Melbourne, Australia. Fax: (+33) 1 48066868. e-mail: cathy.hewison@paris.msf.org

Introduction: Extreme drug resistant tuberculosis (XDR-TB) poses a major challenge. In two GLC approved Médecins sans Frontières projects, despite comprehensive services, patients developed XDR-TB whilst on multidrug-resistant tuberculosis (MDR-TB) treatment.

Methods: A retrospective analysis of all MDR-TB patients, admitted for treatment in Abkhazia from July 2001 until December 2006 and in Nukus, Uzbekistan from September 2003 until December 2006, who did not have XDR-TB at admission (WHO definition November 2006) shows XDR-TB development during MDR-TB treatment. All sputum-positive patients had systematic DST to first-line tuberculosis (TB) drugs and to second line for MDR-TB patients. Treatment, individually adapted, consisted of at least: 4 second line drugs to which the patient was susceptible, an injectable agent for 4–6 months after culture conversion and continuation phase of 18 months. Cultures and DST were performed regularly. Treatment outcomes were according to WHO definitions.

Results: In Abkhazia, 103 MDR-TB patients, 14 (13.6%) developed XDR, 6 are failures, 4 defaulters, 3 dead and 1 still under treatment. In Nukus, 337 MDR patients, 24 (7.1%) developed XDR, 13 are failures, 5 are dead, 4 successful outcomes, and 2 still under treatment.

Discussion: Despite maximum resources, a high number of patients developed XDR-TB during MDR-TB treatment. The rates shown above are likely to be underestimated as the cohort includes patients recently starting treatment. This illustrates the poor efficacy of the drugs used for the treatment of MDR-TB and the very urgent need for new and more powerful drugs to address this disease.

PC-71937-10 XDR-TB in the Philippines

M I Quelapio, G E Egos, R Guilatco, R B Orillaza, T E Tupasi. Tropical Disease Foundation, Makati City, Philippines. Fax: (+632) 7516021. e-mail: mameldquelapio@yahoo.com

Background and setting: Manila, Philippines, a TB high-burden country with a Green Light Committee approved Programmatic MDR-TB Management project.

Objective and methods: To describe the rate of extensively-drug resistant tuberculosis (XDR-TB), that is MDR-TB with resistance to a fluoroquinolone (FQ) plus an injectable second line anti-TB drug (SLD) among patients screened and treated for MDR-TB from 1999–2006 at the Makati Medical Center (MMC).

Results: Of 1082 confirmed MDR-TB cases, 37 (3.4%) were XDR-TB. Of the remaining, 459 (42.4%) had resistance to either a FQ or a second-line injectable agent (IA), and 586 (54.2%) had no resistance to SLDS. Only 521 (48%) cases were enrolled to treatment and outcome was available in 333. Cure was noted in 48% of 21 XDRs, 59% in 137 FQ or IA resistance, and 64% in 175 with no SLD resistance. Failure was 10%, 5% and 5%, respectively, and death was 23%, 17% and 15%, respectively. Default was high at 19%, 19% and 16%, respectively. The overall cure rate of all those who remained on treatment, was 74% and those who died or failed combined was 26%. Among XDR-TB, the corresponding figures

for the outcomes were 59% and 41%, respectively, compared to 75% and 25%, respectively, for non-XDR-TB. The odds for either cure or unfavorable outcome were not significantly different in XDR-TB from non-XDR.

Conclusion: XDR-TB exists in the Philippines and was noted in 3.4% of MDR-TB patients diagnosed. Although not statistically significant, there is a trend towards higher odds of a negative outcome among XDR-TB compared to non-XDR-TB patients in a setting with low HIV prevalence.

	Number		Treatment outcome			
	Enrolled	With outcome	Cured (%)	Failed (%)	Died (%)	Defaulted (%)
XDR	24	21	10 (48)	2 (9)	5 (24)	4 (19)
Non-XDR						
• Resistant to FQ or IA	220	137	81 (59)	7 (5)	23 (17)	26 (19)
• No SLD resistance	277	175	112 (64)	8 (5)	27 (15)	28 (16)
Total	521	333	203 (61)	17 (5)	55 (17)	58 (17)

PC-72095-10 Prevalence of XDR-TB and first results of treatment in Tomsk Oblast, Russia

S Mishustin,¹ A Adamyan,¹ P Golubchikov,¹ T Tonkel,¹ G Yanova,¹ V Pavlova,¹ A Golubkov,² O Ponomarenko,² E Nardell,² A Slutsky.³ ¹Tomsk Oblast TB Services, Tomsk, Russian Federation; ²Partners in Health, Boston, Massachusetts; ³Massachusetts State Laboratory Institute, Boston, Massachusetts, USA. Fax: (+7) 3822 514298. e-mail: sergeymish@inbox.ru

Since 2000, MDR-TB treatment program (DOTS-Plus) has been implemented in Tomsk Oblast, Russia: 1102 patients cured (78.3%). TB mortality decreased from 21.9 (per 100 000) in 2000 to 12.1 in 2006. However, extremely drug-resistant strains of *M. tuberculosis* (XDR-TB) have been recently detected in many regions around the Globe and drew a lot of attention. According to the WHO criteria XDR-TB is defined as resistance to INH, Rif, one of the fluoroquinolones (in this study OFL), and one of the injectables (KAN or CAP). As a part of MDR-TB Project in Tomsk Oblast, emergence and, later, prevalence of MDR and XDR-TB strains has been monitored from 1998 through 2007. Thus, when stratified by the year of specimen collection and processing it was shown that there was no XDR-TB detected in Tomsk Oblast in 1998–1999. Since 2000 we obtained 3993 DST results, of them 404 patients were detected with primary MDR-TB (on average, 11.9% of all), additionally 59 patients were detected with XDR-TB (on average, 1.5% of all DSTs): from 0.3% in 2000 to 3.5% in 2006. Of them, 45 XDR-TB patients received treatment with 2nd line TB drugs. While on treatment, first results were obtained: cured, 7 (15.6%); on treatment, 6 (13.3%); dropped out of the region, 2 (4.4%); failure, 17 (38.8%); died, 13 (28.9%).

Conclusion: It was determined that the main cause to develop amplification from MDR to XDR in the course of DOTS-Plus treatment was irregular TB drug intake—frequent interruption during alcohol drinking. An alcohol subprogram was introduced to improve treatment adherence and additional social-medical and psychological support was provided to patients inclined to interrupt treatment—‘Sputnik’ subprogram.

PC-72096-10 Evolution of the KZN strain of *Mycobacterium tuberculosis*

M Pillay, A W Sturm. Department of Medical Microbiology, Nelson R Mandela School, Durban, South Africa. Fax: (+27) 312604431. e-mail: sturm@ukzn.ac.za

Background: Although several hot-spots of multidrug-resistant (MDR) tuberculosis have been identified on the African continent, extensive drug resistance (XDR) has not been reported until recently when a large number of XDR cases were identified in KwaZulu-Natal.6. The majority of the patients involved were infected with the same strain of *Mycobacterium tuberculosis*, formerly reported as the KZN strain. We report on the development of this strain from MDR into XDR.

Methods: Databases from studies performed between 1994 till 2005 were searched for resistance patterns in isolates of *M. tuberculosis* with the KZN strain fingerprint.

Results: As early as 1994, the KZN strain was responsible for a number of cases of MDR-tuberculosis, indicating fitness of the strain to cause cases of primary resistant tuberculosis. Some of the isolates were also resistant to streptomycin. From 1994 onwards, MDR isolates with resistance to additional drugs were found till the first XDR isolate was discovered in 2001.

Conclusions: Drug resistance to as many as 7 drugs developed in a local strain of *M. tuberculosis* in just over a decade. This coincided with the introduction of the DOT and DOT+ based tuberculosis control programmes. It is postulated that the introduction of these programmes in the absence of susceptibility testing or drug resistance surveillance has been instrumental to the development of XDR in this highly transmissible KZN strain.

TB IN SPECIAL POPULATIONS

PC-71229-10 Infection control and MDR-TB in a slum, Kenya

J R Ong'ang'o,¹ P O McOdiida,² C Kimetto.² ¹Centre for Respiratory Diseases Research, Kenya Medical, Nairobi, ²International Medical Corps, Nairobi, Kenya. Fax: (+254) 203873973. e-mail: jongango@kemri-nuitm.or.ke

Background: Factors that may contribute to MDR-TB in Kenya include; low quality anti-TB drugs, poor

or non-existent TB control programmes in strife torn neighbouring countries, non-compliance of health care providers and non-compliance of TB patients. The country has a 1% estimate of MDR among smear positive pulmonary TB, a tuberculosis case notification rate 324/100 000 population with 55% TB-HIV coinfection. The purpose of this paper is to report the infection control measures put in place in a Primary Health Care outpatient health facility serving a slum population characterised by poverty, overcrowding, and unhygienic conditions.

Methods: In 2006 continuous infection control measures were implemented routinely by the health facility. This included; provision of outdoor waiting area for outpatients, specific weekly clinic day for confirmed TB cases on treatment, provision of HIV screening for all TB cases, routine surveillance of MDR, triage of patients to allow coughers for rapid TB screening, designated area for sputum collection, community awareness/mobilisation activities, promotion of patient treatment literacy, establishment of referral links for ARV treatment and staff information/ training.

Results: A total of 364 TB cases were registered during the year. Treatment success rate rose to 84% from the previous year rate of 79%. Self referrals of TB symptomatics to the laboratory for screening rose to 72% from 52%. There was 95% of DTC uptake among TB patients and 100% Cotrimaxazole preventive therapy provision for the TB-HIV co infected. One MDR case was reported.

Conclusions: Infection control measures should be maintained at health facilities to reduce the risk of nosocomial transmission of TB especially to PLWHA.

PC-71296-10 Frequency of MDR-TB cases among the cohort of detainees successfully treated with Category II regimen

R Mehdiyev,¹ F Huseynov,¹ S Huseynov,¹ E Mukhtarli,² R Montanari,² S Ahmadova.² ¹Main Medical Department, Ministry of Justice, Baku, Azerbaijan; ²International Committee of the Red Cross, Baku, Azerbaijan. Fax: (+994) 12 4656519. e-mail: health.bak@icrc.org

Setting: Specialized Treatment Institution for Detainees with TB, Baku, Azerbaijan.

Objective: To determine the frequency of MDR (Multidrug-resistant) TB patients among cases (no. 449) who achieved treatment 'success' on standard short-course chemotherapy in the cohort of 2005.

Methods: This abstract analyzes data from a retrospective cohort study jointly carried out by the Ministry of Justice (MOJ) and the International Committee of the Red Cross (ICRC) in 2005 among detainees from the penitentiary system of the Republic of Azerbaijan.

Results: Overall 449 TB cases who received WHO recommended category II treatment finished treatment successfully (cured or completed treatment). Among the 'successfully treated' 449 cases 30 (6.7%)

were MDR-TB cases. Among the MDR-TB cases 12 (40%) had never received any prior TB treatment. 9 out of 30 cases were resistant to some second-line anti-TB drugs (6 Pto, 1 Pto Am Cm, 2 Pto Cs). Because of non-availability of DOTS-Plus regimen in prisons during 2005 and 2006, these patients could not be started on MDR-TB treatment regimen.

Conclusion: Start of a DOTS-Plus project in prisons has become a major priority, so as to ensure that MDR-TB detainees receive adequate treatment according to individual DST profiles. At the same time, we assume that a subset of MDR-TB cases may be cured with category II treatment. Meanwhile, instead of using smear results as an indicator for determination of treatment outcome, culture-based bacteriological confirmation of treatment outcome is recommended in the prison sector.

PC-71364-10 The defaulting rate of TB patients among the seasonal migrants: a case study of Balochistan

E Qadeer, G Siddiqui. World Health Organization, Islamabad, Pakistan. Fax: (+92) 519210663. e-mail: drejazqadeer@ntp.gov.pk

A cohort study was conducted in five randomly selected districts of the twenty two DOTS implemented districts of Balochistan province (Pakistan). The aim was to bring evidence about the contribution of Seasonal Migration to defaulting and low TSR in Balochistan. 291 new PTB patients during the two quarters (1st October, 2005 to 30th March, 2006) were interviewed before summer migration by using a structured and pre-tested interview schedule regarding their health seeking behavior and other determinants about seasonal migration to determine default and TSR among migrant and non-migrant patients.

The overall default rate at surveyed districts was very low (2.4%) as compared to national level which is 17%, whereas it was 4.4% among migrant patients. It was evident that TSR also high which was 96% and 100% among migrant and non-migrant patients respectively. It shows that migration has very low impact on default and low TSR.

The main factors of low default and high TSR were the high commitment of patients for seeking their medical checkup as well as regularity in medication by both migrant as well as non-migrant patients.

The high degree of commitment for seeking medical checkup and regularity in medication were the two main factors for low default rate and high TSR in the surveyed districts.

PC-71505-10 Problems at pre- and post-release of TB patients from prisons in Kyrgyzstan

A Yedilbayev,¹ K Mamatov,² Z Zhandauletova,³ T Aptekar,² M Turgunbayev.⁴ ¹USAID ZdravPlus Project, Almaty, Kazakhstan; ²USAID Project HOPE/Kyrgyzstan, Bishkek, Kyrgyzstan; ³USAID Project HOPE/CAR, Almaty, Kazakhstan; ⁴USAID ZdravPlus Project, Bishkek, Kyrgyzstan.
Fax: (+7) 327919370. e-mail: askarkaz@yahoo.com

Background: TB in prisons, problems in communication and coordination of activities between prison and civilian TB Services is a major public health threat in Central Asian countries.

Objective: To define existing barriers to successful DOTS treatment continuation of TB prison patients after their release from penitentiaries and identify gaps in collaboration between civilian and prison health services in Kyrgyzstan and develop strategies of solutions. **Methods:** Operational research using qualitative approaches of data collection through interviews with policy officials in relevant ministries (NTP, prison sector, police and social support services), physicians at prisons and civilian health providers and analysis of existing legislative base including governmental laws and regulatory acts, national strategies and programs related to release of TB patients from prisons was conducted.

Results: Several factors were identified which contribute to spread of TB from prison to civilian populations in Kyrgyzstan with nearly 60% of patients never reached health services for DOTS treatment continuation after release from prisons. Major challenges included lack of mechanisms of coordinating activities within prison sector and with civilian TB and health services at pre and post-release; lack of guaranteed social support from government and poor socio-economic status of patients; no surveillance system and coordination with police available to track TB patients after release; and inadequate legal framework to address coordination issues. Through new Government Decree the study proposed to increase rational use of available human and financial resources, as well as improving management and coordination.

Conclusion: Collaboration between prison and civilian sectors, as well as coordination with police and social support from government at each stage of release, as a comprehensive approach, improves DOTS treatment outcomes and reduce risks of developing drug resistant TB.

PC-71617-10 Tuberculosis prevalence among prisoners in Carapicuíba City, State of Sao Paulo, Brazil

A A Vieira,^{1,2} S A Ribeiro,² A M de Siqueira.¹ ¹Tuberculosis Control Program of Carapicuíba City, Carapicuíba, São Paulo, ²Departamento de Medicina Preventiva da Escolas Paulista de Medicina-UNIFESP, São Paulo, São Paulo, Brazil.
Fax: (+55) 1141451878. e-mail: nantico@uol.com.br

Background: The daily conditions and under-funding of Brazilian prison system often promote illness and poor provision of health services. These situations already have been expressed about the high prevalence and/or incidence of tuberculosis in prisons all over the world. Since there is almost no information from Brazil, we investigated the rate of pulmonary tuberculosis in a local prison—Carapicuíba City.

Methods: This paper is an observational study and done between January and December of 2006, we carried out an active case finding survey in Carapicuíba male prison (police station). We interviewed prisoners and those with cough longer than 3 weeks, called respiratory symptomatic (RS), were screened by sputum-smear microscopy and culture.

Results: 152 (38.3%) of 397 prisoners were screened (mean age 28 years [SD 10]). 7 (4.6%) screened prisoners had pulmonary tuberculosis. All of them were undiagnosed at the start of the study; only 2 were sputum-smear positive and 5 were sputum-smear negative/culture positive (Table).

Variables	N	Rate
Population	397	
Respiratory symptomatic	152	38.28 per 100
TB pulmonary cases	7	1763.22 per 100 000
Smear positive TB cases	2	503.77 per 100 000
Smear negative TB cases	5	1259.44 per 100 000

Discussion and conclusion: We found higher rates of pulmonary tuberculosis (smear positive and smear negative/positive culture) in Carapicuíba 'prison' than its general population (26.69 and 41.57 per 100 000 pop), which suggests a great active transmission of tuberculosis in prison conditions. These could be explained by overcrowding, poor ventilation, little sunlight, poor nutrition, low standards of hygiene and no-specifically funding and/or health service of prison system of Carapicuíba City (police station).

PC-71851-10 Use of traditional birth attendants for tuberculosis case-finding in rural Kenya

K Bali, M MacNamara. Doctors of the World-USA, New York, New York, USA. Fax: (+1) 212 226 7026.
e-mail: kavita.bali@dowusa.org

Purpose and methods: To address tuberculosis (TB) in Kenya's Rift Valley, the Moi Teaching and Referral Hospital's (MTRH) Fidelis-funded initiative expanded its implementation of active case detection of smear-positive patients. With these partners, Doctors of the World-USA (DOW) is implementing the program in West Pokot and TransNzoia Districts. The MTRH model recruits one cough monitor linked to each TB diagnostic center to assist in community education, screening, sputum collection, treatment referral, and adherence monitoring. In West Pokot, DOW has

piloted an alternative to reach rural communities by capitalizing on their high numbers of traditional providers. In communities where literacy remains low, advocacy and education by traditional birth attendants (TBAs) can be important factors in influencing the decision to seek treatment for TB. In West Pokot, DOW has replicated the MTRH cough monitor model around one main diagnostic center. However, due to sparse population and great distances between communities, DOW has adapted the model by building on past experience with TBAs as PMTCT referralists. In this adaptation, 15–30 TBAs around each diagnostic center are trained in basic TB information, community screening for TB, and referral of positive screens.

Program results: DOW will present program data including the change in number of smear-positive TB cases at all diagnostic facilities, number of patients referred to facilities by TBAs, information on educational activities conducted by TBAs, and changes in community knowledge about TB and care seeking behaviors. This data will be compared with Districts in which the original cough monitor model is being utilized.

Recommendations: In areas with high TB burden but limited access to health services, TBAs may be a viable alternative to more highly-trained cough monitors. The lower cost and shorter training of the TBA model responds to efficiency challenges in a rural setting.

PC-71855-10 Performance of a workplace-based TB programme in Bangladesh

M H Khan,¹ A B M T Islam,¹ V Begum,² E Cooreman,¹ M N Uddin,¹ M J Hossain,¹ Q H Ferdousi,³ M A Alam.¹

¹World Health Organization Bangladesh, Dhaka, ²National TB Control Programme, Dhaka, ³Directorate General of Health Services, Dhaka, Bangladesh. Fax: (+88) 02 9884657. e-mail: mohiuddin_khn@yahoo.com

Introduction: DOTS services are being implemented in 13 workplaces of Bangladesh. Overcrowded environment in most of the workplaces make workers vulnerable for TB infection. Moreover, workers most often hide their illness, due to the fear of losing their job and being isolated by co-workers.

Objective: To expand and ensure quality of TB services in workplaces through a patient friendly approach.

Methods: Regular training on TB control management and sputum microscopy and quarterly monitoring meetings are being carried out for the medical and laboratory staff working in workplaces. In most of cases, TB services were integrated in the (general) health facilities of the workplaces. Advocacy workshops for factory owners, trade union leaders, supervisors and workers were conducted to increase awareness for TB suspect identification, referrals and DOT. DOT is provided by supervisors, health staff or co-workers.

Results: Out of 1058 TB patients registered during

2006 in 13 workplaces. Sputum conversion rate is 85.8% among new smear positive patients in 2006 and treatment success rate is 93% among patients registered in 2005.

	2005	2006
No. of workplaces involved	12	13
New smear positive cases	376	706
Re-treatment cases	22	21
Smear negative pulmonary cases	148	222
Extra-pulmonary cases	94	109
Total TB patients	640	1058

Conclusion: TB control Program of Bangladesh is progressing well in workplaces through patient friendly approach.

PC-71901-10 Treatment outcomes of TB treatment and isoniazid preventive therapy among TB contact children in Cambodia

M R Saint,¹ T Sugiyama,² I Onozaki,³ M T Eang,¹

N Ishikawa.³ ¹National Center for Tuberculosis and Leprosy Control, Phnom Penh, Phnom Penh, ²JICA National TB Control Project in Cambodia, Phnom Penh, Phnom Penh, Cambodia;

³Research Institute of Tuberculosis, Tokyo, Tokyo, Japan.

Fax: (+855) 023218090. e-mail: salysaint@yahoo.com

Setting: Four districts in the capital city and five districts in the provinces.

Objective: To analyse treatment outcomes of the TB treatment and the Isoniazid Preventive Therapy (ITP) among TB contact children.

Design: In January 2006, TB contact survey was conducted among children aged less than five years of age who were living in the same household with newly diagnosed pulmonary TB patients. The survey investigated that 31 children were diagnosed with active TB and enrolled in treatment (2RHZ/4RH) and 134 children were enrolled in IPT (6H, 5mg/kg). We followed up these 165 children for one year.

Results: Out of 31 children with TB treatment, 27 (87.1%) were completed and 4 (12.9%) were defaulted. Out of 134 children with the Isoniazid Preventive Therapy, 128 (95.5%) were completed and 6 (4.5%) were defaulted. Among these 128 children, 4 (3.1%) were not healthy after 6 months of the treatment. Rejection of treatment by parents was the most reason of the defaulters.

Conclusion: This study showed the effectiveness of TB Treatment and Isoniazid Preventive Therapy among TB contact children. Parents' compliance was good enough to continue their children's treatment since they could take contact with health staff closely during the survey and got enough information on the treatment from them. However, children's parents were the most reason of defaulters.

PC-72039-10 Tuberculosis in Turkish prisons

G Ongen,¹ O Icmeli,² N Birgen,² G Karagul,² S Akgun,² Z Kılıçaslan,³ S Umut.¹ ¹Istanbul University Cerrahpasa Medical Faculty Pulmonology Department, Istanbul, ²Council of Forensic, Istanbul, ³Istanbul University Istanbul Medical Faculty Pulmonology Department, Istanbul, Turkey.
Fax: (+212) 3152215. e-mail: imranozdemir@hotmail.com

Background: Turkey has a moderate burden of tuberculosis with the incidence of 29/100 000 in 2005. The purpose of this study was to evaluate the burden of TB in one of the high risk groups, prisons, and to compare with the country incidence.

Methods: All the prisoners in ten prisons mostly located in the Marmara Region of Turkey enrolled in the study. Screening was done between January 2006–January 2007. Radiological screening for TB was performed by the mobile X-ray system and followed by bacteriological analysis of sputum for TB suspects. Four physicians evaluated the X-rays independently.

Results: Radiological screening was performed to 4615 prisoners (age: 14–72 years) 301 (6.5%) were female (age: 16–59 years); 3916 (84.8%) were male (age: 18–72 years) and 398 (8.6%) young adults (age: 14–18 years). Radiological abnormalities consistent with TB were found in 105 X-rays and followed by sputum bacteriology. Smear and culture positive pulmonary TB was diagnosed in 5 out of 105, all male (mean age 33 ± 10). The prevalence was found to be 108/100 000 in the prisons which is 4 times higher than the country prevalence.

Conclusion: Prisoners are one of the most important risk groups with high burden of TB in Turkey. This result highlights the need for adequate case-finding strategies in prisons.

PC-72220-10 Sputum collection centre plays significant role in TB control programme

S K Nayak, I Tulsi. LEpra Society, Orissa, India.
e-mail: sashikantnayak@hotmail.com

Introduction: In the year 1997, RNTCP programme was launched in Orissa, India and gradually covered all the districts of Orissa. By now, it has covered all the 30 districts of Orissa with a population of about 36.8 million. Successful TB control programmes depend upon case detection, case holding and follow-up. Poor socio-economic condition, lack of awareness, remoteness of villages and lack of availability of services has affected the disease badly. This way a certain proportion of the TB cases were left untreated and in turn the infection of the deadly disease continues in the area. For this purpose, Sputum Collection Centers (SCCs) had been set up in the remote and un-reached area of Koraput, the tribal heartland of Orissa.

Objective: The basic objective of the study is to find out the role and significance of SCC in TB control measures in tribal areas.

Methodology: 63 sputum collection centres were sur-

veyed for this purpose with a questionnaire. General information on Sputum Collection Centres especially on distance, methods, transportation and follow up etc. have been compiled and compared with PHI data. **Salient Observations:** 63 sputum collection centers (SCC) have been established in the out-reached area with details of distance from the microscopic centers. Around 70% of the centers are situated with more than 10 kms from the Microscopic centre and each center caters about 4000–5000 population. The Table below represents year wise symptomatics collected and number of positive found in the SCCs which indicates its contribution to TB control programmes.

Name of the district	No. of SCC	No. of villages covered	Population covered (approx.)	Distance from the microscopic centers						
				0–9 km	10–20 km	>20 km				
Koraput	63	1587	350 000	30%	44%	26%				
Years										
		1998	1999	2000	2001	2002	2003	2004	2005	Total
No. of sputum collection centers functioning		25	35	40	45	50	60	62	62	62
No. of chest symptomatics reported to SCCs		299	1040	1112	546	806	1161	1270	900	7134
% of chest symptomatics at SCC		14	59	47	34	50	51	68	48	38
Sputum positive cases diagnosed with SCCs		33	130	140	93	120	135	103	76	830

Outcome

- Increase in case detection and decrease in the time gap of the detection process and availability of services in the nearest possible distance.
- All categories of people avail the facilities like aged persons, women etc.
- Increased in participation of community and strengthened the inter-sectoral coordination.

POSTER DISPLAY SESSIONS**BACTERIOLOGY/IMMUNOLOGY/PATHOGENESIS/HOST GENETICS/VACCINES****PS-71270-10 Detection of isoniazid-resistant *Mycobacterium tuberculosis***

P B Antonenko, K O Antonenko, V I Kresyun. Department of Basic and Clinical Pharmacology, Odesa St, Odesa, Ukraine.
Fax: (+380) 48 723 2215. e-mail: peterantonenko@yandex.ru

The goal of present study was to evaluate the possibility of quick and relatively cheap detection of isoniazid-

resistance in *Mycobacterium tuberculosis* clinical isolates in Odesa Region (South of Ukraine) during 2006 via detection of mutation in the *katG* gene and compare obtained results with previous epidemiologic data.

Materials and methods: The 72 *M. tuberculosis* isolates were recovered from 72 adult patients with different forms of diagnosed pulmonary TB. Löwenstein-Jensen medium was used for the cultivation of isolates, and susceptibility testing was performed by the absolute concentration method. DNA extraction was performed by lysis with following deproteinization by chloroform. Next amplification, electrophoresis were done according to Mokrousov I. et al. (2003).

Results: According to drug susceptible test from 72 isolates 40 (55.6%) were resistant to isoniazid and 32 (44.4%) were non-resistant. Also it was found that out of 72 isolates 41 (56.9%) had mutation in *katG* gene and 31 (43.1%) had no this mutation. Among isolates that were resistant to isoniazid 34 (85.0%) were carrying mutation in *katG*, while 15% of resistant isolates had no this mutation. In the same time, 41 isolates that had mutation in *katG* gene 34 (82.9%) were isoniazid-resistant and 7 (17.1%) were isoniazid-sensitive.

Conclusion: Received data provide evidence of high spreading of *katG* gene mutation among *Mycobacterium tuberculosis* strains. Among isolates that were isoniazid-resistant 85% were carrying, however, 15% of resistant isolates didn't have this mutation. So, it may be explanation—either another mutation contribute into isoniazid-resistance or there can be mistakes of drug-susceptibility test. The MAS-PCR assay can be used for the detection of resistance to isoniazid in clinical laboratories in regions with a high prevalence of MDR *M. tuberculosis* strains.

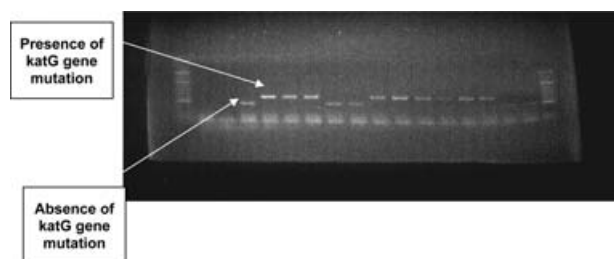


Figure MAS-PCR assay for detection of mutations in the *katG* gene.

PS-71397-10 Results of the comparative trials of TB test-kit for rapid drug susceptibility testing of *M. tuberculosis*

L Domotenko,¹ T Morozova,¹ N Akimova,¹ L Alexeeva,¹ I Shemyakin,¹ V Stepanshina,¹ A Cherednichenko,² G Vanina.² ¹State Research Center for Applied Microbiology and Biot, Obolensk, ²Novosibirsk Institute of Tuberculosis, Novosibirsk, Russian Federation. Fax: (+7) 4967360020. e-mail: domotenko@obolensk.org

Objective: To evaluate TB test-kit for susceptibility testing of *M. tuberculosis* to isoniazid, rifampicin,

streptomycin and ethambutol in comparison with the absolute concentration method.

Methods: TB test-kit is a kit of ready-for-use nutrient media with drugs or without them and reagent Griess for reading results. The TB test-kit has been developed and introduced into manufacture in SRCAMB.

Materials: 199 of *M. tuberculosis* cultures isolated on LJ medium from TB patients in Novosibirsk Institute of Tuberculosis were used for trials. The drug susceptibility testing (DST) results obtained with TB test-kit were compared with those obtained by the absolute concentrations method. TB test-kit had sensitivity for isoniazid of 97.5%, for rifampicin of 94.9%, for streptomycin of 96.9%, and for ethambutol of 94.9%. TB test-kit specificity was 100% for isoniazid and rifampicin, 98.6% for streptomycin and 95.0% for ethambutol.

The turnaround time for TB test-kit was 9.6 days (the range being 8–14 days), and the turnaround time for the absolute concentration method was 21 days.

The DST data were discordant for 17 isolates. The discrepant results analysis was performed by the proportion method on Middlebrook 7H10 agar and by PCR-sequencing.

Conclusion: TB test-kit gives comparable results in the susceptibility testing to drugs of first line. The test-kit is not labor consuming, it does not require special equipment and skilled personnel, and, it is rapid and inexpensive.

PS-71437-10 Non-tuberculous mycobacteria recovered during a prevalence survey in areas with high TB prevalence in RSA

C Kruger,¹ C Pfeiffer,¹ N Beyers,¹ P Godfrey-Faussett,² H Ayles,³ P D van Helden,¹ K Lawrence,¹ T Botha.⁴

¹Desmond Tutu TB Centre, University of Stellenbosch, Cape Town, South Africa; ²Department of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, London, UK; ³Zambart, University of Zambia, Lusaka, Zambia; ⁴Cape Peninsula University of Technology, Cape Town, South Africa. Fax: (+27) 219389476. e-mail: clarisk@sun.ac.za

Background: NTM (non-tuberculous mycobacteria) are often isolated from HIV (human immunodeficiency virus) infected individuals, but the prevalence of NTM in community settings has not been documented.

Aim: This study forms part of baseline surveys of the Zambia South Africa TB and AIDS Reduction (ZAM-STAR) trial and aimed to investigate the occurrence of NTM during a community tuberculosis (TB) prevalence survey in areas with a high TB prevalence in the Western Cape, South Africa.

Methods: Census enumeration areas (CEA) were randomised into a sampling order. All consenting adults in the CEA submitted a spot sputum sample. Samples were cultured in the BACTEC MGIT 960 system and on Löwenstein-Jensen slants. Positive cultures were subjected to identification tests—TAUNS, niacin, p-nitro benzoic acid slants (NLJ) and spoligotyping—to

differentiate *Mycobacterium tuberculosis* complex from NTM. The sensitivity and specificity of the identification tests will be determined using 16S rRNA sequencing as the gold standard. The species distribution of NTM in these settings will be determined.

Results: Of the 5743 samples collected, 105 were identified as probably NTM, on the basis of absent spoligotype patterns typical of TB; as well as negative TAUNTS results. NLJ showed growth (typical of NTM) in 88.6%, and the niacin test identified as NTM in 76.2% (7.6% of the niacin results were indeterminate).

Conclusion: All of the possible NTM (105 samples) are currently being subjected to 16S rRNA PCR and DNA sequencing for species identification, and analysis of these results will be presented.

PS-71491-10 Clinical utility of rapid in-house methods for drug susceptibility testing of *Mycobacterium tuberculosis*

N S Morcillo,¹ B R Imperiale,¹ B Di Giulio,² C Chirico,³ J C Palomino.² ¹TB Laboratory Reference of Buenos Aires Province Dr. Cet, V. Lopez, Buenos Aires, Argentina; ²Mycobacteriology Unite Institut of Tropical Medicine, Antwerp, Belgium; ³Tuberculosis Control Program, V. Lopez, Buenos Aires, Argentina. Fax: (+54) 1147219153. e-mail: nora_morcillo@yahoo.com.ar

Multidrug-resistance to anti-tuberculosis agents timely detection is important in the effective management of tuberculosis (TB) cases. This study was designed as a clinical trial to assess the performance of in-house drug-susceptibility testing for antimicrobial susceptibility of *M. tuberculosis* complex. The assessed methods for isoniazid (INH), streptomycin (SM), rifampicin (RIF), ethambutol and levofloxacin (LX) were: the microplate colorimetric-based methods using MTT and resazurin, and the nitrate reductase assay only for RIF. Results from 492 clinical isolates were compared with those from MGIT960 and the indirect proportion method on LJ medium (ILJ) as gold standard (GS). Novel methods results were available in an average of 8 days with good correlation among their results and those from the GS and the MGIT960. The higher sensitivity and specificity was observed with INH, RIF and LX. Colorimetric methods were performed in a microplate format that could be easily standardized for its use in clinical laboratories. The global performance ranged 0.99 to 0.97 (95%CI: 0.97–1.00) for all the tested methods and drugs. The cost of 1 drug MIC determination was US\$ 0.83. The general performance of these methods as well as the low-cost of reagents and no need for expensive equipment would justify their inclusion in clinical laboratories of developing countries.

PS-71534-10 Concentration by centrifugation: an alternative to direct sputum smear microscopy in Cameroon?

E Dopico,¹ J Noeske,² A Van Deun,³ G Torrea,³ J Maleguel.⁴ ¹Laboratori Clinic L'Hospitalet, Institut Català Salut, Barcelona, Spain; ²German Technical Cooperation, Douala, Cameroon; ³Institute of Tropical Medicine Prince Léopold, Antwerp, Belgium; ⁴Microbiology Laboratory, Hôpital Cebec Bonaberi, Douala, Cameroon. Fax: (+34) 932610127. e-mail: evadopico@gmail.com

Setting: A provincial hospital in Cameroon treating an increasing number of TB patients with the DOTS strategy since 2002.

Objective: To evaluate a concentration method for the detection of AFB in TB suspects as an alternative to WHO recommended direct sputum smear diagnostic.

Methods: Sputum specimen of all successive TB suspects attending the TB service in the provincial hospital of Limbe between 1/4/2006 and 31/1/2007 in the TB service of the hospital of Limbe (Cameroon) were examined according to WHO and IUATLD recommendations using a direct sputum smear microscopy (Ziehl-Neelsen stain) before and after decontamination by Laurylsulphate/NaOH and centrifugation (2000 g × 30 min). The same sputum specimens were subjected to culture in Löwenstein-Jensen medium which was considered as Gold standard. Proportions of positive smear results of the two methods were compared.

Results: Out of 927 suspects included, 902 had culture results available and 328 (35.4%) were positive. Among culture positive cases, 216/328 (65.9%) were detected by direct AFB smear microscopy while 250/328 (76.2%) after concentration method ($P < 0.001$). The proportion of strongly positive smears (2+, 3+) increased from 78.7% using the direct method to 84.8% ($P < 0.001$, McNemar's test) after concentration, making easier the reading of AFB smears. No difference was observed regarding scanty smears.

Conclusions: In Cameroon with a high prevalence of HIV-TB co-infection and where heavy workload TB centres are frequent, the concentration method could be an alternative for improving case detection.

PS-71610-10 Comparative evaluation of the BACTEC MGIT 960 system in The Gambia

J K Otu,¹ M Antonio,¹ R A Adegbola,¹ S A Donkor,¹ B Dejong,¹ Y B Cheung,² T Awine.² ¹Bacterial Diseases Programme, Mrc Laboratories, Fajara, Banjul, Gambia; ²London School of Hygiene And Tropical Medicine, London, UK. Fax: (+220) 4495919. e-mail: jotu@mrc.gm

Setting: Medical Research Council Tuberculosis Diagnostic Laboratory, The Gambia.

Objective: The BACTEC MGIT 960 system was evaluated and compared with BACTEC 9000 MB and Löwenstein-Jensen (solid) medium for recovery rate, time to detection and contamination rate.

Design: 163 clinical samples were processed and inoculated into BACTEC MGIT 960, BACTEC 9000 MB and solid medium.

Results: BACTEC MGIT 960 detected 90 (55.2%), BACTEC 9000 MB 87 (54.0%), and solid medium 67 (41.4%) specimens with *Mycobacterium tuberculosis* complex (MTBC). BACTEC MGIT 960 had the shortest mean number of days (10.3) to detection, followed by BACTEC 9000 MB (13.4) and solid medium (26.7). Sign rank test showed all 3 methods had significant difference in days to detection (each $P < 0.0001$). About 39% of detection by BACTEC MGIT 960 took place within the same week, compared to 26.7% and 7.5% by BACTEC 9000 MB and solid medium respectively. Contamination rates were 12.9%, 6.7%, and 4.9% with BACTEC MGIT 960, BACTEC 9000 MB and 4.9% solid medium respectively.

Conclusion: BACTEC MGIT 960 had a short time to detection of MTBC than BACTEC 9000 MB and solid medium. Despite higher contamination rate, its performance did not appear to be inferior.

Key words: tuberculosis, BACTEC MGIT 960, BACTEC 9000 MB.

PS-71709-10 Evaluation of an antimicrobial formulation to control contamination in rapid phage-based rifampicin resistance

A P Trollip,¹ R J Mole,¹ D Gadre,² T Seaman.³ ¹Biotech Laboratories SA Pty Ltd, Cape Town, South Africa; ²Guru Teg Bahdur Hospital, New Delhi, India; ³University of Cape Town, Cape Town, South Africa. Fax: (+27) 214259857. e-mail: andre.trollip@biotechlabs.co.za

A prospective, comparative study assessed the ability of an antimicrobial formulation (NOA) to control contamination in the phage based direct rifampicin test, *FASTPlaque-Response*, in an Indian tertiary hospital.

One hundred and two smear-positive sputum specimens were processed by NALC-NaOH decontamination procedure. Samples were split, and the *FASTPlaque-Response* test was performed in the presence and absence of NOA.

The NOA antimicrobial effectively controlled contamination, and did not affect the performance of the *FASTPlaque-Response* test compared to testing without the NOA supplement. Without NOA present, contamination prevented the reading of results in 41.5% of specimens, while in the presence of NOA, no results were lost due to contamination.

Use of NOA with the *FASTPlaque-Response* test can improve the number of readable results and lead to wider implementation of the test in settings where contamination may be a problem.

PS-71729-10 A comparison of MGIT versus LJ culture by smear status in pulmonary TB in gold miners in South Africa

V Chihota,¹ X Poswa,² K Fielding,³ P Molefe,¹ G Pilane,¹ J Lewis,^{1,3} L Coetzee,¹ A Grant,³ G Churchyard.^{1,3} ¹Aurum Institute for Health Research, Johannesburg, ²National Health Laboratory Service, Braamfontein, South Africa; ³London School of Hygiene and Tropical Medicine, London, UK. Fax: (+27) 11 638 2505. e-mail: vchihota@auruminstitute.org

Objective: To compare the use of Mycobacterial Growth Indicator Tube (MGIT) and Löwenstein-Jensen (LJ) culture with respect to yield, time to positivity and contamination rate.

Methods: Sputum specimens obtained during screening prior to TB preventive therapy and from TB suspects with no prior history of TB presenting to health services were examined by fluorescence microscopy and cultured on MGIT and LJ. Organisms were identified using MPB64 monoclonal antibody assay and standard biochemical tests.

Results: Of the 702 samples, 89% were smear-negative. For smear negatives, the percentage contaminated on LJ and MGIT was 15.6% and 21.0%, and amongst smear positives it was 12.3% and 1.4%, respectively. Yield of MGIT and LJ, time to positivity and organism identification, by smear status, are summarized in Table 1 below. Among 76 MGIT positive cultures, 2(2.6%) samples were identified as *Mycobacterium tuberculosis* (MTB) with MPB64 but *M. kansasii* with standard biochemical tests.

Conclusion: MGIT increases the culture positive yield among smear negative isolates but not for smear positives. For both smear negative and positives, the time to positivity is shorter for MGIT than LJ. There is little benefit to doing both MGIT and LJ cultures.

	Overall N = 398	Smear negative n = 341	Smear Positive n = 57
MGIT and LJ results (column%)*			
Positive on MGIT and LJ, n (%)	97 (24.4)	42 (12.3)	55 (96.5)
Positive on MGIT only, n (%)	39 (9.8)	37 (10.8)	2 (3.5)
Positive on LJ only, n (%)	2 (0.5)	2 (0.6)	0
Negative on MGIT and LJ, n (%)	260 (65.3)	260 (76.2)	0
Time to positivity (days)**			
On MGIT, median (range)	12 (4–59)	15 (4–59)	8 (4–31)
On LJ, median (range)	19 (4–54)	26 (8–54)	15 (4–53)
Organism identification (on MGIT)			
MTB	46	20	26
Overall NTMs	29	22	7
<i>M. kansasii</i> , n (%)	15 (51.7)	8 (36.4)	7 (100)
<i>M. avium</i> complex, n (%)	7 (24.1)	7 (31.8)	0
NTM (unspecified), n (%)	7 (24.1)	7 (31.8)	0

* Restricted to samples where both MGIT and LJ results available.

** Restricted to samples that were positive on MGIT and positive on LJ.

PS-71814-10 Glycolipidic differences between *Mycobacterium habana*: a vaccine candidate in tuberculosis

L M Mederos Cuervo,¹ J Rodríguez,² J A Valdivia,¹ P L Valero Guillén.² ¹Tropical Medicine Institute Pedro Kourí, IPK, Havana, Cuba; ²Medicine Faculty, Murcia University, Murcia, Spain. Fax: (+537) 2046051. e-mail: mederos@ipk.sld.cu

Background: *Mycobacterium habana* was described in 1970 by Valdivia et al. In 1979 this specie was considered a new immunogenic candidate against tuberculosis and lepra.

Objective: To study some differences between these species about glycolipids compounds.

Methods: Polar glycopeptidolipid (pGPLs) composition of *Mycobacterium habana* and, *Mycobacterium simiae*, was examined by electrospray ionization mass spectrometry (ESI-MS) (positive and negative modes), employing lipid extracts (ethanol-ether and chloroform-methanol soluble lipids). Positive ESI-MS produced [M+Na]⁺ ions, whereas negative ESI-MS gave [M-H]⁻ ions. Further analysis of the monoisotopic [M+Na]⁺ and [M-H]⁻ ions, by means of MS2 and MS3 experiments, revealed the molecular weight and the sugar sequence of the oligosaccharide antigenic chain (OAC).

Results: Some strains of the 'habana' group contained a variant of the previously described pGPL-II (in this case denominate with pGPL-II'), in which the penultimate sugar was tentatively identified as di-OCH₃-fucose. Other strains of the 'habana' group and *M. simiae* ATCC 25275T presented a new pGPL, that was named pGPL-IV, characterized tentatively by the presence of di-OCH₃ rhamnose in the OAC. *M. simiae* ATCC 25275T contained pGPLs with O-CH₃-glucuronic acid and tri-OCH₃-glucuronic acid as distal sugar in the OAC, additionally to the di-OCH₃-glucuronic acid previously detected in this species.

Conclusions: These results evidenced the existence of new pGPLs in *M. habana* y *M. simiae*, and demonstrated a more complex composition within these species, with variation among strains similarly to that found in *M. avium*.

PS-72098-10 Molecular studies on extended spectrum beta lactamase (ESBL) mediated resistance in *Mycobacterium tuberculosis*

A K Sharma,¹ P Vats,² A Malik.³ ¹Department of Zoology, M.S. College (CCS University, Meerut), Saharanpur, Uttar Pradesh, ²IFB-Molecular Research Laboratories, Indian Federation of Biotechnologists, Saharanpur, Uttar Pradesh, ³Department of Zoology, M.S. College (CCS University, Meerut), Saharanpur, Uttar Pradesh, India. Fax: (+91) 1322720015. e-mail: ashwiniak_sharma@rediffmail.com

Aim: ESBLs are the lactam antibiotics hydrolyzing enzymes and play major barriers in employing lactam antibiotics to treat MTB-HIV co-infections. The pres-

ent research was aimed to study the ESBL mediated resistance in *M. tuberculosis* clinical isolates.

Design: 200 AFB-Positive sputum samples were collected from different clinical settings in district Saharanpur, (U.P.) and Karnal (Haryana) of India. H37Rv was used as a control.

Methods: Specimens were confirmed containing *M. tuberculosis* by ZN staining, LJ Culture, Nitrate Reduction, Niacin Production and PCR amplification of IS6110 insertion sequence by primers 5'CCTGCGA GCGTAGGCGTCGG and 5'CTCGTCCAGCGCCG CTTCGG. ESBLs in the clinical isolates were detected by Nitrocefin test and purified by ion exchange and chromatofocusing chromatography. ESBLs were characterized by isoelectric focusing (IEF), determining kinetic parameters reaction with inhibitor and were confirmed to belong to blaC gene by Southern blotting, cloning in ptrchiB vector using EcoRI and XhoI restriction enzyme and expression in *E. coli* Top10.

Results: All the 200 *M. tuberculosis* were found ESBLs positive. Two major bands of pI 4.9 and 5.1 were observed on IEF, the kinetic parameters for nitrocefin were found as Km = 65.37µM, Vmax = 9.86 IU/lit and inhibition of ESBL by Clavulinic acid. The probe (blaC sequence 5'-CATGCGGTAACCGA CAACGT) hybridized to the sequence amplified from the genomic DNA, cloning and expression of the amplified fragment proved the chromosomal nature of beta lactamases in all the 200 isolates.

Conclusion: The ESBL resistance in all the *M. tuberculosis* clinical isolates was proved to be governed by the same chromosomal blaC gene. These findings prove that there is only a single chromosomal pattern of ESBL resistance in *Mycobacterium tuberculosis* clinical isolates.

PS-71134-10 Prevalence of specific CD4 and CD8 IL-10+ cells from MDR-TB patients stimulated with recombinant MTB antigens

A P Junqueira-Kipnis,^{1,2} J A Araújo Filho,^{1,3} A C Vasconcelos Jr,¹ E Ribeiro,³ I M Orme.² ¹Universidade Federal de Goiás, Goiania, Goias, Brazil; ²Colorado State University, Fort Collins, Colorado, USA; ³Hospital Araújo Jorge, Goiania, Goias, Brazil. Fax: (+55) 62 35211839. e-mail: ana.kipnis@pq.cnpq.br

Several works have been showing a decreased specific immune response to TB antigens among the MDR-TB (multi drug resistant tuberculosis) patients. In addition, it seems that PBMC stimulated with PPD antigen (purified protein derivative) from MDR-TB patients produced more IL-10 and IL-18 than the PBMC from other TB regular patients and failed to generate IFN-gamma. The immune response to a protein mix may not correspond to the one elicited to a particular TB antigen. In order to characterize the specific cellular immune response of MDR-TB patients against recombinant TB antigens, four out of seven MDR-TB patients from Goiás State were enrolled in the study and

their PBMC were submitted to a 96 hour culture with PHA, ESAT-6, CFP, GlcB and MPT51 antigens. After flow cytometry analysis, it was observed that CD4 and CD8 cells from MDR-TB were less positive for IFN-gamma than non MDR-TB patients and the healthy controls. Moreover, there were more CD4 and CD8 IL-10 positive cells in the MDR-TB group than in the others one. The specificity of these responses was markedly increased when the PBMC cells were stimulated with GlcB. TB patients showed higher numbers of CD4 and CD8 cells IFN-gamma positive than all individuals (CD4; TB = 31.87 ± 3.21 ; MDR-TB = 12.65 ± 2.86 ; C = 4.21 ± 3.78 , $P < 0.05$); (CD8; TB = 22.56 ± 8.21 ; MDR-TB = 13.65 ± 7.65 ; C = 6.21 ± 2.98 , $P < 0.05$). These results show that the specific immune response to TB antigens depends on the disease status and demonstrate a predominant TH2 immune response among the MDR-TB patients.

PS-71879-10 Transient tuberculosis infection in the naturally infected guinea pig model

E Nardell,^{1,2} K Weyer,³ P Jensen,⁴ S Parsons,⁵ M First,⁶ A Dharmadhikari,^{1,2} K Venter,³ D McMurray.⁷ ¹Brigham and Women's Hospital, Boston, Massachusetts, ²Harvard Medical School, Boston, Massachusetts, USA; ³South African Medical Research Council, Cape Town, South Africa; ⁴Centers for Disease Control, Atlanta, Georgia, USA; ⁵South African Council for Scientific & Industrial Research, Pretoria, South Africa; ⁶Harvard School of Public Health, Boston, Massachusetts, ⁷Texas A&M University, College Station, Texas, USA. Fax: (+1) 617 432 6958. e-mail: enardell@pih.org

Background: Compared to humans, guinea pigs are exquisitely susceptible to even low doses of *M. tuberculosis*. Guinea pigs artificially infected with virulent *M. tuberculosis* strains invariably die of progressive disease. Almost 50 years ago, however, Mills, O'Grady, and Riley (Bull Johns Hopkins Hosp, 1960; 106: 36–45) demonstrated that not all guinea pigs 'naturally' infected by infectious TB patients on an experimental ward developed progressive disease.

Methods: We have re-established a similar experimental ward in South Africa where large numbers of guinea pigs are exposed to a 6-bed ward housing patients with recently diagnosed MDR-TB on treatment. An initial 4-month experiment showed that about 75% of 360 exposed guinea pigs reacted 6 mm or more to 100 TU of PPD. However, serial monthly testing showed that among 163 animals with a maximum reaction of 6–13 mm, 53 (32.5%) decrease on subsequent testing by at least 6 mm to under 6 mm—mostly to 0 mm. Of 64 guinea pigs with a maximum reaction of 14 mm or more, however, none reverted using the same definition. After 3 months exposure, half of the infected animals (reverters and non-reverters) were immunosuppressed with high dose dexamethasone to test the hypothesis that complete clearance of these attenuated drug-resistant strains had occurred. Final outcomes of these infections are pending.

Conclusions: We hypothesize that skin test reversion correlates with complete clearance of viable organisms, as eventually occurs following BCG vaccination, for example, but this remains to be proven.

PS-71970-10 Progression of pulmonary tuberculosis after intranasal infection in BALB/c and C57BL/6 mice

K Venter,¹ A Harrington,² S van Wyngaardt,² J A Verschoor,² K Weyer.¹ ¹Tuberculosis Epidemiology & Intervention Research Unit, Pretoria, Gauteng, ²Department of Biochemistry, University of Pretoria, Pretoria, Gauteng, South Africa. Fax: (+27) 12123255970. e-mail: kobus.venter@mrc.ac.za

Objectives: The progression in acute pulmonary tuberculosis was compared between susceptible BALB/c and resistant C57BL/6 mice with respect to bacterial burdens in organs, number of alveolar macrophages, interstitial lung leucocytes and CD11c+ cells to establish a model for studying different activation states of macrophages during tuberculosis.

Design & Methods: Mice were infected intranasally with 104 CFU of *Mycobacterium tuberculosis* (Mtb) H37Rv. Bacteria were cultured on 7H10 agar from lungs, spleens and livers at baseline, 10, 28, and 36 days post infection ($n = 6$ mice/time point). At the same time points macrophages in bronchiolar alveolar lavage fluid (BALF), interstitial lung leucocytes and CD11c+ cells isolated from the latter with α CD11c+ antibodies conjugated to magnetic beads were quantified by trypan blue exclusion on a Neubauer hemacytometer.

Results: At days 29 & 36 post infection bacterial CFU in lungs of BALB/c mice were significantly ($P > 0.05$) higher than those of C57BL/6 mice. No significant differences between the strains in bacterial burdens of spleens and livers were observed at any time point. Bacterial CFU in lungs were 1000 fold higher than those in liver & spleens for both strains. Alveolar macrophages & interstitial lung leucocytes increased in both strains after 29 days. The fraction CD11c+ cells of interstitial leucocytes increased 7 fold in BALB/c mice but decreased 16 fold in C57BL/6 mice 29 days post infection.

Conclusion: Apart from the higher bacterial burden in lungs of BALB/c mice, the unexpected increase of CD11c+ fraction of leucocytes in BALB/c mice opposed to a decrease in C57BL/6 mice during the late phase of infection was the most striking difference.

PS-72038-10 Microarray-based immunogenesis associated gene expression profiling in osteoarticular tuberculosis cases

Y L Zhao, Y Zhou, M Shang, B Zhao. National Tuberculosis Reference Laboratory of China CDC, 101149, Beijing, China. Fax: (+86) 10 69559710. e-mail: zhaoyanlin@tb123.org

Background: The pathogenic mycobacteria cause the deaths of millions of people every year. One of the reasons these pathogens are so successful is that they are able to invade and replicate within host macrophages, so study the difference in gene expression between the tuberculous granulation tissue and normal tissue nearby the lesions is important for selecting the candidate of TB bio-therapy.

Methods: We made cDNA microarray in which 626 immunogenesis genes were involved. The tuberculous lesions were in eleven osteoarticular tuberculosis, Paired mRNAs from normal osteoarticular tissue specimens from the same cases were labeled with different fluorochromes during cDNA probe synthesis in a reverse-transcription reaction. The signal intensity of each spot was measured by laser scanner and gene expression was quantified as the tubercle-to-normal fluorescence ratio (T:N ratio). The gene was overexpressed when the T:N ratio was greater than 2.0 and underexpressed when the ratio was less than 0.5.

Results: Among 626 immunogenesis associated genes there were 66 genes difference significant, of which 52 expressed higher and 14 lower in tuberculous granulation tissue than that of the controls.

Conclusion: The numerous alterations of gene expression were present in tuberculous lesions of osteoarticular tuberculosis specimens. These results increase the understanding of the mechanisms used by pathogenic mycobacteria to cause disease, the host response to these organisms and provide new insights for anti-mycobacterial intervention strategies.

PS-72140-10 Reproducibility of an IFN- γ release assay and concordance with tuberculin skin tests in people living with HIV

C Maunatlala,¹ H Alexander,² K L Williams,¹ T Agizew,¹ S Nyirenda,¹ B Mosimaneotile,¹ O Motsamai,³ S Toney,² C D Wells,² G H Mazurek,² T Samandari.^{1,2} ¹BOTUSA, Gaborone, Botswana; ²Division of TB Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ³National TB Program, Ministry of Health, Gaborone, Botswana. Fax: (+267) 3181697. e-mail: tts0@cdc.gov

Background: The QuantiFERON-TB Gold In-Tube test (QFT) may allow more accurate detection of TB infection than tuberculin skin tests (TST). Performance of the QFT is not well established in people living with HIV (PLWH). We compared TST and QFT results in PLWH enrolled in an isoniazid TB preventive therapy trial in Botswana, where TB is endemic.

Methods: Blood was drawn for QFT and TST was placed at the screening visit (SV). TST+ was defined

as induration ≥ 5 mm. A second QFT was performed at 2 weeks and a third at 6 months in this prospective cohort.

Results: Among 654 enrollees with valid results, 24% were TST+, 24% were QFT+, 5% were indeterminate at SV and 16% were positive on both QFT and TST at SV, while 31% were QFT+ at 2 weeks. For individuals in whom the SV and 2-week QFTs were unchanged, concordance with TST was 86%. Concordance between the two QFTs (reproducibility) was 80%. Comparing SV QFT with the repeat 2 weeks later, 13% (50/372) converted from negative to positive and 18% (24/134) reverted from positive to negative. Compared to those with CD4 ≥ 200 , those with CD4 < 200 were more likely to have a negative TST (relative risk 1.20, $P < 0.001$, 621 persons with evaluable data) and a negative SV QFT (relative risk 1.14, $P = 0.01$, 568 persons with evaluable data). After 6 months of IPT, 85% of 147 persons had an unchanged QFT. One case of active TB in the third month of IPT retained a negative QFT.

Conclusions: Concordance between QFT and TST in PLWH was 86%, and it was relatively reproducible, as in previous studies. People with CD4 < 200 were less likely to be TST or QFT positive.

PS-71183-10 Human genetic susceptibility to TB: the investigation of candidate genes influencing interferon gamma levels

M Möller,¹ R Kwiatkowski,² A Nebel,² P D van Helden,¹ E G Hoal,¹ S Schreiber.² ¹Division of Molecular Biology and Human Genetics, DST/NRF Centre of Excellence for Biomedical TB Research, MRC Centre, Stellenbosch University, Tygerberg, South Africa; ²Institute for Clinical Molecular Biology, Christian-Albrechts-University, Kiel, Germany. Fax: (+27) 865149624. e-mail: marlom@sun.ac.za

Background: Interferon gamma (IFN γ) is the major macrophage-activating cytokine during infection with *M. tuberculosis* and its role has been well established in animal models and in humans. This cytokine is produced by activated Th1 cells and Th1 responses can best deal with intracellular pathogens such as *M. tuberculosis*. IFN γ has a role in TB containment and it promotes granuloma formation as well as the destruction of bacteria within macrophages. Knockout mice for the IFN γ gene die after mycobacterial infection and defects in IFN γ pathway genes are associated with fatal mycobacterial infections in humans. A single nucleotide polymorphism of the IFN γ gene was previously associated with TB. We selected candidate genes based on the hypothesis that genes which regulate the production of IFN γ may influence susceptibility to TB.

Methods: This research tested the association of potentially important genes with TB in the South African Coloured population using well-designed case-control association studies and attempted to replicate these findings in an independent sample set using a

family-based case-control design (TDT). The following candidate genes were selected for investigation: *IL4*, *IL10*, *IL12B*, *IL12RB1*, *IL12RB2* and *IL18*. SNPs in these genes were selected for genotyping from previous studies. Genotyping methods included the SN-Plex™ Genotyping System, TaqMan® Genotyping, capillary electrophoresis of fluorescently labeled PCR products and ARMS-PCR.

Results: No association was found between any of the polymorphisms investigated and none of the estimated haplotypes showed any association with TB after correcting for multiple testing.

Conclusion: Findings from previous investigations, which showed associations with TB using SNPs in the candidate genes investigated in this study, were not replicated. This discrepancy is probably due to heterogeneity between populations.

PS-71212-10 *RANTES* –403A promoter polymorphism is associated with TB in a South African coloured population

C Babb, H Nel, P D van Helden, E G Hoal. Molecular Biology & Human Genetics, DST/NRF Centre of Excellence for Biomedical TB Research, MRC Centre, Stellenbosch University, Tygerberg, South Africa. Fax: (+27) 219389476. e-mail: cbab@sun.ac.za

Background: *Mycobacterium tuberculosis* is an intracellular pathogen which depends on uptake into and growth in the macrophage for its survival. Depending on the intracellular fate of the bacterium, molecules which facilitate uptake could therefore help or hinder disease progression to active TB. *RANTES* recruits several types of inflammatory cells including monocytes and T lymphocytes and is induced after *M. tuberculosis* infection. In HIV infection, T-lymphocytes are targeted, and HIV is also dependent on uptake for its propagation. One of the receptor molecules responsible is CCR5, and a rare deletion in this gene causes increased resistance to HIV infection and delayed disease progression. CCR5 expression is changed over the course of mycobacterial infection. *CCR2* and *SDF1* polymorphisms have also been found to have an effect in TB. We investigated these candidate genes in relation to TB susceptibility.

Methods: A case-control design was employed to look for association between TB and polymorphisms in *RANTES*, *CCR5*, *CCR2* and *SDF1*. An ARMS-PCR and multiplex PCR in conjunction with a restriction enzyme digest were used to analyse the polymorphisms *RANTES* –403, –109, –28, +1092, *SDF*-3'A, *CCR2* 64I, *CCR5* 59029 and *CCR5* Δ32.

Results: Only the *RANTES* promoter polymorphism –403 AA genotype ($P = 0.03$) was a risk factor, where the G allele containing genotype was found to be protective against TB ($P = 0.01$).

Conclusion: *RANTES* –403G allele containing genotypes may protect against activation of pulmonary

TB. The frequency of these polymorphisms and their haplotypes was established in a local population

PS-71547-10 Reinfection dynamics of a hyper-virulent *Mycobacterium tuberculosis* Beijing strain

J Mitchell,^{1,2} N Gey van Pittius,² R Warren,² P D van Helden,² T Botha.¹ ¹Department of Wellness Sciences, Cape Peninsula University of Technology, Cape Town, ²Department of Biomedical Sciences, University of Stellenbosch, Cape Town, South Africa. Fax: (+27) 219389476. e-mail: joni@sun.ac.za

Background: Reinfection is an important mechanism leading to recurrent tuberculosis.

Objectives: To determine whether pre-infection with a hyper-virulent *M. tuberculosis* Beijing strain will influence subsequent reinfection with another strain in the human macrophage model.

Design and Methods: Two antibiotic-resistant *M. tuberculosis* H37Rv variants were generated by electroporation of marked plasmids: Kan^R and Hyg^R. A THP1 human macrophage cell line will be infected and reinfected with different combinations of these marked strains as well as a *M. tuberculosis* Beijing strain. Mycobacterial growth will be assessed by colony forming unit enumeration and confirmed with polymerase chain reaction (PCR) analysis.

Results: Stable plasmid integration into the mycobacterial genome was confirmed by PCR. *In vitro* growth curves of the wild-type and differentially marked *M. tuberculosis* strains were compared in the BACTEC mycobacterial growth indicator tube (MGIT) system in parallel with conventional liquid culturing and it was established that there was no fitness cost as result of plasmid integration. *In vitro* liquid culture growth curves of Beijing strain clinical isolates were also performed. Infections in a THP1 human macrophage cell line are currently underway to evaluate the intracellular competitive dynamics between the different *M. tuberculosis* strains.

Conclusion: The findings of this study will answer fundamental questions regarding reinfection of mycobacterial strains and whether human macrophages can indeed be reinfected with another virulent mycobacterial strain.

PS-71673-10 Acetylation discordance: sequence analysis of the NAT2 gene in adolescent TB patients

C J Werely,¹ H S Schaaf,² H I Seifart,³ P D van Helden.¹

¹Dept. of Biomedical Sciences, Faculty of Health Sciences, Stellenbosch University, Tygerberg, ²Dept. of Paediatrics, Faculty of Health Sciences, Stellenbosch University, Tygerberg, ³Dept. of Pharmacology, Faculty of Health Sciences, Stellenbosch University, Tygerberg, South Africa. Fax: (+27) 219317841. e-mail: cjlw1@sun.ac.za

Introduction: The acetylation polymorphism is an important pharmacogenetic trait responsible for the

biotransformation of isoniazid. Inter-individual acetylation differences have been described on the basis of well characterized SNPs, but genotype-phenotype discordances obviates the development of adapted therapies for specific patients in concordance with their acetylation status.

Method: We have investigated the acetylation status in a cohort of 64 non-HIV infected adolescent children, being treated for TB: the phenotype analysis was done via a HPLC method, using isoniazid as a probed substrate, whilst the seven most commonly analyzed NAT2 SNPs were genotyped via a PCR-RFLP method.

Key findings: There was a good overall concordance between the phenotype and genotype assignments, however 9/64 (14%) patients recorded a discordance between genotype and phenotype. 7/9 of these individuals recorded a heterozygous intermediate (FS) acetylation genotype, with a corresponding fast acetylation phenotype, whilst the remaining 2 individuals were genotyped as homozygous slow, and phenotyped as intermediate. All of these patients were less than five years old, and there was no indication of altered liver function. Therefore, we decided to analyze a 1700base pair region of the NAT2 gene in these individuals by sequencing. This fragment of DNA includes a 500 base pair domain in the 3' region of the gene. This analysis is currently in progress, and will be presented and discussed.

PS-71813-10 Safety, immunogenicity, and interference study of MVA85A vaccine in infants

A A Odutola,¹ M O Ota,¹ P O Owiafe,¹ S Donkor,¹ R A Adegbola,¹ A V S Hill,² H McShane.² ¹Medical Research Council Laboratories, Banjul, Gambia; ²Centre for Clinical Vaccinology and Tropical, Oxford, UK. Fax: (+220) 4495919. e-mail: aodutola@mrc.gm

Introduction: *Mycobacterium bovis* BCG has variable efficacy but has other non-target benefits. Thus, a vaccination strategy that improves BCG rather than replace it will be ideal. A recombinant modified vaccinia virus Ankara encoding antigen 85A (MVA85A) vaccine is promising as a heterologous prime-boost strategy to BCG during infancy, coinciding with the period when other routine childhood (EPI) vaccines are also administered. This study conducted in human infants for the first time aims to provide the necessary data required for large efficacy trial.

Study design: 36 healthy 4-month old infants vaccinated with BCG soon after birth, were randomised to one of 3 groups; group 1 (only EPI vaccines), group 2 (MVA85A and EPI vaccines) and group 3 (MVA85A and EPI given one week apart). Safety parameters and immunogenicity of MVA85A were measured and compared within the groups using blood samples obtained before and after vaccination.

Findings: The safety profile (haematology, electrolytes

and liver enzymes) were similar before and after vaccination in the 3 groups. The median temperature of subjects in group 2 was higher than those in group 1 ($P = 0.001$) which was also higher than those in group 3 ($P = 0.02$), but resolved within 24 hours. Baseline immune responses to antigen 85A were similar in all the groups but increased after vaccination in groups 2 and 3. The immune response to MVA85A was not different between groups 2 (EPI and MVA85A simultaneously) and 3 (MVA85A alone and EPI vaccination deferred). ($P = 0.6$).

Conclusion: MVA85A vaccine is safe, well tolerated and immunogenic in infants. Preliminary results suggest that coadministration of MVA85A with EPI vaccines does not reduce cellular immune responses. Further work needs to be done to evaluate effect on humoral responses to EPI vaccines.

TB DIAGNOSIS: I

PS-71339-10 The challenge of diagnosing and treating patients with TB and TB-HIV at a regional/district hospital level

M P Loveday,¹ E M Thomson,² Z Ndlela.¹ ¹Health Systems Trust, Pietermaritzburg, KwaZulu-Natal, ²Department of Health, KwaZulu-Natal, Pietermaritzburg, KwaZulu-Natal, South Africa. Fax: (+27) 33347 1251. e-mail: marian@hst.org.za

Methods: The different components of the National Tuberculosis Control Programme (NTCP) were evaluated by conducting retrospective reviews of laboratory and TB registers, a retrospective medical record review ($N = 77$) and semi-structured interviews with TB patients ($N = 92$) and treatment interrupters ($N = 27$).

Results and Investigations: The NTCP guidelines were not used investigations resulting in unnecessary investigations and expenditure and an increased workload for laboratory staff. Systems failures resulted in a failure to collect specimens and laboratory results not being documented.

Diagnosis: Pulmonary TB (PTB) was diagnosed in the absence of smear microscopy and a clinical history suggestive of TB.

Treatment: Three major 'leakages' where patients were getting lost on their journey from diagnosis to completing treatment were identified:

- 58% of the patients diagnosed as smear positive TB in the laboratory were never registered in the TB register.
- 31% of the patients referred from the hospital to the study clinics never arrived.
- 39% of the patients with PTB started treatment but failed to complete it.

TB patients: Increased stigma to TB due to its association with HIV contributed to patient delays in ac-

cessing services. Patients perceived a lack of respect for confidentiality amongst all levels of health workers. Patients were often too weak to get to a clinic and to wait in long queues.

Conclusion: NTCP guidelines have to be implemented at a regional/district hospital level and points of 'leakage' stopped. The increased mortality and stigma due to HIV have to be factored into the delivery of TB services at a Primary Health Care level.

PS-71374-10 Cause of acid-fast smear-positive sputum: *Mycobacterium tuberculosis* or nontuberculous mycobacteria?

J Y Wang,^{1,2} P R Hsueh,^{2,3} L N Lee.^{2,3} ¹Internal Medicine, National Taiwan University Hospital, Taipei, Taipei, ²College of Medicine, National Taiwan University, Taipei, Taipei, ³Laboratory Medicine, National Taiwan University Hospital, Taipei, Taipei, China. Fax: (+886) 223224263. e-mail: jywang@ntu.edu.tw

The percentage of patients with NTM in all with smear-positive sputum in our hospital increased dramatically in recent years (from 9.3% in 2001 to 34.7% in 2006). The study was conducted to evaluate the differences between smear-positive TB and NTM-related smear-positivity.

A total of 100 patients with smear-positive sputum were identified. Of them, 65 were culture-positive for *M. tuberculosis* (MTB group). Of the other 35 patients (NTM group), 30 (85.7%) were culture-positive for NTM, including *M. avium* intracellulare complex in 11, *M. abscessus* in 5, *M. fortuitum* in 4, mixed *M. abscessus* and *M. chelonae* in 4, *M. chelonae* in 2, *M. kansasii* in 1, mixed *M. avium* intracellulare complex and *M. kansasii* in 1, and unidentified mycobacterial species in 2. Smear positivity was more likely due to NTM in patients with underlying bronchiectasis (100%) or old pulmonary TB (58.3%). Dyspnea was significantly associated to TB (85%), whereas weight loss was more likely to occur in NTM group (54.5%). Smear-positivity was more likely due to *M. tuberculosis* in patients with fibroexudative (80.6%) or consolidative (76.2%) pattern, or predominantly upper-lung-field involvement, and more likely due to NTM in patients with normal findings (90.9%). Pulmonary cavitation was significantly associated with TB (91.3%).

Consistent with previous reports, smear-positivity was more likely due to NTM in patients with pre-existing lung damage such as bronchiectasis, old pulmonary TB, and pulmonary fibrotic change. The increasing percentage of NTM patients in all with smear-positive sputum in our hospital points out the necessity of applying a rapid and specific test for identification of *M. tuberculosis* in patients with smear-positive sputum before treatment plan is made.

PS-71695-10 Improved Ziehl-Neelsen microscopy: bleach combined with centrifugation for smear-negative specimens

S W Matu, W A Githui, E Juma, N Tunge, F Karimi. Center for Respiratory Diseases Research-Kenya Medical, Nairobi, Kenya. Fax: (+254) 2729308. e-mail: sophiematu@yahoo.com

Background: Direct Ziehl-Neelsen (ZN) sputum smear microscopy for diagnosis of tuberculosis (TB) has low sensitivity. Concentration of sputum using bleach with sedimentation has been used to increase sensitivity in many settings.

Objective: To determine whether use of bleach with centrifugation significantly increase positive detection in ZN smear negative specimens.

Methods: Three hundred and seventy sputum specimens were collected from new TB suspects attending Mbagathi District Hospital and processed for direct microscopy and culture. Smear negative specimens were treated with 3.5% bleach and left to stand for 30 minutes before centrifugation. Both direct and bleach treated smears were processed and examined using ZN staining method.

Results: Two hundred (54%) of the 370 specimens were culture positive. The number of smear positive by direct ZN was 138 (37.2%) which increased to 171 (46.2%) after treatment with 3.5% bleach. There was a significant increase in sensitivity from 66% to 81.1% ($P < 0.05$)

Conclusion: Use of 3.5% bleach with centrifugation could be recommended for use to enhance case detection in TB control programmes especially in settings with high burden of dual TB-HIV infection.

PS-71754-10 A quality assurance audit of AFB microscopy services at regional TB diagnostic laboratories in Kenya

J N Mburu,¹ E Sigilai,¹ P Juma,¹ E Wangui,¹ O Njuguna,¹ M Mburu,² E Makokha,² J Sitienei.¹ ¹Central Tuberculosis Reference Laboratory, NLT, Nairobi, ²Centers for Disease Control and Prevention, Nairobi, Kenya. Fax: (+254) 2713198. e-mail: njeriwahogo@hotmail.com

Background: Good TB control program depends largely on accurate smear microscopy that is backed up with supervision and consistent re-checking of sputum smears at a reference laboratory. In Kenya, external assessment on smear microscopy in the regional diagnostic centers is done by the Central Reference Laboratory (CRL). We report on our findings recorded in the last quarter of 2006 from 6 regional laboratories.

Methods: During the support supervisory visits to six regional laboratories, 12 smears from each diagnostic center were randomly selected using the LQAS method. The smears were first examined in the field condition, then re-stained and re-read again in a blinded manner at CRL. Data were analyzed for agreement between CRL and the regional laboratories, specimen quality, smear cleanliness, thickness, size and evenness.

Results: A total of 66 smears were validated. We found 75.8 agreements between CRL and the participating laboratories. Blinded rechecking revealed false negative (6%) within two sites and false positive (1.5%) from one site. Specimen quality, smear cleanliness, thickness, size and evenness scored 93%, 53%, 35%, 51% and 27% respectively. Re-staining changed the re-checking results by 12%.

Conclusion: Our findings indicate that the sputum smear microscopy services offered at the regional laboratories are fair. Re-staining changes the re-checking results and should always be included. False negative of 6% suggest the need for refresher training and supervision. We recommend extension of blinded re-checking that is tagged on support supervisory visits to the rest of the network.

PS-71839-10 Second month follow-up sputum test result not a good predictor of TB treatment failure

C P Osakwe,¹ S O Egbuka.² ¹World Health Organization, Enugu, Enugu, ²Mile Four Hospital, Abakaliki, Ebonyi, Nigeria. Fax: (+234) 42 459066. e-mail: osakwec@ng.afro.who.int

A total of 5067 new smear positive TB patients were registered for TB treatment at Mile Four Hospital, Abakaliki, Nigeria between 2000 and 2004. 1414 (28%) of the patients were still sputum positive at the end of 2 months of treatment with rifampicin, isoniazid, ethambutol and pyrazinamide. 512 (10%) of the patients were still positive after extension of the above regimen by 4 weeks. 0.4% and 0% of the patients who were positive at 2 months were still positive at the end of 5 months and 7 months respectively.

In a review of the follow-up sputum test results of 5067 new smear positive TB patients treated with the short course chemotherapy in a popular TB hospital in Nigeria, the authors did not find any relationship between the 2nd month sputum test results and the 5th and 7th month result. The authors recommend a further search for a predictor of treatment failure in new smear positive TB patients in a developing country setting. Furthermore, given that almost one third of the registered patients were still positive at the end of 2 months of treatment and that these patients are automatically commenced on the continuation phase

of treatment regardless of the sputum test result at the end of 3 months of intensive phase treatment, the authors propose placing all new TB patients on a 3-month intensive phase treatment and conducting the first follow-up sputum test at the end of the 3 months.

PS-71974-10 The increasing burden of smear-negative TB in high HIV prevalence settings: the case of Khayelitsha, Cape Town

K Hilderbrand,^{1,2} V Azavedo,³ E Goemaere,¹ N Ford,¹ Z Sondlo,³ K Mkoko,⁴ G Van Cutsem,¹ R Zachariah,¹ A Boule.² ¹Medecins Sans Frontieres, Khayelitsha, Cape Town, ²IDEU, University of Cape Town, Cape Town, ³City Health, Khayelitsha, Cape Town, ⁴PGWC, Khayelitsha, Cape Town, South Africa. Fax: (+27) 213715061. e-mail: k.hilderbrand@msf.org.za

Background: TB incidence in Khayelitsha (population 400 000) is currently more than 1500/100 000. The antenatal HIV prevalence rate is 33%, and the TB-HIV co-infection rate is at 70%. This means that PTB is increasingly difficult to identify particularly in severely immuno-compromised cases, and basing the diagnosis of PTB by smears alone risks becoming increasingly erroneous.

Methods: The methods of diagnosis of TB in all patients registered during 2005 and 2006 in the largest TB clinic in Khayelitsha are described ($N = 3592$). In a sub-sample ($n = 544$), corresponding to all patients registered during the first quarter of 2006; a more detailed analysis of the proportion of patients diagnosed by smears and cultures is carried out and linked to treatment outcomes.

Results: Between 2005 and 2006, the overall proportion of patients registered with a diagnostic smear increased by 10%. Amongst all diagnostic smears, the proportion of negative smears is increasing more rapidly than the proportion of positive smears.

Conclusion: In HIV co-infected patients, smear negative cases are an increasing proportion of the overall TB burden. The increasing numbers of drug-resistant TB cases in environments of high HIV-prevalence requires for new approaches to be able to respond at the primary care level. Smears can no longer be considered the golden standard for PTB diagnosis in high HIV prevalence settings.

PS-71976-10 A nurse-based algorithm for earlier diagnosis of smear-negative pulmonary tuberculosis in HIV-infected adults

P Saranchuk,¹ E Goemaere,¹ G Meintjes.^{2,3} ¹Medecins Sans Frontieres, Morija, Lesotho; ²GF Jooste Hospital, Cape Town, ³University of Cape Town, Cape Town, South Africa. Fax: (+27) 213715061. e-mail: k.hilderbrand@msf.org.za

Background: Tuberculosis is the commonest cause of mortality in HIV-infected people in Lesotho. Diagnosis of pulmonary TB (PTB) in such patients is often delayed for two reasons: their sputum smear results

Year	No. registered new smear positive TB cases	No. sputum positive					
		After 2 months treatment n (%)	After 3 months treatment n (%)	At 5 months n (%)	At 7 months n (%)	At 5 months who were earlier positive at 2 months n (%)	At 7 months who were earlier positive at 2 months n (%)
2000	1160	270 (23.3)	82 (7.1)	5 (0.43)	0	0	0
2001	1070	244 (22.8)	86 (8.0)	12 (1.1)	4 (0.4)	0	0
2002	979	284 (29.0)	102 (10.4)	18 (1.8)	3 (0.3)	0	0
2003	948	303 (32.0)	129 (13.6)	14 (1.5)	0	7 (0.7)	0
2004	910	313 (34.4)	113 (12.4)	30 (3.2)	3 (0.3)	14 (1.5)	0
Total	5067	1414 (27.9)	512 (10.1)	79 (1.6)	10 (0.2)	21 (0.4)	0

are frequently negative and there is a shortage of doctors in the country to assess such patients and prescribe TB treatment when indicated for smear-negative PTB. This delay increases morbidity and mortality.

Methods: An algorithm was designed to facilitate nurse diagnosis of PTB in HIV-infected adults with either a dry cough or at least 2 negative sputum smears in the Scott Health Service Area, Lesotho. Nurses will be trained in the use of this algorithm, including radiology training to recognise pleural effusions and miliary patterns on chest radiograph. All adult PTB suspects assessed by nurses using the algorithm will be prospectively evaluated with respect to the following outcomes: proportion diagnosed with smear-negative PTB and started on TB treatment, alternative diagnoses, clinical outcomes, a doctor's review of the cases and chest radiographs and subsequent TB culture results. The diagnostic accuracy of the nurse-based algorithm will be evaluated, as will the reduction in diagnostic delay attributable to the use of the algorithm.

Results: To be determined in at least 50 adults.

Conclusion: In a resource-limited setting, training nurses in the use of a simple diagnostic algorithm may reduce diagnostic delay associated with smear-negative PTB in HIV-infected adults.

PS-71979-10 Improvement of AFB microscopy quality in Umgungundlovu district, KwaZulu Natal Province

N P Mhlongo,¹ V H Sithebe,² B Margot.² ¹KwaZulu Natal Department of Health, Pietermaritzburg, ²University Research Co., Pretoria, South Africa. Fax: (+27) 123421356. e-mail: ntombim@healthprojects.co.za

Introduction: In April 2006, URC's TASC II TB project conducted training on QA in TB laboratories for Provincial and District laboratory managers in KwaZulu Natal. A Laboratory Quality Control unit was formed in Umgungundlovu district to look at improving the quality of the AFB diagnostic services. The Unit has dedicated microscopists, data capturer, microscopes, computer and computer program for recording and reporting of results.

Background: KwaZulu Natal was the only Province out of 9 whose laboratory services did not fall under the National Health Laboratory Services and has decentralized AFB microscopy services, from 50 hospital based laboratories to 81 AFB microscopy sites in Community health centers and clinics. These centers screen in excess of 70 000 AFB slides per month. The challenge has been to monitor and control the quality of the results.

Objective: To demonstrate improvement in the quality of results produced by laboratories after the introduction of the blinded rechecking program and continuous on the spot mentoring and supervision.

Methods: 8 laboratories in Umgungundlovu district were chosen as a pilot for introduction of blinded re-

checking. A sample of 40 slides was randomly selected. The results were entered into a computer program and a work sheet developed. These slides were then given to a senior Lab technician and a second independent screener looked at the slides again. The results were compared with the results from the peripheral sites. Discrepant results were recorded in a separate work sheet. Both screeners did not have access to previous results.

Results: 2 laboratories had no major errors, while 6 had between 2 and 3 major errors. Mentoring and coaching of all microscopists was done. A second round of slides was collected in the first quarter of 2007. 100% improvement was seen in one centre only.

Conclusion: Decentralization of TB microscopy services requires good QA programs to ensure quality AFB diagnostic services.

PS-71361-10 Capilia TB assay and BD ProbeTec ET System for rapid culture confirmation of *Mycobacterium tuberculosis*

P R Hsueh, J Y Wang, L N Lee, H C Lai, H L Hsu, I S Jan, C J Yu, P C Yang. Laboratory Medicine and Internal Medicine, Taipei, Taiwan, Taipei, China. Fax: (+886) 223224263. e-mail: hsporen@ntu.edu.tw

Aim: Rapid and accurate methods for culture confirmation of *Mycobacterium tuberculosis* are urgently needed.

Design and Methods: This study compared the performance of the Capilia TB immunochromatographic assay with the BD ProbeTec ET (CTB) for culture confirmation of *M. tuberculosis*. Capilia TB (TAUNS, Numazu, Japan) was used to analyze 242 culture-positive liquid media in two mycobacterial laboratories from November 2005 to February 2006 and BD ProbeTec ET was evaluated for the most recent 183 of these same media. The results of both assays were compared to the culture results and to each other.

Results: The overall sensitivity and specificity of the Capilia TB assay were 98.6% and 97.9%, respectively, and for the BD ProbeTec ET assay were 97.3% and 97.1%, respectively. The positive and negative predictive values for the Capilia TB assay were 98.6% and 97.9%, respectively, and for the BD ProbeTec ET assay were 98.2% and 95.8%, respectively. Among the 183 samples tested with both assays, eight had discrepant results, including Capilia TB-false-positive in two, BD ProbeTec ET-false-positive in another two, BD ProbeTec ET-false-negative in two, Capilia TB-false-negative in one, and both assays false-negative in the remaining one.

Conclusions: This study demonstrated that the Capilia TB assay has a similar diagnostic value to the BD ProbeTec ET assay. In addition, with the immunochromatographic method, it is less time-consuming and does not require other laboratory equipment.

PS-71591-10 Comparison of tuberculin skin test, QuantiFERON-TB Gold and T-SPOT.TB results in immigrant close contacts

S V Kik,^{1,2} W P J Franken,³ E A M Mensen,⁴ S Verver,^{1,2} F G J Cobelens,^{1,2} S M Arend,³ M W Borgdorff.^{1,2} ¹KNCV Tuberculosis Foundation, The Hague, ²Department of Infectious Diseases, Tropical Medicine and AIDS, Amsterdam Medical Centre, Amsterdam, ³Leiden University Medical Centre, Leiden, ⁴Municipal Health Service Amsterdam, Amsterdam, Netherlands. Fax: (+31) 703584004. e-mail: kiks@kncvtbc.nl

Background: In the Netherlands, immigrants from high endemic countries are usually not screened for recent latent tuberculosis (TB) infection (LTBI) during contact investigations, as in BCG vaccinated individuals the tuberculin skin test (TST) has a low positive predictive value (PPV) for recent infection and therefore as well for breakdown to disease. Interferon-gamma release assays (IGRA) measure cellular responses to specific *M. tuberculosis* antigens and may not have this disadvantage.

Aim: To determine the predictive value of TST and two different IGRA; QuantiFERON-TB Gold in tube (QFT) and T-SPOT.TB (TSPOT), combined with epidemiological characteristics, for developing active TB in immigrants who are close contacts of smear positive TB patients.

Methods: Between April 2005 and July 2007, immigrants 16 years and older who were a close contact of a smear-positive TB patient were included in this prospective cohort study. Those with a TST induration of 5 mm or more, at 0 or 3 months after diagnosis of the index case, were tested with both QFT and TSPOT and followed during 2 years to evaluate the development of active TB.

Preliminary results: From 194 contacts with a TST ≥ 5 mm IGRA results were available. Of these 83.5% had a TST ≥ 10 mm, and 52.1% a TST ≥ 5 mm, 52.6% were QFT positive, whereas 58.8% were TSPOT positive. All three tests were positive in 43.3% (TST ≥ 10) or 34.5% (TST ≥ 15 mm).

Conclusion: As the TST is sensitive for detection of recent as well as remote infections, the limited difference between the percentage of positive TST and IGRA in immigrant contacts suggests that IGRA may not only detect recent infections. It is yet unclear whether discrepancies between the tests indicate a higher positive predictive value of one or both of the IGRA for developing active TB.

PS-71592-10 Correlation between exposure and tuberculin skin test, QuantiFERON-TB Gold and T-SPOT.TB in close contacts

E A M Mensen,¹ S V Kik,^{2,3} W P J Franken,⁴ S Verver,^{2,3} F G J Cobelens,^{2,3} S M Arend,¹ M W Borgdorff.^{2,3} ¹Municipal Health Service Amsterdam, Amsterdam, ²KNCV Tuberculosis Foundation, The Hague, ³Department of Infectious Diseases, Tropical Medicine and AIDS, Amsterdam Medical Centre, Amsterdam, ⁴Leiden University Medical Centre, Leiden, Netherlands. Fax: (+31) 703584004. e-mail: kiks@kncvtbc.nl

Background: As there is no gold standard for detection of latent tuberculosis (TB) infection (LTBI), the performance of new tests for the diagnosis of LTBI are correlated with exposure to an infectious TB patient. It is unclear whether interferon gamma release assays (IGRA) correlate better with exposure than the current tuberculin skin test (TST), especially among immigrants who are often BCG-vaccinated and have a high risk of old infections.

Aim: To compare the correlation between results of TST, QuantiFERON-TB Gold in tube (QFT) and T-SPOT.TB (TSPOT) in immigrant close contacts with their frequency of exposure to the source case.

Methods: Between April 2005 and July 2007, immigrants 16 years and older who were a close contact of a smear-positive TB patient were included in this prospective cohort study. Contacts with a TST induration of ≥ 5 mm at 0 or 3 months after diagnosis of the index case, were tested with both QFT and TSPOT. Associations between diagnostic tests and frequency of contact were tested with a chi-square for trend.

Preliminary results: In 194 close contacts with TST ≥ 5 mm IGRA results were available. Of these 83.5% had a TST ≥ 10 mm, and 52.1% a TST ≥ 15 mm, 52.6% were QFT positive, whereas 58.8% were TSPOT positive. In total 30.4% were household contacts, 40.7% other daily contacts, 24.7% less frequent contacts and 4.1% had missing data on the frequency of exposure. There was no association between exposure and the rate of a positive test result for TST as well as both IGRA tests.

Discussion: The lack of a correlation between the positive rate of both IGRA tests and exposure in immigrant close contacts indicates that IGRA tests may not be specific for detection of recent latent infections. An alternative explanation is that frequency of contact does not determine the risk of infection within this group of already close contacts.

PS-71676-10 Mycobacterial blood culture for diagnosis of drug-resistant extrapulmonary TB, KwaZulu-Natal, South Africa

N Botelho,¹ A Moll,^{1,2} F Eksteen,¹ T van der Merwe,¹ N S Shah,³ N Gandhi,³ A W Sturm,⁴ P Moodley,⁴ G Friedland.⁵ ¹Church of Scotland Hospital, Tugela Ferry, South Africa; ²Philanjalo, Tugela Ferry, South Africa; ³Albert Einstein College of Medicine, Bronx, New York, USA; ⁴Nelson R. Mandela School of Medicine, Durban, South Africa; ⁵Yale AIDS Program, New Haven, Connecticut, USA.

Fax: (+27) 334930417. e-mail: nickbotelho@yahoo.com.au

Background: Up to 30–40% of tuberculosis (TB) patients have only extrapulmonary (EP) TB, especially in high HIV prevalence settings. Drug-resistant TB has emerged as a critical issue in KwaZulu Natal, and is associated with HIV infection and rapid mortality. Diagnosis of drug-resistance in EPTB requires culture and drug-susceptibility testing (DST) of blood and/or body fluids.

Methods: Inpatients and outpatients of all ages are being enrolled at a rural district hospital in Tugela Ferry, KwaZulu Natal. Blood and body fluids are collected from TB patients with inadequate response to treatment, new patients with suspected bacteremia or disseminated TB, or new patients with clinical evidence of EPTB. Samples are collected and inoculated into Bactec MycoF-lytic bottles. Multidrug-resistant (MDR) TB is defined as resistance to at least isoniazid and rifampicin; extensively drug-resistant (XDR) TB is defined as MDR-TB with additional resistance to at least one fluoroquinolone and one injectable second-line drug.

Results: During 9/06–3/07, 30 culture samples were obtained from 29 patients: 25 (83%) blood, 3 (10%) pleural fluid, 1 (3%) lymph node aspirate, and 1 (3%) unknown. Median age was 28 years (range: 10 months–43 yrs), 15 (52%) were female, 25 (86%) were on TB treatment, 21 (72%) were HIV-infected. Of 22 samples with available results, 9 (41%) were positive for *M. tuberculosis*: 1 (11%) lymph node, 2 (22%) pleural fluid, 5 (56%) blood, 1 (11%) unknown. DST of 9 positive *M. tuberculosis* cultures identified 2 (25%) fully-susceptible, 3 (38%) MDR, and 3 (38%) XDR TB isolates.

Discussion: Blood and body fluid cultures detected a significant number of EPTB cases, including MDR and XDR TB. Fluid culture may be a useful method to detect drug-sensitive and particularly, drug-resistant EPTB.

PS-71910-10 Introducing an assay for rapid detection of rifampin resistance into clinical care of MDR-TB patients, Latvia

G Skenders,¹ T H Holtz,² A Toma,¹ I Prokopovica,¹ L Broka,¹ C D Wells,² V Leimane.¹ ¹State Agency of Tuberculosis and Lung Disease, Riga, Latvia; ²Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+1) 404 639 1566. e-mail: tkh3@cdc.gov

Background: In Latvia 11% of newly diagnosed pulmonary TB patients have multidrug-resistant tuberculosis (MDR-TB), defined as TB with resistance to at least isoniazid and rifampin. Rapid detection of rifampin resistance may hasten initiation of effective treatment with second-line drugs. The line probe assay LiPA Rif-TB Innogenetics detects rifampin resistance (RR) by identifying mutations in the *rpoB* gene. LiPA Rif-TB was used with clinical TB patients at high risk for RR to hasten detection of MDR-TB, initiation of effective therapy, and culture conversion.

Methods: Patients with sputum smear-positive for acid-fast bacillus (AFB+) between October 2004–September 2006 had a LiPA Rif-TB test and drug susceptibility tests (DST) performed using BACTEC. We compared the time between diagnosis and effective treatment, and culture conversion, between MDR-TB patients detected by LiPA Rif-TB to all high risk AFB+

pulmonary MDR-TB cases detected through BACTEC DST in 2001.

Results: 107 AFB+ patients were at high risk for MDR-TB. *Mycobacterium tuberculosis* (MTB) was isolated from 89 specimens, 23 were RR. The LiPA Rif-TB assay detected MTB complex DNA in 22 (96% sensitivity) of these 23 specimens, and was negative in 61 of 63 culture-negative specimens (97% specificity). Patients detected by LiPA Rif-TB received effective treatment after a median of 1 day (range 12 to 47) after diagnosis and culture conversion a median of 112 days (range 19 to 291, mean 109 days) after treatment initiation. By comparison, 62 BACTEC culture-positive MDR-TB cases from 2001 received effective treatment and achieved culture conversion after a median of 15 days (range 176 to 342) and 100 days (range 0 to 837 days, mean 125 days).

Conclusion: The LiPA Rif-TB assay detected RR with high sensitivity and specificity in patients at high risk for MDR-TB and hastened the time to empiric treatment for MDR-TB. It did not appreciably reduce the time to culture conversion.

PS-72006-10 Interferon-gamma: assays in children with tuberculosis and latent TB infection before, during and after treatment

A K Detjen,¹ T Keil,² S Roll,² H Mauch,³ U Wahn,¹ K Magdorf.¹ ¹Department of Pediatric Pneumology and Immunology, Charite, Berlin, ²Institute for Social Medicine, Epidemiology and Health Economics, Charite, Berlin, ³Department of Microbiology, Helios Klinikum E.v. Behring, Berlin, Germany. Fax: (+49) 30 450566931. e-mail: anne.detjen@charite.de

Introduction: Interferon- γ release assays (IGRAs) have shown to be a reliable tool for diagnosis of infections with *Mycobacterium tuberculosis*. Tests that enable the observation of the course of disease and the efficacy of chemotherapy would additionally be of great use. Data on the ability of IGRAs as a measurement of successful antituberculous chemotherapy is scarce and contradictory.

Aim: To evaluate and compare the value of two commercially available IGRAs, T.SPOT TB (T-SPOT) and QuantiFERON-TB® Gold In-Tube (QFT-IT) in monitoring efficacy of antituberculous therapy.

Methods: IGRAs were performed in 42 children with TB (median age 2.7 years) under combined chemotherapy as well as 19 children with latent TB-infection (LTBI, 10.5 years) under INH preventive chemotherapy. IGRAs were performed at several time points before, during and up to 1.5 years after treatment.

Results: Both IGRAs show highly variable kinetics in TB and LTBI and rarely become negative. All children with TB showed clinical and radiological improvement. QFT-IT became negative in 7% (3/42). ESAT-6 response in T-SPOT became negative in 23.8% (10/42) but positive again in 7 children during follow-up.

14.3% (6/42) never had positive ESAT-6 responses. CFP-10 response became negative in 21.4% (9/42) but later positive again in one child. None of the children with LTBI developed clinical or radiological signs of TB. QFT-IT became negative in 42% (8/19) but positive again in two during follow-up. ESAT-6 response in T-SPOT became negative in 47.4% (9/19) children but positive again in one during follow-up. One child never had a positive ESAT-6 response. CFP-10 response became negative in 47.4% (9/19) children but positive in 3 during follow-up.

Conclusion: Both IGRAs are of little use for control of the efficacy of antituberculous therapy. In some cases the interferon-gamma response clearly decreases. However, even years after treatment and clinical resolution of TB IGRAs can be positive.

PS-72015-10 Comparison of MGIT and LJ in isolation of mycobacteria in HIV+ and HIV- patients in Nairobi, Kenya

S J Chebore,¹ J O Ndinya,² C N Akoru,² J K Sitienei,² N G Buziba.² ¹Department of Medical Microbiology, Moi University, Eldoret, ²Central Reference Tuberculosis Laboratory, Nairobi, Kenya. Fax: (+254) 532061992. e-mail: chebore73@yahoo.com

Introduction: In high prevalence countries, TB case detection is largely based on microscopic examination of sputum for Acid Fast Bacilli (AFB). As this is the most efficient preliminary way to detect sources of transmission. Culture examination is usually a useful tool to obtain living bacilli for further steps of TB Laboratory works. Recently, demand for introduction of culture examination to the TB Laboratory is getting increasing due to support DOTS-plus activities and to increase case detection in areas of a high burden of TB associated with HIV infection.

Study design: Cross sectional study design.

Objectives: To compare the yield of isolates from LJ and MGIT system and to compare the mean time of recovery and the rate of contamination.

Study population: All new adult patients attending the TB clinic who met the criteria were targeted and a sample size of 150 was drawn for the study by systematic random sampling.

Materials and methods: Early morning sample was collected from each patient, decontaminated and digested by use of 4% NaOH and cultured on LJ and MGIT system.

Results: The results indicated that out of 150 samples, 46% was captured from LJ media while the MGIT 960 system captured 55% culture positives. There was an incremental yield of 9%. The mean turn around time for LJ medium was 21 days while the MGIT system was 13 days. Contamination rate of LJ samples was 0.7% while that of MGIT system was 10%.

Conclusion: We conclude that the MGIT system had a short turn around time compared to LJ, also an in-

cremental yield was observed. The relatively high contamination rate and its high cost make it less recommendable option for widespread use.

PS-72026-10 Yield of AFB among HIV+ and HIV- patients in Nairobi, Kenya

C Akoru,¹ S J Chebore,¹ J O Ndinya,² J K Sitienei,² N G Buziba.² ¹Medical Microbiology, Eldoret, ²Central Reference Tuberculosis Laboratory, Nairobi, Kenya. Fax: (+254) 53 206 1992. e-mail: cnakoru@yahoo.co.uk

Introduction: Tuberculosis has probably killed more people among other diseases in history. The number of yearly deaths has continued to increase and are now over two million deaths occurring every 15 seconds. PTB remains a major public health threat and increasing this burden is the concurrent HIV epidemic.

Study design: Cross-sectional study design.

Objectives: To determine the yield of concentrate smear over the widely employed direct smear microscopy.

Target population: All new adult patients were targeted and a sample size of 150 was drawn by systematic random sampling.

Materials and methods: Total of 3 smears were prepared from each patient for both direct and concentrate method and stained by use of ZN stain.

Results: The results showed that direct microscopy yielded 35.3% smear positive cases. Out of this 47.8% was detected from HIV+ while 16.7% were from the HIV- patients. In concentrate microscopy a yield 52.7% was detected. Seventy percent was captured from HIV+ while 26.7% from HIV- patients. An incremental yield of 17.4% was observed with the sensitivity of the two tests increasing from 62% to 87%.

Conclusion: Concentration method substantially increased the yield and sensitivity of direct microscopy. All positive smears from direct microscopy were detected in concentrate microscopy giving a *P* value of 0.001 at 95%CI. Therefore there is need to employ concentrate in order to capture all the positives not captured in direct microscopy.

PS-72123-10 Evaluation of sputum examination during an anti-tuberculosis drug resistance survey, Rio Grande do Sul, Brazil

J U Braga,¹ M O Ribeiro,² R M Castro,² F I Mendonça,² V D Micheletti,³ P Paine,⁴ F Moherdau,⁵ J Santos,⁵ C Wells,⁶ D O Garrett.^{5,7} ¹Brazilian Ministry of Health/University of State of Rio, Rio de Janeiro, Rio de Janeiro, ²State Foundation in Health, Production and Research, Porto Alegre, Rio Grande do Sul, ³Secretariat of Health of Porto Alegre, Porto Alegre, Rio Grande do Sul, Brazil; ⁴United States Agency for International Development, Washington, DC, USA; ⁵Ministry of Health/Secretariat of Health Surveillance, Brasilia, Distrito Federal, Brazil; ⁶Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ⁷International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+55) 2125561971. e-mail: ueleres@gmail.com

Introduction: Rio Grande do Sul state accounts for 6% of all new tuberculosis (TB) cases in Brazil and is participating of an anti-TB Drug Resistance Survey (DRS) being conducted nationwide.

Objectives: To evaluate the influence of the time spent between the collection and examination of sputum samples on the yield of sputum smear microscopy.

Methods: We evaluated the time between the a) patient interview, b) sputum collection, c) arrival of sample in the laboratory, and d) realization of smear microscopy. Smear results were reported as negative, inconclusive (1 to 9 acid-fast bacilli), or positive (+ to +++). Slides were prepared utilizing the method of Ziehl-Neelsen.

Results: During the study period, 935 respiratory symptomatic were evaluated in 21 health units participating in the DRS; TB was confirmed in 198 (21.2%). Of 942 samples tested, 717 (76.1%), 211 (22.4%)

Factors	Smear microscopy results—conclusive (n = 928)	Smear microscopy results—inconclusive (n = 14)	Difference	P value
Mean time between the sputum collection and d) realization of smear microscopy (days)	5.6	11.1	5.5	0.0001
Mean time between the sputum collection and arrival of sample in the laboratory (days)	4.3	8.8	4.5	0.0177
Mean time between the arrival of sample in the laboratory and realization of smear microscopy (days)	1.7	2.8	1.1	0.3323

and 14 (1.5%) were negative, positive and inconclusive, respectively. Mean time between the steps evaluated can be seen in table one. Inconclusive smear microscopy results were significantly associated with longer times between sample collection and arrival in the laboratory ($P < 0.001$) and between collection and realization of smear examination ($P < 0.001$).

Conclusion: Results of sputum smear microscopy can be affected by the time between collection and processing of specimens. For the correct identification and inclusion of patients in the DRS, it is important to ensure that sputum samples are processed according to WHO's guidelines.

PS-72151-10 Tuberculosis culture, diagnosis and drug susceptibility testing without centrifugation or decontamination

L Grandjean, L Martin, C Evans. Imperial College Department of Infectious Diseases, London, UK. Fax: (+44) 870 442 1724. e-mail: drlouisgrandjean@hotmail.com

Processing sputum for tuberculosis detection and drug susceptibility with sodium hydroxide destroys many viable tuberculous bacilli. In resource poor countries both sodium hydroxide decontamination and centrifugation are often unfeasible. The effect of sodium hydroxide on H37RV growth was quantified. Subsequently conventional sputum processing using microscopic observation drug susceptibility (MODS) was compared to direct culture in selective media using 715 samples from patients in a Lima shantytown. In liquid media the yield of H37RV decreased by 78% (95%CI 72–85%, $P < 0.001$) following decontamination and centrifugation compared to directly cultured control. In sputum, tuberculosis colony counts were higher when samples were cultured directly ($P < 0.001$). Both techniques detected tuberculosis rapidly in a median of 8.0 days ($P = 0.8$) and simultaneously detected drug resistance with a 98% agreement (Kappa 0.95, $P < 0.001$). Conventional culture was contaminated less and detected 93% (316/338) vs. 73% (246/338) of positives detected with direct culture ($P < 0.001$). Direct sputum culture with MODS is a rapid, simple technique to detect *M. tuberculosis* and determine drug susceptibility, although improved selective media are required to decrease contamination and increase sensitivity.

PS-71264-10 Evaluation of GenoType Mycobacterium assay for identification of clinical mycobacterial isolates in the Caribbean

A Rattan, S Baboolal, D Clarke, L Francis, D Ramkissoon, M Francis. CAREC, Port of Spain, Trinidad and Tobago. Fax: (+1) 686 628 9084. e-mail: rattanas@carec.paho.org

Objective: To identify clinical mycobacterial isolates causing pulmonary disease in the Caribbean region.

Material and Methods: One hundred and ninety six consecutive samples/isolates submitted to the CAREC laboratory were processed for identification by BACTEC 460 and Hain Lifescience's GenoType Mycobacterium CM/AS kits.

Results: Of the 196 cultures submitted or isolated, NAP susceptibility identified 134 as *M. tuberculosis* but NAP test could not be used in 24 contaminated and 16 non viable cultures. GenoType CM/AS kit could be used in all 196 cultures and identified 156 as *M. tuberculosis* and 29 as MOTT bacilli. Species of mycobacteria identified were *M. intracellulare* (7), *M. avium* (3), *M. xenopi* (1), *M. scrofulaceum* (1), *M. fortuitum* (8), and *M. gordonae* (2) while 7 mycobacteria isolates could not be identified to species level using the CM/AS kits.

Conclusions: While *M. tuberculosis* was the commonest mycobacteria isolated from clinical samples, a significant number of MOTT bacilli were also identified. As public health and therapeutic modalities differ, it may be of value to identify isolates to species level in a central laboratory. Seven MOTT bacilli could not be identified to species level indicating the need for further development of the GenoType kit.

PS-71704-10 Results of TB cultures performed at Chris Hani Baragwanath Hospital, Johannesburg

M E Edginton, L Rakgokong. School of Public Health, University of the Witwatersrand, Johannesburg, South Africa. Fax: (+27) 11717 2084. e-mail: mary.edginton@wits.ac.za

At Chris Hani Baragwanath hospital in Johannesburg, South Africa over 7000 patients per year are diagnosed with TB. TB cultures are performed for many patients. **Objectives:** The study set out to measure numbers of TB cultures performed from January to March 2006 and the proportions that were positive and that were registered at the hospital TB Care Centre (TBCC) and the outcomes of those who were not registered.

Methods: Lists of cultures results for the period were received from the National Health Laboratory Service and compared with lists of patients registered with TB. For those not registered, information about whether TB was diagnosed and if treated for TB was sought from a number of sources.

Results: 5404 specimens were sent from 3909 patients, 708 of whom (18%) were culture positive. 279 of the 708 (39%) were not registered at the TBCC. A significantly higher proportion of children were not registered (66 of 122) compared with adults (213 of 586). Follow-up of the 279 revealed that 36% had died, 24% were on TB treatment, 14% not on treatment and 26% could not be traced.

Conclusions: TB cultures are increasingly useful for smear negative pulmonary TB and for suspected drug resistance. The need for this test requires systems for using results for patient management. Suggestions are

made for a system for this hospital with central registration of results and distribution to ensure that positive results are acted upon.

CLINICAL TUBERCULOSIS

PS-71170-10 The comparison of clinical and para-clinical signs in new SPPTB, SNPTB

Ngoc Dinh,¹ Dien Vu Quang,² Trieu Nguyen Xuan.³

¹National Hospital of TB and Lung Disease, Hanoi, ²Phucyen Hosp. of TB and Lung Dis, Vinh Phuc, ³103 Hospital, Hadong, Vietnam. Fax: (+84) 4 76 13 728. e-mail: vnntp463@hn.vnn.vn

Objective: Comparison of clinical and para-clinical signs in new SPPTB, SNPTB and non TB pulmonary diseases to find out the signs for diagnosis orientation of new SNPTB.

Design and method: Prospective, 30 patients with new SPPTB were defined by smear and culture positive sputum, 30 patients with new SNPTB were defined by smear negative sputum but positive culture, 33 patients with non-TB pulmonary diseases were defined diagnosis by smear and culture negative sputum.

Result: There is no significant different between group 1 and 2 about clinical and para-clinical signs. There are 2 signs with significant different between SPPTB and SNPTB: productive cough with small sputum <5 ml per day in group AFB(−) is higher than in group AFB(+) and amount cavities, cavities size >2 cm in group AFB(+) higher than in group AFB(−). The significant signs between group 1, 2 and 3 include: chronic ill (Se 91.7%, Sp 63.6%), losing weight (Se 93.3%, Sp 42.5%), night sweats (Se 60%, Sp 97%), slight fever at evening (Se 86.2%, Sp 80%), long fever (Se 0.6%, Sp 70%), chronic cough (Se 86.7%, Sp 66.7%), hemoptysis (Se 31.7%, Sp 90.9%), Mantoux positive (Se 85%, Sp 78.8%), X-ray (node Se 85%, Sp 75.8%), combination Se 91.7%, Sp 84.8%, upper both of two lungs (Se 35%, Sp 87.9%), fibrilliform cavities (Se 55%, Sp 93.3%). The signs suggest for diagnosis new SNPTB: chronic ill, losing weight, night sweats, fever at evening, slight fever, long fever, chronic cough (>2 weeks), hemoptysis, Mantoux positive, X-ray (node, fibrillar, upper zones of both two lungs, cavity).

PS-71300-10 Therapeutic effect and ADR for pulmonary TB treated by intravenous injection of capreomycin

S Y Gao,¹ S L Zheng,² X L Ruan,² C M Du,² G B Wang.²

¹Henan Center for Disease Control and Prevention, Zhengzhou, Henan, ²Henan Chest Hospital, Zhengzhou, China. Fax: (+86) 68089286. e-mail: gaosanyou@hotmail.com

Objective: To evaluate the therapeutic effect and adverse drug reactions (ADRs) for tuberculosis with

positive sputum treated by intravenous injection capreomycin sulfate.

Method: The tuberculosis with positive sputum were randomly divided into two groups—intravenous injection of capreomycin group and streptomycin group. These were given the chemotherapy 2C(S)HRZE/6H₃R₃E₃, containing capreomycin (or streptomycin), isoniazid, rifampin, pyrazinamide and ethambutol.

Results: The negative conversion rate of the sputum in the end of chemotherapy course were 83.4% and 68.9% for two groups respectively. There were significant difference between intravenous injection capreomycin group and streptomycin group ($P < 0.05$). Total 151 cases treated by CPM—29 cases suffered from ADRs for CPM. The rate was 19.2%. There were total seven kinds of ADRs of CPM. These ADRs were hypokalemia, renal injury, hypocalcemia, cranial nerve injury respectively. Most of them had been happened in the fourth week after CPM had been applied. The ADRs rate was 21.9% in streptomycin groups.

Conclusion: The hypokalemia was the most familiar, and cured by kalium supplied by intravenous drop. Renal injury and cranial nerve damage were more serious. So it is taboo for capreomycin using in tuberculosis of elder and infant.

PS-71405-10 Atypical mycobacteria identified in TB suspects in Lesotho: results from a convenience sample

J J Furin,^{1,2,3} K J Seung,^{2,3,4} J K Joseph,^{2,3,4} J Rigodon,¹ C Cansedda,⁵ H E Satti,⁶ M Letsie,⁷ S Keshavjee.^{2,3,4}

¹Partners In Health Lesotho, Maseru, Lesotho; ²Brigham and Women's Hospital, Boston, Massachusetts; ³Harvard Medical School, Boston, Massachusetts; ⁴Partners In Health, Boston, Massachusetts; ⁵Division of Infectious Diseases, Washington University School of Medicine, Saint Louis, Missouri, USA;

⁶University Research Consortium, Maseru; ⁷Ministry of Health and Social Welfare, Maseru, Lesotho. Fax: (+1) 617 432 6958. e-mail: skeshavjee@partners.org

Background: Lesotho has one of the highest rates of HIV, TB and HIV-TB co-infection in the world (with more than 13 000 smear-positive cases being reported in 2006 alone, from a population of 2.2 million). While the majority of the mycobacteria isolated are *M. tuberculosis*, a proportion are atypical mycobacteria.

Methods: A convenience sample of 50 patients with tuberculosis was collected and sent for drug-susceptibility testing to first and second-line drugs. Samples were assessed for mycobacterial type.

Results: Of the 49 samples that reached the Massachusetts State Laboratory, 14 (28.6%) had positive smears and 17 (37.0%) grew in culture. Of the 17 that grew, 4 were contaminated, 10 were identified as *M. tuberculosis* and 3 as atypical mycobacteria. Two of the three samples were from patients with HIV.

Conclusion: In this convenience sample of patients with TB, HIV and TB-HIV co-infection, 17.6% of samples grew atypical mycobacteria.

PS-71445-10 Assessment of functional capacity in patients with pulmonary tuberculosis using six minutes walk

R Adedoyin,¹ G E Erhabor,² O D Ojo,¹ S Obaseki,² S A Erhabor,² E Haynes.³ ¹Department of Medical Rehabilitation, Obafemi Awolowo University, Ile-Ife, Ile-Ife, Osun State; ²Department of Medicine, Obafemi Awolowo University, Ile-Ife, Nigeria, Ile-Ife, Osun, Nigeria; ³Pelican Health, Florida, USA. Fax: (+234) 803 3829978. e-mail: radedoyi@yahoo.com

Functional capacity assessment has been used to determine severity of diseases and its changes with treatment in patients with COPD. The laboratory tests are usually expensive and time consuming. Six minutes test is now a popular test used. This study was designed to assess functional capacity of patients with pulmonary tuberculosis using 6-minute walk test.

Sixty-five patients with pulmonary TB who were receiving treatment in Obafemi Awolowo Teaching Hospital Complex, Ile-Ife, Nigeria were recruited for the study.

The participants were asked to walk at self pace as fast as they could on a level 30 meter walk way for six minute. The distance covered in six minute, blood pressure and heart rate were measure. Maximum oxygen consumption (VO₂max) an indicator for fitness was calculated using America College of Sport Medicine equation.

The result showed a significant relationship between distance and maximum oxygen consumption ($r = 0.995$; $P < 0.01$). The average distance covered was 492 meter.

Our study concluded that 6-minute walk could be used in assessing functional capacity of patients with pulmonary TB.

PS-71612-10 Can clinicians afford to rely on a chest X-ray suggestive of TB prior to an antibiotic trial?

K Siddiqi,¹ J D Walley,¹ N Safdar,² N Shams,² M A Khan.²

¹Nuffield Centre for International Health and Development, Leeds, UK; ²Association of Social Development, Islamabad, Pakistan. Fax: (+44) 0113 343 3470. e-mail: hssks@leeds.ac.uk

Aim: Guidelines to diagnose pulmonary TB in low-HIV prevalent and low resource settings propose to reserve the use of chest X-ray to after a trial of an antibiotic in order to avoid potential over-diagnosis of TB. On the other hand, it is common practice in Pakistan to take an X-ray at the first visit. We aimed to estimate potential over-diagnosis of TB with the latter approach.

Methods: A group of patients, suspected of smear-negative pulmonary TB in a district hospital in Pakistan (low-HIV prevalent setting), were given a course of antibiotic trial and requested to come for a follow-up in ten days. Chest X-rays were taken at the first and the second appointment. Clinical improvement after the antibiotics was also assessed at follow-up.

Results: We found that out 149 patients with an X-ray suggestive of pulmonary TB at the first visit, 66 patients (44% CI 36–52%) had a clear second X-ray after a course of antibiotic trial. In the other 83 patients with persistent X-ray findings, there was clinical improvement among 46 (55% CI 45–65%) patients after the course of antibiotics.

Conclusion: Diagnosing pulmonary TB based on a chest X-ray prior to an antibiotic trial is likely to lead to over-diagnosis of TB in many cases. On the other hand, reliance on clinical improvement after an antibiotic trial can also lead to false-negative cases. Any new guidance in preparation for the diagnosis of smear-negative TB in low-HIV prevalent settings needs to consider these issues.

PS-71627-10 Multidrug-resistant tuberculosis and *Mycobacterium avium* complex co-infection in an immunocompetent patient

A M Hyson, M J A Reid. Medicine, Montefiore Medical Center, Bronx, New York, USA. Fax: (+1) 718 920 8375. e-mail: anne.hyson@post.harvard.edu

Aim: Present a case of multidrug-resistant tuberculosis (MDR-TB) and *Mycobacterium avium* complex (MAC) co-infection in a patient requiring prolonged hospitalization.

Design: Case report.

Methods: Chart and literature review.

Case: GM, a 57 year-old man, presented to clinic with a cough of 8 months' duration. He also complained of night sweats and weight loss over the previous four months. The patient had been evaluated for these symptoms three months earlier in the Dominican Republic and was put on an unknown antibiotic regimen, which he had not completed. He was subsequently admitted to the hospital, where the initial respiratory isolate was AFB-positive, and was started on anti-tuberculous therapy with isoniazid, rifampin, ethambutol, and pyrazinamide. An initial chest X-ray showed a right upper lobe lesion. DNA probe of an initial sputum sample demonstrated presence of both *M. tuberculosis* and *M. avium*. The patient's sputum isolate was later shown to be resistant to all four first-line drugs and he was started on second-line drug therapy with para-aminosalicylic acid, capreomycin, ethionamide and moxifloxacin. Although he improved clinically, surveillance sputum samples were persistently AFB-positive which subsequently precluded his discharge, in accordance with US Department of Health guidelines. It was only when serial sputum samples underwent DNA testing that persistent MAC co-infection rather than refractory MDR-TB was confirmed. The patient was discharged home to continue treatment on an outpatient DOT regimen.

Conclusion: Although it is established that MAC in sputum is common in patients with pulmonary TB, regardless of HIV infection, this case illustrates the

difficulty in establishing clearance of active MDR-TB in the setting of MAC co-infection.

PS-71897-10 Chest X-ray predictors of relapse of pulmonary tuberculosis in Uganda

C Mukulu,¹ H Mayanja,^{2,3} A Okwera,³ H Luzze,³ E Kiguli-Malwadde,² M Diaz-Insua,¹ R D Mugerwa,^{2,3} C C Whalen,¹ D J Tisch.¹ ¹Case Western Reserve University, Cleveland, Ohio, USA; ²Makerere University, Kampala, Uganda, ³Makerere University–Case Western Reserve University Research Collaboration, Kampala, Uganda. Fax: (+1) 216 368 0883. e-mail: celia.mukulu@case.edu

Relapse of pulmonary tuberculosis (PTB) remains a major stumbling block to the success of ongoing tuberculosis control programs. We conducted a nested case-control study to evaluate the predictive value of baseline and post treatment chest X-rays (CXR) patterns on tuberculosis relapse in Uganda.

Design and methods: This was a Nested Case Control study that used secondary data from The Tuberculosis Research Unit of Makerere University–Case Western Reserve University Research Collaboration database in Uganda. Data had been collected from proven smear positive index PTB patients. Reliability of X-ray data was assessed with a kappa statistic between 2 raters and then between one of the raters and the database. Cases were defined as individuals with recurrence of tuberculosis within the 3.8 years after treatment. Controls were matched to cases by follow-up time from the completion of TB chemotherapy. Comparative analysis of the CXR patterns in the cases and controls was done for both baseline and post treatment CXR.

Results: The inter-rater kappa statistic was highest for disease extent, (kappa = 0.6234), while the rater-database kappa statistic was highest for cavities (kappa = 0.6378). Of the 340 study CXR, the commonest pattern on the baseline CXR in cases and controls were lower lung infiltrates (96.25%, 82.38 respectively). At the end of treatment the most common pattern was upper lung infiltrates (79.73%, 63.22%). The predictive model at baseline included milliary disease (OR = 4.438), lower lung infiltrates (OR 8.879) and high bacillary loads (OR = 2.619). At the end of treatment upper lung infiltrates and residual cavities were predictive of PTB relapse (OR = 2.196, 2.040 respectively). The incidence of relapse was 14.16 per 100 person years.

Conclusion: Relapse of PTB can be predicted from the baseline and post treatment CXR. Any modification to the management plan can be done in a timely manner as to reduce the chances of relapse.

PS-71939-10 Patient delay for new tuberculosis cases Kyrgyzstan, 2005

E Belilovsky,¹ G Tsogt,² I Aitmagambetova,³ A Alisherov,⁴ E Abdrakhmanova,⁴ M Pak,¹ M Favorov.¹ ¹US Centers for Disease Control and Prevention; Central Asia Office, Almaty, Kazakhstan; ²World Health Organization, Central Asia TB Programme office, Tashkent, Uzbekistan; ³US Agency for International Development, Central Asia Republics, Almaty, Kazakhstan; ⁴National Center of Phthisiology, Bishkek, Kyrgyzstan. Fax: (+7) 3272501777. e-mail: belilo5@email.ru

Aims: Patient delay (PD) between development of symptomatic TB and pursuit of clinical care reduces the timeliness of TB case-finding and course of disease. PD risk factors were assessed in Kyrgyzstan (KG) and compared with the previously available data (2006) of neighboring Uzbekistan (UZ) with a TB notification rate about 1/3 of the rate in KG.

Methods: Logistic multivariate regression was used to analyze national TB case-based surveillance data for 2005 in KG (3809 new TB cases). PD defined as months from onset of TB symptoms to first visit to any physician. Degree of PD (DPD1) calculated as proportion of new TB cases with PD >1 month.

Results: The proportion of patients with PD more than one, two or three months were 49.2%, 13.7% and 4.5%, respectively. DPD1 was higher among unemployed (48.7%) than in employed patients (38.7%), OR = 1.5 [95%CI: 1.2;1.9]. DPD1 was higher in rural population (OR = 1.4 [95%CI: 1.1;1.9]) and extra-respiratory TB cases (OR = 3.0 [1.8; 5.1]). DPD1 was less in extra-pulmonary respiratory TB (OR = 0.4 [0.3; 0.5]). PD > 1 month doubled the odds of severe TB forms (OR = 2.2 [1.6; 3.1]) as well as smear positive TB (OR = 2.0 [1.5; 2.7]).

Conclusion: The study demonstrated that rural residence, unemployment and site of TB were significantly associated with PD. PD was associated with high proportion of smear positive TB cases and severe forms of pulmonary TB. The outcomes for KG were the same as for UZ in spite of the sizeable TB incidence difference.

PS-71943-10 Beijing strain *M. tuberculosis* was associated with treatment failure and relapse in a medical centre

J Y Feng, W J Su. Taipei Veteran General Hospital, Chest Department, Taipei City, Taipei, China. Fax: (+886) 228752380. e-mail: peterofeng@yahoo.com.tw

Aim: Despite of the globally reporting of Beijing genotype *Mycobacterium tuberculosis*, the investigation about treatment response of Beijing genotype is still limited. We retrospectively investigated the prevalence, clinical presentations and treatment response of tuberculosis of Beijing genotype among veterans and nonveterans in a tertiary medical center.

Methods: From 2001 to 2004, spoligotyping and drug susceptibility test were performed on 265 *M. tuberculosis* strains isolated from verified cases of culture

positive newly diagnosed tuberculosis patients. Clinical and demographical data of patients with Beijing and non-Beijing genotype infection were compared retrospectively.

Results: Of 265 patients, 151 (57%) patients were infected with Beijing strains, and 114 (47%) with non-Beijing strain infection. Majority of patients were veterans among the Beijing genotype group (59.6% vs. 42.1%, $P = 0.006$). The rate of previous treatment was higher among the Beijing strain group than those of the non-Beijing genotype group (25.2% vs. 9.6%, $P = 0.001$). Patients were younger in Beijing strains group than those of non-Beijing group among the non-veterans (49.5 yrs vs. 61.3 yrs, $P = 0.001$), whereas the rates of treatment failure or relapse was higher in the Beijing strains group among the veterans (17.4% vs. 4.3%, $P = 0.032$).

Conclusions: The study demonstrated that the Beijing genotype strains were more common in reactivation case of tuberculosis, and more often had treatment failure and relapse among the veterans, indicating that Beijing genotype strains may have specific pathogenic properties.

PS-72031-10 Prevalence of *M. tuberculosis* and MOTT among HIV+ and HIV- patients attending the chest clinic in a District Hospital, Nairobi, Kenya

N G Buziba,¹ S J Chebore,¹ C N Akoru,² J O Ndinya,² J K Sitienei.² ¹Dept of Medical Microbiology, Moi University, Eldoret, ²University of Nairobi, Central Reference Tuberculosis Laboratory, Nairobi, Kenya. Fax: (+254) 532061992. e-mail: ngbuziba@yahoo.com

Introduction: Kenya has a large and rising TB disease burden and is ranked among the 22 countries that collectively contribute about 80% of the world's TB cases. As in the sub-Saharan Africa this large increase in TB is attributed primarily to HIV which is largely uncontrolled in many parts of the world.

Study population: Cross sectional design.

Objectives: To determine the prevalence of *M. tuberculosis* compared to MOTT in culture positive specimens.

Materials and methods: A sample size of 150 was collected from the study population who were all new patients attending the clinic sampling was done by use of systematic random sampling. All culture that grew in the LJ medium was identified by use of conventional and biochemical methods. Isolates that were positive for both tests were presumptively identified as *M. tuberculosis* while those that were positive in one or negative in both were identified as negative.

Results: The results indicated that out of 85 specimens that grew, 91.8% were identified as *M. tuberculosis* and 8.2% were identified as MOTT. Among the HIV positive patients 91% of the isolate were *M. tuberculosis* while 9% was MOTT. Among the HIV- the patients 95% was *M. tuberculosis* while 5% was

MOTT. Six MOTT isolates were from HIV+ patients with no previous TB infection while one MOTT isolate was from HIV-ve patient with previous TB infection. **Conclusion:** We conclude that MTB is the most common cause of PTB. The fewer percentage of MOTT was mainly from HIV+ patients indicating opportunistic infections causing TB like illness.

PS-72060-10 The analysis of tuberculosis patients with unusual radiographic findings

T Sevim, G Ataç, G Gündüz, E Aksoy, Y Özmen, N Kapaklı, T Törün, K Tahaoğlu. Süreyyapasa Training and Research Hospital for Chest Diseases, Istanbul, Turkey. Fax: (+90) 216 561 27 12. e-mail: tsevim@superonline.com

Aim: To determine the frequency of unusual radiological findings in adult patients with tuberculosis.

Methods: Chest radiographic findings of 735 HIV(-) tuberculosis patients diagnosed in our clinic between January 2004–December 2006 were reviewed retrospectively. According to radiological patterns on chest X-ray patients were divided into two groups; Group I (patients with usual radiological patterns) and Group II (patients with unusual radiological patterns).

Results: There were 331 (45%) female and 291 (55%) male patients. The mean age was 36.4 ± 16.3 years (range: 16–85 years). Unusual radiographic pattern was observed in 104 (14.1%) of the patients. The most common unusual patterns were; lower lung zones involvement (4.76%), miliary pattern (1.76%), involvement of anterior segments of the upper lobes (1.76%), isolated mediastinal/hilar lymphadenopathy (1.5%), mass lesion (0.95%) and others. Chest X-ray was normal in 2 (0.27%) patients. Unusual patterns were more frequent in female patients (19.3%) than in male (9.9%) ($P = 0.003$). Rate of sputum smear positivity was 74.6%, 50% in Group I and Group II, respectively. Sputum smear analysis has the first place in diagnostic procedures in two groups. Invasive diagnostic procedures were performed more frequently in Group II (28.8%) than Group I (4.3%). Among all patients, 9.5% (70/735) had Diabetes Mellitus (DM). Diabetic subject rates in patients with lower lung zones involvement, patients with involvement of anterior segments of upper lobes and patients with middle lobe involvement were 14.3% (5/35), 30.7% (4/13) and 25% (2/8), respectively.

Conclusion: In our series the unusual radiological patterns are more frequently observed in female patients. Atypical localization of tuberculosis lesions is more frequent in diabetic patient than in non-diabetic subjects.

PS-72080-10 Tuberculosis presentation and outcome among elderly patients

A C C Carvalho, C Marcantoni, R Basché, A Azzini, S Bigoni, G Carosi, A Matteelli. Institute of Infectious and Tropical Diseases (IITD), Brescia, Italy. Fax: (+39) 030303061. e-mail: a.carvalho@libero.it

Background: Elderly persons still represent the majority of cases among Italian born TB patients. Because of associated co-morbidities this population is at higher risk for unfavourable TB outcome.

Objective: To evaluate the TB presentation and outcome among elderly (here defined by age ≥ 60) at one district TB clinic (IITD, Spedali Civili di Brescia).

Methods: All consecutive patients with TB diagnosis identified during the study period (1995–2006) were included. Univariate analyses of clinical and microbiologic data associated with outcome were done. Cox regression models were used to analyse the variables independently associated with decreased survival.

Results: 592 TB cases were analysed: 65.5% (388/592) were male, 74.5% (441/592) were immigrants, 14.5% (86/276) tested positive to HIV infection and 11% were elderly. Among elderly patients 56% presented with extrapulmonary or disseminated disease, 21% had resistance to at least one TB drug (no case of MDR-TB was identified), 19% were HIV seropositive and 14% had other associated co-morbidities. In the univariate analysis elderly cases were more likely to be Italian (OR = 47.80; 95%CI 20.0–114.0, $P < 0.001$), to have associated co-morbidities (OR = 4.73; 95%CI 2.01–11.09, $P = 0.001$) and to die during TB treatment (OR = 7.53; 95%CI 2.96–19.14, $P < 0.001$). In the Cox regression model, HIV infection was independently associated with decreased survival (RH = 6.97; 95%CI 1.88–25.79; $P = 0.004$); age ≥ 60 years increased four times the risk of death, however without reach statistical significance (RH = 4.03; 95%CI 0.88–18.43; $P = 0.07$).

Conclusion: Elderly patients continue to disproportionately contribute to fatal outcome among TB patients in Italy; early diagnosis and prompt treatment in this population are necessary to reduce global TB fatality in Italy.

PS-72117-10 The analysis of tuberculosis cases required stop treatment due to severe adverse effects

T Sevim, E Aksoy, G Ataç, Y Özmen, G Gündüz, K Tahaoğlu. Süreyyapasa Training and Research Hospital for Chest Diseases, Istanbul, Turkey. Fax: (+90) 216 561 27 12. e-mail: tsevim@superonline.com

Aim: To evaluate drug side effects which were required to stop treatment except toxic hepatitis in tuberculosis patients.

Methods: 559 tuberculosis patients hospitalized in our clinic between August 2003–December 2004 were evaluated retrospectively.

Results: Nine patients (1.6%) among all had severe adverse effects. Six (1%) patients had skin reactions, 2 patients had thrombocytopenia and 1 patient had (0.18%) acute renal failure. Skin reactions developed at mean 28.3 days (range: 3–115 days) and treatment interrupted for mean 14.8 days (range: 5–45 days). In only one patient, pyrazinamide could not use in the retreatment protocol. And also in three of cases, corticosteroids were added the treatment regiment. In two cases that had thrombocytopenia, rifampin took out from the regimen. In the other patients who had hemolytic anemia and acute renal failure due to rifampin, rifampin was stopped. This patient was taken to dialysis program and there were no permanent damage in renal function. Among all 9 patients 8 were completed treatment but only 1 was defaulted. **Conclusion:** Although drug-side effects which require treatment interruption can cause serious clinical problems in tuberculosis patients, treatment success can be obtained with proper clinical management.

PS-72193-10 Situation de la tuberculose à Bouaké, République de Côte d'Ivoire

M M L N'dhatz-Sanogo,¹ H V Achi,¹ W F Coulibaly,² E Yao Kouassi.² ¹PPH CHU de Bouake, Abidjan, ²CAT de Bouake, Abidjan, Côte D'Ivoire. Fax: (+225) 22488487. e-mail: ndhatzmel@yahoo.fr

Objectif : Evaluer les résultats de la prise en charge des tuberculeux dans une zone postconflit.

Méthodologie : Analyse des résultats deux études prospectives de cohorte, de tuberculeux TPM+ dépistés et suivis au CAT de Bouaké. Le GI de l'année 2004 comporte 89 patients et GII de 2005-2006 comporte 418 patients.

Résultats : Epidémiologie : la tranche d'âge de 15 à 40 ans est la plus concernée avec 75%. Une prédominance masculine (55,50%) est observée et 3/4 des patients (76,55%) étaient des nationaux. Les sans emplois représentaient plus de la moitié des patients (56, 50) et environ 75% entre eux étaient des analphabètes. La sérologie VIH était positive chez 31,60% des malades dépistés. Le taux d'acceptabilité de réalisation de la sérologie de 80% en 2004 est passé à 55% en 2006. Devenir des patients : la conversion bacillaire à 2 mois est 72% en 2006. Le Taux de guérison de 60% en 2004 est passé à 72% en 2006. Le taux de décès est de 19% en 2004 était à 9% en 2006 et les PDV de 20% 2004 à 12% 2006. Cinq cas de tuberculoses chroniques ont été identifiés dont 2 TMR documentés. **Conclusion :** On note une réduction du taux de perdu de vue et une amélioration du taux de succès thérapeutique qu'il faut améliorer pour atteindre les objectifs de l'OMS dans cette zone post conflit.

PS-72194-10 Pleurésie tuberculeuse: score de diagnostic chez l'adulte

M M L N'dhatz-Sanogo,¹ H V Achi,¹ B Kouassi,² N K J N'drin,³ Y T Aba.³ ¹PPH CHU de Bouake, Abidjan, ²PPH Abidjan, Abidjan, ³Maladies Infectieuses, Abidjan, Côte D'Ivoire. Fax: (+225) 22488487. e-mail: ndhatzmel@yahoo.fr

Objectif : Déterminer un score pour le diagnostic de la tuberculose pleurale chez l'adulte lorsque la biopsie pleurale n'est pas réalisable immédiatement ou réalisée mais non contributive.

Patients et méthodes : Une étude prospective réalisée pour la recherche étiologique des pleurésies à liquide exsudative dans le service de pneumo-phtisiologie du CHU de Cocody. Tous les patients ont bénéficié d'un examen clinique, un examen cytologique du liquide pleurale et de l'analyse anatomopathologique de la biopsie pleurale.

Résultats : 102 patients suivis dans le service ont accepté de participer à l'étude. Cette cohorte est composée de 61 patients de sexe masculin et 41 de sexe féminin. L'âge variant de 15 à 78 ans. 50 patients (49%) ont présenté une tuberculose pleurale histologiquement confirmée, 18 patients (17%) une tumeur secondaire de la plèvre et 01 cas de mycose pleurale. Pour 33 (32.4%) patients le résultat de la biopsie n'a pas été contributif. Pour les cas de tuberculose pleurale histologiquement confirmée composés de 31 hommes et 19 femmes, 31 (62%) ont un âge compris entre 25 et 45 ans, 44 (88%) ont un mode de début progressif et d'évolution chronique, 90% ont présenté des signes d'imprégnation tuberculeuse et contage tuberculeux

Eléments cliniques ou para cliniques	Points si présents ou pas			
	0	1	2	3
Age		<20 ans	≥45 ans	20–45 ans
Antécédent				
Ancien tuberculeux	Non		Oui	
Déficit immunitaire (VIH)	Non		Oui	
Contage tuberculeux	Pas de contage	Tousseur chronique	Contage ancien	Contage récent avec TPM+
Durée des SR		<2 sem	2 à 4 sem	≥1 mois
Signes d'imprégnation tuberculeuse	Non présents		Présents mais incomplets	Présents et complets
Réaction intradermique à la tuberculine (IDR)		Induration <8 mm	Induration 8–15 mm	Induration ≥15 mm ou phlycténulaire
Taux de protides LP	<20g/l		20–30 g/l	≥30 g/l
La cytologie du LP				
Nombre d'éléments/mm ³	<500		500–1000	≥1000
Taux de lymphocytes	<60%		60–85%	≥85%

LP = liquide pleural.

Score <10 = pas de tuberculose ; Score 10–16 = diagnostic probable ; Score >16 = diagnostic fort probable.

récent. 71% ont eu une numération cellulaire du liquide pleural composée de plus de 1000 éléments/mm³ avec plus de 80% de lymphocytes.

Conclusion : Le diagnostic de la tuberculose pleurale est fort probable lorsque le score est supérieur à 16.

Tableau : Score pour le diagnostic de la pleurésie tuberculeuse de l'adulte lorsque la biopsie ne peut être réalisée ou réalisée mais non contributive.

PS-72213-10 Features of pulmonary tuberculosis complicated by meningitis

F K T Tashpulatova. Research Institute of Phthisiology & Pulmonology, Tashkent, Uzbekistan. e-mail: kasten46@mail.ru

Aim: To study features of clinical course of tuberculosis of the lungs complicated by meningitis.

Materials and methods: Thirty-three patients with pulmonary tuberculosis complicated by meningitis have been examined.

Results: Infiltrative tuberculosis of the lungs was revealed in 18.1%; disseminated—in 42.4%; fibrous-cavernous—in 6.0%; tuberculous pleuritis—in 6.6% patients. In 12% patients pulmonary damage and injury of meningeal membranes were combined with abdominal tuberculosis. There were 34.8% males and 65.2% females. A course of pulmonary tuberculosis complicated by meningitis was characterized by a low expressing symptomatics, such meningeal symptoms as nausea and vomiting (in 65.2%), headaches (1091; 100%), hyperesthesia (in 56%), rigidity of occipital muscles and Kernig's symptom (in 100%) of cases were pronounced. A level of protein was increased up to 0.066% in liquor of 47.8%, lymphocytes' cytosis was prevailed in 56% patients. MBT in liquor detected to be in 21.7% patients. In most patients reaction of Pandy was striking positive. Positive dynamics was achieved in only 30.5% patients against a background of 3 months of intensive therapy.

Conclusion: Prevalence of symptoms of damage of nervous system and a low efficacy of treatment were characteristic for tuberculosis of the lungs complicated by meningitis.

PS-71568-10 Profile of non-tuberculous mycobacteria in extra-pulmonary cases and their management

C Iravatham,^{1,2} C Chelluri,² G Saicharan.³ ¹Dr Iravatham's Clinical Laboratory, Hyderabad, Andhrapradesh, ²Krishna Clinic, Hyderabad, Andhrapradesh, ³Apollo Hospital, Hyderabad, Andhrapradesh, India. Fax: (+91) 66623534. e-mail: chitra_chittu@yahoo.com

Setting: Private clinical laboratory.

Aim: Management of non tuberculous mycobacteria (NTM) in clinical practice.

Introduction: About 10% of mycobacterial infections in clinical practice are due to direct inoculation,

aematogenous dissemination or sequelae of surgical complication. We report our findings.

Materials and methods: Between 1998–2004, 155 extrapulmonary cases were screened for acid fast bacilli by Ziehl neelson method and processed for culture by modified petroffs method and MGIT.

Samples included lymph node biopsy ($n = 9$); FNAC (cold abscess) ($n = 142$), sub cutaneous skin abscess due to injection ($n = 2$), and non healing ulcers due to laproscopic intervention ($n = 2$); Sps identification of NTM was done by HPLC and biochemical method at TRC. Chennai. All the patients were on antituberculous treatment and were referred for investigation due to delayed response to treatment.

Results: Out of 71 AFB D/S positive 44 were culture positive and 27 were C/r negative. 84 were D/S negative, out of which 3 were c/r positive. 40 isolates were identified as *M. tuberculosis* complex. Out of remaining 7 isolates NTM identified were; a) *M. fortuitum*, b) *M. chelonae abscess*, c) *M. terrae* and d) *M. scrofulacium*. Treatment protocol included surgical intervention and individualised regimens with amikacin (15 mgs/body wt); clarithromycin (200 mgs BD); cotrimaxazole (bactrim DS); ciprofloxacin or ofloxacin (750 mgs BD). Treatment period varied between 6 months to 1 year with complete healing.

Conclusion: Atypical mycobacteria should be considered as differential diagnosis of non healing ulcers and caseating lymph nodes.

PS-71148-10 Cut-off points of tuberculin skin test to detect LTBI for children under high coverage of BCG

P C Chan,^{1,2,3} L M Huang,² L Y Chang,² Y C Wu,¹ C Y Lu,² H S Kuo,¹ C J Chen.^{3,4} ¹Centers For Disease Control, Taiwan, Taipei, ²Department of Pediatrics, National Taiwan University Hospital and College of Medicine, National Taiwan University, Taipei, ³Graduate Institute of Epidemiology, National Taiwan University, Taipei, ⁴Genomics Research Center, Academia Sinica, Taipei, China. Fax: (+886) 233936149. e-mail: pcanita.tw@cdc.gov.tw

Background: Neonatal Bacillus Calmette-Guérin (BCG) vaccination may confound the induration of tuberculin skin test (TST) in early childhood. The cut-off points defining latent tuberculosis infection (LTBI) remain to be evaluated in children with high vaccination coverage in an area with moderate incidence of tuberculosis.

Methods: A cross-sectional survey of TST induration with purified protein derivative (PPD RT 23 2TU) was conducted on 850 children in 2005–2006. The expected LTBI rates were derived from the TST induration distribution of 2504 seven-year-old children without BCG scars. Goodness of fit was used to identify best cutoff points of TST induration to define LTBI for children with scars. The TST induration distribution of 3523 children having household contact with

sputum-positive confirmed TB case was used to estimate their LTBI rates.

Results: Based on the TST survey of 850 eligible children with BCG scars, the effect of BCG on TST induration decreased with age gradually from vaccination at birth to seven-year old. TST cutoff points derived to define LTBI were set as 23, 19, 13, 10 and 12 mm for ages groups of 0–1, 2–3, 4–5, 6–7 and 8–14 years. These cutoff points had an overall specificity of 89.8%. A cutoff point of 10 mm was recommended for children with household sputum positive contact, and 27.5% of them were found to have LTBI.

Conclusions: This study provided a distribution of TST induration for BCG vaccinated children in a country with a moderate LTBI risk. For them, a set of age-specific TST cutoff points was suggested to define LTBI.

Organization	Cutoff points	Specificity	Sensitivity
US CDC/ATS/AAP	Without contact history	89%	>100%
	4+ years old	15 mm	
	<4 years old	10 mm	
	With contact history or immunodeficiency	5 mm	
World Health Organization	General children	10 mm	90%
	Children with immunodeficiency	5 mm	93%
Taiwan CDC	With BCG scars	18 mm	98%
	Without BCG scars	10 mm	27%
This study	Without contact history	90%	93%
	0–1 year old	23 mm	
	2–3 years old	19 mm	
	4–5 years old	13 mm	
	6–7 years old	10 mm	
	8+ years old	12 mm	
	With contact history	10 mm	

PS-71478-10 Chronic viral hepatitis infection, INH chemoprophylaxis for LTBI and hepatotoxicity: a systematic review

E E Bliven,¹ L J Podewils.² ¹CDC/NCHSTP/DTBE/CHSRB, Atlanta, Georgia, ²CDC/NCHSTP/DTBE/IRPB, Atlanta, Georgia, USA. Fax: (+1) 404 639 8961. e-mail: ddq9@cdc.gov

Objective: To examine chronic viral hepatitis (CVH) as a risk factor for hepatotoxicity during isoniazid (INH) treatment for latent TB infection (TLTBI).

Methods: Search of MEDLINE (1966–August 2006) using terms tuberculosis, antitubercular, therapeutics, prevention, hepatitis, hepatotoxic, and liver injury. Peer-reviewed, English-language articles of persons with a history of CVH who developed hepatotoxicity per WHO criteria during TLTBI were selected. CVH diagnosis required positive serological test or biopsy for hepatitis B or C. Risk ratios and 95% confidence intervals were abstracted or derived.

Results: We reviewed 476 abstracts; 13 studies met selection criteria including: studies in the general pop-

ulation (6), transplant recipients (5), and case reports (2). Variability in study design and case ascertainment precluded a quantitative meta-analysis. Two studies in drug users reported a consistent, positive association between chronic hepatitis C infection and INH hepatotoxicity. Other risk ratios did not significantly or consistently show any association of CVH in patients given TLTBI with the development of INH hepatotoxicity.

Conclusion: CVH is not an established risk factor for INH hepatotoxicity during TLTBI. Controlled studies are needed to define the safety and tolerability of LTBI treatment in those with CVH. Until then, LTBI treatment in persons with CVH should be managed per current guidelines.

PS-72162-10 Managing latent tuberculosis in primary care in the United States

N DeLuca,¹ C Jackson,² J Pang,^{2,3} S Bryant.² ¹Centers for Disease Control and Prevention, Atlanta, Georgia, ²University of Washington School of Medicine, Seattle, Washington, ³Community Medicine & Public Health-Seattle & King County, Seattle, Washington, USA. Fax: (+1) 404 639 8960. e-mail: ncd4@cdc.gov

Background: In 2000, the CDC and the Institute of Medicine encouraged local TB control efforts to partner with primary care providers to eliminate TB among the U.S. foreign born. Primary care providers are encouraged to follow the CDC guidelines for LTBI evaluation and management.

Methods: Seven focus group discussions and 49 key informant interviews were conducted with primary care health providers in 7 different United States cities. Practice patterns, relationships with local TB clinics, knowledge, and perceptions specific to the medical management of latent tuberculosis infection were the focus of audio-taped interviews. Responses were transcribed, coded and modeled to characterize practice patterns and collaboration with local TB authorities.

Results and Conclusions: Clinicians in private practice feel that TB control programs bear most of the responsibility for provider education and LTBI management. Public sector clinicians had more reciprocal contact with TB clinics. Most primary care clinicians interviewed realized LTBI is highly prevalent, but disagreed about how important it is to treat latent TB, especially in light of time and resource constraints, patient attitudes and co-morbidities, and the vicissitudes of health insurance type.

TB-HIV PROGRAMME LINKAGES: I

PS-71110-10 Collaborative HIV and TB activities in South Africa: health policy in the context of two intertwined epidemics

Z Kanjee.^{1,2} ¹Woodrow Wilson School of Public and International Affairs, Princeton University, Princeton, New Jersey, ²Yale University School of Medicine, New Haven, Connecticut, USA. Fax: (+1) 609 356 4032. e-mail: zahir.kanjee@yale.edu

Epidemics of tuberculosis (TB) and HIV are tremendous public health problems in the developing world. Since these diseases strike together, global health policymakers agree that greater collaboration between national TB and HIV programmes is necessary to combat these two infections. Nonetheless, progress in this regard is slow. In analysing the case of South Africa, this paper argues that in addition to technical obstacles, political barriers also prevent successful collaboration. Using a stakeholder analysis informed by over 20 in-depth confidential interviews with South African health policymakers, global TB-HIV experts, policy analysts, representatives from civil society and clinical academics and researchers, this paper recommends several strategies to improve TB-HIV collaboration for a number of actors in the policy environment. A few broad political issues inform the overarching context of health policy and collaboration in South Africa, namely collaboration's status as a 'low politics' issue, power distributions and pressures within the health sector and the relationships between TB and HIV programmes. Major political barriers include the weak role of international institutions in South Africa, a misplaced collaboration coordinating unit within the Department of Health (DOH), the divisive nature of earlier national AIDS controversies and strained relationships between TB and HIV departments. The paper highlights some very urgent and important recommendations. These call for further investigation into the feasibility of the 'one-stop-shop' model of patient care, greater political acceptance of the package of TB-HIV services, improved interaction amongst TB and HIV program personnel via a reorganisation of the DOH superstructure and mutual understanding between staff of the differing philosophies and ethos across TB and HIV control and the active involvement of district managers in bringing facility staff together and acting as champions for collaboration.

PS-71136-10 Initiation of a TB-HIV collaborative programme in Nepal

B Shrestha. Program Division, Oxygen Research and Development Forum, Kathmandu, Nepal. Fax: (+977) 5541555. e-mail: biplabi@ordf.org

Background: In Nepal also the concept of TB-HIV collaboration concept is an emerging concept. With

grant support from OSI (Open Society Institute), from February 2005–October 2005, Oxygen Research and Development Forum (ORDF), had carried out an advocacy program of TB-HIV collaboration in the community level. The program of that period covered a wide range of areas four districts in the country and 10 partner NGOs.

Activities: Participated in TAG's TB-HIV Community Education and Mobilization Workshop in 2004 and 2005, adapted two books entitled 'Interim Policy on Collaborative TB-HIV activities' and 'Stop TB partnership' into Nepali, produced IEC materials, developed and printed a training package on skills-based street-theatre titled Mishap and training in ten partner NGOs, conducted a consultation workshop with EDPs, government and people from I/NGOs, established mechanisms to monitor and report the activities of the 10 network organizations.

Results: ORDF succeeded in raising awareness among EDPs, INGOs, NGOs and government people in the collaborative program of TB-HIV co infection. Many NGOs who are working in the field of HIV are now having TB also as one of the important issues in their programs. As a major result of this advocacy program, the issues of TB-HIV co infection is well addressed in the planning of Six Year National Strategic Plan (2006–2011).

Conclusions: The government needs to be on board for implementation and advocacy efforts. It should also be enhanced as follow up to the ORDF program targeting the governments and donors. Improvement and maintenance of highest standards of TB-HIV services is very crucial. Medical practitioners and DOTS clinicians in the regional and district hospitals should be trained in the OIs, STIs as well.

PS-71230-10 Improving access to HIV care for TB patients in South Africa: a best-practice approach

N Naidoo,¹ K Weyer,¹ M Uys.² ¹Tuberculosis Epidemiology & Intervention Research Unit, Pretoria, Gauteng, ²Foundation for Professional Development, Pretoria, Gauteng, South Africa. Fax: (+27) 123255970. e-mail: natasha.naidoo@mrc.ac.za

Tuberculosis (TB), although curable, is one of the most common causes of HIV-related morbidity and mortality. The unprecedented scale of TB-HIV co-infection in South Africa demands urgent effective action as improved integration of TB-HIV programmes can lead to significant public health gains. Although most WHO strategies to reduce the burden of HIV in TB patients form part of revised TB-HIV policy in South Africa, uptake has been limited. TB and HIV/AIDS programmes have largely pursued separate courses, which result in co-infected patients having to access care from separate facilities or on separate days. This PEPFAR funded project therefore aims to develop a comprehensive

and best-practice approach to integrated TB-HIV care in various settings in South Africa. A model-based approach was implemented at Richmond Hospital, Kwa-Zulu-Natal (KZN), consisting of HIV screening and appropriate referral of TB patients, antiretroviral therapy (ART) for those TB patients who meet national treatment criteria, regular monitoring and follow-up of drug adverse events and adherence to dual therapy, and recording of outcomes after 12 months of integrated TB and HIV management. Thus far 783 HIV-positive TB patients have been provided with palliative care including preventive therapy for opportunistic infections and 238 TB patients have been initiated on ART within the first month of starting TB treatment. Close monitoring of patients on dual therapies has yielded no serious side effects, indicating that TB treatment can safely be initiated early on. Mortality among TB patients has dropped from 37% prior to the model being implemented to 12% at present. Integrated TB-HIV care at Richmond Hospital has significantly decreased patients morbidity and mortality associated with the dual epidemic. The best-practice model to integrated TB-HIV care has been expanded to two new sites in KZN and North West and several other sites have been earmarked for expansion.

PS-71231-10 Private health care sector involvement in provision of TB-HIV collaborative services in Tanzania

M H Makame,¹ K Ramaiya,² G Munuo.¹ ¹PATH Tanzania TB-HIV Project, Dar es Salaam, ²Association of Private Health Facilities, Tanzania, Dar es Salaam, Tanzania, United Rep. Fax: (+255) 222122399. e-mail: mmakame@path.org

Introduction: Program for Appropriate Technology in Health (PATH) in collaboration with the National TB and Leprosy Programme (NTLP), National AIDS Control Programme (NACP) and the Association of Private Health Care Facilities in Tanzania (APHFTA) is scaling up TB-HIV services in the private health sector in 10 districts in Tanzania.

Approach: Through strengthening of human resources capacity, public/private collaboration, stimulation of community awareness of TB and TB-HIV, community mobilization to reduce stigma and promotion of HIV testing and care seeking.

Successes: A Private/Public Coordination Officer was recruited and seconded to APHFTA and 14 private health workers trained in TB-HIV. TB-HIV services are provided in 6 private sector facilities. During September–December 2006, 267 (71.2%) of 375 new TB patients were counselled and tested for HIV; 196 (73.4%) tested positive, of these 177 (90.3%) were referred to CTC where 100 (56.5%) were started on ARVs. An MoU between NTLP and APHFTA on provision of TB and TB-HIV services in the private health sector will be signed shortly.

Challenges: Human resources shortage, lack of phys-

ical space for provision of services, inadequate TB clinics, unavailability of free HIV test kits and co-trimoxazole forcing patients to seek services in the public sector, and provision of completely free services in a business environment hamper scale-up.

Lessons learnt: The private sector is eager to and can provide good quality TB-HIV services. Provision of TB-HIV collaborative services should follow national guidelines and a public/private referral system is essential. Availability of free HIV test kits and co-trimoxazole is vital and involvement of an umbrella national private health sector organization can expedite scale up.

PS-71251-10 Systemic barriers to the implementation of integrated TB-HIV services in 5 districts in Uganda

F Mugisha,¹ R Okot-Chono,² F Adatu,³ E Madraa,⁴ P Dhlwayo,² R Dlodlo,² P Fujiwara.^{2,5} ¹Regional Centre for Quality Health Care, Kampala, Uganda; ²International Union Against Tuberculosis and Lung Disease, Paris, France; ³National TB and Leprosy Programme, Kampala, ⁴National AIDS Programme, Kampala, Uganda; ⁵U.S. Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+256) 41 252839. e-mail: rokotchono@iutatl.org

Background: To understand why Uganda's TB-HIV policy did not improve implementation of TB-HIV services, The Union, in collaboration with the National TB and AIDS control programs, instigated a three phased operations research program in 5 districts in Uganda in 2006. Phase one was to establish barriers affecting integration at various levels of health care.

Design and Method: An exploratory qualitative study design was used to elicit barriers using focus group discussions, key informant and in-depth interviews. A total of 260 subjects including TB and HIV patients, co-infected patients, community members, health workers and district health officials were interviewed.

Results: Limited copies of TB-HIV policy were available at health facilities. Where policies existed, they were not translated into action because no information was disseminated to providers. Poor integration was attributed to lack of provider knowledge on how to implement TB-HIV services, inadequate space that compromised privacy, poor coordination and parallel operations between TB and HIV clinics. Understaffing amidst high TB-HIV service demand resulted in de-motivated staff, increased work load and compromised quality of work, leading to missed opportunities for initiating TB-HIV care. Furthermore, frequent shortages of TB-HIV drugs and supplies especially for ARVs, cotrimoxazole (CPT) and HIV testing kits hindered service provision. Financial barriers hindering access to TB-HIV services were high costs for transport, CD4, X-ray services and procurement of ARVs and CPT (bought locally due to frequent shortages).

Conclusion: For effective policy implementation, strategies should be developed and implemented when

existing health system and health provider aspects are critically addressed.

PS-71306-10 Improvement of TB-HIV at rural health centres by mobile ART clinic

C Dube,¹ C Musiska,¹ I Nozaki,² T Hayakawa.² ¹Ministry of Health, Zambia, Lusaka, ²Japan International Cooperation Agency, Lusaka, Zambia. Fax: (+99) 2591468. e-mail: tadao_h@po.synapse.ne.jp

In Zambia, the accessibility is one of the key issues in health services. In rural areas, people live scattered in the vast land, and it is very difficult for the community people to access to the health facilities. There are only two ART centers which are also diagnostic centers for TB in both Chongwe and Mumbwa districts. In order to provide the better access to the health facilities for the community, we have to utilize the rural health centers as ART centers. However, the Ministry of Health has issued the accreditation guideline in 2006 which requires the certain basic things such as the certain number of staff, equipment, spaces, etc. Therefore, JICA Integrated HIV/AIDS Care Implementation Project at District Level (the Project), which started in April, 2006, focuses on the improvement of ART services in both Chongwe and Mumbwa districts, has provided a 4 wheel drive vehicle to each district, so that ART services can be provided at selected rural health centers by mobile ART team which consists of a doctor, nurses, counselors, lab staff, pharmacist, etc. depending on the necessity of the rural health centers. The VCT service is provided, and further, Diagnostic Counseling and Testing (DCT) will also be provided to the TB patients at those rural health centers. The Finger Pricking method has been introduced for HIV testing, so that the testing can be performed on the spot. The introduction of the mobile ART clinic drastically improves the ART services in both districts.

PS-71350-10 Interventions for healthcare workers' compliance with anti-HIV testing for TB patients

D Silva,¹ M J Pereira,¹ A Trajman,^{2,3} A Kritski.^{3,4} ¹Itaboraí Health Department (SMS), Itaboraí, Rio de Janeiro, ²Gama Filho University, Rio de Janeiro, ³Tuberculosis Research Unit, Rio de Janeiro, ⁴IDT-HUCFF/UFRJ, Rio de Janeiro, Brazil. Fax: (+55) 0312127228630. e-mail: denisefreitasilva@ig.com.br

Introduction: The recent WHO TB report (2007, p 43) indicates a low adherence to its recommendation for offering HIV-testing among TB patients. Globally, only 6.7% of TB patients are tested. Brazil is one of the 6 countries that account for 2.7% of all HIV-infected TB patients.

Objectives: To assess the impact of different interventions on the rate of HIV-testing.

Setting: Itaboraí city, with a population of 221 000 inhabitants, is located 1 hour from Rio de Janeiro, is

one of the 32 priority cities, with a 75/100 000 TB incidence rate. In 2003, DOTS was implemented, the TCP was decentralized using the Family Health Program (FHP) strategy, which currently covers 70% of the population.

Methods: Different strategies were proposed successively and rate of HIV-testing among TB patients by the end of the year of intervention was analyzed.

Results: In Table 1, different interventions and rate of HIV-testing are described.

Table Different interventions and rate of HIV-testing

Intervention	Year	HIV-testing	HIV+
Before DOTS implementation	2000	6%	5%
Before DOTS implementation	2001	11%	2%
Before DOTS implementation	2002	9%	2%
DOTS implementation. Meetings with HCWs, lectures recommending HIV testing	2003	41%	6%
HCWs capacitated for HIV counseling by AIDS Program, refusal by patients registered	2004	58%	5%
Written HIV-testing requested even for those who refused, in case they changed their minds	2005	64%	7%
HIV-testing offered on site of consultation	2006	91%	6%

Discussion and Recommendations: Recognition of HIV infection in TB patients is crucial. In the present study, DOTS implementation resulted in a significant but insufficient increase in HIV-testing. Specific training was also effective, but offering HIV in outpatient facilities or at home was more. Understanding patients' reasons for refusal may result in effective strategies for attaining WHO's goals.

PS-71423-10 Collaboration between the NTP and an NGO in TB-HIV care at sub-district level: experience from Bangladesh

K Hyder,¹ S Sultana,¹ V Begum.² ¹World Health Organization, National TB Control Program, Dhaka, ²National TB Control Program, DGHS, Dhaka, Bangladesh. Fax: (+880) 2 9884657. 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-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, implemen-

tation of DOTS strategy started since March 2004. Till the end December 2006 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 345 suspects among STI were examined and 45 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 has high prevalence of HIV/AIDS, a bordering country of Bangladesh. Detailed results of treatment outcome and process of integration as pilot will be presented.

PS-71480-10 Cost-effectiveness of treatment for isoniazid preventive therapy among HIV-patients in Battambang, Cambodia

B S Sutton,^{1,2,3} P Chheng,⁴ C Eang,⁵ M S Arias,⁴ M E Kimerling.⁴ ¹Dept. of Finance, Economics, & Quantitative Methods, University of Alabama at Birmingham (UAB), Birmingham, Alabama, ²Center for Outcomes and Effectiveness Research and Education, UAB, Birmingham, Alabama, ³Lister Hill Center for Health Policy, UAB, Birmingham, Alabama, ⁴Gorgas Tuberculosis Initiative-Div. Infectious Diseases, University of Alabama at Birmingham, Birmingham, Alabama, USA; ⁵Family Health International, Phnom Penh, Cambodia. Fax: (+1) 205 975 4427. e-mail: bsutton@uab.edu

Aim: To measure the costs and cost-effectiveness of an IPT program for HIV patients in two hospital clinics in Battambang, Cambodia.

Methods: We analyzed monthly administrative budgets retrospectively from September 2003 to February 2006 using a micro-costing approach and interviewed personnel to determine the cost of screening per person, the cost of IPT per person and the cost of post IPT monitoring per person.

Results: The cost of screening per person in 2006 ranged from US\$ 37–40 across clinics. The cost of IPT (with 9 monthly visits) per person was US\$ 28. The cost of post IPT monitoring at 12 months per patient was US\$ 21, while the cost of post IPT monitoring at 24 months per patient was US\$ 33. A sensitivity analysis showed that the cost of IPT per person rose to US\$ 49 when adherence was reduced from the observed 88% to 50%. The cost-effectiveness of IPT fell to US\$ 26 when compliance was increased to 95%. Changes in adherence to post IPT monitoring at 12 months from 30%–60%, led to changes in the cost-effectiveness of patient monitoring from US\$ 43–21. The cost-effectiveness of post IPT patient monitoring at 24 months changed from US\$ 24–61 when adherence to post IPT at 24 months increased from 20% to 50%.

Conclusion: Strong patient monitoring is essential for the sustainability and capacity enhancement of TB screening and treatment of HIV patients in resource constrained environments. Improved patient monitoring

and higher adherence can be achieved at modest levels of cost-effectiveness.

PS-71497-10 Situation assessment of TB and HIV programmes for TB-HIV collaboration in Nepal

S C Baral,^{1,2} B K Thapa,¹ S Kandel,¹ D K Karki,¹ P Malla,³ R Pant.⁴ ¹Health Research and Social Development Forum (HERD), Kathmandu, Nepal; ²Nuffield Centre for International Health and Development, Leeds, UK; ³National Tuberculosis Centre, Bhaktapur, ⁴National Centre for AIDS and STD Control, Kathmandu, Nepal. Fax: (+977) 1 4102016. e-mail: sushilb@mos.com.np

Background: It is estimated that about 70 000 people are living with HIV, and 45% of total population is infected with TB in Nepal. Both diseases are highly prevalent among adult groups.

Objective: Assess the existing situation of TB and HIV programmes, and recommend possible options for TB-HIV collaboration.

Methods: Cross-sectional study conducted in ten districts using qualitative and quantitative techniques. Study participants were TB, HIV and TB-HIV patients, health workers and key stakeholders. Data were analysed using SPSS and grounded theory approach.

Results: TB programme successfully implemented through general health service, achieving global targets over the past several years. HIV programme is expanding services in partnership with civil society organisations. HIV is still concentrated epidemic but it is increasing over the last few years. Surveys showed four fold increase of HIV infection (2.44%) among TB cases; continue increase of HIV may raise TB case load up to 65%. Presently, there is no formal collaboration between two programmes but initiatives have been started. Inadequate access to VCT and DOTS and stigma related to both diseases has weakened service utilisation, placing enormous burden to poor and vulnerable. Very few health workers have received joint training on TB-HIV; however, informal communication exists between VCT and DOTS centres. Lack of joint TB-HIV policy has been a barrier for effective delivery of TB-HIV services in the country.

Conclusion: Increasing TB-HIV co-infections pose a threat to both programmes, which demands development of joint TB-HIV strategy and effective implementation of collaborative activities.

PS-71596-10 Integrated HIV care for TB-HIV co-infection within public health services: the Myanmar model

Min Thwe,¹ Win Maung,² Par Par,³ N Wilson,⁴ H Kluge,⁵ C Casalini,⁵ P H Clevenbergh,⁴ O Picard,⁶ The Township Medical Officers.² ¹National HIV/AIDS Program, Ministry of Health, Yangon, ²National Tuberculosis Program, Ministry of Health, Yangon, ³Medical Unit 1, Mandalay General Hospital, Mandalay, Myanmar; ⁴International Union Against Tuberculosis and Lung Disease, Paris, France; ⁵World Health Organization (WHO), TB/TB-HIV, Yangon, Myanmar; ⁶WHO and Hôpital St Antoine, Internal Medicine, Paris, France.
Fax: (+33) 149956340. e-mail: pclevenbergh@iatld.org

Introduction: Epidemiologic evidence exists for national tuberculosis (TB) and HIV/AIDS programs to collaborate. The Ministry of Health, Myanmar, with technical assistance from The Union, in cooperation with WHO, set up a program to deliver Integrated HIV Care for TB patients and their relatives living with HIV (IHC). IHC includes HIV VCCT and comprehensive treatment of HIV. The program is piloted in Mandalay (800 000 population) in the broader national context of expanding access to HIV services. HIV VCCT is performed in the TB centre and HIV clinical care is delivered by a specialized unit in a tertiary hospital.

Results: Since May 2005, 2808/4115 (68%) adult TB patients and 159 spouse/partner/children accessed HIV-VCCT. 933 (33%) TB patients, 70 spouses and 24 children were diagnosed with HIV. 64% of TB-HIV patients presented with sputum smear negative pulmonary (SS-) or extra-pulmonary (EP) TB. Mortality rate in TB-HIV co-infected patients was twice as high compared to TB patients during TB treatment (13.1% vs. 3.8% for SS-). 631/1027 HIV infected persons were enrolled into the IHC program. Main reasons for non enrolment were: residence outside the eligible area (46%) and premature death (21%). Among those enrolled, 56% were started on antiretrovirals (ART), default rate was 95/618 (15%) and mortality rate was 81/618 (13%).

Recommendations: This model highlights the need to: increase coordination between different health care providers; provide cotrimoxazole pending enrolment and reduce delays in enrolment; investigate optimal timing to initiate ART; improve diagnosis of SS- and EP TB; increase community involvement and strengthen retrieval of patients lost to follow-up and support human resources for HIV VCCT and clinical care.

PS-71707-10 Scaling up intensified tuberculosis case finding at voluntary counselling and testing centres (VCTC) in India

L S Chauhan,¹ J Sokhey,² N Raizada,³ S Sahu,³ F Wares,³ P K Dewan.³ ¹Central Tuberculosis Division, Ministry of Health and Family Welfare, New Delhi, ²National AIDS Control Organization, Ministry of Health and Family Welfare, New Delhi, ³Office of the WHO Representative to India, New Delhi, India.
Fax: (+91) 11 2338 2252. e-mail: dewanp@searo.who.int

Background: In 2006, VCTC availability dramatically expanded in India. India's AIDS and tuberculosis (TB) programmes collaboratively implemented intensified TB case finding of VCTC clients, with TB diagnosis and treatment through the TB programme.

Methods: Trained VCTC counselors routinely screened clients for TB symptoms, recorded referrals, and met with district TB programme staff monthly to determine if referrals were received, diagnosed with TB, and started on treatment under DOTS. We analyzed monthly VCTC reports from January–December 2006 from 6 states with 69% of India's HIV burden.

Results: In 2006, the number of VCTCs reporting on TB suspects referrals increased by 153% (568 [January] vs. 1441 [December]), though in December 445 (23%) of VCTCs did not report. These VCTCs reported 1.81 million client encounters. Of 53 550 persons referred with suspected TB, 11 590 (22%) TB cases were diagnosed, of which 7419 (64%) cases were among HIV-negative persons. In total 9015 (78%) of diagnosed TB cases started DOTS. Intensified case finding in VCTCs accounted for 2.2% of 405 173 notified TB cases.

Discussion: Intensified case finding in VCTCs is feasible on a nationwide scale, and can contribute substantially to TB case finding. However, ongoing supervision is needed to ensure that symptom screening occurs and referrals for TB diagnosis are completed. On the basis of this experience, India's TB and HIV/AIDS programmes are scaling up intensified case finding nationwide in 2007.

PS-71779-10 Experience in the integration of TB and HIV services in Lusaka, Zambia

J Harris,¹ S Hatwiinda,¹ K Randels,¹ M Jham,¹ N Kancheya,¹ P Lumano-Mulenga,¹ E Sadoki,¹ M Kimerling,² S Reid.^{1,2}
¹Center for Infectious Disease Research in Zambia (CIDRZ), Lusaka, Zambia; ²Department of Medicine, University of Alabama-Birmingham, Birmingham, Alabama, USA.
Fax: (+260) 1 293 766. e-mail: Jennie.Harris@cidrz.org

Background: Zambia is faced with dual TB-HIV epidemics. To optimize clinical outcomes, the Ministry of Health has prioritized integration of care for TB-HIV co-infected patients.

Objective: To describe interventions and lessons learned from integration of TB and HIV services in a large, urban public health system.

Methods: Health services interventions were developed and implemented based on careful assessment of task assignments, patient and specimen flow. Interventions included health care provider trainings, diagnostic algorithms to enhance TB case finding, HIV testing for TB patients and referral systems between vertical TB and HIV clinics. As of February 2007, activities were implemented in 7 primary care centers with 124 staff trained. 1039 TB patients have been offered HIV testing. Expansion to 8 additional Lusaka sites is planned during 2007.

Lessons learned: HIV testing uptake was high (73%), but only 54% of HIV-infected patients accepted enrollment in HIV care. Challenges resulted from staffing and infrastructure limitations, large patient loads and insufficient documentation in Lusaka's large primary care centers. Among patients, fear of co-treatment with both anti-retroviral and TB drugs and stigma against TB and HIV were important factors. These challenges were addressed through re-defining staff responsibilities, providing allowances for overtime shifts, utilizing peer educators, modifying infrastructure, re-designing patient flow and tracking systems, and mobilizing community outreach.

Conclusion: HIV integration activities require careful assessment of health services and modifications to address the needs of individual settings. With these considerations, similar programs should be expanded urgently to other sites.

PS-71800-10 Physician adherence to HIV and TB guidelines in Rio de Janeiro, Brazil

V Saraceni,¹ B Durovni,^{1,2} B King,³ L Eldred,³ R E Chaisson.³

¹Rio de Janeiro City Health Department, Rio de Janeiro, ²Federal University of Rio de Janeiro, RJ, Brazil; ³Johns Hopkins University School of Medicine, Baltimore, Maryland, USA.

Fax: (+1) 443 287 7955. e-mail: leldred1@jhmi.edu

Background: Tuberculosis is the most common opportunistic infection among HIV-positive patients in Brazil. Brazil's national policy for HIV care recommends screening for latent tuberculosis (TB) and implementing isoniazid preventive therapy (IPT). We compared physician adherence to TB screening and prevention policies with HIV care and treatment policies among HIV primary care clinics in Rio de Janeiro City (RDJC).

Methods: Standardized data including CD4 count, viral load, tuberculin skin tests (TST), and INH prophylaxis data were abstracted from patient charts at 29 HIV clinics. Pneumocystis (PCP) prophylaxis was abstracted from 150 patient charts at 10 HIV clinics.

Results: Among 13 322 patients with confirmed HIV infection in 2003, 96% had CD4 counts 93% had viral load tests and PCP prophylaxis was prescribed for 97% of patients with CD4 counts <200 cells/mm³, or when clinically indicated. In contrast, 45% of patients had a tuberculin skin test performed; only 11% started IPT. The mean number of CD4 counts per patient per year was 1.11, 1.31 and 1.56 in 2003, 2004, and 2005 respectively. The mean number of viral load counts was 1.17, 1.31 and 1.36, in 2003, 2004 and 2005 respectively. Only 19%, 21% and 22% of patients had TSTs placed in this time period.

Conclusion: Physicians are substantially more compliant with HIV monitoring and PCP prophylaxis guidelines than with TB screening and prophylaxis guidelines. Efforts to improve TB control in HIV patients are badly needed.

PS-71806-10 Improving TB-HIV co-infection services in four Russian cities

V Boguslavsky, O Chenobrovkina, A Ichenko, K Ethier.

University Research Co, LLC, Representative Office, Moscow, Russian Federation. Fax: (+7) 10 495 291 3810.

e-mail: vboguslavsky@urc-chs.com

Prepared on behalf of the members of the HIV/AIDS Treatment, Care and Support Collaborative including QAP staff, health officials, providers, NGO leaders, and PLWHA from St. Petersburg, Orenburg, Togliatti (Samara oblast), Saratov.

Background: The HIV/AIDS epidemic in Russia is among the fastest growing. The incidence of tuberculosis has doubled over the past decade. The number of patients with TB-HIV co-infection has reached almost 13 000. Better integration of TB and HIV services is necessary to facilitate early detection and prevention of TB, as well as improvement of treatment outcomes. Since 2004, the USAID-funded Quality Assurance Project (QAP) has been assisting Russian counterparts in developing an organized model for delivery of treatment, care and support to PLWHA. The improvement collaborative approach is utilized for joint learning and sharing of ideas among interdisciplinary teams of providers from AIDS Centers, TB and narcological clinics, polyclinics, social service institutions and NGOs to work on improving TB-HIV services in the four cities.

Key findings: Within short period of time, the following key results were achieved: decentralization of testing for TB in HIV-positives in polyclinics and an increase in number of clients tested; an increase in number of HIV-positives counseled for TB-HIV co-infection; initiation of IPT in 239 clients; development of a patient record form for IPT; institutionalization of improved practices through adoption of normative documents.

Conclusions: More time and data is needed to conclude about the effectiveness of IPT. However, the improvement collaborative is proven to be a practical and suitable approach for solving such complex problems as TB and HIV services integration.

LUNG HEALTH STRATEGIES AND INTERVENTIONS

PS-71159-10 Comparative impact of results and treatment in TB-MDR, 1999

L Gresely. Depto de Tuberculosis-Direccion de Salud del Guayas, Guayaquil, Guayas, Ecuador. Fax: (+593) 042302491. e-mail: ludwingg71@hotmail.com

Background: In Ecuador initial TB-MDR has a prevalence of 5%, while acquired TB-MDR 24%, according to study made in year 2002, which indicates the presence of an increasing epidemic, and that becomes a true challenge for public health.

The County of the Guayas, starting from the year

1999, it applies outlines with medications of second line, for 18 months, without approaches of inclusion of sick TB-MDR, although it is certain the studies of cohort of the years 1999 and 2001, they reflect low cures and high failures being evidenced and inefficiency of the organization and administered treatment.

Starting from the year 2004, it is implemented organizedly, patients handling with TB-MDR, creating experts' committee, inclusion protocols and hospitalization during the first phase of the treatment, with clinical and bacteriological controls, the cure of 71% of the sick persons is achieved, what evidences impact for better organization and outline of second lines applied.

Results:

Patients	1999	2001	2004
Evaluated	63	129	55
Cured (%)	33 (52)	61 (47)	39 (71)
Failed (%)	14 (22)	20 (16)	2 (3.6)

Conclusions: With the guarantee of the Global Fund and the technical support of the Committee Luz Green, a plan pilot was implemented in the County, the same one that we consider with its application to achieve a decrease in progressive form of cases TB-MDR in Ecuador.

PS-71166-10 'MDR-TB and a second-line drug rapid assessment' is a tool for NTP to realise gaps and develop priorities

K B Navy,¹ M T Eang,² H Sea,² K Seak,¹ S Keo.² ¹USAID Health System Strengthening in Cambodia, Phnom Penh, ²National Center for Tuberculosis and Leprosy Control, Phnom Penh, Cambodia. Fax: (+855) 23 221 433. e-mail: KBNavy@urc-chs.com

Background: Because of the recent reports on MDR-XDR TB and concerns about increasing number of MDR cases in Cambodia, the Cambodian National TB Program (CENAT) and USAID-HSSC project conducted a rapid assessment of MDR-TB situation and availability of anti-TB second line drugs in the country. **Objectives:** To report results of the situational analysis of MDR-TB and second line drug availability and the subsequent development of MDR/XDR TB prevention and control strategies in Cambodia.

Method: Information on MDR-TB and second line drug were collected from CENAT staff, NGOs having MDR-TB programs, reviewing of Drug Lists of MOH and 77 private pharmacies in Phnom Penh. Questionnaires and interviews were used for the assessment.

Results: Cambodia does not have a national program or guidelines for treatment. An infection prevention and control program is also not in place. Human resource and laboratory capacity in diagnosing MDR-TB is limited. There are only two NGOs implementing pilot MDR-TB projects. They use different protocols to manage MDR-TB patients. Eight second line drugs

are sold in the 77 private pharmacies. NTP has used these results to set priorities for the country to provide cure and prevention of MDR-TB.

Conclusion: A situational analysis on MDR-TB and second line drug in Cambodia has been helpful to NTP in setting up priorities for the country to provide cure and prevention of MDR-TB. The fact that many second line drugs are available in the private sector is a big concern. Increasing awareness of using second line drugs properly in both public and private sector is urgently needed.

PS-71241-10 The evaluation of implementing DOTS strategy in Shandong Province of China during 1996–2005

J Cheng. Shandong Center for TB Control, Jinan City, Shandong, China. Fax: (+86) 53186568091. e-mail: chengjun66@126.com

Objective: To analyze the effect of implementing DOTS strategy in Shandong province.

Method: The data from TB quarterly, annual reporting system and other related information during 1996–2005 was collected and analyzed.

Results: During 10 years, the total TB control funds was 214 473 700 yuan (RMB). 1 693 128 TB suspects had been examined and 215 842 cases with pulmonary tuberculosis had been treated free of charge. The trend in the notification rate, negative conversion rate and cure rate showed up by years. The notification rate of smear positive cases increased from 20.18/100 000 in 1996 to 33.28/100 000 in 2005. The average cure rate of initial cases and re-treatment cases with smear-positive were 92.99% and 84.26%.

Conclusion: The successful implementation of DOTS strategy improved the detection and management and reduced the production of drug-resistance TB cases. It made the notion of anti-tuberculosis to be changed and lead the TB control into a new stage of standardized management.

PS-71294-10 Mise en place du programme TB-MR au Rwanda

M Toussaint,¹ I Nzeyimana,² S Mbuyi,² M Gasana.² ¹Damien Foundation / PNILT, Kigali, ²PNILT, Kigali, Rwanda. Fax: (+250) 575928. e-mail: mtoussaint4570@yahoo.fr

Contexte : Les résultats de l'enquête nationale de sensibilité aux antituberculeux réalisée au Rwanda en 2004–2005 ont indiqué que 3,9% des nouveaux cas et 9,4% des cas de retraitement étaient multirésistants.

Méthode : En juillet 2005, le PNILT a démarré un schéma standard de 2ème ligne et une unité de traitement spécialisée. Les critères de sélection sont une tuberculose multirésistante confirmée, l'échec au retraitement ou une tuberculose diagnostiquée parmi les contacts d'un cas multirésistant connu. Tous les

malades commencent le traitement à l'unité spécialisée. Après la conversion des expectorations, ils continuent le DOT en ambulatoire dans un petit nombre de centres de santé. Un suivi bactériologique régulier a été mis en place. Depuis 2006, les cultures et tests de sensibilité sont réalisés en routine par le Laboratoire National de Référence.

Résultats : Au 31 décembre 2006, 86 malades étaient sous schéma de 2^{ème} ligne, parmi lesquels 50 femmes (58%) et 37 malades VIH positifs (43%). 48 cas (56%) ont été mis sous traitement empirique, principalement des échecs au retraitement et des chroniques. La multirésistance a été confirmée pour 74 cas (86%), presque toujours accompagnée de résistance à S et E. Une résistance aux fluoroquinolones a été trouvée pour 5 cas (7,4%), en combinaison avec Cyclosérine pour 2 cas et avec ethionamide pour 1 cas. A la fin du 6^{ème} mois de traitement, 76% des patients évalués (44/58) avaient des frottis négatifs, 32 (55%) avec culture négative et 12 (21%) sans résultat de culture. 7 (12%) étaient décédés et 4 (7%) n'avaient ni frottis ni culture.

Conclusions : Les principaux défis rencontrés lors de la mise en place de ce programme étaient l'instabilité et le manque de formation du personnel, le dépistage précoce et la gestion des effets secondaires, les coûts de fonctionnement des unités spécialisées, la prise en charge nutritionnelle et l'appui socio-économique aux malades.

PS-71326-10 Sustaining TB control in ongoing political conflict in Timor-Leste

N Martins,^{1,2,3} P Kelly,^{1,2,4} A Zwi.² ¹Menzies School of Health Research, Darwin, Northern Territory, ²School of Public Health & Community Medicine, University of New South Wales, Sydney, New South Wales, Australia; ³Universidade da Paz, Dili, Timor-Leste; ⁴National Centre for Epidemiology & Population Health, Australian National University College of Medicine & Health Sciences, Canberra, Australian Capital Territory, Australia. Fax: (+61) 61250740. e-mail: paul.kelly@anu.edu.au

Background: Timor Leste has the highest tuberculosis (TB) notification rate in the Asia-Pacific. Its TB Control Program (NTP) was established soon after violent conflict in 1999. In April 2006 renewed political conflict displaced 150 000 people.

Aim: To examine the impact of the political crisis on the Timor Leste NTP.

Method: Qualitative and quantitative methods were combined to examine how the NTP performed.

Result: The central management unit of the NTP and TB clinics in the capital, Dili, ceased to function for several months. Many TB patients relocated to other districts without proper transfer arrangements. The situation exacerbated previous management weaknesses in the central unit, caused major disruption in Dili (30% default rate in smear positive patients and very few new diagnoses in clinics), but only a small increase in cases in other districts. The program con-

tinued to run due to the high motivation of staff and through informal networks. New strategies were introduced to ensure treatment continuation including early transfer of patients, and using community members as treatment supervisors. Equipment and infrastructure were not targeted and the TB program returned to normal function when the conflict subsided. The expected rebound in case finding did not occur, possibly due to undiagnosed patients in displaced people (IDP) camps without access to TB services.

Conclusion: The NTP survived the conflict and operates in all districts. TB control in long-term, low impact conflicts needs further attention. Mechanisms to link established mainstream health services including the NTP to IDP camps are required.

PS-71342-10 Cost-effectiveness analysis of TB cultures using LJ compared to MGIT liquid media to diagnose TB in Zambia

L Mwenge,¹ D H Mueller,² M Muyoyeta,¹ H Ayles,^{1,2} P Godfrey Fausset,² R Tembwe,³ N Beyers.⁴ ¹ZAMBART Project, University of Zambia, School of Medicine, Department of Medicine, Ridgeway, Lusaka, Zambia; ²London School of Hygiene and Tropical Medicine, London, UK; ³Chest Disease Laboratory, Ministry of Health, Lusaka, Zambia; ⁴Desmond Tutu TB Centre, Stellenbosch University, Tygerberg, South Africa. Fax: (+260) 01257215. e-mail: l_mwenge@yahoo.com

Background: This study was prepared as part of a demonstration project of Mycobacterium Growth Indicator Tube (MGIT) liquid culture technique in resource-poor settings (sponsored by FIND).

Methods: Economic costing using an ingredients approach was performed on homemade and commercial Löwestein-Jensen (LJ) media, manually read and automated MGIT. Costs were collated from detailed observations, expenditure records and interviews. All capital costs were annualized over their estimated lifetime. For MGIT equipment and consumables, preferential costs obtained by FIND for resource-poor settings were obtained. Effects were compared for all 4 techniques done in parallel on 890 clinical samples.

Results: With average throughput between January 2005 and July 2006, costs per processed culture range between US\$ 26–30 for all 4 techniques and US\$ 170–300 per identified *M. tuberculosis* case (precise figures will be presented). Between 50–60% of the cost relate to overhead costs. When maximum possible throughput is modeled, costs per identified *M. tuberculosis* case still remain above US\$ 70. Both MGIT techniques are more cost effective than the LJ techniques.

Conclusion: Mycobacterial culture is expensive under routine conditions in resource-poor settings even for the most cost-effective technique (manually read MGIT).

PS-71363-10 Cost-effectiveness analysis of the T-SPOT.TB test in TB contact investigation

F Marra,^{1,2} N Guo,¹ C A Marra,¹ R K Elwood,² J M FitzGerald.¹ ¹University of British Columbia, Vancouver, British Columbia, ²British Columbia Centre for Disease Control, Vancouver, British Columbia, Canada. Fax: (+1) 604 775 2718. e-mail: fawziah.marra@bccdc.ca

Background: The new immune-based rapid blood test, T-SPOT.TB (Oxford Immunotec, UK), has shown to have high sensitivity and specificity and therefore offers a promising alternative to completely or partially replacing the tuberculin skin test (TST), or in TB control programs. Given that the T-SPOT.TB test is more expensive than the TST, an economic evaluation would provide evidence to facilitate the prioritization of resources.

Objective: To determine whether it would be cost-effective to use T-SPOT.TB in TB contact investigation program.

Methods: A decision analytic Markov model was constructed to represent the epidemiology of TB infection and the diagnosis and subsequent treatment over 20 years. Three screening strategies were compared: (1) TST screening, (2) T-SPOT screening, (3) TST with confirmation of positive results by T-SPOT. Costs and quality-adjusted life years (QALY) were evaluated from the perspective of a third-party payer, the BC health care system. All future costs and outcomes were discounted at an annual rate of 3%. The impact of costs and performance characteristics of diagnostic tests were examined through sensitivity analysis.

Results: In base case analysis, TST strategy was dominated (more costly and less effective) by TST/T-SPOT. When compared with TST/T-SPOT, T-SPOT had an incremental cost-effectiveness ratio of \$-215.5 per QALY gained. Preliminary one-way sensitivity analysis didn't change the overall ranking.

Conclusion: Based on preliminary results, screening TB contacts by using T-SPOT is less costly and more effective compared with the currently used TST.

PS-71428-10 MDR-TB in the National Institute of Chest Diseases and Hospital, Dhaka, Bangladesh: an insight analysis

K Hyder,¹ V Begum,² S Sultana.¹ ¹World Health Organization, National TB Control Program, Dhaka, ²National TB Control Program, DGHS, Dhaka, Bangladesh. Fax: (+880) 2 9884657. e-mail: khyder@dhaka.net

Introduction: The response to the call for information about MDR-TB patients, together with the observation that all but two HBCs plan to introduce appropriate MDR-TB management within two years, shows that the National TB Control Programs are beginning seriously to address the problem of drug resistance. The Global Plan, the new Stop TB Strategy, the 2005 World Health Assembly resolution on sustainable financing for TB Control and the new Inter-

national Standards of TB Care has all encouraged countries to expand their monitoring, diagnosis and treatment programs for drug resistant TB. The National TB Control Program Bangladesh planned to initiate DOTS-Plus Project from this year at the National Institute of Diseases of Chest and Hospital, Dhaka. However the National Institute of Diseases of Chest and Hospital, Dhaka has started implementing management of MDR-TB since 1998.

Objective: To analysis the outcome of MDR-TB being registered and treated by the National Institute of Diseases of Chest and Hospital, Dhaka.

Methods: Cohort analysis of enrolled MDR-TB patients by the National Institute of Diseases of Chest and Hospital, Dhaka.

Results: MDR-TB management started since 1998. Separate block introduced since January 2002. Total beds 47; males: 34 and females: 13. Intensive phase 6 months with kenamycin, pyrazinamide, ethionomide, ofloxacin/ciprofloxacin and ethambutol and the continuation phase 18 months with ethionomide, ofloxacin/ciprofloxacin, ethambutol and pyrazinamide. Till 2006, 290 patients registered for treatment; 130 were cured (44.8%); presently 81 are admitted, 32 getting ambulatory treatment, 12 failed to treatment, 15 defaulted, 20 died. Details will be presented.

Conclusion: The National TB Control Program Bangladesh has intensified its 2006-10 Strategic Plan and gave priority to this challenging area and is expected to treat 700 MDR-TB cases within the next 5 years approved by Green Light Committee.

PS-71507-10 Study on strengthening quality assurance on DOTS Bangladesh, University Research Corporation, USAID

V Begum,¹ S Sultana,² K Hyder,² S D Parveen.³ ¹National TB Control Program, DGHS, Dhaka, ²World Health Organization, Dhaka, Bangladesh; ³University Research Corporation, Bethesda, Maryland, USA. Fax: (+880) 2 9884657. e-mail: vikarun0189@yahoo.com

Introduction: Supervision, monitoring and quality care are important perspective to improve referral of suspects, diagnosis and treatment.

Objective: To determine pros and cons and strengthen supervision, monitoring and quality care on DOTS.

Method: 6 regional supervisors nominated to work in 6 pilots each covering 1 sub-district implementing DOTS.

Results: A 3-day regional supervisory workshops held in 4 batches during last quarter 2005 covering all supervisors from NTP and Partner NGOs. Slide presentation, participatory discussion, brain storming, case study, group work and group presentation were the salient features. The sessions as evaluated by the supervisors were supervision and monitoring (50%), quality care (30%), group work (10%), all of session (10%). The supervisors selected for pilot areas are

performing intensive supervision using NTP check list and other tools. This will reflect challenges and constraints in supervision, monitoring and quality care on DOTS in turn NTP can formulate policies on recommendations further improving status in quality DOTS. **Conclusion:** The assessment results need dissemination among DOTS service providers for both NGO and public sector that will help to build quality assurance system on competitive basis among partners. Details of laboratory quality will be presented.

PS-71520-10 TB recording and reporting in four Ugandan Districts

J Baluka. National TB & Leprosy Programme, Ministry of Health, Kampala, Uganda. Fax: (+256) 41 252839. e-mail: jennifer@ntlp.co.ug

Introduction: Following the 4th International Course in Finance, Management and Logistics in Bangkok in November 2005, an action plan on recording and reporting under the TB control program in Uganda was drawn.

Activities: These included sharing the plan with colleagues, designing an assessment tool which was applied to quarterly reports of 4 districts, drawing up a plan for field visits, visiting the districts in January and March 2006, reviewing subsequent district reports at the national level for completeness, accuracy and timeliness as well as provision of feedback to the district supervisors.

Findings: The baseline assessment of district reports at national level revealed that all four districts had some well-filled sections and varying degrees of omissions, inaccuracies and inconsistencies. A total of nineteen health units were visited. Forty-six registers were accessed; twenty-six had their records correctly entered and twenty-three with entries in all their columns. Comparison among registers in each district showed a wide gap in concordance of information across the board. Over the course of the year, there was notable improvement in accuracy of information reported especially where communication of feedback was successfully done.

Conclusion: Support supervision coupled with provision of feedback to the implementers is able to contribute to improvement in reporting and recording of TB information.

PS-71631-10 Organising an alcohol use disorders treatment programme for TB patients in Tomsk Oblast TB Clinical Hospital

S A Yanov,¹ A K Strelis,² G V Yanova,¹ R R Mazitov,³ D V Taran,³ S S Shin,⁴ V V Provotorov,¹ T A Mathew.⁴
¹Tomsk Oblast Clinical TB Hospital, Tomsk, ²Siberian State Medical University, Tomsk, ³Partners in Health, Moscow, Russian Federation; ⁴Division of Social Medicine and Health Inequalities, Brigham and Women's Hospital, Boston, Massachusetts, USA. Fax: (+382) 2911260. e-mail: janov_seversk@mail.ru

Background: Russia has high prevalence of tuberculosis as well as alcohol use disorders (AUD) that negatively impacts TB treatment outcomes.

Goal: To implement a comprehensive treatment program for patients with TB and AUD within the Tomsk Oblast TB Clinical Hospital, Russia.

Methods: Establishing a successful program for TB and AUD involved identifying members for a working group that included TB doctors, administrators and narcologists; implementing a screening tool; identifying the psychosocial needs of patients with both these comorbidities and subsequently increasing human resources and strengthening the existing infrastructure.

Lessons learned: The screening tool is now used as a guide to determine level of care and type of intervention required. New techniques including biofeedback, psychotherapy, group sessions help both patients and physicians address TB and AUD comorbidities. Psychosocial needs are also addressed with collaboration of religious groups providing spiritual support.

Challenges: Recruiting new personnel and need for constant motivation of physicians, psychologist and social workers to work with patients with both TB and AUD are key factors for a sustainable AUD and TB treatment program.

Conclusion: It is imperative to address AUD in TB patients to improve TB treatment outcomes by designing comprehensive integrated programs.

PS-71633-10 Applying the management and organisational sustainability tool (MOST) for TB control to strengthen the Pakistan NTP

H Sadiq,¹ M Alvaro,² S Pedrao,² D Badar,³ I Ahmed,⁴ A Ghafoor,⁵ B Achakzai.⁶ ¹National Tuberculosis Control Programme, Islamabad, Pakistan; ²MSH, RPM Plus Programme, USA, USA; ³Provincial Tuberculosis Control Programme Punjab, Lahore, ⁴Provincial Tuberculosis Control Programme Sindh, Hyderabad, ⁵Provincial Tuberculosis Control Programme NWFP, Peshawar, ⁶Provincial Tuberculosis Control Programme Balochistan, Quetta, Pakistan. Fax: (+92) 519210663. e-mail: thehassansadiq@yahoo.com

Introduction: Pakistan is classified as a 6th high-burden TB country in the world and the first leading country for the WHO/EMR region. The government of Pakistan revived National TB Control Programme (NTP) in year 2000. Accelerated DOTS expansion started in 2003 and with strong political commitment and widened partnerships DOTS expanded rapidly to cover 100% of the entire population in public sector in 2005. However the detection rate (50%) and treatment success (84%) are still below WHO targets. Factors hindering in meeting WHO targets are: management capacity and lack of human resources and limited involvement of private sector.

Objective: To adapt and pilot a process for improving the management of a NTP.

Methods: The USAID-funded RPM Plus Program, in partnership with Pakistan's NTP, WHO and key

stakeholders have been working to strengthen managerial capabilities at the national and four main 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. Facilitated by RPM Plus Program, a MOST for TB workshop, attended by participants working at the managerial and technical level of Pakistan's NTP, was used to enhance management development.

Results: Using MOST/for TB, Pakistan's NTP developed a baseline assessment of their management capacity, a set of performance improvement target indicators, and five action plans for central and provincial levels. Using the time table agreed upon during the workshop, the action plan is now underway.

Conclusion: MOST/for TB is an appropriate tool for addressing management capacity issues challenging many NTPs.

PS-71703-10 TB control in Zimbabwe: analysis of civil society participation

N Moyo. Zimbabwe Grace Trust, Bulawayo, Zimbabwe.
Fax: (+263) 9882630. e-mail: nickymoyo@yahoo.com

Introduction: The TB epidemic has grown rapidly with spread of HIV/AIDS. Case detection rate in 2004 was low at 42% while treatment success was 66% as reported by the National TB Programme Zimbabwe. TB control in Zimbabwe is carried out only through public health institutions. Civil society participation is essential particularly in areas of care and support if the national TB programme is to be a success.

Objective: The paper will through a case study of the national TB programme in Zimbabwe share lessons of challenges. It will aim to provide a framework to increase civil society participation in the TB with view to increasing detection rates and treatment success of TB responses.

Issues: A review is carried out of the national TB programme, funding trends and challenges. Participation of civil society in planning, implementation and resource mobilization will be reviewed. It will be argued that there is weak civil society representation or no involvement in defining issues of TB control. However, with the huge cover of civil society in HIV/Aids issues at grassroots level, opportunities are available to expand the responses to TB control through joint HIV/Aids and TB issues at community level.

Conclusions: Increased civil society participation in TB responses can be achieved through TB technical capacity building in civil society, integrated TB and HIV/Aids responses at community level. Global Fund application processes at the Zimbabwe Country Coordinating Mechanism need to be transparent, inclusive of needs of community based organizations.

PS-71756-10 Challenges of MDR-TB diagnosis and patient management in high HIV-prevalence settings

L Ohler, M Okuda, H Hueriga, C Genevier, F Varaine.
Médecins sans Frontières, Paris, France. Fax: (+33) 148066868.
e-mail: fvaraine@msf.org

Context: An HIV-TB clinic in Mathare slum (300 000 inhabitants) in Nairobi (Kenya) and a hospital in a rural district with high HIV prevalence (30%). Poor access to culture and 1st line Drug Susceptibility testing (DST). No inpatient facility with adequate infection control measures available in Nairobi.

Objective: To describe and analyse the challenges of MDR-TB patient care in high HIV prevalence settings.

Methods: Retrospective review of MDR-TB patients files diagnosed in 2005–2007. Cultures and DST were performed for all category 1 patients sputum positive at 3 months, and for all category 2 patients at baseline. MDR-TB treatment regimen included Kanamycin, Levofloxacin, Prothionamide, Cycloserine and PAS. Injectable was given for at least 6 months and other drugs continued for at least 18 months. Treatment given on outpatient basis.

Results: 11 patients were confirmed MDR-TB: 8 are on treatment, 1 refused, 2 died before treatment. Patients take 14–26 tablets and 1 injection daily and have to come twice a day for drug delivery. All patients complain of nausea and vomiting, 3 had diarrhoea, 1 had hallucinations and mental confusion, 1 had hypothyroidism; 3 patients are HIV co-infected and co-treated by HAART. Infection control measures are limited: patients live with their families in small rooms without sunlight nor ventilation. Part of the personnel is HIV positive. 1 nurse died from MDR-TB.

Conclusion: Ambulatory based treatment of MDR-TB was the only feasible strategy in these setting. Delayed diagnosis, current long and toxic treatment and HIV co-infection reduce the chances of cure and make the infection control measures almost unworkable.

PS-71770-10 Chest X-ray screening and treatment of inactive pulmonary tuberculosis in a high-incidence country

R Cowie,¹ B Manns,¹ E Bateman,² S den Boon,³ N Beyers.⁴

¹University of Calgary, Calgary, Canada; ²University of Cape Town, Cape Town, South Africa; ³KNCV Tuberculosis Foundation, The Hague, Netherlands; ⁴Desmond Tutu Tuberculosis Centre, Cape Town, South Africa.

Fax: (+1) 403 943 4848.

e-mail: dina.fisher@calgaryhealthregion.ca

Treatment of individuals with inactive pulmonary tuberculosis has been shown to prevent cases of tuberculosis and improve quality-of-life at a 'reasonable' cost in North America. The economic feasibility of screening and treatment of inactive pulmonary tuberculosis has not been established in South Africa, a

country with an increasing tuberculosis epidemic. As such, cost-effectiveness and cost-utility analyses were performed to determine the benefits and costs of a chest X-ray screening and treatment programme for individuals with inactive pulmonary tuberculosis in South Africa. Comparing this intervention with usual care, the incremental cost per QALY gained and the cost per active case of tuberculosis prevented were 31 043 Rand and 17 384 Rand respectively. Screening and treating individuals thirty-five years of age and older instead of individuals fifteen years of age and older and use of miniature chest X-rays for screening instead of conventional chest radiography improved the economic attractiveness of the proposed programme.

PS-71838-10 Age and sex distribution amongst pulmonary tuberculosis patients in Punjab province, Pakistan

N Muham,^{1,2} B Darak.¹ ¹Provincial TB Control Program Punjab Lahore, Pakistan, Lahore, Pakistan; ²Research Institute of Tuberculosis, Tokyo, Japan. Fax: (+92) 429203750. e-mail: mnaeemdr307@yahoo.com

Background: Pakistan is high burden disease country for tuberculosis. Province Punjab has 89.9 millions populations which is more than half population of country. DOTS Strategy was operationalised in year 2000 and expanded rapidly in all 35 districts. Tuberculosis is one of major illnesses responsible for increase in morbidity and mortality.

Objective: To determine sex and age specific trends of tuberculosis and its control in province Punjab Pakistan.

Method and study design: Descriptive retrospective observational study in 35 districts of Punjab.

Data Collection: Data was collected from quarterly surveillance reports.

Key findings: Smear positive case registered in year 2000 and 2001 in age group 15–24 years were 30% and 37% respectively while in age group, >65 years, it was 3% and 7%. In year 2006, case registered in age group 15–24 years were 20% while in age group, >65 years, these were 9%. Data of years between 2001 and 2005 shows intermediate results. Data shows that there is significant decrease in distribution of cases in age group, 15–24 years in year 2006 as compared to those in 2000 and 2001 ($P = 0.02$). Although there is trend in increase in case in age group >65 years in year 2006 as compared to those in 2000 and 2001 but this increase is not significant ($P = 0.06$). In 2001 male patients registered were 56% and female 44% while in year 2006 male were 54% and female 46%. Data show no significant change in trend in sex distribution ($P = 0.7$).

Conclusion: Analysis made, is based on data of short rang 2000 to 2006. Significant decrease in cases distribution in age group 15–24 years, from year 2000 to 2006 and increase in trend of case distribution in

age group >65 years, from year 2000 to 2006 show successful start of tuberculosis control program in province Punjab.

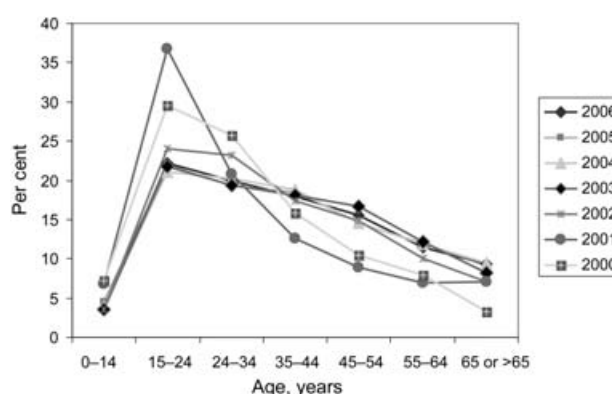


Figure Age distribution amongst pulmonary tuberculosis patients in province Punjab Pakistan.

PS-71843-10 Working with clinic staff to roll out community-based TB treatment and improve TB control performance

A S Millar,¹ Z A Arosi,¹ N Cameron,² V Azevedo,³ L Smith.¹ ¹TADSA, Cape Town, ²Community Health, University of Stellenbosch, Cape Town, ³Department of Health, City of Cape Town, Cape Town, South Africa. Fax: (+27) 219451758. e-mail: asmtadsa@iafrica.com

Objective: Assessing the effect of TADSA's CHW development programme on TB programme performance.

Background: South Africa faces a growing TB epidemic in the face of high HIV prevalence. The national treatment success rate of new, smear-positive TB clients (70%: WHO report 2007) and the treatment interruption rate (10.3%: South African Health Review, 2005) are sub-optimal for preventing the growth of multi, and extensively, drug-resistant tuberculosis—which could put TB control out of the country's reach.

TADSA the TB Alliance DOTS Support Association is an NGO working the South African NTCP in 153 facilities in 20 sub-districts in seven of nine provinces to help strengthen TB programme performance. TADSA's programme aims to help staff at primary care clinics set up and manage community-based TB treatment support in the context of a functioning TB control programme within the facility.

TADSA works with sub-districts selected by the provincial and district TB coordinators in consultation with facility staff in the sub-districts.

39 clinics have begun reporting on community programmes—comprising 471 TB Treatment Supporters supporting 1507 TB patients.

Method: Through workshops, regular monitoring and evaluation and facility support visits, TADSA helps health workers to develop the systems and capacity to manage and support community-based TB care, while strengthening their conventional TB control systems.

Results: TB programme results of the clinics with which TADSA is working will be discussed.

PS-71844-10 Using developmental techniques to improve facility TB programme management: case study, Thaba Nchu

A S Millar,¹ Z A Arosi,¹ N Cameron,² Y Tsibolane,³ L Smith.¹

¹Research and Development, TADSA, Cape Town, ²Community Health, University of Stellenbosch, Cape Town, ³Free State Department of Health, Bloemfontein, South Africa.

Fax: (+27) 219451758. e-mail: asmtadsa@iafrica.com

Objective: To assess what effect TADSA's CHW development programme has on strengthening TB programme management in the primary care facilities in the Thaba Nchu sub-district of Free State Province, South Africa.

Background: TADSA (TB Alliance DOTS Support Association) is an NGO working the South African NTCP in 20 sub-districts in seven of nine provinces to help strengthen TB programme performance. TADSA's programme aims at helping staff at primary care clinics set up and manage community based TB treatment support in the context of a functioning TB control programme within the facility.

TADSA works with sub-districts selected by the provincial and district TB coordinators in consultation with facility staff in the sub-districts.

An evaluation system has been developed to evaluate key process aspects of TB management: prioritising TB clients' clinic visits, availability of TB information, staff training, availability of stationery and bacteriology supplies, regular meetings to discuss outcomes, stock control of drugs and quality control of record-keeping. The results are discussed with clinic staff and district and sub-district managers, and an action plan developed to address issues raised by the evaluation.

Methods: In 2006 TADSA conducted the evaluation in the four clinics of Thaba Nchu sub-district of the Free State Province. The results were discussed with clinic staff and the sub-district management. After support visits by TADSA staff the evaluation was repeated 13 months later.

Results: The findings of the evaluation and the effect on TB programme outcomes will be discussed.

PS-71850-10 Accuracy of sputum microscopy in Tuguegarao City Health Office based on blinded slide rechecking

J Mangulad, S G Pagulayan. Tuguegarao City Health Office—Philippines, Tuguegarao, Philippines.

Fax: (+63) 788464870. e-mail: ann20et@yahoo.com

Primarily, case detection of tuberculosis depends on quality sputum smear microscopy for an effective TB control. To ensure the implementation of External Quality Assessment, Tuguegarao City Health Office—

PPMD has always been submitted for blinded slide rechecking with a sample size of 66 slides annually.

Since it is a pioneer PPMD unit in the region, it is the aim of the medical technologists to deliver quality and standardized laboratory services.

In the last quarter of 2004 up to last quarter of 2006, it was reported by the Provincial validators that in slide reading quality check with 131 slides it has a mean of only 0.76% QE major and 3.81% QE minor. In smear preparation quality check assessment, it was noted that the mean for good specimen quality is 98.33%; in staining technique, good staining has a mean of 90.83%; in cleanliness, it has a mean of 99%; in thickness, the mean for good thickness is 64.08%; for size, the mean for good size is 60.5%; and in evenness, the mean for good evenness is only 30.17%.

It is to be considered that not only sputum microscopy is being rendered in this facility. It is a laboratory that caters the necessary routine lab services manpowered by two medical technologists. With an average of 20 TB symptomatic patients daily, it is not sufficient to have only two medtechs as TB microscopists to sustain a good smear preparation. Pressured with time, it was noted that amidst the poor evenness and size, still, the quality of the specimen is a manifestation to an excellent standing with regards to slide reading.

Therefore, it is recommended for an additional medtech for the facility to render a more quality time in smear preparation to better facilitate and sustain TB detection through a quality sputum microscopy.

PS-71875-10 Asthma control activities in four cities in Brazil

H Campos,¹ P Camargos,² G M Calazans,² Z M Caldeira,³ E B Ceccon,⁴ G B Fischer,⁴ V C D Micheletti,⁴ J L K Borges.⁴

¹Centro de Referencia Prof. Helio Fraga, Rio de Janeiro, RJ,

²Federal University of Minas Gerais, Belo Horizonte, MG,

³Niteroi Health Municipal Secretary, Niteroi, RJ, ⁴Porto Alegre Health Municipal Secretary, Porto Alegre, RS, Brazil.

Fax: (+55) 21 25529500. e-mail: hisbello@globo.com

Aim: To present data regarding asthma programs in four cities in Brazil.

Asthma is an important Public Health problem in Brazil. During the period 1979–2006 (data from 2006 includes the months from January to October), asthma was responsible for an average 2155 deaths/year (6 per day). From 1992 to 2006, asthma was responsible for an average of 324 237 hospitalizations/year (888 per day) in the public hospitals, at a cost of US\$ 52 million/year. During the last decade, some cities implemented asthma programs, with standardized asthma control measures within its health system. The main objectives of these programs include: to decrease asthma morbidity and mortality; to reduce both the number of hospitalizations and emergency consultations, to reduce the cost and absenteeism rate. Among those cities,

Belo Horizonte, Niteroi, Porto Alegre and Caxias do Sul are examples of good results. In all of them, the implementation of the asthma program was preceded by definition of standardized actions and medicines; training process of health care workers, including physicians and nurses. In all four cities, inhaled medicines (beclomethasone and salbutamol) were given free to the registered patients. Immediate results included reduction of hospitalization rates.

Conclusion: Implementation of standardized and effective asthma control procedures within the public health system results not only in good care of the population but also in economy of resources.

PS-71922-10 Is there a role for the private sector in HIV-TB co-infection management? Evidence from India

S G Rangan,¹ A M Kudale,¹ Saju Joseph,¹ S Salve,¹ K Kielmann,² J Porter.² ¹Maharashtra Association of Anthropological Sciences, Centre for Health Research and Development, Pune, Maharashtra, India; ²London School of Hygiene and Tropical Medicine, Health Policy Unit, London, UK. Fax: (+91) 02025897298. e-mail: maaschrd@vsnl.net

The role of the private sector in the management of TB has been globally acknowledged, and efforts have been made to involve them in national TB control programmes. Evidence regarding the role of the private providers in the management of HIV is also now emerging, although HIV programmes have not gone beyond collaborating with NGOs to provide care and support to people living with HIV/AIDS. The problem of HIV-TB co-infection poses challenges for both the TB and HIV programmes. There is now a need to define the role of the private sector in the management of co-infection. This paper uses data from three studies in rural and urban India to discuss the current and potential role of the private sector in the management of HIV-TB co-infection. Using the lessons learnt from the TB programme, it argues that involving private providers in the management of HIV-TB co-infection could, perhaps, help us re-define 'partnerships' between the TB and HIV programmes and between the public and private sectors.

PS-71926-10 Quality management in a public health intervention

E Louw, G Churchyard, L Coetzee. AURUM Institute for Health Research, Centurion, South Africa. Fax: (+12) 6431383. e-mail: lcoetzee@auruminstitute.org

Background: A study of community-wide isoniazid TB preventive therapy is being evaluated among South African gold miners that aims to rapidly and significantly reduce TB incidence (Thibela TB).

Purpose: To describe the quality management program of THIBELA TB to ensure

- professional care of all participants
- management of participant safety

- acceptable quality data delivered within agreed timelines
- promote adherence to regulatory, protocol and good clinical/epidemiological practice requirements

Approach: Key to quality control is standardised procedures, compliant with the study protocol and regulatory requirements. 30 procedures were developed to facilitate conduct of the study. Quality control activities such as audits and monitoring are performed routinely to ensure compliance with procedures and identify problem areas relating to the public health nature of the study. Tools were developed to perform review activities e.g. checklists, observation checklist, interviewing tools, as well as cross verification tools. Discrepancies between operational implementation and procedures are identified and reported to operational teams. Operational teams review findings and take corrective action as indicated, followed by training of the team.

Contribution: Operational implementation of the quality management program posed a number of challenges which will be discussed in this poster.

PS-71964-10 HIV prevention

V Kangwa. TALC Advocacy, Lusaka, Zambia. Fax: (+260) 1 281333. e-mail: victorkangwa07@yahoo.com

There have been several attempts to reduce HIV/AIDS in the various parts of the world including Zambia. This disease kills thousands of people each day thereby reducing the population.

Issue: HIV/AIDS is an epidemic spreading rapidly in Zambia. Research reports 'the disease affects about 200 people each day'. Attempts have been made to eradicate it totally from the system by governmental and non-governmental organizations through the provision

- Does everyone really know about HIV/AIDS?
- Are enough drugs being given to the patients?
- Are there policies that regulate the activities of the commercial sex workers?
- Are the AIDS patients given attention in the society to avoid the spread of the disease?

Conclusion: We can infer from the above that though the various organizations are trying their best to eradicate the disease, it rather seem to be increasing. Information dissemination has still not gotten to certain typical rural areas. Moreover, there are no policy.

PS-71972-10 GO-NGO partnership in a TB control programme

S Bandyopadhyay. German Leprosy & TB Relief Association, Kolkata, West Bengal, India. Fax: (+91) 3322164339. e-mail: ers@glra-ales-india.org

Introduction: The main components of TB control are early diagnosis, specially NSP, microscopy, conversion, cure and curving defaulter rate. Partnership

between government and NGO sector produces quality service. Government system has wider coverage, adequate infrastructure, logistics, sound reporting system. NGO sector have higher motivation & commitment level, competent & accountable management and greater involvement with community. Combination of two sectors ensures quality service delivery. This was experienced in India analysing the activities of 7 NGO projects (5 supported by GLRA & 2 by Swiss-Emmaus) for 2 years' activities (2005–2006).

Objective: To provide the significance, need and outcome of GO-NGO partnership in RNTCP.

Method: The NGOs BAM-India, SWORD, Puri Project, DTST North 24 Parganas, DTST Hoogly are conducting activities in Urban area while GMLF Balarampur and Jhargram Leprosy Project working in rural area in close coordination with Government. BAM-India and Puri with MCTC & DOTs, SWORD with DOTs but collaborates government MCTC, GMLF with MCTC and collaborative DOTs, Jhargram with collaborative DOTs, DTSTs with technical support to districts and supervision is joint.

Result: In collaborative process, Intensive IEC has resulted into New Case Detection (NSP) to 90%. Three new microscopy centers established, counseling and follow up resulted into 91% conversion rate, 88% cure rate, successful sensitisation and involvement of medical fraternity and capacity building of health/development personnel, involvement of volunteers to provide DOTs and socio-economic rehabilitation of persons in need. Efforts put to curve defaulter rate.

Conclusion: To achieve the objectives of RNTCP, greater involvement of NGOs with effective partnership with government is observed to be necessary to reduce morbidity impact aiming at national development.

PS-72088-10 National Tuberculosis Control Programme, Egypt, 2006

E Elmoghazy, A Galal, S Victor. National TB Control Programme, Cairo, Egypt. Fax: (+20) 27921079. e-mail: elmoghazy@yahoo.com

Egypt has an intermediate incidence of tuberculosis. The estimated incidence rate of all TB cases is 25 per 100 000 population. Every year about 20 000 people are estimated to develop TB in the country, 83% of the cases occur in the productive age groups (between 15 and 54 years). TB therefore is an important public health problem.

NTP started implementing DOTS in 1996, and achieved the Regional Targets of DOTS ALL OVER in 2000.

In short, case detection rate is 61%, and a treatment success rate is 79%. In order to accomplish the global targets the NTP made efforts involve other health care providers in DOTS (DOTS comprehensiveness) progress is made through establishment about 59 new diagnostic centers in all governorates,

68 new Health Insurance Organization (HIO) specialized TB centers, training of the health staff of the private sector, prisons, universities, NGOs etc. in diagnosis, treatment, recording and reporting.

The NTP also made efforts to improve quality of DOTS activities by internal & external quality assurance of the laboratories activities, electronic nominal recording-reporting system.

DOTS-Plus activities also started by establishment of specialized multidrug-resistant (MDR) diagnosis and treating center for 75 MDR patients in 2006.

PS-72217-10 Tuberculosis situation in the Province of Azúa, Dominican Republic, 2001–2005

A L Matos Novas, R Díaz. Programa de Control de la Tuberculosis, SESPAS, Dominican Republic. Fax: (+809) 521 6016. e-mail: analuisa_1960@hotmail.com

Summary: 1971 beginning the control program of the tuberculosis in the Province of Azúa. 2001 the situation of TB in Azua and introduction is characterized strategy DOTS. 2004 strategy DOTS/TAES expands. The incidence rates of Azua (2001–2005) was between 34 and 48.1/100 000 inh.

Methods: Revision of record books of new cases of 2001–2005 TB and individual registries of the cases of the 2005. To the groups of age and sex by municipality described themselves. The data were purified, validated and process in Excel and EPI-INFO 3.3.

Results: As of 2001, the number of cases of tuberculosis ($n = 121$) increases, number discreet variations until 2004, when the program introduces and expands strategy DOTS/TAES. The greater increase was registered in 2004, 124 cases (22.4%). TB happens more in men, reason of 2.2 for the 2004. The rate of incidence increase as of 2002, oscillating between 21 and 44/100 000 hab. The greater rate of incidence is registered in the envejeciente population, the group of 65+ years (82 by 100 000 hab.). The municipality with greater incidence is: to palmar of ocoa (87/100 000 hab.) and the minor the municipality of old town (4/100 000 hab). In the 2005 program it caught 113 cases: new 108 96%) and 5 relapses. Laboratory test to the 100% of the cases, treatment shortened in the 96 was made. % of the cases and pursuit with 4.5 strategy DOTS/TAES to 100%. Average baciloscopia control to the cured ones, 112 cases cured (98%); to pos 51% 1 baciloscopia treatment. 0% of the cured ones turned time of treatment.

Conclusions: Important differences of incidence between municipalities exist. Most of the cases are diagnosed by laboratory, they initiate treatment before one week and are followed in good condition. Laboratory controls are made to consider the discharge of the patients, do not occur later pursuit, do not know the time of treatment. We need to reinforce the mon-

itoring and supervision and qualification of the resources and to incorporate the monitoring.

TB IN HIGH-BURDEN COUNTRIES: I

PS-71106-10 Results of the DOTS implementation in Kosova, for the 5-year period, 2001–2005

B Tigani. Ministry of Health (PIU of the Global Fund), Prishtina, Kosova, Serbia and Montenegro. Fax: (+381) 0 38 200 24 085. e-mail: btigani2000@yahoo.com

Objective: To determine the results of the 5 year period DOTS implementation in Kosova.

Methods: TB reports of years 2001–2005 were used and analyzed different indicators.

Results: Number of TB cases decreased from 1674 (74/100 000) in year 2001 to 1102 cases (52/100 000) in year 2005. This decrease for the period of 5 years (2001–2005) presents 26% decrease of case notification with median annual decrease of 5%.

Number of SS+ cases (Sputum Smear positive cases) decreased from 461 (year 2001) to 232 (year 2005).

Bacteriological confirmation of cases among pulmonary cases was 41.8% (2001) and decreased to 31% (2005).

Proportion of pulmonary/extra pulmonary cases during the 5 year period was 80% pulmonary and 20% extra pulmonary.

Percentage of Relapses among Positive Pulmonary cases was 18.6% (2001) and decreased to 15% (2005).

The age-group distribution though 5 years (2001–2005) was very similar with the pick of cases in the age group between 15–34.

‘Treatment Success’ of new positive pulmonary cases in year 2002 was 90%, 2003–89% and 2004–93%. ‘Treatment Success’ for Relapses was 80%, 77% and 76% for the same period.

Conclusion: With successful implementation of the DOTS strategy in Kosova the number of TB cases decreased during 5 year period (2001–2005). Decrease of the bacteriological confirmation of pulmonary cases from 41% to 31% can be explained with the difficulties performing smear examination.

PS-71133-10 Epidemiology and risk factors of extra-pulmonary tuberculosis in a high-burden country: a hospital-based study

T C Sreeramareddy,¹ S C Verma,^{1,2} P R Shankar,³ V S Binu,¹ H S Joshi.¹ ¹Community Medicine, Manipal College of Medical Sciences, Pokhara, Kaski District, ²Director, Regional Tuberculosis Center, Faculty, Pokhara, Kaski District, ³Pharmacology, Manipal College of Medical Sciences, Pokhara, Kaski District, Nepal. Fax: (+91) 61440260. e-mail: chandrashekarats@yahoo.com

Background: Studies from developed countries have shown an association between host-related risk factors and extra-pulmonary tuberculosis (EPTB). Literature on EPTB from a high-burden country like Nepal is lacking.

Design: A retrospective case-series analysis.

Methods: We reviewed the medical case files of 474 patients i.e. 230 EPTB and 244 pulmonary tuberculosis (PTB) patients, treated in a tertiary-care teaching hospital, western Nepal. Demographic, life-style factors and clinical characteristics were compared between EPTB (cases) and PTB (controls) cases using univariate and stepwise forward logistic regression analysis.

Results: Age incidence in both forms of tuberculosis showed a bimodal distribution. The over all male to female ratio was 1.6:1. Male to female ratios for EPTB and PTB were 1.07:1 and 2.29:1 respectively. EPTB was common in younger age (<25 years) and in females. Common sites for EPTB were lymph node (42.6%) and peritoneal and/or intestinal (14.8%) followed by bone and/or joint (12.4%). Younger age (OR 2.11, 95%CI 1.12–3.68) and female gender (OR 1.69, 95%CI 1.12–2.56) were associated with EPTB. HIV test was done for only 16.6% (79/474) of the patients. Smoking habit, use of immunosuppressive drugs, concurrent diabetes mellitus and past history of tuberculosis were associated with PTB.

Conclusion: In high-burden countries, TB control programmes do not prioritize EPTB for case finding since it is less infectious and lower in proportion than PTB. Younger age and female gender are independent risk factors for EPTB in a high-burden country. Therefore, young and female population may be targeted in case-finding for early diagnoses of EPTB.

PS-71163-10 Tuberculosis treatment outcome in Brazil: effect of the number of times a patient initiates treatment

A L Bierrenbach, A B F Gomes. Ministry of Health–Brazil, Brasília, DF, Brazil. Fax: (+55) 61 33266845. e-mail: albierrenbach@yahoo.com.br

Background: Failure and non-completion of tuberculosis treatment may result in acquired drug resistance and increased morbidity and mortality. This study aimed to evaluate the impact on treatment outcome of the number of times a positive pulmonary tuberculosis patient initiates treatment.

Methods: Population-based study with data from the Brazilian National Surveillance System. Records belonging to the same patient were identified by probabilistic record linkage and classified into mutually exclusive categories, depending on which they were kept (first notifications, returns after default, relapses) joined (transfers in/out) or removed (duplicates) from the database. Study population was composed of patients classified as new positive pulmonary TB cases at their first notification record (from 2000 to 2005). Outcome

measures were standard categories reported at the last notification record of each patient (outcome data up to Feb/2007).

Results: Of 234 006 new positive pulmonary cases, outcome results were available for 215 006. Of these, 87% had only one notification, and 10.6%, 1.7%, 0.5% and 0.2% had respectively 2, 3, 4 and 5 or more notifications as returns after default and/or relapses. Favorable outcome (treatment completion or confirmed cure) was 82.3% for patients with only one notification. Favorable outcome rates decreased while death, default and multidrug resistance rates increased with increasing number of treatments initiated. The odds ratio for the effect of one unit increase in the number of notifications (up to 5+) on the presence of a favorable outcome was 0.42 (95%CI 0.41–0.43). There was no evidence of confounding or interaction with HIV status, sex or age.

Conclusions: Favorable outcome rates decrease steeply with increasing number of times a patient initiates treatment. This information may help select appropriate candidates for directly observed therapy.

Number of treatments initiated	Cured/ completed treatment <i>n</i> (%)	Defaulted <i>n</i> (%)	Died <i>n</i> (%)	Transferred out <i>n</i> (%)	Developed TBMR <i>n</i> (%)	Total <i>n</i> (%)
1	154 878 (82.3)	14 361 (7.6)	10 464 (5.6)	8 326 (4.4)	141 (0.1)	188 170
2	12 297 (55.7)	5 623 (25.5)	1 306 (5.9)	2 787 (12.6)	55 (0.3)	22 068
3	1 737 (50.5)	1 016 (29.5)	231 (6.7)	440 (12.8)	19 (0.6)	3 443
4	428 (46.6)	315 (34.3)	67 (7.3)	104 (11.3)	4 (0.4)	918
5+	193 (47.4)	141 (34.6)	24 (5.9)	47 (11.6)	2 (0.5)	407
Total	169 533 (78.9)	21 456 (10.0)	12 092 (5.6)	11 704 (5.4)	221 (0.1)	215 006

PS-71169-10 Association between multidrug-resistant tuberculosis and HIV infection in Donetsk Oblast, Ukraine

S M Lypshina,¹ Y V Yann,² I V Dubrovina,³ K Miskinis,⁴ M Zignol.⁵ ¹Donetsk State Medical University 'M.Gorky', Donetsk, ²Donetsk Oblast Clinical TB Hospital, Donetsk, ³WHO Office for TB Control in Donetsk oblast, Donetsk, ⁴WHO Country Office, Kyiv, Ukraine; ⁵WHO Headquarters, Geneva, Switzerland. Fax: (+380) 62 3829587. e-mail: idu@who.org.ua

Introduction: Ukraine is second only to the Russian Federation among countries of the Former Soviet Union in the size of the epidemics of tuberculosis (TB) and HIV. This study aims to investigate the association between HIV infection and multidrug-resistant TB (MDR-TB) in the civilian and penitentiary sectors of Donetsk Oblast, Ukraine.

Methods: During 12 months, 1289 and 204 patients with TB were tested for HIV and MDR-TB in the ci-

vilian and penitentiary sectors, respectively. In addition, the following information were collected: sex, age, place of residence, and history of treatment.

Results: MDR-TB rates were 21.6% (95%CI 19.0–24.3) and 28.0% (95%CI 22.8–33.8) among civilians with negative and positive HIV status, respectively. In the prison sector MDR-TB rates were 37.0% (95%CI 29.6–44.8) and 58.3% (95%CI 40.8–74.5) in patients with negative and positive HIV status, respectively. In the multivariate analysis HIV status was found significantly associated with MDR-TB (OR: 1.7, 95%CI 1.3–2.3). History of previous treatment (OR: 4.0, 95%CI 3.1–5.1) and imprisonment (OR: 1.5, 95%CI 1.1–2.0) were also found independent predictors for MDR-TB.

Discussion: In Ukraine a positive association between HIV and MDR-TB epidemics is shown although the findings could be confounded by socio-behavioural indicators such as intravenous drug use. These results call for urgent measures to improve HIV prevention among TB patients and to control the development of drug resistant TB.

PS-71208-10 Effect of cooperation between TB dispensary and general hospital on tuberculosis case finding

H Zhang. TB dispensary of Hebei CDC, Shijiazhuang, China. Fax: (+86) 031186573307. e-mail: zhanghuimin_31@163.com

Objective: Comprehending the effect and problem of cooperation between TB dispensary and general hospital for increasing TB case finding.

Method: Retrospective study used in 31 counties/districts, data of TB case finding between 2005.10–2006.9 collected, in that period cooperation of TB dispensary and hospital strengthened.

Result: 1) After implementing the cooperation of general hospital and TB dispensary, number of suspects visited TB dispensary and number of TB cases registered in TB dispensary were more than the same time of last year. 2) The reporting rate and transferring rate of TB cases in general hospital were different between urban and rural area, reporting rate was higher in city and transferring rate was higher in village. 3) In TB cases found by hospital only 13.3% received sputum testing. 4) 94.1% TB cases who transferred by general hospital but did not go to TB dispensary were traced by TB dispensary, the result was different for different kinds tracing methods, and traced result of county TB dispensary's staff was better. The main reason of unsuccessful tracing was the name or address written on reporting cards being wrong and patients hospitalized.

Conclusion: Implement the cooperation between general hospital and TB dispensary can increase TB cases number registered in TB dispensary. But there are some problems still, general hospital staffs should

keep TB cases reporting and transferring well, and persuade TB patients to offer real information and go to TB dispensary seeing doctor, and attach importance to smear-check. Staffs of TB dispensary keep in touch with general hospital usually, and trace those patients who did not arrive TB dispensary.

PS-71209-10 Microscopic observation drug susceptibility assay provides rapid and reliable identification of multidrug resistance

G Shiferaw,^{1,2} Y Woldeamanuel,¹ S Shah,³ M Gebyehu,² A Selassie,⁴ E Lemma.² ¹Department of Microbiology, Immunology and Parasitology, Medical Faculty, Addis Ababa University, Addis Ababa, ²Ethiopian Health and Nutrition Research Institute, Addis Ababa, Ethiopia; ³Albert Einstein College of Medicine, New York, New York, USA; ⁴St. Peter's TB Specialized Hospital, Addis Ababa, Ethiopia.
Fax: (+251) 115513099. e-mail: girumdvm@yahoo.com

The objective of this study was to compare MODS with the BACTEC-MGIT 960 system for INH and RIF susceptibility testing (MDR-TB identification) of *M. tuberculosis*. The evaluation was based on 58 smear and culture positive sputum samples and the BACTEC-MGIT was used as a reference. For the detection of MDR-TB, MODS has a sensitivity, specificity and accuracy rate of 95, 100 and 98.3% respectively (kappa value 0.981; concordance, 98.3%). Concurrent culture detection and direct susceptibility results are obtained with a median date of 9 days while indirect susceptibility results for BACTEC-MGIT are obtained in 8 days. MODS is an accurate optimal inexpensive and rapid methods for identification of MDR-TB.

PS-71222-10 Factors associated with diagnostic delay for patients with smear-positive tuberculosis in rural Hunan

L Q Bai, S Y Xiao. Hunan Institute of Tuberculosis, 410013, Hunan Province, China. Fax: (+86) 07318650026.
e-mail: bailiqiong99@yahoo.com.cn

Objectives: To explore the influences of socio-economic, cultural beliefs, health services, and symptoms on health seeking behavior of tuberculosis patients attending county tuberculosis dispensaries in rural Hunan province of China.

Methods: A cross-sectional descriptive survey was conducted in 4 counties randomly stratified by economic status from 122 counties, Hunan, China. After obtaining informed consent, a consecutive sample of patients, aged 15 years and over, with smear-positive pulmonary tuberculosis was interviewed and completed a pre-tested questionnaire.

Results: A total of 318 patients with smear-positive pulmonary tuberculosis were interviewed. The median of patient delay, health system delay and total delay were 30, 24 and 65 days, respectively. Logistic regression shows that factors significantly contributed to patient delay are haemoptysis, far distance to health

institute, seeking folk therapy, and lower per capita income. Factors significantly associate with health system delay are female, lower level of education, prior received health education on tuberculosis, seeking folk therapy and stigma associated with tuberculosis.

Conclusions: In order to reduce diagnostic delay, integrated measures including extensive training of medical staff in non-tuberculosis health facilities, decentralization services and the more sensitive and effective health education on TB should be taken.

PS-71235-10 A threshold value for the time delay to TB diagnosis

P W Uys, R M Warren, P D van Helden. MRC Centre for Molecular and Cellular Biology, University of Stellenbosch, Cape Town, South Africa. Fax: (+27) 86514 0309.
e-mail: edserve@iafrica.com

Background: In many communities where the incidence of tuberculosis (TB) persists at a high level, the major force sustaining the epidemic is transmission. It is intuitively perceived that in such communities the typical long delay from the onset of infectious disease to diagnosis and the commencement of treatment increases opportunities for that person to transmit bacteria to others. This study aimed to use a simple mathematical model to quantify the contribution of delay in diagnosis and to identify strategies which may reduce the effect of delay on the perpetuation of the epidemic.

Methodology/Principal Findings: A simple mathematical model was constructed according to the assumption that personal contact resembles that of the generalized household. A constant degree of infectiousness is not assumed. Using this model the consequences of delays in diagnosis were analyzed and the existence of a threshold delay value was demonstrated. It was shown that the epidemic could be brought under control if a sufficient number of cases were detected before this threshold. Further analysis reveals possible intervention strategies for increasing the threshold delay value thereby circumventing the more complex issue of reducing the delay to diagnosis.

Conclusions/Significance: In order to reverse the ever increasing incidence of TB in epidemic settings, the delay to diagnosis should ideally be made shorter than the calculated threshold delay. This will require a change in health seeking behavior in combination with more sensitive diagnostic tools and the vigorous implementation of targeted screening. Also, issues relating to socio-economic conditions need to be addressed.

PS-71246-10 Analysis of the effectiveness of implementing WB/DFID TB Control Project, Shaanxi Province, P R China

T H Zhang. Shaanxi Provincial Institute for TB Prevention and Cont, Xi'an, China. Fax: (+86) 2982224625. e-mail: zhthfzhk@126.com

Background: WB/DFID TB Control Project was carried out in 107 counties in the province (covering 36.70 million population).

Objective: To extend the DOTS strategy, to reach 100% of DOTS coverage rate, 70% of detection rate of patients with new smear positive TB and 85% or more of cure rate by 2005.

Methods: To include government commitment, establishing TB control facilities, supplementing necessary equipments and staffs, setting up TB special clinic, X-ray room and sputum testing room, and developing extensive IEC, providing free diagnosis, free anti-TB drugs, technical assistance as well as village doctors to carry out DOT strategy.

Results: Since carried out the program in 2002, TB control facilities reached were all established in 2004, with 4.3 full- or part-time staffs each county and with 100% of DOTS coverage rate. During 2002–2006, a cumulative total of 49 750 patients with smear positive TB were detected under the project, of which 35 206 cases were patients new smear positive. In 2006, detection rate of patients with new smear positive TB reached 78.4% with 90.8% of cure rate.

Conclusions: The implementation of the program resulted in establishing a continuable development system for TB control, and reaching the targets on schedule in 2005.

Keywords: TB; Control; WB/DFID; Project

PS-71255-10 Multidrug resistance patterns among sputum specimens from TB patients in Kenya: experience from CRL

E S Sigilai,¹ M M Mburu,² J S Sitienei.¹ ¹ Kenya Ministry of Health, NLTP-CRL, Nairobi, ² Centers for Disease Control & Prevention, Nairobi, Kenya. Fax: (+254) 202716357. e-mail: esthersigi@yahoo.com

Background: Ranked among the high tuberculosis (TB) burden countries in the world, Kenya has limited information on multidrug resistance (MDR) TB patterns. However, through support from United States International Agency for Development (USAID) the Central Reference Laboratory (CRL) was made fully operational in performing culture, DST and routine surveillance of MDR since 2003. External quality assurance is provided by Queens Health Laboratory of Australia. This study describes the trends of MDR among specimens submitted to CRL since 2004.

Methods: Between years 2004 to 2006, CRL received 5009 sputum specimens from among tuberculosis patients receiving re-treatment countrywide. The specimens were digested using 4% sodium hydroxide, pri-

mary culture was performed on Löwenstein-Jensen solid media, and proportion drug sensitivity testing was done on first line anti-TB drugs; streptomycin, isoniazid, rifampicin and ethambutol. Simple quantitative statistics were used to compare MDR trends across TB control regions and within age and gender. **Results:** Rifampicin and isoniazid resistance was 9.0%. In 2006, Central recorded 3.6% while Eastern region recorded (17%) MDR rates. Female to male MDR ratio was 1:1.6. The youngest and oldest MDR patients were 15 and 59 years respectively.

Conclusion: These results indicate unequal distribution of MDR rates within regions, age and gender.

PS-71256-10 Rates of relapse and reinfection in HIV-positive and -negative individuals with recurrent tuberculosis

A C Crampin,^{1,2} J N Mwaungulu,² M Yates,³ H Traore,² K Munthali,² S Floyd,¹ P E M Fine,¹ J R Glynn.¹ ¹Karonga Prevention Study, London, UK; ²Karonga Prevention Study, Chilumba, Malawi; ³Health Protection Agency, London, UK. Fax: (+44) 207 927. e-mail: mia.crampin@lshtm.ac.uk

Aim: To determine rates of relapse and reinfection tuberculosis in HIV positive and negative individuals.

Design: Cohort study in rural sub-Saharan Africa before anti-retroviral introduction.

Methods: All culture positive pulmonary TB patients diagnosed 1996–2002 in Karonga District, Malawi, were followed for up to 8 years after treatment. Isolates from initial and recurrent episodes of TB were fingerprinted using RFLP and strains compared. In those who had completed treatment with no laboratory evidence of treatment failure, rates of recurrence were calculated separately for relapse (same strain) and reinfection (different strain). Follow-up was censored when individuals died or left the district.

Results: Of 296 HIV positive patients (633 person years of follow-up), 27 had a recurrent episode of culture confirmed TB. Of 204 HIV negative patients (764 person years of follow-up), 19 had recurrence. Paired RFLP results were available on 35 (76%). Rates of relapse were similar in HIV positive and negative individuals (14.2/1000 person years (CI 7.4–27.3) vs. 10.5/1000py (CI 5.2–20.9). Re-infection was seen in 11 HIV positive and 1 HIV negative patient (17.4/1000py (CI 9.6–31.4) vs. 1.3/1000py (CI 0.18–9.2). The reinfection in the HIV negative patient occurred late in follow-up.

Conclusion: This is the first population-based study to estimate rates of relapse and reinfection by HIV status. HIV infection greatly increased the rate of reinfection disease, but not of relapse.

PS-71265-10 Effect of antiretroviral therapy on incidence of tuberculosis among employees of a South African company

L Seyler,¹ S Charalambous,² J Pienaar,³ J Lewis,^{1,2} K Fielding,¹ G J Churchyard,^{1,2} A Grant.¹ ¹London School of Hygiene and Tropical Medicine, London, UK; ²Aurum Institute for Health Research, Johannesburg, ³Anglo Coal Health Services, Witbank, South Africa. Fax: (+32) 2 295 46 81. e-mail: l.seyler.96@cantab.net

Background: Antiretroviral therapy (ART) reduces TB incidence in clinic-based cohorts of HIV-patients; however its impact on TB incidence at the community level is less clear.

Aims: To describe trends in TB case-notification in a community with access to ART and explore whether changes could be attributable to ART.

Methods: We evaluated trends in TB case-notifications from a coal mine workplace TB programme in South Africa from 2001–2005. ART and isoniazid preventive therapy (IPT) were introduced from 2002.

Results: Among a population of about 7000 employees, TB case-notification decreased over time (785, 1127, 391, 517 and 481 cases per 100 000 for 2001 to 2005 respectively) with a non-linear pattern. No changes were identified in HIV prevalence, TB diagnostic or case finding methods, or TB treatment over the study period, but changes occurred in housing (fewer hostels) and dust reduction (fewer exposure-intensive techniques, better protection). The observed case notification rates were lower than modelled estimates based on an anticipated 50% and 80% fall in TB incidence among individuals taking IPT and ART respectively (see Figure).

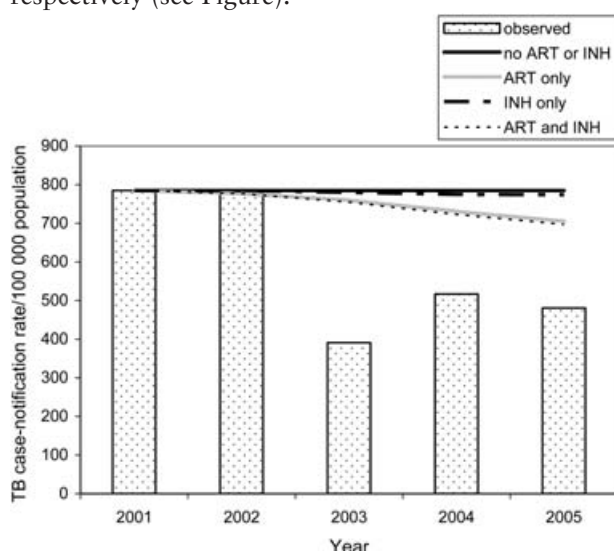


Figure Modelling the effect of ART and INH.

Conclusions: The observed fall in TB case-notification rates was larger and occurred sooner after the introduction of ART/INH than our model predictions, suggesting the observed fall was not attributable to ART/INH alone. Improved housing and dust reduction may have contributed to this decline. Secular

changes in TB incidence should be interpreted with caution.

PS-71284-10 Annual risk of TB infection as determined by tuberculin skin test surveys in Zambia and South Africa

K Shanaube,¹ H Ayles,^{1,2} C Sismanidis,² P Godfrey-Faussett,² N Beyers.³ ¹ZAMBART Project, Lusaka, Zambia; ²Infectious and Tropical Diseases Department, London School of Hygiene and Tropical Medicine, London, UK; ³Desmond Tutu TB Centre, Stellenbosch University, Cape Town, South Africa. Fax: (+260) 1254710. e-mail: kshanaube@yahoo.com

Background: Tuberculin Skin Test (TST) surveys were conducted in 2005 as baseline studies of a larger study, ZAMSTAR (Zambia South Africa TB and AIDS Reduction Trial).

Objective: To estimate the Annual Risk of TB Infection (ARTI) in 24 high burden TB and HIV communities.

Method: IUATLD guidelines were used in the placement and reading of skin tests after school and community social mobilization activities were conducted. Permission was sought from relevant authorities. Children enrolled in grades 1 to 3 were listed along with their age, sex and BCG scar status. Intradermal injections were given using 2 TU (0.1 mls) of tuberculin PPD RT23 and results were read 72 hours later. TB infection prevalence estimates and ARTI were established by direct, mirror and mixture methods.

Results: A total of 49 835 children were registered. Consent was given by 29 053 (58%) children, of these 22 563 (78%) were injected and read. Positive results as determined by indurations of 15 mm or more were recorded in 2690 (12%) of the children read. The ARTI was within the range 0.2–1.5% and 1.9–3.7% for Zambian and South African children respectively.

Conclusion: There were big differences in prevalence of TST positivity and by inference tuberculosis infection and ARTI depending on what method is used to analyze them.

PS-71286-10 Cause of death and respiratory disease at autopsy by duration of HIV infection in goldminers, southern Africa

J Murray,^{1,2} P Sonnenberg,³ G Nelson,¹ A Bester,⁴ S Shearer,⁴ J R Glynn.⁵ ¹School of Public Health, University of the Witwatersrand, Johannesburg, ²National Institute for Occupational Health, National Health Laboratory Service, Johannesburg, South Africa; ³Department of Primary Care and Population Sciences, University College London, London, UK; ⁴Gold Fields Limited, Johannesburg, South Africa; ⁵London School of Hygiene & Tropical Medicine, London, UK. Fax: (+44) 207 636 8739. e-mail: judith.glynn@lshtm.ac.uk

Aims: To describe cause of death in the pre-anti retroviral era.

Methods: A retrospective cohort of 1950 goldminers with known dates of HIV infection, and 6164 HIV

negative miners was followed from 1991–2002. Cause of death was available from clinical and personnel records and death certificates. Autopsies of hearts and lungs of deceased miners were done for compensation purposes.

Results: Cause of death was known for 279/308 HIV-positive and 234/254 HIV-negative men who died while employed or within 6 months. The mortality rate from unnatural causes was similar in HIV negative and positive miners and by duration of infection. 86% of natural deaths in HIV positives and 41% in HIV negatives were due to infection ($P < 0.001$), and 45% of HIV positives and 28% of HIV negatives had tuberculosis. The proportion of deaths with any infection or with specific infections (tuberculosis, cryptococcus, pneumocystis) did not vary with duration of HIV infection. Autopsies were done on 34%. 92% of HIV-positive men with natural deaths had respiratory disease at autopsy compared to 68% HIV-negative men ($P = 0.001$). The majority of these infections had not been diagnosed clinically.

Discussion: Although the mortality rate from natural causes increased greatly with duration of HIV infection, the pattern of disease in those who died did not change. This suggests that slow and fast progressors succumb to the same range of diseases. Tuberculosis was often missed despite an active screening programme.

PS-71287-10 Increasing risk of TB with increasing duration of HIV infection: results from 2000 men followed for 12 years

J R Glynn,¹ P Sonnenberg,² G Nelson,³ A Bester,⁴ S Shearer,⁴ J Murray,⁵ ¹London School of Hygiene & Tropical Medicine, London, ²Department of Primary Care and Population Sciences, University College London, London, UK; ³School of Public Health, University of the Witwatersrand, Johannesburg, ⁴Gold Fields Limited, Johannesburg, ⁵National Institute for Occupational Health, National Health Laboratory Service, Johannesburg, South Africa. Fax: (+44) 207 636 8739. e-mail: judith.glynn@lshtm.ac.uk

Aims: To document the risk of pulmonary TB by time since seroconversion to HIV in the pre-ARV era.

Methods: The incidence of new pulmonary TB was estimated in a retrospective cohort study among men from four South African gold mines over 12 years. HIV tests, carried out with counselling and consent, were available from random surveys in the early 1990s and from clinics. 1950 HIV positive men with seroconversion intervals <3 years were identified and linked to medical, demographic and occupational records using unique industry numbers. Analyses were censored when men died or left the mine.

Results: 88 men had TB before their first negative test, and were excluded from the analysis. 12 men had TB before seroconversion, giving a rate of 0.45 per 100 person years at risk (py, 95%CI 0.26–0.79). 308 men had pulmonary TB after seroconversion (3.9/100py, 3.5–4.3). The rate increased with duration of

infection and with age. The rate was high soon after HIV infection (1.8/100py, 1.3–2.4 within 2 years), and rose steadily to reach 9.2/100py (5.8–14.6) after 10 or more years. Compared to pre-HIV, the rate ratio after 10 years was 20 (9.8–42), decreasing to 14 (6.6–29) after adjusting for age.

Conclusions: This is much the largest seroincident cohort to document the extent of the increasing risk of TB by duration of HIV infection in a high incidence setting. This information is essential for modelling the epidemic, and targeting and assessing the impact of ARVs.

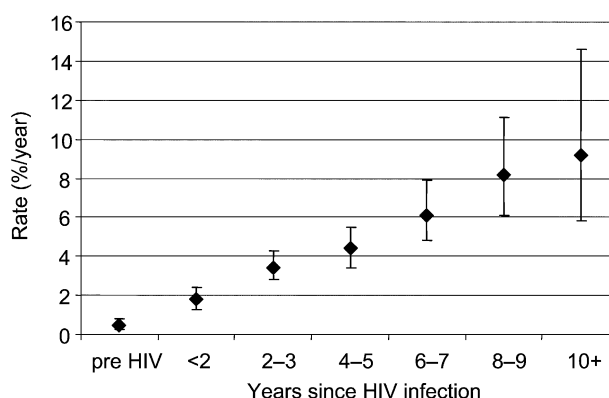


Figure Rate of new pulmonary TB (per 100 person years at risk).

PS-71293-10 Bacteriological screening results of chronic TB symptomatics in Makati, Philippines

M S Gler, R B Orillaza-Chi, L E Macalintal, L O Raymond, E K Maramba, M D Quelapio, T E Tupasi. Tropical Disease Foundation, Makati City, Metro Manila, Philippines. Fax: (+632) 81202874. e-mail: tarcelasg@yahoo.com

Objective: To describe the challenges in the timely diagnosis and treatment of MDR-TB.

Materials and Methods: This descriptive study of 1617 MDR-TB suspects analyzes time from first consultation to diagnosis and treatment.

Results: There were 1204 (74%) with positive smears and 1112 (69%) with culture isolation. Of the 1617 suspects screened, 938 (58%) were MDR-TB, 14 (0.9%) were XDR, 64 (4%) were drug resistant and 50 (3%) were susceptible cases. The rest had non-tuberculous mycobacteria (54) or negative cultures (451).

From 51% to 57% of confirmed MDR-TB cases were enrolled in treatment; 186 (20%) are still awaiting treatment. The time from first contact with our clinic to MDR-TB diagnosis decreased from 8.5 + 3.8 months in 2003 to 4.9 + 0.9 months in 2006. However, the waiting time from first contact to treatment remained long ranging from 6.7 + 3.3 months to 10.6 + 5.6 months across four years. Prior to treatment deaths occurred in 133 (14%), early default in 164 (17%) due to loss and refusal to treat in 43 (5%).

Conclusion: Rapid and direct test for MDR-TB detection is imperative and challenges in drug procurement and absorptive capacity need to be addressed for timely diagnosis and treatment to prevent deaths, early default, and transmission from these infectious cases.

Table 1

Chronic TB symptomatics screened	1617	
Sputum smear positive	1204	74%
Sputum culture positive (MTB)	1112	69%
MDR-TB confirmed	938	58%
XDR-TB confirmed	14	0.9%
DR-TB other than MDR-TB	64	4%
Pansusceptible	50	3%
MOTT	54	3%
Negative	451	28%

Table 2 Outcome of MDR-TB confirmed cases from January 2003 to October 2006

	2003	2004	2005	2006	Total
MDR/XDR-TB confirmed	121	235	290	306	952
Time to diagnosis, months	8.5 ± 3.8	5.4 ± 2.1	5.0 ± 2.3	4.9 ± 0.9	
Time to start treatment, months	10.6 ± 5.6	6.9 ± 3.9	6.7 ± 3.3	7.5 ± 0.5	
Enrolled, <i>n</i> (%)	71 (57)	119 (51)	161 (56)	79 (25)	430 (45)
Died while waiting, <i>n</i> (%)	20 (17)	49 (21)	38 (13)	29 (9)	136 (14)
Early default (refused, treated by others), <i>n</i> (%)	5 (4)	18 (8)	19 (7)	1 (0)	43 (5)
Lost, <i>n</i> (%)	31 (26)	51 (22)	72 (25)	10 (3)	164 (17)
Improved, <i>n</i> (%)		1 (0.4)	1 (0.3)		2 (0.2)
Waiting, <i>n</i> (%)				186 (61)	186 (20)

PS-71298-10 Factors associated with delayed 2-month sputum conversion among PTB patients.

H Luzze,^{1,2} A Okwera,^{1,2} J L Johnson,³ H Mayanja,^{2,4} Y Mulumba,² C C Whalen,³ R D Mugerwa.^{2,4} ¹National Tuberculosis and Leprosy Programme, Kampala, Kampala, ²Uganda-Case Western Reserve University Research Collaboration, Kampala, Uganda; ³Division of Infectious Diseases, Case Western Reserve University and University Hospitals of Cleveland, Cleveland, Ohio, USA; ⁴Department of Medicine, Makerere University Medical School and Mulago Hospital, Kampala, Uganda. Fax: (+256) 41 533531. e-mail: hluzze@mucwru.or.ug

Background: Sputum smear and culture conversion among patients with tuberculosis is the most important indicator for the effectiveness of treatment. We studied the factors which are associated with positive sputum smear and culture after 2 months of treatment. **Setting:** National Tuberculosis Treatment Centre, Mulago Hospital, Kampala.

Design: A retrospective study of adult patients with new onset culture confirmed pulmonary tuberculosis. Univariate analysis was done to determine factors associated with positive sputum smear and culture at 2 months of treatment.

Results: Between 1993 and 2002, 1296 patients were treated at the clinic. 809 patients had sputum smear and culture results available for baseline and at 2 months. 156 of 809 (19.3%) were still smear and culture positive at 2 months. Baseline factors that were associated with smear and culture positive at 2 months were low BMI (17.9 vs. 19.0, $P < 0.0001$), male sex (OR 3.4), higher mycobacterial load (OR 1.8), presence of fibrosis (OR 2.0) and having more than 2 lung zones involved (OR 2.3). HIV- infection (OR 0.2) and presence of cavities (OR 0.6) were associated with better sputum conversion.

Conclusions: It is important to identify patients who will not have early sputum conversion and consider prolonging the intensive phase of treatment in order to reduce disease transmission.

PS-71321-10 Epidemiology of childhood TB in Thailand: TB active surveillance network, 2004–2006

R Lolekha,¹ D Wiriyakitjar,² A Anuwatnonthakate,¹ S Nateniyom,² S Sumnapun,³ N Yamada,⁴ W Wattanaamornkiat,⁵ W Sattayawuthipong,⁶ P Charusontonsri,⁷ N Sanguanwongse,⁸ C D Wells,⁹ J K Varma.^{1,9} ¹Thailand MOPH-U.S. CDC Collaboration, Nonthaburi, ²Thailand Ministry of Public Health, Nonthaburi, ³Chiang Rai Provincial Public Health Office, Chiang Rai, Thailand; ⁴Research Institute of Tuberculosis, Tokyo, Japan; ⁵Office of Disease Prevention and Control 7, Ubon-ratchathani, ⁶Phuket Provincial Public Health Office, Phuket, ⁷Bangkok Metropolitan Health Administration, Bangkok, ⁸Bamrasnaradura Institute, Nonthaburi, Thailand; ⁹U.S. Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+66) 25915443. e-mail: jvarma@cdc.gov

Background: Globally, at least 10% of the >8 million TB cases occur in children. Because childhood TB is usually non-infectious and non-fatal, national programs do not prioritize childhood TB diagnosis and treatment. We reviewed data from a demonstration project to learn more about the epidemiology of childhood TB in Thailand.

Methods: In four Thai provinces and one national hospital, we contacted healthcare facilities monthly to record data about persons diagnosed with TB, assist with patient care, provide HIV counseling and testing, and obtain sputum for culture and susceptibility testing. We analyzed clinical and treatment outcome data for patients age <15 years old registered from 10/2004–9/2006.

Results: Only 289 (2%) of 14 487 total cases occurred in children. The median age of children was 8 years (range: 4 months, 14 years). TB was classified as pulmonary in 202 (70%); 57 (28%) were smear-positive and an additional 7 (4%) were smear-negative, but culture-positive. One was diagnosed with multidrug-resistant TB. HIV infection was documented in 78 (27%). Of 181 with final treatment outcomes, 8 (16%) of 50 HIV-infected children died during TB treatment

compared with 3 (2%) of 131 not known to be HIV-infected ($P < 0.01$).

Conclusions: Childhood TB is infrequently diagnosed in Thailand; understanding whether this is due to absence of disease or diagnostic effort requires further research. HIV contributes substantially to the childhood TB burden in Thailand and is associated with high mortality.

PS-71365-10 Drug-resistant tuberculosis in children: Western Cape of South Africa, March 2003 to February 2005

H S Schaaf,^{1,2} B J Marais,¹ A C Hesselning,¹ A Whitelaw,³ B Eley,^{4,5} G D Hussey,⁶ R P Gie,^{1,2} N Beyers,^{1,2} P R Donald.^{1,2}

¹Desmond Tutu Tuberculosis Research Centre and Department of Paediatrics and Child Health, Stellenbosch University, Tygerberg, ²Tygerberg Children's Hospital, Tygerberg, ³Department of Microbiology, Grootte Schuur Hospital and NHLS, University of Cape Town, Cape Town, ⁴School of Child and Adolescent Health, Cape Town, ⁵Red Cross Children's Hospital, Cape Town, ⁶South African Tuberculosis Vaccine Initiative, University of Cape Town, Cape Town, South Africa. Fax: (+27) 21 9389138. e-mail: hss@sun.ac.za

Aim: Surveillance of drug resistance amongst children presenting with culture-confirmed tuberculosis at two tertiary hospitals.

Methods: Drug susceptibility testing (DST) for isoniazid and rifampicin was done on all children (<13 years) presenting with culture-confirmed tuberculosis at Tygerberg Children's Hospital and Red Cross Children's Hospital in the Western Cape Province, South Africa, from March 2003 through February 2005.

Results: 596 children (330 boys), median age 31 months, presented with culture-confirmed tuberculosis. DST was done in 592 (99.3%). Drug resistance was present in 67 (11.3%); 43 (7.3%) were resistant to isoniazid only, 2 (0.3%) had rifampicin mono-resistance and 22 (3.7%) were multidrug-resistant. Source cases were identified in 295 (49.5%); DST results were only known in 18 (6.1%), 7 of which were drug-resistant and 6 of their contacts had drug-resistant TB. Human immunodeficiency virus (HIV) was tested in 414 (69.5%) children, of which 133 (32.1%) were HIV-infected. There was no significant difference in drug-resistant TB between HIV-infected (23/110; 20.9%) and HIV-uninfected (31/277; 11.2%) children (odds ratio 1.66; 95% CI 0.89–3.09).

Conclusion: The prevalence of drug-resistant tuberculosis in this setting is high, reflecting ongoing transmission of drug-resistant *Mycobacterium tuberculosis*.

PS-71378-10 The incidence of pulmonary TB among different ethnicities of Golestan province in Iran from 1999 to 2003

S Salek, M R Masjedi, S Salek, H Emami. National Research Institute of Tuberculosis and Lung Disease, Tehran, Iran, Islamic Rep. Fax: (+981) 22737446. e-mail: solsalk@yahoo.com

Objective: Every year, Golestan province is reported as having the second highest prevalence of tuberculosis after Sistan and Baluchistan province. Due to the existing of wide variety of ethnicities in Golestan province, this study aimed at assessing the incidence of tuberculosis in different ethnicities of this province.

Materials & Methods: In an analytical cross-sectional study, all TB patients including sputum smear positive and negative, extra-pulmonary and miliary TB were evaluated from 1999 to 2003 in Golestan province. The incidence of all types of TB was compared among different ethnicities of the province. The proportion of disease in each ethnicity was calculated in this study.

Results: Of 2773 studied TB patients being registered in Communicable Disease Control Center in Golestan province (Golestan Center for Communicable Disease Control) from 1999 to 2003, 47% were male. Based on the type of disease, there were 62.7% sputum smear positive, 16.4% sputum smear negative, 20.7% extra-pulmonary, and 0.1% miliary TB patients. Generally, the incidence rate of all types of TB was 36 per 100 000 cases that showed no significant difference during the period of study. Due to the ethnical distribution of tuberculosis in this province, more than 50% of all TB cases were observed among Sistanies and Baluches, accounting for only 20% of all Golestan residents. The incidence rate of tuberculosis in Sistanies was approximately tenfold of Turks and Kurds, six fold of Persians, fourfold of Turkmen, and 2.5 fold of Afghans of this region.

Conclusion: The incidence of tuberculosis was significantly different among various ethnicities of Golestan province, being highest among Sistanies. The high incidence rate in this ethnicity may be related to several factors including immigration or even genetic background. However, further studies need to be carried out to elucidate the risk factors for high TB prevalence among Sistanie residents of Golestan province.

TB IN HIGH-BURDEN COUNTRIES: 2

PS-71385-10 Population structure *M. tuberculosis* in different settings defines the usefulness of MIRU-VNTR typing

M Hanekom, C R E McEvoy, N C Gey van Pittius, G D van der Spuy, S L Ndabambi, T C Victor, P D van Helden, R M Warren. Division of Molecular Biology and Human Genetics, Cape Town, South Africa. Fax: (+27) 21 9389476. e-mail: hanekom@sun.ac.za

Background: PCR analysis of Microbacterial Interspersed Repeat Units (MIRU) and Variable Number Tandem Repeats (VNTR) offers a simple and real time approach to study the molecular epidemiology of *M. tuberculosis*.

Objective: To determine the discriminatory power of the MIRU-VNTR typing method as compared to the

gold standard IS6110 DNA fingerprinting method on *M. tuberculosis* strains with the Beijing genotype.

Methods: *M. tuberculosis* isolates were cultured from sputum samples collected from patients resident within a single epidemiological field site in Cape Town, South Africa. Beijing strains were identified by spoligotyping and were phylogenetically classified according to 40 different genomic loci. The Beijing strains were genotyped by IS6110 DNA fingerprinting and MIRU-VNTR typing.

Results: Distinct allelic variation was shown for Beijing strains between the respective phylogenetic sublineages. Allelic variation was found to be a function of the number of founder strains represented in each lineage and was lower than that of IS6110 DNA fingerprinting.

Conclusion: In contrast to previous reports the discriminatory power of MIRU-VNTR typing was found to be lower than IS6110 DNA fingerprinting for Beijing strains in Cape Town. This may be explained by the population structure of *M. tuberculosis* and age of the tuberculosis epidemic in different geographical settings.

PS-71390-10 Beijing strains: increased pathogenicity in different hosts and different geographical settings

M Hanekom,¹ G D van der Spuy,¹ E Streicher,¹ N C Gey van Pittius,¹ S L Ndabambi,¹ C R E McEvoy,¹ M Kidd,² E G Hoal,¹ N Beyers,³ T C Victor,¹ P D van Helden,¹ R M Warren.¹ ¹Division of Molecular Biology and Human Genetics, Cape Town, ²Centre for Statistical Consultation, Cape Town, ³Department of Paediatrics and Child Health, Cape Town, South Africa. Fax: (+27) 21 9389476. e-mail: hanekom@sun.ac.za

Recent research suggests that the *Mycobacterium tuberculosis* Beijing strain family have evolved unique properties that increases their ability to cause and spread disease. However, it is not known whether these properties are associated with all members of the Beijing strain family or whether host populations have selected for subsets of Beijing strains. In this study we used genetic markers to reconstruct the evolutionary history of the Beijing strain family. The resulting phylogenetic tree was found to be robust, and predicted 7 distinct Beijing sublineages. Analysis of epidemiological data in relation to Beijing sublineages, suggested an association between evolutionary change and frequency of occurrence of cases with strains from defined sub-lineages ($P < 0.001$). This concept was further supported by an association between strains from the more recently evolved Beijing sublineage and an increased ability to transmit and to cause disease [OR = 5.82 95%CI 3.13–10.82 ($P < 0.001$)]. To establish whether sublineages were equally successful in host populations from different geographical settings, the MIRU types from representative isolates from the different Beijing sublineages were

compared to Beijing MIRU types found in East Asia. A significant association was observed between the frequency of occurrence of strains in a defined Beijing sublineage and the human populations from whom they were cultured [OR = 15.58; 95%CI 10.38 to 23.38 ($P < 0.0001$)]. Our results suggest that the properties of the Beijing strains are not conserved but rather that strains within individual sublineages have evolved unique pathogenic characteristics. Adaptation of the strains within a defined sublineage may facilitate spread in different host populations from different geographical settings. Alternatively, host populations within the different geographical settings may have selected for the respective Beijing sublineages.

PS-71439-10 Age and gender distribution trends of new smear-positive TB cases, Bangladesh

M M Rahman,¹ V Begum,² K A Haider,¹ A Alam,¹ M N Uddin,¹ S Sultana,¹ S M A Zahid,¹ M H Khan,¹ T Alam.¹ ¹WHO, Dhaka, ²NTP, Dhaka, Bangladesh. Fax: (+880) 29884657. e-mail: drmdmojib@gmail.com

Introduction: Bangladesh adopted DOTS strategy in 1993 and achieved the treatment success and case detection targets in 2003 and 2006 respectively. This analysis is an attempt to see the age distribution trends among new smear positive cases with gender differentials.

Aim: To assess the impact of DOTS on TB epidemiology.

Methods: Record based data for the period of 1996–2006 from NTP data base and WHO reports were reviewed and analyzed.

Results: Case notification rate of new smear positive cases increased remarkably for both sexes to reach 72 per 100 000 population in 2006, the increase being higher in male than that in female. The increase in notification rates was large during 2005 and 2006. Distribution of the notified cases by age and sex shows that proportion of cases among higher age groups (45 and above) increases over time and average age of the patients shows increasing trend especially for the male.

Conclusion: The increasing trend in average age indicates that spread of tuberculosis infection might have reduced. Continuous trend analysis and nationwide community based TB prevalence survey are needed for conclusive results.

PS-71460-10 The TB-HIV co-infection rates depend on the prevalence of HIV in the community

D G Datiko,^{1,2} M A Yassin,^{1,3} L Takele,¹ L Erosie,¹ B Lindtjorn.² ¹Southern Nations, Nationalities and Peoples' Regional State Health Bureau, Awassa, Ethiopia; ²Centre for International Health, University of Bergen, Armauer Hansen Building, Bergen, Norway; ³Liverpool School of Tropical Medicine, Liverpool, UK, Liverpool, UK.
Fax: (+251) 462205955. e-mail: danieljohn42@yahoo.com

Setting: Tuberculosis patients and pregnant women attending health institutions in Southern Region of Ethiopia.

Objective: To determine the prevalence and association between HIV infection among TB patients and pregnant women attending antenatal clinics (ANC).

Design: All consecutive TB patients and pregnant women attending ANC were enrolled from hospitals and health centres from September 2004 to April 2005. Serum samples were tested for HIV using ELISA test (Vironostica® Uniform II Ag/Ab BIOMÉRIEUX).

Results: 1308 TB patients and 4199 pregnant women were included in the study. The rates of HIV infection among TB patients and pregnant women were 17.9% (127/1308) and 3.8% (155/4199) respectively. We found a significant correlation between HIV infection among TB patients and pregnant women attending ANC in the same health facilities ($R^2 = 0.687$, $P = 0.041$). The correlation was very strong among participants from urban settings ($R^2 = 0.998$, $P = 0.026$).

Discussion: The rate of HIV infection among TB patients and ANC attendees was significantly associated in urban areas possibly due to earlier occurrence of HIV epidemic resulting in higher HIV prevalence in urban population. The prevalence of HIV infection in the general population determines the rate of TB-HIV co-infection.

PS-71509-10 Success of tuberculosis control in the South Asian Association for Regional Co-operation

L Shrestha, K K Jha. SAARC TB and HIV/AIDS Center, Kathmandu, Nepal. Fax: (+977) 16634379.
e-mail: saarctb@mos.com.np

Introduction: Tuberculosis is one of the major public health problems in the SAARC region. The region bears disproportionate burden of TB; 22% of the population bearing 27.9% of the total global new TB cases. The region has adopted DOTS strategy decade back since then progressing well and heading towards WHO targets.

Objective: To highlight the success of DOTS in TB control in SAARC region.

Methods: At SAARC TB and HIV/AIDS center, there is ongoing collection and compilation of data from Member States with the development of an Update on TB every year. Reviewing the latest information from 2006 update document.

Results: Regional population coverage by DOTS services and case detection rate (CDR) were found to be increasing and reached to 84% & 54% respectively by December 2004, while it was 71% & 47% in 2003. Lowest CDR is in Pakistan and highest is in Maldives. Overall regional treatment success rate of registered new smear positive TB patients in 2004 was 85%. By the end of 2006, the region is very close to achieve WHO targets of DOTS coverage and case detection too. To mitigate the problem of MDR-TB, pilot DOTS-Plus project is in progress in Nepal (treatment initiated) and in India. Remaining countries are on the process of planning. HIV prevalence study among TB patients completed in few member states and ongoing in others at national and SAARC level.

Conclusion: Remarkable progress has been found with Directly Observed Treatment Short-course (DOTS) since its inception in 1993 by the region. For the success to continue and to achieve MDG targets set for TB, the region must overcome the challenges such as TB-HIV co-infection, MDR-TB and expansion of DOTS to hard to reach areas, maintaining the quality in diagnosis and treatment.

PS-71525-10 Impact of tuberculosis control on resistance to anti-tuberculosis drugs in the West Province of Cameroon

J Noeske,¹ C Kuaban.² ¹German Technical Cooperation, Douala, Littoral, ²University of Yaounde I, Yaounde, Centre, Cameroon. Fax: (+237) 3433360.
e-mail: juergennoesk@yahoo.fr

Setting: All diagnostic and tuberculosis treatment centres (DTCs) of the West Province of Cameroon with use of 2RHEZ/4RH for the treatment of new cases.

Objective: To assess the impact of the National Tuberculosis Control Programme (NTP) on the evolution of drug resistance.

Design: Sputum cultures of all new and previously treated smear positive pulmonary tuberculosis (PTB) cases from all the DTCs underwent drug susceptibility testing over one year (2004–2005). Anti-TB drug resistance rates obtained during this survey were compared with base-line drug resistance rates obtained in a similar study in 1997/98.

Results: Growth of *Mycobacterium tuberculosis* complex strains was obtained from 624/724 (87.4%) patients. The proportion of previously treated cases decreased during the study period from 15% to 8%. Resistance to at least one drug decreased from 27.0% to 17.9% ($P < 0.000$). This decrease was due essentially to the decrease in resistance to at least one drug in retreatment cases (51.7% vs. 32.7%, $P = 0.04$). MDR resistance increased in both new and retreatment cases without reaching statistical significance. The TB-HIV co-infection rate rose significantly from 22.2% to 28.7% ($P = 0.01$). Like in 1997–1998, there was no significant difference in the proportion of any

drug resistance pattern in HIV positive and HIV negative PTB cases.

Conclusions: The reestablishment of the NTP in the West Province with standardized guidelines for the diagnosis and treatment of TB patients seems to be having a positive impact on anti-TB drug resistance particularly in retreatment cases.

PS-71527-10 The epidemiology of TB in adolescents in the Western Cape Province of South Africa

H Mahomed, A J Hawkrigide, G D Hussey. South African TB Vaccine Initiative, University of Cape Town, Cape Town, Western Cape, South Africa. Fax: (+27) 86 613 4778. e-mail: hassan.mahomed@uct.ac.za

Background: South Africa is a high burden tuberculosis (TB) country. TB vaccines are being considered for adolescents but very little has been published about the epidemiology of TB in adolescents.

Objective: To describe the epidemiology of TB in adolescents in the Western Cape Province of South Africa. **Methods:** Routine data obtained from the TB Control Program of the Western Cape Province of the Department of Health has been analysed and TB indicators calculated.

Results: In 2003, of a total of 27 781 cases reported in the Western Cape Province, 2108 (7.6%) TB cases were in the age group 12–19. 55.9% were female, 79.7% were pulmonary TB cases and 93.2% were new cases. 58.6% were smear positive on first smear, 53.8% on second smear and 46.9% for both. TB incidence in the Cape Town region of the province for July 2002 to June 2003 increased from 224/100 000 (95%CI 185–263) in 12-year-olds to 708/100 000 (95%CI 643–773) in 19-year-olds. In this region, there was also a female predominance of 55%, 89% were new cases and 76% were pulmonary TB only. 3 (17%) out of 18 tested were HIV positive.

Conclusion: In this high burden setting, TB in adolescents has a female predominance, is made up mainly of new cases and is predominantly the pulmonary form of TB. About half are smear positive. The pat-

tern is similar in the Cape Town region of the province. Incidence rates rise substantially during adolescence. Too few had HIV test results to comment on the impact of HIV.

PS-71541-10 Early results on the use of an interferon gamma assay in measuring TB infection in adolescents in South Africa

H Mahomed,¹ D A Abrahams,¹ A J Hawkrigide,¹ S J Gelderbloem,¹ F Kafaar,¹ L Geiter,² W A Hanekom,¹ G D Hussey.¹ ¹SA TB Vaccine Initiative, University of Cape Town, Cape Town, Western Cape, South Africa; ²Aeras Global Tuberculosis Vaccine Foundation, Rockville, Maryland, USA. Fax: (+27) 86 613 4778. e-mail: hassan.mahomed@uct.ac.za

Aim: To determine the usefulness of an interferon gamma based assay in a cohort of adolescents in a high TB burden country, South Africa in measuring tuberculosis infection and disease.

Methods: 6500 adolescents aged 12–18 are being recruited in a tuberculosis vaccine research site and are being followed up for a minimum of two years. Recruitment started in July 2005. At baseline, all subjects are screened for tuberculosis disease and have a tuberculin skin test (TST) and QuantiFERON TB Gold (In-tube method) (QFN) test done and this is repeated at the two year follow up visit. Half the cohort have QFN tests 6 monthly after enrolment and a TST at 12 month follow up. Surveillance is being conducted to detect TB disease in between visits.

Results: Preliminary results are presented and further updated results will be presented at the conference. Of 4092 participants enrolled so far, 56% (95%CI 54.5–57.5%) were QFN positive at baseline and 46% (95%CI 44.5–47.5%) TST positive (10 mm used as cutoff). 93% of participants reported having been vaccinated with BCG at birth. Of cases of confirmed TB disease detected at recruitment, 91% (of 22) (95%CI 79–100%) were QFN positive and 71% (of 14) (95%CI 47.2–94.8%) were TST positive. Of those who reported current or previous TB exposure, 67% (95%CI 64.5–69.9%) were QFN positive and 58% (95%CI 54.9–60.5%) TST positive. A 10.3% QFN conversion rate and a 2.5% reversion rate in a sample of 640 was measured at 6 month follow up. Data on conversion and reversion at 12 month follow up to enable a comparison between QFN and TST will be reported at the conference.

Conclusion: QFN showed higher sensitivity with respect to TB disease and had significantly higher positivity amongst those with reported household TB exposure compared to TST. The high conversion rate and the reversion rate require further investigation.

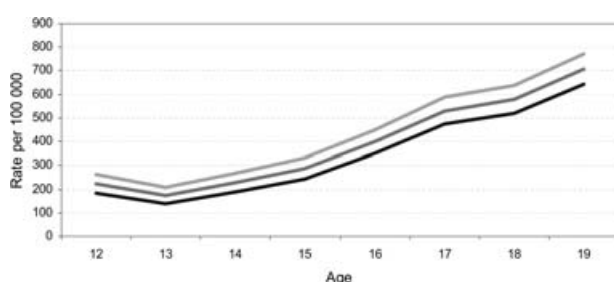


Figure All TB incidence rates by ages 12 to 19 for the Cape Town Region of the Western Cape Province of South Africa for July 2002 to June 2003 with confidence intervals: upper end of confidence interval (top line), calculated incidence rate (middle line), lower end of confidence interval (bottom line).

PS-71586-10 Modelling measures to reduce the nosocomial transmission of extensively drug-resistant tuberculosis (XDR-TB)

S Basu,¹ J Andrews,¹ E Poolman,¹ A Galvani,¹ A Moll,² N Gandhi,³ S Shah,³ G Friedland.¹ ¹Yale University School of Medicine, New Haven, Connecticut, USA; ²Church of Scotland Hospital, Tugela Ferry, KZN, South Africa; ³Albert Einstein College of Medicine, New York, New York, USA.
Fax: (+1) 203 785 3260. e-mail: sanjay.basu@yale.edu

Aim: We sought to determine the potential population-level impact of strategies to reduce nosocomial transmission of extensively drug-resistant tuberculosis (XDR TB) at a district hospital level in rural South Africa.

Methods: We calibrated and validated a model of drug-susceptible, multidrug-resistant (MDR), and XDR TB and HIV transmission to longitudinal data from inpatients and community members in Tugela Ferry, KwaZulu Natal. We simulated individual and combined infection control strategies recommended to reduce airborne transmission of TB (administrative, environmental, and personal).

Results: When accounting for empirical uncertainties in XDR TB pathogenesis, the model predicts a cumulative 1.5- to 6-fold increase in the incidence of XDR TB in Tugela Ferry over the next 5 years if no new interventions are introduced. Several measures averted at least 3% of XDR TB cases over this time when implemented individually: cohorting patients into groups of <5, respiratory barriers for staff and patients, and improvements in either natural or mechanical ventilation. HIV testing and ARV therapy for patients, rifampin resistance testing, and early discharge of patients also significantly reduced future XDR TB incidence, but to a lesser degree when implemented alone. When combined, the impact of respiratory barriers, reduced length of stay, and improved natural ventilation averted 42% of future XDR cases due to the compound effects of these interventions on the probability of nosocomial infection. With the addition of the microscopic-observation drug-susceptibility assay, HIV testing and ARV therapy, and clustering of patients into 5 patient wards, a further 5% of cases could be averted. Involuntary detention of suspected XDR contacts, however, perversely increased community-wide incidence as nosocomial transmission outweighed reduced community risk.

Conclusion: Some infection control measures, in concert, may avert nearly half of future XDR cases over the next 5 years.

PS-71608-10 Using record linkage and a Bayesian methodology to obtain estimates of adult TB prevalence in Brazil

A Stevens, A Bierrenbach. CGIAE/DASIS/SVS/MS, Brasília, Brazil. Fax: (+55) 6134683649.
e-mail: antony.stevens@saude.gov.br

In Brazil data about TB is available in the following information systems i) + ii) notification of infectious disease (SINAN-TB and SINAN-AIDS), iii) hospital separation records (AIH), iv) mortality registration (SIM) and v) other informal systems.

As opposed to the customary use of incidence estimates, prevalence estimates are a more direct measure of TB burden and respond relatively rapidly to improved case finding and control. We used the disaggregated data on TB cases and outcome of treatment available in the notification system to obtain state and national prevalence estimates.

Following an approach described by P. J. Smith, (Biometrika, 1991, 78, 2, pp 399–407) and based on record linkages between AIH/SIM/SINAN-TB/SINAN-AIDS we then obtained new estimates for TB prevalence. We compare these with estimates based solely on the notification/follow-up system data. We also report the effect of the use of data maintained in the AIDS Information System on the values obtained.

PS-71640-10 Ecological study of incidence and social determinants of tuberculosis, Espírito Santo State, Brazil, 2000–2004

R C A Vieira,^{1,2} R Dietze,¹ E Zandonade,^{2,3} E L N Maciel.^{1,2}
¹Núcleo de Doenças Infecciosas, Centro de Ciências da Saúde, Universidade Federal do Espírito Santo, Vitória, Espírito Santo, ²Programa de Pós-Graduação em Saúde Coletiva, Centro de Ciências da Saúde, Universidade Federal do Espírito Santo, Vitória, Espírito Santo, ³Departamento de Estatística, Centro de Ciências Exatas, Universidade Federal do Espírito Santo, Vitória, Espírito Santo, Brazil. Fax: (+55) 27 21227204.
e-mail: rcavieira@ndi.ufes.br

Objectives: To analyze tuberculosis (TB) endemicity and its spatial distribution, and to evaluate relationships among incidence of TB and socio-economic and demographic profiles.

Methods: Cities profiles were produced through factor and clustering analysis, using census tract data. TB epidemiology was described through crude and local empirical Bayesian smoothed rates. Spatial autocorrelation among rates were tested using Moran's I and Local Moran's Index (LISA). Correlation Analysis between TB and SE Indicators was carried out through ANOVA one-way test.

Results: A moderate-to-strong, positive, significant spatial autocorrelation (Moran's I = 0.585; $P < 0.001$) was found in TB incidence rates. Furthermore, three clusters were defined according to LISAMAP: the Metropolitan Region of Vitória, the North Region and the Mountainous/Caparaó Region. In two of four cities profiles, incidence rates were significantly superior to the others ($F = 15.38$; $P < 0.00$). TB was closely correlated with the Urbanization factor ($r = 0.674$; $P < 0.05$).

Conclusions: Spatial autocorrelation shows new TB cases could be determined by an underlying process. The correlation founded could be explained by a his-

torical process, when it was observed that some attractive regions experienced a fast urbanization process marked by excluding and promoter of huge inner-city inequalities. It is suggested that new TB cases follow heterogeneous inner-cities distributions, it tending to be concentrated in poorer regions.

PS-71645-10 HIV testing coverage and HIV prevalence among new patients with tuberculosis in the Russian Federation

A Korobitsyn,¹ W Jakubowiak,¹ E Kourbatova,² O Frolova.³ ¹WHO Office in the Russian Federation, Moscow, ²Samara State Medical University, Division of TB and Lung Diseases, Samara, ³Federal Center of TB Care for People with HIV, Russian Ministry of Health and Social Development, Moscow, Russian Federation. Fax: (+7) 495 7872149. e-mail: w.jakubowiak@who.org.ru

Introduction: Information on HIV testing coverage and HIV prevalence among TB patients was first included in the Russian standard TB reporting forms in 2005.

Objectives: Objectives included assessment of: 1) proportion of new TB patients tested for HIV; 2) HIV prevalence in TB patients; 3) correlation between HIV prevalence in TB patients, TB notification rate, and registered HIV prevalence in Russia.

Methods: Data received from 88 (99%) of 89 Russian regions on new TB cases from standard reporting form #33 and data provided by the Federal AIDS center for 2005 year were analyzed.

Results: The mean proportion of new TB cases tested for HIV was 75% (range 17–100%). In 33 (38%) of 88 regions $\geq 80\%$ of TB patients were tested for HIV, and in 52 (59%)–50 (79%) of patients. The mean HIV prevalence among new TB patients was 1.2% (range 0–8%). The highest HIV prevalence was in Khanty-Mansiyski AO (8%). A strong significant correlation between registered HIV prevalence in general population and HIV prevalence in new TB patients was observed ($r = 0.8$; $P < 0.001$), but there was a weak, non-significant correlation between HIV prevalence in new TB patients and TB notification rates ($r = 0.1$; $P = 0.41$).

Conclusions: Over 50% of TB patients are tested for HIV in the majority of Russian regions. The HIV prevalence in new TB cases remains relatively low. According to available information HIV/AIDS is not yet substantially influencing the TB epidemic in Russia. The validity of data should be further assessed.

PS-71647-10 Effectiveness of HAART on mortality and TB incidence in the South African public sector programme

L Fairall. Knowledge Translation Unit, Cape Town, South Africa. Fax: (+27) 406 6691. e-mail: gfaris@uctgsh1.uct.ac.za

Background: The effectiveness of the South African government's expanding antiretroviral treatment pro-

gramme is unknown. Observational studies of treatment effectiveness are prone to selection bias, rarely compare those receiving antiretroviral treatment with similar patients not receiving antiretroviral treatment, and, unless strategies for active patient follow-up are used, underestimate mortality.

Methods: We followed 14 267 patients enrolled in the Free State public-sector antiretroviral treatment programme for up to 20 months after enrolment. 3619 patients received highly active triple antiretroviral treatment (HAART) for up to 19 (median 6, inter-quartile range 3–9) months. Patients' clinical data were linked with the national mortality register. Marginal structural regression models adjusted for baseline and time-varying covariates.

Results: Of 4570 patients followed for over a year, 53% died. 87% of patients who died had not received HAART. HAART was independently associated with a 86 (95% confidence interval 82–89)% lower mortality hazard and a 39 (19–54)% lower tuberculosis hazard. Cotrimoxazole prophylaxis was independently associated with a 63 (58–68)% lower mortality hazard. Each month of HAART was independently associated with a 15 (15–16) cells/ μ l increase in CD4 lymphocyte count and a 603 (548–658) gramme increase in body weight.

Interpretation: HAART provided through these South African government health services appears as effective as in high income countries. Delays starting HAART contributed to high mortality. Faster expansion and timeous commencement of HAART are needed.

PS-71649-10 Drug-resistant tuberculosis among children 0–18 years in a TB referral centre

M R Alcaneses, G I Balane, J S Pancho, T E Tupasi. Tropical Disease Foundation, Makati City, Philippines. Fax: (+632) 8102874. e-mail: mralcaneses@yahoo.com

Objective: to describe the prevalence of drug resistant tuberculosis among children 0–18 years of age in a TB referral center using contact screening and passive case finding.

Method: AFB smears and TB cultures were taken from active pediatric TB cases among those screened via contact tracing of MDR-TB index cases and among those referred to clinic for suspect MDR-TB from January 2000–December 2006. Patients with drug resistant TB from both populations were identified.

Results: Among 2201 household contacts of 477 MDR-TB index cases screened for active TB disease, 839 (36.0%) were children aged 0–18 years; AFB smears and TB cultures were taken in 94 (11.2%); 4 (5.3%) were culture positive and of these, 2 (50%) had MDR-TB. Out of 12 pediatric cases referred for MDR-TB screening during the same period, 9 (75%) had positive cultures, 5 (41.6%) had MDR-TB. Prevalence of MDR-TB among household contacts was

2.3% while the prevalence among those who consulted at the out-patient department was 41.6%. Two patients with single drug resistance were treated with first line agents while eight patients were treated with second line agents with the following outcomes: 2 cured, 1 relapse, 4 undergoing treatment, and 1 default. One patient is awaiting treatment and one was lost to follow up.

Conclusion: The prevalence of drug resistant TB among our population is lower among contacts of MDR-TB cases than among those who came to the clinic for screening of MDR-TB. In resource-poor settings, the cost effectiveness of contact screening vs. advocacy for TB control among such cases should be evaluated.

PS-71674-10 Collaboration between TB and HIV/AIDS programmes at national level: trends of TB-HIV co-infection in Estonia

M Danilovits,^{1,2} V Hollo,² K Kliiman.^{1,2} ¹Tartu University Clinics, Lung Clinic, Tartu, ²National Tuberculosis Programme, Tallinn, Estonia. Fax: (+372) 7318943. e-mail: manfred.danilovits@kliinikum.ee

Background: The HIV epidemic has increased the global tuberculosis (TB) burden and focused attention on the need to strengthen the link between TB and HIV/AIDS programs. In Estonia the HIV incidence rate is among the highest in the European region, estimated as 0.7–1.2% of the whole population. At the same time Estonia is also facing the problem of drug-resistant TB. Present survey was designed to assess the possible impact of HIV on TB situation in 2001–2006.

Results: Between 1999 and 2006 TB case rates decreased from 52 to 32 per 100 000 population. In 2006 12.9% of new patients and 21.2% of previously treated patients (relapses) had MDR-TB. Absolute number of notified MDR-TB cases declined from 112 in 1999 to 47 in 2006. By the end of 2006 there were 5729 HIV infected persons registered in Estonia. In 2001 out of 708 notified TB cases 7 (1%) co-infected patients were found and respective numbers for 2006 were 438 and 38 (8.7%). Out of 133 HIV related TB patients between 2001 and 2006, 78.5% were men. Mean age was 31.8 years. Location was pulmonary in 84.5% (14), 12.1% had MDR-TB.

Treatment success for patients registered in 2001–2005 was 55.1% and death rate 26%.

Program performance: Political commitment to HIV/AIDS prevention is demonstrated in the National HIV/AIDS Prevention Program for 2002–2006. In 2005 a new HIV/AIDS Strategy for 2006–2015 was developed and a national TB-HIV coordinating body was established. TB services can be the entry point for HIV patients and vice-versa. HIV testing and counseling for TB patients is available within the TB services.

A new challenge is the countrywide linking of TB and HIV surveillance data.

Conclusions: Together with the rapid growth of HIV epidemic in Estonia since 2001, the number of TB-HIV co-infected cases increased from 1.0% in 2001 to 8.7% in 2006. The problem of HIV related TB and MDR-TB must be considered a priority for both TB and HIV programs.

PS-71680-10 Certain clusters within the *M. tuberculosis* Beijing lineage spread more readily

R Johnson,¹ R Warren,¹ A Falmer,¹ M Murray,² P D van Helden,¹ T Victor.¹ ¹Department of Biomedical Science; Faculty of Health Science, Stellenbosch University, Cape Town, South Africa; ²Department of Epidemiology, Harvard School of Public Health, Boston, Massachusetts, USA. Fax: (+27) 21 9389476. e-mail: rjohnson@sun.ac.za

Background: *M. tuberculosis* Beijing strain plays an imperative role in the drug resistant epidemic in the Boland Overberg South Cape Karoo (BOKS) region in the Western Cape, South Africa.

Aim: Characterizing the population dynamics of the Beijing strain family overtime as well as identifying whether specific clusters have a higher propensity to transmit overtime.

Materials and Methods: Sputum samples from patients with pulmonary TB from the BOKS region were subjected to spoligotyping, IS6110-RFLP and mutational analysis.

Results: Thirty-two percent of drug resistant strains in BOKS region belonged to the Beijing family making it the dominant drug resistant strain family. Between 2001 and 2006 a steady increase of the Beijing drug resistant genotypes are observed. Interrogation of the Beijing lineage identified two predominant clusters, cluster 220 (36%) and cluster 208 (15%). Cluster 220 was characterized by a mutation in the *inhA*-15 promoter region and overtime a progressive increase in the incidence of cluster 220, representing both isoniazid mono and multidrug-resistant isolates, was observed.

Discussion and Conclusion: This study showed that transmission characteristics of *M. tuberculosis* strain clusters are not conserved within strain families but rather that individual clusters have unique propensity to spread.

PS-71690-10 Efflux pump inhibitors modulate rifampicin resistance in *Mycobacterium tuberculosis*

G E Louw, R M Warren, P D van Helden, T C Victor. Department of Biomedical Science, Faculty Health Science, Cape Town, South Africa. Fax: (+27) 21 9389476. e-mail: gail@sun.ac.za

Background: Rifampicin resistance develops through mutations in the *rpoB* gene of *M. tuberculosis*.

Objective: To evaluate whether the RIF minimum inhibitory concentration (MIC) in closely related strains of *M. tuberculosis* show fluctuation which can be modulated by inhibiting the activity of efflux pumps.

Design: The MIC of RIF for different clusters (identical IS6110 DNA fingerprints and RIF resistance causing mutations) of *M. tuberculosis* isolates were determined by culture in BACTEC 12B Medium. The same isolates were exposed to non-inhibitory concentrations of efflux pump inhibitors verapamil and reserpine in the presence and absence of varying concentrations of RIF.

Results: The MIC's of RIF for isolates in the different clusters ranged from 5 to 170 µg/ml RIF. The addition of reserpine or verapamil specifically modulated the MIC's of RIF in the different clusters in a concentration dependent manner.

Conclusion: These results strongly suggest that single mutations alone cannot explain the variation in the MIC's of RIF or the different drug-resistant clinical isolates. It suggests that modulation of efflux pumps may make the bacterium increasingly resistant to RIF.

PS-71691-10 Spread of atypical MDR Beijing strains among re-treatment tuberculosis cases in Port Elizabeth, South Africa

O J Strauss,¹ R M Warren,¹ A Jordaan,¹ E M Streicher,¹ M Hanekom,¹ A A Falmer,¹ H Albert,² A Trollip,² E Hoosain,³ P D van Helden,¹ T C Victor.¹ ¹ Department of Biomedical Sciences, Stellenbosch University, Cape Town, Western Cape, ²Biotec Laboratories Ltd, c/o National Health Laboratory Service, Cape Town, Western Cape, ³Nelson Mandela Metropolitan Municipality, Port Elizabeth, Eastern Cape, South Africa. Fax: (+27) 219389476. e-mail: odelia@sun.ac.za

Rationale: Re-treatment and drug-resistance is a threat to tuberculosis (TB) control in the Port Elizabeth (PE) Magisterial District, in the Eastern Cape of South Africa.

Objective: To investigate the phenotypic and genotypic characteristics of *Mycobacterium tuberculosis* strains from re-treatment cases in PE.

Materials and Methods: Two hundred and ninety-four (294) smear and culture positive isolates were obtained from re-treatment cases attending 5 primary health care clinics and a drug-resistant TB referral hospital, between September 2003 and May 2004. Each isolate was subjected to phenotypic and genotypic analysis.

Results: Genotypic analysis showed that 41% ($n = 120$) of the isolates had a Beijing genotype. Nearly half (47.5%) of these isolates were drug-resistant (MDR = 51; isoniazid mono-resistant = 3; rifampicin mono-resistant = 3). In contrast, 30% of the non-Beijing isolates were drug-resistant (MDR = 43; isoniazid mono-resistant = 6; rifampicin mono-resistant = 4). Genotypic analysis showed that most of the Beijing resistant isolates were members of the atypical

group and were characterised by a *rpoB*516C → T mutation.

Conclusion: The results suggest that there is ongoing transmission of a dominant atypical Beijing strain among the re-treatment cases in the PE Magisterial District. Application of molecular methods could ensure the rapid identification and control of such outbreak strains.

PS-71708-10 Population-based survey of resistance to anti-tuberculosis drugs in the state of Gujarat, India, 2005–2006

L S Chauhan,¹ P V Dave,² P R Narayanan,³ R Ramachandran,³ F Wares,⁴ S Sahu.⁴ ¹Central TB Division, Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India, New Delhi, ²Ministry of Health, State Government, Gandhinagar, Gujarat, ³Tuberculosis Research Centre, Chennai, Tamil Nadu, ⁴Office of the World Health Organization Representative to India, New Delhi, India. Fax: (+91) 23382252. e-mail: waresf@whoindia.org

Background: Under the Revised National TB Programme (RNTCP), DOTS has been implemented fully in Gujarat (population 54.8 million) since March 2004. A baseline population-based statewide survey of anti-TB drug resistance was undertaken.

Method: Through population-proportionate cluster sampling, 1664 new smear-positive (NSP) cases and 992 retreatment (RT) cases were planned to be taken into the study. Smear-positive patients diagnosed at 66 microscopy centres in 24 districts during August 2005–June 2006 were included. Samples collected in transport media were inoculated onto LJ slopes and incubated at 37°C for 8 weeks at the TB Research Centre, Chennai, a WHO supranational reference laboratory. Economic variant of Indirect Proportion method was used for drug susceptibility testing against H, R, S and E.

Results: Of 1571 new and 1045 previously treated cases, 1236 (79%) and 562 (54%) were pan-sensitive (Table). Multidrug-resistant isolates (MDR-TB) were detected in 37 new cases (2.4%, 95% Confidence Interval (CI) 1.6–3.1%) and 180 previously treated cases (17.2%, 95%CI 14.9–19.5%).

	New	Previously treated
Culture positive/		
DST result available	1571	1045
Pan-sensitive	1236 (79%)	562 (54%)
Resistant to S	156	88
Resistant to H	84	122
Resistant to R	3	10
Resistant to SH or HE	48	73
Resistant to HR	7	49
Resistant to SHR or		
SHE or HRE	21	74
Resistant to SHRE	13	67
Resistant to at least H	173	385
Resistant to at least R	40	190
Resistant to at least HR	37 (2.4%, CI 1.6–3.1)	180 (17.2%, CI 14.9–19.5)

Discussion: The proportion of MDR-TB among new TB cases in Gujarat was low, and similar to past surveys conducted by RNTCP in other states. The state-wide estimate of MDR-TB in previously treated cases was the first from India. However, given the large population, the total estimated burden of MDR-TB in Gujarat is substantial. From April 2007, RNTCP will start treatment of MDR-TB patients in Gujarat.

PS-71722-10 Towards the understanding the evolution of principle genetic group 2 strains of *Mycobacterium tuberculosis*

E M Streicher,¹ N C Gey van Pittius,¹ G van der Spuy,¹ J W Dale,² N Beyers,³ P D van Helden,¹ T C Victor,¹ R M Warren.¹ ¹Department of Biomedical Science, Stellenbosch University, Cape Town, Western Cape, South Africa; ²University of Surrey, Guildford, UK; ³Department of Pediatrics and Child Health, Stellenbosch University, Cape Town, Western Cape, South Africa. Fax: (+27) 219389476. e-mail: lizma@sun.ac.za

Background: *Mycobacterium tuberculosis* strains have evolved to develop different unique genetic characteristics.

Objective: To use various genetic markers to reconstruct the evolutionary history of strain families belonging to principle genetic group 2 (PGG2).

Methods: Representative isolates from strain families based on IS6110-fingerprinting which belong to PGG2, were analysed by spoligotyping, IS6110 points of insertion, regions of difference, and SNPs and the evolutionary relationship were determined.

Results: Based on the various genetic markers, the strain families were grouped into 5 branches, which includes the LAM family as one major branch, F28/Quebec strain family, F3 and the 1 banders as separate branches and the Low Copy Clade and Haarlem strain families as part of the fifth branch. This study shows for the first time that strains with <6 IS6110 insertions evolved to generate high copy number strain families, including Haarlem, F6, F7, F19 and F24.

Conclusion: We showed that that strains with <6 IS6110 insertions evolved to generate high copy number strain families, including Haarlem, F6, F7, F19 and F24. Differences of clinical and demographical parameters, such as, smear positivity, drug resistance, outcome, new/retreatment, age, sex and clustering of patients between the different lineages failed to demonstrate significant associations, there by suggesting that phylogenetic groups within Principle Genetic Group 2 do not show obvious phenotypic differences as determine by clinical presentation.

TB IN SPECIAL POPULATIONS, OUTBREAKS AND CONTACT INVESTIGATION

PS-71156-10 Structural influences on the epidemiology and control of TB in migrant Africans in London

F Marais,¹ A Renton,² T Weaver.³ ¹Academic Unit for Infection Prevention and Control, Stellenbosch University, Cape Town, South Africa; ²Institute for Health & Human Development, University of London, London; ³Department of Psychological Medicine, Imperial College London, London, UK. Fax: (+27) 21938.5065. e-mail: tbstudy@aol.com

Aim: To describe the structural influences; in terms of social, economic, legal, political and organisational factors; which may impact on the epidemiology and control of TB in migrant Africans in the City of Westminster, London.

Objectives: To identify: (a) the structural influences determined at, and operating across, community and sector level within the local context, (b) the resources which exist or could be strengthened within the sectors and within the study population themselves to improve TB control, and (c) recommendations for contextually and culturally appropriate interventions toward improved TB control which will be relevant and beneficial to the study population.

Design: A multi-method community-based participatory research design, which integrated both quantitative and qualitative methods, and which engaged as research partners, from the outset, members from the study population together with academic researchers and multiple sectors.

Methods: Questionnaire survey interviews, semi-structured interviews, community consultations, and qualitative observations.

Findings: Post-migration living conditions expose the migrant Africans to a range of inter-connected structural influences which are determined at, and operate across, community and sector level. The identified influences can be clustered into 6 main themes, each describing several structural influences with complex interplay: access to TB information and healthcare, stigmatisation, unemployment and poverty, poor housing and temporary accommodation, general health status, and community participation. The findings identify several existing resources and recommendations toward improved TB control.

Conclusion: The impact of post-migration living conditions on the epidemiology and control of TB in migrant African communities should be regarded as a risk factor and should be a focus of attention for improved TB control interventions.

PS-71239-10 Molecular epidemiology of tuberculosis in aboriginal townships in Eastern Taiwan: a population-based study

C B Lin,¹ J J Lee,^{1,2} R Jou,³ Y W Huang,⁴ C Y Chiang.⁵

¹Department of Chest Medicine, Buddhist Tzu Chi General, Hualien, Taipei, ²Tzu Chi University, Hualien, Taipei, ³Reference Laboratory of Mycobacteriology, Center of Disease Control, Department of Health, Taipei, ⁴Chang Hua Hospital, Department of Health, Executive Yuan, Chang Hua, Taipei, China; ⁵International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+886) 38561291. e-mail: ferlin@tzuchi.org.tw

Objective: To investigate recent transmission of tuberculosis in three aboriginal townships with a high notification rate of tuberculosis (517.2 per 100 000 population in 2004) in Hualien County, Eastern Taiwan.

Methods: A prospective study was conducted in 3 aboriginal townships in Eastern Taiwan between 2004 and 2005. DNA fingerprints of mycobacterial isolates were determined by restriction fragment length polymorphism (RFLP). Spoligotyping was used in strains with less than five IS6110 insertion sites. Cases whose isolates shared identical fingerprint patterns were considered to be belonged to the same cluster and attributable to recent transmission.

Results: Of the 499 notified tuberculosis cases, 315 (63.13%) were culture positive for *Mycobacterium tuberculosis*. Of the 315 patients, 273 (86.7%) had isolates with RFLP analysis. Of 273 genotyped isolates, 154 (56.4%) were clustered pattern strains and were categorized into 38 clusters. If the *n*-1 method is applicable, 42.5% of cultured confirmed tuberculosis cases were due to recent transmission of tuberculosis.

Conclusions: The proportion of cases due to recent transmission in these three aboriginal townships were substantial, indicating that TB control program should be strengthened to reduce transmission of tuberculosis, preferentially by strictly carrying out directly observed therapy.

PS-71261-10 Distribution of *Mycobacterium tuberculosis* spoligotypes in Taipei District, Northern Taiwan

W J Su,^{1,2} L Y Huang,¹ R P Perng.¹ ¹Chest Department, Taipei Veterans General Hospital, Taipei, China; ²School of Medicine, National Yang-Ming University, Taipei, China. Fax: (+886) 228752380. e-mail: wj.wjsu@gmail.com

Aim: To evaluate the distribution of the major clades of the *Mycobacterium tuberculosis* (MTB) isolated from Taipei district in Taiwan.

Methods: 294 clinical isolates from a reference laboratory of Taipei city hospital, from July 01, 2005 to Dec. 31, 2006, were analyzed by spoligotyping. The SpoDB4 database and the model-based program Spotclust were used to assign isolates to families, subfamilies and variants.

Results: Of 294 isolates, 20 isolates were excluded because of multiple specimens from a same patient.

Of 274 isolates, we found a total of 74 different spoligotype patterns with 14 clusters (≥ 2 isolates) and 60 unique patterns (orphan patterns) were seen. The diversity of observed clustered was 0.003 (74 of 274). One hundred twelve (40.9%) isolates were Beijing family genotypes and consisted of 102 characteristic Beijing genotypes; and 10 Beijing-like genotypes in 7 spoligotypes. Of 162 non-Beijing genotypes (59.1%), there were 66 spoligotypes, including 11 clusters. Base on SpoDB4, Haarlem family (51, 19%), Beijing (102, 37%), Beijing-like (10, 3%), EAI (18, 7%), LAM (8, 3%), and modern TB strain (35, 13%) were major identified super families. Of the obtained spoligopatterns, 32 spoligotype patterns were not previously reported. Analysis of drug susceptibility showed that only rifampicin resistant strains were found more often in Beijing family genotype strains (25%) than in non-Beijing family genotype strains (12.3%), $P = 0.008$. Of 34 MDR-TB, 18 isolates (52.9%) were Beijing strains, and Haarlem family strains were the most common genotype (20.6%) among the non-Beijing MTB. Although the rate of MDR-TB among the Beijing family strains was higher than those of non-Beijing strains, there was no statistic significance (16.1% vs. 9.9%, $P = 0.13$).

Conclusion: The study highlighted the dominant Beijing genotype and the epidemic potential of Haarlem strain family in Taipei district, Taiwan.

PS-71313-10 Drug-resistant tuberculosis in patients managed in six hospitals of Rio de Janeiro, Brazil (final report)

R C Brito,^{1,2,3} F C Q Mello,² L Fonseca,² P Albuquerque,² M K Andrade,⁴ H M Oliveira,⁵ V Costa,⁶ M C Lourenço,⁷ V C Rolla,⁷ H Matos,⁸ A L Kritski.² ¹Tuberculosis Control Program Rio de Janeiro State, Rio de Janeiro, RJ, ²Federal University of Rio de Janeiro, Rio de Janeiro, RJ, ³UNIFESO, Teresópolis, RJ, ⁴Raphael de Paula Souza Hospital, Rio de Janeiro, RJ, ⁵Santa Maria State Hospital, Rio de Janeiro, RJ, ⁶Ary Parreiras State Lung Institute, Rio de Janeiro, RJ, ⁷Evandro Chagas Institute, Rio de Janeiro, RJ, ⁸Servidores do Estado Federal Hospital, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 26131652. e-mail: rossanacb@terra.com.br

Rationale: In metropolitan areas from high burden countries, 20% to 30% of tuberculous (TB) patients are diagnosed in hospitals, although the emphasis has been given to the TB control activities in primary health centers. Additionally, there are scarce data regarding drug resistant (DR)-TB patients diagnosed in hospitals. To date, the multidrug-resistant (MDR)-TB rate among patients attended in hospitals ranged from 5.1% to 22% and the primary MDR-TB ranged from 2.4% to 7%.

Objective: To evaluate the occurrence of DR and MDR-TB in *Mycobacterium tuberculosis* (MTB) strains isolated from patients attended in six hospitals and, to identify factors associated with drug resistance.

Methods: In Rio de Janeiro State, a cross-sectional and

prospective study was carried out. During 12 months, all MTB strains isolated from patients of six hospitals (2 TB Reference Centers, 1 TB-HIV Hospital and 3 General Hospitals) were analyzed. Patients answered a questionnaire which contained clinical, social, demographic and epidemiological data. DST was evaluated in solid medium in LJ by proportion methods according to Canetti and Grosset. Isolates resistant to isoniazid (H) and rifampin (R) were defined as MDR. **Results:** 584 patients were included, 425 (73.0%) were newly diagnosed TB. Among them, primary DR for H was identified in 39 (9.2%), for R in 21 (5.0%) and MDR in 19 (4.5%). Among 152 patients that referred previous TB treatment, DR for H in 35 (23.0%), for R in 30 (20.0%) and acquired MDR in 26 (17.0%). In bivariate analysis, DR cases were significantly associated with previous admission in hospitals ($P \leq 0.003$) and previous TB ($P \leq 0.0008$). Acquired TB-MDR cases were significantly associated with previous TB ($P \leq 0.0003$).

Conclusion: High occurrence of DR and MDR-TB in hospitals highlight the necessity to implement and evaluate the impact of TB control Programs in hospitals located in high prevalence TB regions.

PS-71334-10 Epidemiological aspects of TB-HIV co-infection, 2003–2007, data of NCTBLD

L P Papitashvili, N O Khomasuridze. National Center for Tuberculosis and Lung Diseases, Tbilisi, Georgia.
Fax: (+995) 32 911941. e-mail: lika_papitashvili@rambler.ru

Objectives: The overall goal of the study was to define HIV-status of TB patients and in case of positive status to plan correctly the treatment tactics and to initiate timely the antiretroviral treatment (ART). The objectives of the study were to: ascertain the dynamics of TB-HIV co-infection case notification in 2003–2007; examine age and sex distribution of co-infection; establish probable geographical locations of acquisition of HIV infection; define HIV and TB infection transmission routes; determine TB-HIV co-infection distribution by regions of Georgia.

Methods: 1. InTek rapid test; 2. Immunoferment analysis IFA; 3. Immunoblot analysis.

Results: 2821 TB patients were tested on HIV infection at NCTBLD in 2003–2007. 44 HIV-positive cases were confirmed. HIV-TB co-infection rates showed increasing trend: 2003—0.7%, 2004—1.0%, 2005—1.7%, 2006—3.1%. 11% of co-infected persons were female, 89% male. Majority of cases were in 30–49 age groups. Majority of HIV infections abroad fall on Russia and Ukraine. Main transmission route is represented by IVD use. 59% of co-infected persons were new TB cases. 50% of co-infected persons were SS+ at the start of treatment. 79.5% of co-infection cases had PTB.

Conclusion: TB-HIV co-infection rate shows steady increase in Georgia. Routine countrywide HIV test-

ing of TB patients will become necessary in coming years in Georgia.

PS-71407-10 Disparities in tuberculosis between Asian/Pacific islanders and non-Hispanic Whites, United States, 1993–2005

L Manangan,¹ R Pratt,² K Elmore,³ B Lewis,³ J Davison,⁴ S Santibanez,⁵ L Armstrong,¹ A Heetderks,¹ V Robison,¹ V Lee,³ T Navin.¹ ¹CDC/NCHHSTP/DTBE, Atlanta, Georgia, ²Northrop Grumman Information Technology, Atlanta, Georgia, ³ATSDR/DHS/OD, Atlanta, Georgia, ⁴Emory University Rollins School of Public Health, Atlanta, Georgia, ⁵CDC/CCHIS/NCHM, Atlanta, Georgia, USA. Fax: (+1) 404 639 8959.
e-mail: lpm2@cdc.gov

Aim: To compare Asian and Pacific Islander (API) with non-Hispanic white TB patients in the United States (U.S.).

Design: Descriptive analysis of data reported to the National TB Surveillance System (NTSS) by 50 states and District of Columbia.

Method: We analyzed demographic, clinical and treatment characteristics of API and non-Hispanic white TB cases reported to NTSS during 1993–2005. We used U.S. Census Bureau 2000 Zip Code Tabulation Areas (ZCTA) to delineate zip codes of TB cases and calculate TB case rates per area. We compared API and non-Hispanic white TB case rates during 1993–2003 by population density using a geographic information system.

Result: Of 239 552 TB patients, 19.6% were API and 23.6% were non-Hispanic whites; 93.7% API and 11.6% non-Hispanic whites were born outside the U.S. The proportions of API who were HIV positive, homeless, in jail, and substance abusers were lower than non-Hispanic whites but those who were on directly observed therapy and who completed therapy within a year were similar in both groups. However, multidrug resistance (resistance to at least isoniazid and rifampin) among API (2%) was twice that of non-Hispanic whites (1%). The ratio of API to non-Hispanic white TB case rates during 1993–2003 was 14/100 000 for areas with low population densities (250 to 1000 per square mile) versus 7/100 000 for areas with higher population densities (10 000 to 177 000 per square mile). In 2005, the U.S. TB case rate in API was 25.5/100 000 versus 1.3/100 000 in non-Hispanic whites.

Conclusion: Disparities in TB exist among API and non-Hispanic whites in the United States. TB rate disparity is highest in areas with lower population densities, which may impact TB program development.

PS-71489-10 Booster prevalence among medical students in Rio de Janeiro, Brazil

E G Teixeira,^{1,2,3} A J L A Cunha,³ A Kritski,³ A Ruffino-Netto,⁴ M T C Belo,^{1,2} L Selig,¹ M S Scartozzoni,¹ P Portela,¹ B Rodrigues,¹ V Gontijo,² D Menzies,⁵ A Trajman.¹

¹Internal Medicine, Gama Filho University, Rio de Janeiro, Rio de Janeiro, Rio de Janeiro, ²Internal Medicine, Souza Marques Foundation, Rio de Janeiro, Rio de Janeiro, ³Internal Medicine, Rio de Janeiro Federal University, Rio de Janeiro, Rio de Janeiro, ⁴Internal Medicine, Ribeirão Preto School of Medicine, São Paulo University, São Paulo, São Paulo, Brazil; ⁵Montreal Chest Institute, McGill University, Montreal, Quebec, Canada. Fax: (+21) 25321661. e-mail: elenygt@globo.com

Introduction: Nosocomial transmission of TB is well reported among healthcare workers (HCW). Serial tuberculin skin testing (TST) is recommended in HCW, including medical students, for early detection of recent latent TB infection (LTBI). In this setting, the booster phenomenon should be tested.

Objective: To evaluate the appropriateness of this recommendation in a young exposed population ubiquitously BCG-vaccinated.

Method: We tested 961 students from 5 medical schools in 3 different cities in RJ state with a first TST <10 mm. The two-step TST was performed by the same trained HCW. Booster was defined as an induration ≥ 10 mm with a 6 mm increment over first TST. The association of sex, age, years of clinical studies, TB incidence in the city and presence of BCG scar with booster prevalence was measured using OR and the 95% CI.

Result: Mean age was 21.9 (± 0.9) years, 52% were female, 89% had a BCG scar. Overall prevalence of booster phenomenon was 7.8% (95% CI 7.1%–9.9%). A higher prevalence was observed among vaccinated students ($8.8\% \times 1.1\%$; OR = 8.4; 1.2–61.1), no other variable was significantly associated with booster prevalence.

Conclusion: Although there was a significant association with BCG vaccination, the booster phenomenon was not as high as reported in other studies. Nevertheless, despite the greater work and costs, this prevalence justifies performing it in young BCG vaccinated populations, as medical students, in order to avoid unnecessary LTBI treatment, suggested by a false conversion.

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PS-71526-10 Long-term follow-up of patients with MDR-TB in Sweden

G Boman,¹ U Ljung,¹ V Romanus.² ¹Respiratory Medicine, Dept. of Medical Sciences, Uppsala, ²Epidemiology, Swedish Institute for Infectious Disease Control, Solna, Sweden. Fax: (+46) 186110228. e-mail: gunnar.boman@medsci.uu.se

Multidrug-resistant tuberculosis (MDR-TB) indicates disease resistant to at least isoniazid (INH) and ri-

fampicin (RMP). TB is a notifiable disease in Sweden since 1939. Now Sweden has among the lowest incidences in the world with around 500 new cases per year or 6/100 000/year. Since 1991 individual data on all persons diagnosed with MDR-TB are collected in the National TB Register.

Methods: This follow-up comprised all patients with MDR-TB, reported 1991–2001. All TB strains in Sweden were tested for resistance to INH, RMP, pyrazinamide, streptomycin and ethambutol but not systematically to second-line drugs. In 2004 information on treatment outcome was collected from the National Registration and/or from the regional medical officers on communicable diseases. It is prohibited to register co-infection with HIV.

Results: During 1991–2001 41 persons were reported to have MDR-TB. The mean incidence of MDR-TB among all culture positive cases was 1.1%, ranging from 0.2% in 1995 to 1.9% in 2000. Ten persons (24%) had strains resistant only to INH and RMP while 18 (44%) were resistant to MDR and one more drug. Four strains were resistant to all five drugs. By 2004 23 (56%) patients were reported 'cured' while 11 (27%) were living but data on their treatment outcome were missing. Six persons (15%) died before 'cure' and another three (7%) died after 'cure'. Twelve of the 41 (29%) were born in Sweden (age range 2–85 years) while 13 were born in Africa (9 in Somalia). Twelve relapses were reported in 8 patients by 2004. Three of them completed their treatment while one died. Median period between previous report and relapse was 1.5 years (range 1–8 years). Acquired MDR was identified in two of the 41 persons.

Conclusions: MDR-TB treated under routine conditions in Sweden was and still is a serious disease.

PS-71735-10 Screening recent migrants in secondary care for TB using the port of entry system in Redbridge PCT, 2003–2006

D Laycock,¹ W Roberts,¹ G Xavier,² C Wright,² P Datta.²

¹North East London TB Network, London, ²Redbridge Primary Care Trust, London, UK. Fax: (+44) 2085107731. e-mail: deborah.laycock@homerton.nhs.uk

Introduction: Migrants to the UK are offered screening for tuberculosis at port of entry. Information on these individuals is sent to their destination districts public health department. In the London borough of Redbridge, those who did not receive screening at port of entry are sent an invitation letter offering screening at the local TB service based within a secondary care acute trust.

Method: We retrospectively audited port of entry forms for all individuals entering the Redbridge local authority from January 2003–December 2006. This data was cross referenced with TB notification information from the London TB Register.

Results: The number of new entrants entering the

borough increased by an average of 423 each year between 2003 and 2006. Of these 9273 individuals 11 went on to develop TB. None of these 11 cases were identified by the TB clinic through secondary care based new entrant screening. Only 1 case developed TB within 3 months of entry in to the UK. The mean time from entry in to the borough to developing TB was 433 days. From notification data it was found that a further 68 cases of TB occurred in migrants in Redbridge who had entered the UK since 2003. None of these 68 patients appeared in the port of entry reporting system

Conclusion: The costs of carrying out new entrant screening in secondary care facilities are very high. As no TB patients were picked up through this screening system possible alternatives to the new entrant screening process currently in place in Redbridge needs to be explored.

Status of new entrant	Number of new entrants	% of new entrants	Number of new entrants who were later diagnosed with TB
Asylum seeker/ asylum seeker dependent	1060	11.5	0
Au pair	4	0.0	0
Detainee	4	0.0	0
Immigrant	1973	21.3	4
Long stay visa	1123	12.1	3
Refugee/ refugee dependent	25	0.3	0
Short stay visa	1	0.0	0
Student visa/ student visa dependent	3313	35.8	2
Work permit/ work permit dependent	1748	18.8	2
Unknown	22	0.2	0
Total	9273	100	11

PS-71835-10 Adverse event experience in workplace setting of wide-spread isoniazid preventive therapy

K T Mngadi,¹ G Churchyard,^{1,2,3} A Grant,^{1,2} L Coetzee,¹ K Fielding,^{1,2} ¹Aurum Institute for Health Research, Johannesburg, South Africa; ²London School of Hygiene and Tropical Medicine, London, UK; ³University of Kwazulu Natal, Durban, South Africa. Fax: (+27) 184783011. e-mail: kmngadi@auruminstitute.org

Background: Thibela is a cluster randomised trial assessing the impact of wide-spread Isoniazid Preventive Therapy (IPT) on TB incidence among ~68,000 South African gold miners. The toxicity profile of isoniazid is well documented. The safety of IPT is described. **Method:** IPT for 9-months is offered to miners without evidence of active TB. Clinical monitoring occurs at monthly scheduled or unscheduled visits for study

defined for adverse events (AEs), namely hepatitis, peripheral neuropathy (PN), hypersensitivity rash (HR), convulsions, psychosis.

Results: 5961 participants enrolled in the study between July 2006 to March 2007, 5009 started IPT; 99% are male, median age 40 yrs 55 suspected AEs have been reported (Table).

		Hepatitis (n = 4)	PN (n = 20)	HS (n = 31)
Grade of severity	Mild	2	19	16
	Moderate	1	1	15
	Severe	1	0	0
	Life threatening	0	0	0
	Death	0	0	0
Relationship to isoniazid	Definitely related	1	0	0
	Probably related	0	3	7
	Possibly related	3	17	24
	Not related	0	0	0

Conclusion: The risk of hepatitis with clinical monitoring is low (0.02%) and consistent with reported data. Most cases of peripheral neuropathy and hypersensitivity rash could not conclusively be linked to study medication. This study confirms the safety profile of IPT, thus far.

PS-71936-10 Tuberculosis among foreign-born persons in Taiwan, 2002–2005

K J Bai,¹ L C Wu,¹ M C Yu,¹ C N Lee,¹ C Y Chiang,² ¹Division of Pulmonary Medicine, Wan Fang Hospital, Taipei, Taipei, China; ²International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+886) 229334920. e-mail: baichan@ms6.hinet.net

Objectives: To investigate the epidemiology of tuberculosis (TB) among foreign-born persons in Taiwan.

Methods: Data of foreign-born persons with TB reported to Taiwan Centers for Disease Control during 2002–2005 were obtained from National TB Registry and analyzed.

Results: A total of 2444 TB cases of foreign-born persons were notified during 2002–2005, which accounted for 3.6% of all notified TB cases during that period in Taiwan. The proportion of foreign-born TB cases among all cases was constant with minimal variation by year. Annual TB notification rate among foreign-born population was higher than that of Taiwan citizens (81.1/100 000 vs. 72.0/100 000). The majority of TB cases among foreign-born population were female (65.4%) and aged 25–44 years (70.9%), whereas the majority of TB cases among Taiwan citizens were males (69.4%) and aged 65 or more years (about 50%). The top three countries where foreign-born TB cases came from were Mainland China (29.7%), Vietnam (28.2%) and the Philippines (13.0%). During 2003–2004, there were 266 foreign-born TB cases whose immigrant status was spouse of Taiwan citizen. Of the 266 cases, 105 (39.4%)

had cultures positive for *M. tuberculosis*. Susceptibility testing results were available for 77 culture positive cases. Of these, 10 (12.9%) had isolates resistant to isoniazid and 3 (3.9%) resistant to at least isoniazid and rifampin.

Conclusion: Foreign-born TB patients have different profiles as compared with those of Taiwan citizens. Monitoring the epidemiologic trend of TB among foreign-born persons, especially for those coming from high TB burden countries, is essential to the fight against TB in Taiwan.

PS-72049-10 HIV/AIDS and tuberculosis control in the central prison of New Bell, Douala

S Mbondi Mfondih,¹ J Noeske,¹ G Amougou.² ¹German Technical Cooperation, Douala, ²New Bell Central Prison, Douala, Cameroon. Fax: (+237) 3433360. e-mail: juergennoeske@yahoo.fr

Setting: Central prison in Douala (Cameroon).

Objective: To assess a HIV/AIDS and TB control programme implemented during 2004 following a TB-HIV prevalence study.

Design: Descriptive and retrospective study. TB registers, cotrimoxazole intake registers and HIV counselling and testing registers were analysed for the years of 2005 and 2006.

Results: The prison population amounted to an annual average of about 3500 inmates, with about 80% in detention pending trial and a high turn-over rate (median stay: 12.2 months). The total number of new smear positive pulmonary TB patients (PTM) diagnosed and treated remained stable with 46 and 44 cases for 2005 and 2006, respectively (during the prevalence survey from 2003/04 a total of 54 new PTB cases were notified). The number of cells with mini-outbreaks (≥ 3 PTM cases/cell) did not change significantly during the intervention period (11 in 2005; 9 in 2006). The proportion of TB patients tested positive for HIV and put on cotrimoxazole prophylaxis was comparable for the two years (14/46 and 10/44, respectively). So was the rate of PTB patients lost to follow-up, principally due to release of prisoners on treatment. The TB lethality rate decreased from 11.5% to 7.7% (statistically not significant). However, the control programme was associated with a significant decrease of the HIV infection rate among prisoners: 180/1390 (13.0%) in 2005 and 222/2432 (9.1%) in 2006 ($P < 0.000$).

Conclusions: The prison's HIV/AIDS and TB control programme has to implement active TB case finding measures and a functional transfer system of released TB cases under treatment to TB treatment facilities in the civilian sector. HIV transmission prevention measures have to be reinforced.

PS-72130-10 Drug resistance and genotyping patterns of *Mycobacterium tuberculosis* complex strains of the WHO specimen bank

Z Rahim,¹ R Raqib,¹ J de Beer,² D van Soolingen,³ C-M Nathanson,⁴ A Ramsay,⁴ A G M van der Zanden.²

¹Tuberculosis Laboratory, International Centre for Diarrhoeal Disease Research, Dhaka, Bangladesh, ²Medical Microbiology and Infection Prevention, Gelre Hospitals, ³National Mycobacterium Reference Laboratory, Bilthoven, the Netherlands, ⁴TDR WHO Geneva, Switzerland. Fax: (+880) 8812529. e-mail: zeau@icddr.org

Aim: To assess resistance patterns of the isolates with respect to first line anti-tuberculous drugs and association between genotyping and drug resistance of *Mycobacterium tuberculosis* complex (MTB).

Methods: One hundred and ten strains of MTB was studied. Conventional method was followed to test susceptibility of the strains to rifampicin (RIF), isoniazid (INH), ethambutol (EMB) and streptomycin (STR). Randomly selected 84 strains were genotyped by spoligotyping. Real-time (RT)-PCR was performed with an attempt to correlate phenotypic resistance of these strains to INH with mutation of codon 315 of the KatG gene.

Results: MTB strains were isolated from 110 TB patients of whom 68 were male and 42 were female. Fifty-eight (53%) strains were sensitive to all drugs and fifty-two (47%) strains were resistance to at least one drug. Mono resistance to RIF, INH, EMB and STR was detected in 1 (1%), 5 (5%), 6 (5.5%) and 18 (16%) strains respectively. Combined resistance to RIF + INH + EMB + STR was detected in 4 (3.4%) strains. Two strains (1.8%) demonstrated combined resistance to RIF + INH + EMB. One strain (1%) was resistant to both RIF and INH. A mutation in codon 315 at katG gene was detected in 7 of 15 (47%) strains. Twenty-eight (25%) of 110 strains were genotyped by spoligotyping into 7 clusters and 56 pattern strains were unique.

Conclusion: This study indicates that heterogeneous populations of MTB were associated with the infection of this group patients. W/Beijing constitutes the predominant genotype and associated with drug resistance.

PS-72170-10 Factors related to TB in pastoralist areas in Northern Kenya

E Bloss,¹ K Macintyre,¹ L Kivihya-Ndugga,² J Chakaya.³

¹Tulane University, International Health and Development, New Orleans, Louisiana, USA; ²Centre for Respiratory Diseases Research (CRDR), Kenya Medical Research Institute (KEMRI), Nairobi, ³Kenya National Leprosy and Tuberculosis Control Program (NLTB), Nairobi, Kenya. Fax: (+1) 202 248 1795. e-mail: ebloss@tulane.edu

Currently ten percent of all TB cases in Kenya come from nomadic areas. Due to the unique challenges of diagnosing and treating migrant populations, many TB cases continue to go undetected and untreated.

Thus, there is an increasing need to focus on prevention efforts by delineating TB risk factors in nomadic pastoralist societies. In order to address this gap and to better inform prevention efforts targeting high-risk groups within these hard-to-reach populations, a case-control study was conducted in two district hospitals in northern Kenya to identify risk factors for active TB disease among adult men and women in pastoralist settings. Recruitment for cases and controls was stratified by gender and controls were frequency matched on age. Approximately two controls were recruited from the outpatient clinic for each new adult TB case and structured interviews were conducted among the participants. Multivariate logistic regressions indicated both male and female TB cases were significantly more likely than controls to live farther away from the hospital, not own livestock, score lower on a TB knowledge index, report daily exposure to an indoor fire or fumes, be poorly nourished, and be HIV positive. Among men, TB cases were more likely to report history of TB contact. Among women, TB was related to brewing alcohol. The role of these results in designing TB prevention policies and interventions among at-risk men and women in pastoralist populations will be discussed.

PS-72228-10 Treatment outcome among patients with extensively drug-resistant tuberculosis, Latvia, 2000–2004

I S Sture. State Agency of Tuberculosis and Lung Disease, Riga, Latvia. e-mail: insture@tuberculosis.lv

Background: Latvia has one of the highest rates of multidrug-resistant tuberculosis (TB resistant to at least isoniazid and rifampin, known as MDR-TB) in the world (15% in 2006). The aim of this study is to evaluate treatment outcome among patients with extensively drug-resistant (XDR) TB in Latvia.

Methods: We reviewed records of XDR-TB patients who started treatment with second-line drugs from January 1, 2000, to December 31, 2004. We defined XDR-TB as MDR-TB caused by a *Mycobacterium tuberculosis* isolate resistant to isoniazid, rifampin, plus resistant to any fluoroquinolone and at least one of three injectable second-line drugs. We evaluated the number of sensitive drugs in the treatment regimen, presence of cavities on X-ray, culture growth at the beginning of treatment, and final treatment outcome.

Key findings: From 2000–2004, 1027 MDR-TB cases started treatment. Of these, 47 (5%) patients had XDR-TB. Treatment outcomes for these 47 XDR-TB patients: cure 18 (38%), failure 22 (47%), died 4 (9%), defaulted 3 (6%). Defaulters were excluded from analysis. Kanamycin or capreomycin was sensitive and included in treatment regimen for 72% of cured patients, as well as for 42% of failures and those who died (RR = 2.2; 95%CI 0.9–5.0; $P = 0.05$). The median number of sensitive drugs included

in the treatment regimen was 4, with a range of 2–6 drugs for cured patients and 1–6 drugs for failures. Culture growth at the beginning of treatment among cured cases: 1+ or less for 8 patients, more than 1+ for 10 patients; among failed–3 patients; and among cases who died–23 patients, RR 2.4 (1.3–4.5), $P = 0.01$. Non-cavitary disease among cured cases was present in 7 patients; among failures and cases who died–3 patients, RR 2.2 (1.2–4.1), $P = 0.03$.

Conclusion: The cure rate among XDR-TB patients is low. Predictors for cure were use of injectable drugs, non-cavitary disease, and low culture growth at the beginning of treatment.

PS-71196-10 Poverty and latent TB infection: preliminary results

A Trajman,^{1,2,3} D Zylberberg,^{1,4} M J Dion,⁵ A O Santos,⁴ M B Barcellos,^{1,3} A A Oliveira,^{1,3} J L M Sanz,^{1,3} C E C Teodosio Santos,^{1,3} D Menzies.⁵ ¹Medical School, Gama Filho University, Rio De Janeiro, RJ, ²Rede Brasileira De Pesquisa Em Tuberculose, Rio De Janeiro, RJ, ³TB Scientific League, Rio De Janeiro, RJ, ⁴Santa Casa Da Misericordia Hospital, Rio De Janeiro, RJ, Brazil; ⁵McGill University, Montreal, Quebec, Canada. Fax: (+55) 2125321661. e-mail: atrajman@gmail.com

Introduction: Tuberculosis (TB) is associated with poverty. The highest incidence rates are found in developing countries, where malnutrition, crowding, HIV co-infection and poor hygienic conditions have been implicated. We assessed factors associated to latent TB infection (LTBI) among contacts of patients under TB treatment in three poor neighborhoods of Rio de Janeiro, Brazil.

Methods: Among 642 contacts, 191 accepted to participate. They answered a questionnaire and were submitted to a tuberculin skin test (TST) performed by a trained professional. LTBI was diagnosed in those with an induration >10 mm. Family income was estimated according to *CriterioBrasil* (www.abep.org).

Results: Median age was 36 (18–82) years, 121 (63%) were female, 44.8% had a family income > US\$ 500, with 12% > US\$ 800. LTBI was not associated to crowding (mean persons/sleeping room 2.56×2.52 ; $P = 0.87$), living in the same house (OR = 1.41; 0.66–3.01), sleeping in the same room (OR = 1.40; 0.54–3.62) nor family income (OR = 1.22; 0.62–2.39; using US\$ 500 as cut-off). There was a trend for BCG association with a positive TST (OR = 2.11; 0.89–5.02).

Discussion: Poverty and poverty-related conditions were not associated to LTBI in this population, suggesting that the higher risk for TB among poor people is not due to TB transmission but to higher rates of progression to disease. Nevertheless, this finding may be explained by the relative homogeneity of the population studied, with very few people from upper economic classes. Further data collecting is ongoing.

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PS-71197-10 Knowledge about tuberculosis transmission among TB patients' contacts

A Trajman,^{1,2,3} D Zylberberg,^{1,4} M J Dion,⁵ A O Santos,⁴ M B Barcellos,^{1,3} A A Oliveira,^{1,3} J L M Sanz,^{1,3} C E C Teodosio Santos,^{1,3} D Menzies.⁵ ¹Medical School, Gama Filho University, Rio De Janeiro, RJ, ²Rede Brasileira De Pesquisa Em Tuberculose, Rio De Janeiro, RJ, ³TB Scientific League, Rio De Janeiro, RJ, ⁴Santa Casa Da Misericordia Hospital, Rio De Janeiro, RJ, Brazil; ⁵McGill University, Montreal, Quebec, Canada. Fax: (+55) 2125321661. e-mail: atrajman@gmail.com

Introduction: Despite the advent of tuberculostatic treatment in the last century, the stigma of tuberculosis (TB) still haunts patients' social, professional and familial relationships. The objective of the present study was to assess household contacts' knowledge about TB transmission and curability.

Methods: A self-administered questionnaire containing 9 questions about TB transmission and one question about treatment ('Is TB curable?') was answered by 191 among 642 identified contacts of patients under TB treatment in three poor areas in Rio de Janeiro, including household and work contacts.

Results: Median age was 36 (18–82) years, 121 (63%) were female, 106 (55%) belonged to class D and E (estimated family income up to US\$ 500, www.abep.org). Answers are displayed in the Table.

Question	Yes n (%)	No n (%)	Don't know n (%)
Is TB transmitted by . . . ? (n = 191)			
Cough?	136 (71)	17 (9)	38 (20)
Sneeze?	116 (61)	37 (19)	38 (20)
Speech?	97 (51)	57 (30)	37 (20)
Fork, knife, spoons and glass?	56 (29)	95 (50)	40 (21)
Towels, clothes, napkins?	28 (15)	122 (64)	41 (22)
Sweat?	16 (8)	135 (71)	40 (21)
Hugging?	9 (5)	142 (74)	40 (21)
Sexual intercourse?	35 (18)	112 (59)	44 (23)
Toilets?	14 (7)	133 (70)	44 (23)
Is TB curable? (n = 185)	181 (98)	0 (0)	4 (2)

Discussion: Although most patients are aware of TB curability, up to half contacts do not precisely know its ways of transmission. In particular, transmission by utensils and sexual intercourse can lead to isolation and social exclusion.

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PS-71369-10 Usefulness of tuberculin skin test in BCG-vaccinated close contacts in the Netherlands

M Mensen,¹ S Kik,^{2,3} S Verver,^{2,3} H Deutekom.¹ ¹Municipal Health Service Amsterdam, the Netherlands, Amsterdam, ²KNCV Tuberculosis Foundation, The Hague, the Netherlands; ³Department of Infectious Diseases Tropical Medicine and AIDS, AMC, University of Amsterdam, Amsterdam, the Netherlands. Fax: (+31) 205555350. e-mail: marliesmensen@ggd.amsterdam.nl

Background: In the Netherlands it was not common practice to do a tuberculin skin test (TST) on BCG vaccinated close contacts of a smear positive TB patient. TST specificity is reduced by BCG vaccination and exposure to non-tuberculous mycobacteria (NTM). However it is also argued that BCG vaccination when given during infancy has little effect on TST.

Objective: To evaluate the usefulness of TST in BCG-vaccinated close contacts at the Municipal Health Service of Amsterdam.

Methods: All close contacts of all ages of smear positive patients received TST testing during the period January 2004 to April 2005. A positive TST was defined as ≥ 5 mm from age 0 till 12 and ≥ 10 mm from age 12. Persons who were tested positive were seen by a TB doctor. Contacts who were not BCG vaccinated in the past received chemoprophylaxis. Contacts who were BCG vaccinated in the past were asked for follow-up for two years receiving an X-ray at zero, three months and every six months for the next two years.

Results: Preliminary results showed 71 source patients. 82 persons with a BCG vaccination in the past and a positive TST were included for follow-up. From this group at least 7 persons (8.5%) developed TB within 2 years after contact investigation.

Conclusion: More detailed results on the predictive value of epidemiological parameters and TST at zero and three months for development of active TB will be presented.

PS-71721-10 The prevalence of airborne *Mycobacterium tuberculosis* in health care settings in a high incidence area

I H Mardarowicz,¹ I Wiid,¹ C Pfeiffer,¹ R Warren,¹ P D van Helden,¹ A Diacon,² T Botha,³ V T Traor.⁴

¹Department of Biomedical Sciences of University of Stellenbosch, Cape Town, ²Department of Health Sciences, University of Stellenbosch, Cape Town, ³Department of Wellness Sciences, Cape Peninsula University of Technology, Cape Town, South Africa; ⁴National Institute of Hygiene and Epidemiology, Immunology and Molecular Biology, Hanoi, Vietnam. Fax: (+21) 9389476. e-mail: imardar@sun.ac.za

Background: With the advent of extremely drug resistant (XDR) tuberculosis (TB) and the increasing incidence of HIV (human immunodeficiency virus) infection, it is essential to investigate the risk of TB infection in health care settings.

Aim: To determine the presence of airborne *Mycobacterium tuberculosis* in different clinical settings to establish the risk for nosocomial transmission in the Western Cape Province of South Africa.

Methods: Circulating air will be collected by air sampling in clinic waiting rooms and in hospital wards. Air will be sampled twice daily for 14 days. Following air collections, membrane filters containing trapped *Mycobacterium* will be transported to the Bio-safety Level 3 laboratory, where they will be liquefied and subjected to *Mycobacterium tuberculosis*-specific polymerase

chain reaction and bacterial culture to identify both non-viable and viable bacteria. The air sampling technique will be tested and validated in a laboratory using aerosolized *Mycobacterium bovis* BCG and a specially designed chamber to optimize the method.

Discussion: Currently, optimization experiments with *Mycobacterium bovis* BCG are being performed. Air sampling in health care centers will be conducted shortly, and preliminary results of these experiments presented. The reported increase of XDR TB and HIV-infection rates in South Africa makes this study of considerable importance.

PS-71957-10 Yield of tuberculosis contact investigations in high-income countries: a systematic review and meta-analysis

J L Morrison,^{1,2} M Pai,³ P C Hopewell.² ¹Desmond Tutu TB Research Centre, University of Stellenbosch, Cape Town, South Africa; ²School of Medicine, University of California, San Francisco, San Francisco, California, USA; ³Department of Epidemiology and Biostatistics, McGill University, Montreal, Quebec, Canada. Fax: (+27) 21 917 9177. e-mail: janinalorrison@gmail.com

Background: With growing international concern over the spread of drug resistant tuberculosis (TB), contact tracing continues to be a mainstay of TB control policies in high income nations. This systematic review aims to synthesize the literature on the yield of contact tracing among close contacts in high income nations. **Methods:** The main outcomes include the prevalence of latent infection and active tuberculosis among close contacts of tuberculosis cases. We searched four databases (PubMed, Embase, Biosis, Web of Science) from 1950 to 2004 to compile an initial database of 1237 citations. From the database, we selected 30 studies with data on the yield of contact tracing within close contacts. Data extracted from these studies included characteristics of index cases and contacts, proportion of contacts found to have tuberculosis, and proportion of contacts found to have latent infection.

Results: Of the 30 studies, 19 reported yield for active TB and 19 reported yield for LTBI. Thirteen studies reported outcomes among child contacts and 6 examined the contacts of index cases with multidrug-resistant TB. Meta-analysis of the proportion of contacts found to have active tuberculosis revealed a pooled yield of 3.1% (range 0.4–6.2%). The pooled yield of contacts found to have latent infection was 38.1% (range: 16.3–56.0%).

Conclusion: Evidence from our review suggests that contact investigation in high income countries appears to be a high yield approach.

PS-72191-10 CXCL10 as a novel and potent marker for latent tuberculosis infection

P Ravn,¹ M Nakaoka,^{1,2} B Coulter,³ K Kofoed,² J Eugen-Olsen,² B Squire,³ L Lawson,⁴ C A Hart,⁵ L Cuevas,³ M Ruhwald.^{1,2} ¹Dpt. Infectious Diseases 144, University Hospital Hvidovre, Hvidovre, ²Clinical Research Unit, University Hospital, Hvidovre, Denmark; ³Liverpool School of Tropical Medicine, Liverpool, UK; ⁴Zankli Medical Centre, Abuja, Nigeria; ⁵Department of Medical Microbiology, University of Liverpool, Liverpool, UK. Fax: (+45) 3632 3405. e-mail: pravnd@dadlnet.dk

Background: We have recently shown that CXCL10 has similar power to discriminate between tuberculosis (TB) infected and uninfected individuals when compared to the QuantiFERON®-TB Gold-In Tube (QFT-IT) test (Ruhwald et al, *Microbes and Infection* 2007). CXCL10 was expressed following stimulation with *M. tuberculosis* antigen (ESAT-6/CFP-10/TB7.7) in vitro in a highly *M. tuberculosis* specific manner. The aim of the present study was to evaluate the performance of CXCL10 for the diagnosis of latent TB infection in children exposed to cases of sputum positive TB in a high endemic country.

Methods: A cross sectional study to assess the risk of TB infection among young household contacts of adults with pulmonary TB in Nigeria was performed in 2005 (Nakaoka et al., *Emerging Infectious Diseases* 2006). Nil, antigen and PHA stimulated samples from 107 children from this study were evaluated for the presence of CXCL10 and results were compared to IFN-gamma obtained in the QFT-IT tests and the Tuberculin Skin Test (TST) using exposure gradient as the best surrogate markers of TB infection.

Results: The main findings of the study were that IFN-gamma and CXCL10 showed comparable diagnostic sensitivity and specificity for TB exposure, but CXCL10 was expressed in much higher amounts than IFN-gamma median 1358 pg/ml vs. 106 pg/ml $P < 0.001$. Using a cut point for positive CXCL10 test based on best Youden Index the concordance between CXCL10 and QFT-IT was excellent ($\kappa = 0.84$) whereas concordance between CXCL10 and TST was moderate ($\kappa = 0.48$). Lowering the cut point for CXCL10, sensitivity was higher than QFT-IT. CXCL10 responses correlated strongly with the bacillary load of the index cases.

Conclusion: We have shown that CXCL10 determined in antigen stimulated whole blood was highly specific for *M. tuberculosis* exposure and the CXCL10 may improve the performance of the RD1 based test for latent and active TB.

TUBERCULOSIS AND SOCIETY/POVERTY

PS-71172-10 Illness costs to households determine access and adherence to treatment in a DOTS programme in Tajikistan

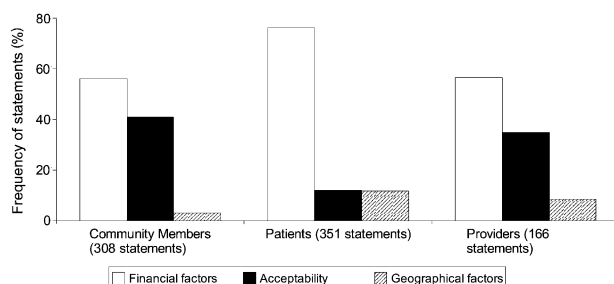
R Ayž,¹ H Abdualimova,² S Saidaliev,³ K Wyss.¹ ¹Swiss Centre for International Health, Swiss Tropical I, Basel, Switzerland; ²Project Sino, Dushanbe, ³Republican anti-TB Centre, Dushanbe, Tajikistan. Fax: (+41) 61 281 81 04. e-mail: raffael.aye@unibas.ch

Objective: To analyse determinants of access and adherence to treatment for WHO-defined tuberculosis cases as identified by patients, health services providers and community members in Tajikistan.

Methods: The study was conducted in four districts of Tajikistan implementing the Directly Observed Treatment, Short Course (DOTS) Strategy. Thirteen focus group discussions involving a total of 97 informants were carried out. Content analysis of discussions and a participatory approach to quantify the relative importance of discussed factors were conducted.

Findings: All three respondent groups considered financial factors to be the most important determinants of access to medical care and treatment adherence. Expenditure for drugs and consultations, for transport, and for food that was not usually part of people's diets as well as loss of income due to the inability to pursue usual working activities were identified as the major barriers to treatment adherence. Notably, expenditures were emphasized much more than the loss of income. Stigma and doubts about quality of care—while raised as issues—were not seen to be significant determinants of access and adherence to treatment.

Conclusions: Illness costs to households formed the main barrier to access and adherence to treatment for tuberculosis. The costs were determined by medication for iatrogenic problems as well as the provision of food to hospitalised patients. Users of health care services did not see loss of income to be as important as has been suggested in the literature. To improve adherence to tuberculosis treatment in Tajikistan and other countries, there is a need to better understand the importance of financial factors and to identify appropriate and effective mitigation strategies for patients and their households.

**PS-71496-10 TB and AIDS stigma among TB patients in Southern Thailand**

A M Kipp,¹ P Pungrassami,² S Sengupta,¹ Q Balhithip,³ S Choonuan,³ Y Kasetjaroen,² R P Strauss,¹ V Chongsuvivatwong,³ A Van Rie.¹ ¹Department of Epidemiology, University of North Carolina, Chapel Hill, North Carolina, USA; ²Tuberculosis Center 12, Yala, Yala Province, ³Prince of Songkla University, Hat Yai, Songkhla Province, Thailand. Fax: (+1) 919 966 2089. e-mail: kipp@email.unc.edu

Background: Anecdotal evidence suggests that the HIV epidemic compounds existing TB stigma with HIV/AIDS associated stigma. We aimed to quantify AIDS and TB stigma among TB patients in Southern Thailand and identify clinical factors associated with TB and AIDS stigma.

Methods: Four stigma scales were developed: TB stigma from community and patient perspective, and AIDS stigma from community and patient perspective. Scale scores were based on a Likert type response to the 10 to 12 items of each scale. Scores were summed and standardized to a 50 point scale. Scores greater than the mean standardized score were classified as 'high stigma'. The effect of HIV status and TB symptoms on TB and AIDS stigma was analyzed using multivariate logistic regression with age, sex, religion, income and TB knowledge entered as covariates.

Results: Among 480 TB patients enrolled, mean stigma scores were 27.9 on the Community TB Stigma Scale, 27.6 on the Patient TB Stigma Scale, 27.8 on the Community AIDS Stigma Scale, and 32.9 on the Patient AIDS Stigma Scale. Those with known HIV infection (15%) had twice the odds of high patient TB stigma (adjusted OR 2.15; 95%CI: 1.16, 3.98), and half the odds of high Patient AIDS stigma (adjusted OR 0.52; 95%CI: 0.29, 0.94) compared to those with known negative HIV status. Those presenting with atypical TB symptoms (absence of cough; 20%) tended to express lower community and patient TB stigma and higher patient AIDS stigma compared to those with cough (with or without other symptoms). Those presenting with hemoptysis tended to express lower stigma on all four scales.

Conclusion: Known HIV co-infection was associated with high TB stigma and low AIDS stigma. Atypical presentation of TB, independent of known HIV infection status, was associated with low TB stigma and high AIDS stigma. These characteristics of the dual TB-HIV epidemic have the potential to adversely impact the experiences and social interactions of affected individuals.

PS-71514-10 Gender disparity among TB suspects and new TB patients: record-based retrospective study in SAARC member states

K K Jha, L Shrestha. SAARC TB and HIV/AIDS Center, Kathmandu, Nepal. Fax: (+977) 16634379. e-mail: saarctb@mos.com.np

Introduction: The gender differentials are potentially important source of inequity in TB control. With equal population distribution between sexes in SAARC member countries, the low detection of female TB cases remains a troubling public health issue demanding urgently focused study in this region.

Objective: To assess the gender differences in TB suspects, TB case detection and treatment outcome under National TB Control Programmes of SAARC member countries.

Methods: This is cross sectional, record based retrospective study. Using a uniform format, sex specific data were collected under the categories of TB case detection, TB suspects and treatment outcomes recorded during the last 2 quarters of 2004 from randomly selected five TB treatment centers from each SAARC country.

Results: Male/female ratio of more than one was observed among the TB suspects and also in TB case detection in all the countries except in Pakistan. Male are more affected as NEW smear positive and smear negative PTB than female whereas in new extra pulmonary TB female are more affected than male. Gender distribution among cured and treatment failure found to be similar in both sexes where as in relation to defaulter and died male are more affected than female.

Conclusion: The SAARC region being one of the most gender sensitive regions in the world, existing gender inequalities may reflect gender differences in TB epidemiology. The results of this study support to derive testable hypotheses such as; gender differences in susceptibility to TB infection and treatment outcomes. This reflects there might be presence of gender differential in health seeking behaviors and medical care at the health care units in all member states of SAARC. Further studies are needed to examine those hypotheses.

PS-71544-10 Tuberculosis: an additional tipping stress on poor households in South Africa and Zambia?

M B V Chileshe, B Magazi, V Bond. Social Science Dept. ZAMBART Project, Lusaka, Zambia. Fax: (+260) 1254710. e-mail: mutale@zambart.org.zm

Background: Households in high HIV prevalence settings are often coping with HIV alongside other forms of adversity—including food insecurity and escalating tuberculosis incidence. In both Zambia and Western Cape (South Africa), TB and HIV prevalence are high and many households are food insecure.

Objective: This 18 month anthropological RENEWAL study compares the converging impact of food insecurity,

TB and HIV/AIDS on households in rural Zambia and peri-urban South Africa.

Methods: Participant observation in two field sites (Pemba, Mbekweni). Case studies of 16 TB and 16 non-TB households over 8/6 months using timelines, seasonal calendars, matrix ranking and scoring, well-being ranking and scoring, observation, and semi-structured interviews.

Preliminary Findings: In both countries, TB patients put additional demands on households for 'special' foods. The most striking difference between countries is the possibility in South Africa for people living with HIV/AIDS and TB patients to access welfare grants and food aid from government and NGOs that help them cope. In Zambia, access to external welfare is more limited and strategies to cope include moving children out of school, moving children to other households, borrowing money, selling livestock, working for wealthier households or missing a meal. In both countries, most TB patients are living with HIV and access to ARVs is more lengthy and costly in rural Zambia.

Conclusion: TB tips households into deeper poverty in the absence of external welfare and in the wider context of food insecurity and high HIV prevalence.

PS-71576-10 Barriers to care seeking in DOTS clinics and tuberculosis control in southern Nigeria: a qualitative analysis

J C Okeibunor,¹ N G Onyeneho,¹ J N Chukwu,² E B Post.²

¹Department of Sociology/Anthropology, University of Nigeria, Nsukka, Enugu, Nigeria; ²German Leprosy and Tuberculosis Relief Association, Wuerzburg, Germany.

Fax: (+49) 931 7948160. e-mail: erik.post@dahw.de

An understanding of the socioeconomic and cultural realities of persons infected with tuberculosis (TB) is important in setting programme strategies because they often come as constraints to the use of TB services (DOTS) in Southern Nigeria. The study took place in 24 communities, both urban and rural, in 12 randomly selected local government areas in Southern Nigeria. Using in-depth interviews and focus group discussion, this study looked qualitatively at the barriers to the use of DOTS facilities for prompt diagnosis and treatment of smear positive cases in Nigerian communities. It was found that a number of common and interrelated issues underlie these barriers, including perceived causes of the infection and perceived efficacy of the treatment, which are often influenced by the causative theories held by the infected persons and their relatives.

'Ukwaranta (TB) is a very deadly disease and it is a disease of shame. No one wants to be associated with it.'

Others include perceived costs of following treatment. Facility staff were noted to have demanded monies from patients in spite of the advertised free treat-

ments in the DOTS clinics. Furthermore, the general attitude of health staff was highlighted as a barrier to community use of public health facilities.

'Health workers at DOTS clinic, all have consulting shops outside the hospital. Drugs are not free. Attitude of health workers towards patients is influenced by amount of money the patient has.'

It follows therefore that the attitude of health workers must be addressed if the community members are to make better use of the DOTS clinics.

The poster presents typical community views and attitudes towards the use of TB services in Southern Nigeria.

PS-71767-10 Factors influencing adherence to tuberculosis treatment in KwaZulu-Natal, South Africa

M Taylor,¹ C C Jinabhai,¹ S Knight,¹ N A Dladla.² ¹Dept Public Health Medicine, Nelson R Mandela School of, Durban, KwaZulu-Natal, ²MRC, Durban, KwaZulu-Natal, South Africa. Fax: (+27) 0312604211. e-mail: Taylor@ukzn.ac.za

In SA the TB epidemic has been exacerbated by HIV. The aim of the study was to explore adherence to TB treatment and factors influencing non-adherence.

Methods: An ethnographic study was undertaken in Umkhanyakude District, Northern KZN. Nine clients (7 women, 24–33y), and two men (24 and 58y) currently on TB treatment were visited at home by an experienced ethnographer, conversant with local practices and beliefs, and interviewed using an interview schedule. The analysis explored themes influencing adherence.

Results: The respondents had always lived in the area, but many partners worked outside the district. Clients complained that increased appetite resulting from TB medication meant often being hungry. The stigma of TB did not differ if clients were better educated. The need for a more caring approach by health workers (HCWs) was articulated by many respondents, e.g., 'No, they do not care about us. I think they also think we have HIV and should go and die at home'. Clients needed assistance of HCWs since they felt vulnerable, and did not consider having a DOT supporter to be disempowering, but rather that s/he provided support and encouragement. Confidentiality was difficult to achieve as people in the area knew that DOT support for TB required regular visits.

Conclusions: Many people in KZN live in rural areas. Stigma against TB and HIV was a serious constraint and poverty limited access to food and health facilities, DOT support was viewed positively but the importance of caring by HCWs was emphasized.

PS-71975-10 TB-related stigma in Bangladesh: repercussions of social disapproval

F Ahmed, M I Islam, R Alam, F Karim, S Islam, A A Talukdar. BRAC, Dhaka, Bangladesh. Fax: (+880) 28823614. e-mail: rafiulalom@yahoo.com

Introduction: Despite 99% DOTS coverage in Bangladesh, case detection rate still about 70% due to stigmas and taboos attached to TB.

Objectives: To explore the existing stigmas associated with TB and its influence on health seeking behavior.

Methods: Two studies using both questionnaire survey and focus group discussions were conducted in 1998 and 2002 in rural Bangladesh.

Result: 'Fear of TB patient' leads people to hide their disease and increase delay in seeking treatment. Exaggerated concerns about the risk of spreading the disease to others make a TB patient socially avoided, and physically isolated even after getting cure from the disease. Most common perceived causes of spread of disease are contamination and contact, food, smoking, airborne exposure, physical exertion and sexual contact. TB stigmas also create problem in marriage and in conjugal life. In work place 'fear of losing work' prevent people from seeking TB health care. For women these stigmas are more acute and make them more vulnerable.

Conclusions: More strenuous effort through awareness campaign and social mobilization activities are found to be effective to decrease the stigma and increase early identification of the patient.

PS-71998-10 Evaluation of women's awareness about TB in Khartoum State, Sudan

L Ali,^{1,2} M Moukhayer,^{2,3} E Hamouda,² E Yousif,⁴ H Hussien,⁵ K H Adam.⁵ ¹National TB Program-Head Research Unit, Khartoum, Khartoum, ²National Stop TB Board-Executive Committee, Khartoum, Khartoum, ³Ahfad University for Women-Faculty of Medicine, Omdurman, Khartoum, ⁴National TB Program Manager, Khartoum, Khartoum, ⁵National TB Program-information Unit, Khartoum, Khartoum, Sudan. Fax: (+249) 183 772 182. e-mail: louratb@gmail.com

Introduction: NTP data shows that the numbers of women who develop TB are nearly equal to men. As there is lack in programs targeting women, this survey provides information about women knowledge about TB, development of IEC strategy that is sensitive to women's needs and that is effective in raising women awareness.

Methods: Questionnaires and women interviews.

Results: 27.3% of the samples were illiterate, 81.8% housewives, over 86% aware of TB, 47.3% reported radio as source of information, 23.6% from newspaper, 20% from family and 17.3% from friends. 65% knew about DOTS, only 10% of them will refuse to support infected relative. Reason for not supporting relative were 4.6% fear of infection, 3.6% drugs cost

and 2.7% fear of stigmatization. On knowledge on treatment, over 77% reported hospital isolation, 10.9% at home. when asked how to treat TB, 11.9% patients' will communicate with other to access care 32.7% refused to visit nearest centre if TB case, 21.8% fear stigma, while only 11.8% think TB untreatable. On preferred source of information 61.8% prefer radio, 21.9% medical doctors and 24.5% TV. Preferred activities to participate in, 48.2% public talks, 35.5% home visit while over 48.% will prefer schools for doing activities.

Recommendations: Need for initiatives and programs targeting women, mobilization of media, public debate and home visits are good means for mobilizing women.

PS-72059-10 Delays in diagnosis of smear-positive tuberculosis under the DOTS strategy: a systematic review

C T Sreeramareddy,¹ P V Kishore.² ¹Community Medicine, Manipal College of Medical Sciences, Pokhara, Kaski District, ²Internal Medicine, Manipal College of Medicine, Pokhara, Kaski District, Nepal. Fax: (+91) 61440260. e-mail: chandrashekharats@yahoo.com

Background: Delay in diagnosis of tuberculosis results in increasing severity, mortality and transmission. Various investigators have reported about delays in diagnosis of tuberculosis. We aimed to summarize the data on these delays.

Design: A systematic review.

Methods: Literature search was done in Medline from 1990 to 2006 using the following search terms: delay, tuberculosis, diagnosis, and help-seeking/heath-seeking behavior without language restrictions. In addition, indices of four major tuberculosis journals were hand-searched. Subject experts, authors of primary studies were contacted. Reference lists, review articles and text chapters were also searched. All the studies were assessed for methodological quality. Studies carried out on smear/culture-positive tuberculosis patients, defined and reported about total, patient and health-care system delays were included.

Results: A total of 344 potential studies were identified by the search. Twenty seven studies qualified for the review. The reported ranges of average (median or mean) total delay, patient delay, health system delay varied from 25 to 185 days, 7 to 162 days and 6 to 156 days respectively. The average health system delay was longer than patient delay (49 versus 32 days). Both types of delays in low and middle income countries were longer than those reported from developed countries. Frequent types of first contact of tuberculosis patients were traditional healers, pharmacies/shops and private practitioners.

Conclusion: Results suggest a need for revising case-finding strategies under DOTS strategy. The reported high treatment success rate of DOTS if complimented

by identification and shortening of diagnostic delays among infectious cases may effect in better TB control.

PS-72099-10 Psychosocial and clinical outcomes of Peruvian TB-HIV patients receiving community-based adherence support

M Munoz,¹ J L Sebastian,² B Espiritu,¹ E Palacios,¹ E Sanchez,³ M Callacna,³ C Rojas,³ C Bonilla,⁴ A Caldas,⁵ K Llaro,¹ K Chalco,¹ S Shin.^{5,6} ¹Socios En Salud, Lima, ²National HIV Program, Lima, ³Hipolito Hunanue Hospital, Lima, ⁴National TB Program, Lima, Peru; ⁵Brigham and Women's Hospital, Boston, Massachusetts, ⁶Partners in Health, Boston, Massachusetts, USA. Fax: (+1) 617 732 5629. e-mail: sshin@partners.org

Background: Early management of TB and HIV co-infection must address both clinical and psychosocial factors in order to establish adequate patterns of adherence to antiretroviral therapy (ART). We report preliminary clinical and psychosocial outcomes in a pilot adherence intervention of 30 patients with HIV and TB.

Methods: 30 patients receiving TB treatment and meeting criteria to initiate ART were approached and enrolled from 11/2005–5/2006. Patients received support with essential medical care, directly observed ART and psychosocial support from a team of community-based nurses and health promoters. Data were collected at baseline and at 12 months by chart review and patient interview.

Results: Of 30 patients, the mean age was 32 years, 23% were female. 27 patients started ART, a median of 3 months after TB treatment start. 1 patient died; two abandoned the support program, although 1 was later re-enrolled at his request. Regarding TB outcomes, 73% were cured, while 5 (17%) failed treatment and initiated treatment for multidrug-resistant TB; 1 abandoned TB treatment and 2 continued in treatment. The median change in CD4 was 100 (from a median of 88 to 200) and the median decrease in HIV viral load was 129 600 (from a median of 130 000 to 250). The average weight gain was 9 kg. At one year, patients reporting high stigma decreased from 67% to 23%, poor quality of life decreased from 40% to 27%, and depression decreased from 57% to 4%. Suicidal ideation in the past month decreased from 27% to 0% from baseline to 12 months. While some patients (37%) reported improved social support, 53% reported less social support and 10% reported no change at 12 months.

Conclusion: In this small cohort, patients receiving community-based adherence support demonstrated clinical and psychosocial improvement. However, changes social support were variable, and could reflect the dynamic nature social support provision to patients as they recover.

PS-72206-10 An exploratory study on challenges of mainstreaming of HIV/AIDS and TB activities in home-based care groups

B Nhlema Simwaka, M Phiri, F Kachomoza, M Nolo N, B Nhlane, C Masiye. Research for Equity and Community Health, Lilongwe, Malawi. Fax: (+265) 1 757 782. e-mail: bertha@reachtrust.org

Objectives: To map roles and responsibilities of home based care groups; identify weaknesses and linkages with the district health offices.

Methods: The study was conducted in five districts using qualitative research methods. Focus group discussions and in depth interviews were conducted with key informants, providers, policy makers and patients at community, district and national levels. This was done to understand roles of the groups, challenges in integrating TB and HIV/AIDS activities and linkages with the district health office.

Findings: Two out of 12 home based care groups assessed were implementing TB activities on referral for diagnosis. There is lack of capacity building on TB, coordination and lack of supervision by the district health offices. Some of the groups were operating without training on both TB and HIV/AIDS.

Discussion: Little has been done in integrating TB and HIV/AIDS at grass root level. The home based care groups create a resource for both TB and HIV/AIDS activities. Poor linkages with the health systems and lack of capacity building pose as risks for quality assured services.

Conclusions: Capacity building, proper coordination and clear linkages between home based care groups, health facilities and district health offices can increase access and quality of services delivered by home based care groups on TB and HIV/AIDS.

DOTS EXPANSION: I

PS-71214-10 An ethnographic study of the impact of local knowledge and attitudes on TB control in Timor Leste

N Martins,^{1,2,3} J Grace,^{1,4,5} P M Kelly.^{1,5,6} ¹Menzies School of Health Research, Darwin, NT, ²School of Public Health & Community Medicine, University of New South Wales, Sydney, NSW, ³University da Paz, Dili, Timor-Leste; ⁴National Drug Research Institute, Curtin University, Perth, WA, ⁵Institute of Advanced Studies, Charles Darwin University, Darwin, NT, ⁶National Centre for Epidemiology & Population Health, Australian National University College of Medicine & Health Sciences, Canberra, ACT, Australia. Fax: (+61) 61250740. e-mail: paul.kelly@anu.edu.au

Background: Tuberculosis (TB) is a major public health problem in Timor Leste. Treatment compliance was identified as an impediment to the successful control of TB in that country.

Aim: To identify socio-cultural barriers to and en-

abling factors for the successful implementation of the DOTS strategy in Timor Leste.

Method: Qualitative research was carried out in one rural and one urban district with the highest TB prevalence and the lowest treatment compliance rates. Semi-structured interviews and focus group discussions were conducted with patients, health workers and community members in eight villages.

Result: Tuberculosis nurses have a good understanding of, and a high level of commitment to implementing the DOTS strategy. Defaulting patients and community members have a low level of knowledge and awareness of TB. Having a high level of knowledge about the disease, including correctly understanding how it is cured, together with the provision of food incentives, are important factors in assisting patients to complete TB treatment. Obstacles to TB treatment completion included preference for traditional medicine, economic difficulties and geographic remoteness.

Conclusion: This study has assisted the TB control program to modify DOTS expansion strategies to overcome barriers which prevent patients from completing treatment in Timor Leste.

PS-71237-10 Mid-term evaluation of World Bank Loan Project of tuberculosis control in Guangxi Zhuang autonomous region

F Y Liu. Tuberculosis Department of Guangxi Center for Disease, Nanning, Guangxi, China. Fax: (+86) 7715315803. e-mail: liufeiying@163.com

Objective: Evaluate the effect of World Bank Loan Project to TB Control Program in Guangxi and the situation of the project serving poverty population, provide constructive ideas for Guangxi TB Control Program.

Method: According to the requirement of Ministry of Health for Mid-evaluation of World Bank Loan Project, the implementing organizations in all levels fill the forms and evaluate by themselves. The all forms will be collected, checked, recorded and analyzed by provincial level using computer.

Result: The coverage rate of DOTS strategy reached 100% in 2004, the finding numbers of smear sputum positive tuberculosis cases exceeded the project target in 2004 and 2005, the cure rates of smear sputum positive tuberculosis cases reached 85% in 2004 and 2005. In 50 poverty counties, the registered rate of new smear positive TB cases was increased year by year; it increased from 10.4 in 2003 to 32.25 per one hundred thousand in 2005 and cure rate of new smear positive TB cases increased from 76.7% in 2003 to 88.6% and 92.1% in 2004 and 2005. The project make the governments pay more attention to TB control and add fund, establish the TB institutes in all levels, train many technique staff, establish TB prevention and treatment net, equip many apparatuses, implement large scale public education activities, all these

provide basis and possibility for sustainable development of TB prevention and control after the project. **Conclusion:** Through implement World Bank Loan Project in Guangxi, the mid-objective of the program has been achieved, sustainable development system has been established, but TB control work still need to be strengthened further.

PS-71263-10 Lessons learned: scale-up of MDR-TB laboratory services in Peru

S Shin,^{1,2} A Taylor,³ M Yagui,⁴ L Asencios,⁴ G Yale,⁵ C Suarez,² N Quispe,⁴ C Bonilla,⁶ J Blaya,^{7,8} P Cegielski.³

¹Division of Social Medicine and Health Inequalities, Brigham and Women's Hospital, Boston, Massachusetts, USA; ²Programa de Control de Tuberculosis, Dirección de Salud IV Lima Este, Lima, Peru; ³Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ⁴Instituto Nacional de Salud, Lima, Peru; ⁵Programa de Control de Tuberculosis, Dirección de Salud V Lima Ciudad, Lima, Peru; ⁶Programa de Control de Tuberculosis, Lima, Peru; ⁷Harvard-MIT Division of Health Sciences and Technology, Boston, Massachusetts, USA; ⁸Partners in Health, Boston, Massachusetts, USA. Fax: (+1) 404 639 1566. e-mail: abtaylor@cdc.gov

Background: In 2004, we quantified the delay to diagnosis of tuberculosis (TB) in 2 districts in Lima. Concurrently, the National TB Program (NTP), the National Reference Laboratory (NRL) and US partners were implementing a protocol to incorporate rapid diagnostic methods, decentralize first line drug susceptibility testing (DST), reduce delay, and improve patient care.

Methods: Political commitment ensured adequate coordination, personnel, materials, and administrative approvals. The NTP included increased capacity in their long range planning. Laboratory personnel were trained to implement more sensitive and rapid microbiological methods among high-risk patients including the Griess method, and Bactec460TB for smear negative HIV-positive patients and children. Hurdles included logistics, coordinating with policy, competing interests, changing personnel, communications, and evaluation.

Conclusions: Operational research results guided laboratory scale-up and identified barriers to effective capacity building. Communication between lab and program personnel, attention to detail related to logistics and coordination of these interventions, and concurrent operational research/evaluation were crucial to the success of this program.

PS-71285-10 Evaluation of training on sputum smearing and staining for laboratory aides in Quezon City, Philippines

P Rostrata,¹ N Macalalad,¹ J Lagahid,² R Vianzon,² A Inumerable,³ L Reyes,³ M Trono,⁴ A Lagos,⁴ A Fujiki,^{4,5} M Kasamatsu,^{4,5} Y Yanase,^{4,5} K Osuga.^{4,5} ¹National TB Reference Laboratory, Muntinlupa City, Metro Manila, Philippines; ²Infectious Disease Office, Department of Health, Manila City, Metro Manila; ³Quezon City Health Department, Quezon City, Metro Manila; ⁴JICA Project for Quality TB Control Programme, Muntinlupa City, Metro Manila, Philippines; ⁵Research Institute of Tuberculosis, Japan Anti-TB Association, Tokyo, Japan. Fax: (+81) 424928258. e-mail: yyanase@jatahq.org

Objective: Rapid turnover of health workers particularly in urban cities greatly affects the activities of the National Tuberculosis Control Program (NTP) in the Philippines. Due to the absence or shortage of medical technologists, laboratory aides (auxiliary laboratory workers) who basically have no medical background perform smearing and staining of sputum themselves. Recognizing the need to strengthen laboratory services in this situation, the NTP and the Japan International Cooperation Agency (JICA) conducted a training course for laboratory aides in Quezon City, Metro Manila. Our aim was to determine the effectiveness of the training for laboratory aides.

Methods: This is an interventional study. The existing format of basic smearing staining microscopy training was modified to fit the roles of laboratory aides in the City, focusing on smearing and staining components. Six assessment indicators (i.e., specimen quality, staining, cleanness, thickness, size and evenness) were compared between initial and final practice for 17 each trainee during the course.

Findings: The training on smearing and staining for laboratory aides was effective and could be recommended in similar settings as Quezon City. The study also showed the importance of proper sputum collection practice, suitable laboratory environment, adequate implementation of External Quality Assessment (EQA), and the technical responsibility of medical technologists at microscopy centers in ensuring the quality laboratory services.

PS-71301-10 Quality of DOTS implementation at the National TB Control Programme, Bangladesh

M D Ashraful Alam, D R Mojibor Rahman, V Begum, A B M T Islam, M H Khan, M N Uddin. WHO, Dhaka, Bangladesh. Fax: (+880) 29884657. e-mail: ashzan73@yahoo.com

Introduction: In Bangladesh, tuberculosis care services are delivered through the Upazila Health Complexes in the rural areas. Checklists are used to supervise the quality of DOTS and sputum microscopy for national TB control programme.

Aim: To monitor the implementation status of national TB control programme, Bangladesh.

Methods: A descriptive cross sectional study conducted from July 2006 to September 2006 at Upazila Health Complexes (UHC) in the rural areas of Bangladesh. Informations were collected from TB register, laboratory register and treatment card using check-lists. Analysis of TB services in 384 UHCs (out of 640) was done.

Results: All the UHCs had regular supply of drugs and laboratory consumables. NTP manuals and laboratory manuals were available at 97.5% and 99% UHC respectively. Among the visited UHCs, 92% maintained TB register and treatment cards completely and 98% had complete information of TB patient. 80% of the interviewed patients had good knowledge about TB, 98% of UHCs disposed waste properly.

Conclusion: The results indicate that the quality of DOTS implementation in Bangladesh has been improved further from 2005 to 2006.

PS-71305-10 Role of GRECALTES in tuberculosis control and preventing MDR in TB in the metropolis of Kolkata

G Saha, G Das. Greater Calcutta Leprosy and Tuberculosis Treatment and, Kolkata, West Bengal, India.
Fax: (+33) 22871917. e-mail: dr.gitanjali@vsnl.net

Introduction: GRECALTES is a NGO, sponsored by GLRA, started its Revised National Tuberculosis program since 1999. GRECALTES is rendering its services through 7 DOTS Centers and 4 Microscopic Centers in Kolkata covering a population of 352091. A study from 1999 to 2006 has been analysed and reported.

Method: For diagnosis we have established 4 microscopic centers which have contributed to substantial TB case detection in the city of Kolkata. For commu-

nity mobilisation we are performing regular and combined IEC program for TB and HIV/AIDS like group discussion, school program, counseling with patients and family members, leaflet distribution and miking in regional languages. We do sensitization of private medical practitioners and RMP doctors in the slums to increase the referral of chest symptomatic patients and to prevent MDR in TB.

Result: The following table is showing the activities of GRECALTES in the field of tuberculosis.

MDR diagnosed in our DOTS centers since 1999: 8 (culture and sensitivity of sputum for AFB done).

Conclusion: GRECALTES is holding a strong role in social mobilization for fighting against the TB and prevent MDR in TB in the metropolis of Kolkata.

PS-71375-10 Impact of training of religious leaders about tuberculosis on case detection rate in Balochistan, Pakistan

Q Ejaz, P Sarwa. World Health Organization, Islamabad, Pakistan. Fax: (+92) 519210663.
e-mail: drejazqadeer@ntp.gov.pk

Setting: Religious Leaders (RL) who have religious education and offering weekly prayers in three randomly selected and three matched control districts of Balochistan province.

Objective: To study the impact of involving religious leaders in increasing awareness of the community regarding timely care seeking with the ultimate goal of increasing case detection rate of tuberculosis in Balochistan.

Design: An intervention study conducted between July 2005 and March 2006, in which baseline knowledge of religious leaders about tuberculosis (TB) was assessed by a questionnaire interview and then one day orientation workshop arranged for RLs of intervention districts. A campaign of awareness about TB was launched by religious leaders by delivering speech about TB in weekly prayers. The impact of this campaign was assessed by interviewing the patients attending the TB clinics of six districts and recording of Case Detection Rate (CDR) of 2nd, 3rd, 4th quarter of 2005 and 1st quarter 2006 in these districts.

Results: A significant increase in knowledge about TB and its symptoms (95–100%) and about duration of cough for TB suspects (90%) was noted among the religious leaders after training. They conveyed the message to masses successfully, 27.88% patients attended the TB clinics on advice of religious leaders. The relation and trust of religious leaders on TB clinics increased significantly (100%). The religious leaders became aware about the presence of TB clinics in their area and after intervention the religious leaders advised people to visit TB clinics. The CDR increased in intervention districts from 2 to 40% in different quarters. The impact was significantly associated with the number of religious leaders in the population of the district.

Year	Pulmonary		Extra-pulmonary	Total TB cases	Cure rate of NSP	Conversion rate of NSP	Total Chest Total symptomatic referred to our MC
	Pos.	Neg.					
1999	NSP-66 Others-14	39	25	144	82%	95%	685
2000	NSP-77 Others-19	70	29	195	84%	87%	777
2001	NSP-102 Others-17	74	29	222	85%	97%	1026
2002	NSP-110 Others-13	76	24	223	99%	93%	1137
2003	NSP-108 Others-24	70	28	230	86%	94%	1085
2004	NSP-189 Others-44	85	60	378	86%	98%	1582
2005	NSP-173 Others-42	84	61	360	87%	96%	2823
2006	NSP-193 Others-35	95	93	428		97%	2636

Conclusion: Awareness about TB in these religious leaders improved successfully and they conveyed the message to the masses.

PS-71395-10 Government-NGO collaboration in TB prevention and care: the case of TB control in Bangladesh

A N Zafar Ullah,¹ J N Newell,¹ J U Ahmed,² M K A Hyder,² A Islam.³ ¹Nuffield Centre for International Health and Development, Leeds, UK; ²National TB Control Programme, Bangladesh, Dhaka, ³Bangladesh Rural Advancement Committee (BRAC), Dhaka, Bangladesh.
Fax: (+44) 1133436779. e-mail: hss1anuz@leeds.ac.uk

Aim: To investigate the experiences of different projects promoting government-NGO collaborations in TB control programme in Bangladesh to identify the policy frameworks and collaborative mechanisms through which the NTP can address challenges of TB prevention and care.

Design and Methods: This study analyses the basic concepts, and key issues of existing government-NGO collaboration in health care, using the example of implementing the DOTS strategy for TB control in Bangladesh. It also examines government of Bangladesh effort to improve health services delivery especially for the poor through collaboration with NGOs. Data were collected as a part of the process of developing a public-private partnership (PPP) model for TB care in Bangladesh.

Results: Analyses of data indicates that government-NGO collaboration is an effective way of improving access and quality of TB care services. government collaboration with NGOs has enhanced case finding, treatment success, supervision, and community participation. We found an increasing trend of government collaborating with NGOs in implementing TB control programmes.

Conclusions: The government-NGO collaboration in TB control strongly suggests that the government and NGO sectors can be complementary in controlling TB. There is compelling evidence to demonstrate that government-NGO collaboration is an effective way of improving access and quality of TB care services.

PS-71413-10 Gender differences in delays in initiating DOTS among new smear-positive tuberculosis patients, Nepal

T S Bam,¹ D A Enarson,² R S Chapman.³ ¹Nepal Public Health Association, Kathmandu, Nepal; ²International Union Against Tuberculosis and Lung Disease, Paris, France; ³College of Public Health, Chulalongkorn University, Bangkok, Thailand.
Fax: (+977) 14482293. e-mail: tarabam@hotmail.com

Setting: All 3 districts of Kathmandu valley, Nepal.

Objective: To investigate gender differences in delays in initiating DOTS among new smear-positive TB patients.

Methods: Direct interviews, using a standardized questionnaire, were conducted in 379 males and 237

females, who were enrolled at 37 randomly selected DOTS centres between January and August 2006. Multilevel analysis was employed.

Results: The median total delay was 115 days for females and 95 days for males. Patient delay (60 vs. 45 days, $P < 0.001$), and diagnosis delay (34 vs. 29 days, $P = 0.013$) were significantly longer in females than in males. Self-recognition of symptoms as possible TB, and ability to decide by oneself to seek medical help, were strongly associated with shortened patient delay. Perception of social isolation was associated with lengthened patient delay in females. In males, higher education and self-recognition of symptoms were associated with shortened patient delay. HIV-positive status and perception of coughing as not a serious matter were associated with lengthened patient delay. Consultation with traditional healers, and not being advised to obtain a sputum test were associated with lengthened diagnosis delay in females.

Conclusion: Gender inequalities in early access to DOTS should be remedied by increasing public awareness, promoting female autonomy in decision making, and developing effective cooperation between public and private sectors.

PS-71416-10 Impact of quarterly monitoring meeting with service providers in National TB Control Programme at Dhaka division

M Uddin,¹ V Begum,² A B M T Islam,¹ M H Khan,¹ A Alam,¹ M Rahman.¹ ¹WHO, Bangladesh, Tuberculosis Control Program, Dhaka, ²National Tuberculosis Control Program, Dhaka, Bangladesh. Fax: (+880) 29884657.
e-mail: mirzanizam@hotmail.com

Background: Tuberculosis is still a major public health problem in Bangladesh and government has the initiative to provide through public and NGO health care staffs.

Objectives: To review the performance and status of the National TB Control Program in Dhaka division, to find out the ways and means for increasing the case detection under DOTS services and to improve the quality of the laboratory services.

Methodology: Quarterly monitoring meeting were organized in each district under the leadership of district health authority of the division by involving all service providers both GO and NGO working in TB control program of district and sub-districts. Representative from local Medical Association were also involved. Performances were discussed and evaluated through a supervision checklist and quarterly reports.

Results: A total of 68 quarterly monitoring meeting were held in 2006. A total 3264 participants attended. Case detection rate increases from 61% in 2005 to 70.03% in 2006. Follow-up shows remarkable improvement of the scenario after intervention.

Conclusion: The quarterly meetings under the leadership of the head of the district health authority have

improved the case detection rate and quality of service delivery both in laboratory and referral of suspects in the health facility.

PS-71424-10 The successful development of the TB programme in Lagos State, 2003–2006

M O Williams Ogbuigwe,¹ O Ojikutu,¹ H Abdur-Razzaq,¹ E Olowookere,¹ E Lawal,¹ F Arowosafe,¹ A Trébucq.²

¹LSTBCP, Lagos, Nigeria; ²International Union Against Tuberculosis and Lung Disease, Paris, France.

Fax: (+33) 146337144. e-mail: atrebucq@iatatld.org

Means: Strong political support from Lagos State; very dedicated team at central level; regular drug supply from Federal level; regular visits from The Union (twice a year); very little money coming from Lagos State, Union, CIDA through WHO, no central office, no computer.

Background: Lagos State, 9 million inhabitants, is divided in 20 local government areas (LGAs). Work started January 2003 in 6 chest clinics hosted by hospitals with traditionally performed TB activities but no standardised treatment, very irregular drug supplies, no performing notification system.

Strategy: 1) Involve the currently 6 TB chest clinics in DOTS, 2) expand right away to the PHC facilities of the corresponding LGAs, 3) progressively create TB services in other hospitals, systematically involving PHC centres, 4) consider each DOTS centre as a BMU, 5) organise a referral system from the main TB centres to fuel the new DOTS centres, 6) request only two sputum for suspects to allow labs to deal with workload, 7) systematically train the new DOTS centres, 8) do very regular supervisory visits.

Results: All LGAs covered (Table).

Year	No. LGAs involved	No. DOTS centres (end of year)	New SS+ cases	Total TB	Defaulter rate (new SS+)
2003	6	11	2706	4327	24%
2004	11	18	3304	6351	19%
2005	18	37	3897	7225	17%
2006	20	46	4470	8690	

HIV: 79% of TB all forms are tested, 21% are positive; 19% for new SS+.

Conclusion: Rapid coverage of Lagos State with very little means. Lagos is the state notifying by far the highest number of TB cases in Nigeria. Challenges: 1) consolidate the network, 2) reduce the defaulter rate (<10%) and increase the success rate to 85%, 3) offer cotrimoxazole preventive therapy to HIV positive cases.

PS-71426-10 AFB microscopy in Bangladesh

A B M T Islam,¹ V Begum,² M H Khan,¹ A Alam,¹

M N Uddin,¹ M Becx.¹ ¹World Health Organization, Bangladesh, Dhaka, ²National Tuberculosis Control Program, Dhaka, Bangladesh. Fax: (+880) 29884657.

e-mail: dr.tauhidul@gmail.com

Aim: To assess the situation of AFB microscopy in Bangladesh.

Methodology: Analysis of database of quarterly microscopy reporting format.

Results: 687 microscopy units serve 100% geographical area of Bangladesh. National Tuberculosis Control Program Bangladesh has increased its microscopy units in view to increase accessibility. 534 centers were in 2003, 635 in 2004, 665 in 2005 and 687 in 2006. Total 2 147 206 slides were checked all over the country up to 3rd quarter. During 1st quarter 33% slides, 2nd quarter 34% and in 3rd quarter 32% slides were checked. Among the total slides 10% (208 321) were positive (9.1% positive and 0.6% scanty positive) and rests (1 938 885) were negative. Though slides positivity was 10% on an average but it was not uniform all over the country. Among the six divisions 3 division (Dhaka, Rajshahi and Khulna) showed 9% positivity, Chittagong and Barisal has 11% and 12% positivity rate and Sylhet division showed highest (15%) positivity rate.

Conclusion: AFB microscopy network of Bangladesh is well established. Slides positivity rate is decreasing in Bangladesh probably due to massive ACS activities.

PS-71427-10 Impact of organised EQA system in Bangladesh

A B M T Islam,¹ M Becx,¹ V Begum,² M H Khan,¹ Z Begum.³

¹World Health Organization, Bangladesh, Dhaka, ²National Tuberculosis Control Program, Dhaka, ³National Tuberculosis Control Project, Dhaka, Bangladesh. Fax: (+880) 29884657. e-mail: dr.tauhidul@gmail.com

Aim: To assess the impact of continuous quality control system in AFB microscopy in Bangladesh.

Setting: National Tuberculosis Control Program Bangladesh introduced External Quality Assurance system with the help of NGO partners. In 1995: 78 centers by 4, in 2001: 101 centers by 5, in 2004: 384 centers by 16, in 2005: 635 by 22 and in 2006: 687 centers were covered by 28 EQA centers.

Methodology: Analysis of database of quarterly EQA reporting format.

Result: 29 768 slides were rechecked in 2005 among which 12% were positive and 88% were negative. In 2006, up to 3rd quarter 30 863 slides were rechecked among which 10% were positive and 90% were negative. False positivity rate decreased (0.9% from 1.3%). False negativity also reduced (1% from 1.7%). High false negativity rate in 2006 is 0.8% which was 1.4% in 2005. Quantification error rate also reduced from 3.4% to 2.3%. In 2006, no microscopy centers were found with more than 1 high false positive. 45 centers were found with more than 1 high false negative whereas this number was 68 in 2005.

Conclusion: Continuous EQA system, regular feed back and need based supervision have positive impact in terms of quality of AFB microscopy in Bangladesh.

PS-71433-10 EQA in an urban setting in BangladeshA B M T Islam,¹ M H Khan,¹ M Hossain,² M Rahman.¹¹World Health Organization, Bangladesh, Dhaka, ²NSDP, Dhaka, Bangladesh. Fax: (+880) 29884657.

e-mail: dr.tauhidul@gmail.com

Aim: To assess the quality of AFB microscopy in urban setting (Dhaka, the capital of Bangladesh) in Bangladesh.**Setting:** NGO service Delivery Program (NSDP) operates 12 microscopy centers in Dhaka. They introduced EQA system for their laboratories in mid of 2005.**Design:** Quarterly reports are analyzed centrally.**Result:** Total 17414 slides were checked in 2006, smear positivity rate was 12%. Among the positive 20% were scanty positive. In 1st quarter 24%, 2nd quarter 27%, 3rd quarter 22% and 4th quarter 26% slides were checked. 690 slides were rechecked during the period. Among the rechecked slides 7% were positive. Samples were collected randomly from all 12 centers. No false positive slides were found, 9.6% false negative (63) slides were found (9.1% high false negative and 0.6% low false negative). 1st controller showed 0.3% low false negative and 0.9% quantification error. Mean sensitivity with 1st controller was 59%. 4 laboratories showed very low sensitivity (<50%) with first controller (47%, 32%, 28% and 26%). All laboratories showed 100% positive predictive value. 8 centers (67%) reported more than 1 false negative result.**Conclusion:** Continuing EQA activities and regular supportive feedback improves the quality of AFB microscopy in Dhaka, Bangladesh.**PS-71435-10 Is restaining a problem for the EQA system in Bangladesh?**A B M T Islam,¹ V Begum,² S Sultana,² M H Khan,¹M Hossain.³ ¹World Health Organization, Bangladesh, Dhaka, ²National Tuberculosis Control Program, Dhaka, ³NSDP, Dhaka, Bangladesh. Fax: (+880) 29884657.

e-mail: dr.tauhidul@gmail.com

Aim: To assess either restaining is a problem in EQA system in Bangladesh.**Setting:** Continuous monitoring was done in 12 laboratories of Dhaka urban operated by NSDP. Among 12 laboratories 4 laboratories showed continuous high false negative in 2006. The 2nd controller expressed her feelings that the AFB found might be due to contamination.**Design:** Contamination check was done at beginning of 2nd quarter and 4th quarter at 12 laboratories of Dhaka urban area from water source, carbol fuchsin container and methylene blue container. 3 slides were prepared from each source.**Result:** During 1st checking at the beginning of 2nd quarter 2 centers (Rampura and Doyagonj center)showed positive results from methylene blue sources, grading was 1+ for both cases. Smears from water sources and carbol fuchsin container did not show any positivity. During 2nd checking at the beginning of 4th quarter 4 centers showed clue of contamination. 3 centers (Rampura, Circular road and Sahajadpur) showed positive results from methylene blue and grading were scanty, 2+ and 3+ respectively. 1 center (Doyagonj) showed positive results from water source. **Conclusion:** Contamination is a problem in rechecking system in EQA as restaining is done at 1st controller level.**PS-71444-10 Study of improved quality DOTS through supervision and monitoring of piloted districts, Bangladesh**S Sultana,¹ K Hyder,¹ V Begum.² ¹World Health Organization, National TB Control Program, Dhaka, ²National TB Control Program, DGHS, Dhaka, Bangladesh.

Fax: (+880) 29884657. e-mail: sabera_s@yahoo.com

Introduction: TB Control becomes more simplified if effective supervision and monitoring is justified at places. Quality services to the clients are important perspective to improve referral of suspects, diagnosis and treatment.**Objectives:** To analyze whether supervision and monitoring improves quality of DOTS.**Methods:** The analysis was rapid reviewing the reports that were submitted to the National TB Control Program. The data were crosschecked and reviewed. A total of 24 Upazila Health Complexes (Sub-Districts) were randomly selected from 6 Districts of 6 Divisions. Each district represented in each division.**Results:** NTPs ownership of DOTS improved at local levels where services of TB are provided through integrated approach in primary health care. Public sector offers the complete set of TB-DOTS services and NGOs facilitate activities with the government. There have been a lot of evidences that effective supervision and monitoring improves the quality of DOTS. This study of approximately 1 year shows an increased trend of case detection and the treatment success rate remained static to 91%. However overall provider knowledge increased from 85% to 92%, compliance with the national guidelines increased from 75% to 89%, record completeness 96% to 97%, and patients knowledge remain static to 93%.**Conclusion:** The assessment results need dissemination among DOTS service providers for both NGO and public sector that will help to build quality assurance system on competitive basis among partners. Therefore effective supervision and monitoring is essential in management of DOTS to combat MDR-TB.

PS-71504-10 Quality control of AFB microscopy in Bangladesh in 2006

V Begum,¹ A B M T Islam,² M H Khan,² M N Uddin,²

A Alam,² M Rahman,² A S M Zahid,² M Z Hossain.²

¹National Tuberculosis Control Program, Dhaka, ²World Health Organization, Bangladesh, Dhaka, Bangladesh.

Fax: (+880) 29884657. e-mail: dr.tauhidul@gmail.com

Aim: To assess the quality of AFB microscopy National Tuberculosis Control Program, Bangladesh introduced External Quality Assurance system by blinded rechecking of samples smears phase by phase from 2003.

Methodology: Analysis of database of quarterly EQA reporting format.

Results: The 28 EQA centers in the country cover all 687 (100%) peripheral laboratories. All EQA centers submitted quarterly report to NTP up to 3rd quarter 2006. 30 863 slides were rechecked in 28 EQA centers during the period among which 10% (3008) were positive (9.2% positive and 0.5% scanty positive) and rests (27 855) were negative. Slide positivity rate during the period is also 10%. Samples were collected by random sampling from all centers. 28 (0.9%) slides were found false positive, 289 (1%) were found false negative and quantification error was found in 70 (2.3%) slides. Among the false positive slides 12 (43%) were high false positive and 16 (57%) were scanty false positive. Among the false negative 236 (82%) were high false negative and 53 (18%) were scanty false negative. No microscopy center was found with more than 1 high false positive slide and 45 (7%) centers were found with more than 1 high false negative slide.

Conclusion: Continuing EQA system and regular supportive feedback enhance quality improvement of AFB microscopy.

PS-71542-10 Strengthening of urban DOTS in Bangladesh: an experience through operational research

S Sultana,¹ K Hyder,¹ V Begum,² N Ishikawa.³

¹World Health Organization, National TB Control Program, Dhaka,

²National TB Control Program, DGHS, Dhaka, Bangladesh;

³Research Institute of TB, Tokyo, Japan. Fax: (+880) 2 9884657. e-mail: sabera_s@yahoo.com

Introduction: Operational Research guides NTPs to formulate policies and guidelines for expansion of urban DOTS.

Objectives: To discuss a successful Operational Research (OR) in expansion and implementation of Directly Observed Treatment, Short Course (DOTS) by identifying critical elements.

Methods: DOTS implementation in urban areas of Bangladesh through Participatory Action Research (PAR) usually consisted 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 2006, the number of microscopy centers increased to 94 in all urban cities out of 245 DOT centers compared to 6 in Chest Disease Clinics in 2001. The participation of NTP-NGOs increased number of smear positive cases to 26 319 out of 145 215 cases detected through out the country in 2006. 18.12% of cases contributed by Urban Centers to the national figures. Out of 10 420 smear positive cases detected by urban centers 8756 cases were treated successfully (83.8%) in 2005. Details will be presented. DOTS were expanded among private practitioners through Participatory Action Research. 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 complicated. Operational Research only could solve issues. This consists of implementation team (Public-Private/NGOs), technically supervisory team (program management team, supervisors' public-private/NGOs) and research team (top managers and external researchers).

PS-71577-10 DOTS implementation in Uzbekistan

A Yuldashev. Research Institute of the Phthiology and

Pulmonology, Tashkent, Uzbekistan. Fax: (+998) 71 2764490.

e-mail: a.yuldashev@uzpak.uz

In Uzbekistan since 1998 the DOTS strategy recommended by the WHO has been implementing. As for today 100% of the Republic population has an access to the free of charge examination and treatment according to the DOTS strategy. From 1998 till 2006 within the frame of the DOTS program more than 60 thousand new cases TB patients have been registered and treated; from them 32.9% is a new cases of pulmonary tuberculosis by a positive smear. Tuberculosis detection constitutes: according to microscopy 10.6%, radiological findings 0.4%, and tuberculin diagnostics 0.05%. Sputum smear conversion in pulmonary patients with positive smear registered since 1998 till 2005 has been achieved by the end of the treatment intensive phase of treatment on average in 85.8% of cases.

Results: Of the new SS+ TB cases patients treatment according to the DOTS strategy registered during 8 years are as follows: cured 67.7%, treatment completed in 11.4%, failures in 7.6%, died 5.1%, defaulters in 7.4%, transferred 0.8%. Tuberculosis relapse increase is an alarming factor. In 1994 relapse intense index is 2.0 per 100 000 people (early relapse is 0.6), and in 2006 it is 4.8 (early relapse is 2.5), so it is increased by 2.4–4.2 times. Despite the large-scale introduction of the DOTS program in the Republic of Uzbekistan within the last 8 years global targets by WHO have not been achieved.

ABSTRACT PRESENTATIONS SUNDAY 11 NOVEMBER 2007

THEMATIC SLIDE PRESENTATIONS

COMMUNITY INITIATIVE FOR LUNG HEALTH

TS-71414-11 Diabetic control and risk of tuberculosis

C C Leung,¹ T H Lam,² W M Chan,³ W W Yew,⁴ K S Ho,³
G M Leung,² W S Law,¹ C M Tam,¹ C K Chan,¹ K C Chang.¹
¹TB & Chest Service, Dept. of Health, Hong Kong Govt, Hong
Kong; ²Department of Community Medicine, The University
of Hong Kong, Hong Kong; ³Elderly Health Service, Dept. of
Health, Hong Kong Govt, Hong Kong; ⁴TB and Chest Unit,
Grantham Hospital, Hong Kong, SAR China.
Fax: (+852) 28346627. e-mail: cm_tam@dh.gov.hk

Background: Diabetes mellitus (DM) is a well reported risk factor for TB, but few studies have examined this systematically.

Method: A cohort of 42 116 clients aged 65 or above, enrolled at 18 elderly health centers in Hong Kong in 2000, were followed up prospectively through the TB registry for development of active TB from 3 months after enrolment until 31 Dec 2005. The effects of DM and DM control were assessed with adjustment for socio-demographic and other variables.

Results: DM was associated with a modest increase in risk of active culture-confirmed and pulmonary TB (PTB) but not extrapulmonary TB (ETB) (+/-PTB involvement), with adjusted hazard ratio (95%CI) of 1.38 (1.09–1.74), 1.48 (1.12–1.95), 1.42 (1.12–1.80) and 0.90 (0.49–1.65) respectively. Among DM subjects, higher risk of active, culture-confirmed and PTB but not ETB was observed with baseline HbA1c $\geq 7\%$ (versus $< 7\%$), with adjusted hazard ratios (95%CI) of 3.13 (1.65–5.97), 3.13 (1.47–6.68) and 3.65 (1.81–7.39) and 0.78 (0.18–3.38) respectively, even after control of other confounding variables. DM accounted for 10.7% (95%CI 3.9–19.1%) of the observed active TB risk. Within DM patients with known baseline HbA1c, HbA1c $\geq 7\%$ accounted for 58.2% (95%CI 29.8–76.5%) of the active TB risk.

Conclusion: With increasing prevalence of DM, modest increase in TB risk may translate into substantial disease burden. Better DM control will help to reduce such a risk, especially in places with a high prevalence of both conditions.

TS-71614-11 Costs and affordability of TB diagnosis and treatment from the patient's perspective in Lusaka, Zambia

A Aspler,^{1,2} O Oxlade,¹ J Banda,³ H Ayles,^{2,3}
P Godfrey-Faussett,^{2,3} D Menzies.¹ ¹McGill Respiratory
Epidemiology Unit, Montreal, Quebec, Canada; ²London
School of Hygiene & Tropical Medicine, London, UK; ³ZAMBART
Project, Department of Medicine, Lusaka, Zambia.
Fax: (+1) 514 843 2083. e-mail: aaspler@ualberta.ca

Introduction: Increasing case detection and cure rates are the principal means of reducing tuberculosis (TB) incidence and averting TB-related deaths. Achieving these increases in TB case-detection and cure rates will require patients' money and time.

Objectives: The overall aim of this economic study was to estimate the costs and affordability of TB diagnosis and treatment from the patient's perspective in Lusaka, Zambia. Our secondary objective was to identify potential determinants of variation in patient costs.

Methods: A cross-section of adult TB patients in the intensive phase of treatment at four primary health centres in Lusaka were interviewed using a standardised questionnaire between 10 and 29 July 2006 ($n = 103$). Direct and indirect costs were estimated on a microlevel and categorised into two time periods: 'pre-diagnostic' and 'post-diagnostic' in 2006 US\$. Determinants of individual patient costs were analysed using a multiple linear regression model.

Results: The patient resources required to detect and provide 2 months of treatment for 103 TB patients at four urban clinics in Lusaka amounted to a total cost of \$3109.93. Pre-diagnosis, direct costs composed the largest proportion (68%) of total costs, with user fees as the largest cost item (average total cost per patient \$4.23 (95%CI 3.60–4.86)). Post-diagnosis, indirect costs comprised 97.7% of total patient costs—largely a function of the high opportunity cost associated with DOT (average total cost per patient \$22.7 (95%CI 18.8–26.6)). The burden of total direct costs on females was almost 50% higher for women than for men when expressed as a proportion of their average income ($P < 0.001$). Gender, patient delays in seeking care and treatment strategy together explained 39.8% of the variation in total patient costs.

Conclusion: Our findings suggest that enhancing TB case-finding and the creation or strengthening of community-based DOT programmes would be the most effective means of reducing patient costs.

TS-71801-11 Community knowledge and perceptions about tuberculosis in KwaZulu-Natal, South Africa

C Davidson, M Taylor, S Knight, C C Jinabhai. Dept Public
Health Medicine, Nelson R Mandela School, Durban,
KwaZulu-Natal, South Africa. Fax: (+27) 31 260 4211.
e-mail: Taylor@ukzn.ac.za

Introduction: KZN has a high prevalence of TB, MDR-TB and XDR-TB and poor adherence to TB

treatment. This community-based study aimed to investigate knowledge and perceptions about TB in urban and rural areas.

Methods: A cross-sectional study was undertaken in Ugu (rural) and Umlazi (urban) using an administered, structured questionnaire to investigate knowledge and perceptions about TB. The respondent was the household head (or family member aged >18 years).

Results: Of 915 households, 53.4% respondents were rural and 46.6% urban and a third were males. A case of TB was reported by 52.0% of households in the past 2 years. Although respondents knew TB was curable, feeling better was the most common reason (42.6%) for TB clients to stop treatment before completion. A knowledge score was developed for signs/symptoms, transmission, curability of TB, length and frequency of treatment, health seeking behaviour, and link between TB and HIV/AIDS. Urban dwellers had significantly better knowledge scores ($P < 0.005$), with literacy associated with overall TB knowledge ($P = 0.03$). Respondents were better informed about treatment than symptoms or transmission, and although 71% linked HIV and TB, there was poor understanding about transmission of HIV and TB.

Conclusion: Health education is urgently required for early diagnosis and treatment, to improve adherence, reduce incidence and reduce the associated stigma.

TS-72087-11 Community outreach of a TB support group: strengthening DOTS implementation in an urban area in The Philippines

V S Lofranco,¹ R C Villarete,¹ F L Collera,² A D Del Rosario,² B L Nuestro,¹ H C Igarta,¹ J R Gonong,¹ B B Villasencio,¹ J A Rubio.¹ ¹LCP-PHDU DOTS Center, Quezon City, ²Samahan Ng Lusog Baga Asso., Quezon City, Philippines.
Fax: (+632) 9298324. e-mail: vivs_lofranco@yahoo.com

Background: The Samahan Ng Lusog Baga Asso. (LUSOG BAGA CLUB) was launched in March 2001 with 15 members only. It is a non-stock, non-profit association organised in a government hospital in the Philippines. Members are former TB patients who have undergone directly observed treatment for 6 months or more, cured in the DOTS clinic. The objective of the support group is to make former TB patients act as advocates or mobilisers during community outreach; educate and persuade people in the community with signs/symptoms of TB to access quality diagnosis and treatment, and to promote DOTS services to prevent drug resistance.

Methods: The support group was empowered through orientation on their roles and responsibilities; they serve as contact persons in organising community outreach together with local health staff in depressed areas; refer individuals with chronic cough to the DOTS clinic; share experiences during seminars and outreach; and assist DOTS staff in retrieving defaulters.

Achievements:

- Total of 106 registered members: 60% female, 40% male
- Starting 2002, support group shared experiences and testimonies during community outreach, commemoration of World TB Day and Lung Month celebration
- In 2005, 121 TB symptomatics during community outreach submitted sputum for AFB determination, and 6 persons were found to be smear-positive for TB bacilli
- Qualified to join the prestigious Country Coordinating Mechanism (CCM) of the Global fund and Phil-CAT as representative of people living with disease
- Referred more than 50 persons with chronic cough to the DOTS clinic for evaluation and management.

Benefits: Free medical consultation, sputum examination and chest X-ray to all active members.

Conclusions: Community social awareness on TB prevention done by the previous TB patients is an effective tool in strengthening the case detection rate, partnerships with community leaders and health workers, making TB services accessible to general population and minimising community social stigma.

TS-71262-11 Le niveau de connaissance des enfants orphelins sur la transmission du VIH en RDC

J M Talwa,¹ H Mukumbi Masangu,² B Mulelebwe.² ¹HIV Programme, Aid DRC, Kinshasa, ²National Direction, AMO Congo, Kinshasa, Congo (Democratic Rep.).
Fax: (+44) 8701329706. e-mail: jilunga1970@yahoo.fr

Contexte : La séroprévalence VIH en RDC est autour de 4,5%. Le total estimé des personnes vivant avec le VIH est autour de 2 500 000 et plus de 1 million d'orphelins et enfants vulnérables (OEV). AMO Congo et Fondation Femme Plus, deux ONG locales, ont exécuté un programme VIH de 4 ans dans 6/11 provinces du pays, interventions basées notamment sur l'amélioration des connaissances VIH par l'éducation des pairs, le conseil et dépistage volontaire, l'accompagnement psychosocial des personnes vivant avec le VIH (PVV) et leurs familles, les activités génératrices des revenus et la scolarisation des OEV.

Méthode : Une évaluation externe utilisant un guide d'entretien semi-directif et des séances de groupes de discussion focalisées sur un échantillon de 126 OEV (55 garçons et 71 filles) choisis au hasard.

- Enquête qualitative portant sur les connaissances, attitudes et pratiques des OEV, au coeur de l'épidémie du VIH.
- Parmi ces OEV, 4% sont sans instruction, 44% sont au primaire et 52% au secondaire.

Résultats : Pour les moyens de contamination du VIH, 76% du total de personnes identifient les rapports sexuels non protégés comme source de transmission ; 66% reconnaissent le rôle péjoratif des objets souillés ; 50% de personnes la transmission par le sang ; 49%

les injections et 27% la transmission mère-enfant. L'exploration du niveau de connaissances liées aux moyens de prévention est aussi carencée : seuls 40% mentionnent l'utilisation des préservatifs ; 32% citent d'éviter plusieurs partenaires sexuels ; l'abstinence est mentionnée par 60% et la fidélité n'est citée que par 40%. Ce bas niveau de connaissances est préoccupant étant donné que l'évaluation a montré que 32% de l'ensemble interrogé ont déjà pratiqué l'acte sexuel. 79% estiment qu'ils peuvent vivre avec un membre de famille qui a le VIH.

Conclusion : Il est impératif d'intégrer, dans tout projet de prise en charge des PVV et familles, un volet prévention ciblant les OEV.

TS-71555-11 Cost-effectiveness of educational outreach on respiratory diseases in primary care nurses

L Fairall,¹ M Bachmann,² M Zwarenstein,³ B Majara,⁴ D van Rensburg,⁵ E Bateman,⁶ R Chapman.⁷ ¹Knowledge Translation Unit, University of Cape Town, Cape Town, Western Cape, South Africa; ²School of Medicine, Health Policy and Practice, University of East Anglia, Norwich, East Anglia, UK; ³Li Ka Shing Knowledge Institute, St Michaels Hospital, Department of Health Policy, Management and Evaluation, University of Toronto, Toronto, Canada; ⁴Department of Community Health, Faculty of Health Sciences, University of the Free State, Bloemfontein; ⁵Centre for Health Services Research and Development, University of the Free State, Bloemfontein; ⁶Department of Medicine, University of Cape Town, Cape Town, Western Cape; ⁷Free State Department of Health, Bloemfontein, Free State, South Africa.
Fax: (+27) 21 4066 9991. e-mail: lfairall@uctgsh1.uct.ac.za

Background: The Practical Approach to Lung Health in South Africa (PALSA) combines integrated case management guidelines of adult respiratory diseases with educational outreach to primary care nurses. A cluster randomised controlled trial showed it improves the quality of care.

Objective: To assess the incremental cost-effectiveness of educational outreach compared with usual training and support for respiratory diseases.

Methods: Cost-effectiveness analysis alongside the randomised trial. Data on costs and effects were collected from 1999 patients aged ≥ 15 years with cough or difficult breathing (1000 in intervention clinics, 999 in controls) attending 40 nurse-run primary care clinics in the Free State Province.

Results: Mean costs per patient over 3 months were higher in the PALSA group (health service US\$56 vs. US\$46; societal US\$66 vs. US\$51), mainly because of TB treatment costs, which accounted for 75% and 71% of the difference in health service and societal costs, respectively. Intervention costs accounted for only 5% of health service costs (mean US\$ 2.74 per patient). PALSA cost the health service US\$ 26 extra (95% confidence interval-US\$ 27, US\$ 99) for every additional patient appropriately managed, if TB treatment costs were not considered.

Conclusion: Educational outreach is more effective and more costly than usual training for respiratory diseases in the short term. It represents good value for money if the effect on multiple conditions is considered.

TS-72164-11 Risk factors for tuberculosis treatment default in South Africa differ between new and retreatment patients

M Van der Walt,¹ A M Finlay,² J Lancaster,² T Holtz,² A Miranda,² K Laserson,² C Wells,² K Weyer.¹ ¹South African Medical Research Council, Pretoria, South Africa; ²US Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+1) 404 639 1566. e-mail: afinlay@cdc.gov

Background: In 2002, 215 120 people were registered with tuberculosis (TB) in South Africa; 13% were estimated to have defaulted from TB treatment. Non-adherence to TB treatment can lead to treatment failure or death and development of anti-tuberculosis drug resistance.

Methods: We conducted a national retrospective case-control study to identify factors associated with treatment default using TB program data from 2002 and a standardized patient questionnaire. Cases were a sample of registered TB patients who defaulted from treatment. Controls were those who began therapy and were cured, completed or failed treatment. We stratified patients by history of TB treatment (new and retreatment patients) and constructed two respective multivariate models to identify independent risk factors associated with default.

Results: We interviewed 926 new patients (160 cases, 766 controls) and 236 retreatment patients (71 cases, 165 controls). Of these, 670 (58%) were male; the median age was 34 years (range 18–90 years). Signif-

Risk factor	New patients		Retreatment patients	
	OR	95% CI	OR	95% CI
Poor HCW attitude	2.1	1.1–4.4	12	2.2–66
Changing residence during TB treatment	2.0	1.1–3.7	3.4	1.1–9.9
Did not receive adequate counselling or information	1.9	1.2–2.8	—	—
No formal education	2.3	1.2–4.2	—	—
Drank any alcohol during treatment	1.9	1.2–3.0	—	—
Felt ashamed to have TB	2.0	1.3–3.0	—	—
Saw a traditional healer for TB	1.9	1.1–3.4	—	—
History of previous TB treatment default	—	—	6.4	2.9–14
Did not feel better with treatment	—	—	21	5.2–84
Agreed that if food was provided by clinic, adherence to treatment would have been better	—	—	5	1.3–19

important risk factors associated with default among both new and retreatment patients included poor health care worker attitude and changing residence during TB treatment. Among new patients, cases were also more likely than controls to report not receiving adequate counselling about their treatment, feeling ashamed to have TB and seeking care from a traditional healer. Among retreatment patients, additional strong risk factors associated with default included stopping TB treatment because they felt better and having a previous history of TB treatment non-adherence.

Conclusion: New and retreatment patients with a poor patient-provider interaction and those who change residence may be at risk for default. Some risk factors for default differ between new and retreatment TB patients. Among retreatment patients, important risk factors include a patient perception that their TB treatment was not working and having a previous history of TB treatment non-adherence.

TS-71971-11 Does antiretroviral treatment reduce case-fatality among HIV-positive patients with tuberculosis in Malawi?

R Zachariah,¹ M Fitzgerald,² M Massaquoi,² A Acabu,² D Chilomo,³ F Salaniponi,³ A D Harries.^{4,5} ¹Medecins Sans Frontieres, Medical Department (Operational Research), Brussels, Belgium; ²Medecins Sans Frontieres, Thyolo District, ³National TB Control Program, Lilongwe, ⁴National Technical Advisor, HIV care and support, Ministry of Health (Supported by Family Health International), Lilongwe, Malawi; ⁵London School of Hygiene and Tropical Medicine, London, UK. Fax: (+352) 335133. e-mail: zachariah@internet.lu

Setting: Thyolo district, Malawi.

Objectives: To report on a) case fatality among HIV-positive tuberculosis (TB) patients while on anti-tuberculosis treatment and b) whether antiretroviral treatment (ART) initiated during the continuation phase of TB treatment reduces case fatality.

Design: Retrospective cohort analysis.

Methods: Comparative analysis of treatment outcomes for TB patients registered between January and December 2004.

Results: There were 983 newly registered TB patients, of whom 658 (67%) were HIV-positive. A total of 132 (20%) patients died during the 8-month course of anti-tuberculosis treatment, of whom 82 (62%) died within the first 2 months of treatment (initial phase) when ART was not provided (cumulative incidence = 3.0, 95%CI 2.5–3.6 per 100 person-years). There were 576 TB patients who completed the initial 2 months of anti-tuberculosis treatment, of whom 180 (31%) chose to start ART. The case-fatality rate per 100 person-years among those accepting ART (1.0, 95%CI 0.6–1.7) was not significantly different from that of patients not accepting ART (1.2, 95%CI 0.9–1.7, Adjusted Hazard Ratio: 0.86, 95%CI 0.4–1.6, $P = 0.6$).

Conclusions: ART provided in the continuation phase of TB treatment does not have a significant impact on

reducing case fatality. Additional measures to address high early mortality in HIV-positive TB patients are urgently needed.

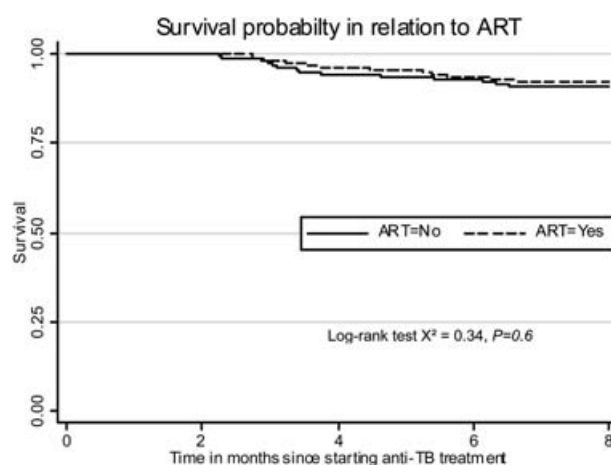


Figure Survival probability in relation to antiretroviral treatment (ART) during the continuation phase (months 2–8) of anti-tuberculosis treatment, Thyolo, Malawi.

POSTER DISCUSSION SESSIONS

TOBACCO

PC-71324-11 Prevalence and determinants of tobacco use among junior collegiates in twin sub metropolises, western Nepal

C T Sreeramareddy,¹ J Paudel,² P V Kishore,³ R G Menezes.⁴ ¹Department of Community Medicine, Manipal College of Medical Sciences, Pokhara, Kaski District, ²Department of Sociology Prithvi Narayan Campus, Pokhara, Kaski District, ³Department of Internal Medicine, Manipal College of Medical Sciences, Pokhara, Kaski District, ⁴Department of Forensic Medicine, Manipal College of Medical Sciences, Pokhara, Kaski District, Nepal. Fax: (+91) 61440260. e-mail: chandrashekhharats@yahoo.com

Design: Cross-sectional survey.

Methods: A sample of 1600 was calculated based on Nepal GYTS data. Twelve junior colleges were selected by two stage stratified random sampling by probability proportional to college enrollment size. The survey was carried out during January–March 2007 using a pre-tested, anonymous, self-administered questionnaire in local vernacular language (Nepali). Questionnaire was adapted from those of global youth tobacco survey (GYTS) and a World Bank study on tobacco economics, Indonesia, 2003.

Results: Overall prevalence of 'ever users' of tobacco products was 13.5%. Prevalence among boys and girls was 20.2% and 3.1% respectively. Prevalence of current use of tobacco was 9.5% (smoking: 8.7%, smokeless products: 5.7%, both forms: 4.9%). The determinants of tobacco use were: age, gender, knowledge

about health risks, beliefs that tobacco products are easily available, accessible and are not banned in the college premises, one or more of, teachers and/or friends smoke, ever purchased tobacco products for family members. Most current users bought tobacco products by themselves from stores or got from friends. Their average daily expenditure was 20 Nepalese rupees (~0.3US\$) and >80% reported to have had adequate money to buy tobacco products. Majority (82%) of the students were exposed to tobacco advertisements within previous 30 days mostly through magazines/newspapers, and advertising hoardings.

Conclusion: Enforcement of laws and regulations are necessary to decrease availability, accessibility and affordability of tobacco products. Policies to bring changes in acceptability of tobacco use (social norms) among parents, teachers may also help to curb the tobacco use.

PC-71583-11 Prevalence and determinants of smoking in Morocco

C Nejari,¹ M C Benjelloun,² M Berraho,¹ K Slama.³

¹Epidemiology, Clinical Research and Community Health, Fez, ²Service de Pneumologie, Fez, Morocco; ³International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+212) 35619321. e-mail: cnejari2000@yahoo.fr

The objective of the study was to determine the prevalence and determinants of cigarette smoking among Moroccans.

A sample of 10 828 individuals aged 15 years and above from both sexes was randomly selected from all 7 regions in Morocco, using a stratified cluster sampling technique. A cross-sectional, household, community-based survey was conducted. The participants were interviewed by trained interviewers. The interview covered personal, social, and educational characteristics of the respondents, and questions about smoking status, duration of smoking, and daily cigarette consumption. Associations between smoking and sociodemographic variables were studied in univariate and multivariate analysis.

The overall prevalence of current and former smokers was 51.1% for males and 5.7% for females. Prevalence of current smoking was 31.5% for men and 3.3% for women. Our results may underestimate smoking among women. The highest prevalence of current smoking was for men between 30 and 39 years (41.96%) and for women between 20 and 29 years (4.62%).

As educational level increased, smoking prevalence increased in women (from 1.49% to 6.01), but this was not the case for men. Smoking prevalence was higher among unskilled manual workers, craftsmen, and shopkeepers. There was no difference in prevalence of smoking between rural and urban areas for men but for women, prevalence was 1.11% in rural areas and 4.56% in urban areas ($P < 0.0001$).

In conclusion, cigarette smoking is an important public health problem in Morocco.

The study was supported by the International Union Against Tuberculosis and Lung Disease.

PC-71732-11 Cigarette smoking behaviour among Moroccan women

Z Serhier,¹ N Tachfouti,¹ K El Rhazi,¹ J F Tessier,²

M C Benjelloun,³ K Slama,⁴ C Nejari.¹ ¹Laboratory of Epidemiology and Community Health, Fez, Morocco; ²Institut de Santé Publique, d'Épidémiologie et de Développement (ISPED), Université Victor Segalen Bordeaux 2, Bordeaux, France; ³Service of Pneumology, University Hospital, Fez, Morocco; ⁴International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+212) 35619321. e-mail: zserhier@yahoo.fr

The increase of tobacco use in some categories of the population, especially women, will have dramatic long-term consequences especially in southern countries in which women seem until now protected. The aim of this survey is to determine the prevalence of tobacco use and related sociodemographic factors among Moroccan women.

A cross-sectional survey was carried out in 2005–2006 on a representative sample for the entire country. A standardised questionnaire was interviewer administered.

Among 4406 women 3.3% (95% confidence interval (CI) = 2.8–3.8) was current smokers, 2.4% (95% CI = 2.0–2.9) former smokers. The prevalence of women's smoking was higher in urban areas (4.6% CI = 3.8–5.4 versus 1.1% CI = 0.7–1.8 in rural areas). The highest prevalence was observed in age group (20–29 years) (4.6%; 95%CI = 3.6–5.9) and among high social class area (9.3%CI = 7.3–11.7). Marital status was associated ($P < 10^{-5}$) with women's smoking: 13.5% among divorced versus 1.5% among married women. On average, women began smoking at the same age than men (17.5 ± 4.3 versus 17.6 ± 4.4) but women smoked a lower number of cigarettes per day (12.3 vs. 14.1; $P = 0.027$). 58.5% of all women smokers stated that they wanted to stop smoking, and about 29.4% had attempted to quit.

The study shows that in women, prevalence of smoking in Morocco is lower than prevalence in industrialized countries but we should be careful because it seems to increase quickly and it is more important in higher social class.

This survey was supported by the International Union Against Tuberculosis and Lung Disease.

PC-71761-11 Socio-economic status and variation in behaviours and knowledge of tobacco smoking health risks

S Elfakir,¹ K El Rhazi,² M Berraho,² Y Elachhab,² M C Benjelloun,³ K Slama,⁴ C Nejjar.² ¹Regional Observatory of Epidemiology, Fez, ²Laboratory of Epidemiology and Community Health, Fez, ³Service of Pneumology, University Hospital, Fez, Morocco; ⁴International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+212) 35619321. e-mail: zserhier@yahoo.fr

Social class differences contribute substantially to social inequalities in mortality. The aim is to determine the association between social class area and variations in knowledge, behaviours and attitudes towards tobacco smoking.

Cross-sectional study in a representative national sample (9197 subjects) was performed. Standardised questionnaire on smoking was interviewer administered. Data were collected in 2005–2006.

In men, the lower rates of smoking were among middle class in urban area (26.9% versus 35% in low and high class areas). In women living in high class area, the prevalence rate was observed 9.3% versus 1.1% in rural area ($P < 0.0001$). The average daily consumption of cigarettes was about 14.3 ± 9.1 . This number was not associated to social class. People in low social class area spent on average 22 ± 18 Dirham* per day. Higher social class area was significantly associated with higher knowledge of health effects of smoking (96.4% versus 91.4% in low social class and rural areas, $P < 0.00001$).

Middle social class area was associated with elevated smoking consumption, and lower social class was associated with lower awareness of the harms of smoking. There is a need to improve knowledge of the dangers of smoking among the disadvantaged segments of the population.

* 1 dollar = 8.5 Moroccan Dirhams

This survey was supported by the International Union Against Tuberculosis and Lung Disease.

PC-71765-11 Knowledge and attitude towards antismoking legislation by smoking status in Moroccan population

N Tachfouti,¹ M Berraho,¹ Z Serhier,¹ Y Elachhab,¹ K Slama,² C Nejjar.¹ ¹Laboratory of Epidemiology and Public Health-Faculty of Medicine University of Fez, Fez, Morocco; ²International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+212) 35 61 93 21. e-mail: tachfoutinabil@yahoo.fr

In Morocco, antismoking legislation has been promulgated since 1996. The aim of this study is to assess knowledge about that legislation according to tobacco status.

A cross-sectional study was performed in a random representative sample of Moroccan adults in seven regions. Data was collected during 2005–2006 using a standardised questionnaire.

Among the 9197 subjects questioned about legislation, only 33.3% of the population knew there was an anti-tobacco law (39.4% of men versus 26.7% of women). More regular smokers (39.5%) than non smokers (30.6%) knew about the law ($P < 0.001$). Among the people who knew about the law, the ban on tobacco advertisements was known by 68% of regular smokers and 72.7% ($P = 0.04$) of non smokers.

Around 73.2% of regular smokers versus 79.9% of non smokers agreed that tobacco taxes should be increased ($P < 0.01$). 51.9% of regular smokers and 53.7% of non smokers ($P = 0.002$) agreed that anti-smoking legislation should prohibit tobacco sales for children.

36.1% of regular smokers reported that they did not respect non-smoking areas, and 76.3% of them smoked in work places.

These data demonstrate the weak information level concerning the law among Moroccans despite its promulgation more than 10 years ago. The results emphasize the need of better information on the different specific aspects of the law and much better implementation.

This survey was supported by the International Union Against Tuberculosis and Lung Disease.

PC-71773-11 Smoking in rural populations: a survey on seven regions of Morocco

M Berraho,¹ S Elfakir,² N Tachfouti,¹ N Qarmich,¹ K Slama,³ C Nejjar.¹ ¹Laboratory of Epidemiology and Public Health-Faculty, Fez, ²Reginal Observatory of Epidemiology, Fez, Morocco; ³International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+212) 35 61 93 21. e-mail: tachfoutinabil@yahoo.fr

Few data exist for smoking in rural areas in Morocco where almost 40% of the population lives. We aim to describe smoking prevalence and characteristics of smokers in rural areas in order to devise the most efficient strategies for tobacco control in those areas.

A cross-sectional study was performed in a random sample of Moroccan adult individuals stratified by sex, age and residence areas (seven regions of Morocco). Data was collected in 2005–2006 using a pre-tested questionnaire.

Among the 3434 subjects living in rural areas (37.3% of the whole population), 16.9% were current smokers and 16.8% former smokers. The prevalence of current smoking was 1.1% among females in rural areas versus 4.6% in urban areas ($P < 10^{-6}$). For men, the figures were 31.0% and 31.9% respectively. On average, in rural areas, the daily amount of smoking was 13.9 ± 8.4 . The average daily expenditure on cigarettes among current smokers was 20.7 ± 20.4 Dirhams.* 57.3% of current smokers were aged between 20 and 40 years. Among non smokers and former smokers 33.9% reported being exposed to tobacco in their homes, and 40.5% in their professional setting.

The study shows the emergence of smoking in rural areas and demonstrates the need to pay more attention to this new public health problem taking into account its specificity.

* 1 Dollar = 8.5 Dirham

This survey was supported by the International Union Against Tuberculosis and Lung Disease.

PC-71792-11 Trends of smoking by educational level in Morocco

K El Rhazi,¹ Z Serhier,¹ S Elfakir,¹ A Benslimane,¹ M C Benjelloun,² K Slama,³ C Nejari.¹ ¹Laboratory of Epidemiology and Public Health-Faculty, Fez, ²Department of Respiratory Disease-University Hospital Center, Fez, ³International Union Against Tuberculosis and Lung Disease, Fez, Morocco. Fax: (+212) 35 61 93 21. e-mail: tachfoutinabil@yahoo.fr

In Morocco where illiteracy is frequent, educational status could be an important determinant of tobacco use. The aim of this study was to assess tobacco use in the Moroccan population according to different levels of education.

A cross-sectional interview survey of tobacco use was conducted in Morocco. Anonymous, administered questionnaires were given to 9197 participants.

Among the respondents, 15.7% were uneducated (11.6% in men vs 24.7% in women) and 4.55%, 30.3%; 33% and 16.5% were in traditional school, primary, secondary and high school respectively.

Among men, smoking prevalence was 38.97% among uneducated subjects, 29.2% in subjects with traditional school level, and 33.13% in primary; 29.29% in secondary and 29.82% in high school. Among women, prevalence rates were 1.49%; 0%; 1.96%; 4.16%; 6.01% respectively.

The average number of cigarettes smoked was 14.3 ± 9.06 ; [1–60] cigarettes per day with no significant difference between the uneducated smokers and those of other educational levels. The average age of onset of smoking was 17.59 ± 4.36 ; [5–47] years. The uneducated began smoking later than others (18.1 ± 4.9 vs 17.5 ± 4.3 [$P < 0.001$]). Uneducated subjects are less informed about tobacco health risk than those with education ($P < 0.001$).

These results demonstrate the need to develop relevant prevention tools for the uneducated as well as the educated.

This survey was supported by the International Union Against Tuberculosis and Lung Disease.

PC-71807-11 Attitudes of Moroccan pneumo-phthisiologists towards smoking in tuberculosis patients

B Amara,¹ K El Rhazi,² H Rahimi,² M El Biaze,¹ C Nejari,² M C Benjelloun.¹ ¹Department of Respiratory Diseases, Fez, ²Department of Epidemiology and Public Health, Fez, Morocco. Fax: (+212) 35619321. e-mail: amarabouchra@caramail.com

Introduction: Cigarette smoking is a risk factor for developing pulmonary tuberculosis; the management of the disease offers a good opportunity for smoking prevention.

Objective: The aim is to evaluate attitudes and knowledge of Moroccan pneumo-phthisiologists towards smoking in the care of tuberculosis patients.

Material and Methods: A questionnaire was administered using a phone interview for Moroccan pneumo-phthisiologists practicing at the tuberculosis and respiratory diagnostic center (CDTMR).

Results: 75 pneumologists have answered the questionnaire representing 88.2% of all questioned. Currently, the rate of smoking in medical doctor is 10.7%, and 12% are former smokers. 66.7% of interviewed pneumologists considered that smoking increases the incidence of tuberculosis represents while 96% believed that smoking worsen the pathology; more than 84% investigated the smoking habits in their patients. 80% considered that 50% of their male patients with tuberculosis are smokers; in contrast, only 5.3% of pneumologists believed that they are well trained to help smokers to stop. 79.7% recognized the interest of integrating a systematic smoking cessation in the national programme fighting tuberculosis (NPFT).

Conclusion: The rate of tuberculous smokers is considered high by Moroccan pneumologists. However, they seem being insufficiently trained to help their patient's. Therefore, it is interesting to integrate the education on smoking cessation in the NPFT.

PC-71867-11 Chronic obstructive lung disease as a cause of hospitalisation in Brazil, 1992–2006

H S Campos,¹ M S Pedrosa,² M A Hijjar,¹ M J Procopio.¹ ¹Centro de Referencia Prof. Helio Fraga, Rio de Janeiro, RJ, ²Gedinf-DATASUS, Brasilia, DF, Brazil. Fax: (+55) 21 25529500. e-mail: hisbello@globo.com

Aim: To present data regarding hospitalizations resulting from chronic obstructive lung disease (COPD) in Brazil during the period 1992–2006.

Method: Data was obtained from the Brazilian official hospital records system (DATASUS), which includes those hospitals financed by the Public Health System (PHS), during the period 1992–2006.

Results: During 1992–2006, respiratory diseases ranked 8th among the main reasons for hospitalizations, being responsible for 15% (13–17%) of all hospitalizations financed by the PHS. COPD was responsible for an average of 237 779 hospitalizations per year (12% of all hospitalizations for respiratory diseases and 2% of the total number of hospitalizations financed by the PHS) or an estimated 651 per day. During these years, the average number of hospitalizations was 231 936 per year, or 19 328 monthly. This figure represents a mean cost of US\$ 54 millions per year, or an average of US\$ 226 per hospitalization during that period, for PHS. About 4.5% of these hospitalizations

resulted in death. Considering only the patients whose hospitalizations were caused by COPD, this disease caused an average of 93 660 deaths, or 4% of all COPD hospitalizations. The largest number of hospitalizations was observed amongst those aged 50 or more (86%). When gender differences were considered, COPD was more prevalent in males than females (65%).

GLOBAL TB IN HIGH-BURDEN COUNTRIES

PC-71253-11 Face validity of a novel method to elucidate patient preferences: conjoint analysis

T W Rennie, W Roberts. Northeast London Tuberculosis Network, London, UK. Fax: (+44) 02085107731. e-mail: timothy.rennie@homerton.nhs.uk

Introduction: Due to drug-resistance, little or no choice of drug treatments can be offered to TB patients. Therefore, it is imperative to offer choice in other areas, such as service provision, allowing a concordant relationship between service-deliverers and service-users to ensure adherence.

Method: Conjoint analysis is based on standard gamble theory whereby different scenarios are offered to identify the relative importance of components of the scenario. This methodology was applied to supervised treatment (DOT) in terms of where and how frequently supervision would take place, and time to get to the deliverer. A sample of TB nurses and pharmacy colleagues ranked 8 cards offering different combinations of these choices (scenarios) to test for face validity of this novel technique.

Results: Seventeen nurses and pharmacists completed the exercise. Overall, community pharmacy was the most preferred location of supervision and, predictably, individuals preferred fewer supervisions per week and less time to reach supervision location. Location was considered the most important aspect of supervision with time the least important (Table 1). However, analysed separately, nurses ranked supervision frequency as the most important aspect whereas pharmacists ranked location most important.

Aspects of DOT supervision	Importance values*		
	All rankers (n = 17)	TB-HCPs (n = 8)	Pharmacy-HCPs (n = 9)
Location	39.602	32.725	45.714
Time	22.483	22.961	22.059
Frequency	37.915	44.314	32.227

* Higher importance values infer greater importance. HCP = Healthcare professional.

Conclusion: Conjoint analysis was successful in differentiating between conflicting healthcare practitioner preferences.

PC-71275-11 Reactivation and re-infection among patients with recurrent tuberculosis treated in the Netherlands

C G M Erkens,¹ S Verver,¹ D van Soolingen,² ¹KNCV Tuberculosis Foundation, Den Haag, ²RIVM, Bilthoven, Netherlands. Fax: (+31) 703584004. e-mail: erkensc@kncvtbc.nl

Aim: To estimate the recurrence rate through reactivation or re-infection in TB-patients treated in the Netherlands.

Design: Retrospective study of surveillance data of patients with new or recurrent TB.

Methods: Data from the Netherlands TB Register from patient-cohorts from 1993–2003 were used to analyse new and retreatment cases and calculate rates of recurrent TB. Risk factors for recurrence were determined through univariate analysis. The analysis will be extended to surveillance data including 2005 and linked with culture and fingerprint data of the Laboratory for Mycobacteriology for all isolates from 1993–2005. In patients notified as retreatment patients (treated >1 month) and treated before in the Netherlands an identical DNA-fingerprint in the first episode will be classified as reactivated TB. A different DNA-fingerprint will be classified as re-infection TB. The occurrence of reactivation and re-infection will be calculated during the follow up period.

Results: Among 16 675 patients, 201 patients with culture positive TB had been treated before in the Netherlands. The estimated percentage of recurrent TB after successful treatment was 0.7% and after interruption of therapy 7%, within a mean follow-up time of 6 respectively 7 years. The risk of recurrent TB after completion of treatment is higher in sputum positive PTB, rifampicin or MDR-resistant TB, drug addicts, homeless and HIV-infected individuals. Further analysis of DNA-fingerprint data will provide the rate of reactivation after successful completion of treatment,

Cohorts 1993–2003	Previous treatment completed	Previous treatment defaulted
Mean person years follow-up	6	7
Number of patients in cohorts	13 349	2 207
Number of person years follow-up	79 485	15 188
Number of cases with culture positive recurrent TB	99	102
Mean time interval for recurrence	2.9 ± 1 years	1.2 ± 1 years
95% BI	(2.5–3.2 years)	(0.9–1.5 years)
Incidence recurrent TB per 100 000 person years follow-up	125	672
95% BI	(100–149)	(541–802)
Estimated % recurrence	0.7%	7.0%
Estimated % recurrence after maximum 3 years follow-up	0.5%	6.4%

the proportion of re-infection among cases of recurrent TB and risk-factors for reactivation or re-infection.

PC-71289-11 Assessment of management of TB medicines in DOTS centres in Nigeria

O Taylor,¹ A Awe,¹ M Kabir,² M Belhocine,¹ R Soremekun.³
¹World Health Organization, Abuja, ²Federal Ministry of Health, Abuja, ³University of Lagos, Akoka, Nigeria.
 Fax: (+234) 94618725. e-mail: tayloro@ng.afro.who.int

Background information: Globally, Nigeria ranks 4th amongst countries with the greatest burden of tuberculosis. By the end of 2004, the TB program had a national treatment success rate of 78% which is below the target of 85%. Uninterrupted supply of good quality TB medicines is required to effectively tackle the epidemic.

Objective: To assess the availability of TB medicines in stores and DOTS centres with the aim of strengthening the procurement and supply management of TB medicines.

Method: Availability of 5 TB medicines namely isoniazid, ethambutol, 4 FDC, rifampicin + isoniazid and ethambutol + isoniazid was assessed in randomly sampled stores and DOTS centres. Stock-out, proper distribution, record keeping, storage and rational use of TB medicines were assessed. A check list was used to evaluate storage conditions at the stores and the facilities.

Results: 96 DOTS centres and 18 stores were assessed. All prescriptions examined conformed to the required regimen corresponding to the age of the patient. 77% of facilities had national standard treatment guidelines for TB. While 6 out of the 8 stores had all the tracer TB drugs in store, only 25% of facilities surveyed had all 5 of the key TB medicines and 4% had no TB medicines at the time of visit. 14 out of the 96 facilities (15%) had a stock-out of 4FDC for an average duration of up to 93 days in the year. Only 40% of the TB medicines had stock cards for record keeping. While the zonal and state stores had most TB drugs, the facilities sometimes had very long periods of stock-out showing poor distribution. While storage at zonal and states stores was adequate, storage of TB medicines in most facilities was inadequate with medicines stored on the bare floor, unclean shelves, and not systematically arranged to mitigate expiry.

Conclusion: Adequate TB medicine supply management with appropriate distribution and documentation are required to ensure accountability and uninterrupted availability.

PC-71349-11 The most prevalent tuberculosis genotypes in the United States

P K Moonan,¹ L S Cowan,¹ M C Hlavsa,^{1,2} J S Kammerer,^{1,3} J E Oeltmann,¹ K Ijaz,¹ T R Navin,¹ J T Crawford.¹ ¹Centers for Disease Control and Prevention, Atlanta, Georgia, ²Epidemic Intelligence Service, Office of Workforce and Career Development, Atlanta, Georgia, ³Northrop Grumman, Atlanta, Georgia, USA. Fax: (+1) 404 639 8959. e-mail: pmoonan@cdc.gov

Background: Since 2004 the National Tuberculosis Genotyping Service (NTGS) has provided universal access to molecular characterization of *Mycobacterium tuberculosis* isolates for tuberculosis cases managed in the United States. While several U.S. studies have examined the distribution and prevalence of genotypes, most were conducted at the jurisdictional level or as sentinel sites.

Methods: We characterized the distribution and prevalence of isolates using spoligotyping and mycobacterial interspersed repetitive units typing with NTGS data. Bacterial family clades were defined by spoligotyping.

Results: Of 14 157 TB genotyping results collected between January 2004 and December 2005, we linked 11 874 (83.9%) to patient-level records. A total of 4861 different genotypes were noted. The top 10 most prevalent genotypes had a median of 101 members (range 68 to 442) for a total of 1650 (13.6%) individuals. Of those, isolates from 515 (31.2%) individuals were from the Beijing clade, 414 (25.1%) from the Manila clade and 306 (18.5%) were from the X2 clade. Individuals with the most common genotypes represented 62 different birth countries.

Conclusions: This is the first nationwide study to describe the most common genotypes in the US. Recognizing which genotypes predominate nationally is an important factor in prioritizing investigations of ongoing transmission.

PC-71580-11 What surveillance factors are associated with disparity in tuberculosis case rates among blacks and whites?

E Magee,¹ C Winston,² V Robison,³ R Wallace.⁴ ¹CDC/CCID/NCHHSTP/DTBE, Atlanta, Georgia, ²CDC/CCID/NCHHSTP/DTBE, Atlanta, Georgia, ³CDC/CCID/NCHHSTP/DTBE, Atlanta, Georgia, ⁴CDC/CCID/NCHHSTP/DTBE, Atlanta, Georgia, USA. Fax: (+1) 404 539 8959. e-mail: eem9@cdc.gov

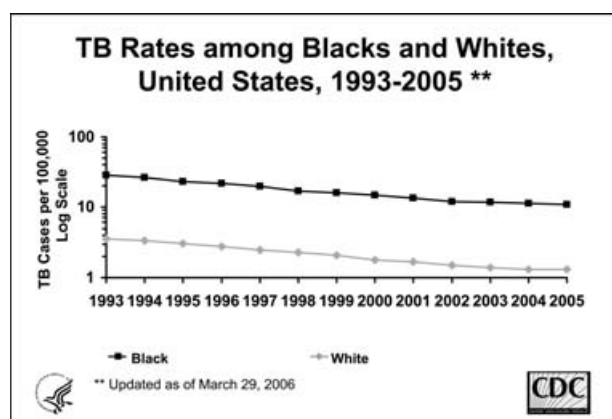
Aim: This study compared reported tuberculosis (TB) among blacks and whites in the United States.

Method: A retrospective analysis of routine national surveillance data. Persons reporting Hispanic ethnicity were not evaluated.

Results: During 1993–2005, TB rates decreased by 62% in blacks, and 64% in whites (from 28.5 to 10.9/100 000 and 3.6 to 1.3/100 000, respectively); thus, the TB rate ratio between blacks and whites remained relatively constant, ranging from 7.4 to 8.7 over the study period. Black persons with TB were younger than whites (mean 44 vs. 57 yrs, respectively, $P < 0.001$)

and were more likely than whites to report positive HIV test results (21% vs. 7%, $P < 0.001$). Black persons with TB were more likely than whites to report drug use behaviors including excess alcohol use (19% vs. 16%, $P < 0.001$), non-injecting drug use (12% vs. 5% $P < 0.001$), and injecting drug use (4% vs. 2%, $P < 0.001$).

Conclusions: The disparity in TB rates between blacks and whites is not diminishing. To accelerate the decline among blacks, intensive efforts will be required to reach populations that have the following risk factors; younger, HIV infected, or substance abuse behaviors.



PC-71669-11 Analysis of WB/DFID TB control project implementation effect in Xinjiang

Y H Li,¹ G Wu.² ¹The Center for Disease Control and Prevention of Xinjia, Urumqi, Xinjiang Uygur, ²The Center for Disease Control and Prevention of Xinjiang Production and Construction Corps, Urumqi, Xinjiang, China.
Fax: (+99) 18835349. e-mail: liyuehua1975@tom.com

Objective: Discussion the WB/DFID Project implemented 5 years results in Xinjiang.

Methods: All suspected took free chest X-ray and sputum smear examinations. S+ got free treatment and directly observed chemotherapy with whole course.

Results: The WB/DFID project started in 2002. After working of defense people, it had yielded initial results. 353 328 suspected TB patients got free examination in whole region, 109 648 cases of active TB had been found. There are S+ 68 196 cases (62.2%) and S- 41 452 cases (37.8%); and there are new S+ 54 960 cases among them. There are initial 55 039 cases and retreated 13 157 in S+. After 2-3 month course of treatment, sputum negative conversion rate was 94.73% and 97.08%. From the end of the course of treatment of 51 176 cases of S+ cases cohort analysis, 49 069 were cured, the cure rate is 95.88%; 497 had completed treatment, the treatment success rate is 96.85%, it has achieved the planning requirements. The suspected TB patients has increased every year, totaled for 353 328 cases five years, of which 154 718 cases for attendance (43.79%), 81 559 cases for referred (23.08%), 48 271 cases for focused of recom-

mendation (13.66%), 66 005 cases for the daily recommendation (18.68%) and 2775 cases for the other (0.79%). The overall S+ detection rate is 19.35%. The people of referred, focused and the daily of recommendation is 55.43%. It proved the three founding ways are the main of founding TB, especially active patients. From the newly diagnosed patient's symptoms to analyze S+ detection rate, the S+ detection rate is 22.92% in cough, expectoration 3 weeks and hemoptysis TB patients, but the S+ detection rate was only 10.88% in cough, expectoration less than 3 weeks and others, with the former is two times of the latter. It prove that cough, expectoration three weeks and hemoptysis were high-risk groups.

Conclusions: Implementation of the TB/DFID project and DOTS strategy is the only way to accelerate the pace of TB epidemic and control.

PC-71692-11 Assessing savings and microcredit interventions in high incidence tuberculosis communities

E Torkelson,¹ E Speelman,² J Morrison,² A Detjen,² N Beyers.² ¹Fulbright Fellow, Community Resource Organisation, Cape Town, ²Desmond Tutu TB Centre, Stellenbosch University, Stellenbosch, South Africa.
Fax: (+27) 219389719. e-mail: erin.torkelson@gmail.com

Introduction: The DOTS strategy does not include formalised community support and organisation for TB patients. Savings and microcredit schemes, however, have been used throughout the world to cultivate social and economic networks in poor communities. The aim of this pilot project is to introduce savings and microcredit schemes into TB treatment facilities and assess the effectiveness of savings and microcredit as a community support network for TB patients.

Methods: We have introduced the pilot project at community clinics in the Cape Town area. Interested TB patients have formed savings groups, commencing a model of daily savings and loans, weekly community meetings, and horizontal learning exchanges. Monitoring and evaluation of this intervention will include focus group discussions to assess how TB factors into savings meetings and how understandings of TB change through community dialogue. Treatment completion rates of those involved with the savings groups will be compared to those not involved.

Results: The intervention has reached 3 clinics with 20 people per savings groups. We will track the continued growth and expansion of savings groups, conduct focus group discussions on communal understandings of TB, and gather treatment outcome data.

Conclusions: Savings and microcredit schemes have the potential to improve treatment completion and enhance understanding of TB within poor communities.

PC-71750-11 Delay and decline in reporting drug susceptibility test results, United States, 2000–2005

S P Althomsons, T H Holtz, L R Armstrong. Division of TB Elimination, CDC, Atlanta, Georgia, USA.
Fax: (+1) 404 639 8958. e-mail: soa4@cdc.gov

Aim: Delayed reporting of drug susceptibility test (DST) results for TB cases can lead to delays in notifying the US Centers for Disease Control of drug resistant tuberculosis (TB) and may result in delays in diagnosis of drug-resistant TB. We describe trends in reporting first-line DST results on initial isolates to the U.S. National TB Surveillance System (NTSS).

Method: We conducted a descriptive analysis of all culture-confirmed TB cases reported to the NTSS from 50 states and the District of Columbia from 2000 to 2005. We assessed completeness of first-line DST reporting (isoniazid, rifampin, ethambutol, and either streptomycin or pyrazinamide). We analyzed data at annual points to determine changes in completeness of DST reporting over time.

Results: By 2003, 89.3% (11 624/13 013) of cases from 2000 had reported first-line DST results, whereas only 85.5% (11 145/13 034) of cases had results first reported in 2000. Two age groups had the greatest proportional changes over this time period. Among cases ≤ 14 years old in 2000, first-line DST reporting increased from 80.6% (203/252) in 2000 to 86.2% (213/247) in 2002, an increase of 5.6%. Among TB cases ≥ 65 years old in 2000, first-line DST reporting increased from 84.9% (2595/3057) in 2000 to 89.6% (2736/3053) in 2002, an increase of 4.7%. As of 2005, overall national reporting of first-line DST has declined (see Table).

	Year reported					
	2000	2001	2002	2003	2004	2005
Total TB cases (N)	13 013	12 750	11 976	11 695	11 319	10 943
TB cases with first-line DST results reported as of 2005 (%)	89.3	88.7	87.5	87.4	86.7	84.5

Conclusion: The proportion of first-line DST results reported to the NTSS has declined from 2000 to 2005. The reasons for this are not well understood. Identifying groups with pronounced delays may facilitate increasing proportions of patients having first-line DST reported to NTSS.

PC-71978-11 MDR-TB in sub-Saharan Africa: a reappraisal of global surveillance data

R McNerney, E Zager. London School of Hygiene & Tropical Medicine, London, UK. Fax: (+44) 20 7637 4314.
e-mail: Ruth.Mcnerney@lshtm.ac.uk

Background: The prevalence of MDR-TB is widely reported as the proportion of TB cases found resistant

to rifampicin and isoniazid. Whilst this provides a very useful indicator of the effectiveness of TB control within a geographic setting it does not adequately reflect the burden of drug resistant disease, or the risk of transmission within a population. We present a reappraisal of global data to report the estimated incidence of new TB cases having multidrug-resistant disease.

Study design: Published drug resistance surveillance data was used to estimate the incidence of new TB cases with multidrug-resistant disease per 100 000 of the population. Data for each country or geographical setting was compiled and ranked according to the estimated incidence.

Key findings: In 72 geographical settings the estimated incidence of new cases with MDR-TB was less than 3 cases per 100 000 of the population. Twenty five settings had estimated incidences of between 3 and 35.3 cases per 100 000. Countries in sub-Saharan Africa with a low proportion of MDR-TB within the total TB caseload were found to have high estimated incidences of MDR-TB. Zambia, Mozambique and all eight of the South African provinces for which data was available had estimated incidences of between 8 and 15 cases per 100 000 of the population.

Conclusion: Re-appraisal of global drug resistance data suggests that the problem of drug resistant tuberculosis in sub-Saharan Africa is more critical than previously perceived as countries in the region have amongst the highest incidence of previously untreated MDR-TB cases in the world. Global surveillance activities should be expanded to include assessment of the incidence of drug resistant disease within communities.

TB IN CHILDREN

PC-71538-11 Manifestations of primary tuberculous infection in 37 unvaccinated preschoolers

A Gillman,¹ S E Bergström,² M Eriksson,² H Wahlgren,² R Bennet.² ¹Department of Infectious Diseases, Academic Hospital, Uppsala, ²Astrid Lindgren Children's Hospital, Stockholm, Sweden. Fax: (+46) 851777419.
e-mail: rutger.bennet@karolinska.se

A teacher in a Stockholm suburb day care centre developed cavitary tuberculosis (TB) that went undiagnosed from March to August 2005. Four of the 53 attending 1–5-year-old children were BCG vaccinated. After the diagnosis of the source case, all children had a tuberculin skin test (TST) and 32 (60%) were positive. Of 33 siblings and other frequent visitors, 5 were positive. Eighteen of the TST positive children had radiological signs of TB: 10 had hilar lymphadenopathy, 7 had infiltrates, and 1 had miliary disease. In retrospect, many especially in May had unspecific symptoms compatible with primary infection. At least 7 then sought medical attention for these symptoms.

A questionnaire about symptoms was mailed to all children at the centre. Twenty-four infected and 17 uninfected responded. Night sweats, reported by 50% of the infected and none of the uninfected children, was the symptom best discriminating between them.

The frequencies of symptoms and signs were remarkably similar to that reported in a prospective study of TST converters from the Faeroe Islands in the 1930's.

Five children showed transiently worsening radiological changes after 2–4 months of treatment. One girl developed atelectasis and pleural fluid after 16 months, with a prompt response to corticosteroid treatment. At 19 months, 4 children have slight radiological changes, but all are asymptomatic.

PC-71584-11 Drug-resistant tuberculosis in children: report of 38 cases in DOTS-Plus treatment in Lima, Peru

E Sanchez,¹ T Chinchay,¹ H Anger,² J Bayona.^{2,3,4} ¹Hospital Sergio Bernales, Carabayllo, Lima, ²Socios En Salud Sucursal Peru, Lima, Peru; ³Partners in Health, Boston, Massachusetts, ⁴Department of Social Medicine, Harvard Medical School, Boston, Massachusetts, USA. Fax: (+51) 15580090. e-mail: epis53@yahoo.es

Introduction: In Peru, drug-resistant tuberculosis in children is a public health problem due to a high percentage of household drug-resistant TB contacts. A robust strategy is needed to diagnose and treat pediatric cases.

Objective: To describe primary, drug-resistant TB among pediatric patients and to determine treatment outcomes among these cases.

Methods: We conducted a retrospective, descriptive study of 38 pediatric patients who entered a DOTS-Plus treatment program with diagnosed drug-resistant TB between 1996 and 2005 at Hospital Sergio Bernales in Lima, Peru.

Results: Six (16%) patients were five years old or younger, eight (21%) were between the ages of six to ten years, and 23 (61%) were eleven to fifteen years old. Smear and culture conversion by the sixth month of treatment was observed in 34 (90%) and 36 (95%) patients, respectively. 34 (89%) patients were cured, one (3%) died, three (8%) abandoned treatment, and none failed treatment. Patients were resistant to a mean of five drugs (range: 2–8), including four (1–5) first-line drugs and one (0–3) second-line drug. Drug resistance patterns include 23 (61%) resistant to isoniazid and rifampin, 20 (53%) to ethambutol, 20 (53%) to streptomycin, 11 (29%) to pyrazinamide, seven (18%) to kanamycin, and five (13%) to ethionamide.

Conclusions: Most pediatric patients with drug resistant TB are between the ages of eleven to fifteen years old and have high rates of resistance to isoniazid and rifampin. Children with drug-resistant TB can be treated and cured with an individualized treatment regimen in a DOTS-Plus program.

PC-71597-11 A high prevalence of *Mycobacterium tuberculosis* disease in children with type 1 diabetes in Cape Town

E A Webb,^{1,2} R Gie,¹ H S Schaaf,¹ A Hesselning,¹ A Spitaels,² S Delpont,² B Marais,¹ K Teare,² K Donald,² N Beyers.¹

¹Desmond Tutu TB Centre, Cape Town, ²Groote Schuur and Red Cross Children's Hospitals, Cape Town, South Africa.

Fax: (+27) 21 938 9719. e-mail: emmaalicewebb@yahoo.com

Introduction: Diabetes mellitus (DM) is associated with tuberculosis (TB) in adults-poor glycaemic control and changes in immune system function have been implicated in this association. However, there are few studies of this association in the paediatric population.

This study aimed to assess the prevalence of TB infection and disease in children and adolescents with type 1 DM and to describe the association between glycaemic control and TB infection and/or disease.

Methods: In a prospective hospital-based study all diabetics (aged 1–20 years) seen over a 5 month period were assessed for TB infection and disease (symptom screen, chest-X-ray, Mantoux tuberculin skin test, sputum), and glycaemic control (HbA1c).

Results: 258 diabetic children and adolescents completed the study (58% female), 30% had TB infection. 16 had previously had TB disease, 2 were on treatment at the time of recruitment and 7 were diagnosed with TB disease during the study. 10 of the 25 children developed TB within 20 months of diabetes being diagnosed, 23/25 consented to HIV testing all were HIV –ve.

Conclusion: Children with type 1 DM experience an extremely high point prevalence of TB disease (3488/100 000). The prevalence of TB infection was no different from that in the non-diabetic population (30%). The onset of type 1 DM was associated with a high rate of TB disease suggesting that there is an additional impact on the immune system at this time. 10 of the cases (40%) developed TB within 20 months of the diagnosis of diabetes, this finding differs from the previous study involving paediatric patients, which found that the risk of TB disease in patients with DM increased with the duration of DM. Poor glycaemic

	No TB disease (SD)	TB disease ever (SD)	P value
Number patients	233	25 [7 new, 2 current, 16 previous]	
Age, years	13.3 (3.6)	13.3 (5.6)	1.00
Female, %	60	52	0.43
Duration of DM, years	5.7 (4.1)	3.5 (3.9)	0.02
Age diagnosed with DM, years	7.5 (3.9)	8.6 (4.8)	0.18
Mantoux ≥ 10 mm	24%	88%	0.001
HbA1C, %	10.7 (2.4)	13.3 (2.4)	0.001
History of contact with tuberculosis	13% [at time of assessment]	44% [at time of TB disease]	0.001

SD = standard deviation.

control was significantly associated with TB disease ($P < 0.004$). These data indicate that children with DM need to be screened for TB and raise questions about whether Mantoux positive and poorly controlled diabetic children should receive chemo prophylaxis.

PC-71681-11 Features of disseminated tuberculosis disease in children

M Hatherill,¹ H Mahomed,¹ M Kibel,¹ T Hawkrigide,¹ L Geiter,² G Hussey.¹ ¹South African Tuberculosis Vaccine Initiative, UCT, Cape Town, South Africa; ²Aeras Global TB Vaccine Foundation, Rockville, Maryland, USA.
Fax: (+27) 21 4066081. e-mail: mark.hatherill@uct.ac.za

Background: A Cape Town study of cumulative tuberculosis incidence before and after changeover from percutaneous Tokyo 172 bacille Calmette Guérin (BCG) immunization, found that intradermal Danish 1331 BCG reduced the proportion of children under two years old with disseminated tuberculosis (Mahomed et al., 2006).

Aim: To describe the demographic, clinical, and laboratory co-variables associated with disseminated tuberculosis in these children.

Design: Before-and-after observational study.

Methods: Database records of 5102 children diagnosed with tuberculosis (January 1999–June 2004) were examined. Three hundred and eighty children (7.5%) with disseminated tuberculosis, including 202 (4%) with tuberculous meningitis, were compared to 4722 children (92.6%) with pulmonary tuberculosis. In the bivariate analysis, unadjusted odds ratios (OR) were calculated using logistic regression (STATA version 8.0).

Results: Hepatomegaly (OR 3.92); splenomegaly (OR 3.75); fever (OR 3.41); lymphadenopathy (OR 2.77); pallor (OR 2.40); failure to gain weight (OR 2.08); culture positive gastric lavage (OR 2.02); smear positive gastric lavage (OR 1.64); poor feeding (OR 1.44); and weight loss (OR 1.3), were associated with increased risk of disseminated disease. Presence of a BCG scar (OR 0.32); positive HIV ELISA (OR 0.49); household smoker (OR 0.51) or tuberculosis contact (OR 0.54); cough (OR 0.63); and increasing respiratory rate (OR 0.97), were associated with reduced risk. All $P < 0.05$ (Wald test).

Conclusion: Disseminated tuberculosis remains a significant health problem in this region. Diagnosis is associated with multiple factors, including organomegaly, growth failure, and microbiological confirmation. A multivariate regression model will examine independent odds ratios adjusted for time factors.

PC-71763-11 Clinical scoring systems for childhood tuberculosis

A J Hawkrigide,¹ M Hatherill,¹ F Little,¹ L Geiter,² G D Hussey.¹ ¹SATVI, IIDMM, University of Cape Town, Cape Town, Western Cape, South Africa; ²Aeras Global Tuberculosis Vaccine Foundation, Rockville, Maryland, USA.
Fax: (+27) 21866134778.
e-mail: anthony.hawkrigide@uct.ac.za

Background: We conducted a field trial involving 11 680 newborns vaccinated at birth with BCG. All participants were followed up for ≥ 2 yr for TB disease. TB suspects underwent investigation in a dedicated ward. 1751 participants were evaluated during 1981 admissions, of whom 172 were classified algorithmically as having definite [DEF] (culture +), 213 probable [PROB] (suggestive CXR + signs/symptoms), 351 possible [POSS] (suggestive CXR, little other evidence) and 436 unlikely (clinician diagnosis, little other evidence) TB. Detailed clinical and epidemiological data were collected on all these participants.

Methods: Prior to the study's start we identified several widely used scoring systems devised to help diagnose TB in suspects and attempted to collect all of the information used in these various systems. We then programmed the details of these systems into a statistical computer program and assessed the performance of each scoring system using different definitions of tuberculosis (e.g., DEF and DEF + PROB cases).

Results: Cleaned data will be available prior to this meeting and the sensitivity, specificity, predictive values and generated receiver operator curves for each scoring system will be presented using the base case of a positive TB culture plus a suggestive CXR as = TB disease and negative microbiology plus normal CXR as = no TB disease. Sensitivity analyses will also be presented with broader definitions of TB cases.

Discussion: Scoring systems are widely used in resource poor settings to diagnose childhood TB. We expect that our results will show that some systems will perform well when used in infants/young children in high TB prevalence resource poor settings, using a robust gold standard. The results from this analysis provide the opportunity to validate the scoring systems in an environment where there was a high rate of disease, the ability to obtain respiratory specimens from all suspects and the ability to perform TB cultures.

PC-72012-11 Investigation of child contacts of patients with smear-positive tuberculosis in rural Rwanda

B Bucyibaruta,¹ A Manzi,¹ J Gitesi,¹ Y Gatesi,¹ D Nurihano,¹ M F Franke,¹ M L Rich,^{1,2} S N Stulac.^{1,2} ¹Partners In Health, Rwinkwavu, Rwanda; ²Division of Social Medicine and Health Inequalities, Brigham and Women's Hospital, Boston, Massachusetts, USA. Fax: (+1) 617 432 5300.
e-mail: mfranke@pih.org

Study aims: 1) To estimate BCG vaccination coverage among this group of children at high-risk for tu-

berculosis; 2) to use PPD response to estimate the percentage of child contacts who have been exposed to *Mycobacterium tuberculosis*.

Methods: Between February and March 2007, all children who were ≤ 15 years of age and were household contacts of adults with smear-positive TB were evaluated for signs and symptoms of active TB disease. BCG vaccination was determined by the presence of a scar. A standardized treatment algorithm was used to calculate a score for each child, based on the following criteria: signs and symptoms of TB, nutritional status, PPD response, and TB contact history. This score was used to guide treatment decisions. Children initiated home-based directly observed therapy (DOT) of INH prophylaxis and Category I TB treatment as appropriate.

Results: A total of 107 child contacts of smear positive women were identified. 53 (49.5%) of these children were ≤ 5 years of age and 65.6% had been vaccinated for BCG. 18.7% of child contacts had a PPD response suggestive of transmission. 11 (33.3%) of unvaccinated children had a PPD induration ≥ 10 mm, and 9 (13.8%) vaccinated children had a PPD induration ≥ 15 mm. No child has defaulted from isoniazid therapy.

Conclusion: One third of this cohort of child contacts of smear-positive TB patients had not received vaccination with BCG. Increased efforts to facilitate BCG vaccination among children in this region may decrease secondary cases of TB, particularly among children less than 5 years of age. High rates of INH completion can be obtained when home-based DOT INH for household contacts is combined with DOT for the household TB index case.

PC-72105-11 An outbreak of childhood MDR-TB in the United States: treatment challenges and health-care costs

M Crain,¹ J Mangan,² M White,¹ S Austin,³ M Pisu.⁴

¹Pediatrics, UAB School of Medicine, Birmingham, Alabama, ²Pulmonary Medicine, UAB School of Medicine, Birmingham, Alabama, ³Student, UAB School of Health Related Professions, Birmingham, Alabama, ⁴Preventive Medicine, UAB School of Medicine, Birmingham, Alabama, USA. Fax: (+1) 205 975 6549. e-mail: mcrain@peds.uab.edu

Background: In 2002 a southern city in the United States reported an outbreak of MDR TB involving five children, ages 4–39 months, who were epidemiologically linked to an adult source case resistant to all first line anti-mycobacterial agents. The medical complexity of these cases challenged the institutions charged with providing care.

Objective: Characterize treatment outcomes, complications, and associated costs of care.

Methods: Medical record reviews were conducted to quantify the diagnostic testing, surgical interventions, and inpatient and home health services utilized to pro-

vide care for these children. Costs were determined from administrative claims and hospital bills.

Results: A regimen of amikacin, levofloxacin, and ethionamide was chosen for all five children based upon DNA fingerprinting and antibiotic susceptibility testing of a positive culture from one child obtained via gastric aspirate and sputum cultures from the source case. A health care team was assembled for DOT (directly observed therapy) in the ambulatory setting. Central venous lines (CVL) were placed in each child for amikacin administration. Three children required gastrostomy for oral medications. Therapy lasted 18 months. After 12 months, cycloserine was substituted for amikacin. Complications included CVL infections in 2/5, osteomyelitis in 1/5, and hearing loss in 1/5. All are free of active disease at 3 years. The average cost of care per child was determined to be \$90 831 (USD), with inpatient costs averaging \$76 238, and outpatient costs averaging \$14 592.

Conclusions: Successful DOT of childhood MDR TB can be accomplished in the ambulatory setting, but demands intensive effort from a team of providers and significant health care dollars.

PC-72109-11 Analysis of 2456 children treated for tuberculosis at Chris Hani Baragwanath Hospital, Soweto, South Africa

D P Moore,¹ M E Edginton,² H Moultrie,³ T M Meyers,⁴ S A Madhi,⁵ S Yacoob,⁵ A Violari.⁶ ¹Department of Paediatrics and Child Health, Chris Hani Baragwanath Hospital, Johannesburg, ²Department of Public Health, University of the Witwatersrand, Johannesburg, ³Harriet Shezi Children's Clinic, Wits Paediatric HIV Clinics, Johannesburg, ⁴Harriet Shezi Children's Clinic, Department of Paediatrics, University of, Johannesburg, ⁵Respiratory and Meningeal Pathogens Unit, University of the Witwatersrand, Johannesburg, ⁶Paediatric HIV Research Unit, University of the Witwatersrand, Johannesburg, South Africa. Fax: (+27) 118802056. e-mail: mooredp@medicine.wits.ac.za

Background: The diagnosis of tuberculosis in children is challenging, particularly in the era of HIV. TB and HIV co-infection rates in children in developing countries are poorly described.

Methods: A retrospective review of children treated for TB at Chris Hani Baragwanath Hospital (CHBH) between November 2003 and July 2006 was conducted. TB microscopy, culture and susceptibility (if done), histology, monocyte, HIV, CD4 and HIV RNA results were extracted. TB diagnosis was classified as culture positive (TBC+), smear or histology positive (TBS+) and no microbiological evidence of TB (TB-). Paediatric HIV clinic records were cross referenced to identify children on Antiretroviral Therapy (ART).

Results: Of the 2456 children (median age 23 months), 408 (16.6%) were TBC+, 310 (12.6%) were TBS+ and 1738 (70.8%) TB-. Fifty four children had had two or more episodes of TB. One thousand one hundred sixty-nine (47.6%) children were HIV-positive,

600 (24.4%) were HIV-negative and 687 (28.0%) had no definitive HIV result. Only 67% of the HIV-positive children had ever been registered at CHBH's paediatric HIV clinics. HIV status was not associated with lower TB microscopy ($P = 0.54$) or culture ($P = 0.73$) yields. HIV-infected children had higher monocyte % ($P < 0.0001$). Monocyte % was similar across TBC+, TBS+ and TB-. Of the 192 children reported as deceased 131 (68.2%) were HIV-positive. HIV-infected children on ART had significantly lower mortality than those not on ART ($P = 0.02$). One hundred ninety four (47.5%) of the TBC+ children had had on average of 3.5 negative smears. HIV status was not significantly related to the smear yield in these children.

Conclusion: High rates of dual TB-HIV were present, with higher mortality rates in HIV positive patients. HIV status surprisingly was not associated with lower TB microscopy or culture results. Negative microscopy results should be treated with caution in all children.

PC-72152-11 Child screening in households of contagious TB in Eldoret, Kenya: how are the canaries doing?

E J Carter,¹ L Watetu,² L Kamle,² N Bhakta,³ N G Buziba,² P Losikoff.¹ ¹Warren Alpert School of Medicine at Brown University, Providence, Rhode Island, USA; ²Moi University School of Medicine, Eldoret, Kenya; ³University of Cincinnati College of Medicine, Cincinnati, Ohio, USA.
Fax: (+1) 401 793 2266. e-mail: E_Jane_Carter@Brown.edu

Background: Children are the most vulnerable victims of tuberculosis. They are more susceptible to developing disease when exposed and more difficult to diagnose than adults. Many children perish before the diagnosis is made. For this reason the World Health Organization (WHO) recommends all children < age 5 living in the household of an AFB smear positive case of TB should be evaluated and receive primary prevention; yet, this rarely occurs in TB programs in the developing world.

Methods: Household assessment of pulmonary smear positive index cases was performed as part of a trans-

mission study. A home visit was made to enroll household members. All household contacts were offered PPD, chest radiographs (CXR), symptom screening (cough questionnaire) and HIV testing. Reported here are the results of evaluations of all children under the age of 12 in the households studied.

Results: See Table.

Discussion: TB household contact tracing to locate at risk children is feasible in the developing world setting. 100% of children completed CXR screening. 95% completed PPD testing. Significant morbidity in children is discovered through this simple screening. 68% of children, age 5 or less, demonstrated LTBI based on skin testing; 38% meet local criteria for TB disease (contact plus an abnormal CXR). Children continue to bear a disproportionate burden of TB morbidity. Efforts to prioritize children in TB care programs are warranted and overdue.

PC-72156-11 Tuberculosis among children less than 15 years old in Brazil, 2001-2005

C P S Barbosa,¹ J R P Santos,¹ S B Codenotti,¹ D O Garrett.^{2,3}

¹National Tuberculosis Control Program/ Epidemiological, Brasília, Distrito Federal, Brazil; ²International Union Against TB and Lung Diseases, Paris, France; ³United States Agency for International Development, Brasília, Brazil.

Fax: (+61) 32252562. e-mail: carlapat.barbosa@gmail.com

Introduction: Tuberculosis (TB) in children causes considerable mortality and morbidity.

Objective: To describe all cases of TB among patients <15-years-old in Brazil.

Methods: An analysis of all TB patients <15 years old registered at the National TB Surveillance System in Brazil, from 2001 to 2005. Software for analysis were TabWin 3.4 and EpiInfo 6.04D.

Results: A total of 17 064 TB cases (8.4 per 100 000 population) were reported in children <15-years-old during the study period; most (51.6%) were male. Highest notification rates were seen in <1-year-old (11.3 per 100 000 population) and median is 7 years old. Pulmonary TB was seen in 77.2% of the cases. Sputum smear-microscopy was realized in 5872 (44.6%) patients; of these, 3481 (26.4%) had sputum smear-positive. Treatment success and default rates were of 78.7% and 7.8%, respectively.

Conclusion: Childhood TB is sometimes a neglected aspect in TB control programmers. In Brazil, despite of high BCG coverage (99%), the highest TB notification rates were seen in <1-year-old.

	Age 6–12 years	Age <6 years
Household contacts evaluated	23	36
No. of index cases/households	10	15
Age in years, mean	8.7	2.5
PPD <5 mm	2	11
PPD 5–9 mm	0	4
PPD 10–14 mm	3	5
PPD >15	17	14
'Positive' PPD*	20 (91%)	23 (68%)
Symptomatic†	9	8
Abnormal CXR	15	14
Accepting HIV testing	16	20
HIV positive	1	2

* Defined as >5 mm due to known contact to active case.

† Defined as having at least one positive answer on cough questionnaire.

TREATMENT, SURVEILLANCE AND GLOBAL DRUG MARKET

PC-71139-11 Improving quality of care at first-level referral for sick children: a country-wide programme

P M Enarson. Child Lung Health, International Union Against Tuberculosis and Lung Disease, Paris, France.
Fax: (+33) 01 43 29 90 87. e-mail: penarson@iuatld.org

The intervention strategy of standard case management (SCM) for pneumonia has been shown to be efficacious. It works, and is relatively affordable. The problem is that in most low-income countries the health service delivery mechanism is unable to deliver this interventions to a sufficient number of children at a level of quality and coverage that would result in a significant impact. Although ARI programmes started implementation in the mid-nineteen eighties by December 1994, of the 42 countries targeted in Africa, none had achieved universal coverage. What was urgently required was a health service delivery model that could scale up SCM to cover a whole country while at the same time maintain quality of care.

The Union has developed such a model for health service delivery of SCM strategies for childhood lung diseases which was implemented in Malawi. The Malawi Child Lung Health Programme (CLHP) is of great importance as it demonstrates that by identifying the children at greatest risk of dying and introducing SCM of childhood pneumonia at district hospital level country wide, at reasonable cost, leads to significant saving in the lives of children. The CLHP is unique in that it takes existing child health strategies adapts and implements them countrywide in a resource poor country and ensures the success by training and supervising health care workers, making antibiotics available and ensuring their rational use while generating quality health service information which is used to improve the quality of service and programme.

PC-71140-11 Introduction of oxygen concentrators into district hospitals by the Child Lung Health Programme (CLHP) in Malawi

P M Enarson. Child Lung Health, International Union Against Tuberculosis and Lung Disease, Paris, France.
Fax: (+33) 01 43 29 90 87. e-mail: penarson@iuatld.org

In Malawi in 2000 oxygen was not readily available in most paediatric wards at district hospital level. Staff did not know indications for nor details of how to administer it to young children. The system for delivery of oxygen to the child, when available, was inadequate due to lack of supplies. Most hospital generators and back up cylinder oxygen was available to theatres only. Most hospitals there were only one or two functioning oxygen concentrators that were primarily assigned to the operating theatre and maternity

ward. Each of the central hospitals in the 3 regions had Biomedical Engineering Departments who serviced and repaired the concentrators throughout their region. District Hospitals reported that there was no regular maintenance of the existing concentrators. The objective of the CHLP was to implement a system of supplying oxygen via oxygen concentrators in all paediatric wards in district hospitals throughout the country of Malawi. To achieve this a package of information/tools for all levels of activity, i.e., management, clinical and technical, that covers all steps from procurement through training to installation and maintenance of oxygen concentrators was developed. **Conclusion:** That it is feasible to introduce an oxygen system country-wide using oxygen concentrators at district hospital level in low-income countries. That it is important to have the appropriate people trained and in place, along with all necessary equipment and supplies, prior to installation of concentrators. That it is essential to have regular maintenance and supervision of system/personnel.

PC-71187-11 Pathway to patients: pricing, purchasing, procurement, distribution, and the size of the global TB drug market

N Schwalbe, H Ignatius. Policy Department, TB Alliance, New York, New York, USA. Fax: (+1) 212 227 7541.
e-mail: nina.schwalbe@tballiance.org

This session will provide results from an analysis of the pricing, purchasing, procurement and distribution mechanisms for currently-used first- and second-line TB treatments, and an estimate of the value of the global first-line TB drug market. It will also address the implications of these market dynamics with respect to the introduction of new regimens.

Conducted in six high-burden countries (Brazil, China, India, Indonesia, the Philippines and South Africa) and four high-income countries (France, Japan, the UK and the US), the research methodology included both qualitative and quantitative components. Qualitative primary and secondary data were used to map the: 1) flow of TB drugs from supplier to patient; 2) selection process for suppliers; and 3) role of public and private payers for first- and second-line TB drugs. Based on country data and the IMS Health database, a quantitative analysis was performed to assess the global first-line market size.

The researchers estimate that the global market for first-line TB drugs totals approximately US\$ 320 M per year. This market is highly fragmented in terms of both purchasers and suppliers, and is divided across multiple individual agents, with a preference in high burden countries for procurement from domestic manufacturers. There is also a limited commercial market for second-line drugs, as access is restricted mainly to the private sector. Tapping the second line market

would require a significant expansion of public sector treatment programs.

Research findings show a wide range of procurement, distribution and drug-delivery systems and procedures in high burden countries. Preparing for rapid adoption and use of new regimens will require understanding these market dynamics, the perceived benefits of the new regimens, manufacturing and supply chain issues, operational changes for new therapies, donor policies, and price elasticity of demand and other issues that would justify a change in regimen.

PC-71273-11 Systematic cluster and resistance surveillance in a low prevalence country

C G M Erkens,¹ M Sebek,¹ M Mensen,² G M Berkel,³ A Kiers,⁴ D van Soolingen.⁵ ¹KNCV Tuberculosis Foundation, Den Haag, ²GGD Amsterdam, Amsterdam, ³GGD Hart voor Brabant, Tilburg, ⁴GGD Fryslân, Leeuwarden, ⁵RIVM, Bilthoven, Netherlands. Fax: (+31) 703584004.
e-mail: erkensc@kncvtbc.nl

Background: Country-wide fingerprinting of *M. tuberculosis* isolates is established in the Netherlands since 1993. It has proven to be of use in the study of transmission patterns on local and national level. In 2004 the routine use of DNA-fingerprinting was deemed as essential for TB-control efforts. To improve the routine use and analysis of DNA-fingerprint information on different levels in TB-control a sub commission (CORD) of the National Tuberculosis Policy Committee (CPT) was formed in 2006.

Aim: To enhance the implementation of cluster surveillance of *M. tuberculosis* complex isolates in order to detect TB-transmission and to guide TB-control efforts and interventions.

Design: A report-system for the feed-back of DNA-fingerprinting data on different levels:

Local level: The TB-district reports risk factors of index-case, epidemiological links with other cases in the cluster and yield of contact investigation in Netherlands TB-Register (NTR).

Regional level: Quarterly aggregate data on number of clusters epidemiology and antibiotic resistance of growing clusters in the last 12 months;

National level: Quarterly to CORD and CPT:

- aggregate data on number of clusters and epidemiology of growing clusters (≥ 3 persons per year) and of resistant isolates in the preceding 12 months;
- analysis of the yield of contact-investigation results (annually).

Results: Examples will be shown of output of cluster analysis for the regional and local district level.

Conclusion: Active feed-back on cluster- and resistance data of *M. tuberculosis* isolates is an important tool to detect transmission patterns, and helps to further target TB-control interventions in local populations with a higher level of exposure.

PC-71316-11 Establishing sustainability mechanism for the FIDELIS project activities

G X He,¹ D M Hu,¹ M Xu,¹ J P Cao,² L Y Zhang.² ¹National Centre for TB Control and Prevention, China CD, Beijing, ²Hebei CDC, Shijiazhuang, China. Fax: (+86) 1083135306.
e-mail: heguangxue@chinatb.org

Background: Hebei FIDELIS project phase II has been implemented in 88 counties with the population of 41.2 million.

Objective: Through implementing priority and cost-benefit TB health promotion (HP) activities after FIDELIS fund finished

- 1 To maintain high case detection and cure rate
- 2 To establish sustainability mechanism for the activities of FIDELIS project
- 3 To provide the scientific experience for the entire country

Methods: Based on experience of Hebei FIDELIS project phase II, the results of the survey on the sources of patients' TB information, demands of the general public and the average cost to get one patient of different HP activities, a pack of priority and cost-benefit TB HP activities are being conducted after FIDELIS fund finished and the fund from central, provincial, prefecture, county level.

Results: Wall painting (26.4%), television program (17.4%) and government notice (15.1%) were the three key TB information sources for the patients seeking health care services, and the cost-benefit HP activities were government notice, television program, wall painting. The case detection rate was 85% and cure rate was 93.6% in project areas, which convince government continue to fund the priority and cost-benefit TB HP activities including wall painting, television program and government notice after FIDELIS fund finished.

Conclusion: Through implementing FIDELIS project, we know how to implement and what kind of HP activities to greatly increase the case-detection and maintain high cure rate which recognized by government and continue to fund the HP activities, and the experience of FIDELIS project has also been extended to other provinces.

PC-71327-11 Problems of retreatment TB cases: reasons and probable solutions in West Benga, India

P K Mitra,¹ T Abraham.² ¹German Leprosy & TB Relief Association-India, Kolkata, West Bengal, ²German Leprosy & TB Relief Association-India, Chennai, Tamilnadu, India.
Fax: (+91) 03322164339.
e-mail: Mitra@glra-ales-india.org

Introduction: Retreatment cases which constitute nearly 28% of all case is a major problem in the state. Treatment outcome among retreatment cases is far from satisfactory when compared to new cases. The cure rate is 60%, defaulter rate is over 20%, death and failure rate are 14%.

Objective: To find out the major reasons for the non-compliance to treatment and plan for possible corrective interventions.

Methodology: 1200 re-treatment cases were interviewed by a team of TB experts, both in the urban and rural areas of 19 districts, in West Bengal using a special format. Informations collected were analysed and the reasons for non-compliance were identified. Plans for the possible corrective interventions were developed.

Results:

- 1 Major reasons for non-compliance were fixed timing of DOTS centers, non friendly client oriented approach of NTP staff, the high cost of treatment and improper counselling in private sectors.
- 2 Non-compliance is more among female patients.
- 3 Non-compliance is a problem not only in private sector but also in NTP.

Conclusion: A client oriented, flexible DOTS in NTP and involvement of private practitioners in NTP with proper counselling of patients, involvement or cured TB patients as counsellors and DOT providers can solve lot of problems of non-compliance and thereby preventing development of MDR cases in future.

PC-71343-11 Global market of second-line anti-tuberculosis medicines

M Zignol,¹ T Moore,² F Jouberton,¹ E Jaramillo.¹ ¹World Health Organization, Geneva, Switzerland; ²Management Sciences for Health, Cambridge, Massachusetts, USA.
Fax: (+41) 22 791 1589. e-mail: zignolm@who.int

Introduction: The global market of second-line drugs (SLD) for the treatment of multidrug-resistant TB (MDR-TB) is largely unknown. This study aims to investigate the availability and use of SLD, project the size of the global market and stimulate the increased production of quality-assured, lower priced drugs.

Methods: A questionnaire was sent to the National TB control Programmes (NTPs) to collect the following information: number of MDR-TB cases notified, type of medicines procured, regimens used, unit pack size procured, quantities ordered and price per unit pack.

Results: A total of 52 countries replied to the questionnaire with 2238 MDR-TB cases notified in 2004 and more than US\$ 8.2 million spent for SLD in the same year. Extrapolating this, if all estimated new MDR-TB cases in 2004 were treated, the global market would exceed US\$ 1.5 billion. Great variability of unit prices was documented with generally lower prices found for drugs purchased by the private health sector.

Discussion: The size of the global market of SLD should attract the interest of pharmaceutical companies to invest in increasing production capacity and meeting international quality standards. The average drug cost to treat MDR-TB varies among regions and is higher in Africa and lowest in South-east Asia and

Western Pacific regions. This could be explained by the different capacity of procurement departments to conduct efficient tenders and different availability of nearby manufacturers and suppliers.

PC-71662-11 Progress of Nepal DOTS Plus pilot project on completion of first year and key challenges faced by NTP and patients

P Malla,¹ S Jha,¹ M Khanal,¹ D Khadka,¹ K Jha,² B Shrestha,³ M Akhtar.⁴ ¹National Tuberculosis Centre, Kathmandu, ²South Asia Association for Regional Cooperation TB HIV Centre, Kathmandu, ³German Nepal Tuberculosis Project, Kathmandu, ⁴World Health Organization, Kathmandu, Nepal.
Fax: (+977) 15527756. e-mail: akhtarm@searo.who.int

Objective: To review the progress of the DOTS PLUS pilot project on completion of the first year and determine key challenges faced by NTP and patients.

Background: Nepal National Tuberculosis Control Programme started Green-Light Committee approved DOTS PLUS project in September 2005 using standardized treatment regimens. Project started in pilot sites (5 main & 16 sub centres) covering all administrative Regions of the country.

Methods: Standardized treatment (kanamycin, ethionamide, cycloserine, pyrazinamide, ofloxacin) is offered for category 2 failures and other culture demonstrated multiple drug resistance. Free daily treatment including prophylactic side effect drugs; ranitidine and pyridoxines are given by trained health workers. Monthly medical reviews include smear and culture testing, and blood monitoring for potassium and creatinine.

Results: 220 patients were registered during September 2005 to August 2006 period, of these 207 had positive sputum at recruitment while 195 had recent culture evidence of TB.

Sputum conversion:

3 months	56%	(124/220)
6 months	72%	(160/220)
9 months	65%	(110/170)
12 months	79%	(90/114).

During this period 13 patients died (6%), 16 patients defaulted (7.3%).

Key challenges observed during the first year of DOTS PLUS pilot project are lack of socio economic support for patients and how to decrease risks of transmission of MDR TB to health care workers.

Conclusion: Nepal DOTS-Plus programme is delivering standardized treatment with adequate initial sputum conversion rates. Provision of socio economic support to patients and decrease risks of transmission of MDR TB to health care workers are key challenges.

PC-71883-11 An innovative internet-based surveillance system: the TBweb

L A R Santos,¹ V M N Galesi,¹ M M B Leorati,² ¹ São Paulo State Health Secretary, São Paulo, SP, ² PRODESP Data Processing Sp State Company, São Paulo, SP, Brazil.
Fax: (+55) 1130822772. e-mail: lasantos@cve.saude.sp.gov.br

Almost 21 000 TB cases are notified every year in SP State, Brazil, and TB cases are treated at 645 cities and more than 1000 health services.

TB surveillance system was previously performed with an EPI-INFO-based software. To increase sensibility, TB cases are supposed to be notified when they are admitted at a new health service, even if the case was notified elsewhere. Timely data were very difficult to obtain, given patients' mobility through the State.

Surveillance network internet infrastructure of was considered sufficient, and so a more rapid and interactive on-line internet based TB surveillance system was developed.

The aim of TBweb system is not only to generate timely epidemiological situation data to all surveillance levels, but also to monitor each individual patient's treatment.

Notifying TB is now done on-line, at every possible level in health system. Old databank, that had 227 630 registries, was analysed and each TB case's history was re-built, including all possible treatment courses.

Patient's status is monitored at least monthly. Every way a patient is hospitalized, an automatic e-mail is generated, informing the surveillance team to take the necessary measures to opportune contact investigation. The same instrument (e-mail) is sent in case of hospital discharge or transference from one to other health center, informing the destiny service that the patient is coming, so that discontinuity can be avoided.

TBweb is now successfully established through all the State. Each health authority can, according to their responsibility area, obtain timely data about TB situation.

While continuous efforts are made to improve data quality and TBweb performance, next stage includes empowerment of TB local teams to use all these available data to increase TB program quality.

PC-71962-11 New interventions to reach more people through the FIDELIS project: BRAC experience

M Rifat, S Biswas, T K Gosh, M A Islam, J Ahmed, F Ahmed.
BRAC Health Programme, BRAC, Dhaka, Bangladesh.
Fax: (+880) 28823542. e-mail: rifat.m@brac.net

Introduction: BRAC started FIDELIS project in rural areas of 5 districts of Bangladesh in April 2004. After successful completion, in November 2005 the project period was extended to one year to total 73 subdistricts of 10 districts covering 27.6 million population.

Objectives: To increase case detection of new smear

positive TB patients from 58 to 65 per 100 000 and to ensure more than 90% cure rate.

Methods: Main activities under the projects were orientation of school students, cured TB patients and community leaders on TB symptoms and referral of TB suspects for examination. Messages on TB disseminated through popular theater and also cable television. Field level staff were trained. DOT is ensured mainly by trained community health volunteer (CHV).

Results: Till November, 2006, 21 718 new sputum positive patients were diagnosed. Among them, 89% were from limited access areas. Case detection increased from 58 to 79 against the project target of 65 per 100 000 population. Sputum conversion rate was 95%.

Conclusion: Effective interventions are required to reach more people. Results of the project reflect the effect of the activities. These activities could be helpful in scaling up to other districts. Furthermore effectiveness of specific activities could be explored.

POSTER DISPLAY SESSIONS**TB TREATMENT AND DRUG DEVELOPMENT****PS-71179-11 The evaluation of culture conversion during treatment for tuberculosis as a surrogate for treatment failure**

P P J Phillips,^{1,2} K Fielding.² ¹MRC Clinical Trials Unit, London, ²London School of Hygiene and Tropical Medicine, London, UK.
Fax: (+44) 2076704815. e-mail: ppp@ctu.mrc.ac.uk

As the number of clinical trials for new tuberculosis regimens being conducted is expected to increase over the next few years, there is a growing need for effective prognostic and surrogate markers for long term response to treatment. Phase III trials require large numbers of participants and can take up to five years to complete. A surrogate marker for treatment failure (defined as failure at end of treatment, and relapse or TB-related death following successful treatment), the established endpoint in such trials, could dramatically shorten trial duration and increase power. Culture conversion at two months has been shown to be the most promising marker, but little work has been done to evaluate this marker as a surrogate.

A surrogate marker is used in a clinical trial to substitute for the true endpoint. To be a valid surrogate, it should fully capture the treatment effect on the final endpoint.

In this paper, preliminary results from a meta-analysis of clinical trial data identifying prognostic and surrogate markers for failure will be presented. The data are from twelve seminal randomised con-

trolled trials conducted by the British Medical Research Council in the 1970–80s across East Africa and East Asia involving over 11 000 participants and 61 different treatment regimens.

Culture positivity at each of months 1–4 was strongly prognostic for failure ($P < 0.0001$ in each case). Adjusting for culture positivity does change the global odds ratio of failure of the experimental regimen compared with the control, moving it closer to 1 (see Table), but this treatment effect remains strongly associated with failure. These results indicate that culture conversion is a valuable prognostic marker, but only a partial surrogate requiring further investigation.

Treatment comparison	Failure of experimental versus control regimen	
	Odds ratio	95% CI
Unadjusted	0.744	0.64, 0.87
Adjusted for culture conversion		
At month 1	0.744	0.64, 0.87
At month 2	0.750	0.64, 0.88
At month 3	0.793	0.68, 0.93
At month 4	0.787	0.67, 0.92
At months 1–4	0.788	0.66, 0.93

CI = confidence interval.

PS-71332-11 The mutations are predominant in multidrug-resistance *Mycobacterium tuberculosis* strategy

A Almaz Aldashev,¹ K Jumab.^{1,2} ¹Institute of Molecular Biology and Medicine, Bishkek, Bishkek, Kyrgyzstan; ²National Centre of Phthisiology, Bishkek, Lesotho. Fax: (+312) 660387. e-mail: cardio@elcat.kg

Aim: To characterize the rpoB, katG, inhA and ahpC gene mutations in rifampicin (RIF) and isoniazid (INH) resistant *M. tuberculosis* strains isolated from tuberculosis patients in Kyrgyz Republic.

Materials and methods: A 328 samples were obtained from patients with tuberculosis, proved by clinical, X-ray and bacteriological studies. Mutations of rpoB, KatG, inhA and ahpC gene associated with rifampicin and isoniazid resistance were detected by biological micro-chip test.

Results: 183 of 328 samples (56%) were found to be wild type MBT strains, while 145 (44%) samples appeared to be mutations associated with RIF or INH resistance. The drug resistance only to RIF was 3% (10/328) and whereas to INH it was 15.2% (50/328). Multidrug resistance to RIF+INH was found in 25.9% (85/328) strains of all samples. 15 types of mutations were found in RIF-resistant strains. The most common point mutations in rpoB gene were in codon 531 (60%), 526 (19%), 516 (5.5%) and 511 (6.8%). The point mutation Ser531Leu was at the highest frequency (59%). Other point mutations in codons 533, 522, 513 and 512 were minors. The INH resistance was associated mostly with katG gene mutations—

91%, where as in inhA gene—7% and ahpC gene—2%. In katG gene five different mutations were detected: Ser315→Thr-94%, Ser315→Asn-3%, Ser315→Arg-1%, Ser315→Gly-1% and Ile335→Val-1%. In the inhA gene the only mutation was inhA T15. In the ahpC promoter region-AhpC₉ (1%) and AhpC₁₂ (1%) mutations were found.

Conclusion: The rifampicin and isoniazid resistance of *M. tuberculosis* strains isolated in Kyrgyzstan is associated mostly with Ser531Leu mutation of rpoB gene, and Ser315Thr mutation of katG gene.

PS-71561-11 The challenges of enrolling adolescents into studies involving invasive procedures

F Kafaar,¹ H Mahomed,¹ A J Hawkrigge,¹ W A Hanekom,¹ L Geiter,² G D Hussey.¹ ¹SA TB Vaccine Initiative, University of Cape Town, Cape Town, Western Cape, South Africa; ²Aeras Global Tuberculosis Vaccine Foundation, Rockville, Maryland, USA. Fax: (+27) 86 613 4778. e-mail: fazlin.kafaar@uct.ac.za

Background: A prospective epidemiological study of tuberculosis (TB) infection and TB disease is being conducted in adolescents in a high TB burden area just outside of Cape Town, South Africa.

Objectives: To describe the challenges faced in recruiting adolescents into a study involving invasive and potentially painful clinical procedures.

Methods: Up to 6500 adolescents aged 12–18 are being enrolled through eleven high schools into an epidemiological study. The study procedures include blood draws, tuberculin skin tests and sputum specimen collection.

Results: Enrolments have been completed at seven schools to date. The percentage of enrolled pupils in relation to the total number of pupils in a specific school varied from 30% to as high as 74%, with the average enrolment figure being 62% per school. The major challenges to date have been obtaining consent (from biological parents/legal guardians) and pupil assent. Poor or limited infrastructure at some schools, poor socio-economic conditions, occasional language barriers and logistical problems are contributing factors impacting on enrolment. Additional resources (staff and transport) to enable face to face meetings with individual parents, improved the proportion agreeing to participate in the study. Making the phlebotomy and skin test procedures as comfortable as possible for participants has also been implemented. Limited infrastructure improvements at certain schools have been put in place.

Conclusion: The main challenges for enrolling adolescents into clinical studies involving invasive procedures are obtaining parental consent and pupil assent, with the concomitant fear of needles and the uncomfortable experience whilst undergoing the tuberculin skin test, being the main contributing factors. However, selected interventions can be used to address these problem areas.

PS-71656-11 Early bactericidal activity and bioavailability of high dosage rifampicin in smear-positive pulmonary TB

A H Diacon,^{1,2} R F Patientia,³ H McIlleron,⁴ P Smith,⁴ A Venter,² S Maritz,⁵ P D van Helden,² P R Donald.⁶

¹Department of Internal Medicine, Cape Town, ²Department of Medical Biochemistry and MRC Centre for Molecular and Cellular Biology, University of Stellenbosch, Cape Town, ³Tierlei Trial Centre, Karl Bremer Hospital, Cape Town, ⁴Division of Clinical Pharmacology, University of Cape Town, Cape Town, ⁵Biostatistics Unit, Medical Research Council, Cape Town, ⁶Department of Paediatrics and Child Health, University of Stellenbosch, Cape Town, South Africa.

Fax: (+27) 21 933 3591. e-mail: ahd@sun.ac.za

Rationale: Rifampicin (RMP) is a potent antituberculosis drug with bactericidal as well as sterilizing properties. A dose size of 10 mg/kg body weight is the backbone of the currently recommended 6-month short course treatment regimen.

Methods: This study assessed the efficacy, tolerability and pharmacokinetics of twice the regular dose-size of daily oral RMP (20 mg/kg) given to 13 patients with uncomplicated smear-positive tuberculosis (61% male, 55 ± 16 kg body weight, age 27 ± 9 years). Counts of viable colony forming units (CFU) of *Mycobacterium tuberculosis* on agar plates were used to calculate the bactericidal activity defined as the decrease in \log_{10} cfu/ml sputum/day (\pm SD).

Results: The early bactericidal activity was 0.44 ± 0.24 over the first two days and 0.30 ± 0.11 over the first five days. A peak RMP level of 14 ± 4.8 μ g/ml was achieved 3.3 ± 2.3 hours after oral administration. The area under the curve was 153 ± 46 μ g/ml/h. No adverse effects were observed. Compared to historical controls, these results imply a linear increase in bactericidal activity up to twice the standard dose-size of RMP.

Conclusions: These findings encourage further studies to investigate whether high dosage RMP will increase not only the bactericidal activity but also the speed of sterilization by RMP, which will assist the reduction of the duration of antituberculosis treatment.

PS-71661-11 Re-infection vs reactivation as causes of tuberculosis recurrence in a high-burden country

G Anyo,¹ J Allen,² R Rustomjee,² C Reddy,² C Lienhardt,^{3,4} F Portaels.¹ ¹Mycobacteriology Unit, Institute of Tropical Medicine, Antwerpen, Belgium; ²Medical Research Council, Unit for Clinical and Biomedical TB Research, Durban, South Africa; ³Institut de Recherche pour le Développement, Paris, ⁴International Union Against Tuberculosis and Lung Disease, Paris, France. Fax: (+32) 32476333. e-mail: ganyo@itg.be

Introduction: The two main reasons for tuberculosis (TB) recurrence have been reported to be disease reactivation and re-infection, and researchers have observed that clinical cure or the successful completion of an appropriate antibiotic regimen may not be linked to mycobacterial sterilization in some patients.

Method: The aim of our study was to determine whether recurrent TB episodes occurring in patients involved in a fluoroquinolone-based clinical trial in South Africa were due to treatment failure, relapse or re-infection. We analyzed the fingerprints of paired isolates from the sputum samples of 23 patients by typing 12 *M. tuberculosis* loci containing variable numbers of tandem repeats of mycobacterial interspersed repetitive units (MIRU-VNTR).

Results: Of the 23 patients who presented a recurrent episode of TB post-treatment, 10 (43.5%) cases relapsed due to infection with a strain that was completely different from that identified at baseline, 2 (8.7%) were due to clones of the baseline strain and 11 (47.8%) due to the same strain as that of the baseline.

Conclusion: We confirm that 43.5% of the cases were actually due to a re-infection, while 47.8% were due to reactivation (true relapse). We suggest that genotyping is mandatory for patients' follow-up in clinical trials and for the management of TB patients in hospitals as well as for surveys tracking the spread of infection in a population.

PS-71712-11 Molecular characterisation of ethionamide resistance amongst MDR isolates of *Mycobacterium tuberculosis*

T N Muthivhi, M T Mphahlele, K Weyer. Tuberculosis Epidemiology and Intervention Research Unit, Medical Research Council, Pretoria, South Africa. Fax: (+27) 12 321 0861. e-mail: tshilidzi.muthivhi@mrc.ac.za

Objective: Ethionamide is a prodrug activated by the monooxygenase *ethA*. It has been previously shown that mutation on *ethA* may lead to ethionamide resistance. The purpose of this study is to investigate the occurrence of such mutations on *ethA* loci of ethionamide resistance amongst MDR *M. tuberculosis* isolates from South Africa.

Method: We determined the nucleotide sequence of a 342-bp fragment of the *ethA* on 14 clinical isolates of *M. tuberculosis* initially found to be resistant to rifampicin, isoniazid as well as to ethionamide (5 μ g/ml). Automated DNA sequencing was performed by Dichlorhodamine Big Dye Terminator Cycle Sequencing Kit.

Results: Thirteen of the 14 ethionamide resistant *M. tuberculosis* clinical isolates show no genetic alteration. However, one isolate (resistant to rifampicin, isoniazid, ethionamide, streptomycin) has a nucleotide T inserted at position 1171 of the *ethA*. The observed mutation was confirmed on both strands.

Conclusion: The data suggest that *ethA* mutations amongst the ethionamide resistant *M. tuberculosis* clinical isolates are uncommon or suggesting that mutations could have occurred outside the 342-bp region of *ethA* sequenced in this study. Diagnostic strategies using this fragment of *ethA* would fail to detect most ethionamide resistant isolates.

PS-71809-11 Research on the side effects of second-line drugs, Orel Oblast, Russia

B Y Kazenny,¹ T M Khorosheva,¹ E V Kiryanova,¹ V V Khoroshutina,¹ E S Nemtsova,¹ W Jakubowiak,² D D Pashkevich,² V V Testov,² N Y Afanasiev,³ S E Borisov,⁴ I A Vasilieva,⁵ P Cegielski.⁶ ¹Orel Oblast TB Service, Orel, ²WHO Office in the Russian Federation, Moscow, ³USAID, Moscow, ⁴Research Institute of Phthisiopulmonology, Sechenov Moscow Medical Academy, Moscow, ⁵Central TB Research Institute, Moscow, Russian Federation; ⁶Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+7) 495 7872149. e-mail: w.jakubowiak@who.org.ru

Objective: To evaluate side effects of second-line drugs during treatment of MDR-TB in Orel Oblast.

Materials: Data on 200 smear/culture positive TB patients with MDR-TB, registered from November 2002 to December 2005.

Methods: At baseline and every other month during the treatment, the following tests were performed:

- General blood and urine tests
- Bilirubin, transaminase, uric acid, glucose, BUN/creatinine, electrolytes (K⁺, Na⁺, Mg⁺⁺, Ca⁺⁺)
- Thyroid gland hormones
- Stool test for dysbacteriosis
- EEG, ECG, audiogram

Results: On 1 March 2007, of the 200 patients, 113 (56%) had treatment success, 28 (14%) were failure cases, 19 (10%) died, 26 (12%) defaulted from treatment, 6 (2%) transferred out, and 2 (1%) discontinued treatment due to side effects and concomitant conditions. Side effects were registered in 88% of cases. In 28.5% of the cases, side effects were treated without modification of the treatment regimen; in 53% of the cases, the dose of the suspected drug was decreased or temporally discontinued; in 6.5% of the cases, the suspected drug was discontinued.

Side effects were registered to: K (43.9%), Cap (50.5%), OfI (46.5%), Pr (45.5%), Cs (53.1%), Z (18.4%).

The majority of the side effects were registered during the first months of chemotherapy. The majority of the side effects were tolerable; their management did not demand modification of the anti-TB treatment.

PS-71856-11 Clinical research site assessment instrument

N Dianis,¹ K Robergeau-Hunt.² ¹Westat, Rockville, Maryland, USA; ²Westat, Rockville, Maryland, USA. Fax: (+1) 301 738 8379. e-mail: Nancydianis@westat.com

Background: The Tuberculosis Trials Consortium (TBTC) is a collaboration of North American and international clinical investigators whose mission is to conduct programmatically relevant research concerning the diagnosis, clinical management, and prevention of tuberculosis (TB) infection and disease. In this time of limited clinical research dollars, the TBTC recognizes the need to rapidly, but safely, move TBTC study research findings into practice. Critical to the

ability to move research findings into practice is the clinical research site's capacity to generate credible data from research studies that achieve improved treatment of patients with TB infection and disease.

Methods: The instrument was developed to include fundamental elements for assessing a site's ability to enroll, treat, and follow-up with research participants while generating quality data. Quality data conveys confidence and expedites the data analysis process.

Results: An instrument is presented that quantitatively and qualitatively measures a clinical research site's ability to conduct clinical research which will deliver reliable, credible data.

Conclusions: The instrument presented in this poster provides a systematic approach to determining a clinical research site's ability to safely and efficiently conduct clinical research. It is relevant for use with existing clinical research sites, and potential new sites.

PS-71896-11 Direct detection of isoniazid- and rifampicin-resistant *Mycobacterium tuberculosis* using the MGIT 960 system

F Mumbowa,¹ H Nabbanja,² J Akol,¹ M Joloba,³ A Etwom,¹ K Morgan,¹ K Eisenach,⁴ E Jones-Lopez,⁵ R D Mugerwa,⁶ R McNerney,⁷ J Ellner,⁵ S Kayes.⁸ ¹Mycobacteriology Laboratory, Joint Clinical Research Centre, Kampala, ²National Tuberculosis Treatment Center Mulago Hospital, Makerere University–University of Medicine and Dentistry of New Jersey Research Collaboration, Kampala, ³Department of Medical Microbiology, Makerere University Medical School, Kampala, Uganda; ⁴Departments of Pathology and Microbiology/Immunology, University of Arkansas for Medical Sciences and Central Arkansas Veterans Healthcare System, Little Rock, Arkansas; ⁵Department of Medicine, University of Medicine and Dentistry of New Jersey, Newark, New Jersey, USA; ⁶Department of Medicine, Makerere University Medical School, Kampala, Uganda; ⁷Department of Infectious and Tropical Diseases, London School of Hygiene & Tropical Medicine, London, UK; ⁸Tuberculosis Research Unit, Case Western Reserve University, Cleveland, Ohio, USA. Fax: (+256) 41342632. e-mail: francmumbowa@yahoo.co.uk

Aim: To evaluate the BACTEC MGIT 960 system (Becton-Dickinson, Sparks, MD) for its ability to detect isoniazid and rifampicin resistant isolates of *Mycobacterium tuberculosis* directly in smear-positive sputum specimens.

Design: Specimens from suspected MDR-TB cases were tested at the JCRC TB lab in Kampala, Uganda. Sputa were processed by the NALC-NaOH method, and sediments with positive AFB smears inoculated directly into 3 MGIT tubes containing Panta, and either isoniazid, rifampicin, or no drug. The control inoculum was decreased (1:2) to boost organism growth and the protocol extended to 21 days. Turn around times and concordance of results were compared with the indirect MGIT testing.

Results: Preliminary results showed a high correlation between the indirect and direct MGIT methods for both drugs. Contamination was not a major issue

as originally speculated. Turn around time for the direct assay ranged from 6 to 19 days (mean 11 days), while indirect susceptibility tests were generally available in 29 days.

Conclusions: The direct MGIT offers advantages over the indirect method, was easy to perform and is readily adaptable to labs with MGIT technology. Further operational research is planned to determine whether this direct assay can provide clinical and economic benefit as part of an improved patient management strategy for retreatment cases.

PS-71899-11 Direct nitrate reductase assay for detection of isoniazid- and rifampicin-resistant *Mycobacterium tuberculosis*

F Mumbowa,¹ B Asimwe,² E Hatanga,³ M Joloba,² I Ayakaka,⁴ K Morgan,¹ K Eisenach,⁵ E Jones-Lopez,⁶ A Okwera,⁷ R McNerney,⁸ P Smith,⁹ S Kayes.¹⁰

¹Mycobacteriology Laboratory, Joint Clinical Research Centre, Kampala, ²Department of Medical Microbiology, Makerere University Medical School, Kampala, ³Wandegeya Central Laboratory, Ministry of Health, Kampala, ⁴National Tuberculosis Treatment Center Mulago Hospital, Makerere University–University of Medicine and Dentistry of New Jersey Research Collaboration, Kampala, Uganda; ⁵Departments of Pathology and Microbiology/Immunology, University of Arkansas for Medical Sciences and Central Arkansas Veterans Healthcare System, Little Rock, Arkansas, ⁶Department of Medicine, University of Medicine and Dentistry of New Jersey, Newark, New Jersey, USA; ⁷National Tuberculosis Treatment Center Mulago Hospital, Uganda–Case Western Reserve University Collaboration, Kampala, Uganda; ⁸Department of Infectious and Tropical Diseases, London School of Hygiene & Tropical Medicine, London, ⁹Department of Epidemiology and Population Health, London School of Hygiene & Tropical Medicine, London, UK; ¹⁰Tuberculosis Research Unit, Case Western Reserve University, Cleveland, Ohio, USA.
Fax: (+256) 41342632. e-mail: francmumbowa@yahoo.co.uk

Aim: To investigate the nitrate reductase assay (NRA) as a direct, low-cost method for detecting isoniazid and rifampicin resistant isolates of *Mycobacterium tuberculosis*.

Design: The nitrate reductase assay is based on the ability of *Mycobacterium tuberculosis* to reduce nitrate to nitrite, with the presence of growth being detected by a color change in the medium using Griess reagent. For the NRA, standard Löwenstein-Jensen medium was prepared with potassium nitrate and isoniazid, rifampicin, or no drug. Sputum specimens from patients suspected of having MDR-TB were processed by the NALC-NaOH method. Aliquots from smear-positive sediments were inoculated directly onto 1 INH, 1 RIF, and 3 drug-free slants. Control slants were checked up to 3 times for nitrate production (days 10, 14, 18). Once growth was detected, the drug-containing slants were tested. Results were compared with the indirect test of corresponding isolates using the MGIT 960 system.

Results: High agreement between the direct NRA and MGIT has been observed with specimens tested

to date. Turnaround time for the direct assay averaged 14 days, while the mean for indirect MGIT susceptibility results was 29 days.

Conclusions: The direct nitrate reductase assay is a rapid, inexpensive, low-tech method, which can be readily adopted by National TB Program Laboratories and other labs routinely using Löwenstein-Jensen slants.

PS-71930-11 Interpreting good clinical practice for a community study

L Coetzee,¹ E Louw,¹ T Crawford,¹ G Barnes.² ¹AURUM Institute for Health Research, Centurion, South Africa; ²CREATE Johns Hopkins University, Baltimore, Maryland, USA.
Fax: (+27) 126431383. e-mail: lcoetzee@auruminstitute.org

Background: A study of community-wide isoniazid TB preventive therapy is being evaluated among South African gold miners that aims to rapidly and significantly reduce TB incidence (Thibela TB).

Purpose: To describe how Good Clinical and Epidemiological Practice (GCP) was interpreted in a community wide public health intervention. Key principles which will be discussed are:

- Informed Consent, both community and participant level
- Confidentiality, including access to records
- Document management, including essential documents and source data
- Vulnerable communities

Approach:

- Consent for this intervention was obtained from key stakeholders to ensure community participation as well as from individual participants to allow voluntary enrollment of individuals.
- Various strategies to ensure participant confidentiality, including limited system access and confidentiality agreements were implemented.
- Study document management posed a key challenge which has been addressed by implementing electronic data capturing as well as a central shared electronic investigator site file.

This study community is as per GCP definition a vulnerable community and particular caution was taken to ensure that participants are not at risk of coercion or breach of confidentiality.

Contribution: Key lessons learnt include the establishment and management of community advisory groups, which will be shared in this poster.

PS-72030-11 The effect of immunosuppressants on the tuberculin skin test

I Özdemir,¹ F Zuhur,¹ B Musellim,¹ S Erturan,¹ G Hatemi,² V Hamuryudan,² G Ongen.¹ ¹Istanbul University Cerrahpasa Medical Faculty Pulmonology Department, Istanbul, ²Istanbul University Cerrahpasa Medical Faculty Rheumatology Department, Istanbul, Turkey. Fax: (+212) 3152215. e-mail: imranozdemir@hotmail.com

Objective: There is limited data on the effect of immunosuppressives on tuberculin skin test (TST), except for steroids. This survey aims to evaluate the effect of immunosuppressive and immunomodulating drugs, in a group of patients with various inflammatory disorders.

Methods: A retrospective chart review of 399 patients with various inflammatory rheumatologic conditions and inflammatory bowel disease was performed with regard to demographic features, history of tuberculosis, radiologic evidence of past tuberculosis infection, coexisting diabetes mellitus and the drugs that were used. TST and the presence of BCG scars were evaluated. The effect of these candidate parameters on TST were determined using univariate and logistic regression analysis.

Results: Among the 399 patients who were surveyed, the mean age was 39 ± 15 years; 243 (61%) were women, and 316 (79%) were using at least one immunosuppressive drug. These drugs were methotrexate in 203 patients (51%), steroids in 212 (53%), salicylazosulphapyridine in 114 (29%), azathioprine in 25 (6%), hydroxychloroquine in 24 (6%), leflunomide in 23 (5.8%), colchicine in 14 (3.5%) and monthly pulses of cyclophosphamide in 1 patient. Nine patients (2.3%) had diabetes mellitus. Twelve patients reported a history of tuberculosis infection while 42 (10.5%) had apical scars on chest X-ray. At least one BCG scar was observed in 108 of the 126 patients who were examined for a BCG scar (86%). Overall, the mean TST diameter was 8 ± 8 mm (median 7 mm). The TST was measured as 0 mm in 158 patients (39.6%), 1–4 mm in 14 (3.5%) patients, and ≥ 5 mm in 227 patients (56.9%). Regression analysis showed an association between steroid use and a non-reactive TST ($P = 0.002$).

Conclusion: This survey supports the previous contention that steroid use suppresses the TST, while suggesting that other immunosuppressives do not, in a group of patients with various inflammatory conditions.

PS-72071-11 Eligibility criteria for IPT in a community-wide isoniazid prevention therapy study

F M Popane, G Churchyard, L Coetzee, K Mngadi. Aurum Institute for Health Research, Johannesburg, South Africa. Fax: (+27) 57 900 2398. e-mail: fpopane@auruminstitute.org

Background: A study of community-wide isoniazid TB preventive therapy is being evaluated among ~68 000

South African gold miners that aims to rapidly and significantly reduce TB incidence (Thibela TB). In order to minimize toxicity to IPT, it is necessary to screen individuals for contraindications to IPT.

Objective: To describe reasons for ineligibility for IPT in a community-wide IPT study.

Method: All individuals working or living at a participating mine shaft or hostel were eligible to participate. All consenting volunteers are screened for eligibility for IPT using; a questionnaire (including symptom screen for TB), weight, chest X-ray and urine pregnancy test for women of child bearing potential.

Results: Of 6060 miners screened, mean age was 39.5 years, males (98.6%), past history of TB (13.8%). 385 (6.4%) were permanently ineligible for IPT due to: being on TB treatment (1.08%), history of psychosis (0.20%), epilepsy (0.63%), contraindicated medication (0.94%), pregnancy (0.10%), possible hypersensitivity rash (0.03%), at risk alcohol intake (>28 units for men, >21 units women) (2.6%) and other (0.82%). 678 (11.4%) were temporarily ineligible due to being identified as a TB suspect (97.8% of those temporarily ineligible) or suspected hepatitis (0.11%).

Conclusions: Almost a fifth of individuals were ineligible for IPT at the time of screening, most commonly because TB was suspected on symptoms or chest X-ray.

PS-72129-11 Adherence to isoniazid TB preventive therapy (IPT) among people living with HIV (PLWH), Botswana, 2004–2006

B Chengeta,¹ B Chengeta,¹ B Ndebele,¹ M Malibala,¹ B Mosimaneotsile,¹ T Agizew,¹ Z Tedla,¹ S Nyirenda,¹ O Motsamai,² PH Kilmarx,³ C D Wells,⁴ T Samandari.^{1,3}

¹BOTUSA, Gaborone, ²National TB Program, Ministry of Health, Gaborone, Botswana; ³Division of HIV/AIDS Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia, ⁴Division of TB Elimination, CDC, Atlanta, Georgia, USA.

Fax: (+267) 3181697. e-mail: tts0@cdc.gov

Background: A six-month course of IPT is recommended for PLWH in TB-endemic countries. A clinical trial of a 6-month vs. continuous IPT was launched in Botswana in the context of the National IPT Program. The measurement of adherence is pivotal to the accurate assessment of IPT effectiveness in the trial. We measured adherence during 6 months of IPT in a cohort of enrolled PLWH.

Methods: Trial exclusion criteria, among others, included habitual treatment default. Enrollees received monthly bottles of 100 mg isoniazid tablets, 50 mg pyridoxine tablets and a travel reimbursement. Defaults were defined as not taking IPT for ≥ 4 weeks. Study nurses counted pills in returned bottles at months 1, 3 and 6 and administered an adherence questionnaire at 6 months.

Results: Among the 2013 enrollees, 1876 (93%) completed 6 months of therapy. Reasons for the 137

non-completions were 20% defaults, 13% adverse events, 12% voluntary withdrawals, 10% losses to follow-up, 9% ineligibles after enrolment, 8% deaths, and 27% other. In 1763 participants (94% of 1876) with pill counts at all three visits $\geq 80\%$ adherence was observed at all visits. Of 1574 responding participants, 15% expressed adherence difficulties; common concerns were discrimination should people discover their HIV status (8%), too many medications (4%), and forgetfulness (4%).

Conclusions: Adherence was excellent during the first 6 months of IPT among PLWH. Stigma about HIV infection remains an important concern to PLWH taking IPT.

PS-71104-11 Mutations in codons 526–531 of rpoB are associated with high-level resistance to rifampicine in MTB in Belarus

S Zakerbostanabad,¹ A Bahrmand,¹ L P Titov.² ¹Institute Pasteur of Iran, Tehran, Iran, Islamic Rep. Of; ²Belarusian Research Institute for Epidemiology and Microbiology, Minsk, Belarus, Minsk, Belarus. Fax: (+98) 21 66465132. e-mail: saeed1976@mail.ru

Background: Resistance to rifampicine in *M. tuberculosis* strains is usually caused by the point mutations in the rpoB gene encoding the β -subunit of the DNA-dependent RNA polymerase, which is a target of the drug describe multiple rpoB mutants for *M. tuberculosis*.

Aim of study: The prevalence of mutations at amino acid position 526 and 531 in rpoB gene of rifampicine-resistant *M. tuberculosis* isolated from Belarus.

Methods: Drug susceptibility was determined by using the absolute concentration (standard) method on slants by using the BACTEC system and 44 Rif-R strains were identified (standard methods + PCR) and their 411 bp fragments of rpoB gene were amplified, autosequenced.

Results: Sixteen different types of mutations were identified. Fourteen silent mutations were found in four *M. tuberculosis* isolates in codons 520 (CCG>CCC)-2, 521 (CTG>TTG), 508 (ACC>ACG)-2, 523 (GGG>GGA), (GGG>GGC)-4 and 510 (CAG>TAG)-4 contributing to 16.8% of all mutations. From 44 rifampicine resistance isolates 11 (29.5%) were from sputum of patients with primary infection which consist of different types of mutations, in 5 isolates 4 found to have single mutation in codon 531TCG→TTG and one in codon 510 CAG→GAG. The last one isolate found to have triple mutation in codons 520(silent) CCG→CCC, 507 GGC→AGC and 510 CAG→AAG. In 8 (72%) of patients with primary infection shows to have predominant mutations in codon 531 TCG→TTG and 5 (45.4%) in codon 510 and 33 (70.5%) were isolated from secondary cases, in patients with secondary infection 20 (60.6%) were found to have mutations in codon 526,

16 (48.4%) in codon 523 and 13(39.3%) in codon 510. Concluding that in Belarus the highest frequency of common mutation shearing in between primary and secondary infections found in this study is occurring in codon 510.

Conclusion: In patient of Belarus were found high-level resistance to rifampicine in the isolates that in codon 526 and 531(>100 $\mu\text{g/mL}$) were found mutation.

PS-71164-11 Non-tuberculous mycobacteria (NTM) isolated from a low HIV community with a high incidence of tuberculosis

N C Gey van Pittius, R M Warren, P D van Helden. Department of Biomedical Sciences, Stellenbosch University, Tygerberg, South Africa. Fax: (+27) 219389476. e-mail: ngvp@sun.ac.za

The genus *Mycobacterium* contains 119 species, of which *M. tuberculosis* is the most well-known. One-third of non-tuberculous mycobacterial species (NTM) have been associated with disease in humans, and are increasingly recognized to cause pulmonary and non-pulmonary infections. The aim of this study was to retrospectively determine the presence of and speciate the NTM present within a mycobacterial genomic DNA sample bank isolated over a period of 13 years from sputum samples obtained from patients resident in a low HIV community with a high incidence of tuberculosis. 16S rRNA PCR-sequencing and secondary typing using rpoB, secA1, and ITS was done to identify and speciate NTM. One hundred and thirty samples were suspected to contain NTM genomic DNA. Forty-five were found to predominantly contain *M. tuberculosis* DNA, with a detectable, but unidentifiable, underlying NTM. Sixty-five samples were identified to contain NTM DNA and were speciated. A wide range of different NTM species were identified in this setting. Of these, *M. terrae* (14), *M. peregrinum* (7), *M. fortuitum* (7) and *M. intracellulare* (6) were the most common species identified. No isolates of the *M. avium* complex or *M. kansasii* could be identified, but 5 previously-unknown species of mycobacteria were revealed. The absence of the *M. avium* complex and *M. kansasii* is of particular importance as these species have been shown to be the predominant NTM's isolated in other communities. The significance of these results is discussed in the context of HIV incidence and implications for diagnosis and treatment.

PS-71175-11 *Mycobacterium tuberculosis* glutamine synthetase modification and export

D Hayward,¹ K Kenyon,² P D van Helden,¹ I Wiid.¹ ¹Division of Molecular Biology and Human Genetics, Cape Town, ²CSIR Bio/Chemtek, Pretoria, South Africa. Fax: (+27) 219389476. e-mail: dh@sun.ac.za

It has been demonstrated that inhibition of secreted glutamine synthetase (GS) has a bactericidal effect on

M. tuberculosis cultures in vitro and in vivo. It is unknown how GS are secreted in *M. tuberculosis* (also *M. bovis* BCG). Two proteins (≈ 53 kDa and 56kDa) representing GS was purified from *M. bovis* BCG through ammonium sulphate precipitation. The 53kDa GS was found exclusively in the cytosol while the 56kDa GS was present in the cell wall and culture filtrate. *M. tuberculosis* GS was expressed as a histidine tagged fusion protein in *M. smegmatis* (which does not secrete GS to the culture filtrate). Recombinant *M. smegmatis* was cultured in Kirchners media and Kirchners substituted with 38mM (NH₄)₂SO₄. These *M. smegmatis* cultures were fractionated into sub-cellular fractions by ultra-centrifugation. Only the 56kDa *M. tuberculosis* GS was detected through western blotting with the highest concentration of GS being produced from a hypothetical-110 bp promoter region in both the NH₄ substituted and normal cultures. *M. tuberculosis* GS was most abundant in the *M. smegmatis* cell membrane and cell wall fractions, while interestingly, no GS could be detected in concentrated culture filtrate preparations. These results suggest that *M. tuberculosis* GS may be post-translationally modified by a mechanism not present in *M. smegmatis*. We hypothesise that in *M. tuberculosis*, GS could be exported over the cell membrane to the cell wall but not into the exogenous environment and that the presence of exogenous GS could be ascribed to mechanical damage of the *M. tuberculosis* cell wall. This may have implications for drugs being developed targeting exogenous GS.

PS-71223-11 Is it possible to cure TB in weeks instead of months?

E Nuermberger, I Rosenthal, M Zhang, J Grosset.
Department of Medicine, Johns Hopkins University,
Baltimore, Maryland, USA. Fax: (+1) 410 614 8170.
e-mail: enuermb@jhmi.edu

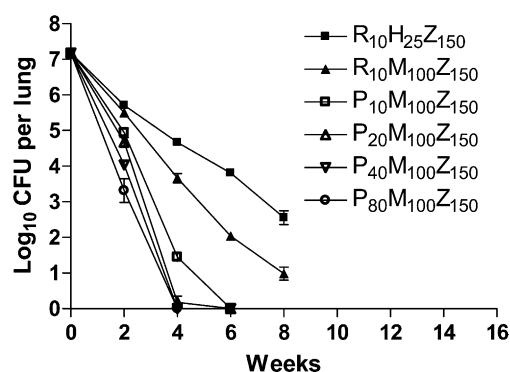
Background: New drugs with new mechanisms of action are being sought to shorten the duration of TB treatment. To determine, experimentally, if TB can be cured in ≤ 8 wk using existing drug classes, we assessed the dose-ranging sterilizing activity of rifapentine (P) in combination with moxifloxacin (M) and pyrazinamide (Z) (PMZ) in a validated mouse model.

Methods: Beginning 2 wk after aerosol infection, with $>7 \log_{10}$ CFU/lung, control mice received 8 wk of daily treatment with rifampin 10 mg/kg (R), isoniazid (H) and Z (regimen abbreviated as RHZ) or RMZ. Test mice received PMZ, with P given at 10, 20, 40 or 80 mg/kg, M at 100 or 400 mg/kg, and Z at 150 or 600 mg/kg. Serial lung CFU counts and relapse rates after 4 and 8 wk of treatment were determined.

Results: Replacing H with M, replacing R with P, and raising the P dose resulted in successively greater activity (Figure), but increasing M and Z doses did not. Mice receiving RHZ and RMZ remained culture-

positive at 8 wk, while PMZ-treated mice were culture-negative after 4 or 6 weeks. Remarkably, although all 15 mice treated with P at 10 or 20 mg/kg relapsed after 4 wk of treatment, treatment with P at 40 and 80mg/kg resulted in stable cure of 20% and 60% of mice, respectively. Relapse results after 8 wk of treatment are pending.

Conclusions: High doses of P have dramatic sterilizing activity when used in combination with M and Z in the mouse model, with no plateau in activity observed. At the highest P dose (80 mg/kg/d), the majority of mice were cured in just 4 wk. Although many of the P doses tested are not expected to be safe for human administration, these results prove that it is theoretically possible to cure experimental murine TB in ≤ 4 wk using existing drug classes. Efforts to develop more potent rifamycins or other RNA polymerase inhibitors and to study the tolerability of higher rifamycin doses in humans may lead to significantly much shorter TB treatment regimens.



PS-71291-11 Elucidating the role of M2 in the preclinical safety profile of TMC207

N Mesens,¹ J Verbeeck,² M C Rouan.² ¹J&J Pharmaceutical R&D, Beerse, ²Tibotec, Mechelen, Belgium.
Fax: (+32) 14 603999. e-mail: jverbeeck@tibbe.jnj.com

TMC207 is a diarylquinoline active against drug-sensitive and drug-resistant forms of *M. tuberculosis*. In preclinical species, plasma exposure to the N-desmethyl metabolite of TMC207 (M2) is as high or higher than the exposure to TMC207, whereas in man M2 plasma concentrations are lower. M2 also has a higher tissue/plasma (T/P) ratio than TMC207. Given the differences between human and animal M2 levels the relative toxicity of both molecular species must be discriminated. The preclinical safety profile of M2 is less relevant for the overall safety profile for TMC207 given the lower M2 levels in man.

To elucidate the role of M2 in the safety profile, the in vitro cytotoxicity and phospholipidogenic potential of TMC207 and M2 were compared in human monocytes. Both are cationic amphiphilic molecules with an amino group positively charged at physiological pH responsible for the induction of phospholipidosis. With the mono-demethylation at the amino

group, there is an increase in the pKa, so that M2 is a stronger base than TMC207 and may be a stronger phospholipidosis-inducer. This could both promote the tissue accumulation and explain the higher M2 T/P ratio.

The results showed that M2 was more cytotoxic in vitro than TMC207. M2 caused phospholipidosis at concentrations lower than TMC207 and is thus a stronger phospholipidosis inducer. This explains the higher T/P ratio for M2 and suggests that M2 is the main driver behind the preclinical safety profile.

PS-71358-11 The effect of CYP3A4 inhibition on the clinical pharmacokinetics (PK) of TMC207

R P G van Heeswijk,¹ R Lachaert,¹ L Leopold,² K de Beule,¹ D McNeeley,² R M W Hoetelmans.¹ ¹Tibotec, Mechelen, Belgium; ²Tibotec Inc., Yardley, Pennsylvania, USA. Fax: (+32) 15444291. e-mail: rvheesw1@tibbe.jnj.com

Objective: TMC207 is an ATP synthase inhibitor with activity against *M. tuberculosis*. CYP3A4 has been shown to be the major enzyme involved in its metabolism, resulting in the formation of a N-desmethyl metabolite (M2). In this study the effect CYP3A4 inhibition by ketoconazole on the PK of TMC207 and M2 was explored.

Methods: An open-label, 1-way, crossover trial in 16 healthy male subjects was conducted. First, subjects received ketoconazole 400 mg q.d. for 3 days. After a washout period of 14 days, subjects received TMC207 400 mg q.d. for 14 days with co-administration of ketoconazole 400 mg q.d. from day 12 to 14. PK of TMC207, M2 and ketoconazole were measured over 24 hours.

Results: Co-administration of ketoconazole and TMC207 increased the TMC207 AUC_{24h} and C_{min}, but not C_{max}. The ratio of the Least Squares means (LSmeans) and 90% confidence interval (90%CI) of the TMC207 C_{min}, C_{max}, and AUC_{24h} was 1.33 (1.24–1.43), 1.09 (0.98–1.21), and 1.22 (1.12–1.32), respectively. Exposure to M2 was not affected. TMC207 did not have a relevant effect on the C_{max} and AUC_{24h} of ketoconazole, but C_{min} was reduced by 45% (LSmeans ratio 0.55, 90% CI 0.44–0.70). AEs were grade 1 or 2 severity, except for one asymptomatic grade 3 lipase elevation which normalized after discontinuation of TMC207.

Conclusion: Short-term co-administration of ketoconazole increased exposure to TMC207. These results can likely be explained by inhibition of CYP3A4-mediated metabolism of TMC207 by ketoconazole.

PS-71601-11 Ultra-potent regimens with rifapentine and moxifloxacin yield stable cure by 3 months in a murine model of TB

I Rosenthal, M Zhang, K Williams, J Grosset, E Nuermberger. Department of Medicine, Johns Hopkins University, Baltimore, Maryland, USA. Fax: (+1) 410 614 8170. e-mail: enuermb@jhmi.edu

Background: A recent study in our murine model demonstrated that the combined substitution of rifapentine (P) for rifampin (R) and moxifloxacin (M) for isoniazid (H) results in 0% relapse after only 4 months of twice-weekly (2/7) treatment and that increased rifamycin exposure is associated with increased sterilizing activity. In this experiment we explored the treatment-shortening potential of PM-based regimens with increasing rifamycin exposures compared to the standard 6-month regimen.

Methods: Balb/c mice were aerosol-infected with ~4 log₁₀ CFU of *M. tuberculosis*. At treatment onset, 15 days later, the lung log CFU count was 7.64. Treatment regimens were R_{10mg/kg} H (positive control) 5 days/wk (5/7), P₁₅M or P₂₀M 2 days/wk (2/7), P₁₅M 3 days/wk (3/7), P_{7.5}M or P₁₀M (5/7), and P₁₀M daily (7/7). All regimens included pyrazinamide (Z) for the first 2 months. Quantitative lung CFU counts were assessed monthly. Relapse rates were assessed in selected groups after 2, 3, 4 and 6 mo. of treatment.

Results: Increasing the P dose and dosing frequency was associated with greater bactericidal activity. All mice receiving PMZ were culture-negative after 2 mo. of therapy, except 2 of 5 mice in the P₁₅MZ(2/7) group, while mice treated with RHZ had 3.17 and 1.25 log CFU in the lungs after 2 and 3 mo. of treatment, respectively, and were not culture-negative until after 4 mo. of treatment. Relapse rates are presented in the table.

Treatment	Relapse rate			
	After 2 mo. treatment	After 3 mo. treatment	After 4 mo. treatment	After 6 mo. treatment
R10HZ (5/7)	—	—	90% (18/20)	0% (0/20)
P15MZ (2/7)	—	10% (2/20)	0% (0/20)	—
P20MZ (2/7)	95% (19/20)	20% (4/20)	—	—
P15MZ (3/7)	95% (19/20)	0% (0/20)	—	—
P7.5MZ (5/7)	60% (12/20)	5% (1/20)	—	—
P10MZ (5/7)	35% (7/20)	0% (0/20)	—	—
P10MZ (7/7)	20% (4/20)	—	—	—

Conclusions: Thrice-weekly P₁₅M- and daily PM-containing regimens killed tubercle bacilli at least twice as fast as the RHZ regimen and achieved stable cure in just 3 mo. Stable cure required 4 mo. of treatment with twice-weekly P₁₅M-containing regimens and 6 mo. for RHZ. PMZ-based regimens have great potential for shortening the duration of TB therapy, even with intermittent administration.

PS-71689-11 Investigation of the efficacy of identified hit compounds against *Mycobacterium tuberculosis*

B F Sebesho,¹ M Jacobs,¹ K Chibale.² ¹Division of Immunology, UCT, Cape Town, ²Division of Chemistry, UCT, Cape Town, South Africa. Fax: (+27) 214066029. e-mail: sebeshob@uctgsh1.uct.ac.za

Tuberculosis remains an important public health problem worldwide. There has been increase in the development of drug resistance towards INH and RIF, two of the frontline antimycobacterial drugs currently used in therapeutic regimes. There is currently emphasis on the design and synthesis of new chemical libraries to develop new potential antituberculosis drugs. We therefore assessed 121 derivatives from the acetolactate synthase (ALS) inhibitors, cysteine protease inhibitors, thiosemicarbazones, and thiolactomycins classes of compounds for in vitro efficacy against *M. tuberculosis* using the resazurin microtitre plate assay after which active compounds were assessed for cytotoxicity in vitro against elicited peritoneal macrophages using the MTT assay. Of all the compounds tested, the most active with the least cytotoxicity were RKG162A and RKG1541 from ALS inhibitors and a cysteine protease inhibitor AXE29. RKG162A was less toxic than RKG1541. RKG162A and AXE29 were further investigated for their intracellular killing potential of *M. tuberculosis*. Intracellular killing was concentration dependent for both AXE29 and RKG162A. These findings suggest the compounds that had antitubercular properties as lead structures around which a combinatorial library could be constructed.

PS-71789-11 Detection of mutations causing resistance to rifampin and high or low-levels of isoniazid in *M. tuberculosis*

R Vijdea,¹ A Sosnovskaja,² V O Thomsen,¹ D Bang.¹ ¹International Reference Laboratory of Mycobacteriology, Copenhagen, Denmark; ²Tuberculosis and Infectious Diseases, National University Hospital, Vilnius, Lithuania. Fax: (+45) 32683871. e-mail: DVB@ssi.dk

Background: Molecular methods are available for the detection of multidrug-resistant tuberculosis (MDR-TB) with high-level isoniazid resistance when growth of *M. tuberculosis* has been isolated by analyzing the *rpoB* and *katG* genes. The new Genotype MTBDR Plus (Hain Lifescience) has been developed also to detect mutations in *inhA* causing low-level isoniazid resistance by combining a multiplex PCR with hybridization to specific membrane bound probes.

Aim: The aim of the study was to evaluate the application of a new DNA strip assay which includes rifampin resistance mutations and high- and low-level isoniazid resistance mutations directly in isolates and compare with traditional susceptibility testing.

Materials and methods: A total of 62 clinical Lithu-

anian *M. tuberculosis* isolates were investigated. BACTEC susceptibility testing was performed on the same isolates in Lithuania and Denmark. Twenty-eight Danish *M. tuberculosis* isolates with low-level isoniazid resistance were also tested.

Results: Interpretable Genotype results were found in 62 of 62 (100%) Lithuanian isolates. Interpretable Genotype results correlated in 56 of 62 (90%) isolates compared to those found in BACTEC performed in Lithuania and 39 of 40 (98%) until now performed in Denmark.

Conclusions: We conclude that the assay can effectively detect rifampin resistance including most high- and low-level isoniazid resistance in *M. tuberculosis* isolates. Application of the assay directly in clinical specimens has the potential to speed up the detection of MDR-TB.

PS-72134-11 Isoniazid-related hepatitis in people living with HIV (PLWH) during TB prophylactic therapy in Botswana

S Nyirenda,¹ T Agizew,¹ Z Tedla,¹ B Mosimaneotsile,¹ O Motsamai,² C D Wells,³ T Samandari.^{1,3} ¹BOTUSA, Gaborone, ²National TB Program, Ministry of Health, Gaborone, Botswana; ³Division of TB Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+267) 3181697. e-mail: tts0@cdc.gov

Background: IPT is recommended for PLWH in TB-endemic countries. Hepatitis is a well known adverse effect of isoniazid (INH). The incidence of INH-related hepatitis in PLWH is not well established in countries where persistent viral hepatitis B infection is common or in combination with anti-retroviral therapy (ART).

Methods: As part of an IPT clinical trial, PLWH were excluded if they had symptoms of TB, history of hepatitis or \geq grade 2 hepatic enzymes or bilirubin. Trial participants were queried about alcohol use and medications during 6 months of IPT. Those who developed \geq grade 2 hepatic enzymes (cases) and a sample of those who did not (controls) were tested for hepatitis B and C infection.

Results: During the 6 months of IPT, among 2013 participants, 11% reported alcohol use and 18% initiated ART. The overall incidence of \geq grade 2 hepatitis was 1.9%. Among 26 persons with grade 3–5 hepatitis, who were mostly asymptomatic, 25 were attributed to INH. One death was attributed to INH. In 129 enrollees tested, 56%, 9% and 3% had evidence of prior hepatitis B infection, persistent hepatitis B and hepatitis C, respectively. Four cases of INH-hepatitis had either persistent hepatitis B or C infection. INH-related \geq grade 2 hepatitis was not associated with age, alcohol use, ART use or persistent viral hepatitis.

Conclusions: There was no increased risk of hepatitis morbidity and mortality in this population of PLWH

compared to published studies of persons treated prophylactically with INH.

DRUG RESISTANCE: I

PS-71379-11 L'efficacité du cétylpyridium chloride (CPC) dans l'isolement des souches des mycobactéries destinées au DST

J P S Simelo Kahodi,¹ A Bamoleke Sefu,² A Ndongosieme,¹ D Kandolo Kakongo,³ ¹PNT-RDC, Kinshasa, ²CRENK, Kinshasa, ³ISTM/KIN, Kinshasa, Congo (Democratic Rep.). Fax: (+243) 998666698. e-mail: simelokahodi@yahoo.fr

En prévision d'une enquête de résistance dans les provinces, le PNT-RDC a réalisé une étude pouvant contourner les difficultés liées au délai de conservation de crachat et choisir la méthode de décontamination efficace pour l'isolement des mycobactéries.

Objectif : Tester l'efficacité du CPC 1% dans la conservation et la décontamination des échantillons en comparaison aux Pétrof (Pétrof) et à lauryl sulfate (lauryl).

Méthodologie : 51 crachats dont les frottis positifs au Ziehl Nelsen étaient mélangés au CPC 1%, repartis chacun en six aliquotes (306 échantillons). Quatre aliquotes de chaque crachat (204 échantillons) furent décontaminés au huitième jour et au quinzième jour respectivement au Pétrof, à Lauryl et deux autres de chaque (102 échantillons) lavés à l'eau distillée stérile au 8ème et au 15ème jour. Inoculés sur L-J, la lecture était faite chaque jour pendant 56 jours d'incubation à 37°C.

Résultats : En 56 jours, le lavage à l'eau distillée stérile (CPC) a donné : 48 cultures positives au 8ème jour et 43 au 15ème contre 44 et 46 pour le Lauryl, 31 et 28 pour le Pétrof. 2 cultures négatives au 8ème jour et 5 au 15ème jour contre 2 et 2 pour le Lauryl, 19 et 22 pour le Pétrof.

Conclusion : Le CPC conserve bien le crachat pendant quinze jours et décontamine aussi bien que le Lauryl.

PS-71406-11 Risk factors for default among MDR-TB patients in Tomsk Oblast, Russia

I Y Gelmanova,¹ S S Shin,^{2,3,4} A K Strelis,⁵ T P Tonkel,¹ E G Andreev,⁶ S Mishustin,⁶ A Pasechnikov,¹ A Yedilbayev,¹ V T Golubchikova,⁷ L F Kashtanova,^{4,7} E Nardell,^{2,3,4} S Keshavjee.^{2,3} ¹Partners in Health, Russia, Moscow, Russian Federation; ²Brigham and Women's Hospital, Boston, Massachusetts; ³Partners in Health, Boston, Massachusetts; ⁴Harvard Medical School, Boston, Massachusetts, USA; ⁵Siberia State University, Tomsk Oblast, ⁶Tomsk Penitentiary Services, Ministry of Justice, Tomsk Oblast, ⁷Tomsk Oblast Tuberculosis Services, Tomsk Oblast, Russian Federation. Fax: (+1) 617 432 6958. e-mail: skeshavjee@partners.org

Background: Tomsk began to treat MDR-TB in 2000. With program expansion, an increase in the rate of default has been observed.

Methods: Retrospective cohort study evaluating major risk factors for default among 636 MDR-TB patients in the civilian and prison sectors.

Results: In the penitentiary sector, 12% of patients defaulted. Associated risk factors were: release from prison while on treatment (RR = 1.38; $P < 0.001$) and later enrollment ($P = 0.02$). In the civilian sector, the default rate was 24%. Urban patients had a higher risk of default (RR = 1.15; $P = 0.009$) with the major risk factors being substance abuse (RR = 1.58; $P < 0.001$), absence of home ownership (RR = 1.96; $P = 0.002$), history of previous default (RR = 1.99; $P < 0.001$), previous incarceration (RR = 1.34; $P = 0.001$), and later year of enrollment (RR = 1.29; $P = 0.002$). In rural settings previous incarceration (RR = 1.18; $P = 0.02$), absence of home ownership (RR = 1.39; $P = 0.02$), and a later year of enrollment (RR = 1.19; $P = 0.016$) were statistically significant.

Conclusion: Urban residence, substance abuse, absence of home ownership and being enrolled during the latter part of program scale-up were associated with significant increase in default rate. Risk factors associated with default varied among rural, urban, and prison groups.

PS-71468-11 Efficacy and safety of linezolid in patients with multidrug-resistant TB (MDR-TB): a report of ten cases

G De Iaco,¹ S De Lorenzo,¹ P Viggiani,¹ R Fanelli,¹ A Sarassi,¹ P Troupioti,² B Arighi,¹ G Besozzi.¹ ¹Department of Pneumology, Morelli Hospital, Sondalo, Sondrio, ²Department of Microbiology, Morelli Hospital, Sondalo, Sondrio, Italy. Fax: (+39) 0342808498. e-mail: giusideiaco@gmail.com

Introduction: Multidrug resistant tuberculosis is an increasing problem in many parts of the world. Extensively drug resistant strains (XDR-TB) has been recently reported also in Italy. New therapies for MDR-TB have not been introduced since the fluoroquinolones in the 1970s. Few reports have shown good activity of linezolid against *Mycobacterium tuberculosis*, including MDR strains. However clinical experience with this oxazolidinone in tuberculosis is scarce. We report preliminary results of ten patients with MDR TB treated with combination regimens including linezolid.

Objective: We evaluated efficacy and safety of linezolid in combination with other anti-TB drugs in HIV negative adults patients with intractable or extensive MDR-TB.

Methods: Eight patients with confirmed MDR TB and two with XDR-TB were enrolled if unresponsive to at least three cycles of treatments and/or had less than 4 active drugs. They were treated with linezolid

(600mg twice a day) and at least three companion drugs with median follow up of 8.5 months. Sputum culture, blood chemistry and clinical examination were undertaken on a regular basis.

Results: Sex ratio was 1/1 and median age was 39 years (23–63). Majority of patients came from East Europe (60%). As a March 2007 culture became negative in six of ten patients in average of 90 days. For two patients only microscopic conversion was documented. Positive microbiological outcome was also obtained in XDR-TB cases. Median duration of treatment with linezolid was 60 days (30–360). After median period of 42 days three of 10 patients experienced serious adverse events which led to withdrawal of linezolid. Two patients developed bone marrow suppression and one peripheral neuropathy.

Conclusion: In our experience linezolid seems an interesting alternative drug in the management of selected cases of MDR-TB. Its long term utilization was associated with toxicity mainly anaemia and peripheral neuropathy, fully reversed after drug cessation.

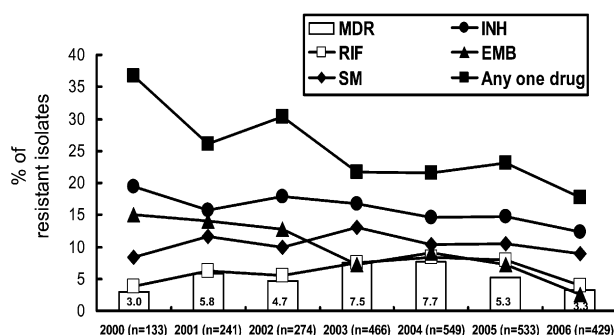
PS-71558-11 Trend of antimicrobial resistance in *Mycobacterium tuberculosis* at a university hospital in Taiwan

P R Hsueh, J Y Wang, L N Lee, S L Hsu, P C Yang, K T Luh. Laboratory Medicine and Internal Medicine, Taipei, Taiwan, Taipei, China. Fax: (+886) 223224263. e-mail: hsporen@ntu.edu.tw

Aim: To determine the annual trend of antimicrobial resistance in *Mycobacterium tuberculosis* at a university hospital, a 2000-bed hospital in northern Taiwan.

Design and Methods: Resistance data of clinical and non-duplicate isolates of *M. tuberculosis* from 2000 to 2006 were obtained from the Mycobacteriology Laboratory of the hospital. Susceptibility testing to four first-line antituberculous agents was performed using the modified proportional method.

Results: Susceptibility results in the 6-year period are shown in Figure.



Conclusions: This study demonstrated that the resistance rates to the four agents or the rates of multi-drug-resistant *M. tuberculosis* (MDR-TB) did not in-

crease with year. The highest rate of MDR-TB occurred in 2004 (7.7%).

PS-71567-11 Monitoring of *Mycobacterium tuberculosis* multidrug resistance in some regions of the Russian Federation

V Erokhin, V Golyshevskaya, E Sevastyanova. Central TB Research Institute, Moscow, Russian Federation. Fax: (+7) 495 963 80 00. e-mail: elinasev@yandex.ru

Aim: To carry out monitoring of *M. tuberculosis* multidrug resistance in some regions of the Russian Federation.

Methods: The pilot regions of the Central Federal District of Russia were selected for the present study. These regions were implementing the DOTS and DOTS+ programmes and performed high quality laboratory diagnosis, ensuring reliable study results. Multidrug resistance of mycobacteria isolated from new and retreatment cases of pulmonary TB was determined using method of absolute concentrations on Löwenstein-Jensen medium. The data obtained from the regions were compared to the Russian average rates.

Results: In Russia the proportion of multidrug resistance among new TB cases grew from 7.8% in 2002 to 9.5% in 2005. In the pilot regions during the reporting period this rate changed as follows: in Vladimir region—increased from 2.1% to 7.1%; in Orel region—increased from 2.7% to 6.7%; in Ivanovo region—decreased from 6.2% to 3.3%. Among previously treated TB cases the proportion of multidrug resistance increased, both in Russia—from 14.5% in 2002 to 18.7% in 2005, and in the pilot regions: in Vladimir region—from 11.1% to 25.8%; in Orel region—from 10.4% to 19.2%; in Ivanovo region—from 14.7% to 44.7%.

Conclusion: In the pilot regions the proportion of multidrug resistance among new TB cases was lower than in Russia. From 2002 through 2005 gradual proliferation of multidrug resistance was observed among new and retreatment cases of pulmonary TB, both in the pilot regions and countrywide.

PS-71578-11 Drug-resistant tuberculosis in geriatric patients: report of 45 cases in DOTS-Plus treatment in Lima, Peru

E Sánchez,¹ J Vilcra,¹ H Anger,² J Bayona.^{2,3,4} ¹Hospital Sergio Bernales, Carabayllo, Lima, ²Socios En Salud Sucursal Perú, Lima, Peru; ³Partners in Health, Boston, Massachusetts, ⁴Department of Social Medicine, Harvard Medical School, Boston, Massachusetts, USA. Fax: (+51) 15472121. e-mail: hanger_ses@pih.org

Objectives: To describe demographic and clinical characteristics, to determine treatment outcomes, and to identify risk factors for poor outcomes among geriatric DOTS-Plus patients with drug-resistant tuberculosis.

Methods: We retrospectively analyzed 45 DOTS-Plus patients aged 58–80 years who underwent treatment for pulmonary drug-resistant TB between 1997 and 2005 at Hospital Sergio Bernales in Lima, Peru. Bivariate analysis was performed to calculate risk ratios and 95% confidence intervals for demographic and clinical variables predicting the outcomes of death or treatment abandonment.

Results: Patients were resistant to a mean of four medications (range: 1–8), including three (0–5) first-line drugs and one (0–3) second-line drug. Resistance to isoniazid and rifampin was recorded in 30 (67%) patients. 28 (62%) patients were cured, 11 (24%) abandoned treatment, 4 (13%) died, and none failed treatment. Smear-negative and culture-negative status was achieved by the sixth month of treatment for 37 (82%) and 35 (78%) patients, respectively. Three or more previous TB treatments were associated with an outcome of death (RR = 6.0, 95%CI: 1.3–26.8), but not with treatment abandonment (RR = 0.80, 95%CI: 0.2–3.2). Gender, age above 70 years, resistance to five or more drugs, positive baseline smear and positive baseline culture did not predict death or treatment abandonment.

Conclusions: Geriatric patients with pulmonary drug-resistant TB can be treated and cured with a tailored regimen in a DOTS-Plus program. Special attention should be given to geriatric patients with three or more previous TB treatments. Drug susceptibility tests remain indispensable for effective treatment of drug-resistant TB.

Risk factor	Death in DOTS-Plus treatment, risk ratio (95%CI)
Male gender, <i>n</i> = 20	1.4 (0.3–6.6)
Age greater than 70 years, <i>n</i> = 8	1.6 (0.4–7.3)
Resistance to five or more drugs, <i>n</i> = 9	0.5 (0.1–3.8)
Three or more treatments previous to DOTS-Plus treatment, <i>n</i> = 8	6.0 (1.3–26.8)
Positive baseline smear, <i>n</i> = 31	0.7 (0.1–8.2)
Positive baseline culture, <i>n</i> = 30	0.7 (0.1–4.3)

PS-71660-11 Extensively drug-resistant *Mycobacterium tuberculosis* in Taiwan

M-C Yu,¹ M-H Wu,² W-D Yang,³ S-T Chien,⁴ C-L Kuo,⁵ R Jou.² ¹Ref Lab of Mycobacteriology Centers for Disease Control, Taipei, ²Taipei Medical University-Wan Fang Hospital, Taipei, ³Taichung Hospital, Taichung, Taipei, ⁴Chest Hospital, Tainan, ⁵Taipei Union Hospital, Taipei, China.
Fax: (+886) 26531387. e-mail: rwj@cdc.gov.tw

Global surveillance of drug resistance tuberculosis (TB) revealed that there was an emerging concern of TB patients infected with multiple-drug resistant (MDR) and extensively drug-resistant (XDR) *Mycobacterium tuberculosis* isolates. In 2003, the newly diagnosed TB patients were 15 042, and the combined MDR-TB

resistance rate was 4.0% by national laboratory surveillance system. The XDR-TB was originally defined as MDR isolates, resistant to both isoniazid and rifampin, with further resistant to at least 3 of the 6 main classes of second-line drugs (SLDs), including aminoglycosides, polypeptides, fluoroquinolones, thioamides, cycloserine, and para-aminosalicylic acid. Since no universal panel for drug susceptibility testing (DST) was recommended in Taiwan, we were only able to use this definition to understand the extent of XDR-TB. Currently, there were 3 clinical mycobacteriology laboratories performed drug susceptibility tests (DST) of SLDs using agar proportion method by clinicians' request. During 2004 and 2005, testing of susceptibility to SLDs was performed for 185 and 194 MDR isolates, and results showed 9.7% and 8.2% XDR-TB, respectively. In addition, of 166 MDR isolates tested in one laboratory, 41.6% were fluoroquinolone resistant that was much higher than the XDR-TB rate (14.5%) obtained in the same one. Therefore, restricted use of fluoroquinolones was suggested for adequate MDR-TB treatment. The emergence of XDR TB cases in Taiwan highlights the need to reinforce the diagnosis and treatment strategies of the National TB Program. Consequently, surveillance activity and programmatic management of XDR-TB will be implemented in 2007.

PS-71694-11 Current situation of tuberculosis drug resistance in Nepal: results of 4th tuberculosis drug resistance survey

P Malla,¹ M Khanal,¹ S Jha,¹ D Khadka,¹ B Shrestha,² M Akhtar.³ ¹National Tuberculosis Centre, Kathmandu, ²German Nepal Tuberculosis Project, Kathmandu, ³World Health Organization, Kathmandu, Nepal. Fax: (+977) 15527756. e-mail: akhtarm@searo.who.int

Objective: To determine prevalence of anti-TB drug resistance in a representative sample of patients with sputum positive tuberculosis (TB) in Nepal.

Introduction: Nepal NTP has conducted three drug resistance surveillances in the past (last one in 2000/2001) as part of the Global IUATLD WHO anti-TB drug surveillance programme.

Methods: 1082 sputum samples from sputum smear positive TB patients at the start of their first treatment or re-treatment from 33 random clusters (32 samples/cluster) were collected. Culture and drug sensitivity testing were done at GENTUP lab in Kathmandu. Histories from patients and medical records established prior treatment status. Data entry and analysis is done using EPI-INFO software.

Results: 1082 sputum samples were collected from 33 randomly selected clusters (32 samples/cluster). Currently DST results are available for 574 patients. The preliminary analysis shows initial resistance of 8.61% for any drug. Multi-drug resistance is 2.9% in new cases and 13.2% in previously treated cases. High-

est resistance among new cases was to streptomycin (5.5%) while among re-treatment patients it was greatest to isoniazid, (4.1%). Final and complete results of this survey will be available by end April 2007.

Conclusion: The 4th Multi Drug Resistant Tuberculosis survey was completed in Nepal in 2006, final results will be available by April 2007. The preliminary analysis shows an initial resistance of 8.61% for any drug. Multi-drug resistance is 2.9% in new cases and 13.2% in previously treated.

PS-71706-11 High prevalence rate of extensively drug-resistant tuberculosis in India

S Singh, G Krishnamoorthy, M Mani Sankar, S Kumar.
Division of Clinical Microbiology, All India Institute, New Delhi, India. Fax: (+91) 2658 8663. e-mail: sarman_singh@yahoo.com

We carried out a prospective study between March 2006 and November 2006 to detect the prevalence of extensively drug resistant (XDR) strains of *Mycobacterium tuberculosis* in Indian AIDS patients. The clinical samples were subjected to culture isolation of the mycobacterial species in BACTEC MGIT-960 (BD®, USA) followed by first line anti-mycobacterial drug susceptibility (4 drugs). The *M. tuberculosis* strains having multidrug resistance were further subjected to second line drug susceptibility testing using the same BACTEC MGIT-960 system. The results showed that of the 47 patients suspected to have HIV-TB co-infection from 23 (48.9%) patients *M. tuberculosis* was isolated. Of 23 MDR strains 11 (47.8%) were found multidrug-resistant. The second line drug susceptibility results showed alarmingly high rate of XDR-TB as per the definition of CDC and WHO. Out of 11 MDR isolates 4 (36.3%) isolates also had extensive drug-resistance to 3 classes of second line drugs. Of the four patients (all adults) with XDR tuberculosis, one was female and three males. All the four patients died within 3 months of diagnosis of tuberculosis in spite of treatment. These findings suggest an alarming prevalence of XDR-TB from India.

PS-71714-11 Drug resistance profile of *M. tuberculosis* strains isolated in central Russia

I Shemyakin, A Nizova, N Maiskaya, A Bogun, A Maiorova, V Stepanshina. Molecular Biology Lab, State Research Center, Obolensk, Moscow region, Russian Federation.
Fax: (+7) 4967 360010. e-mail: shemyakin@obolensk.org

Aim: To determine drug resistance profile of *M. tuberculosis* strains isolated in Central Russia.

Design: Study was done on 300 *M. tuberculosis* strains isolated from sputum of TB patients from clinical hospital in city Tula, Central Russia, starting from June 2001 till June 2002.

Methods: The strains of *M. tuberculosis* were cultured on LJ medium to assess their resistance to ri-

fampin, isoniazid, ethambutol, kanamycin, ofloxacin, streptomycin and analyzed by method PCR-sequence.

Results: Less part of strains (36.3%; $n = 109$) are sensitive to all drug tested. MDR strains are reached up to 45.7% of cases ($n = 137$). Resistance to one drug is shown in 10% ($n = 30$), to two drugs in 9.3% ($n = 28$), to three drugs in 11% ($n = 33$), to four drugs in 15% ($n = 45$). A lot of clinical strains are already resistant to five drugs (18.3%; $n = 55$). Streptomycin sensitive strains are revealed in 51.7% cases ($n = 155$), isoniazid sensitive in 44% ($n = 132$), rifampin sensitive in 52% ($n = 156$), kanamycin sensitive in 68.3% ($n = 205$), ethambutol sensitive in 72% ($n = 216$) and ofloxacin sensitive in 99.3% ($n = 298$).

A→C mutation in 513 position of gene 16SrRNA is detected in 62.8% streptomycin resistant isolates. 98.8% of isoniazid resistant strains are carry out mutations in gene katG. Mutation GAC→GTC in 516 codon of rpoB is predominant among rifampin resistant isolates. Most of kanamycin resistant strains (96.8%) have got A→G change in 1400 position of 16S rRNA gene. ATG→ATA mutation in 306 codon of embB gene is found in 72.6% of ethambutol resistant strains.

Conclusion: There are no XDR strains detected among different drug resistant isolates collected during 2001–2002 in Central Russia due to absence of fluoroquinolones in TB treatment regiment at this period of time.

This study was supported by ISTC and the BTEP of the U.S. DHHS under grant ISTC2628/BTEP63.

PS-71742-11 TB resistance in a single health-care sector: Pathcare

F Patel. Dept Microbiology, Pathcare Reference Laboratory, Goodwood, South Africa. Fax: (+27) 215963617.
e-mail: fadheela.patel@pathcare.co.za

Aim: Analyzing the incidence of single and multidrug infection resistance in the private sector, using Pathcare Laboratory's database, may provide useful information for infection distribution in SA with effective stratification and health care management.

Design and Methods: Data was collected from Pathcare Lab for the period 1 January 2006 to 31 December 2006. The study population included patients referred to the private sector, Pathcare Laboratories. Specimens which flagged positive on the Mgit 960 machine were tested for sterility on a blood agar plate, a Ziehl Neelsen was performed, followed by the sensitivity using Becton Dickinson Mgit 960. Specimens were tested against ethambutol, rifampicin, isoniazid (0.1 ug/ml), and streptomycin (SIRE).

Results: 11 013 specimens were cultured for TB from 1 January to 31 December 2006 at Pathcare. 435 cases were resistant to a single or multiple drugs and 127 cases were resistant to all four drugs (SIRE). From this 435 cases, 55% showed resistance to streptomycin,

83% to isoniazid, 52% to rifampicin and 36% to ethambutol.

Discussion and Conclusion: The incidence of multiple drug resistance to all tested antibiotics which include most of the first line drug medication is significant and of concern in SA. Area distribution shows that the majority of the drug resistance occurred in Welkom (63%).

PS-71760-11 Mortality among patients with multidrug-resistant tuberculosis (MDR-TB) in South Africa

M L van der Walt,¹ J L Lancaster,¹ K Weyer,¹ P Becker.² ¹TB Epidemiology and Intervention Research Unit, Pretoria, Gauteng Province, ²Biostatistics Research Unit, South African Medical Research Council, Pretoria, Gauteng Province, South Africa. Fax: (+27) 123255970. e-mail: joey.lancaster@mrc.ac.za

Background: Following the implementation of a standardized programmatic approach to multidrug-resistant tuberculosis (MDR-TB) in South Africa since 2000, reported mortality rates among patients have remained high at around 17%.

Aim: The aim of this study was to investigate factors associated with mortality.

Methodology: A retrospective cohort analysis of 2070 cases enrolled on standardized MDR-TB treatment in the nine provinces of South Africa between 2000 and 2004 was conducted.

Results: 93% of MDR-TB patients had been treated previously with first-line anti-TB drugs. 61% were male and the mean age was 36.9. HIV data was available for 69% of patients. Of these, 59% were HIV positive. Considerable variation in mortality was observed between the different provinces pulmonary TB was the reported cause of death in 74% cases, while HIV-related conditions were reported as the cause of death in 26% of MDR-TB cases. Patients with HIV co-infection were three times more likely to die when compared to those without HIV (UOR 2.9; 95%CI 2.2–3.9; $P < 0.001$). Culture positivity at time of MDR-TB treatment initiation (68.9%) was also significantly associated with death (UOR 1.64; 95%CI 1.1–2.4; $P = 0.008$).

Conclusion: HIV-associated mortality in MDR-TB patients indicates the need for initiation of anti-retroviral therapy in co-infected MDR-TB patients at the earliest opportunity.

PS-71764-11 Results of a DOTS-Plus project in Orel Oblast, Russian Federation, November 2002–December 2006

B Y Kazenny,¹ T M Khorosheva,¹ E V Kiryanova,¹ V V Khoroshutina,¹ E S Nemtsova,¹ W Jakubowiak,² D D Pashkevich,² V V Testov,² N Y Afanasiev,³ S E Borisov,⁴ I A Vasilieva,⁵ P Cegielski.⁶ ¹Orel Region TB Service, Orel, ²WHO Office in the Russian Federation, Moscow, ³USAID, Moscow, ⁴Research Institute of Phthisiopulmonology, Sechenov Moscow Medical Academy, Moscow, ⁵Central TB Research Institute, Moscow, Russian Federation; ⁶Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+7) 495 7872149. e-mail: w.jakubowiak@who.org.ru

Objective: To evaluate the results of the implementation of a MDR-TB diagnostics and treatment program in Orel Oblast.

Materials: Data on 200 smear/culture positive TB patients with MDR-TB, registered for treatment from November 2002–December 2005.

Methods:

- Smear microscopy by Ziehl-Neelsen.
- Cultures were inoculated into two solid nutrient media.
- Drug resistance of *Mycobacterium tuberculosis* (MBT) was detected by absolute concentrations method on solid media by indirect method to the following drugs: H, R, E, S, K, Cap, OfI, Pro, Cs, PAS.

Results: By 1 March 2007, the following treatment outcomes were reached in the 200 MDR-TB patients: Sputum conversion by culture was reached in 70.0%, with average duration of the intensive treatment phase of 7.8 months.

Results of treatment were: cured—113 (56%), died—19 (10%), treatment failure—28 (14%), defaulted—26 (13%), transferred out—6 (3%), discontinued on medical reasons—2 (1%), continuing treatment—6 (3%).

The average total duration of treatment was 20.1 months.

During programme implementation, the number of MDR-TB cases registered in Orel oblast decreased by 1.6 times.

Conclusion: The experience of the DOTS Plus project in Orel Oblast showed a high treatment success rate and decrease of MDR-TB prevalence.

PS-71934-11 Second-line drug management: coping with the challenges

M I Quelapio, K Gonzales, N Munez, M Ortiz, B G Bersola, T E Tupasi. Tropical Disease Foundation, Makati, Philippines. Fax: (+632) 7516021. e-mail: mameldquelapio@yahoo.com

Background: MDR-TB management in the Philippines started in 1999 as an initiative of the Tropical Disease Foundation DOTS Clinic in Makati Medical Center. There have since been eleven procurements made for second-line drugs (SLDs).

Objective: To describe the challenges of SLD management.

Results: Although the Green Light Committee (GLC) has negotiated a decrease in SLD prices, overall MDR-TB treatment remains costly. There was a 76% drop in cycloserine (Cs) cost through the GLC, but minimal reduction for kanamycin (Km) and protionamide (Pto), and with fluctuation in capreomycin (Cm) cost. Global drug manufacturing faces the challenge of meeting increased demands for quality SLDs with Global Fund support being offered to countries. The SLD procurement process in the Philippines is coursed through the World Health Organization and procured through the International Dispensary Agency. The average procurement lead time by experience is 7 months. Other challenges include complex forecasting due to individualized regimens and frequent regimen modifications due to side effects; ensuring rational drug use; cold chain requirement for para-aminosalicylic acid. In addition, the shelf-life of some SLDs is short: 12.5 months for Cs, 20 for PAS, and 23 for Cm.

Conclusion: SLD management requires more efficient procurement, further decrease in drug costs, advocacy for increased drug manufacturing with quality assurance, and personnel dedicated to drug management and individual case management.

PS-71946-11 What happened to MDR-TB treatment failures?

V A Belen, M I D Quelapio, R B Orillaza-Chi, E K Maramba, M T Gler, L E Macalintal, L O Raymond, T E Tupasi. Tropical Disease Foundation, Makati, Philippines.
Fax: (+63) 028102874. e-mail: virgilbelen@tdf.org.ph

Setting: The Programmatic MDR-TB Management (PMTM) Project at the Makati Medical Treatment Center (MMC), Manila, Philippines.

Objective: To describe what happened to MDR-TB patients declared 'treatment failure' based on the definition in the WHO Guidelines for Drug-Resistant TB.

Methods: A list of treatment failures from 1999–2005 was generated by the Electronic Medical Record for MDR-TB patients. Contact details on clinic charts were used to get in touch with those patients, their relatives, and/or health care provider. A structured questionnaire was used to facilitate the interview to determine the current condition of the patients.

Results: Failure rate among 417 MDR-TB patients was 6%. Of 25 failure cases, five could not be located. Among the remaining 20, 11 (55%) had died, 6 (30%) were restarted on category IV regimen, 3 (15%) are alive. Death occurred within 5 months after disclosure of treatment failure in more than half (54%) while the remaining died later than the 5th month. Among those restarted on category IV treatment, 4 (20%) eventually failed again (1 died, 3 with unknown status), 1 (5%) cured then died and 1 (5%) underwent surgery and currently continuing treatment. Of the 3 patients alive, 1 (4%) persists to be symptomatic and

is on cough suppressants, while the other 2 (8%) are asymptomatic.

Conclusion: Patients who fail under the PMTM program have limited treatment options, underscoring the urgent need for new drugs with novel mechanisms that would be effective for MDR-TB. Almost half of deaths occurred after more than 6 months of treatment failure, indicating the significant public health consequences of continuing transmission from these infectious MDR-TB patients. Appropriate treatment of MDR-TB patients is imperative to break transmission.

	Number of patients (%)
Current status of treatment failures of PMTM	
Unknown (lost to follow up)	5 (20)
Alive	3 (12)
Restarted on category IV treatment	6 (24)
Died	11 (44)
Months after treatment failure when patient died	
<1	3 (27.3)
1–5	3 (27.3)
6–10	1 (9.1)
11–20	1 (9.1)
21–30	2 (18.2)
31 up	1 (9.1)

PS-71993-11 The systematic review of the influence factors for multidrug-resistant in China

X M Wang,¹ J J Liu,² H Y Yao,² C H Chen,¹ W Chen,¹ F Huang,¹ H Zhang.¹ ¹National Center for TB Control and Prevention, China CD, Beijing, ²Chinese Center for Disease Control and Prevention, Beijing, China.
Fax: (+86) 10 8313 4388. e-mail: florawangbj@vip.sina.com

Background: China is one of the 22 high TB burden countries in the world. Although China has achieved the 2005 global TB control targets, for reaching the 2015 Millenium Development Goal's (MDG's) of halving the TB prevalence and deaths in the country, China still face the threat of the epidemic of multi-drug-resistant TB (MDR-TB). The aim of our study is to find the main influence factors for MDR-TB in China.

Method: Quantitative and quality study and systematic review, including meta-analysis were used in our study.

Key findings: The key influence factors for MDR-TB are as follow:

- 1 Irregular treatment and treatment default, especially in the first treatment of TB patients. There are all kinds of reasons which led irregular treatment, such as economic difficulty, drug adverse reaction and patients didn't know the essentiality of full cause treatment etc.
- 2 Therapy regime was not reasonable.
- 3 The increase of initial MDR-TB patients.
- 4 Combined chronic disease, such as diabetes.

- 5 The fixed number of year for anti-MDR-TB drugs has been used in some areas.
- 6 Long period of drug sensitive test caused minor guidance role in clinical treatment of MDR-TB, therefore many patients missed the best time to adjust the therapy regime.
- 7 The economic situation of TB patients and their situation of medical insurance.

Conclusion: MDR-TB control and prevention is really a big challenge in China. The influence factors for MDR-TB is complexe and various. The measures should be taken according to different factors.

EXPERIENCES IN LUNG HEALTH

PS-71315-11 Health seeking behaviour of tuberculosis suspects in Middle and South Jordan

N Abu Sabrah. Directorate of Chest Diseases and Foreigner's Health, Amman, Jordan. Fax: (+962) 6 5520177. e-mail: femaletb@yahoo.com

Aim: A community-based cross-sectional survey was carried out in 3 regions in Middle and South Jordan, during a four-month period. It aimed at studying the health seeking behaviour of tuberculosis suspects and the barriers interfering with their timely diagnosis and treatment in Jordan; it also aimed at determining the prevalence of tuberculosis suspects and active TB cases among those suspects.

Design: A representative sample of households was stratified according to proximity to the tuberculosis centre in each region; within 30 km or further away from the centre. 9251 households were randomly selected from the 3 regions and 61 730 adult household members were screened for tuberculosis symptoms. Tuberculosis suspects, defined as suffering from cough for more than 3 weeks, were interviewed according to a structured and pretested questionnaire including information about socio-demographic characteristics, signs and symptoms of the disease, and factors affecting health seeking behaviour. Tuberculosis suspects were referred to the nearest diagnostic centre for sputum smear examination.

Results: Of the screened 61 730 household members, 1544 adults were suffering from cough for more than 3 weeks thereby reporting a prevalence of adult TB suspects of 2.51%. Of these, two were active pulmonary tuberculosis corresponding to a prevalence of 'yet undiagnosed' active pulmonary tuberculosis of 3.24 per 100 000 population. All of the detected cases were smear positive. The significant risk factors for inadequate health seeking behaviour were female gender, living in Karak and Maan governorates, rural residence, expatriate, using private means of transportation.

Conclusion: A considerable proportion of delayed

diagnosed tuberculosis cases exist in the rural community mainly due to their poor accessibility to the TB health services and their low awareness regarding the disease. These constitute a source of transmission of infection in the community and a barrier against disease control.

PS-71367-11 Chronic lung disease in HIV-infected children on antiretroviral therapy in a central hospital in Malawi

G Poerksen,¹ E Chesshyre,¹ S Graham,² P Tembo,¹ M Nyirenda,¹ L Pollock,¹ E Molyneux.¹ ¹Paediatric Dept. College of Medicine, Blantyre, ²Malawi-Liverpool-Wellcome Trust Clinical Research Programme, Blantyre, Malawi. Fax: (+265) 01 673 198. e-mail: gpoerksen@yahoo.de

Background: Antiretroviral therapy (ART) has been freely available for limited numbers of HIV-infected Malawian children since 2004. Chronic lung disease is common in these patients.

Objectives: To assess outcome of HIV-infected children who had chronic lung disease (CLD) prior to starting antiretroviral therapy (ART).

Methods: This is a descriptive, cross sectional study at the paediatric ART clinic at Queen Elizabeth Central Hospital, Blantyre, from June 2005–September 2006. Raised respiratory rate was defined as >40 breaths per minute (bpm) in 1–5 year olds and as >30 bpm in children above 5 years of age.

Results: A diagnosis of suspected or probable chronic lung disease was made in 27.6% ($n = 142$) of 514 children started on ART. Mean follow up time was 15.1 months (3.2–87.7 months). Mean age in the cohort with CLD was 7.6 years (range 4.3 months–16.75 years). Half of them (51.4%) were treated for pulmonary TB in the past. Antibiotics were prescribed at ART clinic follow-up visits significantly more often in children with CLD ($P < 0.001$): 9.4% received antibiotics every 2nd–3rd visit and 23.7% every 4th–5th visit. The number of children who died (6.2%) or defaulted (16.2%) did not differ significantly from the patients without CLD. Twenty-five children with CLD underwent more detailed investigations: In this subgroup respiratory rate was within normal range in 53.8%. In 15.4% it was 1–10 bpm above normal limit for age, in 15.4% above 10–20 bpm and above 20 bpm in 11.5%. Guardians reported physical activity level as reduced in 27%. A persistent cough was present in 46% of the cases, 29% had an intermittent cough.

Conclusion: Short-term outcome for HIV-infected children with CLD receiving ART was not different from those without CLD. However significant persistent respiratory symptoms are common. Regular or intermittent antibiotic prophylaxis may improve long-term outcome and quality of life in this group.

PS-71373-11 A pragmatic approach to ensuring accuracy in language translation in TB research

T W Rennie,¹ G H Bothamley,¹ I P Bates,² D Engova.²

¹Northeast London Tuberculosis Network, London, UK;

²Department of Practice and Policy, School of Pharmacy, Univ. London, London, UK. Fax: (+44) 2085107731.

e-mail: timothy.rennie@homerton.nhs.uk

Introduction: Upwards of 300 languages are spoken in London. This makes it practically impossible to validate translated research tools using large studies for use in multi-language TB cohorts. We describe a method of ensuring translation accuracy in research that can also be applied to practice in providing written information.

Method: A three-stage translation protocol was used to translate a research questionnaire (Stage 1–Forward translation; Stage 2–Back translation; Stage 3–Group validation). A fourth stage (conceptual content rating) was used to validate the process in terms of conceptual content of amended questionnaire items.

Results: A total of 62 amendments were made to the original forward translation, most in Bengali (Table 1). The validation stage suggested an improvement in the conceptual content of amended questionnaire items for Urdu and Turkish but not Bengali language. In addition, the two conceptual raters for Bengali did not demonstrate agreement suggesting difficulties with this language. Issues raised in back-translation and group validation stages suggested redundancy of the back-translation stage as this was effectively conducted in group validation.

Language	Amendments	Conceptual validation
Turkish	18	Yes
Bengali	25	Unknown
Urdu	19	Yes
Total	62	

Conclusion: The translation protocol described resulted in improved accuracy for Turkish and Urdu languages. Difficulties with Bengali may relate to the formality of this language in relation to the more colloquial spoken language Sylheti. An amended protocol may exclude back-translation stage.

PS-71479-11 The MTB-specific gamma interferon ELISpot: assay validation in a resource poor-settings

J Mutsvangwa,¹ A E Butterworth,^{1,2} L Corbett,^{1,2}

P R Mason,¹ A Lalvani,³ K Boyd-Chaka,¹ R Vundla,¹

T Mavhudzi,¹ K Ewer,³ Y Cheung,² K Millington.³

¹Biomedical Research and Training Institute, Harare, Zimbabwe;

²London School of Hygiene and Tropical Medicine, London,

³Nuffield Dept of Clinical Medicine, University of Oxford,

London, UK. Fax: (+263) 4 735004.

e-mail: jmutsvangwa@brti.co.zw

Setting: The inherent sensitivity and specificity limitations of the conventional Tuberculin Skin Test (TST) for the detection of MTB infection has led to several attempts to find a more reliable alternative. Promising is the IFN- γ ELISpot a based on T cell-mediated immune responses to specific MTB antigens ESAT-6 and CFP-10.

Aim: To validate test efficiency of the *M. tuberculosis* specific antigen assay, IFN- γ ELISpot in a resource poor setting.

Design and Subjects: An experimental study to validate the ELISpot before adopting it in a longitudinal comparative project of TST and ELISpot conversions among household contacts of factory workers in Harare, comprising 271 subjects (47 TB Cases and 29 controls and their contacts).

Methods: At an average of 4 bleeds/subject, within the 12 months study period, 471 ELISpot records were generated based on manual (hand lens) and subsequently automated spot counts. Analyses were to assess between-well variation (since antigens were tested in duplicate wells), between-observer variations (manual versus machine count) and between-experiment variations.

Results: Using the Wilcoxon Rank Sum test, there were no significant differences between median spot counts of duplicate wells, $P > 0.150$ and ICC > 0.7 [95%CI 0.74–0.99] among observers. For between-observer variation, using one way ANOVA, the ICC of manual versus automated spot counts was comparable, ICC > 0.7 [95%CI 0.64–0.83] and with good agreement of kappa values 0.621–0.899. Specificity and sensitivity values of manual against automated spot counts were high 75% [95%CI 70.4–80.6] and $>80\%$ respectively. No significant differences with time were observed using Kruskal Wallis, $P 0.296–0.999$ and ICCs between experiments were >0.50 [95%CI 0.24–0.97].

Conclusion: This study demonstrated that reliability and reproducibility of the ELISpot technique could be achieved and maintained in a resource poor setting where automated counters may not be available.

PS-71623-11 Experience in combining community-based screening and tertiary hospital care in HIV pregnancy

A S Chao,¹ A Chao,¹ C N Wang,¹ A Chao,² T H Wu.¹

¹Department of Obstetrics and Gynecology, Chang Gung Memo, Tao-Yuan, Taipei, ²Department of ICU, Taipei, Taipei, China. Fax: (+886) 33288252.

e-mail: aschao1295@cgmh.org.tw

Aim: To determine the role of a tertiary hospital in the management of human immunodeficiency virus (HIV) positive pregnancy among pregnant women in Taoyuan, Taiwan.

Patients and Methods: Between 2004 to 2006, all pregnant women in Taoyuan, Taiwan received HIV blood

tests under the county health insurance reimbursement. Samples were analyzed for HIV-1 antibodies with enzyme-linked immunosorbent assay (ELISA). Information was obtained upon request to the county public health service registry.

Results: Nine cases (0.01%) were detected HIV positive among 61 891 pregnant women who had the tests and transferred to the tertiary hospital. Eight asymptomatic women were confirmed positive by viral antigen assays and viral load assays. Five out of the eight mothers were heroin users. Three women had pregnancy before 24 weeks of gestation opted for termination. For the five pregnancies that were detected beyond 24 weeks, all delivered healthy term babies, with postnatal follow-up more than six months. Measurements taken to reduce vertical transmission from HIV-infected mothers include administration of prenatal antiretroviral medicine, drug replacement, selected route of delivery, refraining from breast-feeding and an active monitor system.

Conclusion: Vertical transmission could be reduced significantly when active prenatal interventions are provided in a tertiary hospital.

PS-71854-11 Case detection and treatment success in priority cities for tuberculosis control in São Paulo State, 2001–2003

M F Oliveira,^{1,2} R A Arcêncio,^{1,2} E G Assis,^{1,2} T C S Villa,^{1,2} A Ruffino-Netto.^{2,3} ¹University of São Paulo–College of Nursing of Ribeirão Preto, Ribeirão Preto, São Paulo, ²Brazilian Tuberculosis Research Network, Rio de Janeiro, RJ, ³University of São Paulo–School of Medicine of Ribeirão Preto, Ribeirão Preto, São Paulo, Brazil. Fax: (+55) 1636333271. e-mail: tite@eerp.usp.br

Aim: To verify if the 36 priority cities for tuberculosis (TB) control in the State of São Paulo reached, in 2001 to 2003, the goals proposed by the World Health Organization: detect at least 70% of TB cases and cure at least 85% of the cases detected.

Method: Sources for data collection were the São Paulo State Health Secretariat and DATASUS. Data was displayed on a spreadsheet and indicators were calculated for the percentage of cases detected and treatment success, by city, per year.

Results: In 2001, only 6 cities reached the two proposed goals, 8 reached only the goal concerning cure rates, 6 reached only the case detection goal, and 16 cities did not reach either one. In 2002, only 4 cities reached both goals, 13 reached the cure rate goal, 8 reached the case detection goal, and 11 did not reach either one. In 2003 there was an increase to 9 cities that reached both goals, 10 that reached the cure goal, 7 reached the case detection goal, and 10 did not reach either one.

Conclusion: Most of the studied cities did not reach the goals proposed by WHO. In fact, many did not reach either of the two goals. The cities need an ade-

quate structure to reach the rates proposed for case detections, without reducing cure rates.

PS-71878-11 Improving information sharing between tuberculosis clinicians and researchers

C Dukes-Hamilton,¹ A Walden,¹ B Kisler,² K Booher,¹ R O'Brian,³ M Nahm,¹ L Geiter.⁴ ¹Duke University, Durham, North Carolina, ²CDISC, Austin, Texas, USA; ³Find Diagnostics, Geneva, Switzerland; ⁴Aeras, Rockville, Maryland, USA. Fax: (+1) 919 668 7107. e-mail: anita.walden@duke.edu

Background: Tuberculosis care and management is complicated by other conditions such as HIV/AIDS, drug-resistance and poor access to care. Healthcare information needs to be shared between different clinicians, organizations and institutions. Clinical research efforts to improve prevention, diagnostic and treatment options for TB also require accurate and timely data collection. Methods are needed to reduce duplication and improve efficiencies in data collection and sharing.

Objective: To delineate and define a set of critical data elements used both by clinicians and those involved in TB vaccine, diagnostic, epidemiologic and therapeutic studies.

Methods: A U.S. National Institute of Health (NIH) Roadmap project has brought together key stakeholders among US and international TB clinicians and researchers including Institutes within NIH, the U.S. FDA, the Centers for Disease Control, and research groups including the Foundation for Innovative New Diagnostics (FIND), the TB Trials Consortium, the TB Alliance, and Aeras. Efforts have been underway for 2½ years to build consensus definitions for the data elements.

Conclusion: Work is nearing completion for the first package of data elements and associated definitions. The Union meeting will provide an important forum for getting feedback and gaining consensus for using the data elements in future projects, as well as ideas for ways to make the product easily accessible for users.

PS-71880-11 An epidemiological study of TB in neonates: impact of surveillance methodology on measurement of TB incidence

S Moyo,¹ T Hawkrigide,¹ L Geiter,² S Mlanjeni,¹ E Simon,¹ L Workman,¹ S Verver,³ G Hussey.¹ ¹South African Tuberculosis Vaccine Initiative, UCT, Cape Town, South Africa; ²Aeras Global Tuberculosis Foundation, Rockville, Maryland, USA; ³KNCV, Leidschendam, Netherlands. Fax: (+27) 21 4066081. e-mail: sizulu.moyo@uct.ac.za

Background: A randomized controlled trial comparing route of BCG administration in preventing TB in children conducted in Cape Town in 2001–2006, showed the two-year risk of TB in children aged 0–2 years to be about 2%. The trial incorporated active surveillance to detect TB disease. Incidence of TB as

measured in the trial might be higher than if presentation is based on signs and symptoms.

Objective: To compare incidence of TB in infants, followed up using two surveillance methodologies.

Methods: Participants were randomized to active or passive surveillance. Follow up is for two years. Infants in the active group are assessed for TB every 3 months. Contacts and symptomatic infants are investigated in a dedicated TB research ward. Infants in the passive group are monitored through surveillance at TB clinics. They are referred to the research ward only if treated or are suspected of having TB by public health practitioners.

Results: Enrollment was concluded November 2007 with 4786 infants enrolled since May 2005. Up to January 2007, 7% of participants had been investigated for TB in the case verification ward. More cases of definite and probable TB have been detected in the active group, with incidence rates of 2.6% and 1.4% for active and passive groups respectively.

Conclusion: While early results indicate that active follow up yields a higher estimate of TB incidence this may change with extended follow up. Extended follow up data will be presented. This study also provides an opportunity to examine trends in TB incidence in this population through comparison with the rates in the BCG trial.

PS-71636-11 Value of spirometry in detecting airflow obstruction during a routine health check-up among never and ex-smokers

A S Haque, F F Zuberi, M Irfan, N Salahuddin, A B S Zubairi, J Hussain, J A Khan. Section of Pulmonary & Critical Care Medicine, Aga Khan, Karachi, Pakistan. Fax: (+92) 21 4934294. e-mail: suleman.haque@aku.edu

Objectives: To assess the usefulness of spirometry in detecting airflow obstruction (AFO) during routine medical check-up (RMC) among never and ex-smokers.

Methods: Patients attending a university hospital for RMC and referred for spirometry were recruited. Demographics and symptoms were collected using a performa. 847 (22.7%) underwent bronchodilator reversibility testing (BRT). Presence of AFO was assessed using 1) pre-bronchodilator FEV1/FVC ≤ 70 among those who did not have BRT and 2) Post bronchodilator FEV1/FVC ≤ 70 in those undergoing BRT.

Results: 3697 patients were enrolled. 77.4% were male. Mean \pm SD age was 46.70 ± 12.7 yrs, height 167 ± 8.9 cms, weight 75.9 ± 15.6 kgs, FEV1 2.71 ± 0.78 L, FEV1/FVC 82.8 ± 7.6 . Symptomatically, 16.6% had cough only, 15.1% excessive sputum only, 24.7% had dyspnea only and 63.9% had none of these. 258 (6.9%) gave a history of allergy. 781 subjects were ≤ 35 yrs in age, 1996 subjects were between 36–55 yrs and 920 were >55 yrs of age. The overall yield from spirometry in detecting AFO using the first criteria was 5.14% (202 patients): 4.4% (165) in males and

0.9% (34) among females. The distribution by age was 1.9% in those ≤ 35 yrs of age, 3.7% in those between 36 and 55 yrs and 11.8% in those >55 yrs. Using the second criteria in 847 patients undergoing BRT (age distribution: 96 ≤ 35 y, 399 between 36 and 55 y and 352 >55 y), the yield from spirometry in detecting AFO was 145 (17.1%): 118 (13.9%) in males and 27 (3.1%) females. Distribution by age was 0.7% in ≤ 35 y, 5.9% between 36 and 55 y and 10.5% in >55 yrs of age.

Conclusion: Spirometry during routine health check-up can detect a significant number of patients with airflow obstruction particularly among the middle and older age groups. A higher prevalence was found in those undergoing reversibility testing, which could be due to referral bias and needs further study.

PS-71634-11 Self-reported inhaler compliance in patients with asthma

A S Haque, M Irfan, M Naeem, S Aziz, F Shahabuddin, G Akbar. Section of Pulmonary & Critical Care Medicine, Aga Khan, Karachi, Pakistan. Fax: (+92) 21 4934294. e-mail: suleman.haque@aku.edu

Setting: Chest clinic at a teaching hospital in Karachi, Pakistan.

Objectives: To explore self-reported compliance with inhaler therapy and identify patient related variables leading to non-adherence.

Methods: Patients >12 years of age with physician labeled asthma and who had been using inhaler/s for ≥ 6 months, answered a questionnaire inquiring about demographics, compliance over the previous six weeks and treatment details.

Results: 168 patients were studied prospectively. Mean age was 48 years (SD ± 18.8 yrs). 52% were female. 91% had an urban residence. 12% were current smokers. 20% had asthma for <1 year, 34% between 1 and 4 years and 46% >4 years. 38% self-reported not using inhaler/s regularly in the last six weeks. The level of non compliance among them was: 25% missing them daily, 39% once a week and 35% more than once a week. The reasons for not taking the inhaler/s regularly were: improvement in symptoms 46%, forgetting 30%, side-effects 20% and fear of dependence 2%. On univariate and multivariate regression analysis age, gender or the number of inhalers prescribed did not show a statistically significant relationships to self-reported compliance.

Conclusions: In this study, more than on third of the patients reported non compliance to prescribed inhaler/s, with a quarter missing a dose every day. The most frequent reason for non compliance was improvement in symptoms. Age, gender or the number of inhalers prescribed did not predict non-compliance. Future studies assessing the combined effect of health literacy, local asthma knowledge and beliefs on compliance are warranted.

PS-71963-11 Evaluation des connaissances et pratiques des agents socio-sanitaires sur l'asthme bronchique

S Diallo,¹ Y Toloba,¹ D A Naco,² B F Sissoko,¹ M Berthe,² M M A Neino,¹ A Tamara,¹ O Mbaye,¹ B Keita.¹ ¹CHU De Point-G, Bamako, Mali; ²Programme National de lutte contre la tuberculose, Bamako, Mali. Fax: (+223) 2228586. e-mail: toloba71@yahoo.fr

Le but de l'étude était d'évaluer les connaissances et pratiques des agents sanitaires sur l'asthme bronchique, étude prospective, 1 mois (juillet 2007) dans 2 CHU et 1 centre de référence du district de Bamako. Au total, 145 agents socio sanitaires : 20 médecins, 13 assistants médicaux, 22 techniciens supérieurs de santé, 23 techniciens de santé et 67 internes étaient concernés. Le caractère inflammatoire de l'asthme était ignoré par plus de la moitié de nos agents ; 37,2% connaissaient les 3 éléments (interrogatoire, examen clinique, DEP) du diagnostic de l'asthme. La connaissance des facteurs déclenchants et celle des affections pouvant simuler un asthme était de 5,5 et 9%. Le débitmètre de Pointe était connu par 4,8% des agents. Ils étaient 97,2% des agents qui n'avaient jamais assisté à des journées de formation sur l'asthme. La meilleure voie d'administration d'un traitement de fond était connue par 47,6% des agents. L'évaluation du degré de la sévérité de l'asthme avant le traitement était faite par 83,4% des agents, et 34,5% des agents prescrivaient les anti-inflammatoires, les β_2 sympathomimétiques, la théophylline, les antibiotiques, les fluidifiants.

Conclusion : Les agents sanitaires avaient une connaissance sur l'asthme qui était limitée d'où la nécessité de la formation, de l'évaluation, de l'éducation du personnel sanitaire et de la création d'un consensus national sur le traitement de l'asthme bronchique au Mali.

PS-71818-11 Factors interfering on health care performance in home-based DOT to tuberculosis control

R I Cardozo Gonzales,¹ A A Monroe,^{1,2} C M Sassaki,¹ T C S Villa,^{1,2} A Ruffino-Netto.^{1,3} ¹Brazilian Tuberculosis Research Network-REDE-TB, Rio de Janeiro, RJ, ²University of São Paulo-College of Nursing of Ribeirão Preto, Ribeirão Preto, São Paulo, ³University of São Paulo-School of Medicine of Ribeirão Preto, Ribeirão Preto, São Paulo, Brazil. Fax: (+55) 1636333271. e-mail: tite@eerp.usp.br

Aim: The purpose of this exploratory study was to analyze the factors that interfere on health care performance in home-based DOT in a big city.

Design/methods: The technique used was content analysis, thematic mode. The data was obtained through interviews with health professionals who were responsible for TB control actions.

Results: Factors related to health care: reduced staff, larger coverage areas with higher number of TB patients to be supervised, restricted hours for the super-

vision vehicle, discontinuity of incentives (food basket, public transportation voucher, etc) and little involvement of the TB Control Program (TCP). Factors related to the patient's socio-cultural and economical context: unemployment, causing patients to be away from home, alcoholism and drug addiction, denial, the impossibility of supervision due to the patient's alcoholic state, disinterest in treating TB.

Conclusion: Performing home-based DOT demands permanent managerial, organizational, and technical qualification of all health care professionals involved in order to conduct actions and render services that meet the specificities of each social and cultural context in which the activities occur.

PS-71330-11 Placebo equivalent to amoxicillin for treatment of acute bronchitis: triple-blind randomised equivalence trial

V N Nduba,^{1,2} C W Mwachari,² A S Meier,³ D R Park,⁴ A Kigo,² T M Hooton,⁴ C R Cohen.⁵ ¹KEMRI/CDC Research Station, Kisumu, KE, ²Center for Respiratory Disease Research/KEMRI, Nairobi, KE, Kenya; ³Departments of Laboratory Medicine, University of Washington, Seattle, Washington, ⁴Departments of Medicine, University of Washington, Seattle, Washington, ⁵Department of Obstetrics, Gynecology and Reproductive Sciences, University of California, San Francisco, California, USA. Fax: (+254) 572022981. e-mail: vnduba@ke.cdc.gov

Context: Antibiotic treatment is not recommended for acute bronchitis in immunocompetent patients in industrialized countries. Whether these recommendations are relevant to the developing world and to immunocompromised patients is unknown.

Design, Setting and Participants: Randomized triple-blind placebo-controlled equivalence trial of adults presenting to two outpatient clinics in Nairobi, Kenya with acute bronchitis but without evidence of chronic lung disease.

Main Outcome Measure: The primary study endpoint was clinical cure as defined by a $\geq 75\%$ reduction in a validated acute bronchitis severity score (ABSS) by 14-days; analysis was by intention-to-treat with equivalence defined as $\leq 8\%$ difference between study arms.

Results: Clinical cure rates in the amoxicillin and placebo arms were 81.7% and 84.0% respectively (absolute difference = 2.3%, 95%CI 8.6% to 4.0%). Of 131 HIV infected subjects (19.8%), cure rates for those randomized to amoxicillin (77.2%) and placebo (83.8%) differed by 6.6% (95%CI 21.7% to 8.6%). Among HIV uninfected subjects, the absolute difference in cure rates was 1.6% (95%CI 8.5% to 5.3%). Potential drug side effects were similar in the two arms. No subjects required hospitalization or died.

Conclusion: Antibiotic treatment of acute bronchitis appears unwarranted, even in populations with high prevalence of HIV infection.

PS-71726-11 Status of tuberculosis infection control at hospitals in China

H Zhang, L X Wang, S W Jiang, X Q Liu, H C Xu. National Center for TB Control and Prevention, China CDC, Beijing, China. Fax: (+86) 01083135306. e-mail: zhanghui@chinatb.org

Background: Hospitals play a critical role in tuberculosis (TB) prevention and control. Nosocomial infection is an important issue for both patients and clinicians, and is of emerging importance in public health. The objective of our study is to understand the incidence and determinants of tuberculosis infection control, and to provide basic information for infectious control at hospitals in China.

Methods: The reported incidence rates of TB among health-care workers (HCWs) were analyzed using the data from China information system for diseases control and prevention. The determinants of HCWs infected by tubercle bacillus were summarized with a comprehensive literature review.

Results: The reported incidence rates of TB among HCWs in 2004, 2005 and 2006 were 78.2/100 000, 85.6/100 000, and 81.6/100 000, respectively. Especially, those among HCW at tuberculosis specialized hospitals were higher. The major reasons of HCWs TB infection as follows: (1) the delay of access to tuberculosis diagnosis, (2) the treatment is not completely, (3) poor awareness of bio-safety, (4) defective infection control, and (5) the sustained generation and prevalence of drug resistance strains, particularly MDR strains.

Conclusions: The incidences of HCWs with TB were higher and have not any trend of decline in these years in China. The infection control management, monitoring, and procedures at the hospitals especially at the tuberculosis specialized hospitals should be reinforced by evaluating the methods or contents of control measures conducted so far in China.

TB IN HIGH-BURDEN COUNTRIES: 3

PS-71725-11 Trends of *M. tuberculosis* resistance in Pakistan: molecular epidemiology of multidrug-resistant isolates

R Hasan,¹ Z Hasan,¹ K Jabeen,¹ M Tanwir,¹ A Ali,¹ A A Khan,² S Ghebremicheal,³ R Siddiqui,⁴ M Kadir.⁴

¹Department of Pathology and Microbiology, Aga Khan Univ, Karachi, ²Marie Adelaide Center, Karachi, Pakistan;

³Department of Bacteriology, Swedish Institute for Infectious Diseases Control, Solna, Sweden; ⁴Department of Community Health Sciences, Aga Khan University, Karachi, Pakistan.

Fax: (+92) 214934294. e-mail: rumina.hasan@aku.edu

Objectives: Incidence of tuberculosis in Pakistan is estimated at 181 cases per 100 000 population. Published reports suggest drug resistance amongst *M. tuberculosis* (MTB) isolates is increasing. The aim of this

study was to assess resistance trend amongst MTB isolates in the country, and to explore genotype of strains associated with drug resistance.

Methods and Results: Laboratory based data on 14 882 MTB strains from across the country (1990–2006) was analysed after excluding duplicate samples from the same patient. Resistance to first line agents was seen to increase until 2003 with a decline thereafter. Extensively drug resistant (XDR) TB strains were first detected in 1998, with a total of 26 cases being reported to date. A survey based on passive case finding in Karachi (July 2006–March 2007) suggests 6% multidrug-resistant (MDR) prevalence at a community level. To assess strain types associated with drug resistance 926 isolates were selected by stratified random sampling method from different regions of the country. These were genotyped using Spacer-oligotyping (spoligotyping) and Variable Number of Tandem Repeat-Mycobacterial Interspersed Repetitive Units (VNTR-MIRUs) methods. Central Asian Strain1 (CAS1) was the single predominant spoligotype constituting 44% ($n = 411$) of isolates tested with a further 14% ($n = 133$) being homologous to CAS1. Although Beijing strains were only 3% ($n = 25$) of the study isolates they were significantly associated with MDR ($P = 0.023$), CAS strains on the other hand did not show such association.

Conclusion: The declining resistance trend is encouraging. Moreover, the fact that the prevalent CAS strains were not associated with resistance suggests that effective control programs should be successful in reducing the tuberculosis burden in Pakistan.

PS-71737-11 Diversity of the spread of TB and TB control activities in Russian regions and populations

E Belilovsky,¹ W Jakubowiak,¹ S Borisov,² A Kononentz,³ I Danilova.¹ ¹WHO Office in the Russian Federation, Moscow, ²Research Institute of Phthisiopulmonology, Sechenov Moscow Medical Academy, Moscow, ³Federal Correctional Service of the Russian Federation (FSIN), Moscow, Russian Federation. Fax: (+7) 495 7872149. e-mail: w.jakubowiak@who.org.ru

Introduction: The TB epidemiological situation in Russia is frequently described using countrywide statistical indicators, in particular TB notification and mortality rates (83.8 and 22.5, respectively, per 100 000 in 2005) and TB treatment success rates. Data has shown the relative stabilization of notification and mortality rates in 2001–2005 after their dramatic growth in the previous decade. However, the use of pooled indicators to describe the heterogeneous country of Russia does not facilitate effective TB control.

Methods: We analyzed 2000–2005 Russian data from the aggregated annual reporting TB forms from all regions and the TB notification surveillance database (197 318 cases).

Results: Overall notification rates are a conglomerate of data from civilian and penal TB services and

populations. The penal contribution to notification rates decreased in 2000–2005 from 30% to 12.5%, reflecting a growth in the civilian sector. Extremely high notification rates were present among the unemployed (890 per 100 000), males aged 25–30 and 41–45, which exceed the average rate by factors of 1.45 and 1.75, respectively. Overall mortality rates are composed of 3 distinctive components: postmortem detected TB cases (mainly defined by late detection in risk groups [14%]), death of new TB cases (23%), and of retreatment and chronic cases, connected to bad quality of treatment in the past and high levels of MDR TB. There were significant differences in treatment success rates in regions under the new TB strategy implementation since 2004 (24%–75% for ss+ new pulmonary TB cases; 58.5% for Russia overall in 2005).

Conclusion: Effective TB control requires targeted activities defined by specific and purposeful statistical information.

PS-71738-11 Genotypic characterization of INH resistance in INH mono-resistant and MDR-TB strains from GSH

J Evans,¹ M Stead,¹ M Nicol,¹ H Segal.^{1,2} ¹Medical Microbiology, Institute of Infectious Diseases, Cape Town, ²National Health Laboratory Service, Cape Town, South Africa. Fax: (+27) 214066796. e-mail: heidi.segal@uct.ac.za

Setting: Isoniazid (INH) resistance in *M. tuberculosis* is commonly associated with mutations in KatG (40–95%) and the promoter region of *inhA* (8–20%) (Lavender et al. 2005) as well as *ndh* and *oxyR-ahpC* (Hazbón et al. 2006). KatG mutations occur predominantly at codon 315 (75–90%) with up to 25% of INH-mono-resistant (mono-R) strains carrying mutations in unknown gene targets (Hazbón et al. 2006). The predominant INH-R mutations are less common in INH mono-R strains, suggesting that mutations in genes other than *katG*, *ahpC*, *ndh* and *inhA* may play a role in development of INH mono-resistance and that the predominant INH-R mutations may serve as markers of MDR-TB. INH mono-R strains with mutations in *katG* may have a selective advantage over strains with other INH resistance determinants which may contribute to emergence of MDR-TB from INH mono-R strains (Hazbón et al. 2006). Strains carrying these *katG* mutations may therefore be related to each other and genotypically distinct from strains with other INH resistance mutations.

Aim: To investigate the genetic basis of INH resistance in INH mono-R strains and MDR-TB strains isolated from patients at Groote Schuur Hospital (GSH) and to investigate an association between INH-resistance genotype, emergence of MDR-TB and clonal lineages. **Methods:** A total of 100 MDR-TB strains and 72 INH-R strains from GSH were included in the study. Nested PCR assays, using primers designed for detec-

tion of the *katG* mutation (codon 315) and the *inhA* promoter mutation (–15C→T), were carried out to screen for the presence of these mutations. Genotyping of the strains was carried out using spoligotyping. **Results and Conclusion:** Neither the *katG* nor *inhA* mutations are present in the INH mono-R strains, but both mutations are represented in MDR-TB strains. Mutations other than these may account for resistance in the INH mono-R strains. Whilst MDR-TB strains included strains of the W-Beijing lineage, these were not represented in the INH mono-R strains.

PS-71743-11 Factors associated with detection of post-mortem TB cases and cases with advanced TB forms in Russia

S Borisov,¹ E Belilovsky,² W Jakubowiak,² M Matveeva,¹ N Maryina.¹ ¹Research Institute of Phthisiopulmonology, Sechenov Moscow Medical Academy, Moscow, ²WHO Office in the Russian Federation, Moscow, Russian Federation. Fax: (+7) 495 7872149. e-mail: w.jakubowiak@who.org.ru

Background: Effective tuberculosis (TB) case-finding is characterized by low levels of postmortem TB detection (PMD) and of new TB cases detected with advanced pulmonary TB forms (ATF), which typically arise as a result of a long, untreated course of disease. **Objective:** To identify the risk groups of PMD and ATF, in order to define target populations for primary health care activities in TB detection.

Methods: We used data from the national TB notification surveillance database (2004–2005), which included 70 608 new pulmonary TB cases (NPTC) from regions covering 49% of the Russian population. NPTC were divided into three groups: PMD (1517 or 2.2%), ATF (48.0%) and others. Univariate and logistic regression models were used to identify factors of PTB findings in the first and second groups. **Results:** Both PMD and ATF populations included, respectively, 98.1% and 67.2% unemployed persons, and 21.9% and 2.2% homeless persons. Both types of NPTC had a sharp peak in the 40–55 age group (OR = 2 [1.8; 2.2] and 1.2 [1.1; 1.2]), and were more often male (OR = 1.2 [1.0; 1.3], 1.42 [1.4; 1.5]), unemployed (OR = 24.4 [16.0; 37.2], 1.6 [1.6; 1.7]), homeless (OR = 6.8 [5.8; 18.0], 1.2 [1.02; 1.3]) and alcohol abusers (OR = 1.5 [1.2; 1.8], 1.5 [1.4; 1.3]). However, we found opposite results for the urban vs. rural factor (OR = 1.8 [1.6; 2.0] but 0.8 [0.8; 0.9], respectively).

Conclusion: Study outcomes have given the basis to specify case-finding management to reduce TB deaths before treatment and to increase TB control effectiveness. In particular, underdetection of TB in rural areas can be suspected.

PS-71747-11 Emergence of extensively drug-resistant (XDR) tuberculosis in a well functioning control programme

A Calver,¹ A A Falmer.² ¹West Vaal Hospital, Orkney,
²Department of Biomedical Sciences, Cape Town, South Africa.
Fax: (+27) 219389476. e-mail: alecia@sun.ac.za

Background: Despite excellent tuberculosis (TB) control, XDR-TB has emerged in a gold mine located in the North West province.

Aim: To investigate the mechanisms leading to the emergence of XDR-TB in this setting.

Methods: TB is proactively diagnosed by chest X-ray, smear and culture in this setting. All cultures were subjected to drug susceptibility testing (DST). The study cohort consist of TB cases with isoniazid and rifampicin (MDR-TB) resistance. MDR cultures were genotyped and phenotyped for second-line drug resistance.

Results: During 2003–2005, 140 miners were diagnosed with drug resistant TB of which 90% were infected with MDR-TB and 4.3% had XDR-TB. According to clinical data, new and re-treatment cases were of equal proportions and 59% of the cohort were known HIV sero-positive of which 37% died. Genotyping identified 17 strains and 6 clusters suggesting outbreak of MDR-TB. Three XDR cases emerged out of the largest cluster while two emerged out of two unrelated clusters and a single unique XDR was identified.

Conclusion: The results strongly suggest that the treatment regimen for MDR-TB does not prevent the development of XDR-TB within this setting. This study investigated the mechanisms responsible for the development of XDR-TB, which may help in preventing future outbreaks of XDR-TB.

PS-71749-11 TB control in priority cities in the State of Paraíba, Brazil, before and after implementing the DOTS strategy

T M R M Figueiredo,^{1,2} L D Sá,^{2,3} D S Lima,^{2,4} R P Queiroga,³ T C S Villa,^{2,5} A Ruffino-Netto.^{2,6} ¹State University of Paraíba, Campina Grande, Paraíba, ²Brazilian Tuberculosis Research Network, Rio de Janeiro, RJ, ³Federal University of Paraíba, João Pessoa, Paraíba, ⁴Nucleus of Sanitary Pneumology of the Health Secretary of the State of Paraíba, João Pessoa, Paraíba, ⁵Nursing School of Ribeirão Preto-University of São Paulo, Ribeirão Preto, São Paulo, ⁶School of Medicine of Ribeirão Preto-University of São Paulo, Ribeirão Preto, São Paulo, Brazil.
Fax: (+55) 1636333271. e-mail: tite@eerp.usp.br

Objective: To analyze tuberculosis (TB) treatment results in priority cities in the state of Paraíba before and after implementing the DOTS strategy.

Method: A descriptive and epidemiological study, with data sourced from SINAN (case-registry database).

Results: Two periods were considered: 1995 to 1998, which was before implementing DOTS; and 1999 to 2004, after DOTS. In the city of João Pessoa, there was a reduction in cure rates (11.6% per year), after implementing DOTS. After implementing DOTS, the cure rates increased at a speed of 2.26% per year, and

default rates showed a tendency to reduce (0.78% per year). The city of Campina Grande presented an average cure rate of 80% after DOTS. An even higher average (90%) was reached in the cities of Bayeux, Santa Rita, Patos and Cajazeiras.

Conclusion: The state of Paraíba showed strong political will and change in the form of health care management, investing in primary health care and in implementing the DOTS strategy, thus improving cure rates.

PS-71794-11 Pulmonary tuberculosis detection rate evolution in three health districts of Burkina Faso

F A G Assogba,¹ K M Drabo,¹ H Z Ouedraogo,¹ B Kafando,² R Zerbo,¹ J B Ouedraogo,¹ J Macq,³ B Dujardin.³ ¹Institute of Health Sciences Research, Ouagadougou, ²Health Region Direction, Ouagadougou, Burkina Faso; ³EPS/ULB, Public Health, Brussels, Belgium. Fax: (+226) 20974868.
e-mail: assogbafrank@yahoo.fr

Objective: The evaluation microscopy confirmed pulmonary tuberculosis (PTM+) detection rate in the three health districts of Burkina Faso.

Methods: FORESA project carry a retrospective study in three rural health districts (Ziniaré, Zorgho, Boussé). We have screened health data base available in the study areas for the period of 2002 to 2006. All notified cases of microscopy confirmed PTM+ were recorded from patient's files. The data was analyzed with Epi-Info 3.2. The detection rate was calculated as the ratio of the number of PTM+ notified and the expected number of PTM+ in the same year. The expected number of tuberculosis case was calculated according to the WHO estimation. The Pearson khi square statistics was used to compare proportions at the signification threshold $P < 0.05$.

Results: The detection rates was higher in Ziniaré (14.3%; 31/216) and Boussé (21.2%; 24/113) compare to Zorgho ($P = 0.004$) in 2006. The overall detection rate were lower in 2002 (13.1%; 81/615) than in 2006 (13.1%; 81/615) ($P = 0.004$). Elsewhere we have observed a net improvement of the detection rate from 2002 to 2006. The results were respectively 6.41% (10/156) against 14.3% (31/216) in Ziniaré ($P = 0.02$); 10.46% (9/86) against 21.2% (24/113) in Boussé ($P = 0.009$) and 2% (4/200) against 9% (26/286) in Zorgho ($P = 0.004$).

Conclusion: The detection rate remains low in comparison to the WHO objectives. The actors at the districts level should strengthen the TB control programme in order to reach the WHO references.

PS-71803-11 Clinical structure of new TB cases as an indicator of TB control in Kazakhstan

F A Iskakova,¹ T A Muminov,¹ A T Akbaeva,² N R Mukushev,³ D A Sabasova,³ N A Pitckaj.² ¹Kazakh National Medical University, Almaty, ²Almaty Regional TB Center, Talgar, ³Almaty City TB Center, Almaty, Kazakhstan. Fax: (+7) 3272928658. e-mail: iskakovaf@msn.com

Implementation of DOTS (1998) over all country and Ministry of Health's efforts caused to decreasing of TB mortality (2 times) and of TB incidence (20%) in 1998, 2006, but they were the highest in Central Asia. So it is need to find of ways of a further improvement of TB situation in Kazakhstan.

Target: Evaluation of TB control in Kazakhstan was carried out analysis by estimation of clinical TB forms in 2000, 2004, comparatively.

Methods: 22 921 new TB cases in 2000 and 23 170 in 2004 were enrolled in study. They have been shared to two groups: patients with serious and deserted TB (SDTB) and others. It estimated a level of patients with SDTB by all patients and in cohorts (adults, children, teenagers) in 2000, 2004.

Results: The level of all patients with SDTB was 6.7% (1530 people) in 2000 and 3.3% (768 people) in 2004 in general; by adults 7.4% (1427 people) versus 2.8% (702 people), by children 3.3% (71 cases) versus 2.6% (39 cases), by teenagers 2.7% (37 cases) versus 2% (27 cases), accordingly. Thus, it revealed a decreasing of the level of patients with SDTB among new cases in general (OR 2.9 [1.91–2.28], $P < 0.001$) and by adults (OR 2.22 [2.02–2.44], $P < 0.001$) during DOTS.

Conclusion: Decreasing of the patients with serious deserted forms in the clinical structure of TB was a benefit of DOTS strategy in Kazakhstan, especially TB diagnostic.

PS-71848-11 TB information system: improving tuberculosis data collection in Rio de Janeiro City, Brazil

R Carvalho,¹ M L Santos,² B Durovni,² S Cavalcante.² ¹Rio de Janeiro State Health Secretariat, Rio de Janeiro, RJ, ²Rio de Janeiro City Health Secretariat, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 22999750. e-mail: regue@alternex.com.br

Background: Rio de Janeiro city, the capital of Rio de Janeiro state reports about 8000 TB cases/year and has been implementing DOTS since 1999 with 50% coverage in 2006. Rio de Janeiro city has a big public health system network (215 health units). Primary care health units and emergency hospital are managed by municipality and several hospitals by federal or state government. 30% of the TB cases reported to the city surveillance system is diagnosed in hospitals and 10% in prisons. Municipal TB Program-MTP has been using the National Information System-SINAN since 1995 to register TB cases reported by all health units but until 2006, MTP used an alternative

EPIINFO database, to assess treatment outcomes only for TB cases reported by health centers and hospitals. This database could not be linked to the national system preventing and merging of the local, state and national data.

Methods: In order to have reliable and interchangeable information concerning case detection and treatment outcomes in June 2006 MTP decided to register treatment outcomes data for all cases registered in SINAN that began TB treatment in 2005 (8549 TB cases reported by 96 health units). The challenge was to implement a reporting practice in health units, considering their operational and managing differences. Subsequently, was evaluated the missing outcome data by health unit and defined strategies to recover it.

Results: 80% of the outcomes for the year 2005 were recovered and integrated to the state and national system.

Conclusion: Improving of technical assistance and financial support coupled with a better partnership with state and federal level are crucial to improve the quality of surveillance.

PS-71862-11 Spatial distribution of pulmonary tuberculosis cases in Vitoria City, Espirito Santo State, Brazil, 2002–2006

E L N Maciel,¹ R C A Vieira,¹ E Zandonade,¹ M Palaci,¹ R R Ribeiro,¹ R Dietze,¹ C Moreira,² W Pan,³ J E Golub.³

¹Universidade Federal do Espirito Santo, Vitoria, Espirito Santo,

²Prefeitura Municipal de Vitoria, Vitoria, Espirito Santo, Brazil;

³Johns Hopkins University, Baltimore, Maryland, USA.

Fax: (+55) 2733357379. e-mail: emaciel@ndi.ufes.br

Introduction: Spatial analysis of health indicators is as an important methodology for detection of intra-urban differences.

Objective: Identify and describe inner-city spatial pattern of pulmonary tuberculosis (TB) incidence.

Design: Ecological study.

Methods: ALL new reported cases of pulmonary TB among residents of Vitoria between 2002 and 2006 were included. Records were reviewed to avoid misclassification of neighborhoods, which was the stratifying factor. Incidence rates were calculated for each neighborhood. Local Empirical Bayes estimators were calculated and mapping disease rates were produced. Spatial analysis was performed to identify areas at high risk for transmission of *M. tuberculosis*.

Results: 651 new cases of TB were notified. Exploratory data analysis revealed a broad heterogeneity among neighborhood rates, ranging from 10.5 to 87.1 cases (per 100 000 inhabitants). Moran's Index (0.686 [$P = 0.001$]) indicates a strong spatial autocorrelation between incidence rates. Three inner-city micro-areas with high incidence rates share same characteristics as low-income, slums and overcrowding which was identified by the Local Indicators of Spatial Association (LISA). These micro-areas encompass 27 of

the 78 analyzed neighborhoods and have a mean incidence of 69.6/100 000.

Conclusions: Pulmonary TB was shown to be concentrated in specific areas, probably determined by a spatial underlying process. Compared with previous studies, pulmonary TB appears to have a more defined distribution than all-forms of TB cases, thus helping to target micro-areas that may benefit from more intense intervention efforts.

PS-71863-11 Results of self-administered treatment and impact of TB-HIV co-infections in rural Cameroon

E Kongnyu,¹ P Tata,¹ H Yeager,² T Welty,¹ N Yengong,¹ P Tih,¹ A Ginsburg.³ ¹Cameroon Baptist Convention Health Board-TB Program, Kumbo, Northwest Province, Cameroon; ²Georgetown University, Washington, DC, ³Elizabeth Glaser Pediatric AIDS Foundation, Santa Monica, California, USA. Fax: (+237) 3481262. e-mail: kongsan2003@yahoo.com

The Cameroon Baptist Convention Health Board (CBCHB) implements TB control within its AIDS prevention and care program at 4 CBCHB treatment centers supported by the National TB Program. Twenty (80%) of 25 CBCHB health centers perform AFB smears and refer positive cases for treatment.

New and re-treatment cases are admitted for 2 weeks and 2 months, respectively of DOTS and individualized counseling to appropriately and consistently administer drugs themselves. Patients return monthly for review, further counseling/education, and refill of TB medications.

From 1999 through 2005, 1694 cases were diagnosed with TB at Bansa Baptist Hospital, 76.4% were AFB-positive, 11.0% were smear-negative, 12.6% were extrapulmonary TB, 20.9% died, 68.9% completed therapy, and 10.2% were lost to follow-up. Of 314 deceased patients, 82.8% were tested for HIV. Of those tested, 92.5% were HIV-positive compared to 65.7% of all TB patients tested for HIV. Acceptance of HIV testing increased significantly from a range of 47–69% in 1999–2002 to 86–98% in 2004–2005.

Late diagnosis, limited knowledge, influence of traditional healers/beliefs and patient inability to pay for sputum cultures or ART increases mortality. Financial and human resources are needed to fully implement DOTS and TB-HIV management. Volunteers trained as health educators/treatment facilitators, including local church pastors and teachers are needed.

PS-71906-11 TB suspect examination rate: an useful indicator for programme monitoring

A T Thein,¹ T L Lwin,¹ K L L Lwin,¹ M M C Che,¹ W M Maung,¹ H Kluge,² A D De Muynck.³ ¹National TB Programme, Yangon, ²World Health Organization, Yangon, Myanmar, ³Institute of Tropical Medicine, Antwerp, Belgium. Fax: (+95) 1212605. e-mail: klugeh.whomm@undp.org

Background: In Myanmar, the case detection rate is routinely used as key indicator for case finding monitoring, but the denominator relies on non-recent incidence estimates that need to be updated and that are probably no longer valid at subnational level, as suggested by recent ARTI work done in Yangon. Therefore the case notification rate is preferred. But is there a simple indicator that allows to predict trends in case finding?

Method: Retrospective analysis of the case finding data at national and division/state level, from 1999 till 2006, using the case notification rate indicator; the denominator being the DOTS covered population. Exploration of the association with TB suspects' examination rate.

Results: The smear positive case notification rate was 40/100 000 in 1999, increasing linearly to reach 81/100 000 in 2005. At national level a linear association was observed between the number of TB suspects examined and S+ patients diagnosed ($R^2 = 0.98$); even at subnational level a similar linear association was found ($R^2 = 0.85$). This association hold also at the individual division/state level.

Conclusion: These observations suggest that the use of the TB suspects' examination rate indicator could add a very relevant indicator to the monitoring arsenal of NTP officers.

PS-71907-11 Sex- and age-specific notification rate: a useful indicator for programme management

T L Lwin,¹ A T Thein,¹ K L L Lwin,¹ M M C Che,¹ W M Maung,¹ H Kluge,² A D De Muynck.³ ¹National TB Programme, Yangon, ²World Health Organization, Yangon, ³Institute of Tropical Medicine, Yangon, Myanmar. Fax: (+95) 1212605. e-mail: klugeh.whomm@undp.org

Background: In Myanmar, NTP is covering the whole country since 2004; in various divisions & states the program implementation was gradually consolidated, resulting in increasing case notification rates. The question has to be raised if the consolidation concerned all age groups and both sexes equally.

Method: Retrospective analysis of the case finding data at national and division/state level, from 1999 to 2006, using the case notification rate indicator stratified by age and sex; the denominator being the DOTS covered population, stratified in the same age & sex groups.

Results: The modal age group in males was the 45–54 yrs, the age specific S+ notification rate was 80/100 000 in 1997 and reached 200+/100 000 in 2005; the distribution remained unimodal all the time. The same modal age group was found in females; the age specific S+ notification rate was 40/100 000 in 1997 and reached 90/100 000 in 2005; the distribution became bimodal in recent years; the second mode affecting the 25–34 yrs age group, the cause of which has to be further explored (HIV-TB?).

Conclusion: The consolidation of the NTP implementation has affected all age groups and both sexes equally. The trends of the annual age and sex specific S+ notification rates pinpoints to an increasing problem in the younger females, the nature of which could HIV related.

PS-71908-11 TB disease prevalence survey in Yangon division, Myanmar, 2006 [preliminary results]

T L Lwin,¹ I O Onozaki,² N Y Yamada,² T T TiTi,¹ H M Myint,³ P N Noe,³ M Z Zaw,¹ H Kluge,⁴ W M Maung.¹ ¹National TB Programme, Yangon, Myanmar; ²Research Institute of TB, Japan Anti-TB Association, Tokyo, Japan; ³Aung San TB Hospital, Yangon, ⁴World Health Organization, Yangon, Myanmar. Fax: (+95) 1212605.
e-mail: klugeh.whomm@undp.org

Setting: Yangon division with a population of 6.4 million with case notification rate of smear positive new 118/100 000, of all smear positive 143/100 000 in 2005, and of all TB 384/100 000 under DOTS program.

Objective: To clarify magnitude and trend of TB in capital district of Yangon.

Design: Cross sectional survey with population proportionate cluster sampling; 20 792 eligible subjects of aged 10 or more in 9 rural and 21 urban clusters were invited for structured interview and chest X-ray. Those with 'TB treatment history' or 'cough more than 3 weeks or blood contained sputum' or 'any abnormality by X-ray' were asked to submit three sputum specimens.

Results: 18 809, 90.5%, among 20 792 eligible subjects participated in the study. 1059 had a previous TB treatment history and 64 were on TB treatment. 58 smear positive pulmonary TB cases, S(+)TB, 279 (204–381)/100 000 aged 10 or more, and 53 smear negative/culture positive TB cases, S(–)C(+)TB, 255 (182–357)/100 000 were detected. 40 (76%) of S(+)TB and 48 (91%) of S(–)C(+)TB were unknown new. Assuming there was no S(+)TB among 4389 children aged less than 10 in the study areas who were not screened, a prevalence rate of S(+) TB was 230 (168–314)/100 000. Age distribution of S(+)TB was bimodal with modes of 492/100 000 in aged 35–44 and 378/100 000 aged 65+. Male, 43 (451/100 000), had significantly more S(+)TB than female, 15 (133/100 000), however, this difference was smaller in S(–)C(+)TB, male 30 (314/100 000), female 23 (204/100 000). There was no significant difference between urban (245/100 000) and rural (360/100 000).

Conclusion: TB burden in Yangon is much higher than expected and TB epidemic seems to be younger than compared with 1972 survey. There might be second wave of epidemic in last 2 decades, not explained by TBHIV only. National survey should be carried out to clarify nationwide situation.

PS-71958-11 Five-year TB mortality rate as an indicator of the effectiveness of Estonian TB programme

V Hollo,¹ A Kurve,² M Meren,² A Pärnsalu.² ¹National Tuberculosis Registry, Tallinn, ²North Estonia Regional Hospital, Tallinn, Estonia. Fax: (+372) 6593918.
e-mail: vahur.hollo@regionaalhaigla.ee

Background: By year 2000 Estonia was 100% covered by the DOTS system. The TB notification rate in 2001 was one of the highest during last ten years—56 cases per 100 000 population and the proportion of MDR TB among all cases was 20%. By 2005 the notification rate has decreased to 39 cases per 100 000 population and proportion of MDR TB has stayed the same. Treatment success of all culture positive pulmonary TB cases has remained stable, reaching 68% in 2001 (included also retreatment cases other than relapses) and 69% in 2005.

Objective: To analyse the TB mortality rate as an indicator of effectiveness of Estonian TB program.

Methods: A record review TB Registry data was performed in order to obtain medical information of all 3066 patients registered at the Estonian TB Registry between January 1, 2001 and to December 31, 2005.

Results: By the year 2007, 2703 (88.2%) patients out of 3066 were alive. Out of those 2421 (78.9%) were cured from TB, 166 (6.1%) were lost to follow up, 20 (0.7%) were on symptomatic treatment and 48 (1.8%) are still on treatment. Out of 340 patients dead, 257 (8.4%) died of TB and 65 (2.1%) because of other reasons than TB. In case of 18 (0.6%) patients cause of death was unknown. The death rate in TB per 100 000 population has changed by years: 2001—6.0 (82 cases); 2002—3.6 (49); 2003—3.8 (52 cases); 2004—3.6 (49 cases) and 2005—1.9 (25 cases).

Conclusions: The 5-year TB mortality rate in Estonia during 2001–2005 has decreased 3 times from 6.0 to 1.9—but due to big yearly variability and low number of cases, the effectiveness of Estonian TB Program cannot be drawn out by this indicator.

PS-71959-11 Time-to-event analysis of household incidence of tuberculosis in two high-incidence communities

J L Morrison,^{1,2} R Dunbar,¹ C Lombard,³ D Bester,¹ S van Zyl,¹ N Beyers.¹ ¹Desmond Tutu TB Research Centre, University of Stellenbosch, Cape Town, South Africa; ²School of Medicine, University of California, San Francisco, San Francisco, California, USA; ³Medical Research Council of South Africa, Cape Town, South Africa. Fax: (+27) 21 938 9476.
e-mail: janinalorrison@gmail.com

Background: Household transmission of tuberculosis (TB) contributes significantly to the burden of disease in both high and low incidence settings. Though contact tracing studies give an important cross-sectional view of TB in households, little is known about the incidence of TB in households over time.

Methods: We carried out a descriptive analysis of all confirmed TB cases in two high incidence communities in Cape Town, South Africa from 1993–2004. Time-to-event analysis was used to determine the proportion of episodes leading to secondary cases at 6 month intervals. Kaplan-Meier estimated curves were used to explore the contribution of various episode characteristics to the incidence of TB within the households.

Results: There were 1448 individuals with confirmed TB at 1017 addresses from 1993–2004. 27.3% of households had >1 individual with confirmed TB; 10.4% had >2. Time-to-event analysis revealed that 10% of all households (37% of households with >1 case) had a second confirmed case within 6 months of the first case. Risk factors for increased household incidence will also be discussed.

Conclusion: This study provides a unique view of TB incidence over time within households in a high incidence area. A large proportion of households had multiple individuals with confirmed TB. Better understanding of these trends in household incidence can be used to guide household interventions and TB control policy.

PS-71980-11 Genotyping of *Mycobacterium tuberculosis* strains isolated from tuberculosis patients in rural Bangladesh

S Banu. International Centre for Diarrhoeal Disease Research, B, Dhaka, Bangladesh. Fax: (+880) 2 8812529. e-mail: sbanu@icddr.org

Objective: The aim of the study was to characterize the *M. tuberculosis* strains prevailing in rural Bangladesh and to investigate the transmission pattern of tuberculosis caused by these strains.

Methods: Clinical isolates of *M. tuberculosis* were collected from adult pulmonary TB patients from two different rural sites of Bangladesh. The total number of the strains was 324, 213 were from the Mymensingh site and 111 were from Matlab site. Deletion analysis, a PCR-based technique using regions of difference (RDs), mycobacterial interspersed repetitive units-variable-number tandem repeats (MIRU-VNTR) genotyping and spoligotyping were performed on all strains.

Results: All the isolates tested were *M. tuberculosis*. Presence of TbD1 region was observed in 211 strains indicating that 65% of the strains are of 'ancestral' type (mostly endemic strains) while 113 (35%) were 'modern' type. A total of 172 strains (53%) were grouped by spoligotyping into 37 clusters; the largest comprised 45 (14%) isolates of the Beijing genotype, whereas the remaining 36 clusters are of two to nine isolates. MIRU-VNTR genotyping was also done on the isolated strain. Overall, isolates from 251 patients (77%) had unique MIRU patterns, whereas isolates from 73 patients (23%) had MIRU patterns that were identical

to those of an isolate from at least one other study patient; the isolates in the latter group fall into 29 clusters. The largest cluster comprised seven isolates, the remaining 28 clusters were of two to five isolates. Interestingly, clustering was significantly higher among 'ancestral' strains (64%) while it was 36% among the 'modern' strains. There was no apparent epidemiological link found among the identical strains.

Conclusion: Our results indicate that recent transmission is not very common in rural Bangladesh rather reactivation of latent disease mostly caused by 'ancestral' strains contributes substantially to the increase in tuberculosis in rural Bangladesh.

PS-71987-11 TB incidence: are national estimates valid for use at sub-national level?

M A Hamid Salim, K H Habebul Arif, D R Alamgir, E Declercq. Damien Foundation, Dhaka, Bangladesh. Fax: (+880) 2 8810903. e-mail: dfsalim@citechco.net

Setting: Eight districts of north and northwest Bangladesh with TB control activities is implemented by Damien Foundation Bangladesh. Those districts cover a total population of 19.8 million. Presently 114 laboratories are functional and remain under EQA system with excellent and comparable results. Incidence of new smear positive TB is estimated at 103 per 100 000 population at national level.

Methods: Data on suspects, new smear positive patients and CDR for the years 2001 and 2006 are compared between north and northwest districts.

Results: Data show that between 2001 and 2006 the suspicion rate per 100 000 population increased from 354 to 680 in northwest and from 522 to 986 in northern districts due to expanding laboratory networks and strengthening social mobilization campaigns. The case detection rate increased in the north from 56% to 67% but from 30% to 36% only in the northwest in spite of the enormous efforts made for detecting cases. In 2006, mean duration of disease at diagnosis was 2.08 months in the northwest and in 2.23 months in the north.

Conclusion: Incidence of sputum positive TB appears to be lower in northwest than in northern districts. TB incidence estimates used at national level may not always be applied to calculate the number of expected cases at sub-national level.

GLOBAL EPIDEMIOLOGY

PS-71308-11 The role of zoonotic TB at the human, livestock and wildlife interface in South Africa

C Geoghegan,¹ W M Getz,^{1,2} J Godfroid,³ M P Robertson.⁴

¹Mammal Research Institute, Department of Zoology and Entomology, University of Pretoria, Pretoria, South Africa;

²Department Environmental Science Policy & Management, University of California at Berkeley, Berkeley, California, USA;

³Department of Veterinary Tropical Disease, University of Pretoria, Pretoria, ⁴Department of Zoology and Entomology, University of Pretoria, Pretoria, South Africa.

Fax: (+27) 12 420 3210. e-mail: cgeoghegan@zoology.up.ac.za

Mycobacterium tuberculosis (TB) infects 8 million people and is responsible for 2 million deaths per year. In Africa, it is estimated that >90% of people have been exposed to the Mycobacteria causing TB. Thus, controlling the spread of TB is a top priority for public health, especially in poor areas with high levels of MDR TB and HIV/AIDS, and limited access to health care.

In rural South Africa, farming communities are also frequently exposed to zoonotic Mycobacteria like bovine tuberculosis (BTB), which is present in wildlife and livestock species. Efforts to monitor and control BTB in wildlife populations have been successful in South African parks, but the role and transmission of zoonotic TB between wildlife, livestock and human populations has received little attention, and remains poorly understood.

This paper reviews the latest research on zoonotic TB in Africa, and outlines the practical risk factors for transmission of BTB between animal species and humans. We discuss the risks and implications of zoonotic disease for poor rural communities who rely on livestock for agriculture, food security and social status; and ask if improving the links between animal, human and conservation health services may help to strengthen the fight against TB?

PS-71391-11 *M. bovis* human TB: epidemiological findings, case histories and evidences of anthrozo-zoonotic transmission

M Gorla,¹ A Dondo,¹ A Garrone,¹ A Benedetto,¹ S Zoppi,¹

A Mondo,² F Rosso,³ G Moda,³ S Bonora.² ¹Istituto Zooprofilattico Sperimentale del Piemonte, Liguria, Torino, ²Clinica Delle Malattie Infettive, Università di Torino, Ospedale Amedeo Di Savoia, Torino, ³Servizi Veterinari Della Regione Piemonte, Settore Sanita Animale E Igiene Degli Allevamenti, Torino, Italy. Fax: (+39) 0112686 259. e-mail: mariella.gorla@izsto.it

Humans are the natural host for *M. tuberculosis*, but also *M. bovis*, etiologic agent of bovine tuberculosis, was known to be sporadically transmissible to man. In the 2005 EFSA Community Report on Trends and Sources of Zoonoses, Zoonotic Agents, in fact, 119 *M. bovis* TB cases in man were registered in Europe, confirming a rising trend during the last years and it is

reasonable to suppose that the real contribution of *M. bovis* in human TB cases remains still underestimated. A retrospective study was planned to evaluate *M. bovis* transmission to humans in North Western Italy and in order to update zoonotic TB features. The investigation was performed in areas where cattle breeding represents an important economical resource and TB eradication is not completed. From 2001 to 2006 13 cases of human tuberculosis due to *M. bovis* were unexpectedly detected. Correlations either with age (prevalence of infection in elder people) or with job (breeders, butchers etc.) of patients were analysed. Furthermore, in 4 cases of *M. bovis* infection in farmers, an epidemiological linkage between infection in humans and animals was not only suspected by veterinary epidemiological investigations but also confirmed by molecular analysis of respective mycobacterial strains. Our report showed that human *M. bovis*-related tuberculosis is underestimated in our geographical region, and the use of molecular analysis allowed to correctly trace epidemiological links between humans and animals.

PS-71115-11 Prevalence and risk of TB infection in Somalia: national tuberculin survey 2006

A Munim. WHO Somalia, Nairobi, Kenya.

Fax: (+254) 207623725. e-mail: aaiydmunim@yahoo.com

Setting: Somalia is a complex emergency country where tuberculosis (TB) remains a significant health problem; February, March 2006.

Objective: To estimate the annual risk of tuberculosis infection (ARTI) and trend of TB infection by comparing the current rate with the results of previous surveys.

Design: A tuberculin survey was held in randomly selected 101 primary schools with in 18 regions, 32 districts in February, March 2006. Tuberculin testing with 2TU PPD RT 23 with Tween 18 was performed in 10 680 grade one school children by highly trained designated tuberculin testers. A stratified sampling was adopted for selection of clusters. Transverse tuberculin reaction size were measured about 72 hours later by trained readers. The number of children satisfactory test-read was 10 364.

Results: Based on frequency distribution of tuberculin reaction sizes, the ARTI in Somalia was estimated at 2.2% (1.5–3.2%) with statistically difference among the three zones (high prevalence and ARTI in South and Center and lowest North East Zone).

Conclusion: The ARTI in Somalia was 2.2% and there was an annual decline of 2.6% comparing with previous studies in 1956. However the transmission is still high and further study should be carried out in five years and again in ten years to monitor the progress toward the MDG.

PS-71319-11 *Mycobacterium tuberculosis* drug resistance and the analysis for patients with multidrug-resistant pulmonary tuberculosis

Y Wei, Y Zao, L Yang. TB Control Institution of Guizhou CDC, Guiyang, Guizhou, China. Fax: (+86) 08516823835. e-mail: GZSTB@sina.com

Objective: To determine the state of anti-tuberculosis drug resistance, and to analyze the reason of multidrug resistance.

Methods: *Mycobacterium tuberculosis* (MTB) isolated from 13 countys and prefectures were subjected to susceptibility testing against 4 anti-tuberculosis drugs and to consult the history disease data who acquired the multidrug-resistant *Mycobacterium tuberculosis*.

Results: The total drug resistance rate of the 200 MTB isolates was 34.5%. The multidrug resistance rate (MDR) was 13.5%. The resistance rate to INH, RFP, SM and EMB was 22.0%, 20.0%, 17.0% and 7.0%, respectively. To investigate the data of the MDR-TB patients, found that whose disease-process above 2 years accounted for 48%, patients possessed irregular treatment accounted for 59%.

Conclusions: We should not ignore the anti-tuberculosis drug resistance. Most of the multidrug resistance patients accepted irregular and repeated treatment, which suggest that is necessary to improve the management quality aimed to tuberculosis patients, and the measures of treatment and supervision for drug resistant tuberculosis patient should be cleared and standardized.

PS-71355-11 Predictors of favorable results in pulmonary tuberculosis treatment (Recife, Pernambuco, Brazil, 2001–2004)

C M Sasaki,¹ L M Scatena,² R I Cardozo-Gonzales,¹ A Ruffino-Netto,³ R A A Ximenes,⁴ P Hino,¹ M J B Vilela,⁵ T C S Villa.¹ ¹College of Nursing, University of São Paulo, Ribeirão Preto, São Paulo, ²University Federal of São Carlos, São Carlos, São Paulo, ³College of Medicine, University of São Paulo, Ribeirão Preto, São Paulo, ⁴University Federal of Pernambuco, Recife, Pernambuco, ⁵Tuberculosis Control Program, Recife, Pernambuco, Brazil. Fax: (+55) 1636333271. e-mail: midsas@eerp.usp.br

Aim: To identify and analyze predictors of treatment success for pulmonary TB cases.

Design/Methods: Based on information obtained from the National Case-registry database (SINAN) factors were identified and analyzed as predictors of favorable results in pulmonary tuberculosis treatment for cases diagnosed between 2001–2004 in the city of Recife, Pernambuco state, Brazil. The statistical methods used were uni- and multivariate logistic regression.

Results: Variables in the final multivariate model were: age, '0 to 9 years' (OR = 4.27; $P = 0.001$) and '10 to 19 years' (OR = 1.78; $P = 0.011$), both of which had greater chance of cure than 'over 60 years'; education, '8 to 11 years' (OR = 1.52; $P = 0.049$) had a better chance of cure than 'no education'; type of entry, 'new

cases' (OR = 3.31; $P < 0.001$) and 'recurrence' (OR = 3.32; $P < 0.001$) had a greater chance of cure than 're-treatment after default'; time 2, '5–6 months' (OR = 9.15; $P < 0.001$); '6–9 months' (OR = 27.28; $P < 0.001$), and 'over 9 months' (OR = 24.78; $P < 0.001$) had a better chance of cure than 'less than 5 months'; health unit district, 'HUD I' (OR = 1.60; $P = 0.018$) and 'HUD IV' (OR = 2.87; $P < 0.001$) had better chances of cure than 'HUD VI'.

Conclusion: It is recommended that health care services should be organized to focus on individual needs giving priority to groups with lower chances of cure. This would assure greater equity in care and improve the city's epidemiologic indicators of tuberculosis.

PS-71356-11 Quality of SINAN data for tuberculosis control in Recife, Pernambuco, Brazil (2001–2004)

C M Sasaki,¹ L M Scatena,² R I Cardozo-Gonzales,¹ A Ruffino-Netto,³ A A Monroe,¹ M E F Brunello,¹ T C S Villa.¹ ¹College of Nursing, University of São Paulo, Ribeirão Preto, São Paulo, ²University Federal of São Carlos, São Carlos, São Paulo, ³College of Medicine, University of São Paulo, Ribeirão Preto, São Paulo, Brazil. Fax: (+55) 1636333271. e-mail: midsas@eerp.usp.br

Aim: The purpose of this exploratory study was to analyze the quality of data available from the National Case-registry database (SINAN) about pulmonary tuberculosis in the city of Recife–state of Pernambuco, between 2001 and 2004 and adjust such data in terms of availability, use and production of information in the Unified Health System.

Design/Methods: Statistica 7.1 (Statsoft) software was used to build tables and histograms. Such data arrangements were built in order to identify and obtain frequency distribution for categories of each selected data.

Results: The following data fields did not show any blank, ignored, and/or inconsistent records: year of diagnosis; city of residence; clinical form; and type of entry. There was high percentage of blank records for the following: occupation (82.10%) and other diseases (42.85%). Records were ignored for: education (39.40%), other diseases (39.73%), and supervised treatment (63.96%). Inconsistent records were found for: occupation (2.53%), start-of-treatment date (9.94%); and end-of-treatment date (17.66%). Data fields type of entry and HIV had categories which did not allow for information production: does not know (7.59%); forwarded (2.51%); waiting for result (8.36%); and 'not tested' (76.79%).

Conclusion: In order to adequately increase SINAN use, it is necessary to develop a policy for information management and provide healthcare professionals with technical training.

PS-71515-11 Evaluation of the World Bank China TB control project in Liaoning province for 15 years

P Qu, C Wang. Liaoning Provincial CDC, Shenyang, China.
Fax: (+86) 24 23388233. e-mail: heguangxue@yahoo.com.cn

Background: World Bank (WB) China TB Control Project has been implemented in Liaoning province with the population of 41.6 million for 15 years.

Objective: Through implementing the WB China TB control project

- 1 To increase the TB case detection rate and cure rate
- 2 To establish sustainability mechanism for implementing the priority and cost-benefit activities of WB China TB control project
- 3 To provide the scientific experience for the entire country

Methods: Based on Project Implementation Plan, Liaoning utilized a WB loan to carry out a TB control project since 1992 and started to implement the WB/DFID China TB Control Project in 2002. We evaluate the project through analyzing the results of the survey on TB information, quarterly report, annual report and relative data/document.

Results: WB China TB control project has been implemented for 15 years in Liaoning province from 1992 to 2006. The population coverage rate has increased from 7.53% in 1992 to 100.00% in 2006; the new smear positive TB cases detected has increased from 826 in 1992 to 12103 in 2006; the cure rate of new smear positive TB cases has increased from 74.58% in 1992 to 95.88% in 2006. We got a lot of experience through implementing the project.

Conclusion: Through analyzing the data and document, we know how to implement and what kind of activities to greatly increase the case detection rate and cure rate which recognized by government and continue to fund the priority and cost-benefit activities, and the experience of WB China TB project has also been extended to other provinces.

PS-71618-11 Spoligotypes of *Mycobacterium tuberculosis* complex isolates of an aboriginal township in Taiwan

P-C Chuang,¹ H Liu,¹ C Sola,² R Jou.¹ ¹Ref Lab of Mycobacteriology Centers for Disease Control, Taipei, Taipei, China; ²Unité de Génétique Mycobactérienne, Institut Pasteur, Paris, France. Fax: (+886) 26531387. e-mail: rwj@cdc.gov.tw

To understand the genetics of *Mycobacterium tuberculosis* complex isolates circulating in the aboriginal Sioulin Township, the highest tuberculosis (TB) endemic area in Taiwan, we collected 138 isolates from January 2003 to December 2004 for genotyping. Spacer oligonucleotide typing (spoligotyping), IS6110-restriction fragment length polymorphism (RFLP) and ogt and mgtC single nucleotide polymorphisms (SNPs) characterization were used for genotyping. Spoligo-

typing data were compared with the fourth international spoligotyping database, SpolDB4. Of 27 spoligotypes resolved, 14 (51.9%) spoligotypes were noted in SpolDB4 and 13 (TW1–13) unique ones. Among 14 defined spoligotypes, the most common was the ST1 of Beijing lineage (35.5%), followed by ST742 (10.9%) of a Haarlem-like lineage, ST33 (5.8%) of LAM3 lineage and ST50 (3.6%) of Haarlem 3 sublineage. Based on the clade analysis results of RFLP dendrogram, 5 (TW6–8, TW12&13) were suggested to be Haarlem-like lineages and 8 (TW1–5, TW9–11) novel spoligotypes. Overall, major spoligotypes found in the Sioulin Township were Haarlem-like (39.1%), Beijing (38.4%), and Latin-American-Mediterranean (LAM) (5.8%) lineages. Interestingly, no East-African-Indian lineage, highly prevalent in Far-East Asia, was identified; and the ST33 of LAM3 lineage was reported for the first time in Asia. This study provides a first depiction of *M. tuberculosis* complex molecular population genetics in this isolated population and further elucidation of the global historical expansion of the isolates.

PS-71821-11 Role of NGOs in identification of chest symptomatic patients, case diagnosis, and DOTS expansion in Dominican Republic

R M Cruz Ferreira,¹ I Acosta,² A Lister,³ D Pérez,⁴ L Pérez Bidó,⁴ J Fajardo,⁵ U Anderson,⁶ E Nadal.⁷ ¹Social Mobilization of TB Program, Santo Domingo, ²Profamilia/Global Fund, Santo Domingo, ³Promotion and Human Solidarity Center (CEPROSH), Santo Domingo, ⁴Dominican Association of Family Plan (ADOPLAFAM), Santo Domingo, ⁵Dominican Institute of Integral Development (IDDI), Santo Domingo, ⁶Absent Samanenses Association; ⁷Dominican Women in Development (MUDE), Santo Domingo, DN, Dominican Republic. Fax: (+809) 6821234. e-mail: rmcruz@profamilia.org.do

Introduction: PNCT on Dominican Republic has experienced significant changes in the last five years, going from the DOTS expansion phase to its consolidation. In support to these process, Profamilia, NGO with social participation experience, since 2005 it is the main beneficiary of the Project National Response against tuberculosis financially supported by Global Fund, applies the social mobilization strategy for tuberculosis control in 10 provinces of the country.

Objective: To mobilize to the civil society in support to the actions of PCT prevention and control, strengthening DOTS in the communities.

Method: Profamilia through agreements with NGOs, Provinces Administration of Health and PNCT, it generates a communitarian boarding causing the integration of social and volunteer networks supporting DOTS implementation, and decrease of stigma and discrimination associated. NGOs identify and train volunteers. Perform IEC activities and household visits, supporting to patients in treatment, recovering negligence and taking BK samples.

Results: 111 communities were intervened on Dominican Republic. 4 committees of Fight against TB were formed. 150 community groups were incorporated to prevention of tuberculosis. 403 trained volunteers. 25 315 people reached through IEC. 618 chests symptomatic identified, 87% examined. 147 patients contacted referred to TB. 5230 household visits. 17 new cases detected. Social supervision and the integration of 5 diagnosis units.

Conclusions: Civil society involvement helps to increase cases detection; decrease of negligence and to maintain a high rate of cure.

PS-71872-11 Chronic obstructive pulmonary disease (COPD) mortality in Brazil, 1980–2006

H Campos,¹ R M Fernandes,² M A Hijjar,¹ M J Procopio.¹
¹Centro de Referencia Prof. Helio Fraga, Rio de Janeiro, Rio de Janeiro, ²CGIAE/DASIS/SVS, Brasília, Distrito Federal, Brazil.
 Fax: (+55) 21 25529500. e-mail: hisbello@globo.com

Aim: To present data regarding COPD mortality in Brazil during the period 1980–2006.

Method: Data was obtained from the Brazilian official mortality system (SIM). For data from 1980–1997, the ICD 490, 491, 492 and 496 (Revision 9 of the International Classification of Diseases [ICD]) were used and for the period 1998–2006, ICD J40, J41, J42, J43 and J44 (Revision 10 of the ICD). Data from 2006 includes the months from January to October. Data from 2005–2006 is provisory.

Results: During 1980–2006, COPD was responsible for a mean 22 010 deaths per year, or an average of 60 deaths per day. These figures are about 10 times more than the rate for asthma during the same period. For the whole period, there was an increasing trend (1980 = 9358; 2004 = 35 548). Overall, the death rate per 100 000 habitants was 14.12; with more deaths amongst males (17.93/100 000 females vs. 10.38/100 000 males). 84% of the deaths were amongst those aged 55 or more. 79% of the deaths occurred in a hospital environment.

Conclusion: During 1979–2006, COPD was responsible for an average of 58 deaths per day; and accounted for around 84% of deaths amongst adults over the age of 55. Undoubtly, COPD is a major cause of death amongst adults at Brazil, mainly for men. Almost 80% of the deaths occurred in hospital, which may reflect less of the population having access to effective ambulatory care.

PS-71917-11 HIV testing in tuberculosis patients and TB-HIV co-infection rates, Brazil, 2001–2005

R G Abreu,¹ S B Codenotti,² M L Z Lise,² R Maia,³ J R P Santos.² ¹Epidemiological Surveillance Dept./Secretariat of Health Surveillance/Ministry of Health, Brazil, Brasília, ²National Tuberculosis Control Program/Epidemiological Surveillance Dept./Secretariat of Health Surveillance/Ministry of Health, Brazil, Brasília, ³General Coordination of Public Health Laboratories/Epidemiological Surveillance Dept./Secretariat of Health Surveillance/Ministry of Health, Brazil, Brasília, Distrito Federal, Brazil. Fax: (+55) 613315 3214.
 e-mail: ricardo.gadella@saude.gov.br

Introduction: TB-HIV co-infection establishes a serious public health problem as much in developed countries as in developing ones. Brazil notifies about 85 000 cases per year with a co-infection rate of 8 by 1000.

Objective: To verify the percentage of co-infected patients that made anti-HIV test from 2001 to 2005 in Brazil to enable the decision make process.

Method: It was analyzed 474 033 new tuberculosis (TB) cases records into the TB Notification Information System (SINAN-TB) of Ministry of Health from 2001 to 2005. It was considered as HIV-positive only SINAN-TB registered cases with positive result for anti-HIV test. It was used the TABWIN software.

Results: Among 474 033 new TB cases, it was made 179 823 (37.9%) anti-HIV tests. The higher rate of tests occurred in the State of Espirito Santo with a rate of 80.9% and the lowest one in the State of Amapa with a rate of 2.4% in 2005 and 2002, respectively. In Brazil, the TB-HIV co-infection mean percentage varied from 7.5% to 7.7% in 2001 and 2005, respectively. Among all Brazilian States the higher co-infection rate occurred in the State of Rio Grande do Sul with the incidence rate of 18.7 by 1000 inhabitants and the lower rate in the State of Acre with 0.6 by 1000 inhabitants in 2002 and 2001, respectively.

Conclusion: Despite the offer of 100.0% of anti-HIV tests in TB patients has been advocated, it has observed that some Brazilian States are beneath of proposal goal. Then, it recommends identifying the associated factors of doing or not doing the anti-HIV test in the country as well the improvement of offered service.

PS-72033-11 The burden of tuberculosis of a large Brazilian municipality: the influence of socio-economic status

T C S Villa,¹ S H F Vendramini,² M L S G Santos,² C E Gazetta,² F Chiaravalotti Neto,² S A C Oliveira,² A Ruffino-Netto,¹ N S G M Santos,² M A Z Ponce,² J C Figueiredo,³ M R Cury.⁴ ¹Nursing School of Ribeirão Preto, Ribeirão Preto, São Paulo, ²São José do Rio Preto Medical School, São José do Rio Preto, São Paulo, ³Paulista University, São José do Rio Preto, São Paulo, ⁴Secretary of Health and Hygiene of de São José do Rio Preto/SP, São José do Rio Preto, São Paulo, Brazil. Fax: (+55) 16613633 3271. e-mail: tite@eerp.usp.br

This paper explores TB risks in relation to potential determinants in São José do Rio Preto, São Paulo State, Brazil.

Objectives: To analyze morbidity and mortality rate in the city of São José do Rio Preto, and to determine the relationship between the risk of occurrence and the socioeconomic level, using a georeferenced information system (GIS) and the national census for the year 2000. Data sources: Mortality Information System (MIS), Case Registry Database (EPI TB), National Information on System of Notifiable Diseases, the Information Department of the Brazilian Health Ministry (DATASUS), and the Brazilian Institute of Geography and Statistics (IBGE). New cases reported in 1998/1999 and 2003/2004 in the urban area of the city were georeferenced and analyzed.

Method: Standardized incidence rates and TB incidence and mortality rates were calculated. Socioeconomic variables were determined by means of the statistical technique of Principal Component Analysis.

Results: TB risk in the city is twice as high in areas with lower socioeconomic levels in comparison to areas with higher levels.

Conclusion: The identification of areas with different levels of risks enables the Municipal Health Department to propose innovative interventions to minimize the risk of disease both at the individual and population level.

PS-72110-11 The rising burden of chronic obstructive pulmonary disease in Nigeria

D Obaseki,¹ G E Erhabor,¹ O F Awopeju,¹ F A Erhabor.² ¹Dept of Medicine, Obafemi Awolowo University Teaching Hospital, Ile-Ife, Osun, ²Dept of Nursing, Obafemi Awolowo University Teaching Hospital, Ile-Ife, Osun, Nigeria. Fax: (+234) 8037107877. e-mail: danseki@yahoo.com

Chronic Obstructive Pulmonary Disease (COPD) was previously considered a rare condition in Nigeria but in recent years there seem to have been a change in this pattern. We aimed at assessing the pattern of change in this condition and its presentation over the last 45 years.

Method: We did a retrospective analysis of all pulmonary admissions on account of COPD in Obafemi Awolowo University teaching hospital, Ile-Ife in 2006

with special note on the social demographics, smoking history, use of biomass fuels. The lung function results were retrieved were available. These figures were compared with the pattern in 1961 in University College Hospital which was then the only tertiary hospital in the south west region of Nigeria to review the trend after 45 years.

Result: Mean age, 68 yrs; BMI 22; FEV1% Pred, 50%; FVC % 55 and most (62%) were of the low socioeconomic status. No record of admissions (0%) on account of COPD was noted in 1961 but in 2006 it accounted for 13% of respiratory admissions. 40% were previous smokers but 54% had never smoked. Use of wood smoke is noted as a common practice among patients (55%).

Conclusion: COPD is a rising health problem in Nigeria and adequate preventive modalities should be taken to stop this trend.

PS-72150-11 Treatment outcomes of tuberculosis patients with acquired immune-deficiency syndrome (AIDS), Brazil, 2001–2005

S B Codenotti,¹ J R P Santos,¹ M L Z Lise,¹ D O Garrett,^{2,3} C P S Barbosa,¹ R G Abreu.⁴ ¹National Tuberculosis Control Program/ Epidemiological Surveillance Dept./Secretariat of Health Surveillance/Ministry of Health, Brasília, Distrito Federal, Brazil; ²International Union Against Tuberculosis and Lung Disease, Paris, France; ³United States Agency for International Development, Brasília, ⁴Epidemiological Surveillance Dept./Secretariat of Health Surveillance/Ministry of Health, Brasília, Brazil. Fax: (+55) 6132256416. e-mail: stefanocodenotti@gmail.com

Introduction: HIV and tuberculosis (TB) are leading global causes of mortality and morbidity.

Objective: To analyze treatment outcomes of TB patients with AIDS in Brazil.

Methods: Cohort analysis of results of treatment of all new TB cases registered at the National TB Surveillance System in Brazil, from 2001 to 2005. Analyses were performed with TabWin 3.4 and EpiInfo 6.04D.

Results: Of 357 628 TB patients evaluated, 22 552 (6.3%) had AIDS. Median age of TB/AIDS patients was 35 (range = 0–99) years; 15 904 (70.5%) were male. Pulmonary TB was present in 15 825 (70.2%). Among these, 7306 (46.2%) were new smear-positive pulmonary TB. Treatment success among TB/AIDS cases was achieved in 264 504 (74%). Treatment success among TB patients without AIDS was significantly higher than among TB/AIDS patients (75.6% vs. 50.2% relative risk [RR] = 1.50; 95% confidence interval [CI] = 1.48–1.52; $P < 0.001$). TB/AIDS patients were more likely to default treatment (13.9% vs. 10.0% RR = 1.38; 95%CI = 1.33–1.43; $P < 0.001$) and to die (24.2% vs. 6.0% RR = 4.05; 95%CI = 3.95–4.16; $P < 0.001$).

Conclusion: TB/AIDS patients in Brazil have generally poor treatment outcomes, with treatment success

rates much lower than the WHO global target of 85%. Brazil should implement measures to improve cure rates among these patients.

PS-72155-11 Evaluation of treatment outcomes among new and retreatment tuberculosis patients in Brazil, 2001–2005

M L Z Lise,¹ J R P Santos,¹ S B Codenotti,¹ C P S Barbosa,¹ D O Garrett,^{2,3} R G Abreu.⁴ ¹National Tuberculosis Control Program/Epidemiological Surveillance Dept./Secretariat of Health Surveillance/Ministry of Health, Brasília, Distrito Federal, Brazil; ²International Union Against Tuberculosis and Lung Disease, Paris, France; ³United States Agency for International Development, Brasília, ⁴Epidemiological Surveillance Dept./Secretariat of Health Surveillance/Ministry of Health, Brasília, Brazil. Fax: (+55) 6133214268. e-mail: lisemlz@yahoo.com.br

Introduction: Brazil is one of 22 countries responsible for 80% of all tuberculosis (TB) cases worldwide. **Objective:** To perform a cohort analysis and describe treatment outcomes of pulmonary TB patients.

Methods: A retrospective cohort study of all TB patients registered National TB Surveillance System in Brazil, from 2001 to 2005. Analyses were performed with TabWin 3.4 and EpiInfo 6.04D.

Results: A total of 466 245 patients with TB were evaluated. Among these, 407 682 (87.4%) were new TB cases and 27 590 (5.9%) were re-treatment after defaulting and 30 973 (6.6%) relapse cases. A treatment success rate among new cases was significantly higher than among re-treatment after defaulting and relapse cases (74.0% vs. 57.2% relative risk [RR] = 1.28; 95% confidence interval [CI] = 1.28–1.30; $P < 0.001$). Among re-treatment cases, relapse patients were more likely to complete treatment than previously defaulting patients (67.9% vs. 42.2%; RR = 1.49; 95% CI = 1.47–1.52; $P < 0.001$).

Conclusion: Treatment success rates among new and re-treatment TB patients in Brazil are much lower than the WHO global target of 85%. Brazil should implement measures to improve cure rates, specially among previously treated patients.

TB IN LOW-BURDEN COUNTRIES

PS-71116-11 Molecular investigation of recurrent tuberculosis in Rwanda: reactivation vs reinfection

A Umubyeyi Nyaruhirira,^{1,2} I C Shamputa,^{1,3} A Dediste,² G Zissis,² E Karita,⁴ J M Struelens,⁵ F Portaels.¹ ¹Institut of Tropical Medicine, Mycobacteriology Unity, Antwerpen, ²CHU St Pierre, Microbiology, Brussels, Belgium; ³Tropical Diseases Research Center, Ndola, Zambia; ⁴Projet San Francisco, Emory University, Kigali, Rwanda; ⁵Erasme Hospital, Microbiology, Brussels, Belgium. Fax: (+32) 03 247 6333. e-mail: alainenyaruhirira@hotmail.com

We investigated the clinical outcome of MDR versus non-MDR tuberculosis and the cause of recurrences

in Rwandese patients by DNA fingerprinting. From January 2002 to September 2005, 710 patients in 4 provinces were studied. Initial drug susceptibility results available for 638 patients, classified 68 (10.8%) patients as harbouring *M. tuberculosis* isolates resistant to at least isoniazid and rifampicin (multidrug-resistant; MDR), and 570 patients as non-MDR-TB.

Among the 68 MDR-TB patients, 21 who failed treatment had follow-up isolates. Among the 570 patients, 558 were cured and 12 were lost to follow-up isolates. DNA patterns of sequential isolates from 5 patients (3 MDR and 2 non-MDR) TB patients were different, indicating reinfection caused the recurrence. Mixed infection was detected in one non-MDR-TB case. Indistinguishable DNA patterns were obtained from isolates of the other 8 MDR-TB patients suggesting reactivation or treatment failure as the cause of the recurrence. Follow-up isolates from all the 10 chronic MDR-TB patients had identical DNA patterns, indicating treatment failure. These results document a high treatment failure rate for MDR-TB and show that reinfection is an infrequent cause of recurrent TB in this setting.

PS-71450-11 Introduction of a standardised risk assessment for DOT therapy

D J Laycock, W G Roberts, C McSparron, G H Bothamley, T Rennie, S Anaraki. North East London TB Network, London, UK. Fax: (+44) 2085107731. e-mail: deborah.laycock@homerton.nhs.uk

Introduction: The National TB Action Plan published by the UK Department of Health in 2004 included the target of minimum 85% treatment completion in TB patients. Directly Observed Therapy (DOT) is a useful tool for increasing adherence in patients with complex needs. In order to select patients for DOT a risk assessment tool needs to be used.

Methods: Nursing notes of patients diagnosed in 2006 and treated in NE London TB clinics were assessed for evidence that risk assessment had been carried out. Details of patients on DOT were extracted from the London TB Register (LTBR) and cross-referenced with nursing notes. Denotified patients were excluded from analysis.

Results: Of the 75 patients who were on DOT in 2006, 25.3% did not have a documented risk assessment. This was variable across the sector: Homerton

Clinic	Patients on DOT <i>n</i>	Patients on DOT who have risk assessment <i>n</i> %
Homerton Uni Hosp	19	19 (100)
Barts and the London	12	3 (25.0)
Whipps Cross Uni Hosp	3	0
Barking, Havering, Redbridge	12	12 (100)
Newham Trust	29	22 (75.9)
Total for NE London	75	56 (74.7)

Hospital recorded assessment in all patients whereas Whipps Cross hospital had no documented risk assessment (table). 60% of DOT patients had smear positive TB, 69.3% were not born in the UK and 10.7% had a previous diagnosis of TB.

Conclusion: The low level of risk assessment in some clinics has prompted a standardised risk assessment for new patients to be implemented in all clinics. The modified nursing notes will evaluate intended use of DOT with actual practice and also give a clearer picture of the complex needs issues of DOT patients.

PS-71495-11 Trend analysis of tuberculosis incidence in ecological zones of Nepal during 1996–2003

G Badri,¹ T Yoshiyama,² K K Jha,³ P Malla.⁴ ¹Eastern Regional Health Offices, Dhankutta, Nepal; ²Community TB and Lung Health Project, JICA/Nepal, Kathmandu, Japan; ³SAARC Tuberculosis and HIV Center, Bhaktapur, ⁴National Tuberculosis Center, Bhaktapur, Nepal. Fax: (+977) 16634379. e-mail: bngyawali@hotmail.com

Rationale: Tuberculosis (TB) is a public health problem. About 45% population is infected, 40 000 develop active TB, of whom 20 000 have infectious every year. Implementation of DOTS throughout the country assumes to reduce mortality, still 5000–7000 deaths annually.

Objective: The study describe trends of TB incidence in different ecological zones.

Methods: Using notified data during 1996–2003, descriptive study was conducted.

Results: During 1996–2003, 241 078 TB cases were reported under NTP. Out of them, mountainous ecological zone contributed 7390 (3%), hilly 90 532 (38%), and flat zone 143 156 (59%). The overall incidence rate during this period was found in mountainous ecological zones 54, hilly 112 and flat 166/year/100 000 with ratios (3.1:2.1:1). The trend analysis during this period in hilly & mountainous ecological zones is almost static whereas in flat, the overall incidence rate is decreasing from 170 to 154/100 000 and given by an equation $IR_t = 166.75 - 3.98 \times \text{year}$ ($P < 0.05$). Analyzing notified & expected incidence during this period shows that TB is still public health problem in Nepal (t -test, $P < 0.05$).

Conclusion: TB is major public health problem in Nepal even though overall reported incidence is decreasing 0.81/year/100 000 in Nepal during this period. The study finds that TB incidence in flat ecological zone is higher than hilly and mountainous ecological zone. Trends analysis shows that in mountain and hilly ecological zones, it is almost static whereas in flat ecological zone, TB cases are decreasing 3.98/year/100 000. Successful implementation of DOTS throughout the country assumes to reduce TB burden in each ecological zone. However, resources and activities should be allocated considering TB burden especially on flat ecological zone.

PS-71550-11 Outbreak of drug-resistant tuberculosis in a country with a low incidence of TB

S Ghebremichael,¹ R Petersson,¹ T Koivula,¹ S Hoffner,¹ V Romanus,² G Källénus.¹ ¹Department of Bacteriology, Swedish Institute for Infectious Disease Control, Solna, ²Department of Epidemiology, Swedish Institute for Infectious Disease Control, Solna, Sweden. Fax: (+46) 8 3017 97. e-mail: Solomon.ghebremichael@smi.ki.se

Background: Today drug-resistant tuberculosis (DR-TB) threatens the TB control programmes over the world. It is important to know the molecular epidemiology of the drug resistant isolates in order to monitor and stop the transmission. A large proportion of TB patients in Sweden are immigrants from countries with a high burden of TB, and more than 10% have DR-TB.

Aim: To study the molecular epidemiology of drug resistant isolates from TB patients in Sweden from 1994–2005.

Material and methods: 399 confirmed drug resistant isolates from TB patients were collected. Drug susceptibility test was performed for the first-line drugs using Bactec 460. RFLP, using IS6110, and spoligotyping was used to differentiate the isolates.

Results and conclusions: 36 different clusters of isolates with identical DNA fingerprints were found. The size of a cluster varied from 2 to 98. The largest cluster (SMI 049) mostly comprised patients from East Africa, but during the later part of the study several Swedish born patients appeared. This study revealed the spread of an isoniazid resistant TB strain in Sweden and the shortcomings of the Swedish TB programme.

PS-71551-11 Identification of *Mycobacterium tuberculosis* Beijing genotypes in Sweden

R Petersson,¹ S Ghebremichael,¹ T Koivula,¹ E Andersson,¹ S Hoffner,¹ V Romanus,² G Källénus.¹ ¹Department of Bacteriology, Swedish Institute for Infectious Disease Control, Solna, ²Department of Epidemiology, Swedish Institute for Infectious Disease Control, Solna, Sweden. Fax: (+46) 8301797. e-mail: ramona.petersson@smi.ki.se

Background: In Sweden the tuberculosis (TB) incidence is about 5 cases per 100 000 population and primary drug resistance (DR) is around 12%. Most of the TB patients are immigrants from countries with a high burden of TB.

Aim: To explore the presence of Beijing genotype strains in Sweden.

Materials and methods: Between 1994 and 2005 all 399 DR isolates were studied. In addition, 1265 isolates from patients with drug susceptible TB were also investigated. Drug susceptibility testing for the first-line drugs was performed using the Bactec 460 system. RFLP, using IS6110, and spoligotyping was applied to differentiate the isolates.

Results and conclusions: Based on the spoligotype pattern 102 isolates of Beijing genotype were detected

of which 47 were DR. Among these, 11 were multi-drug and one was extensively drug resistant. Sixteen different clusters were identified where the largest involved six patients. The Beijing genotype was more common among women (65%) than among men (35%). The majority of patients with Beijing strains were foreign born and came from countries with a high prevalence of DR Beijing strains. So far no extensive spread of DR Beijing genotype has occurred in Sweden.

PS-71560-11 Epidemiological profile of TB in Albania

P Kapisyzi, I Mino, J Bukli. University Hospital of Lung Disease, Tirane, Albania. Fax: (+355) 354792. e-mail: perlatk@yahoo.com

Objective: To study the epidemiological profile of TB during 1987–1996 and the comparison with cases of 2001–2005, the incidence of TB, the incidence of sputum acid-fast bacilli positive cases, the incidence of TB-HIV in hospitalized patients, the incidence of age distribution of the disease, the study of resistance of *Mycobacterium tuberculosis*.

Methods: This is a retrospective study. The data of 9982 patients diagnosed with TB were collected. We collected the data of BCG vaccination the data of disease treatment and the treatment for latent TB.

Measurements and main results: There are 3266, 3046, and 2670 new cases during 1987–1991, 1992–1996 and 2001–2005, respectively. In the curve of absolute incidence of TB during the years 1987–1991 is shown that the disease has a tendency to go down, during the years 1992–1996 there is a tendency to go up, in 1996 there are 707 new cases. The mean incidence for 100 000 inhabitants during the years 1987–1991, 1992–1996 and 2001–2005 is 20.4; 18.5; 17.2 respectively. During 1987–1991, the sputum for acid-fast bacilli was positive in 35.7% of all cases and 57.8% of pulmonary cases, during 1992–1996, the sputum for acid-fast bacilli was positive in 26.7% of all cases and 44.1% of pulmonary cases, during 2001–2005 the sputum for acid-fast bacilli was positive in 42.2% of all cases and 60.5% of pulmonary cases. There is a strong correlation between BK positive cases and absolute incidence of disease.

Conclusions: The incidence of the disease has a tendency to go down, most of patients are more than 65 years old. 2% of cases has shown multidrug resistance. The co-morbidity of TB-HIV is seen in 11 cases from a total of 21 cases with HIV and pulmonary problems. According to the regression analysis for one BK positive case we have to diagnose 6.4 TB cases.

PS-71599-11 The hard way from control to elimination of tuberculosis in Chile

M Zuñiga. Programa de Tuberculosis, Santiago, Chile. Fax: (+562) 6382238. e-mail: mzuniga@minsal.cl

The evolution and the present situation of tuberculosis in Chile are described. On this basis, the feasibility of changing from the current 'control' program to an 'Elimination' Program, which is now a Ministry of Health objective, is discussed.

A basic systematic information is available to characterize the evolution of the endemia, which allows the proper diagnosis of the situation in the pre-chemotherapeutic era, especially in relation to mortality.

Enough information is also available to describe the evolutive steps in the first decades of the chemotherapeutic era, adding to the information related to mortality, morbidity rates and the results of infection studies.

Under advise of Dr. Styblo, from 1997 the control program was transformed in an 'elimination program', with the following objectives:

- 1 Initial goal or 'elimination threshold', incidence rate 20/100 000 for the year 2000.
- 2 Intermediate goal, 'advanced elimination', 10/100 000 for the year 2010.
- 3 'Elimination as a public health problem' goal, 5/100 000 for the year 2018–2020.

Until 2006, an important reduction in morbidity has been achieved, with a yearly declination coefficient of 7.1% for the decade 1997–2006.

In 2000, the first goal was reached, with a morbidity rate of 19.9/100 000. In 2006, incidence was reduced to 13.9/100 000, which allows to hope for achievement of the 2010 goal.

The future, or the possibility of reaching the third goal, will depend on several factors, especially related to the growing importance of high risk groups as the total incidence is reduced, which makes imperative the development of specific programs for these groups, together with the sifting of respiratory symptomatic patients.

Furthermore, as regards the future perspectives, an analysis is made about the obstacles faced in Chile in relation to the possible effects of the current health reform on the evolution of tuberculosis in the country.

PS-71603-11 An approach to improve the diagnosis of smear-negative tuberculosis patients in Havana City

J Sevy Court,¹ D Machado,¹ L Armas,² L Carreras,¹ R Sanchez,² C R Valladares,¹ E Gonzalez.² ¹Neumology Teaching Hospital Benefico Juridico, Havana, ²Pedro Kourí Tropical Medicine Institute, Havana, Cuba. Fax: (+53) 7246051. e-mail: ochoa@ipk.sld.cu

Background: Diagnosis of smear-negative pulmonary tuberculosis (TBp AFB-) patients is a clinical and public health challenge. In 1995, a commission for diagnosis of TBp AFB-cases was set up.

Objective: To describe the commission's work during 1996–2003.

Method: Data collected from patients presented to

the commission's sessions such as precedence, presumptive diagnosis initially formulated by doctors who presented it, previous history of antibiotic treatments, and diagnostic label given by the commission were analyzed.

Results: Of the total 1703 patients presented for clarifying the diagnosis, 848 were from Havana City, 48.4% were ≥ 55 years old, and 63.8% were male. Of the total 1037 patients presented during 1996 to 2000, 176 (16.9%) were administered specific TB drug treatment at that moment and so were 75 (11.3%) of the total 666 patients in 2001–2003. In 1966–2000, the final diagnosis of active TB was given to 396 (43.1%) patients out of 918 who completed their examination and this diagnosis resulted in 323 (52.2%) out of 619 in 2001–2003. In 344 patients studied as presumptive TBp AFB-culture in 2001–2003, the diagnosis was corroborated by the commission in 128 (37.2%).

Conclusions: The commission's work seems to be useful as it avoids over-diagnosis, unnecessary human suffering, and side effects of unnecessary treatment, thus, reducing costs and becoming an educational experience.

PS-71713-11 TB in Danes with clustered *M. tuberculosis* strains, 1992–2004

Z Kamper-Joergensen, V O Thomsen, T Lillebaek, A Kok-Jensen. Statens Serum Institut, Copenhagen S, Denmark. Fax: (+45) 32683871. e-mail: zkj@ssi.dk

Aim: To analyse tuberculosis (TB) in Danes with clustered *M. tuberculosis* (MT) strains including origin and epidemiology.

Method: A national register containing DNA fingerprinting results from 94% of all culture positive TB cases in DK 1992–2004 was used. Subtyping was performed by IS6110 Restriction Fragment Length Polymorphism (RFLP) method. Only Danish TB cases with clustered DNA fingerprints were included.

Material: The register contained DNA fingerprints from 4631 TB cases; including 1780 Danes among whom 1174 were clustered; males 841 and females 333.

Results: Clustered TB cases by age group showed a symmetrical distribution with a peak in age 40–49. Average annual number in the later half of the period was 91% of number in first half. The proportional decline was equal in men and women.

Discussion: All Danish TB cases presenting with a clustered DNA fingerprint when subtyped were included. Such cases represent recent MT transmission mainly. There is ongoing MT transmission among Danish males age 30–59.

Conclusion: Recent MT transmission among Danes is the main cause of clustered TB cases among Danes.

Only a pronounced reduction in transmission of MT can reduce TB incidence in Danes in near future.

PS-71718-11 TB in Danes with unique *Mycobacterium tuberculosis* RFLP patterns, 1992–2004

Z Kamper-Joergensen, V O Thomsen, T Lillebaek, A Kok-Jensen. Statens Serum Institut, Copenhagen S, Denmark. Fax: (+45) 32683871. e-mail: zkj@ssi.dk

Aim: To analyse tuberculosis (TB) in Danes with unique *M. tuberculosis* (MT) RFLP patterns including origin and epidemiology.

Method: A national register containing RFLP patterns from 94% of all culture positive TB cases in DK 1992–2004 was used. Subtyping was performed by IS6110 Restriction Fragment Length Polymorphism (RFLP) method. Only Danish TB cases with MT presenting unique RFLP patterns were included.

Material: The register contained RFLP patterns from 4631 TB cases including 1780 Danes among whom 568 had unique RFLP patterns; males 300 and females 268.

Results: Age distribution among TB patients with unique RFLP patterns showed a peak frequency at age 80–89. Average annual number of cases in the latter half of the period was 64% of number in the first half.

Discussion: All Danish TB cases presenting with a unique RFLP pattern when subtyped were included. Such TB cases are mainly due to reactivation of latent MT infection acquired decades earlier. The reduction of unique RFLP patterns during the 13 years investigated is mainly due to reduction in number of elderly people with high prevalence of MT infection.

Conclusion: TB with unique RFLP patterns will continue to decline without additional intervention.

PS-71727-11 *Mycobacterium tuberculosis* infection rate by age in Danes, 1992–2004

Z Kamper-Joergensen, A Kok-Jensen. Statens Serum Institut, Copenhagen S, Denmark. Fax: (+45) 32683871. e-mail: zkj@ssi.dk

Aim: To calculate age distribution of *M. tuberculosis* (MT) infection rate (MIR) /100 000/year in Danes in 1992–2004.

Method: A sputum smear positive TB patient was estimated to infect 10 persons. Clustered TB among Danes was regarded as result of recent MT infection. Incidence of clustered TB/age for Danes was calculated using a nationwide MT subtyping database with IS6110 RFLP patterns from 1992–2004. Incidence of clustered TB/age allowed calculation of MIR/age if a fixed proportion of infected developed TB.

Material: Infected persons were estimated to be 1350/year in a population of 5.39 million. Subtyping results were available from 72% of notified- and 94% of culture positive TB cases in DK. Incidence/year of clustered TB in Danes was 1.67. Age distribution was known.

Results: MIR was on average 25 and varied from 4.9 for age 0–9 to 37.3 for age 40–49 and declined at higher age.

Discussion: MIR in DK is low and direct measurement of age distribution not possible. MIR is regarded as equal for all age-groups when TB incidence is high. TB incidence in DK is now <10/100 000/year and only a small fraction (1.67) of these cases are clustered cases among Danes due to recent MT infection. **Conclusion:** This method allows indirect estimation of MIR/age in TB low incidence countries, where it can not be measured directly.

PS-71757-11 Burden of tuberculosis in Denmark from 1937 to 2007

P H Andersen,¹ V Østergaard Thomsen,² Z Kamper-Joergensen,² M Galle.¹ ¹Department of Epidemiology, Statens Serum Institut, Copenhagen, ²International Reference Laboratory of Mycobacteriology, Statens Serum Institut, Copenhagen, Denmark. Fax: (+45) 32683874. e-mail: pea@ssi.dk

Aim: To describe and analyse the historical and present burden of TB in Denmark on the basis of three separate TB-registries containing about 90 000 individual records covering a period of 70 years.

Design: Pulmonary TB was made statutory notifiable by the Danish National Board of Health in 1905 but the first national registry was not established until 1920. TB-data was kept on individual patient cards. In 1951 the Danish Tuberculosis Index (DTI) was made responsible for TB-surveillance at which time data in the registry dating back to 1937 and onwards was put on punch cards. Notification was extended to include extra-pulmonary TB. In 1974 TDI changed its name to the Danish Institute for Clinical Epidemiology (DIKE). In 1968 a Civil Registration Number (CPR-number) was introduced in Denmark and given to all living persons. From 1972 data on TB-cases was registered electronically with the CPR-number as a unique identifier. Data on punch cards from 1937 to 1971 was put on electronic media (magnetic tapes). When Statens Serum Institut took over surveillance of TB from DIKE in 1989 two separate historical TB-registries could be defined: one registry without CPR-numbers covering the period from 1937 to 1971 containing about 71 000 records and one registry with CPR-numbers covering the period from 1972 to 1988 containing about 12 000 records. Combined with the current national TB-registry from 1989 containing about 7000 records the study period comprises a total of about 90 000 records.

Methods: Epidemiological analysis of historical data retrieved from magnetic tapes and other media obtained from DIKE and of recent data from the current national TB-registry.

Results: Trends over time and epidemiological differences regarding variables such as age, sex and social indicators will be presented.

Conclusions: Pending analysis of data the Danish TB-registries comprise a unique and exhaustive collection of national TB-data.

PS-71778-11 Recurrent tuberculosis in Denmark: relapse versus reinfection analysed by nationwide DNA fingerprinting

D Bang,¹ A B Andersen,² V O Thomsen,¹ T Lillebaek.² ¹International Reference Laboratory of Mycobacteriology, Copenhagen, ²Department of Infectious Diseases, Rigshospitalet, Copenhagen, Denmark. Fax: (+45) 32683871. e-mail: DVB@ssi.dk

Aim: Analyze the Danish tuberculosis (TB) treatment program over time concerning recurrent disease; the magnitude of relapse versus reinfection.

Design: A prospective study of recurrent TB in Denmark in the period from 1992 to 2005.

Methods: A nationwide database of all DNA subtyping of *M. tuberculosis* was used. It included 74% of all notified TB and 94% of all culture verified TB cases. DNA fingerprinting was performed by the gold standard, IS6110 restriction fragment length polymorphism (RFLP). Recurrent TB was defined as an episode of culture positive TB occurring ≥ 6 months after a previous culture positive episode. A relapse was defined as a recurrent episode caused by the original strain, whereas reinfection TB was defined as a recurrent episode caused by a new strain with a ≥ 2 band change in RFLP pattern.

Results: We found 126 episodes of recurrent TB in 4900 subtyped cases in up to fourteen years.

Conclusion: The differences between retrospective and prospective studies of recurrent TB and the limited possibilities to distinguish between recurrent TB and reinfection TB are discussed. We describe the occurrence of recurrent TB disease in Denmark after treatment.

PS-71924-11 Increased risk of tuberculosis in patients hospitalised for COPD and their first degree relatives in Sweden

C G Löfdahl,¹ M Inghammar,¹ L Brandt,² A Ekblom,² A Egesten.¹ ¹Department of Respiratory Medicine and Allergology, Lund, ²Department of Clinical Epidemiology, Karolinska Institute, Stockholm, Sweden. Fax: (+46) 46146793. e-mail: claes-goran.lofdahl@med.lu.se

COPD is regarded as a systemic disease, where the susceptibility to an inflammatory response seems to be an important pathogenetic factor. We therefore reasoned that comorbidity between COPD and tuberculosis could give indications of a common susceptibility factor for the two diseases. We tried to get a first indication of such a common trait studying the total Swedish Inpatient register together with a register of their first degree relatives. We found 180 219 patients hospitalised due to COPD 1987–2002 and selected the same number of control subjects from the Swedish Multi-generation register matched for age, gender and county. For both groups we then studied the number of hospitalised patients due to tuberculosis. Further, we studied the number of hospitalisations due to tuberculosis in the same Inpatient register for

first degree relatives, found in the Multi-generation register of the COPD patients and their controls. Using Cox proportional hazard estimates we found a hazard ratio of 5.5 (95%CI 3.7–8.2) for a diagnosis of tuberculosis up to 2 years before the COPD diagnosis, 5.9 (4.3–8.2) 2–5 years before COPD diagnosis and 3.8 (2.5–5.9) more than 5 years before COPD diagnosis. We also studied the hospitalisations of first degree relatives to the COPD patients, and compared to the relatives of controls. We found that the risk of being hospitalised for tuberculosis among relatives to COPD patients compared to control relatives was 1.25 (1.03–1.52) for hospitalisation before the patient's hospitalisation for COPD and 1.36 (1.05–1.76) for hospitalisation after the hospitalisation for COPD. In summary, we found a considerable increased risk for tuberculosis in patients hospitalised for COPD and also an increased risk for tuberculosis in relatives of COPD patients. This indicates that there is a common pathogenetic susceptibility trait for these diseases due to environment and/or genetic factors.

TB EDUCATION AND TRAINING

PS-71257-11 A pilot intervention to reduce the stigmatisation of tuberculosis in rural Pakistan

M Agboatwalla,¹ G N Kazi,² K Shah.³ ¹HOPE (Health Oriented Preventive Education), Karachi, ²WHO (World Health Organization) Pakistan, Islamabad, ³NTP (National TB Control Programme) Pakistan, Islamabad, Pakistan.
Fax: (+92) 214520464. e-mail: agboat@hope-ngo.com

In rural areas of Pakistan, tuberculosis is highly stigmatized and considered a disease to be ashamed. An intervention study was conducted in rural Pakistan to reduce the stigma associated with tuberculosis with the help of NGO's and CBO's and to improve case detection and treatment by neutralizing the stigma. Health education messages were imparted in the intervention group (rural Thatta) through local NGO's using IEC material and interpersonal communication (IPC). In the control group (Jhirik) no health education was imparted. The baseline data in both groups showed that 92% patients felt ashamed on developing tuberculosis which reduced to 51% post-intervention. At baseline 89% patients said they tend to hide the disease from others but after intervention only 54.6% agreed to it. Tuberculosis was considered a dangerous disease and pre intervention 44% female patients got scared on first hearing that they had developed tuberculosis which was reduced to 31% post intervention while 14.5% patients developed a fear of death reducing to 6.5% in post intervention. Case detection at base line was 21.6/100 000 in both areas, which improved to 36/100 000 in the intervention areas but reduced to 14.5/100 000 in the control group. Thus, it can be concluded that once the misconceptions re-

garding tuberculosis are removed, greater number of TB patients seek treatment. Misconceptions about tuberculosis lead to stigmatization of the disease with patients trying to hide the disease and delaying treatment. Involving community based NGOs and providing health education through them will help in early detection and treatment of TB cases.

PS-71302-11 Knowledge of TB patients about the disease and its treatment in rural health centres, Bangladesh

M D Ashraful Alam, V Begum, S M A B U Zahid, M H Khan, A B M T Islam. WHO, Dhaka, Bangladesh.
Fax: (+880) 29884657. e-mail: ashzan73@yahoo.com

Introduction: Checklists are used to find out the level of knowledge of TB patients about the disease and its treatment in Bangladesh.

Aim: To determine patient's general knowledge of tuberculosis and the treatment of the disease.

Methods: A descriptive cross sectional study conducted from July 2006 to September 2006 at Upazilla Health Complexes (UHC), Bangladesh. Data were collected from registered TB patients using checklists. Analysis of knowledge of 384 patients was done.

Results: When correct answers to three out of four questions asked were regarded as good knowledge and correct answer to two out of four questions asked were regarded as satisfactory knowledge. 80% patients have good knowledge about tuberculosis and its treatment while 20% patients have satisfactory knowledge. The most important source of information about TB was health worker. Health education and counseling is very much important for quality TB service.

Conclusion: The study identified factors associated with the level of knowledge of TB patients that could assist in designing health education intervention strategies.

PS-71396-11 Designing training activities to teach recording and reporting skills to health care workers

C Tryon, A Khan, K Stinson, B Kim. Centers for Disease Control and Prevention, Atlanta, Georgia, USA.
Fax: (+1) 404 639 8114. e-mail: ctryon@cdc.gov

Background: Recording and reporting (R&R) of TB data and HIV surveillance among TB patients is essential to the STOP TB Strategy. These activities and resulting data are critical not only for patient management, but also in making programmatic decisions including funding, staffing, and resource allocation. However, TB and HIV data recorded on R&R forms by health care workers (HCWs) are often incomplete or inaccurate. To ensure reliable data and improve surveillance, it is essential that training courses provide skills-based activities that enhance the R&R skills of HCWs.

Methods: Needs assessments determined that HCWs needed increased motivation, knowledge, and skills to accurately complete the R&R forms and to identify problems. Adult learning principles were used to develop interactive skills-based exercises to address these needs. Three comprehensive R&R training activities, including group discussions, role plays, and hands-on exercises, were designed to increase knowledge, skills, and motivation. The activities were used in various TB and HIV courses to train 24 participants in Nigeria, 72 participants in Kenya, and 73 participants in Botswana.

Results: As a result of the activities, participants demonstrated that they had increased their knowledge and skills in completing the R&R forms. For courses in which evaluation data was collected, participants indicated that the R&R activities were useful in learning how to accurately fill out the forms.

Conclusion: To ensure accurate and reliable data for surveillance, HCWs need skills-based training in completing R&R forms. The interactive exercises use real-life examples to provide hands-on experience for practicing R&R. These training activities can be incorporated in other TB and HIV courses to teach R&R skills to HCWs.

PS-71430-11 Experience of training of trainers on laboratory supervision in Bangladesh

A B M T Islam,¹ V Begum,² E Hoque,² M H Khan,¹ M N Uddin,¹ A Alam.¹ ¹World Health Organization, Bangladesh, Dhaka, ²National Tuberculosis Control Program, Dhaka, Bangladesh. Fax: (+88) 029884657. e-mail: dr.tauhidul@gmail.com

Training of Trainers on Laboratory Supervision in Bangladesh was organized from 17th December to 21st December 2006 by NTP Bangladesh for first time aims to improve capacity of laboratory supervisors of government and NGOs. Laboratory supervisions were cornered due to lack of proper capabilities of the supervisors. So NTP Bangladesh planned to arrange laboratory supervision training courses. This ToT was the first step of the plan. IUATLD and CDC Atlanta gave technical support for the training program. The duration of the course was 5 days. Main contents were: 1) Importance of AFB microscopy. 2) TB Bacteriology essentials. 3) Diagnostic methods in laboratory. 4) TB laboratory network 5) Technical details of AFB microscopy. 6) Equipments and supplies. 7) Quality assurance. 8) Recording and reporting: Compilation and analysis. 9) Supervision: problem identification and solving. 50% time were spent for demonstrations and exercises. 23 participants (17 were from government and 6 were from NGOs) were present. A pretest and post test was taken to measure immediate impacts of the training. This type of training would be continued in Bangladesh to develop human resources in laboratory field with the involvement of these master trainers.

PS-71513-11 Evaluation of WHO collaborating centre for research and training in management of MDR-TB teachback methodology

I Leimane,¹ V Leimane,¹ C Tryon,² N DeLuca.² ¹SATLD, WHO Collaborating Center for Research and Training, Latvia, Riga, Latvia; ²Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, USA. Fax: (+371) 7048256. e-mail: signe@tuberculosis.lv

Background: The International Training Center (ITC) in Latvia was approved as a World Health Organization Collaborating Center (WHO CC) in 2004 to provide national and international TB and MDR TB training courses. To improve the training skills of the ITC faculty, a Teachback Methodology training-of-trainers (TOT) course was conducted in September 2006 for 26 participants. A follow-up evaluation was conducted to determine how the faculty used the knowledge and skills gained in the course.

Methods: Teachback Methodology course questionnaires, participant action plans, and existing curricula were analyzed. The TOT participants were interviewed to determine the impact of Teachback Methodology on their subsequent training sessions.

Results: 1) The Teachback Methodology TOT course evaluations indicated that 79.16% of the course participants thought that Teachback Methodology was very useful in improving training skills and increasing confidence as facilitators.

2) Review of action plans and interviews with course participants indicated that 91.6% had revised subsequent training activities by incorporating interactive elements learned in the Teachback TOT.

Conclusion: Teachback Methodology was an effective training technique for improving the training skills of the ITC faculty and enhancing training activities in the TB and MDR TB courses.

PS-71554-11 Behavioural and psychological factors associated with refusal of TB treatment in penitentiaries, Moldova

M V Morosan,¹ A Nacu,² V I Laticevschi,³ S Plamadeala,³ A Corloteanu.¹ ¹Department of Penitentiary Institutions, Chisinau, ²Nongovernmental organization Philantropie, Chisinau, ³Nongovernmental organization Carlux, Chisinau, Moldova. Fax: (+373) 22 506383. e-mail: carlux@prisontb.md

25% of TB patients in the PI refused TB treatment in 2006. To find out the reasons a behavioural-psychological research was carried out from September till December 2006. Physicians working in 'Philantropie' on mental health and psychiatry performed the study in collaboration with PI. Study was supported by CORDAID/ICCO through KNCVTF/CARLUX.

Aim: To identify and analyse the psychological and behavioural factors associated with refusal of TB treatment.

Methods: Study was performed in two groups. 78 patients in Refusing Group (RG) and 16 in Control

Group (CG). Psychological tests and behavioural questionnaires were used. Informed consent was obtained and confidentiality ensured. All participants provided with feedback and professional counselling.

Results: Knowledge of TB infection and disease was found in 36% of RG vs. 67% in CG; positive attitude toward treatment in 48% in RG vs. 72% in CG. 32% in RG did not trust medical personnel. Level of mistrust was: suspicious 75% in RG vs. 12% in CG; concerned 69% vs. 12%; nonconformists 12% vs. 69%.

Conclusion: Patients from the RG had lower knowledge of TB and less trust in medical personnel. Depressive disorders were twice as common among RGs. Need to improve communication; professional counselling and psychotherapy in TB patients should be considered.

PS-71559-11 Organizational development training for TB community volunteers: an effective sustainable mechanism

M Villanueva,¹ M G Gayoso,¹ E O Merilles,² T Tupasi.²

¹World Vision Development Foundation Inc., Quezon City,

²Tropical Disease Foundation Inc., Makati City, Philippines.

Fax: (+63) 3747618. e-mail: marlon_villanueva@wvi.org

Background: To ensure the sustainability of the organized community volunteers, called TB task forces, as a TB prevention and control group in villages, World Vision's Global Fund supported TB project in the Philippines conducted an Organizational Development (OD) training to the organized communities.

Goal: To strengthen and sustain task forces as a TB prevention and control group even after project life.

Method: World Vision conducted a 5-day OD workshop to selected task force members and partners from 11 project sites (6 cities and 5 provinces) that includes discussion on basic OD concepts, assessment of participants' facilitation skills, and critiquing of the OD manual draft for use in the field. The OD Manual is consist of 10 modules—Formulation of Vision, Mission and Goals, Constitution and By-laws, Strategic and Operational Planning, Team Enhancement, Proposal Making, and Financial and Information Management. Pilot test of the modules was conducted in 18 villages in four (4) project sites in preparation for their advocacy activities and implementation of their income-generating project (IGP).

Result: The training gave the Task Force better focus to operate as a team, led them to register themselves as a recognized legal entity making advocacy for TB support from the community and the local government easier, and assisted them in implementing their TB-related IGPs.

Conclusion: OD training provided clarity, focus, and project ownership to the organized communities and local officials, and prepares them for sustainability.

PS-71654-11 Education of patients on TB and HIV issues

N Vezhnina, N Shumskaya. AIDS Foundation East-West (AFEW), Almaty, Kazakhstan. Fax: (+7) 327 234 17 29. e-mail: natalia_vezhnina@afew.org

Aim: According to the official data of Central Asian National TB services 40–60% of TB-patients get incomplete course of treatment and more than 30% are practicing risky behavior concerning HIV. TB institutions are not involved in vast majority HIV prevention programs.

Design: In the frames of the Client Management project AFEW promoted HIV education for head nurses in TB institutions of civil and penitentiary health systems, developed their skills and knowledge, assisted in organization of 'School of patients', development and implementation of thematic Module 'Education of patients on TB and HIV issues'.

Methods: Educational program on the Module includes 6 standard lessons which are conducted by trained medical nurses during patient's treatment. Nurses organize the system of lessons and conduct monitoring. At 'School' patients get knowledge about risks of TB and HIV transmission, development of resistant forms, harm reduction and possibilities of medical-social support through Social Bureaus where they gain behavioral skills and emotional support.

Results: 'School of patients' improves knowledge on TB and HIV, develops prevention skills and enhance adherence to treatment and interest in HIV testing. In TB institutions it is necessary to develop harm reduction programs along with VCT.

Conclusion: Medical nurse as an instructor on patient's education can play very important role in struggle against TB, HIV, TB-HIV and drugs resistance.

PS-71667-11 Motivation in training curricula: empowering health care workers

S Bandyopadhyay. German Leprosy & TB Relief Association, Kolkata, West Bengal, India. Fax: (+91) 3322164339. e-mail: ers@glra-ales-india.org

Introduction: Motivation is the key component to empower Health Care Workers which is ensured when conception and perception on the program is developed resulting to achieve the objectives of reducing morbidity impact, improving functional ability of patients. Above components need to be emphasised and incorporated in training curricula. It was experienced in 3 years' (2004–2006) activities at GMLF Balarampur Unit, a GLRA supported Project in India extending supportive services to RNTCP.

Objective: To reveal the need, significance and impact of motivation reinforced by conception and perception and to develop a training program suitable to empower Health Care Workers.

Method: A training was conducted for Health Personnel of GMLF while participating the RNTCP and

subsequent yearly trainings were conducted on conception, perception and motivation on anti-TB activities and need of coordination aiming at national development with adequate emphasis on medical, socio-economic, operational and management aspects. **Result:** Involvement of trained GMLF workers with higher motivation level contributed to quality improvement of treatment results, improving ACDR (NSP) to 90%, conversion rate to 91%, cure rate to 88%. Partnership with government health workers and local panchayats contributed to quality DOTS delivery, community awareness program and removal of social stigma.

Conclusion: Conception gives a transparent idea of program, perception being an idealistic and emotional approach widens the vision on national perspectives leading to Motivation. Understanding what, why, where they were doing, ensured an improved treatment outcome for their beneficiaries. Above components are suggested to be incorporated in all TB training curricula.

PS-71836-11 Developing a comprehensive TB coordinators training curriculum for Botswana

V M Gammino,¹ A R Khan,¹ G Nkubito,² J J Mboya,² T Samandari.^{1,3} ¹Division of TB Elimination, Atlanta, Georgia, USA; ²National Tuberculosis Programme, Botswana Ministry of Health, Gaborone, ³BOTUSA Project, US Centers for Disease Control and Prevention, Gaborone, Botswana.
Fax: (+1) 404 639 1566. e-mail: vmg00@cdc.gov

Background: Botswana's tuberculosis (TB) incidence rate—654/100 000 in 2005—was among the highest in the world. HIV coinfection rates among TB patients range from 60–86%. In 2006, the Botswana National TB Program (BNTP) hired dedicated TB Coordinators (TBCs) for 22 of 24 health districts in an effort to strengthen TB program functions and TB-HIV collaborative activities at the district level. Thirteen of the TBCs were health educators, and nine were nurses; none had TB-specific experience.

Methods: Based on a task analysis, we identified 13 key topic areas including epidemiology, diagnosis, treatment, TB-HIV, drug resistance, health education, laboratory functions, infection control, recording and reporting, and management tools. We created training modules for each topic, adapted relevant information from published CDC, WHO, and KNCV materials and incorporated these into existing Botswana resources. We utilized adult learning principles to design interactive skill-building exercises for each module.

Results: We developed a comprehensive, performance-based training course for TBCs focusing on the core competencies and knowledge needed for this position. The modules consist of a Powerpoint® slide set and individual and group activities, case studies, role-plays, discussions, and mentored field exercises. In January 2007, the first cadre of district TBCs completed their classroom training. Pre- and post-test re-

sults indicate that participants' knowledge of TB-HIV and TB Program functions increased.

Conclusions: The curriculum, which is under revision based on participant and facilitator feedback, may adapted for training TB coordinators in other TB-HIV settings.

PS-71902-11 External quality assessment for smear microscopy in the tuberculosis laboratory network in Serbia

B Savic,¹ D Vukovic,¹ I Dakic,¹ G Stefanovic,² L J Tomic.²

¹Institute of Microbiology, School of Medicine, Belgrade,

²Institute of Lung Diseases and Tuberculosis, Clinical Centre of Serbia, Belgrade, Serbia and Montenegro.

Fax: (+381) 11 2656 748. e-mail: branislava.savic@gmail.com

Current incidence rates of tuberculosis (TB) in Serbia is 32 per 100 000 population with 36% of sputum smear positive cases. Bacteriological diagnosis of TB is conducted in 60 laboratories out of which 17 laboratories perform acid fast microscopy only, 35 culturing, and 8 drug susceptibility testing. In order to determine the accuracy of smear microscopy for acid fast bacilli, the National Reference Laboratory (NRL) carried out external quality assessment program during 2006.

The program was implemented during supervision visits to 46 laboratories and by rechecking of slides. The overall sensitivity, specificity and efficiency were 99%, 89.2%, and 94.7%, respectively. Proportion of false positive and false negative results were 8%, and 1.4% respectively. The technical failures in smear microscopy in 8 laboratories have been revealed, and corrective measures have already been undertaken. All laboratories were equipped with high quality microscopes and two training courses were organized in NRL. The quality improvement of microscopy for acid fast bacilli in one laboratory is still not on satisfying level, and additional intervention measures should be introduced such as more frequent on-site evaluation.

Results of initial round of external quality assessment for smear microscopy demonstrate relatively high proportion of false positive findings in some of the local laboratories. This problem was solved after implementation of retraining of staff. Next step is to expand quality assurance program to all laboratories in the network.

PS-72086-11 Training in airborne infection control in high-burden TB-HIV settings

E Nkhi,¹ P Jensen,² K Weyer.¹ ¹Medical Research Council, Pretoria, South Africa; ²Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+27) 12 3255970. e-mail: elizabeth.nkhi@mrc.ac.za

Background: The global emergence of extensively drug-resistant TB (XDR-TB), associated with exceptionally high HIV-associated mortality in South Africa, has highlighted serious shortcomings in airborne infection control, particularly in congregate settings.

The South African Medical Research Council in collaboration with the US Centers for Disease Control and Prevention is addressing the pressing need for infection control curricula, training and assessment through a standardised Infection Control Course aimed at high-burden TB-HIV settings, presented through a recently-established International Training and Research Centre (ITRC).

Aim: The overall Course objective is to disseminate the fundamentals of infection control in order to reduce/prevent TB transmission in institutional settings and to equip Course participants with the skills and tools to develop targeted infection control plans for different levels of TB health care settings.

Methods: Course content consists of didactic training, interactive groups sessions and on-site practical application of infection control measures. The hierarchy of infection control strategies (administrative, engineering and personal respiratory protection) is covered. In addition to training, the ITRC offers technical assistance in infection control assessment and health facility design. Research on affordable and appropriate infection control interventions for high-burden TB-HIV in resource-limited settings is also underway.

Results: To date more than 500 participants have been trained in South Africa. Training has also been expanded to the Southern African region. Training of a core group of international Infection Control Consultants is envisaged as a high priority to address the serious global lack of infectiocontrol expertise.

PS-72118-11 Beyond the cure of tuberculosis: educational policy for TB preventive health in Paraiba State, Brazil

D Lima,¹ N S Formiga,² G S Sousa.³ ¹Sanitary Pneumol Dept/ Paraiba State Secretary of Health, Joao Pessoa, ²Federal University of Paraiba, Joao Pessoa, ³Paraiba State Secretary of Health, Joao Pessoa, PB, Brazil. Fax: (+55) 8332187332. e-mail: dinalvalima_saude_pb@yahoo.com.br

Introduction: Tuberculosis (TB) is an infectious disease that has been victimized many people worldwide. In the Paraiba State, TB reached 90.0% of cure for five consecutive years, but it is necessary to become ill to realize the gravity? It must be beyond the cure. It must indicate preventive tasks such as educational process and juvenile conduct. Those tasks present as effective interventional ways to change the behavior and consciousness and decision making for a social-human and environment well being of health. The Ministry of Education, Brazil into the National Curriculum parameters directs themes and didactics to the inclusion of social complexity related matters calling for citizenship, policy and health education reflections.

Objective: The purpose of this study is evaluating the understanding and behavior levels of youth in the Paraiba State facing TB.

Method: 359 youth of Paraiba State public schools among 14 to 21 years old, with both gender and maximum income of 700.00 reais have answered a survey about the understanding, identification of symptoms and behaviors facing TB.

Results: 80.0% of youth have confirmed knowing what is TB; and the identification of 8 classical symptoms. 60.0% have just confirmed knowing frequent cough and lumbar pain as TB symptoms. Related to behaviors facing TB patient 66.0% said 'do not be away because the person counts on him/her'; 'it will do something to help', and 'did not explain what knew about TB because it is ugly'.

Conclusion: Beyond the absence of health education program there is a poor juvenile understanding about TB regarding symptoms and behaviors of infectious protection.

PS-72182-11 Clinical care of TB-HIV co-infected patients is an integral component of the 2nd level IMAI learning programme

J van den Hombergh,¹ R A Cedillos,² K J Seung.³ ¹Dpt. Development, Policy and Practice, KIT, Amsterdam, Netherlands; ²Infectious Diseases and HIV/AIDS Programme, National Hospital Rosales, San Salvador, El Salvador; ³WHO, Geneva, Switzerland. Fax: (+31) 205688444. e-mail: j.v.d.hombergh@kit.nl

IMAI is an acronym for Integrated Management of Adolescent and Adult Illness, implemented by WHO. The increasing number of countries implementing large scale anti retroviral treatment (ART) programmes calls for availability of appropriate and comprehensive learning and training material to prepare staff and teams for their complicated tasks.

After having successfully developed and implemented a learning programme for the first level (nurses, primary health workers, and health centre staff in low resource settings), which contains an elaborate TB-HIV module, IMAI now embarks on the Second Level IMAI Clinical Learning Programme. This new programme consists of an introductory training course with focus on ART and management of Opportunistic Infections (OIs) as well as follow-up after training and clinical mentoring. Materials developed for this 2nd level learning programme include a clinical HIV care manual, course outline and contents, learning aids, case books and video demonstrations. The program is targeted at multi-purpose doctors, medical officers, and GPs working as clinicians at district hospitals in low resource settings. It will also be appropriate for clinical officers or experienced nurse clinicians in some setting. The training materials have been developed by a number of working groups representing core areas (TB-HIV, adult health, paediatrics, mental health, women's health, alcohol and substance use).

The Pulmonary TB components are specifically integrated in the section Adult Health as part of the two

main syndromic approaches for respiratory disease: 'Cough or difficult breathing' and 'Chest Pain'. Extra-pulmonary TB is represented in all relevant syndromic approaches of the IMAI programme. Childhood TB and HIV will be an integral part of the Paediatric HIV care section.

Clinical care aspects of TB-HIV are fully addressed in the elaborate generic learning programme and training material for HIV care, developed by WHO as part of IMAI.

PS-72196-11 Application of effective communication strategies in TB hospitals

A Haaland,¹ V Gajauskiene,² A Skerbiene,² K Röhme.³

¹University of Oslo, Oslo, Norway; ²Siaulai TB and Lung Disease Hospital, Siaulai, Lithuania; ³Association of Heart and Lung Disease, Oslo, Norway. Fax: (+47) 23357039. e-mail: ane.haa@online.no

Objectives: Assess effect of process training in communication and psychology on nurses and physicians' attitudes and skills, as expressed in interpersonal relationships, patient motivation, and treatment success rate.

Methods: Process training was conducted with 17 nurses and physicians in Siaulai TB hospital over 8 months in 2006. Baseline survey assessed initial perceptions of problems, and learning needs. Training continued with observation tasks over 3 months to identify own problems and strengths in communicating, and dealing with anger and conflict. Most Significant Change measured progress, and one week's skills training based on own problems and situations was conducted.

Results: Communication has improved interpersonal relations between patients, staff and colleagues. Hostile attitude to patients is reality.

Before, 25% of patients wanted more attention and respect from staff; 80% of staff was satisfied with communication with patients. After: 96% of patients noted good staff changes in communication. Staff saw own mistakes in communication and interpersonal relations, and saw need to make changes.

Treatment success rate 2005: 87%, default 1.5%. 2006: 92% treatment success, no defaulters.

Conclusion: Process training has effectively improved communication with colleagues and patients, and has helped create safe environment where people trust each other and learn from each other.

PS-72200-11 Determinants of health seeking and treatment adherence behaviours for TB among HIV patients in Honduras

M S Arias,^{1,2} M E Kimerling.^{1,2} ¹Gorgas Center for Geographic Medicine, Birmingham, Alabama, ²Division of Infectious Diseases and International Medicine, University of Alabama at Birmingham, Birmingham, Alabama, USA. Fax: (+1) 2059341746. e-mail: arias@uab.edu

Aim: To estimate current level of perceptions of susceptibility to and severity of the disease; perceptions of the quality of care provided in public health centers; motivating factors to seek care and adhere to treatment; barriers to seek care and adhere to treatment; stigma; hopelessness and; intentions to seek care for TB symptoms and to adhere to treatment among HIV-infected individuals attending HIV/AIDS clinics in Honduras.

Design: Cross-sectional, descriptive survey.

Methods: During the first phase of the study we will test and validate the instrument to measure factors (i.e. knowledge, barriers, and motivating factors) related to the subjects (personal) and to the health care services that may affect seeking care or compliance with TB treatment. We will select a sample of five clinics (clusters) through simple random sampling to include in the study. We will approach 538 consecutive patients visiting these clinics during a one-week period. Selected participants will respond to a face-to-face interview.

Results: Pending; these will be available by July 2007.

Conclusion: Expected outcomes of this study include the development and administration of a reliable instrument that will evaluate determinants of health seeking and treatment adherence behaviors. The findings of the study will enable TB and HIV program managers to plan, design and implement a tailored and theory-based TB education and information program for persons living with HIV/AIDS (PLHA), which will complement existing strategies to improve TB case finding and treatment outcomes among this high-risk population in Honduras.

PS-71126-11 Impact of Union management courses: Internal Consilium—opportunity for learning, coordination and peer support

A A L Concepcion, M I J D Quelapio, R B Orillaza-Chi, L Eclevia-Macalintal, L O Raymond, M T Gler, E K Maramba, T E Tupasi. MDR-TB, Tropical Disease Foundation, Inc., Makati, Metro Manila, Philippines. Fax: (+632) 8935847. e-mail: bong@tdf.org.ph

Background: The Union has been conducting innovative management courses for TB control programs since 2004. One of the authors attended one of the management courses in Thailand, the 4th International Course in Management, Finance and Logistics for TB Control in November 2005.

Action Plan: A six-month action plan (AP) was developed as a requirement in completing the course. The AP implemented was aimed to establish a standardized approach in the programmatic management of MDR-TB patients in the Tropical Disease Foundation, Inc. (TDFI) through an Internal Consilium (IC). This approach ensured all MDR-TB suspects and cases were discussed in the IC prior to enrolment, change in treatment regimen, shift to continuation phase or determination of outcome.

Accomplishments: The AP facilitated the development of guidelines and tools for IC use; setting a common time for and organization of regular weekly IC meetings; preparation and submission of weekly summary of recommendations to IC members and clinic pharmacist for drug allocation; and conduct of peer review and revision of IC guidelines using available data.

Challenges: The following challenges have been identified: expanding the membership of the IC from largely clinical to multidisciplinary; implementing and strengthening monitoring and supervision; enhancing decision-making through sound and consistent policies; coordinating relevant activities with concerned units; developing practical tools and harnessing technology to facilitate discussions, data management, monitoring and supervision; and replicating the IC in other PMTM treatment centers.

Lessons Learned: Development of IC guidelines and tools requires collaboration, proper coordination and follow-up to ensure that meetings are regularly conducted and that sound recommendations based on guidelines are made. Clinical and program coordinators are able to share their expertise and work together to come up with appropriate management plans for MDR-TB patients.

DOTS EXPANSION: 2

PS-71582-11 Differentials in treatment outcomes of new and retreatment tuberculosis patients, Campinas-SP, Brazil, 2005

H Oliveira, M Dall'Aqua. UNICAMP—University Of Campinas, Campinas, SP, Brazil. Fax: (+55) 1932518036. e-mail: helenice@unicamp.br

Objective: To evaluate the results of TB-treatment among patients that attended public health services in the city of Campinas-SP, Brazil, in 2005.

Methods: A retrospective study of 374 patients treated by the Public Health Units was carried out. Data were obtained from the University of Campinas TB-Registry. The type of treatment outcome was described separately for new and retreatment cases. Patients from prisons, those with atypical mycobacteria or multidrug-resistant-TB were excluded.

Results: The cohort was formed by 315 (84.2%) new and 59 (15.8%) retreatment cases, which presented TB-Aids comorbidity in 13.3% and 32.2% respectively. Among previously treated patients, 33 (55.9%) were relapse and 26 (44.1%) treated after abandonment. At the time of analysis, there were 222 (70.5%) new cases that completed treatment successfully, 37 (11.7%) defaulted, 27 (8.6%) died and 18 (5.7%) transferred. In retreatment cases 29 (49.2%) were cured, 12 (20.3%) abandoned, 8 (13.5%) died and 3

(5.1%) transferred. The failure proportion in retreatment (3.3%) was higher than in new cases (0.6%). Among those previous defaulters the proportion of another similar outcome was 30.8%.

Conclusions: The high proportion of dropout signalize for special attention regarding patients who present risk factors for non-compliance to TB-treatment. The program should consider expanding DOTS to community through health center network, to motivate the health care workers regularly and to concentrate on consequences of treatment interruptions.

PS-71607-11 Problems associated with tuberculosis control in the metropolitan region of João Pessoa, Brazil

L D Sá,^{1,2} J A Nogueira,^{1,2} A L C Gomes,^{1,2} R G Nóbrega,¹ A B L Marcolino,¹ T M R M Figueiredo,^{2,3,4} N P D D Alencar,¹ A O Ricarte,¹ T C S Villa,^{2,3} A Ruffino-Netto.^{2,5} ¹Federal University of Paraíba, João Pessoa, Paraíba, ²Brazilian Tuberculosis Research Network-REDE-TB, Rio de Janeiro, RJ, ³University of São Paulo—College of Nursing of Ribeirão Preto, Ribeirão Preto, São Paulo, ⁴State University of the Paraíba, Campina Grande, Paraíba, ⁵University of São Paulo—School of Medicine of Ribeirão Preto, Ribeirão Preto, São Paulo, Brazil. Fax: (+55) 1636333271. e-mail: tite@eerp.usp.br

Objective: This study aimed to investigate some difficulties concerning the tuberculosis (TB) control in cities of the metropolitan region of João Pessoa, considered as top priority for the control of this disease in Paraíba State/Brazil.

Methods: Seven health professionals involved with TB control of the capital and two neighboring cities took part in this study. The data were collected by means of semi-structured interviews and then analyzed by using the technique of content analysis.

Results: Difficulties found by the subjects: resources were not directly available to the TB local control coordinations for the implantation and sustainability of DOTS (Directly Observed Therapy Short-Course), high frequency of professionals alternating in their jobs due to their performance in the Family Health Groups (FHG), little effort of the FHG professionals in respect to control actions of TB, resistance to the Supervised Treatment, sub-notation cases and lack of qualified professionals to act in the Information Sector.

Conclusion: To definitely control TB, in what concerns the great urban centers and their relative areas, by means of the functioning of DOTS strategy, it is necessary the political commitment of health and municipal managers in the promotion of actions that should favor principally the decentralization of resources, the deprecation of work as well as the qualification of professionals acting in the basic health services.

PS-71613-11 Strategies for advancing evidence-based TB control practices in a post-Soviet country

K Gamazina,¹ A Tsarenko,¹ T Ivanenko,¹ A Dadu,¹ N Zaika,¹ A Bishop,² M D Richardson.³ ¹PATH, Kyiv, Ukraine; ²PATH, Seattle, Washington, ³PATH, Washington, DC, USA.
Fax: (+380) 444962627. e-mail: kgamazina@path.org

Aim: Since 2003, PATH has sought to accelerate the adoption of DOTS in Ukraine, which has been slow to change Soviet-era TB control practices.

Methods: PATH's main strategy has been to support sub-national and municipal TB control efforts to demonstrate the feasibility and effectiveness of the DOTS strategy and the new Global Plan. Concurrently, PATH, in collaboration with WHO and local partners, supported a participatory process to encourage national government adoption of internationally recognized TB control guidelines and policies.

Results: Since 2003, DOTS coverage went from 6% to over 40%. Parliament passed 14 pieces of legislation supporting updated TB control standards, and established a National TB Program. A new management information system was introduced and all project areas now generate standard cohort analysis data where previously they could not. A laboratory network was created and quality control was introduced, with the rate of acceptable-quality smears increasing from 35% to 75% overall. After PATH trained TB specialists on communication and counseling, the proportion of people with TB satisfied with specific aspects of their care went from 33% to 84%.

Conclusions: Keys to success in this region include meaningful engagement of national and sub-national stakeholders, acceptance of phased introduction of key components, exposure to best practices within the same region and internationally, and genuine involvement of people at risk for or with TB disease.

PS-71626-11 DOTS in Rio de Janeiro City: adherence and results

V M B Ferreira,¹ C Brito,² M C Portela,² C C Escosteguy,³ S M L Lima.² ¹Tuberculosis Programme of Rio de Janeiro State, Rio de Janeiro, RJ, ²National School of Public Health/Fiocruz, Rio de Janeiro, RJ, ³Servidores do Estado Hospital/Ministry of Health, Rio de Janeiro, RJ, Brazil. Fax: (+55) 2125230571. e-mail: vanjaferreira@gmail.com

Aim: To evaluate the impact of DOTS on tuberculosis control in a city with high TB incidence.

Methods: The implementation of DOTS in Rio de Janeiro City began in 1999. In 2005, nine primary health care centers (PHCC) were offering DOTS. One of the centers was also reference for a community-based DOTS program. We interviewed the directors of the PHCC and the nurses that are responsible for DOTS in each center. We also analyzed secondary data of Rio de Janeiro City Health Department about all TB treatments performed in 2004 in all PHCC of the city. A

multinomial model was employed to infer independent associations between several variables and treatment outcomes and the effect of DOTS in a same center. We also analyzed the performance of the nine centers in which DOTS was offered to identify which variables were associated with better treatment results.

Results: In 2004, 4598 TB cases were treated in Rio de Janeiro City PHCC; 1118 (24.3%) on DOTS and 3480 (75.7%) on self-administrated treatment (SAT). Community-based DOTS reached only 303 patients (6.6%) but achieved the highest treatment success rate (92% vs. 80.5% DOTS vs. 74.4% SAT) and the lowest default rate (5% vs. 12.8% DOTS vs. 19.7% SAT).

Conclusions: DOTS coverage in Rio de Janeiro City is still low. A tendency to enroll more patients with 'poor adherence profile' in DOTS program was observed. To provide health education and social support with community-based DOTS is a good strategy for better results on TB control.

PS-71731-11 Evaluation on cost-benefit of TB control project in Jilin, China

Y L Yuan, S Y Xu. Jilin Provincial CDC, Changchun, Jilin Province, China. Fax: (+86) 431 87976875. e-mail: jlcdctb75@sina.com

Objective: To analyze and evaluate the cost-benefit of TB control project during 2002–2006 in Jilin Province.

Methods: To analyze the available date of TB case detection, treatment outcome and management data in the project supported by central government funds, local government funds, WB/DFID funds and Global funds during 2002–2006 in Jilin Province.

Results: 32 299 smear positive patients and 24 338 new smear positive patients were cured by TB control project with 56.4 million Yuan RMB, among which central government funds, local government funds, WB/DFID funds and Global funds are 20.1 million Yuan, 25.8 million Yuan, 3.9 million Yuan and 6.6 million Yuan respectively. 315.2 million Yuan were saved by the project. It is estimated that the losses both of GDP and income were reduced by 2.9 billion Yuan and 0.8 billion Yuan, 65 991 person were avoided suffering from TB. Then the losses avoided both GDP and income was 6.0 billion Yuan and 1.7 billion Yuan respectively.

Conclusion: Remarkable achievement has been achieved by using central government funds, local government funds, WB/DFID funds and Global funds for 5 years in Jilin Province. Although the investment was low, good social and great economic outcome have been achieved. It was a cost-benefit disease control project.

PS-71733-11 WHO-TB control pilot projects in the Russian Federation (USAID funded): achievements and challenges

A Korobitsyn,¹ I Danilova,¹ L Rybka,¹ V Testov,¹ D Pashkevich,¹ N Afanasiev,² W Jakubowiak.¹ ¹WHO Office in the Russian Federation, Moscow, ²USAID, Moscow, Russian Federation. Fax: (+7) 495 7872149. e-mail: w.jakubowiak@who.org.ru

Introduction: DOTS pilot TB control projects, supported by the WHO Moscow office from 1999–2007, have played an important role in nationwide dissemination of the new strategy. However, some of them were discontinued due to the cessation of funding or weak political commitment. The projects analyzed (Orel, Vladimir, Chuvashia) have the longest period of implementation and have experienced strong political commitment.

Objectives: To analyze the results of TB confirmation by bacteriological methods and treatment outcome results in new sputum smear positive (SS+) TB patients in three WHO pilot regions in comparison to the latest available average statistics for Russia.

Methods: Analysis of quarterly reports.

Results: At the start of project implementation (first two quarters) TB diagnosis was confirmed by smear microscopy in 43.3% of all cases across the projects (36.4%–54%) and treatment success reached 73.6% (72%–76.8%). In consecutive years these indicators remained stable, with the former between 47% and 63% and the latter between 67% and 82%. TB diagnosis confirmation by culture for 3rd quarter 2006 across the three regions reached 72.6% (69.4%–77.8%). Overall in Russia in the civilian sector in 2005, 33.5% (3.7%–57.9%) of new TB patients were SS+, and 51.4% were culture positive. Treatment success in new SS+ patients was 58.5%.

Conclusion: In WHO pilot regions, stable and considerably higher than country average results have been observed with regards to infectious patient case detection and treatment outcomes. However, the WHO target for treatment outcomes has not yet been reached.

PS-71758-11 Evaluation of the DOTS programme in Orel Oblast, Russian Federation

B Y Kazenny,¹ T M Khorosheva,¹ E V Kiryanova,¹ V V Khoroshutina,¹ E S Nemtsova,¹ W Jakubowiak,² D D Pashkevich,² L N Rybka,² V V Testov.² ¹Orel Region TB Service, Orel, ²WHO Office in the Russian Federation, Moscow, Russian Federation. Fax: (+7) 495 7872149. e-mail: w.jakubowiak@who.org.ru

Objective: To evaluate the results of the implementation of the DOTS TB control program in Orel Oblast.

Materials: Records of 3444 new TB cases (smear-positive and smear-negative) registered for treatment in the civilian sector from January 2000–December 2006.

Methods: Cohort analysis.

Program results:

- During the time period, the regional TB notification rate decreased by 26.5%, TB mortality rate by 48.3% and TB prevalence by 44.5%.
- TB detection by microscopy in new pulmonary TB cases increased from 45% to 67%, while by culture confirmation from 74% to 85%.
- Orel Oblast established an effective Drug Resistance Surveillance program in the area.
- The absolute number of MDR-TB cases registered in the area decreased from 120 (2003) to 73 (2006).
- The absolute number of relapses decreased from 49 (2001) to 15 (2006) cases.
- In 2006, the treatment success rate among new smear-positive TB cases reached 81%, death—10%, failure—7%, transferred out and defaults—2%.
- Main reasons for treatment failure were: MDR-TB among new TB cases and high mortality due to late detection of advanced TB cases.
- Since November 2002, Orel Oblast has been implementing the DOTS-Plus program in the area.

Conclusions: Results of the cohort analysis for 2000–2006 reflect an improving TB epidemiological situation at the regional level and provide evidence of successful DOTS program implementation in the Russian environment.

PS-71804-11 A review of tuberculosis control among displaced people in a chronic war setting in Uganda, 2004–2006

S Muchuro, L Drile, A Collins, G Root, J Walley. Malaria Consortium Africa, Kampala, Uganda. Fax: (+256) 312 300 425. e-mail: s.muchuro@malariaconsortium.org

Aim: To improve access to quality health care including HIV services, for TB patients.

Methodology: A comprehensive package for increasing access was implemented. The package consisted of training and routine supervision for over 48 health workers to improve their skills in tuberculosis case detection and management. Case finding was strengthened through provision of microscopes, behavior change communication and external quality assurance. Orientation of health workers to provide integrated care for tuberculosis and HIV/AIDS co-disease. Health workers were given incentives to provide routine follow-up to TB patients under their care.

Results: Pader district won the national award for registering the best improvement in case detection & treatment success rates in 2005. Pader annual case detection improved from 24.3% in 2004 to 58.6% in 2006. While its treatment success rates improved from 32.3% in 2003 to 85.9% in 2005. The number of tuberculosis treatment units increased from 3 to 19, while the diagnostic units increased from 2 to 6. The quarterly number of people attending TB services

that were detected to have HIV increased from 0 in 2004 to 143 (64.9%) in 2006.

Conclusions: It is feasible to markedly improve access to quality TB care in a chronic emergency setting. Integrating TB and HIV services noticeably increases case detection of HIV among people attending health services.

PS-71812-11 Community participation in supervised tuberculosis treatment in the state of São Paulo, Brazil, 2005

R A Arcêncio,^{1,2} M F Oliveira,^{1,2} T Arakawa,¹ T C S Villa,^{1,2} A Ruffino-Netto.^{2,3} ¹Nursing School of Ribeirão Preto, Ribeirão Preto, São Paulo, Brazil; ²Brazilian Tuberculosis Research Network, Rio de Janeiro, RJ, Brazil; ³University of São Paulo-School of Medicine of Ribeirão Preto, Ribeirão Preto, São Paulo, Brazil. Fax: (+55) 1636333271. e-mail: tite@eerp.usp.br

The purpose of this study was to investigate the participation on the community in the tuberculosis Supervised Treatment and control in the priority cities in the state of São Paulo. This study has a qualitative approach, in which the theoretical line used is the dimensions of healthcare quality, especially in terms of the interaction between patient and healthcare professional. Twenty-two coordinators of the TB Control Program were selected. All were subject to semi-structured interviews at the Quarterly State Coordination Meeting for Control in the state of São Paulo in July 2005. Data analysis was performed by categorizing and identifying the main and specific categories. It was observed that in most cities community participation is incipient, with no signs of expansions. Two cities have used community members to execute the Supervised Treatment, such as 'bar owners', who collaborate by supervising alcoholic patients and the 'sponsors', who became responsible for the patient completing the treatment, and for the bonding that motivates compliance to the medical treatment. In conclusion, despite inexpressive in the priority cities, community participation shows a certain degree of involvement with the TB issue, and demonstrates the social responsibility involved in fighting a disease for years has debilitated and killed a considerable part of the population in the state of São Paulo.

PS-71828-11 Low case detection rate: liability of tertiary care hospitals in big cities of Punjab, Pakistan

N Muham,^{1,2} B Darak.¹ ¹Provincial TB Control Program Punjab, Lahore, Pakistan; ²Research Institute of Tuberculosis, Tokyo, Japan. Fax: (+92) 429203750. e-mail: mnaeemdr307@yahoo.com

Background: Pakistan is high burden disease country for tuberculosis. DOTS Strategy was operationalised in year 2000 and expanded rapidly in all 35 districts. Large number of patients are being treated in tertiary care hospital but case detection rate is very low which

has negative impact on overall tuberculosis control in country.

Objective: To explore the reasons of low Case Detection Rate in Tertiary care hospitals of big cities in Punjab Pakistan.

Method and Study Design: Descriptive cross-sectional study in 14 Tertiary care hospitals in Punjab. Data was collected with help of questionnaire and interview from DOTS, non DOTS clinics and hospital administration.

Results: No referral and default tracing mechanism exist in any hospital. Less than 10% of estimated NSS+ cases are registered under DOTS expect in one hospital it was more than 100%. Many patients are treated under non DOTS and record of these patients is not available, except in one hospital, meant for chest diseases where record is available, patients registered under non DOTS are more than 13 000 in one quarter. Default Rate is more than 20% in most of the hospitals. DOT in 90% hospitals is family based. MDR TB cases are treated in 14% of the hospitals. All hospitals are having, well trained human resource, equipped labs with EQA and uninterrupted drugs and logistic supply. Interview with physicians and hospital administration reveals that CDR may rise with better coordination, consensus building among consultants and proper referral mechanism.

Conclusion: Bulk of the patients is not approaching to DOTS center in Tertiary care hospitals in big cities and lack of proper referral system contribute to low CDR.

PS-71849-11 Developing and implementing a new TB management information system (MIS) in Ukraine

A Dadu,¹ O Smetanina,² K Gamazina,¹ A Bishop,¹ D Richardson.¹ ¹PATH, Kyiv, ²F.G. Yanovsky's Institute of Tuberculosis and Pulmonology of Academy of Medical Sciences of Ukraine (ITP), Kyiv, Ukraine. Fax: (+380) 444962627. e-mail: andrei_dadu@hotmail.com

Background: Accurate data for program evaluation and global TB reporting are unavailable from Ukraine because of an outdated data recording and reporting system. Since 2003, PATH and partners have expanded DOTS in 8 Ukrainian oblasts. One project challenge was to design and pilot a new MIS and expand it throughout the country.

Objectives: To introduce and institutionalize a new TB MIS based on international standards and indicators.

Methods: With international and local partners, PATH developed monitoring and evaluation (M&E) guidelines based on cohort analysis; designed and implemented standardized data collection forms; designed a TB electronic management information system (TBEMIS); designed a training curriculum for field TB program staff; conducted computerized training classes; and organized an M&E study tour for national and oblast level data analysts.

Results: Since the start of the program in October 2003, 366 field TB service workers have been trained to enter and analyze data using standard indicators. TB managers are beginning to use these data to evaluate program performance although continued follow-up and support are needed to ensure sustainability. Ukraine's NTP now plans to expand the TBMIS throughout the country.

Conclusion: An appropriately managed, standardized MIS is an essential tool for effective M&E of the NTP at all administrative levels, but it requires substantial support during introduction to ensure its consistent use for program improvement.

PS-71861-11 Improving laboratorial diagnosis of tuberculosis: a successful experience of partnership in Rio de Janeiro, Brazil

M P Martins,¹ M C Cabral S de Sá,¹ M M Pereira,² L dos Anjos Filho,² R Maia,³ L M R Freitas,¹ R C Brito.^{1,4} ¹TB Control Program of Rio de Janeiro State-Brazil, Rio de Janeiro, RJ, ²State Reference Laboratory Noel Nutels, Rio de Janeiro, RJ, ³Ministry of Health Laboratory Coordination, Brasília, DF, ⁴Serra dos Orgãos University-UNIFESO, Teresópolis, RJ, Brazil. Fax: (+55) 21 2299 9750. e-mail: mmartins@saude.rj.gov.br

Introduction: Brazilian Ministry of Health and TB Control Program of Rio de Janeiro State (TBCP/RJ) have defined 32 municipalities with unfavorable indicators on TB control as a priority to actions and investments. Since 2004 a partnership between TB Control Program and USAID is ongoing in order to improve DOTS strategy. Low compliance to quality control, lack of incomes and equipment, low quality of lab registers, difficult of access to culture, low integration with other program staff and low quality of lab information system were some of the problems observed at the beginning of the actions implementation.

Objective: To improve laboratory actions in 32 priority municipalities as one of the steps of DOTS strategy. **Methods:** TBCP/RJ, Regional Laboratory Noel Nutels and Ministry of Health Laboratory Coordination elaborated a action plan for these 32 municipalities which includes training, supervisions, elaboration of educational material and, intensifying investments in laboratorial network, paying attention on municipalities specificities.

Results: Since 2004 forward actions were done: implementation of lab net register, permanent practice training in bacilloscopy on Regional Laboratory, 3 annual meetings for lab staff, 3 workshops for suspect TB finding in hospitals, 4 workshops for implementation of lab information system, monthly meetings for planning and training, 35 local supervisions, elaboration of educational material for sputum collect and distribution of 45 microscopy and 25 computers.

Conclusion: Investments in laboratorial settings are most necessary to improve DOTS strategy. These success experiences corroborates the importance of na-

tional and international partnerships in order to improve TB diagnostic.

PS-71952-11 Results of active case finding among minority groups in Kosova, 2006

X H Kurhasani,¹ L Adams,² R Mehmeti,³ B Tigani.⁴ ¹NGO KeA, Prishtina, Kosovo, Serbia and Montenegro; ²Dartmouth Medical School, Hanover, New Hampshire, USA; ³NTP Kosovo, Prishtina, Kosovo, ⁴Ministry of Health, Prishtina, Kosovo, Serbia and Montenegro. Fax: (+381) 38 245 797. e-mail: xhevat.kurhasani@gmail.com

Aim: To determine the added value of active case finding conducted among minority groups in Kosova. **Methods:** Household surveys were conducted in Plemetin Camp in Kosova where Roma, Egyptian and Ashkali minority groups reside (estimated population 400) by outreach nurses in December 2006. The survey contains questions for each adult household member about their TB history, symptoms and risk factors. Those that had at least one symptom, and either history of TB contact and at least one risk factor were considered TB suspects and referred for further evaluation.

Results: Among 397 adults interviewed, 17 (17.1%) met the criteria for a TB suspect, of which 8 (47.1%) presented for evaluation. Of those evaluated, 3 (37.5%) were diagnosed with smear positive TB, 1 (12.5%) with smear negative TB. All 4 (100%) of the cases identified through active case finding had been reported previously to the National TB Programme (NTP).

Conclusion: Active case finding did not identify any previously undiagnosed cases. Passive case finding through routine NTP activities appears to have comprehensive capture of TB cases in Kosova.

PS-71984-11 Community participation in TB: the case of Shasthya Shebika in Bangladesh

J Ahmed, R Alam, M A Islam, M A S Sarker, M Rifat, F Ahmed. Bangladesh Rural Advancement Committee (BRAC), Dhaka, Bangladesh. Fax: (+880) 28823614. e-mail: rafiulalom@yahoo.com

BRAC has been implementing a community based TB program in rural and urban areas of Bangladesh since 1984. Female community health volunteers, know as Shasthya Shebikas are playing an important role in TB control.

Objective: To develop a community-based cost-effective model to reach case detection of 70% and treatment success rate of 85% by 2005.

Method: Shebikas are selected from BRAC's micro credit village organizations. Each Shebika provides basic health care services to an average of 250 households. They receive 18 days residential training before starting work and attend in the refresher training once a month. During household visits, they disseminate TB information, identify and refer TB suspects for sputum examination and provide DOT. If any patient

has side-effect, Shebika refer the patient to sub-district hospital.

Result: Currently about 65 000 Shebikas are working throughout country. In 2006, a total 87 381 patients were diagnosed. Of them, 68 432 were new sputum positive, The case detection rate is raised from 68% in 2005 to 80% in 2006. Treatment success rate of new sputum positive TB patients diagnosed in 2005 was 93%.

Conclusion: Shebikas are effectively reaching out the community to identify TB case and treating patients for achieving MDGs.

PS-72005-11 Eight steps to detect undetected TB cases: guide for countries with low case detection in EMR

A Seita, S Baghdadi, A Bassili, S Ibrahim, K Soltan, C Bronke. Stop TB, WHO Eastern Mediterranean Regional Office, Cairo, Egypt. Fax: (+20) 22765414. e-mail: seita@emro.who.int

Low case detection (CD) is a serious problem in the WHO Eastern Mediterranean Region (EMR): 44% CD in 2005. The Regional Office has developed a Guide to help countries to improve CD based on the Stop TB Strategy. The Guide uses a simplified model of CD processes, and illustrates seven possible layers of undetected TB cases in the community [Figure].

The layers indicate where TB cases could remain undetected: Layer 1 (1) TB Management Unit (TBMU) after diagnosis; (2) TBMU laboratory; (3) TBMU outpatient units; (4) public health facilities other than TBMU; (5) private health facilities, and; (6) community. (7) Overestimation of TB incidence is also a factor of low CD.

Layers 1 to 8 correlate to sets of programme activities, 'Steps.' These are, from inside to outside: Step 1 (1) treatment & drug management, and contact management; (2) TB laboratory activities; (3) suspect management; (4) public-public mix approach; (5) public-private mix approach; (6) advocacy, communication and social mobilization; and (7) revision of estimates. Moreover, there are crosscutting activities (Step 8) like monitoring & evaluation [Figure]. For each Step,

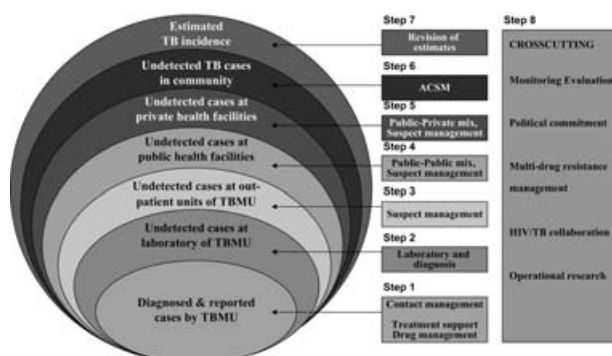


Figure Eight steps to detect undetected TB cases.

monitoring and evaluation indicators are listed in the Guide.

The draft Guide was tested in the TB programme review of Syria (42% CD) in December 2006, and was found effective to identify causes and possible interventions to detect undetected TB cases in each layer of case finding. The Guide is supportive for countries in EMR to comprehensively assess and address low case detection.

PS-72065-11 Features of tuberculosis patients in 2005 in Turkey

F Gümüşlü,¹ S Özkan,² Ü Güllü,¹ S Ypek,¹ F Baykal,¹ M Akça,¹ S Özkara.³ ¹TB Control Department, MoH, Ankara, ²Central TB Dispensary, Ankara, ³Ataturk Chest Diseases Hospital, Ankara, Turkey. Fax: (+90) 3123552135. e-mail: ozkaraseref@yahoo.com

Aggregate data on tuberculosis (TB) patients in Turkey have been collected by Ministry of Health for 45 years. The data proved to be insufficient to meet current requirements. Individualized data of 2005 annual cohort of TB patients have been collected by a dedicated software within the scope of Turkish National TB Surveillance Study (TUTSA). Completeness and accuracy were maintained by great efforts. Cases were reported to World Health Organisation (WHO) on an individual basis. Of the 20 535 cases registered in 2005, 18 753 (91.3%) were new, 1782 (8.7%) were previously treated cases. Of the previously treated cases, 1509 were relapse, 227 were defaulter, 26 were failure and 20 were chronic cases. 13 359 (65%) were male and 7176 were female. 14 462 only pulmonary, 5548 only extrapulmonary and 525 pulmonary plus extrapulmonary TB cases were registered. Of the 6073 total extrapulmonary cases, pleura TB (2274) was the commonest followed by lymph node TB (total 1957; extrathoracic 1622; intrathoracic 335). Of the 14 987 pulmonary TB cases, 11 866 (79.2%) had smear results, where 8505 (56.7%) were positive and 6971 (46.5%) had culture results, where 5708 (38.1%) were positive. There were drug susceptibility test results for 3711 (24.8%) patients and MDR-TB was detected in 190 patients. There were 63 foreign patients. Incidence of new cases and new smear positive cases are 25.8 and 10.2 per hundred thousand population respectively (population 72 065 000). Case notification rate is estimated to be 85% according to WHO estimation. We began collecting the treatment outcome data of 2005 cohort in February 2007. New recording and reporting system is currently operational. In 2007 individual data recording and reporting will be conducted quarterly at central level. The real-time operation will allow us to identify transfers and double recorded patients and will help to improve monitoring the TB Control Programme.

PS-72166-11 Applying the management and organisational sustainability tool for improved TB management (MOST for TB)

P G Suarez,¹ A Monroy,¹ E Barillas,² B Tobin,³ C H Owunna.² ¹Center for Health Outcomes, Management Sciences for Health, Arlington, Virginia, ²RPM Plus Program, Management Sciences for Health, Arlington, Virginia, ³Center for Health Outcomes, Management Sciences for Health, Cambridge, Massachusetts, USA. Fax: (+1) 703 524 7898. e-mail: psuarez@msh.org

Introduction: Many high TB burden countries have made important advances in expanding DOTS. However, the detection rate and treatment success rate are still below WHO targets. The main factor hindering DOTS expansion is lack of management capacity. Recognizing the need for a coherent health service response for TB, MSH has developed a novel approach for the assessment of management capacity to improve TB programs performance.

Objective: To adapt and pilot an innovative approach to improve management skills, including problem solving capacity, of national and mid-level TB managers in selected NTPs in LAC, EMR and Africa.

Methods: During 2004–2007, the USAID-funded RPM Plus Program and M&L/MSH project conducted the MOST for TB process in partnership with four NTPs and key stakeholders. This structured, participatory process guides participants to determine their status in different collaboration components, prioritize the components for improvement, and create an action plan. A key component has been an initial workshop.

Results: Using MOST for TB, selected NTPs developed a baseline assessment of their management capacity, which includes performance improvement target indicators, and an action plan. Using the time table agreed upon during the MOST for TB workshop, the implementation of an action plan is the ultimate objective. Progresses towards the goals incorporated in the plan are measured by indicators, such as a joint monitoring, evaluating and planning.

Conclusion: MOST for TB is an effective tool to help NTPs addressing management capacity issues.

PS-72185-11 Assessment of the capacity to diagnose and treat TB in Tororo district, Uganda

E Buregyeya, F Nuwaha. Disease Control, Makerere University Institute of Public Health, Kampala, Uganda. Fax: (+256) 41531807. e-mail: eburegyeya@iph.ac.ug

Tuberculosis (TB) is one of the most common causes of morbidity and the leading cause of mortality in people living with HIV/AIDS.

Objective: We set out to assess the capacity of health facilities to diagnose and treat tuberculosis in Tororo district, Uganda.

Methods: In March 2006, we conducted an assessment of all health facilities. We reviewed TB records in all the health centres in Tororo County, Tororo district.

We looked at the availability of laboratory services, functionality, availability of essential laboratory equipment required to perform testing for TB, qualifications and training of laboratory staff. We also assessed the availability of key laboratory commodities and logistics management practices.

Results: It was found that, on average only 50% of patients on TB treatment have repeat sputum done at the end of the treatment. There were incomplete TB records at the lower levels of the health facilities and only 18% (3/17) of the health facilities could carry out sputum exam for TB. The lack of staff to run the laboratories was found to be the main reason for lack of these services. Stock outs of TB drugs were also reported and the main reason was failure to order for enough drugs.

Conclusion: Lack of laboratory facilities in most HC IIIs leading to poor follow up of TB patients and incomplete records.

Recommendation: There is need to strengthen laboratory human resource capacity especially in the era of HIV/AIDS and the emergency of drug resistant strains of TB.

PS-72208-11 Caractéristiques des réseaux de laboratoire des PNT des pays francophones de l'Afrique de l'Ouest

S Anagonou,¹ G Torrea,² A Combarry,³ F Camara,⁴ M Barry,⁵ G Nahoua,⁶ A Van Deun.⁶ ¹Programme National de Lutte contre la Tuberculose, Cotonou, Benin; ²Institut de Médecine Tropicale, Anvers, Belgium; ³Laboratoire National de Référence, Ouagadougou, Burkina Faso; ⁴Laboratoire National de Référence, Bamako, Mali; ⁵Laboratoire National de Référence, Conakry, Guinée; ⁶Laboratoire National de Référence, Abidjan, Côte D'Ivoire. Fax: (+229) 21337057. e-mail: sanagonou@yahoo.fr

Objectif : Identifier les caractéristiques des réseaux de laboratoires de 5 pays de l'Afrique de l'Ouest impliqués dans un projet de renforcement de laboratoires.

Méthode : Visites annuelles de supervision effectuées dans les pays impliqués, synthèse et analyse des données collectées.

Résultats : Les constats étaient les suivants :

- Organisation du réseau : 2 niveaux (central et périphérique) sont fonctionnels dans la plupart des pays, le niveau intermédiaire est globalement presque non opérationnel
- La microscopie est en général standardisée, mais la faible charge de travail de certains laboratoires est parfois préjudiciable à la fiabilité des résultats
- L'insuffisance en ressources humaines formées et motivées à tous les niveaux est constante
- L'assurance qualité, antérieurement peu observée, constitue une priorité des réseaux des laboratoires de microscopie dans tous les pays, cependant, la méthodologie, l'analyse et l'interprétation des résultats de contrôles de qualité externe ne

sont pas toujours conformes aux recommandations internationales

- Les supervisions sont irrégulières et leur impact sur l'amélioration de la qualité du dépistage est faible.
- Les formations, de plus en plus réalisées sont généralement mal ciblées et non évaluées
- La réalisation régulière des cultures en vue des tests de sensibilité constitue une priorité de tous les laboratoires de référence, en dépit de leur non conformité tant au niveau des locaux, des équipements que des capacités techniques : 2 pays sur les 5 disposent d'un laboratoire de référence conforme

Conclusion : Il est donc nécessaire de renforcer en ressources humaines et financières, en appui technique. L'énorme expansion des laboratoires pour le développement des cultures et test de sensibilité n'est donc pas réalisable à court terme.

PS-72211-11 Cause of death in TB cases during DOTS management: a province, 2005

S B Boonnak,¹ B L Boonpendej,¹ V H Hutanon,¹ S V Vijitbunjong.² ¹Office of Disease Prevention and Control 1 Bangkok, Bangkok, ²A Provincial Public Health Office, Bangkok, Thailand. e-mail: Suboon777@yahoo.com

Methodology: This cross-sectional survey was conducted in Ayutthaya province by qualitative and quantitative method.

The purposes: 1) To assess the causes of death during DOTS management and 2) assess experience of DOT watchers who took care the patients living in their household. Study populations included 128 registered TB patients who had been registered during October 2003 to May 2005. Medical records of these patients were reviewed. In-depth interview was performed among 30 DOTS watchers.

Results: The results indicated that 51.6% (66/128) died due to HIV co-infection and 8 cases of TB (6.3%) which diagnosed in military TB and TB with pneumothorax, from organism of inflammatory (3.9%), cancer disease (3.1%), accident (1.6%), complication disease (14.8%) and other causes (18.7%). However, the DOTS watchers reported that those patients died from HIV co-infection, underlining disease and the findings from in-depth interview showed that patients had severe side effects with nausea, psychology from TB, stigma and social discrimination also discouraged patients to take the medications. DOTS watchers did not actually observe the intake of the medication even though they were expected to do.

In summary, patients who died had suffered more than one disease. The complexity of management for many diseases might prevent the patients to be able to follow the prescribed regimens.

Recommendation: Although the DOT watchers had adequate knowledge and attitude regarding TB, they might create social discrimination unintentionally. Further studies such as caring TB patients for more

than one disease should be explored to prevent the deaths effectively.

TB DIAGNOSIS: II

PS-71191-11 A novel algorithm for identifying mycobacterium species by rpoB duplex PCR-RFLP with key phenotypic characters

G H Shen,^{1,2} J H Chen,² C H Chen,³ C H Hung,⁴ R M Huang.⁵

¹Chest and Respiratory Department, Taichung, Taiwan, Taipei,

²Institute of Molecular Biology, National Chung Hsing University, Taichung, Taiwan, Taipei, ³Departments of Medical

Laboratory Science and Biotechnology, China Medical University, Taichung, Taiwan, Taipei, ⁴Institute of

Biotechnology and Chemical Engineering, I-Shou University,

Kaohsiung, Taiwan, Taipei, ⁵Center for Chest Diseases,

Department of Health, Executive Yuan, ROC, Tainan, Taiwan,

Taipei, China. Fax: (+886) 423500034.

e-mail: 911B@vghtc.gov.tw

We have developed a novel algorithm for identifying Mycobacterium species by combining rpoB duplex PCR-RFLP with key phenotypic characters. The presence of a 235-bp amplicon was identified as a *Mycobacterium tuberculosis* complex (MTBC) and a 136-bp amplicon as a nontuberculous Mycobacterium (NTM). NTM species were then divided into eight patterns by the MspI and HaeIII restriction enzyme analysis of a 136-bp rpoB gene segment, which could be easily differentiated by the naked eye without the need of computerized algorithm. The growth character, the presence or absence of pigmentation and the two key biochemical (nitrate reduction and Tween 80 or aryl-sulfatase) tests were further analyzed to identify Mycobacterium to the species level. A total of 440 clinical isolates of mycobacteria representing 17 Mycobacterium species were analyzed. Overall, there was 96.8% (426/440) concordant result obtained by rpoB DPCR-RFLP with key phenotypic characters, biochemical methods, and BD probeTec ET tests. The sensitivity and specificity were 96.2% and 98.8% for the MTBC, respectively. All 334 NTM strains had a 136-bp amplicon. The algorithm provides both of the advantage with rapid genotyping and conventional phenotyping, and could be used for differentiating mycobacteria in the daily practice of clinical mycobacteriology laboratory.

Mycobacteria	No. of isolates	Concordance %
MTBC	106	95.3
NTM	334	97.3
Slowly growing mycobacteria	161	96.3
Photochromogen	73	100
Scotochromogen	19	100
Nonchromogen	69	91.3
Rapidly growing mycobacteria	173	98.3
Total mycobacteria	440	96.8

PS-71493-11 The additionality of third sputum sample in the diagnosis of MDR-TB

G E Egos, H I Evasco, C V Guray, P C Bilangbilin, M L Bernardino, S F Magali, M S Evangelista, V R Ferrera, M I Quelapio, T E Tupasi. Laboratory, Tropical Disease Foundation, Makati, Philippines. Fax: (+63) 28102874. e-mail: grace_egos@tdf.org.ph

Objective: To analyze the cost incurred and the additionality of sputum culture and DST of a third specimen in the detection of MDR-TB.

Materials and Methods: The results of screening 1208 MDR-TB suspects from 2002–2006 were retrospectively reviewed.

Results: Eight hundred fifty-eight patients (71.03%) were culture positive. Of these, 738 were confirmed to be MDR-TB including 640 (86.7%) patients with a positive culture by the first specimen, another 73 (9.9%) positive on the second specimen and an additional 25 (3.4%) positive in the third specimen (Table). The cost incurred in detecting 738 MDR-TB patients was US\$ 98220 including 3624 cultures at US\$ 20 each plus another 858 DSTs at US\$ 30 each with a unit cost of US\$ 133 per case of MDR-TB diagnosed. If only two specimens were processed, 96.6% of the 738 MDR-TB patients would have been detected with corresponding cost incurred of US\$ 73040 and a unit cost of US\$ 102.44.

Conclusion: Two specimens are adequate to detect 96.6% of MDR-TB patients at a cost savings of 23%. A more extensive cost-benefit analysis is needed to determine whether this benefit can outweigh the clinical and public health consequences of missing 3.4% of cases.

Culture results of patients screened for MDR-TB

Culture results of patients			All patients	MDR-TB
Negative cultures in three specimens			350	0
Positive cultures in one or more specimens			858	738
First specimen	Second specimen	Third specimen		
Positive	Positive	Positive	615	541
Positive	Positive	Negative	38	30
Positive	Negative	Positive	44	37
Positive	Negative	Negative	42	32
Negative	Positive	Positive	58	54
Negative	Positive	Negative	27	19
Negative	Negative	Positive	34	25
Total			858	738

PS-71537-11 Response to RD1 epitopes is significantly reduced in patients with drug-resistant tuberculosis

D Goletti,¹ S Carrara,¹ D Vincenti,¹ O Butera,¹ M Del Mondo,¹ M P Parracino,¹ F Lauria,² G Gualano,² F Palmieri,³ E Girardi.² ¹Dipartimento di Epidemiologia e Ricerca Preclinica INMI L. Spallanzani, Rome, ²Pneumologia INMI L. Spallanzani, Rome, ³Postacuzie INMI, Rome, Italy. Fax: (+39) 06 5582825. e-mail: d.goletti@tiscali.it

Background: Drug-resistant tuberculosis (DR-TB) is known as having a poor prognosis with a weak response to therapy and very high death rates. Recently we set-up an assay based on IFN-gamma induction in response to RD1 selected peptides, that is associated to active TB, differently from the assays based on RD1 overlapping peptides able to identify TB infection.

Aim: Objective of this study was to assess at the time of diagnosis the response to the RD1 tests, including those commercially available, in DR-TB patients and compare to non-resistant (NR) TB patients and controls.

Results: Among 529 subjects studied, 224 were diagnosed with NR-TB, 25 with DR-TB (24 multidrug (MDR)-TB, 1 XDR-TB), and 280 without TB. A positive response to RD1 selected peptides was found in 160/224 patients with NR-TB, in 7/25 DR-TB and in 54/280 controls with a sensitivity of 71% for NR-TB and 28% of DR-TB respectively and a specificity of 81%. More than half of the overall patients (285/529) was simultaneously tested with the RD1 selected peptides assay and one of the two commercially available tests for TB infection (QuantiFERON-TB Gold and T-SPOT.TB). In this group, while the sensitivity for RD1 selected peptides was impaired in those with DR-TB compared to NR-TB (30% vs. 70% respectively), no significant differences were found for the commercial tests (73% vs. 86% respectively). Specificity was 78% for RD1 selected peptides assay and 51% for the commercial tests.

Conclusions: The data indicate that the response to RD1 selected peptides is significantly impaired in those with DR-TB compared to that of commercial tests. Based on the well known knowledge on the poor clinical outcome of DR-TB, this finding may suggest that the absence of response to RD1 selected peptides during active TB disease may be a negative prognostic marker of the disease outcome.

PS-71619-11 Rapid identification of Beijing family *Mycobacterium tuberculosis* isolates

P-C Chuang, H-Y Chen, R Jou. Ref Lab of Mycobacteriology, Centers for Disease Control, Taipei, China. Fax: (+886) 26531387. e-mail: rwj@cdc.gov.tw

Background: A simple and rapid method for identification and differentiation of Beijing genotype *Mycobacterium tuberculosis* isolates is needed in the TB endemic regions, especially if genotyping methods are not readily accessible. Single nucleotide polymorphisms (SNPs) in genes, *fbpA*, *fbpB* and *pimB*, involved in cell wall biosynthesis were analyzed.

Methods: A total of 204 Beijing family and 380 non-Beijing genotype isolates were evaluated. Polymerase chain reactions using primers designed from *fbpA*, *fbpB* and *pimB* were carried out on either ABI 3730 automated sequencer (Applied Biosystems, USA) or

ABI 7500 real time PCR system (Applied Biosystems, USA).

Results: Overall, 204 (100%) Beijing family isolates had mutation in codon 107 (GGT > GGC) of *pimB* gene, whereas the other 95 major non-Beijing genotypes isolates also elicited the same mutation. Furthermore, 29 (14.2%) and 157 (77.0%) of Beijing family genotypes strains displayed unique mutations in codon 156 (AGG > ATG) of *fbpA* and codon 238 (CCC > CCA) of *fbpB* genes, respectively. No *fbpA* or *fbpB* mutations were observed in all 380 non-Beijing genotype strains.

Conclusions: After analyzing 584 clinical isolates, a PCR method with combined *pimB*, *fbpA* and *fbpB* SNPs for differentiating Beijing lineage isolates was established, of which sensitivity and specificity are 91.2% and 100.0%.

PS-71668-11 Laboratory diagnosis of suspected children and adolescent tuberculosis cases

W-L Huang,¹ C-C Huang,¹ Y-C Huang,² C-Y Kuo,² N-C Chiu,³ M-C Hsieh,³ R Jou.¹ ¹Ref Lab of Mycobacteriology Centers for Disease Control, Taipei, Taipei, China; ²Chang Gung Children's Hospital, Taoyuan, Taipei, China; ³Markay Memorial Hospital, Taipei, Taipei, China. Fax: (+886) 26531387. e-mail: rwj@cdc.gov.tw

Purpose: To evaluate an interferon- γ release assay (IGRA) for the diagnosis of suspected children and adolescent tuberculosis cases.

Methods: Blood samples of 39 suspected TB and 6 control cases were collected from 2 medical centers and sent to the reference laboratory of Mycobacteriology at Taiwan CDC for analysis. The results of IGRA, by using T-SPOT.TB, along with the results of tuberculin skin test (TST), clinical information and data from the clinical laboratories were analyzed thoroughly for evaluation.

Results: Of 18 confirmed TB cases, 7 cases had contact history. Of those 7 cases, 42.9% were TST positive, 14.3% smear positive, 28.6% culture positive, and 85.7% IGRA positive. While, for those 11 cases without contact history, 50% were TST positive, 40% smear positive, 50% culture positive and 45.5% IGRA positive. For 11 pulmonary TB cases, 54.5% were TST positive, 30% smear positive, 30% culture positive, and 54.5% IGRA positive. While, for 7 extrapulmonary cases, 33.3% were TST positive, 28.6% smear positive, 57.1% culture positive and 71.4% IGRA positive.

Conclusions: The IGRA assay demonstrated comparative test results with TST for active TB cases without contact history. It has excellent sensitivity and specificity for the detection of cases with contact history, and extra-pulmonary TB. Even through only limited numbers of cases were tested, it is still suggested for rapid diagnosis and targeted screening of certain TB cases. This study will continue recruiting more cases

for the diagnosis of suspected children and adolescent tuberculosis cases before final recommendation.

PS-71865-11 Would a new rapid diagnostic test for TB be cost-effective?

D Bishai, M O'Brien, C Spencer, D Dowdy. Bloomberg School of Public Health, Johns Hopkins University, Baltimore, Maryland, USA. Fax: (+1) 410 955 2303. e-mail: dbishai@jhsph.edu

Objective: To model the cost-effectiveness of a hypothetical new rapid test for TB.

Methods: A deterministic decision tree model compared costs, disability adjusted life years (DALYs) and the number of secondary cases resulting from 3 TB testing strategies applied to a population of 1000 symptomatics. Strategies were: 1) a hypothetical new rapid diagnostic test, 2) sputum smear alone, and 3) smear combined with culture. Probabilities of TB, HIV, effectiveness of DOTS and death rates were incorporated into the model for 3 different settings: South Africa, Kenya and Brazil. Costs included medical and patient time costs and costs of testing. Model inputs were collected from published sources when available. Baseline sensitivity of smear was set at 50%.

Results: In non-HIV populations, the smear identifies TB cases where mortality and transmission is higher. DOTS treatment based on this useful 'auto-triage' property delivers extremely cost effective DALYs. Because a new test will identify higher numbers of lower mortality (smear negative, HIV negative) patients the cost per DALY averted and secondary case averted will be inferior to smear. In this model, the inferiority of a new test to smear alone can be mitigated by 1) increasing new test sensitivity >80%; 2) lowering new test cost to <\$1.00; 3) application preferentially in HIV+ patients; 4) combining new test with smear. We present sensitivity tests quantifying the incremental cost effectiveness achieved for a new test in each situation.

Conclusion: Although very insensitive, sputum smear microscopy is cost effective in the non-HIV population because it identifies the subgroup with highest infectiousness and morbidity. Here, we present parameter thresholds that any new diagnostic test must meet in order to be a cost-effective alternative or complement to sputum smear microscopy.

PS-72010-11 Comparison of contamination rate between two methods of sputum collection for the diagnosis of tuberculosis

E L N Maciel,¹ T Prado,¹ R C A Vieira,¹ M Palaci,¹ D J Hadad,¹ J L Jonhson,² R Dietze.¹ ¹Universidade Federal do Espirito Santo, Vitoria, Espirito Santo, Brazil; ²Case Western Reserve University, Cleveland, Ohio, USA. Fax: (+55) 2733357379. e-mail: emaciel@ndi.ufes.br

Sputum culture contamination is one of the limiting factors for the tuberculosis diagnosis. A nested case

control study was performed to evaluate the contamination rate between a home standard sputum collection (HSC) performed routinely by tuberculosis clinics in Brazil and a direct observed sputum collection (DOC). All specimens were collected in a sterile container. The HSC patients ($n = 26$) were oriented to collect the first morning specimen in fasting. In addition to this recommendation, the DOC patients ($n = 32$) were told to remove any alimentary residue from the mouth using a new toothbrush without toothpaste, to wash hands with soap and not to touch the container with the mouth during the procedure. The DOC group produced 76 sputum samples and the HSC, 43 samples. All samples were inoculated in Ogawa-Kudof media in the Mycobacteriology Laboratory at Núcleo de Doenças Infecciosas. The contamination rate in the DOC group was 13.2% versus 37.2% (16/43) in the HSC group ($P < 0.05$, OR = 0.25). Also, the specimens of the DOC group were of better quality (higher volume and less saliva) than the HSC group. The DOC collection method is more efficient to reduce culture contamination rates than the HSC method and should be implemented whenever is possible.

PS-72032-11 Diagnosis of PTB among HIV+ and HIV- patients in Nairobi, Kenya: a comparison of direct microscopy and culture

S Chebore,¹ C N Akoru,¹ N G Buziba,² J O Ndinya,² J K Sitienei.² ¹Department of Microbiology, Moi University, Eldoret, ²Central Reference Tuberculosis Laboratory, Nairobi, Kenya. Fax: (+254) 532061992. e-mail: chebore73@yahoo.com

Introduction: Worldwide, over 2 billion people are infected with MTB. TB kills 2 million people a year with 80% of the cases occurring between the ages of 15–50 years in developing countries. HIV pandemic which is largely uncontrolled has contributed significantly to spread of TB.

Study design: Cross-sectional study design.

Objectives: To determine the yield of culture technique over the employed direct smear microscopy.

Study population: New adult patients were targeted and a sample size of 150 was drawn for the study by systematic random sampling.

Materials and Methods: Total of 3 smears were prepared from each patient for direct and treated for culture on LJ medium.

Results: Direct microscopy yielded 35.3% smear positive cases. Out of these 47.8% was detected from HIV+ while 16.7% were from HIV- patients. Culture technique yielded 57% positive cultures. Seventy five percent of culture positive were captured from HIV+ while 40% were from HIV- patients. This gave an incremental yield of 21%.

Conclusion: Culture technique increased the yield substantially compared to direct microscopy. All positive smears were positive in culture confirming cul-

ture as the gold standard. Its relatively long time for isolation makes it less recommendable option for wide-spread use.

PS-72154-11 Rapid diagnosis of pulmonary tuberculosis in stool samples

L Martin, L Grandjean, C Evans. Imperial College Department of Infectious Diseases, London, UK. Fax: (+44) 870 442 1724. e-mail: martin.lauraj@gmail.com

Diagnosing pulmonary tuberculosis is difficult in patients who cannot produce sputum. 289 stool samples were collected to test whether tuberculous bacilli in swallowed sputum may be detected in stool to diagnose pulmonary tuberculosis. Pre-treatment, all patients were sputum culture-positive and the sensitivity of culturing paired stool samples was 60% with the Microscopic Observed Drug Susceptibility assay (MODS) compared with 50% for Middlebrook 7H10 agar, 43% for Löwenstein-Jensen agar, and 36% for auramine microscopy. HIV-infection had no effect on sensitivity ($P = 0.8$). MODS identified positive cultures most rapidly (median 11 days, $P < 0.001$) and simultaneously indicated antibiotic susceptibility with 100% concordance with other tests. 47 stools from healthy controls were negative (specificity 100%). Patients with multidrug-resistant tuberculosis remained stool culture positive throughout tuberculosis treatment. Sensitivity was lower for stool than sputum culture ($P < 0.001$) despite similar contamination rates. IS6110 PCR confirmed speciation of *Mycobacterium tuberculosis* for 98% of stool cultures. Therefore, stool culture with MODS is effective for diagnosing pulmonary tuberculosis and should be considered when sputum is unavailable.

PS-72183-11 Additionality of the second sputum in the monitoring of treatment of MDR-TB patients

G E Egos, H I Evasco, C V Guray, P C Bilangbilin, M L Bernardino, S F Magali, M S Evangelista, V R Ferrera, M I Quelapio, T E Tupasi. Laboratory, Tropical Disease Foundation, Makati, Philippines. Fax: (+63) 28102874. e-mail: grace_egos@tdf.org.ph

Objective: To analyze the additionality of sputum culture of a second specimen in the bacteriological monitoring of MDR-TB patients.

Materials and Methods: The results of one or two specimens collected from patients on follow-up in 2006 were retrospectively reviewed and compared.

Results: Two specimens were collected from MDR-TB patients on treatment for monthly follow-up by culture. A total of 1396 specimens for culture during the intensive phase and 1066 during the continuation phase were processed. During the intensive phase, 35 (3.0%) were culture-positive, 28 (80.0%) by the first and 7 (20.0%) by the second specimen. During

the continuation phase 13 (1.0%) were positive, 11 (84.6%) by the first and 2 (15.4%) by the second specimen. The latter two patients who were culture-positive only by their second specimen on the continuation phase were on their 7th and 8th month of treatment, respectively.

Conclusion: If only one specimen will be collected during the intensive phase, 20% will be missed, if only one specimen will be collected on the 7th and 8th month of the continuation phase, 15% will be missed. But starting on the 9th month of treatment, none will be missed for those that remain positive on culture.

PS-71217-11 The drug resistance rate of *Mycobacterium tuberculosis* complex in Central Taiwan in 2005–2006

G H Shen,^{1,2} J H Chen,² C H Hung,³ C H Chen,⁴ S T Jian.⁵

¹Chest and Respiratory Department, Taichung, Taiwan, Taipei, ²Institute of Molecular Biology, National Chung Hsing University, Taichung, Taiwan, Taipei, ³Institute of Biotechnology and Chemical Engineering, I-Shou University, Kaohsiung, Taiwan, Taipei, ⁴Departments of Medical Laboratory Science and Biotechnology, China Medical University, Taichung, Taiwan, Taichung, Taiwan, Taipei, ⁵Center for Chest Diseases, Department of Health, Executive Yuan, R.O.C., Tainan, Taiwan, Taipei, China. Fax: (+886) 423500034. e-mail: 911B@vghc.gov.tw

Aim: To evaluate the drug susceptibilities of first line anti-tuberculous medications (isoniazid, rifampin, ethambutol and streptomycin) in 2005–2006 in Taiwan with high prevalence of antibiotics resistance.

Design: Drug susceptibility testing of systematic samples of *M. tuberculosis* isolated from newly registered sputum culture-positive cases in the central Taiwan during a 24-month period (2005–2006).

Methods: Drug susceptibility test was performed by indirect agar proportion methods with the following critical concentrations: RMP (1.0 µg/mL), low level INH (0.2 µg/mL), high level INH (1.0 µg/mL), low level EMB (5.0 µg/mL), high level EMB (10.0 µg/mL), low level SM (2.0 µg/mL) and high level SM (6.0 µg/mL).

Results: Of 5017 isolates, 574 (11.4%) were resistant to low concentration of INH (INH-L), 380 (7.6%) to high concentration of INH (INH-H), 262 (5.2%) to RMP, 175 (3.5%) to low concentration of EMB, 39 (0.8%) to high concentration of EMB, 471 (9.4%) to low concentration of SM and 289 (5.8%) to high concentration of SM. In these 262 RMP resistant isolates, there were 217 (82.8%) resistant to INH-L, 184 (70.2%) to INH-H, 120 (45.8%) to EMB-L, 34 (13%) to EMB-H, 92 (35.1%) to SM-L and 63 (24.0%) to SM-H. Overall, there were 217 (4.3%) isolates with rifampin and at least low concentration INH resistant (termed as MDR-TB) in central Taiwan during 2005–2006.

Conclusion: In the Central Taiwan, the rifampicin resistance rate was still low but increased gradually.

RMP resistance was strongly combined with resistance to INH-L, INH-H, EMB-L and SM-L in Taiwan.

PS-71791-11 Extreme drug-resistant (XDR) tuberculosis in Vladimir and Orel Oblasts, Russia

T R Somova,¹ L V Tsaplina,¹ G V Volchenkov,¹ E S Nemzova,² B Y Kazionny,² E V Kiryanova,² I D Danilova,³ W Jakubowiak,³ E V Kourbatova.⁴ ¹Vladimir Oblast Tuberculosis Dispensary, Vladimir, ²Orel Oblast Tuberculosis Dispensary, Orel, ³WHO Office in the Russian Federation, Moscow, ⁴Samara State Medical University, Division of TB and Lung Diseases, Samara, Russian Federation. Fax: (+7) 495 7872149. e-mail: w.jakubowiak@who.org.ru

Introduction: XDR-TB is multidrug-resistant (MDR)-TB that is also resistant to any fluoroquinolone (FQ), and at least one of the injectable second-line drugs (SLDs).

Objectives: To study XDR-TB prevalence in two Russian Oblasts (regions).

Methods: A cross-sectional survey was conducted during the period of 01/01/2006–31/12/2006 in a joint WHO project in Vladimir and Orel Oblasts, Russia. Drug susceptibility testing (DST) for SLDs (FQ, kanamycin, capreomycin, ethionamide, cycloserine, and para-amino-salicylic acid) was performed on isolates from new and retreatment MDR-TB cases.

Results: In Vladimir Oblast, 182 (50%) of 363 registered cases of MDR-TB were tested for resistance to the SLDs. XDR-TB was found in 9 (5%) of 182 MDR-TB cases (all among retreatment cases). Overall 145 (80%) isolates had resistance to at least one SLD; 54 (30%) had monoresistance; 82 (45%) had resistance to ≥2 SLDs, but not XDR-TB. In Orel Oblast, DST to the SLDs was performed for 75 (87%) of 86 registered MDR-TB cases. XDR-TB was diagnosed in 1 (6%) of 18 new and 15 (26%) of 57 retreatment MDR-TB cases. Overall 49 (65%) of 75 patients had resistance to at least one SLD; 13 (17%) had monoresistance; 20 (27%) had resistance to ≥2 SLDs, but not XDR-TB.

Conclusions: XDR-TB has emerged in Russia. It is crucial to prevent, diagnose and treat TB and MDR-TB more effectively. It is important to improve laboratory capacities to perform DST for SLDs and implement registration forms for recording and reporting XDR-TB cases in Russia.

PS-71949-11 Logistics for sample collection and transportation for anti-tuberculosis drug resistance surveillance in Kenya

H Meme,¹ W A Githui,¹ E S Juma,¹ L Muthami,² P Kinyanjui,¹ F G Karimi,¹ F Orina,¹ P Mumbi,¹ J Kimwomi,¹ A Kutwa,³ K Evans.¹ ¹Centre for Respiratory Diseases Research, Kenya Medical, Nairobi, ²Centre for Public Health Research, KEMRI, Nairobi, ³National Leprosy and Tuberculosis Programme, Nairobi, Kenya. Fax: (+254) 2729308. e-mail: helenmeme@yahoo.com

Setting: Thirty nine sites from all nine administrative provinces in Kenya.

Objective: To identify smear positive TB patient, administer a questionnaire, collect spot and overnight sputum samples, package and send them to CRDR, TB laboratory in Nairobi by the quickest available means of transport.

Design: Descriptive.

Methods: Provincial Tuberculosis and Leprosy Coordinators were familiarized on the study during a workshop in Nairobi. They orientated District Coordinators under whose supervision the exercise was conducted. Specimen handling was in accordance with standard guidelines. Investigators monitored the exercise through site visits and phone calls. Courier service was most common means used for transportation. Far to reach sites used local bus company.

Results: Specimens from all sites except those from arid areas were delivered to Nairobi within 1–2 days. 98.7% of the samples were properly collected and packaged. 1.3% of the samples leaked and were not included in the analysis. Accompanying documents (questionnaire and shipment form) were properly secured and packaged.

Conclusion: National Surveillance exercises are taxing and difficult to accomplish in low income countries. Systematic organization of operational procedures is vital for quality and representative data.

PS-72174-11 Prevalence of initial MDR in TB patients from an urban and tribal community in South India

A Srikantam, V C Kishore, A Srinivas, B Triveni, K V KrishnaMoorthy, P V R Rao. Microbiology Division, LEPR-BluePeterResearchCentre, Hyderabad, AP, India. Fax: (+91) 4027261261. e-mail: aparna@bprcleprasociety.org

Background: Newly diagnosed sputum smear positive pulmonary tuberculosis patients ($n = 494$) treated under DOTS during April 2004–September 2005 from an urban and tribal community covering about 1 million population in South India were studied.

Methods: Pre treatment sputum specimens were subjected for culture of *Mycobacterium tuberculosis*. Drug susceptibility testing of *M. tuberculosis* isolates was carried out by 1% proportion method with critical drug concentration for isoniazid (H) ($0.2\mu\text{g/ml}$), rifampicin (R) ($40\mu\text{g/ml}$), streptomycin (S) ($4\mu\text{g/ml}$) and ethambutol (E) ($2\mu\text{g/ml}$).

Results: Out of the 494 specimens inoculated on Löwenstein-Jensen (LJ) slopes, 325 (66%) have yielded *M. tuberculosis* (isolates). Out of 325 isolates, 272 (84%) were susceptible to all the four drugs tested and 16% (53/325) were resistant to any one or more drugs. Combined resistance to H and R (MDR), was shown by 14 (4%) of the total isolates.

Conclusion: The drug susceptibility study on *M. tuberculosis* isolates from urban and tribal community gave an insight into the presence of different pattern of anti TB drug resistance in these areas. All the 14

isolates with MDR were from 238 urban patients, where as, MDR was absent in all the 87 isolates from patients in tribal area.

PS-71266-11 Community engagement in TB control interventions: Cape Town, South Africa

F Marais. Academic Unit for Infection Prevention and Control, Cape Town, South Africa. Fax: (+21) 938 5065. e-mail: tbstudy@aol.com

Aim: To investigate the nature and extent of community engagement in TB control interventions in order to identify recommendations toward improved policy and practice.

Objectives: To investigate the strategies and operational frameworks for the funding, planning, implementation and evaluation of the process of engaging communities in TB control. To explore the various TB control activities undertaken by community members. To identify existing evidence and perceived benefits (at both community and sector level) of the impact of community engagement in TB control. To explore operational limitations and existing needs. To make recommendations toward improved policy and practice for the engagement of communities in TB control interventions (research, policies, services and programmatic responses).

Design: A qualitative study.

Methods: Semi-structured interviews with individuals receiving TB treatment, community members engaged in TB control activities, programme managers, policy makers and commissioners.

Findings: The findings identify the utility of, and the need for, community engagement in TB control interventions. Several limitations, challenges and areas for improvement are identified; and recommendations, grounded in the study findings, are proposed toward improved policy and practice.

Conclusion: The engagement of community members is fundamental to the effective delivery and expansion of TB control interventions, but their position as key workers should be strengthened at both policy and operational level.

PS-71411-11 Perceived risk of acquiring tuberculosis among health care workers at a sub-Saharan reference hospital

W M Wayengera. Medicine, Makerere University Faculty of Medicine, Kampala, Central, Uganda. Fax: (+256) 782 450 610. e-mail: wmisaki@yahoo.com

Background: Health Care Workers (HCWs) in the sub-Saharan setting perceive themselves at substantial risk of acquiring TB, HIV and HBV. To ascertain the perceived risk of acquiring TB among HCWs in Uganda compared to other infectious diseases: HIV and HBV.

Design: Qualitative questionnaire survey employing

an anonymous questionnaire and two focus group discussions.

Settings: Mulago National referral hospital and the Infectious Diseases Clinic (IDC).

Participants: 240 HCWs working in the depts of internal Medicine, Surgery, Obs & Gyn and IDC.

Main outcome measures: Perceived risk of acquiring TB relative to HIV and HBV, frequency of needle stick injuries & splashes, as well as priorities for reducing such risk.

Results: 123 responded to the survey: 29 (23.6%) doctors, 72 (58.5%) nurses and 22 (17.9%) others. 104 (84.6%) considered themselves at risk of acquiring TB at work compared to 114 (92.7%) of HIV and HBV respectively. 74 (60.2%) considered themselves at risk of acquiring infection at work all the time, 19 (19.5%) sometimes, 4 (3.3%) often, 1 (0.8%) rarely and none never at all. 76 (75.3%) of doctors and nurses indicated to have ever had a needlestick injury while 61 (60.4%) had had such an injury in the past one year. 84 (83.2%) reported to have ever had a splash with patients' body fluids, while 65 (64.4%) had had a splash in the past one year.

Conclusion: HCWs at this Ugandan referral & teaching hospital perceive themselves at substantial risk of acquiring TB at work, despite this risk being lower than that perceived for HIV & HBV.

PS-71420-11 Patient acceptance of DOT: is adherence to anti-tuberculosis drugs guaranteed?

A Kawuma,¹ M Nanteza Walusimbi,¹ A Okwera,¹ J Sekandi,² R Mugerwa,¹ P Nassozi,¹ G Nalugwa,¹ A Mbabali,¹ J Birabwa,¹ S Eagan,¹ D Dobbs,¹ H Mayanja,¹ C Whalen,³ H Boom.³ ¹Makerere University-Case Research Collaboration, Kampala, ²Makerere University Institute of Public Health, Kampala, Uganda; ³Case Western Reserve University, Cleveland, Ohio, USA. Fax: (+256) 41533531. e-mail: a.kawuma@yahoo.com

Objectives: To determine the level of DOT non-compliance and describe reasons for non-compliance with DOT supervision program.

Methods: A retrospective review of counseling records for TB patients who accepted to take treatment under DOT was done. Between January 2005 and December 2006, 746 patients were diagnosed with TB and 120 who accepted to be supervised under DOT were closely followed up during 6 months of TB treatment with or without ART. DOT was community-based and supervised by local health workers.

Results: Of the 120 patients who accepted to be supervised under DOT, 37 (31%) patients missed DOT for more than 5 days, 23 (62%) missed DOT for more than 20 days and 7 (19%) patients abandoned treatment, of which 4 patients were taking both TB and HIV drugs. Several reasons given for non-compliance with DOT; 21(56.7%) said it was difficult to take drugs when hungry and yet they often did not have

food to eat. Six (16.2%) patients had busy work schedules while 10 (27%) said they lost interest in taking drugs because of unavailability of the supervisor.

All clients received ongoing support counseling on adherence throughout the study.

Conclusions: The findings suggest that the community-based DOT may not guarantee total treatment adherence for TB patients. There is need to provide nutritional support as part of the patients care package in low-income settings. Furthermore, alternate DOT approaches that are more patient centered need to be identified to enhance adherence.

PS-71488-11 Ethambutol susceptibility testing of *Mycobacterium tuberculosis* using Mycobacteria Growth Indicator Tube

A Vicente, M Gutierrez, M Montoto, M Hoffman. Mycobacteriology Laboratory-Tornu Hospital, Buenos Aires, Argentina. Fax: (+54) 1147909648. e-mail: yoyando@gmail.com

The reliability of the Mycobacteria Growth Indicator Tube system (MGIT; Becton Dickinson) for rapid susceptibility testing (ST) has been evaluated in several studies demonstrating a good correlation with the Proportion Method (PM) and the BACTEC 460TB system when tested to isoniazid, rifampicin and streptomycin but ethambutol (EMB) still needs a further evaluation due to discrepant results.

Aim: To evaluate the reliability of the MGIT system for ST of *Mycobacterium tuberculosis* (MT) to EMB at the critical and at a lower concentration (cc) in comparison with the PM.

Design: A total of 49 MT isolates were included in the present study. 39 MT were recovered from primary isolation cultures (MGIT medium) and 10 MT, with known susceptibility patterns, were selected from the collection distributed as external quality control for the susceptibility testing. The MGIT ST was performed with final drug cc of 2.5 mcg/ml and 5 mcg/ml. Both cc were tested in parallel. The PM on Löwenstein-Jensen was performed with a final drug cc of 2 mcg/ml.

Results: With an EMB cc of 2.5 mcg/ml, the two methods agreed in 46 cases (93.9%), 28 susceptible and 18 resistant. 2 isolates were susceptible by MGIT and resistant by PM, and 1 was resistant by MGIT and susceptible by PM.

With an EMB cc of 5 mcg/ml, the two methods agreed in 38 cases (77.6%), 29 susceptible and 9 resistant. 11 isolates were susceptible by MGIT but resistant by PM.

Conclusions: The MGIT results agreed better with those obtained with the PM when an EMB cc of 2.5 mcg/ml was used. Considering that the great majority of false susceptible results were observed when tested EMB at 5 mcg/ml, we think it should be necessary to adjust the cc for the MGIT ST in order to avoid under-reporting of resistance.

PS-71564-11 Detection of *Mycobacterium tuberculosis* rifampin resistance by a nitrate reductase assay applied on sputum

D Affolabi,^{1,2} M Odoun,¹ A Martin,² J C Palomino,² S Anagonou,¹ F Portaels.² ¹Laboratoire de Référence des Mycobactéries, Cotonou, Benin; ²Mycobacteriology Unit, Department of Microbiology, Institute of Tropical Medicine, Antwerp 2000, Belgium. Fax: (+229) 21 33 70 57. e-mail: affolabi_dissou@yahoo.fr

Objective: To evaluate the nitrate reductase assay (NRA) performed on smear positive sputa for direct detection of Rifampin resistance in *M. tuberculosis*.

Methods: A total of 213 smear-positive sputa with a positivity score of 1+ or more (>1 acid fast bacilli (AFB) per field at fluorescence microscopy) were used in the study. The samples were decontaminated using the modified Petroff method and portions of the resulting suspension were used to perform the NRA. The NRA results were compared with the reference indirect proportion method for 177 specimens for which comparable results were available.

Results: NRA results were obtained at day 10 for 15 specimens (9%), 88 (50%) at day 14, 66 (37%) at day 18 and the remaining 8 (4%) at day 28. Thus 96% of NRA results were obtained in 18 days. Of the 177 specimens there was only one discrepancy (susceptible with NRA and resistant with indirect proportion method).

Conclusion: NRA is simple to perform and provides a rapid, accurate and cost effective means for detection of rifampin resistance in *M. tuberculosis*.

PS-71641-11 The nursing experience in management of MDR-TB patients in Kampala, Uganda

C Drajoru,^{1,2} F Sebuyira,^{1,2} H Oketcho,¹ A Okwera,^{1,2} I Ayakaka.² ¹TB Treatment Centre, Mulago Referral Hospital, Kampala, ²Makerere University-UMDNJ, Kampala, Uganda. Fax: (+256) 41533531. e-mail: cdrajoru@yahoo.com

Objective: To share the nurses' experience in management of MDR TB patients' from a Pilot treatment Program.

Methods: In Mulago Hospital TB centre, 12 confirmed MDR patients were enrolled into a pilot treatment program starting October 2005 to January 2007. Second line TB drugs were given to all patients, 11 as in-patients and one as an out-patient. The treatment regimens consisted of five to six second line anti-TB drugs, with at least an injectable and a fluoroquinolone. The nurses administer the injections and oral drugs daily 5 days a week under direct observation until smear conversion. Nurses record patients' weight once weekly. Food is supplied for nutritional support and continuous adherence counselling is offered. The patients live in separate ventilated rooms with a sealed roof. The health workers wear fitted protective masks and patients are asked to use handkerchiefs to cover

their mouths and not to visit other non-MDR TB patients in the wards.

Results: Of the 12 patients treated 5 (42%) are females, and the average duration of admission was 6 months. Patients' admission weight ranged from 41 kgs to 73 kgs with average weight gain was 5.3 kgs at discharge. Patients received 130 injections on average and this sometimes led to scar tissue formation.

Challenges: Patients stay in hospital for a long time, with little or no social support from their families and fear for loss of jobs. Patients always complain about the pill burden, painful injections for a long duration, and they often feel stigmatised by friends or family members. The food provided in hospital is sometimes not adequate to meet patients' nutritional needs.

Conclusion: Nurses are few and bear an extra burden of caring for the MDR patients. They have the longest contact with the MDR patients causing them anxiety because of the high risk of infection with MDR TB. Guidelines for infection prevention for nurses working with MDR-TB patients and risk allowance are needed.

PS-72203-11 Supportive supervision is key to motivating clinic staff to improve programme performance: Nelson Mandela Metro

N P Mhlongo, M E Mhlophe, P Giyose, B Ncanywa. University Research Co., Pretoria, South Africa. Fax: (+27) 123421356. e-mail: ntombim@healthprojects.co.za

Introduction: The TASC II TB Project is a project of University Research Co., funded by USAID to provide technical assistance to the South African National TB Control Program to achieve the WHO global TB targets and promote integration between the TB and HIV programs. The project works at all levels of the health care system—national, provincial, district and facilities.

Background: Supervision of the TB program needs considerable technical expertise. District TB Coordinators often lack the time to conduct regular supervisory visits to health facilities. In spite of numerous training activities, staff at health facility level still needs to be mentored and monitored in order to effectively implement the activities of the TB program. PHC Supervisors are therefore a valuable resource in complementing this important function. Regular supervision of primary health care staff is essential for the delivery of quality health service.

Method: Quarterly supervisory visits are conducted in the district using the District Rapid Assessment Tool. The tool facilitates rapid assessment of the implementation of the TB Program at facility level. Because the facility staff is actively involved during the assessment, they are able to identify their own challenges. Their understanding of the reasons behind the challenges enables them to develop practical and sometimes innovative interventions that are within their

capabilities. In this way, supervision is not seen as a threatening exercise and this keeps the staff motivated.

Results: Improvements in TB program indicators after 14 months: TB patients completing treatment successfully improved by 40%, smear conversion rates by 35% and defaulter rates reduced by 10% on average, sputum turn around time improved to 80%.

Conclusion: Immediate and regular feedback on performance ensures that staff is motivated to improve with each round of supervision. The supervision process is negotiated and agreed upon by all team members.

TB-HIV: 1

PS-71195-11 Investigation of expanding point of HIV infection among AFB(+) TB patients: finding TB among HIV-patients

T H Do,¹ S N Dinh,¹ L D Nguyen,¹ H M Trinh,¹ D T Han,¹ T B Tran,¹ T B Le.² ¹National Hospital of TB and Respiratory Diseases, Ha Noi, ²Pham Ngoc Thach Hospital, Ho Chi Minh City, Vietnam. Fax: (+84) 483626162. e-mail: thangduduc@yahoo.com

Objectives:

- Evaluating HIV infected situation among AFB(+) TB patients.
- Survey on TB infected situation among HIV patients.
- Location: in 6/10 provinces which have highest ratio HIV infected over 100 000 citizens.

Method:

- By testing fast determine to diagnosis HIV infection in TB patients in districts level, patients are sent to Center of Preventive medicine of province level to re-diagnosis using ELISA method if the result is positive.
- By using investigation cross through method to detect HIV infected among TB patients and TB infected among HIV patients in an exact time, carried out in 6 months, to follow up the rate of TB patients infected HIV and the rate of HIV patients who are TB infected.
- For TB diagnosis of HIV patients: Sputum smear test and X-ray taken to patients who has TB symptoms as coughing within 2 weeks with expectorate, light fever in the afternoon.

Results:

- The overviewed picture of HIV among TB patients could be presented in the table.
- HIV infected among TB patients:
Total of patients AFB(+) HIV test taken 1217; 940 male (77.20%) and 277 female (22.80%).
HIV Status is 100 patients HIV(+) = 8.2%; male 94 (94%) and female 6 (6%).
- TB examination and diagnosis to HIV patients:
Total of patients HIV: 1609, with 1398 male (86.90%) and 211 female (13.10%).

Result: X-ray 1458 patients; sputum smear test 1264 finding 59 AFB(+) = 4.7%.

Province	No. of patients	HIV(-)	HIV (+)	
			Rate (%)	Male/female
Baria-Vungtau	230	191	39 (17.0)	38/1
Can Tho	212	200	12 (5.7)	11/1
Cao Bang	75	73	2 (2.7)	2/0
Hai Phong	277	240	37 (13.4)	35/2
Khanh Hoa	282	276	6 (2.1)	5/1
Lang Son	141	137	4 (2.8)	3/1
Total	1217	1117	100 (8.2)	94/6
Rate		91.80%		94.0%/6.0%

PS-71200-11 The success model of holistic health care for TB and TB-HIV

M S Hutanon,¹ M S Wiriyakijar,² M S Boonnak,¹

M S Boonpendej.¹ ¹Office of Disease Prevention and Control 1, Bangkok, ²Department of Disease Control, Ministry of Public Health, Bangkok, Thailand. Fax: (+662) 9729606. e-mail: vhutanon@yahoo.com

Background: National Policy; DOT by official. It does not lead into success rate >85%.

Objective: Develop official health care capacity in the counseling, develop and integrate network care in the community and develop a model for holistic health care.

Method: Participatory action research in 3 process: planning, action, evaluation. Each process had 3 dimensions: physical, mental, social.

Target group: 30 health officials, 428 volunteers.

Project indicator: Success rate >85%, DOT rate >85%.

Results: In-depth interview of officials from DOT: the most want supervision, case finding, counseling, and had not received a course in training counseling, and were not to the information network between TB clinics and health centers, and made 1–2 home visits per month, review the care network and community network activities such as volunteers. The plan provided education by trained officials about TB, AIDS and counseling. For the result, the official had better knowledge after training was completed. The plan resulted in greater social comprehension by trained volunteers about TB, AIDS, home visit. They also had higher knowledge and more positive attitudes after training. The model holistic care found that 3 model; Model 1: the most patients received DOT by volunteer, Model 2: DOT corner, specific for some old patients, Model 3: DOT by official, specific for the patients cannot disclosure.

Outcome: Success rate of 88.51%, and a DOT rate of 100%.

Conclusion: Intervention (Community participation) resulted in a higher success rate than before intervention, mortality was less, and the default rate was less than before intervention. The success rate for the

project was higher than National success rate indicator, Thailand.

Treatment outcome	Before	After
Case finding	175 persons	289 persons
Success rate	68.09%	88.51%
Death rate	11.48%	8.05%
Default rate	12.61%	3.44%

PS-71228-11 TB-HIV co-infection among TB patients attending the DOTS clinic in a hospital of Nepal

N Jha. Dept. of Community Medicine, BPKIHS, Dharan, Koshi, Nepal. Fax: (+977) 25 520251. e-mail: niljha@yahoo.com

Research question what is status of TB-HIV co-infection among TB patients?

Objective: To assess the proportion of TB-HIV co-infection among the TB patients.

Design: Descriptive study using laboratory tests.

Setting: BP Koirala Institute of Health Sciences, DOTS clinic, Dharan, Nepal.

Participants: 200 TB patients.

Statistical analysis: Percentage.

Results: Among 200 newly diagnosed TB patients, 11 (5.5%) patients were HIV positive. There were 132 (66.0%) males and 68 (34.0%) females. The maximum number (42, 31.9%) were males and (22, 32.4%) females. The TB-HIV co-infection was 5.5% among 200 newly diagnosed TB cases coming to DOTS center. All 11 TB and HIV co-infected were males and below age of 40 years. Among 132 male patients, 99 (75.0%) were diagnosed pulmonary TB and rest extra pulmonary. Similarly among 68 female patients, 47 (69.0%) were diagnosed as pulmonary TB and rest extra pulmonary TB. Out of 99 male pulmonary TB cases, 71 (71.7%) were sputum positive. Similarly, out of 47 female pulmonary TB cases, 41 (87.2%) were sputum positive. There were 8 (72.7%) pulmonary and 3 (27.3%) extra pulmonary TB cases among 11 TB and HIV co-infected patients. Out of these 8 cases, 6 (75.0%) were sputum positive.

Conclusion: This study shows 5.5% HIV-TB co-infection in a hospital based study. Among these 75.0% was sputum positive. TB-HIV co-infection is increasing in Nepal with comparison to other studies in the country.

PS-71278-11 Analysis of implementing state of screening HIV-TB dual infection in two experimental counties in Guizhou province

Y Li, J M Pan, Z P Chen. TB Control Institution of Guizhou CDC, Guiyang, Guizhou, China. Fax: (+86) 08516823835. e-mail: chenhujuan2005@yahoo.com.cn

Objective: To evaluate the implementing efforts of screening HIV-TB dual infected victims for 3 months

in 2 experimental counties that AIDS higher popular in Guizhou province.

Methods: Diagnosed TB patients would be HIV antibody examined and consulted by the cooperation of TB institute and AIDS institute. Patients who have been diagnosed HIV/AIDS would do the sputum smear examination and X-ray examination.

Results: 5 HIV antibody positive patients were detected among 152 diagnosed TB patients, accounting for 3.3% (5/152). 6 TB patients were detected among 26 HIV/AIDS patients, accounting for 23%, and there was no smear sputum positive patient.

Conclusions: The HIV-TB dual infectious screening can be extended in whole province, for TB institute and AIDS institute can establish a sound cooperation mechanism.

PS-71389-11 Constraints in initiating services for HIV-TB co-infected patients at OMACU Omdurman Teaching Hospital, Sudan

O Nemery,¹ E Hamouda,^{1,2} T Mansour,³ D Elsayed,⁴ K Khalafala.⁴ ¹School of Medicine, Juba University, Omdurman Hospital HIV/AIDS Clinical Management Unit (OMACU), Omdurman, Khartoum, ²Executive Committee, Sudan National Stop TB Board, Omdurman, Khartoum, ³Sudan National AIDS Control Program, Khartoum, Khartoum, ⁴Sudan Medical Specialization Board, Khartoum, Khartoum, Sudan. Fax: (+249) 187579111. e-mail: eisahamouda@hotmail.com

Introduction: The full extent of TB-HIV co-infection in Sudan is unknown. The annual risk of TB infection is estimated to be 1.8% and the prevalence of HIV infection is estimated to be 2.6% among the general population.

Results: OMACU provides VCT for HIV. Cumulatively, 786 HIV/AIDS patients received HIV care, 414 of whom were enrolled on ART. Of the 786, 119 (15.1%) were also diagnosed with TB, 22% sputum smear positive and 28% with extrapulmonary TB. A special referral clinic was established for TB-HIV co-infected patients, staffed by two chest physicians. Collaboration with the Central Chest Hospital allows referral of all their co-infected patients to OMACU for CD4 counting and enrolment on ART.

Conclusion: The uptake of HIV testing is still very low, perhaps in part attributable to limited access to HIV treatment, impediments in integrating medical services for two diseases, and other factors. The center still lacks basics, such as sputum smear microscopy services. Initially treatment for tuberculosis was unavailable at the centre, requiring their referral resulting in loss of patients from follow-up. While the center has been gaining a reputation for providing comprehensive integrated care with routine counseling, testing, and treatment for TB-HIV patients, the constraints are only gradually overcome. To better ascertain the accomplishments, the treatment outcome of the TB-HIV co-infected patients is being assessed. Such an evaluation should further improve the pro-

vision of services as well as enhancing a policy dialogue to expand collaborative TB-HIV activities in the country.

PS-71392-11 Results of self administered treatment and impact of TB-HIV co-infections in Bansa Baptist Hospital (BBH)

E R Kongnyu,¹ P D Tata,¹ H Yeager,² T Welty,¹ Y Nelson,¹ P Tih,¹ A S Ginsburg.³ ¹Cameroon Baptist Convention Health Board TB Program, Kumbo, Cameroon; ²Georgetown University Washington, DC, ³Elizabeth Glaser Pediatric AIDS Foundation, Washington, DC, USA. Fax: (+237) 3481262. e-mail: kongsan2003@yahoo.com

Introduction: The CBCHB implements TB control within its AIDS prevention and care program at 4 CBCHB treatment centers. Twenty (80%) of 25 CBCHB health centers perform AFB smears and refer positive cases for treatment.

Method: New and re-treatment cases are admitted for 2 weeks and 2 months, respectively of DOTS and individualized counseling to appropriately and consistently administer drugs themselves. Patients return monthly for review, further counseling/education, and refill of TB medications.

Results: From 1999 through 2005, 1694 cases were diagnosed with TB at BBH, 76.4% were AFB-positive, 11.0% were smear-negative, 12.6% were extrapulmonary TB, 20.9% died, 68.9% completed therapy, and 10.2% were lost to follow-up. Of 314 deceased patients, 82.8% were tested for HIV. Of those tested, 92.5% were HIV-positive compared to 65.7% of all TB patients tested for HIV. Acceptance of HIV testing increased significantly from a range of 47–69% in 1999–2002 to 86–98% in 2004–2005.

Conclusion: Late diagnosis, limited knowledge, influence of traditional healers/beliefs and patient inability to pay for sputum cultures or ART increases mortality. Financial and human resources are needed to fully implement DOTS and TB-HIV management. Volunteers trained as health educators including local church pastors and schoolteachers are needed.

PS-71446-11 Knowledge, attitude and practice on TB among PLWHA in Dar Es Salaam

P C Madulu. Medical-PASADA, Dar Es Salaam, Tanzania, United Rep. Fax: (+255) 22 2286618. e-mail: pmadulu@yahoo.co.uk

Broad objective: To determine the influence of knowledge, attitude and practice among PLWHA towards TB prevention and care.

Specific objectives: To assess PLWHA's knowledge, perception on risk, treatment and prevention of TB, To determine where PLWHA went to seek treatment when noticed signs/symptoms of TB and to determine the attitude of PLWHA towards TB infection.

Methods: This was descriptive cross sectional study. Five centres were conveniently sampled. Sample size

was 384. Respondents aged 15 and above were purposefully sampled. Data was collected by interviewer-administered questionnaire.

Results: Only 15.6% of respondents are knowledgeable on the cause of TB. Only half of the respondents are knowledgeable on transmission of TB. On signs and symptoms, 65% had low knowledge. Only 60% of the respondents perceive that they are at risk of TB. Seventy-seven respondents (20%) have negative attitude towards TB infection. Buying medicines from a local medical shop was practised by 15% and traditional healers were consulted by 5% of those who had suffered from TB.

Conclusion: The study calls for a comprehensive and through information, education and communication strategy to equip PLWHA in Dar Es Salaam with the correct information on TB. This will facilitate to tackle the challenges posed by HIV and MDR in TB prevention and care.

PS-71464-11 Inter-reader agreement for chest X-ray readings in HIV-infected pulmonary tuberculosis suspects

A Tamhane,¹ P Chheng,² T Dobbs,¹ C Eang,³ S Mak,⁴ M E Kimerling.¹ ¹Gorgas Tuberculosis Initiative, University of Alabama, Birmingham, Alabama, USA; ²Gorgas Tuberculosis Initiative, Battambang, ³Family Health International, Phnom Penh, ⁴Battambang Provincial Health Department, Battambang, Cambodia. Fax: (+1) 205 934 1746. e-mail: tamhane@uab.edu

Setting: HIV clinic, Battambang district referral hospital, Cambodia.

Objectives: Determine inter-reader agreement for chest X-ray readings and compare these readings with regard to accuracy, sensitivity, specificity, and kappa.

Methods: Retrospective cohort analysis of HIV-positive subjects' data comparing chest X-ray readings by on-site (Cambodia) and off-site (Gorgas Tuberculosis Initiative, University of Alabama at Birmingham, USA) physicians. The gold standard was culture-confirmed pulmonary tuberculosis (PTB).

Results: Prevalence of culture-confirmed PTB was 17% (141/833); 59% (83/141) were smear-positive. Overall, X-ray had lower accuracy and specificity but higher sensitivity than sputum-smear. Off-site readings had higher accuracy (79% vs. 54%) and specificity (80% vs. 49%) than on-site readings with comparable sensitivities (70% vs. 77%). Overall, agreement between the two readings was 62% and kappa was 27%. Among the X-rays classified as 'normal' by the off-site reader, 45% were classified as abnormal by the on-site reader. Disagreement between the two readings was more likely to be in smear-negatives (adjusted OR = 2.4; 95%CI = 1.3–4.5) and symptomatics (either fever >1 month or cough >3 weeks or hemoptysis) (adjusted OR = 1.4; 95%CI = 1.03–2.0).

Conclusions: Chest X-ray readings by the on-site Cambodian reader were likely influenced by concurrent

availability of clinical/laboratory data. Unblinded readings can adversely affect disease assignment; therefore, additional training and development of X-ray reading protocols are needed to increase accuracy of on-site readings.

PS-71476-11 AIDS surveillance as a major task for tuberculosis elimination in Cuba

E Gonzalez,¹ L Armas,¹ S Borroto,¹ L Oropesa,¹ M Diaz,¹ J C Millan,¹ J L Perez,¹ E Montoro,¹ M I Lantero,² M J Llanes,² R Ochoa,² M Santin.² ¹Institute of Tropical Medicine 'Pedro Kourí', Havana, ²National Epidemiology Division, Ministry of Public Health, Havana, Cuba.
Fax: (+53) 7 2046051. e-mail: ochoa@ipk.sld.cu

Background: In the Americas, because of HIV/AIDS, health situation becomes worse due to tuberculosis (TB)/HIV coinfection.

Objectives: To describe the trend and current situation of HIV/AIDS and Tuberculosis in Cuba.

Design: Data on surveillance of HIV and TB from both Ministry of Public Health and the 'Pedro Kourí' Institute, were analyzed.

Results: Since 1986 up to December 2004, around 30 millions of HIV tests (1.9 million/year) have been performed; 6025 HIV seropositive persons (2.9 per 10⁵) were identified; 2535 AIDS cases (1.2 per 10⁵) and 1301 deaths; around 80.2% of seropositive persons were 15–34 years old; 60.1% were infected by homo-bisexual intercourse; 39.1% by heterosexual, 0.4% by blood-borne transmission, and 0.3% by perinatal way. Cumulative figures of HIV seropositive persons increased from 3230 in 2000 to 6025 in 2004. TB cases notification decreased from 1133 in 1979 (11.6 per 10⁵ population) to 503 in 1991 (4.7 per 10⁵), but there was a reversion of up to 1574 (14.2 per 10⁵) in 1994, and it declined to 7.2 per 10⁵ in 2004. Overall primary TB drug-resistance decreased from 8% in 1981 to 5.0% in 2004 and primary multidrug-resistance was 0.7%, 0.0% and 0.3% in 1996, 1998 and 2004 respectively. Among seropositive persons, 247 (4%) tuberculosis cases have been diagnosed; around 45 of them by nosocomial transmission in 1993–94. So far only one, new HIV infection case was detected through the TB finding strategy.

Conclusions: A few new cases of TB emerged among HIV seropositive persons and the TB-HIV coinfection seems to keep low figures which permits to continue with the TB elimination plan

PS-71528-11 Responses to tuberculosis treatment with DOTS in HIV-positive and HIV-negative patients on HAART in Ibadan

O Onigbogi. Dept of Community Medicine, University College Hospital, Ibadan, Nigeria. Fax: (+234) 22411768.
e-mail: lanreonigbogi@yahoo.com

Background: Co-infection of tuberculosis with HIV occurs worldwide. In countries with a high preva-

lence of tuberculosis who have adopted the Directly Observed Treatment Strategy (DOTS), the adverse effects of these drugs used with Highly Active Antiretroviral Therapy (HAART) need to be investigated. This study sought to achieve this objective.

Methods: It involved a retrospective review of 181 case notes (91 HIV-positive patients on HAART and DOTS and 90 HIV-negative patients on DOTS only) treated over the same period. The adverse events recorded when HAART was combined with DOTS and when DOTS alone were noted. Data were analyzed by the use of SPSS version 10.

Results: The median duration of DOTS treatment was 5 months (range 2–24 months). The median duration of HAART was 3 months after the commencement of DOTS (range 0–6 months). A combination of isoniazid and rifamycin formed the basis of the DOTS regimen. Hepatic toxicity was reported in 10 (11%) of the HIV-positive patients as against 8 (8%) of the HIV-negative patients ($P = 0.042$). Skin rashes were reported in 5 (6%) of HIV+ves vs 4 (4%) of HIV-ves ($P = 0.11$), peripheral neuropathy in 14 (15%) of HIV+ves vs 6 (7%) of HIV-ves ($P = 0.015$), and nausea and vomiting in 8 (9%) in HIV+ves vs 2 (2%) in HIV-ves ($P = 0.03$). TB treatment had been interrupted in 5 (6%) of HIV+ves and 4 (4.4%) of HIV-ves due to hepatic toxicity and treatment failure. HAART had been stopped in 3 (3%) of HIV+ves and 4 (4%) of HIV-ves due to treatment failure and poor adherence.

Conclusion: The simultaneous use of HAART and DOTS is associated with an increase in adverse effects although the patterns are similar in both groups. However, the treatment interruption patterns were not influenced by this noticeable increase in adverse effects.

PS-71609-11 Tuberculosis and HIV/AIDS co-infection in Paraíba, Brazil, 1994–2006

R C B Betazzolli,¹ M A Cardoso,¹ L D Sá,^{2,3} J A Nogueira,^{2,3} R Camara Filho,⁴ L C Trindade,⁴ G S Sousa,^{3,5} T C S Villa,^{5,6} A Ruffino-Netto.^{3,7} ¹State University of Paraíba, Campina Grande, Paraíba, ²Federal University of Paraíba, João Pessoa, Paraíba, ³Brazilian Tuberculosis Research Network-REDE-TB, Rio de Janeiro, RJ, ⁴Clementino Fraga Hospital, João Pessoa, Paraíba, ⁵Nucleus of Sanitary Pneumology of the Health Secretary of the State of Paraíba, João Pessoa, Paraíba, ⁶University of São Paulo—College of Nursing of Ribeirão Preto, Ribeirão Preto, SP, ⁷School of Medicine—University of São Paulo of Ribeirão Preto, Ribeirão Preto, SP, Brazil.
Fax: (+55) 1636333271. e-mail: tite@eerp.usp.br

Objective: To describe the epidemiological profile of tuberculosis (TB)/AIDS patients from Clementino Fraga Hospital at Paraíba, Brazil.

Methods: Retrospective study of TB/AIDS co-infection cases registered from 1994 to 2006, notified at SINAN (Information System of Damaging Notification) at Clementino Fraga Hospital, reference centre for infection disease treatment at Paraíba.

Results: 265 cases of co-infection were registered, which 171 cases were pulmonary TB (64.5%) and 94 (35.5%) were of disseminated TB. It was diagnosed 250 cases of concomitant TB and HIV/AIDS (94.3%) while 15 individuals were diagnosed with TB after the HIV/AIDS diagnosis (5.7%). The age group of 30 to 39 years showed the larger prevalence with 120 cases (45.3%). Males were more affected with 201 cases (75.8%) while females accounted for 64 cases (24.2%). Brown race was the most affected (47.1%) followed by white (23.3%); 195 individuals (73.5%) had none or up to seven years of school.

Conclusion: Since people living with HIV/AIDS develop tuberculosis, and tuberculosis has an adverse effect on HIV progression, tuberculosis care and prevention should be priority concerns of HIV/AIDS programmes, and HIV/AIDS prevention and care should be priority concerns of TB programmes.

PS-71717-11 Pulmonary disorders as the initial manifestation of HIV infection

V Skodric-Trifunovic, T Mitic-Rasic, B Savic. Institute for Pulmonary Diseases and TB, Beograd, Serbia and Montenegro. Fax: (+381) 11 3976699. e-mail: vesnaskodric@eunet.yu

Pulmonary disorders are one of the serious problems in HIV infected patients. The purpose of the study was to evaluate the pulmonary disorders as the initial manifestation of HIV infection. In eighteen-year period (1988–2006), seventy-nine HIV positive patients were diagnosed at the Institute for Pulmonary Disease and TB. They were hospitalized due to respiratory problems with unknown HIV status. There were 60 (76%) males, and 19 (24%) females, aged 22–77 years. In our study, intravenous drug users were reported in 25 cases (31.6%), homosexual way of transmission—in 8 (10.1%), while heterosexual way was the predominant cause of transmission of HIV infection—it was recorded in 46 (58.2%) cases. Bilateral interstitial pneumonia was found in 45 patient (57%) out of whom 19 patients (42.2%) had acute respiratory failure on admission. Tuberculosis was bacteriologically verified in 22 patients (27.8%), pleuropneumonia and abscess in 9 patients (11.4%), and carcinoma, lymphoma and pneumothorax in 3 patient (3.8%). Among 20 TB patients, 11 (55%) had pulmonary, 5 (25%) manifested extrapulmonary (2 patients lymphadenitis, 3 pleuritis), and 4 (20%) patients had miliary tuberculosis. In 5/10 patients with pulmonary tuberculosis, the unusual radiological presentation with hilar and/or mediastinal lymphadenopathy was noted that resembled primary bronchogenic tuberculosis.

Conclusion: The interstitial pneumonia, especially with acute respiratory failure, presents the significant sign suggesting the suspicion of HIV infection. Tuberculosis is very frequent complication in HIV infected patients with different clinical and radiological man-

ifestations and with more common extrapulmonary and miliary dissemination in relation to immunocompetent persons.

PS-71795-11 Analysis of the spread of TB-HIV co-infection and the timeliness of HIV detection in TB patients in Russia

O Frolova,¹ E Yurasova,² W van Gemert,² W Jakubowiak.²
¹Federal Center of TB Care for People with HIV, Russian Ministry of Health and Social Development, Moscow, ²WHO Office in the Russian Federation, Moscow, Russian Federation.
 Fax: (+7) 495 7872149. e-mail: w.jakubowiak@who.org.ru

Background: The number of TB-HIV co-infections in Russia has grown by a factor of 2.8 in the past 3 years. On one hand, this growth is due to the development of immunodeficiency in people who became infected with HIV primarily via drug use 6+ years ago. On the other hand, it is a reflection of the more accurate system that has been created for diagnosis and reporting of co-infected cases.

Objective: To analyze the spread of TB-HIV co-infection and the timeliness of HIV detection in TB patients in Russia.

Methods: Analysis of the TB-HIV co-infected population using state statistics, as well as co-infected patient recording forms. Accuracy of the recording forms has been attained by establishing in each region a specialist who coordinates the work between TB and HIV/AIDS services and provides co-infected patients with needed help, as well as keeps records.

Determination of the level of coverage of screening and timeliness of screening for TB among people with HIV and of screening for HIV among TB patients, according to state statistics.

Results: Overall, the prevalence of TB-HIV co-infection in Russia was 6.4 per 100 000 population (9102 cases)

Among co-infected cases, 73.3% were male, 79.2% were unemployed, and 71.6% were drug users.

Among all cases of active tuberculosis in Russia, 3.0% were HIV positive.

Among all cases of HIV infection in Russia, 2.6% were registered with active tuberculosis.

Among all people with late stage HIV infection (i.e., with immunodeficiency), 52.5% became ill with tuberculosis.

According to records from AIDS centers, 46.9% of all people with HIV were screened for TB during the year.

Among all newly detected TB cases, 94.3% were screened for HIV during the year, and among all TB cases on record, 79% were screened for HIV.

Conclusion: The spread of TB-HIV co-infection in the Russian Federation calls for the urgent need for immediate measures to prevent and treat TB among those with HIV.

ABSTRACT PRESENTATIONS MONDAY 12 NOVEMBER 2007

THEMATIC SLIDE PRESENTATIONS

CHALLENGES TO TB CONTROL

TS-71893-12 Antiretroviral treatment outcomes in patients who received rifampicin together with nevirapine or efavirenz

A Boule,^{1,2} G Van Cutsem,³ K Cohen,⁴ K Hilderbrand,^{1,3} E Goemaere.³ ¹Infectious Diseases and Epidemiology Unit, School of Public Health and Family Medicine, University of Cape Town, Cape Town, ²Department of Health, Provincial Government of the Western Cape, Cape Town, ³Medecins Sans Frontieres, Cape Town, ⁴Division of Clinical Pharmacology, Department of Medicine, University of Cape Town, Cape Town, South Africa. Fax: (+27) 213617051. e-mail: gilles.vancutsem@msf.org.za

Background: TB-HIV co-infection is a major service challenge in sub-Saharan Africa. Many countries rely on nevirapine-containing fixed dose combinations as the mainstay of ART. The clinical and virological significance of the reduction in trough levels of nevirapine (NVP) due to interaction with rifampicin is not sufficiently understood.

Objectives: To compare virological, immunological, and clinical outcomes, as well as drug tolerability, in HIV-infected patients who underwent rifampicin-based treatment for tuberculosis concomitantly with combination antiretroviral therapy (cART) containing nevirapine versus patients who received cART containing efavirenz.

Methods: Prospective cohort study of all treatment-naïve adults started on cART in Khayelitsha by the end of 2005. Survival, virological suppression, CD4 count gain, and liver enzyme changes were compared for groups of patients on NVP or EFV, with or without TB treatment. Multivariate regression models were used for analysis.

Results: A lower probability of virological suppression at 18 months was associated with starting NVP when on TB treatment as compared to NVP alone; and with NVP when compared to EFV in patients not on TB treatment. No increased risk of failure was found when starting TB therapy whilst on cART. Increases in CD4 count were equivalent between the groups. Severe hepatic events on NVP were few, and were not associated with concomitant rifampicin use.

Conclusions: Hepatic induction reducing NVP levels might be of particular concern when initiating cART in patients on TB treatment. The differences in virological suppression between patients on EFV and NVP without exposure to TB therapy are an unexpected

finding warranting further exploration. Concurrent TB treatment in this cohort has not been associated with inferior outcomes. The lack of association between the concurrent use of rifampicin and nevirapine and increases in ALT is encouraging.

TS-71696-12 Risk factors for tuberculosis in HIV-positive and HIV-negative sub-populations living in high-prevalence countries

T Bandason,¹ E L Corbett,^{1,2} R Vundla,¹ J Muzangwa,¹ A Zesai,¹ S Munyati,^{1,3} S Mungofa,⁴ P Mason.^{1,5}

¹Biomedical Research and Training Institute, Harare, Zimbabwe;

²London School of Hygiene and Tropical Medicine, London, UK;

³National Institute of Health Research, Harare, ⁴Harare City Health Department, Harare, ⁵University of Zimbabwe Medical School, Harare, Zimbabwe. Fax: (+263) 4735033.

e-mail: tbandason@brti.co.zw

Background: Tuberculosis (TB) notifications have increased drastically in Southern Africa because of the HIV epidemic. We investigated risk factors for TB in the high-density Western suburbs of Harare.

Methods: 472 case patients were recruited as they registered for TB treatment (91% participation). 1888 community controls were randomly selected from participants in a community-based prevalence survey, frequency matched for sex.

Results: HIV prevalence was 76% in cases and 20% in controls. 15% and 14% of cases and controls reported past or present smoking. Reported alcohol consumption was implausibly low in cases (3% any regular drinking; 24% in controls). Risk factors varied by HIV status: for HIV-related TB, middle age (OR = 3.1, 95%CI 1.8–5.2) and higher social status indicators ($P < 0.05$) were significant risk factors. For HIV-negative TB, middle age (OR = 3.1, 95%CI 1.7–5.5), past TB treatment (OR = 2.9, 95%CI 1.1–7.5) and recent household contacts (OR = 1.9, 95%CI 1.4–2.5) were significant risk factors. Church going was significantly associated with decreased risk for both HIV-positive and HIV-negative TB. Smoking was not significant in either.

Conclusions: Risk factors for TB may differ by HIV status, with past TB treatment and household contact being only significant for HIV-negative TB in this study. We find no evidence that smoking is associated with TB. Under-reporting on socially undesirable risk factors may affect case-control studies, as reported here for alcohol.

TS-71837-12 The impact of *M. tuberculosis* exposure, age and HIV infection on T-cell assays to detect *M. tuberculosis* infection

A C Hesselring,¹ A M Mandalakas,² N Chegou,^{1,3} H L Kirchner,² X Zhu,² G Black,^{1,3} K Stanley,^{1,3} N Beyers,¹ B J Marais,¹ G Walzl.^{1,3} ¹Desmond Tutu TB Centre, Stellenbosch University, Tygerberg, South Africa; ²Pediatrics, Center for Global Child Health, Case Western Reserve University, Cleveland, Ohio, USA; ³Immunology, DST/NRF Centre for Excellence in Biomedical Research, Stellenbosch University, Tygerberg, South Africa. Fax: (+1) 2168446265. e-mail: anna.mandalakas@case.edu

Aim: To assess agreement between two commercial IGRAs and the tuberculin skin test (TST) for the detection of *M. tuberculosis* infection and examine the impact of age and HIV status on test results.

Design: Cross-sectional study.

Methods: 52 children (44% HIV-infected) and 73 adults (27% HIV-infected) were recruited from household contact investigations and HIV clinics. Data were collected on age, HIV status and *M. tuberculosis* exposure. An *M. tuberculosis* contact score was developed and used as a gold standard for infection. The TST was completed and defined as positive if ≥ 5 mm in HIV-infected and ≥ 10 mm in HIV-uninfected individuals. The T-Spot.TB and Quantiferon TB Gold (QFT) assays were performed and interpreted based on manufacturers' guidelines.

Results: In children, the T-Spot.TB test had poor agreement with the TST ($\kappa = 0.04$) and QFT ($\kappa = 0.16$) while TST and QFT had good agreement. In adults, all 3 tests had fair agreement. Test agreement appeared to be modified by HIV status in adults and children. After controlling for age and HIV status, subjects with a contact score of ≥ 4 were 8.5 (95%CI 3–24) and 10.3 (95%CI 3–32) times more likely to test positive on QFT and T-Spot.TB, respectively, compared to those with score < 4 . In these models, QFT and TST outcomes were dependent on age; T-Spot.TB was not dependent on age. ESAT-6 results were more strongly associated with *M. tuberculosis* exposure status than CFP-10 results.

Conclusions: In a setting with high burdens of TB and HIV infection, IGRA responses may be dependent on *M. tuberculosis* exposure, age and HIV infection status. Our preliminary data suggest that population-specific cut-offs may improve the diagnostic utility of IGRAs in these settings.

TS-72014-12 Pyridoxine serum concentrations in children hospitalised with tuberculosis

P Donald,¹ K Cilliers,² M Willemsse,¹ D Labadarios,² H Schaaf,¹ J Maritz,³ C Werely.⁴ ¹Paediatrics and Child Health, Tygerberg, ²Human Nutrition, Tygerberg, ³Biostatistics Unit of South African Medical Research Council, Tygerberg, ⁴Biology and Human Genetics, Tygerberg, Western Cape Province, South Africa. Fax: (+27) 219389138. e-mail: prd@sun.ac.za

The supplementation of children receiving isoniazid (INH) with pyridoxine is controversial. We determined serum concentrations of pyridoxine in 56 children (22 HIV-infected) treated in hospital for serious forms of tuberculosis. Amongst the HIV-infected and non-HIV-infected children the mean serum pyridoxine concentrations after 1 month of treatment were 8.19 ng/ml and 11.16 ng/ml, respectively ($P = 0.07$) and after 4 months of treatment 6.59 and 14.76 ng/ml ($P < 0.0001$). After 1 month of treatment 11 of 21 (52%) HIV-infected children had suboptimal pyridoxine concentrations (< 6 ng/ml), and after 4 months 9 of 20 children (45%). Of 34 HIV-uninfected children, 5 of 34 children (15%) and 2 of 32 (6%) children had suboptimal values at 1 and 4 months, respectively. Serum pyridoxine concentrations were not related to INH dose or to N-acetyltransferase genotype. Pyridoxine supplementation of HIV-infected children treated for serious forms of TB is recommended.

TS-71781-12 Success in detection and treatment of MDR-TB patients

A S Kononets,¹ S G Safonova,¹ S V Sidorova,¹ W Jakubowiak,² V V Testov,² D D Pashkevich.² ¹Federal Correctional Services of the Russian Federation (FSIN), Moscow, ²WHO Office in the Russian Federation, Moscow, Russian Federation. Fax: (+7) 495 7872149. e-mail: w.jakubowiak@who.org.ru

Background: Despite recent progress and trends observed, the TB situation in Russia remains unfavorable. This is especially the case in penitentiary settings, where TB registration rates are 20 times higher than in the civilian sector.

Objective: To analyze MDR-TB detection and treatment rates in the penitentiary sector.

Methods: Analysis of statistical data from the penitentiary sector.

Results: TB incidence in the penitentiary sector has decreased by 50% from 2001 to 2006 and is currently 1387 per 100 000. Mortality has decreased by 41.5%, and is currently 79 per 100 000. Over the last 6 years, the number of patients in penitentiary facilities has decreased by 52%. However, the number of TB patients with drug resistance has increased by 13%, and with MDR-TB by 6%. The rate of primary drug resistance has been high for 5 years. In 2006, it was 49%, and the MDR-TB rate was 20.3%. In 2004, the penitentiary facilities in 25 regions of Russia initiated treatment of MDR-TB patients. When treating MDR-TB patients for over 12 months, cessation of bacterial

excretion was reported in more than 60% of patients; mortality decreased from 4% to 2.7%.

Conclusions: Substantial investments from the World Bank loan and GFATM grant have facilitated the strengthening of the national TB control program. However, the growing threat of the man-made problem of XDR-TB poses a grave public health concern and sets up new challenges for TB control services across the country. High MDR-TB rates have been observed among new and retreatment cases in inmates. In the current situation, equipping medical services in prison settings with effective measures for infection control and rapid detection of MDR- and XDR-TB has become crucial for curbing TB in Russia.

TS-72042-12 Natural ventilation to reduce tuberculosis transmission risk in health care facilities in Peruvian prisons

E Ticona,¹ J Best,² P Valencia,^{1,3} L Huaroto,¹ V Chavez,¹ V Baffigo,⁴ M Aguero,⁵ D Moore,^{6,7} A R Escombe.^{6,7}

¹Grupo Levir, Lima, ²Instituto Nacional Penitenciario, Lima, ³Instituto Nacional de Salud, Lima, ⁴CARE Peru, Lima, ⁵Ministerio de Salud, Lima, Peru; ⁶Department of Infectious Diseases and Immunity, Imperial College, London, ⁷Wellcome Trust Centre for Clinical Tropical Medicine, London, UK. Fax: (+44) 207 594 3894. e-mail: rodescombe@yahoo.co.uk

Background: The high prevalence of tuberculosis (TB) in prisons is an important public health problem, compounded by the emergence of drug resistance. As well as the health risks to the prisoners themselves, TB in prisons is an important danger for prison health care workers, visitors, and the household contacts of TB infected prisoners on release.

Aim: To evaluate room ventilation in the health care facilities of 8 Peruvian prisons before and after the renovation or new construction of health care infrastructure guided by the principles of optimising natural ventilation.

Methods: A carbon dioxide tracer gas technique was used to measure ventilation in 94 different rooms in health care facilities, including consultation rooms, treatment rooms, wards, waiting rooms, laboratories, cells for TB patients, and sputum collection areas. Architectural features and environmental variables were recorded. Measurements were repeated following renovation or construction of new infrastructure (financed by the Global Fund). Theoretical risk of TB transmission to a health care worker during an 8 hour shift was estimated for each room using the Wells-Riley airborne infection model, assuming prisoners in each room had untreated pulmonary TB producing 13 infectious quanta per hour.

Results: Baseline median room ventilation was 15 air-changes/hour (ACH) (interquartile range (IQR) 9.3–26). Following renovation/new construction, median ventilation increased to 28 ACH (IQR 20–41; $P < 0.001$). Differences in wind speed were not significant. Theoretical risk of TB transmission decreased from



22% to 14% ($P < 0.001$). The natural ventilation modifications (e.g., skylights, elevated roofing and additional windows) comprised a small fraction of overall budget.

Discussion: In countries where climate permits, optimising natural ventilation is an effective and low-cost intervention to provide high rates of fresh air exchange and theoretical reduction in TB transmission risk in health care facilities in prisons.

TS-71415-12 *Mycobacterium bovis* infections in animals and humans in Tanzania

R R Kazwala. Sokoine University of Agriculture, Morogoro, Tanzania, United Rep. Fax: (+255) 2604647. e-mail: kazwala@suanet.ac.tz

A molecular epidemiological study to determine the zoonotic importance of bovine tuberculosis was carried out in Tanzania. Specimens from human cases of tuberculosis as well as from slaughtered cattle were collected from regions with a high proportion of extrapulmonary tuberculosis. Genetic fingerprinting was determined using spoligotyping. There were 13 different spoligotypes found in this study, whose genetic relatedness was also high (79%). The diversity of the spoligotype patterns observed in Tanzania probably reflects the extensive internal movements of cattle belonging to pastoralists in and out of wildlife livestock human interfaces of Tanzania.

Adjunct to the above studies, a human case-control study was conducted in northern Tanzania, involving 27 villages, with 622 herds. *Mycobacterium bovis* was confirmed in 10.8% of 65 human cases. *M. bovis* in human patients was associated with families in which a confirmed diagnosis of tuberculosis had previously been made ($P < 0.001$). In cattle, overall prevalence was widespread in herds tested (11.8%). Risk factors for positive herds were: >50 cattle in the herd ($P = 0.024$); herds housed inside at night ($P = 0.021$) and herds in contact with wildlife ($P = 0.041$). Furthermore, villages that experienced annual flooding had a higher prevalence of infection ($P = 0.043$).

TS-71672-12 The burden of respiratory disease and tuberculosis due to smoking in South Africa

P Groenewald, R Norman, D Bradshaw. Burden of Disease Unit, South African Medical Research, Cape Town, South Africa. Fax: (+27) 21 9380310. e-mail: prenaud@intekom.co.za

Objective: To quantify the burden of respiratory disease, including tuberculosis, attributed to smoking in South Africa in 2000.

Methods: The absolute difference between the observed lung cancer death rate and the level in non-smokers was used to estimate the proportion of lung cancer deaths attributable to smoking and the smoking impact ratio (SIR). The SIR was substituted for smoking prevalence in the attributable fraction formula for COPD to allow for the long lag between exposure and outcome. Assuming a shorter lag between exposure and disease, the current prevalence of smoking was used to estimate the population attributable fractions (PAFs) for respiratory tuberculosis and other respiratory conditions. Relative risks from the American Cancer Society cancer prevention study were used to calculate PAFs.

Results: Smoking caused approximately 21 789 deaths due to respiratory diseases (4.2% of all deaths) in South Africa in 2000. Age standardized tobacco-attributable mortality rates differed markedly by population group and gender. Lung cancer had the largest attributable fraction (75%), followed by COPD (62%). A high proportion (24%) of tuberculosis deaths in adults aged >35 years were attributed to smoking.

Conclusions: The South African government has taken bold legislative action to discourage tobacco use since 1994. However, given the high proportion of tuberculosis deaths attributable to smoking, the feasibility of implementing smoking cessation programmes in the SA public health sector, particularly the tuberculosis programme, needs to be investigated.

POSTER DISCUSSION SESSIONS**BACTERIOLOGY AND VACCINES****PC-71117-12 Limited fluoroquinolone resistance among *M. tuberculosis* isolates from Rwanda: results of a national survey**

A Umubyeyi Nyaruhirira,^{1,2} L R Leen Rigouts,² J Marc Struelens,³ K F Krista Fissette,² P F Portaels Françoise.²
¹National University of Rwanda, Kigali, Rwanda; ²Institut of Tropical Medicine, Mycobacteriology Unit, Antwerpen, ³Erasmus Hospital, Microbiology, Brussels, Belgium.
 Fax: (+32) 03 247 6333. e-mail: alainenyaruhirira@hotmail.com

Background: There is an increasing interest in the possible role of fluoroquinolone (FQ) antibiotics for treatment of tuberculosis (TB), but widespread use of these antibiotics for treatment of other bacterial in-

fections may select for resistant *Mycobacterium tuberculosis* strains.

Methods: We evaluated fluoroquinolone susceptibility using the proportion method (ofloxacin critical concentration of 2.0 µg/ml) in isolates obtained from patients enrolled in a national drug resistance survey in Rwanda from November 2004 to February 2005.

Results: Of the 701 *M. tuberculosis* patient-isolates studied, 617 (88%) were susceptible to all first-line drugs, 32 (4.6%) were resistant to at least isoniazid and rifapin, multidrug resistant (MDR), 52 (7.4%) were resistant to one or more first-line drugs but not MDR. Ofloxacin resistance was found in 4 (0.6%) of the isolates, 3 of them being MDR and one mono-resistant. Mutations in the gyr A gene in codon 80 and 94 were found in the ofloxacin resistance strains.

Conclusion: Despite the widespread use of FQ for treatment of common bacterial infections in our community, resistance among clinical isolates of *M. tuberculosis* remains rare, occurring primarily among MDRTB strains. This finding is not alarming in the context of Rwanda, but highlights the general risk of producing primary resistance to quinolones, creating incurable TB strains and jeopardizing the potential of these drugs to become part of second-line antituberculosis drugs in the programmatic management of drug-resistant tuberculosis.

PC-71303-12 Construction of post-exposure DNA vaccine encoding Rpf of *Mycobacterium tuberculosis*

M Tafesse,^{1,2} E Kuchmina,³ M Lakew,² T Hain,³ L Yamuah,¹ A Aseffa,¹ H Engers,¹ L Gedamu,⁴ M Young,⁵ M Chakraborty,³ S K Parida.^{1,6}
¹Armauer Hansen Research Institute, Addis Ababa, ²Addis Ababa University, Department of Biology, Addis Ababa, Ethiopia; ³Institute of Medical Microbiology, Justus-Liebig University, Giessen, Germany, Giessen, Germany; ⁴Department of Biological Sciences, University of Calgary, Calgary, AB, Canada, Calgary, Canada; ⁵University of Wales, Aberystwyth, UK, Wales, UK; ⁶Max-Planck Institute for Infection Biology, Berlin, Germany, Berlin, Germany.
 Fax: (+251) 113 21 15 63. e-mail: mesfinedu@yahoo.com

Background: Tuberculosis, caused by *M. tuberculosis*, is a major worldwide health problem. There is a real need to develop effective, more efficient and cost effective vaccines against TB particularly, new post-exposure vaccines and delivery systems for the control of latent tuberculosis.

Objectives: To construct recombinant attenuated *Salmonella typhimurium* DNA vaccine carrying genes encoding Rpf-like proteins of *M. tuberculosis* in eukaryotic expression on plasmid and to assess the immunogenicity of the recombinant vaccine constructs in vivo and in vitro using experimental mice models.

Materials and Methods: Four Rpf gene fragments (RpfB, RpfC, RpfD, RpfE) of the H37Rv strain of *M. tuberculosis* were cloned into PCR2.1TOPO and vical VR1020 vectors. Each recombinant plasmid was

used to transform competent *E. coli* DH5 α and *S. typhimurium* SL7207 Δ aroA strain. Positive clones were screened plus characterized by PCR and BamHI restriction enzyme digestion. In vitro identification of expression of each recombinant vaccine construct was done by transfecting each recombinant pVR1020::Rpf to mice macrophages. Ex vivo immunogenicity test was done by intraperitoneally injecting mice with these constructs. Immunofluorescence assay, RT-PCR, SDS-PAGE and immunoblotting were used to verify expression of these genes in vitro and ex vivo.

Results: Four Rpf gene (latency genes) fragments (RpfB, RpfC, RpfD, RpfE) were successfully cloned into PCR2.1TOPO and eukaryotic expression (viral VR1020) vectors. Immunofluorescence assay, RT-PCR and SDS-PAGE and immunoblotting results showed in vitro and ex vivo expression of both recombinant DNA vaccine constructs in *S. typhimurium* expressing RpfC and RpfE in C57BL/6 mice macrophages.

Conclusion and Recommendation: The recombinant attenuated *S. typhimurium* DNA vaccine strain expressing Rpf proteins of *M. tuberculosis* with immunogenicity could be constructed and would be helpful for investigating its immune action in vivo after oral immunization to mice models.

PC-71354-12 MGIT manual method for the rapid detection of second-line drug resistance in *Mycobacterium tuberculosis*

A Martin,^{1,2} F Varaine,² A Von Groll,^{1,3} P Almeida,³ J C Palomino,¹ F Portaels.¹ ¹Institute of Tropical Medicine, Antwerp, Belgium; ²Médecins Sans Frontières, Paris, France; ³Fundacion Universidade do Rio Grande, Rio Grande, Brazil. Fax: (+32) 3 247 63 33. e-mail: amartin@itg.be

The aim of this study was to evaluate the rapid non-radiometric MGIT manual system (Becton Dickinson) for the detection of resistance to second-line drugs in *M. tuberculosis* isolates originating from countries with high prevalence of MDR-TB. We evaluated ethionamide (ETH), kanamycin (KAN), capreomycin (CAP), ofloxacin (OFLO), and para-aminosalicylic acid (PAS) with one-hundred isolates of *M. tuberculosis*. We performed in parallel the gold standard method; the proportion method on Löwenstein-Jensen (LJ) and 7H11 agar media and compared the results with those obtained with the manual MGIT. Only two studies have previously used manual MGIT to detect resistance to OFLO and KAN and this study is the first to validate the MGIT manual system for second-line drugs. Our study helps to optimize the critical concentrations of second-line drugs for the manual MGIT. This commercial system is reliable, less expensive than the BACTEC TB-460 system, non-radioactive and faster than the conventional method. The manual MGIT system requires no special equipment, except an UV lamp to enable reading of the tubes.

PC-71552-12 Performance of different culture methods: implications for TB control in TB-HIV endemic areas

M Muyoyeta,¹ W Mwanza,¹ N Beyers,² P Godfrey-Faussett,³ A Schaap,³ G Mbulo,¹ K Lawrence,² C Kruger,² H Ayles.^{1,3} ¹ZAMBART Project, ZAMSTAR, Lusaka, Zambia, Zambia; ²Desmond Tutu TB Center, Stellenbosch University, Capetown, South Africa; ³London School of Hygiene & Tropical Medicine, London, UK. Fax: (+260) 1254710. e-mail: monde@zambart.org.zm

Introduction: There is increasing pressure for poorly resourced countries to extend the use of culture to diagnose TB. The MGIT system is known to have a higher yield and quicker time to recovery of TB but is largely not available in resource limited countries. The ZAMSTAR study is evaluating the routine use of MGIT culture on prevalence survey samples from Zambia and South Africa.

Methods:

- Samples digested and decontaminated using NaOH and NALC system
- Inoculated on solid media and liquid media
- ZN stain positive isolates subjected to identification tests to confirm presence of *Mycobacterium tuberculosis* complex

Results: 385 *Mycobacterium tuberculosis* complex (MTB) were isolated in total. MGIT isolated 322 (81%) and LJ 172 (45%). 373 non-tuberculous mycobacteria (NTM) were isolated, MGIT isolated 316 (85%) and LJ isolated 123 (33%). Of 310 smear negative samples, MGIT recovered 252 (81%) and 117 (38%) were recovered on LJ. The median time of positivity for smear negative samples was 17 days on MGIT and 34 days on LJ. Contamination rates were high on MGIT ranging between 23% and 9.8%.

Discussion: MGIT system recovered double the number of smear negative isolates of *M. tuberculosis* compared to LJ. The MGIT system was also quicker to give results. Using MGIT system may improve the diagnosis of TB in high HIV endemic areas that have seen an increase in smear negative TB.

PC-71571-12 Equivalence of a build-on module using LED for transmitted fluorescence microscopy detection of AFB

S Rienthong,¹ D Rienthong,¹ C Boonin,¹ S Suboon,¹ T Beller,² A Van deun.³ ¹Supra-National TB Reference Laboratory, Bangkok, Thailand; ²Fraen Corporation, Srl, Italy; ³Institute of Tropical Medicine, Antwerpen, Belgium. Fax: (+662) 2125935. e-mail: dhanida2547@yahoo.com

Setting: Supra-National TB Reference Laboratory, Bangkok, Thailand.

Objective: Comparison of acid-fast smear microscopy using a classical mercury lamp epifluorescence microscope versus a novel commercial transmitted light LED fluorescence module.

Methodology: 461 successive auramine stained smears were routinely examined with an Olympus BX-51 epi-

fluorescence microscope (100 Watt mercury lamp, 200X magnification). Smears were reread blindly at the same magnification, using an Olympus CX-31 microscope fitted with a 'Royal Blue' Light Emitting Diode (LED) for transmitted light fluorescence from Fraen Corporation Srl, Italy.

Results: Making abstraction of one-grade quantification differences, agreement between the two instruments was 99.1%. Quantification gradings with the LED were lower, but this may have been largely due to the widefield eyepieces of the BX-51, resulting in a 1.5 times larger field. The brighter background, even with potassium permanganate counterstaining, was favoured by part of the users.

Conclusion: In this evaluation, the FRAEN LED fluorescence module appeared equivalent in performance with a large BX-51 fluorescence microscope. Besides, this LED system is cheap, the lamp has a very long lifespan, is easy to adjust, and can even be used on a battery. Most users liked its brighter image. The system thus holds a big promise, and should now be evaluated further for its acceptability and ease of use in various settings.

PC-71590-12 Stability of inhalable BCG vaccine via pulmonary route of administration as compared to lyophilised vaccine

Y L Wong,¹ S S Sampson,² W A Germishuizen,¹ S Goonesekera,² J M DeRousse,¹ B R Bloom,² D A Edwards.¹ ¹Harvard University, Cambridge, Massachusetts, ²Harvard School of Public Health, Boston, Massachusetts, USA. Fax: (+1) 617 495 8534. e-mail: lingwong@fas.harvard.edu

Aim: To develop an inhaled BCG vaccine that is stable for long term storage as compared to standard lyophilized vaccine and is delivered via the pulmonary route. An alternative method for drying the vaccine and route of administration are possible solutions for enhancing BCG efficacy against tuberculosis.

Design: A spray drying method was developed to create a dried aerosol BCG powder and lyophilized vaccine was created using a Virtis Freezemobile Freeze Dryer. BCG vaccine was stored in several environmental conditions: -20°C 10% RH, 4°C 25% RH, 25°C 60% RH and 40°C 75% RH. A study comparing viability and aerosol characterization of spray dried to lyophilized BCG powder was conducted over 12 months.

Results: At freezer and refrigerated conditions, viability was maintained over 6 month period where viability in spray dried form was consistently 1 log or greater than lyophilized powders. Powders in room temperature conditions had a higher viability than lyophilized. Accelerated conditions spray dried powder maintained viability for 2 months longer than lyophilized powder. Spray dried powder exhibited ideal aerosol particle size and properties while lyophilized powders could not.

Conclusion: Spray dried BCG vaccine powders provide a feasible alternative to lyophilized powders in maintaining viability and aerosol properties ideal for aerosol delivery which could enhance BCG efficacy.

PC-71774-12 Assessment of the MTBDR-plus assay for rapid detection of MDR tuberculosis from smear-positive samples

M Barnard,¹ R O'Brien,² T Dolby,¹ H Albert,² G Coetzee,³ M Bosman.¹ ¹National Health Laboratory Services, Cape Town, South Africa; ²Foundation For Innovative New Diagnostics (Find), Geneva, Switzerland; ³National Health Laboratory Services, Johannesburg, South Africa. Fax: (+27) 214252907. e-mail: marinusb@gmail.com

The emergence of extensively drug-resistant tuberculosis (XDR-TB), defined as MDR plus resistance to any fluoroquinolone and one of the injectable kanamycin, amikacin and capreomycin drugs, in South Africa, constitutes a major health hazard. Rapid identification of MDR-TB will greatly improve its management and impede the development of further resistance. The performance of a new DNA strip assay, Geno-type® MTBDRplus (Hain Lifescience), was evaluated and compared with conventional culture and drug susceptibility testing (DST). The MTBDRplus assay, involving PCR amplification and reverse hybridization, is designed to detect mutations in the *rpoB* gene for rifampicin resistance and the *katG* and *inhA* genes respectively for high- and low-level isoniazid resistance. Six-hundred sputum samples were collected from February to March 2007 for direct MTBDRplus testing and for culture and DST. Analysis of rifampicin and isoniazid resistance findings involving 49 MTBDRplus-positive specimens shows 100% correlation between the performance of the MTBDRplus assay and the DST findings. The addition of the *inhA* mutations demonstrates its importance, since 9 of the isoniazid resistant strains had mutations in this gene only. These preliminary results show that the MTBDRplus approach is extremely promising for early MDR-TB detection but further test results are awaited for comprehensive evaluation of the assay.

PC-71776-12 Enquête nationale sur la résistance primaire aux antituberculeux à Madagascar, 2005–2006

H Ramarokoto,^{1,2} B Rarivoson,¹ O Ratsirahonana,¹ G Ranjalaly,¹ S Ranaivohajaina,¹ J Ravaosolo,¹ A Rakotoarisaonina,¹ M Mosa,¹ M Ratsitorahina,² V Rasolofo,² J L Soares.² ¹PNT Ministère de la Santé, Antananarivo, ²Institut Pasteur de Madagascar, Antananarivo, Madagascar. Fax: (+261) 20 22 415 34. e-mail: herimana@pasteur.mg

A Madagascar, près de 13 000 nouveaux cas de TPM+ sont dépistés par an. La dernière enquête sur la résistance, effectuée à Antananarivo en 1999–2000, a montré un taux de multirésistance primaire (MDR)

de 0,1%. L'enquête nationale actuelle sur la résistance de *M. tuberculosis* chez les malades TPM+ a commencé en octobre 2005, et a duré un an. L'échantillonnage s'est fait sur 205 centres de diagnostic et de traitement du pays, sur le modèle d'un sondage en grappe de type PEV : 35 grappes de 30 patients ont été retenus, soit 1050 nouveaux cas TPM+ à inclure de manière consécutive, pour l'étude de la résistance primaire. La résistance secondaire sera évaluée sur les patients TPM+ déjà traités, inclus au cours de la même période. Les tests de résistance à la streptomycine 4 µg/ml, la rifampicine 40 µg/ml, l'isoniazide 0,2 µg/ml, et l'éthambutol 2 µg/ml, sont réalisés sur milieu LJ, suivant la méthode des proportions. L'inclusion a pris fin le 31 janvier 2007. Au 28 février 2007, 494 souches de nouveaux cas ont été testées, dont 485 ont eu des résultats disponibles : 449 sont complètement sensibles et 39 résistantes à au moins 1 antituberculeux, soit 7,4% de résistance primaire globale. Le nombre de souches résistantes à au moins HR a été de 3, soit une MDR primaire à 0,62%. Les résultats finaux seront obtenus dans 5 mois.

PC-71805-12 Molecular characterisation of *Mycobacterium simiae* (habana) strains using RAPD analysis

R Diaz,¹ D Saavedra,² L M Mederos,¹ Y de Armas,¹ E Montoro,¹ J A Valdivia.¹ ¹Tropical Medicine Institute 'Pedro Kouri' (IPK), Havana, ²Havanan Center of Hygiene and Epidemiology, Havana, Cuba. Fax: (+537) 2046051. e-mail: raul.diaz@ipk.sld.cu

Background: *Mycobacterium habana* was initially described by Valdivia et al. in 1971 from sputum samples of Cuban patients with respiratory symptoms. However, it is still recognized that these isolates belong to *M. simiae* (serovar 1).

Objective: To characterize *M. simiae* (habana) strains using random amplification of polymorphic DNA (RAPD) analysis.

Methods: Fifteen *M. simiae* (habana) strains, extensively studied by phenotypical methods and belonged to a Cuban collection of 32 strains, and two *M. simiae* reference strains were compared by RAPD analysis using 20 commercial primers (OPA A Kit, Operon Technologies, USA).

Results: A high polymorphism among *M. simiae* (habana) strains were found with three independent primers (OPA 2, 4, 20). The use of RAPD with the OPA2 primer showed a better differentiation than the other two primers. A higher discriminative power was obtained by combining the results of the three RAPD primers and then all strains could be distinguished.

Conclusions: RAPD analysis with the combination of the three primers (OPA 2, 4, 20) could be a useful method to subtype isolates from *M. simiae*. The RAPD method showed to be a simple and fast technique with a good discriminative power. It could be a ratio-

nal genotypic method of atypical mycobacteria in laboratories with limited resources.

PC-72034-12 Rapide microarray-based rapid method to identify mycobacterium and drug resistance

Y L Zhao,¹ Y Guo,² S F Wang,¹ H W Yang.² ¹National Tuberculosis Reference Laboratory of China CDC, Beijing, ²National Engineering Research Center for Beijing Biochip Technology, Beijing, China. Fax: (+86) 10 69559710. e-mail: zhaoyanlin@tb123.org

Objective: Multi-drug resistance tuberculosis (MDR-TB) and Mycobacterium identification are two major issues in current tuberculosis control and management. Conventional identification and drug susceptibility testing are time-consuming. Thus, there is an urgent need for investigating the rapid method to identify the mycobacterial bacilli and MDR-TB.

Methods: Here we made DNA Chip in which DNA fragments of 16s RNA encoding sequence and DNA fragments of isoniazid or rifampicin resistance associated genes were involved. 611 clinical isolates were analyzed by this DNA chip comparison with conventional culture and drug susceptibility test. All results were validated by DNA sequencing and DST respectively.

Results: The results indicate that this DNA chip has 100% accordance rate of mycobacterial bacilli identification and 83.58–89.37% accordance rate of isoniazid or rifampicin resistance. Very few observed discrepancies were attributed to rare and new mutations not represented in the microarray, while a few of the strains with discrepant results did not carry mutations in the rifampin resistance-determining region. The results of this study confirm the utility of the system for rapid detection of isoniazid or rifampicin resistance and suggest approaches to increasing its sensitivity.

Conclusion: DNA chip system is a rapid system to identify the mycobacterial bacilli and to detect mutations associated with isoniazid or rifampicin resistance in mycobacteria. DNA chip is promising new diagnostics for mycobacterial bacilli identification and MDR-TB detection.

TB-HIV: 2**PC-71502-12 Is a tuberculosis treatment success target of 85% achievable for HIV-infected persons?**

L King,¹ S D Ahuja,¹ S Munsiff.^{1,2} ¹Bureau of Tuberculosis Control, New York City Department of Health and Mental Hygiene, New York, New York, ²Division of Tuberculosis Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+1) 212 788 9836. e-mail: sahuja@health.nyc.gov

Aim: Review outcomes of HIV-infected TB patients in New York City (NYC) to determine if the World Health Organization treatment success target of 85% was met.

Methods: We retrospectively reviewed treatment outcomes for new NYC TB patients with known HIV status from 1995–2004, excluding patients with rifampin-resistant isolates.

Results: Of 9203 eligible TB patients, 31% (2825) were HIV-infected. Of these, 72% (2033) had treatment success, 18% (518) died during treatment, 5% (137) failed, 3% (81) defaulted, and 2% (56) moved from NYC. Among HIV-uninfected patients, treatment success was consistently over 85%. Among 1303 acid fast bacilli sputum smear positive, HIV-infected patients, treatment success was 66% (864), increasing from 61% to 71% over the study period ($P_{\text{trend}} < 0.001$), compared to 77% (1169) among 1522 smear negative patients, increasing from 67% to 83% ($P_{\text{trend}} < 0.001$). Among HIV-infected patients who received any outpatient treatment, directly observed treatment ($\text{OR}_{\text{adj}} = 1.83$; 95%CI: 1.45–2.30), inclusion of rifabutin in the regimen, a proxy for patients receiving antiretroviral therapy ($\text{OR}_{\text{adj}} = 1.43$; 95%CI: 1.14–1.80), and diagnosis after 1999 ($\text{OR}_{\text{adj}} = 1.31$; 95%CI: 1.02–1.70) were associated with treatment success. Sputum smear positive ($\text{OR}_{\text{adj}} = 0.52$; 95%CI: 0.41–0.65) or culture positive ($\text{OR}_{\text{adj}} = 0.62$; 95%CI: 0.44–0.88) patients were less likely to have treatment success.

Conclusion: In NYC, despite universal access to HIV treatment, TB treatment success did not reach 85% in HIV-infected patients due to high mortality. To achieve this target, further efforts to strengthen and integrate TB and HIV treatment and control programs are warranted.

PC-71639-12 Accuracy of self-reported chronic obstructive pulmonary disease among Pakistani patients

A S Haque, M Irfan, A B S Zubairi, Z Waheed, N Salahuddin, J Hussain, J A Khan. Section of Pulmonary & Critical Care Medicine, Aga Khan, Karachi, Pakistan. Fax: (+92) 21 4934294. e-mail: suleman.haque@aku.edu

Setting: The Aga Khan University Hospital, Karachi, Pakistan.

Objectives: To analyze the accuracy of self-reported presence of Chronic Obstructive Pulmonary Disease among the local population.

Methods: Patients referred to our pulmonary function laboratory were asked about the presence of any known lung disease prior to undergoing pulmonary function testing. Our laboratory operates an open access policy for all physicians, and thus receives referrals from a variety of sources. Forced spirometry was performed according to ERS/ATS guidelines. Presence of airflow obstruction was defined as pre-bronchodilator FEV_1/FVC ratio ≤ 70 .

Results: 406 patients self-reported having COPD and were able to perform a satisfactory test. Mean \pm SD age was 62.41 ± 12.9 years. 340 (83.7%) were male. 167 (41.1%) patients had normal spirometry. 239 (58.8%) patients had air flow obstruction. Of these, 9 (3.7%) had an $\text{FEV}_1 \geq 80\%$ of predicted, 65 (27.1%) had FEV_1 between 50% and 79%, 109 (45.6%) had an FEV_1 between 30% and 49% and 56 (23.4%) had $\text{FEV}_1 < 30\%$ of predicted.

Conclusions: In this study, 167 (41.1%) patients were incorrectly labeled as having COPD. In our settings, spirometry is essential not only to confirm the presence of COPD but also to avoid a significant number being mislabeled as having the disease.

PC-71710-12 Health-seeking behaviour and routine management of urban TB suspects in Harare, Zimbabwe

A Zezai,¹ E L Corbett,^{1,2} P R Mason.^{1,3} ¹DETECTB Project, Biomedical Research and Training Institute, Harare, Zimbabwe; ²London School of Hygiene and Tropical Medicine, London, UK; ³University of Zimbabwe, Harare, Zimbabwe. Fax: (+263) 4735033. e-mail: azezeai@brti.co.zw

Objective: To investigate health seeking behaviour and routine investigation of tuberculosis suspects participating in a community based intensified case-finding (ICF) study (DETECTB).

Methods: Residents in study areas are provided with community-based collection and examination of sputum smears, with free clinic-based follow-up of undiagnosed symptoms. Study clinic attendees were interviewed about their previous health contacts.

Results: Of 492 TB suspects with chronic cough, 142 (29%) had TB and 350 (71%) did not. HIV prevalence was 72% and 63%, respectively ($P = 0.06$). Only 55 (39%) patients with TB and 79 (23%) patients with a non-TB diagnosis had previously attended a health facility for the same illness ($P = 0.001$). Of 87 TB patients with no prior consultations, 46 (53%) cited lack of money for consultation fees. The figure summarizes the choice of provider and outcome of first consultation in participants who had previously sought care. Primary health care clinics (PHC) were the main providers. However, 38 (41%) of 93 PHC-attendees had first sought care before having cough

for 3 weeks, and so had not been identified as TB suspects. Only 22 (38% of those with chronic cough) had sputum investigated with results reported back to them. There were no significant differences in reported PHC management by TB status.

Conclusion: Most participants in our community-based ICF study had not previously sought care, in part due to economic barriers. PHCs were the most frequently consulted provider, but effective TB case-finding at these facilities was limited by the three week definition of a chronic cough, and frequent failure to request sputum examination in those with a chronic cough.

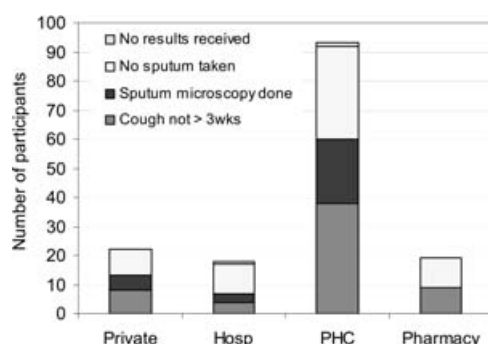


Figure Outcome of previous consultation for cough (first consultation only).

PC-71877-12 Burden of tuberculosis in three HIV treatment centres in Ouagadougou, Burkina Faso

M Dembele,¹ N Saleri Nuccia,¹ D Hien Diédon Alain,² T Koala Tanga Samuel,³ H Ouedraogo Hermann,⁴ J Simporé Jaques.⁵ ¹Ministère de la Santé, Ouagadougou, ²MSF-HIV/AIDS Treatment Centre, Ouagadougou, ³African Solidarity Association, Ouagadougou, ⁴National Research Institute, Ouagadougou, ⁵Saint Camille Medical Centre, Ouagadougou, Burkina Faso. Fax: (+226) 50 33 72 07. e-mail: mathurin_dembele@hotmail.com

Aim: To determine the incidence rates of TB after highly active antiretroviral therapy (HAART) initiation. **Methods:** We conducted a retrospective cohort study based on medical charts of three treatment centres in Ouagadougou, Burkina Faso. All 1818 HIV-positive patients aged >15 years, TB-free at HAART initiation and receiving HAART for 1 year were included. Data were entered in Access database and analysed under SPSS for Windows 12.0. The TB incidence rate was computed with regard to the time of follow-up. We established Cox regression models to identify factors associated to TB incidence. Relative risks were derived from the final model with 95% confidence intervals.

Results: The TB incidence rate at one year follow-up was 3.0 (2.2–3.8) per 100 person-years, 1.8 (1.1–2.4) for pulmonary TB and 1.3 (0.8–1.8) for extra-pulmonary TB. It was 7.0 (4.6–9.3) person-years at three months follow-up and 4.7 (3.3–6.1) person-years

at six months follow-up. The TB incidence was associated to the WHO clinical stage IV versus stage I [RR = 4.73 (1.33–16.70)], the CD4 count <50 cells/μL versus 50–199 cells/μL [RR = 2.76 (1.46–5.23)].

Conclusions: The TB incidence rate in the first three months of HAART is high, including both undiagnosed prevalent TB at HAART initiation and sub-clinical TB developing during the immune reconstitution inflammatory syndrome. Innovative interventions are needed to control TB in HIV-infected populations.

PC-71891-12 Predictors of culture-confirmed smear-negative pulmonary tuberculosis among HIV-infected patients

A Tamhane,¹ P Chheng,² T Dobbs,¹ C Eang,³ S Mak,⁴ B Sar,⁵ T Chharann,⁴ M E Kimerling.¹ ¹Gorgas Tuberculosis Initiative, University of Alabama at Birmingham, Birmingham, Alabama, USA; ²Gorgas Tuberculosis Initiative, Cambodia, Battambang; ³Family Health International, Phnom Penh; ⁴Battambang Provincial Health Department, Battambang; ⁵Pasteur Institute of Cambodia, Phnom Penh, Cambodia. Fax: (+1) 205 934 1746. e-mail: tamhane@uab.edu

Setting: HIV clinic, Battambang, Cambodia.

Design: Retrospective cohort analysis. Data was restricted to only smear-negatives ($n = 776$) for evaluating predictors. The comparison group consisted of MOTT, clinically-diagnosed TB, and non-TB patients. Chest X-rays were read by on-site (Cambodia) and off-site (University of Alabama, Birmingham) physicians. **Results:** Overall prevalence of culture-confirmed pulmonary TB (PTB) was 17% (150/881) of which 41% were smear-negative (SN). For those with any positive Löwenstein-Jensen culture, a smear-negative case was 4× times more likely to be MOTT than MTB (OR = 4.1; $P = 0.001$). Median CD4 count was lower in culture-confirmed (MTB) smear-positives than in smear-negatives (46 vs. 105; $P = 0.04$). Age >40 (OR = 2.2; $P = 0.04$), having either fever or cough or hemoptysis (OR = 4.1; $P = 0.01$), enlarged extra-inguinal lymph nodes (OR = 4.1; $P = 0.002$), and abnormal chest X-ray as read by the off-site reader (OR = 7.7; $P < 0.001$) were significant predictors. Abnormal X-ray had the highest positive predictive value (= 20) and likelihood ratio (= 2.8). Chest X-ray was no longer significant when the on-site reading result was used (OR = 1.4; $P = 0.40$).

Conclusions: In patients with any positive culture, a smear-negative case is more likely to be MOTT than MTB. Chest X-ray and symptoms are significant predictors of SNPTB. However, chest X-ray reading accuracy can adversely affect disease assignment.

PC-71982-12 Profil immuno-virologique des tuberculeux co-infectés par le VIH dans trois centres antituberculeux au Bénin

D Affolabi,¹ A Hounto,² F Challa,¹ P Wachinou,¹ A Makpenon,¹ M Gninafon,¹ S Anagonou.¹ ¹Programme National Contre la Tuberculose, Cotonou, ²Laboratoire de Référence pour le VIH, Cotonou, Bénin.
Fax: (+229) 21 33 70 57. e-mail: affolabi_dissou@yahoo.fr

Objectif : Dans le but de déterminer le statut immuno-virologique des tuberculeux co-infectés par le VIH au CNHPP de Cotonou, au CPP d'Akron et au CSC d'Abomey-Calavi, nous avons mené une étude prospective, transversale chez les tuberculeux co-infectés par le VIH dans ces 3 centres, qui dépistent près de la moitié des tuberculeux du Bénin.

Méthodologie : Du 1er août au 30 novembre 2006, la sérologie VIH a été réalisée après counselling chez tous les tuberculeux qui ont accepté de faire le test. Les patients dépistés séropositifs VIH ont de nouveau été prélevés pour la numération des lymphocytes TCD4 et la mesure de la charge virale VIH.

Résultats : Parmi les 618 patients tuberculeux dépistés, 594 (96%) ont accepté après counselling de faire la sérologie VIH. Elle est positive chez 82 patients (13,8%). Parmi les tuberculeux co-infectés par le VIH, 52% ont moins de 200 lymphocytes T CD4/ μ L. Seuls 20% des patients ont plus de 350 lymphocytes T CD4/ μ L et seuls 10% ont plus de 500 lymphocytes T CD4/ μ L. La charge virale VIH moyenne est de 4,7 log₁₀ copies/ μ L et près d'un patient sur trois a une charge virale supérieure ou égale à 5 log₁₀ (100 000) copies/ μ L.

Conclusion : Cette étude souligne la nécessité en cas de co-infection tuberculose/VIH, de faire dès que possible la numération des lymphocytes T CD4 et lorsque les moyens le permettent, la charge virale pour identifier les patients susceptibles d'être mis sous traitement antirétroviral.

PC-72101-12 Factors associated with antiretroviral non-adherence in Peruvian HIV-TB co-infected patients

B Espiritu,¹ M Munoz,¹ J L Sebastian,² E Sanchez,³ C Rojas,³ M Callacna,³ C Bonilla,⁴ A Caldas,⁵ D Guerra,¹ L Mestanza,¹ J Zeladita,¹ S Shin.^{5,6} ¹Socios En Salud, Lima, ²National HIV Program, Lima, ³Hipolito Hunanue Hospital, Lima, ⁴National TB Program, Lima, Peru; ⁵Division of Social Medicine, Boston, Massachusetts, ⁶Partners In Health, Boston, Massachusetts, USA. Fax: (+1) 617 732 5629. e-mail: sshin@partners.org

Background: Tuberculosis and HIV co-infection presents additional clinical and psychosocial complexities that can impact nonadherence to antiretroviral treatment (ART). We identified risk factors for non-adherence to ART among HIV-TB co-infected patients who recently initiated ART in Lima, Peru.

Methods: 47 patients with HIV and TB who had initiated ART within the past 18 months were interviewed using validated instruments to measure stigma, de-

pression, social support and quality of life. Nonadherence during the past month was identified by patient self-report.

Results: The mean age was 32 years and 28% were female. The median initial CD4 and HIV viral load were 75 (range 2–350) and 141 000 (94–739 000) respectively. Patients had received a median of 9.5 months of ART (range 1–16). Most patients reported that they were able to access health services (61.7%) and perceived a benefit from ART (87.2%). Univariable analysis identified low social support ($P < 0.0001$), substance use ($P = 0.02$), and depression ($P = 0.04$) as factors associated with nonadherence. In multivariable analysis, drug and/or alcohol use (adjusted OR of 5.7, 95% CI 1.0–37.8) and social support score (adjusted OR of 0.92, 95% CI 0.87–0.98) to be associated with ART nonadherence. Clinical characteristics and perceived benefit of ART were not associated with nonadherence.

Conclusions: In our urban cohort of HIV-TB co-infected individuals in Lima, Peru, substance use and lack of social support were key barriers to adherence in Peruvian co-infected patients. These findings suggest that adherence interventions may be unsuccessful unless they target the underlying psychosocial challenges faced by patients living with TB and AIDS.

PC-72102-12 The effect of antiretroviral treatment on incident TB in HIV+ children in Kinshasa, DRC

A Edmonds,¹ J Lusiana,² N Shabani,² F Kitetele,² K Akele,³ A Van Rie,¹ F Behets.¹ ¹Department of Epidemiology, School of Public Health, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA; ²School of Public Health, Kinshasa, ³Kalembe Lembe Pediatric Hospital, Kinshasa, Congo (Democratic Rep.). Fax: (+1) 9199664914. e-mail: aedmonds@email.unc.edu

Background: Antiretroviral treatment (ART) has been shown to decrease the incidence of TB in HIV+ adults, due to reconstitution of immunity. Less is known about the effects of ART on TB in HIV+ children in sub-Saharan Africa. We assessed the effect of ART on incident TB among HIV+ children receiving care at Kalembe Lembe Pediatric Hospital in Kinshasa, DRC, as part of the SARA Project. SARA provides comprehensive pediatric HIV care within a family-centered approach.

Methods: We followed a cohort of ART-naïve HIV+ children who were TB disease-free and under 18 years old at enrollment. TB was diagnosed based on symptoms and chest X-ray. To assess the effect of ART on incident TB while controlling for time-dependent confounders affected by treatment, we used a Cox proportional hazards marginal structural model. Model parameters were estimated via inverse-probability-of-treatment weighting.

Results: Between 11/2004 and 5/2006, 365 eligible children were recruited. They contributed 337.5

person-years of follow-up. Mean age at baseline was 6.2 years (range <1–17 years). Almost half (165, 45.2%) were HIV clinical stage 3 or 4. During follow-up, 213 (58.4%) initiated ART and 63 (17.2%) were diagnosed with incident TB. At time of TB diagnosis, 27 (42.9%) were receiving ART and 36 (57.1%) were receiving primary HIV care only. Crude TB incidence in those on ART was 17.0/100 person-years (95%CI: 10.6–23.4) compared to 26.9/100 person-years (95%CI: 18.1–35.7) in those not on ART. For children who developed TB while receiving ART, the median time between ART initiation and incident TB was approximately 3.5 months; 4 developed TB within 1 month. The model-estimated TB hazard ratio for ART was 0.35 (95%CI: 0.16–0.75).

Conclusion: Preliminary analysis demonstrated that, as in adults, ART is protective against incident TB in HIV+ children living in a TB endemic area. The incidence of TB however remains high among children without clinically evident TB disease at ART initiation.

PC-72143-12 HAART in HIV1, HIV2, HIV1/2 TB patients: preliminary data of the National Reference Centre for Tuberculosis, Bissau

R Colombatti,^{1,2} F Riccardi,^{1,3} C Vieira,¹ F Bassani.¹

¹Hospital Comunità di Sant'Egidio, Bissau, Guinea-Bissau;

²Dipartimento di Pediatria, Università di Padova, Padova,

³Università di Tor Vergata, Roma, Italy. Fax: (+39) 02251065. e-mail: rcolombatti@gmail.com

Background: In Guinea-Bissau official data give a TB rate of 271/100 000, a HIV prevalence of 5%. National Reference Center for Tuberculosis, Hospital Comunità di Sant'Egidio (HCSE), rebuilt after the war, opened to inpatients in 2004. X-rays, haemograms, CD4 count, biochemical analyses, treatment, food are available for free to inpatients. Patients are admitted in severe clinical conditions. HAART was started according to the DREAM (Drug Resource Enhancement against AIDS and Malnutrition) Protocol in July 2005.

Aim: Evaluate the feasibility of HAART in TB admitted patients.

Methods: TB diagnosis is made with clinical examination, sputum examination and X-ray. HIV+ patients started HAART if CD4 <350/mm³. Zidovudine/lamivudine/abacavir was used during intensive phase of TB treatment for all patients and was continued afterwards for HIV2 patients. Zidovudine/lamivudine/nevirapine was used if patients were in maintenance phase of TB, for HIV1 and HIV1/2 patients.

Results: 106 admitted patients started HAART. 64.7% were HIV1, 23.5% HIV2 and 11.7% HIV1/HIV2. 66% had pulmonary TB at the beginning of HAART: 51% during intensive phase of TB treatment, 15% during maintenance. Mean CD4 count at beginning of HAART was 190 (range: 3–366). 5/70 (7%) developed immune reconstitution syndrome with fever, cough,

high respiratory rate, X-ray worsening of previous TB pattern; all patients were in TB intensive phase. Mean CD4 count increased to 317 and 334 after 6 and 12 months of HAART. Overall 23 patients died, 10 before concluding 3 months of HAART. No hypersensitivity reactions to abacavir were observed.

Conclusion: Tuberculosis hospitals in Africa can really be starting points to develop new integrated approaches for HIV related TB. HIV2 targeted protocols could help in determine best treatment regimens for TB-HIV coinfecting patients.

EDUCATION AND ADVOCACY

PC-71125-12 Initial findings: KAP of health care providers on TB patients' rights and responsibilities

A A L Concepcion,¹ M I J D Quelapio,¹ C Auer,¹ N R C Mira,¹ R B Orillaza-Chi,¹ V Lofranco,² T E Tupasi.¹ ¹MDR-TB, Tropical Disease Foundation, Inc., Makati, Metro Manila, ²Lung Center of the Philippines, Quezon, Metro Manila, Philippines. Fax: (+632) 8935847. e-mail: bong@tdf.org.ph

Background: The Patient's Charter for TB Care (PCTC) outlines the rights and responsibilities of people with TB. In April 2006, Tropical Disease Foundation, Inc. (TDFI) introduced it as one of the topics in its Programmatic MDR-TB Management (PMTM) training program in Metro Manila, Philippines.

Objective: To determine the knowledge, attitude and practices (KAP) of health care providers (HCP) in Metro Manila in relation to the PCTC.

Methodology: A KAP survey was conducted among PMTM trainees using a self-administered questionnaire.

Initial findings: There were 33 trainees who participated in the initial survey. Majority was female, highly educated and employed in the public sector. None were familiar about the PCTC. **Knowledge:** The three most common rights identified were: receive treatment (70%), refuse treatment (55%) and confidentiality (55%); the three most common responsibilities identified were: take medications daily (94%), prevent transmission of the bacteria (24%) and report adverse events (AE) (18%). **Attitude:** Some HCP (12%) felt it was not important for patients to return to work

TB patients' rights	n (%)	TB patients' responsibilities	n (%)
Receive TB treatment	23 (70)	Take TB medicines daily	31 (94)
Refuse TB treatment	18 (55)	Prevent the transmission of TB (Infection Control)	8 (24)
Confidentiality or privacy	18 (55)	Report adverse events	6 (18)
Receive information about anti-TB drugs, including adverse events expected	12 (36)	Submit for laboratory follow-up (sputum)	6 (18)
Receive information about the disease (TB)	11 (33)	Follow instructions of HCP	3 (9)

when proven to be non-infectious at the 2nd month of treatment. Others (21%) felt that the National TB Program (NTP) should strengthen its advocacy efforts for patients to continue being employed after 2 to 4 weeks of treatment. Practices: A few HCP never or seldom: talked to patients' families nor encouraged them to provide support (21%), informed patients about the treatment including AE (27%) and kept the patients' records confidential (24%). Findings from a larger sample will be presented at the conference.

Initial conclusions: The basic concepts of patients' rights and responsibilities are known to HCP but not the PCTC. There is a need to increase their knowledge and understanding of the TB patients' rights and responsibilities as embodied in the PCTC to enhance provider-patient relationship. Capacity building activities within the NTP should include the PCTC.

PC-71185-12 Community-based human resource mobilisation to improve TB diagnosis in Zambia

J Banda,¹ H Ayles,^{1,2} R B Tembwe,^{1,3} M Mweemba,³ A Schaap,^{1,2} P Godfrey-Faussett.² ¹ZAMBART Project, Department of Medicine, Lusaka, Zambia; ²London School of Hygiene and Tropical Medicine, London, UK; ³Chest Diseases Laboratory, Lusaka, Zambia. Fax: (+260) 254710. e-mail: bandazm@yahoo.co.uk

Background: The Ministry of Health has described a shortage of human resources in the health sector in Zambia as critical. Lack of adequate laboratory technicians is affecting efforts to improve tuberculosis case detection and is hampering efforts to improve the laboratory network.

Objectives: To train school leavers as TB microscopists, and to determine whether the trained microscopists acquired necessary skills to perform TB smear microscopy and to assess whether microscopists improve TB case detection by smear microscopy.

Methods:

- Development of a standardised competence-based training curriculum
- Training in smear microscopy of 16 school leavers for a period of 6 weeks
- Deployment of trained microscopists to public primary health care facilities
- Evaluation of microscopists technical competence to perform TB smear microscopy using a national external quality assurance tool 6 months after deployment
- Comparison of TB case detection before and after deployment of microscopists

Results: Out of 16 microscopists trained, 14 continued to perform TB smear microscopy. All microscopists attained the required skill to perform TB smear microscopy. Case detection increased by 3% in the six months after microscopists were deployed. High false positive and high false negatives were detected in 2 of 14 microscopists.

Conclusion: Three quarters of the school leavers trained in smear microscopy were performing well. Case detection for tuberculosis was significantly higher in the period when the school leavers were present. This is an encouraging approach to alleviate the human resource crisis and to improve tuberculosis control.

PC-71225-12 Taking TB-HIV to scale within the US President's Emergency Plan for AIDS Relief

P Jensen, S Perez, J Carter. RESULTS Educational Fund, Washington, DC, USA. Fax: (+1) 202 783 2818. e-mail: emintz@results.org

Aim: In 2003, President Bush launched the five-year, \$15 billion PEPFAR initiative aimed at 14 countries—a 15th country was added later. Overall, TB has not been a priority issue for PEPFAR despite TB being the leading infectious killer of people living with HIV/AIDS. RESULTS Educational Fund (REF) has advocated strongly for greater attention to TB-HIV within PEPFAR. PEPFAR has steadily increased funding for TB-HIV from US\$ 21 million in 2005 to at least US\$ 120 million in 2007, which has produced models and best practices in TB-HIV coordination that should be scaled up in all focus countries and disseminated widely.

Methodology: REF compiled examples from four PEPFAR focus countries on models and best practices in TB-HIV coordination in a report launched in April 2007. Additional data from PEPFAR's Third Annual Report to Congress and the June 2007 PEPFAR Implementers' meeting were also reviewed.

Results: PEPFAR has developed important models of TB-HIV coordination in several focus countries, including Ethiopia, Kenya, Rwanda and Tanzania. These models demonstrate success in increasing HIV testing among TB patients and placement on CPT or ART as needed.

Conclusion: PEPFAR's efforts to date to support implementation of TB-HIV activities have yielded important models and best practices that with increased resources should be scaled up, adapted to all focus countries and disseminated to the broader TB and HIV/AIDS communities.

PC-71292-12 Africa's TB emergency: progress since 2005?

S Perez,¹ J Carter,¹ O Akanni,² L Chesire,³ B John,⁴ R Kanyanja,⁵ J Mwanjisi.⁶ ¹RESULTS Educational Fund, Washington, DC, USA; ²Journalists Against AIDS Nigeria, Abuja, Nigeria; ³tbACTION Kenya, Nairobi, Kenya; ⁴Global Health Advocates, Pune, India; ⁵PANOS Global AIDS Programme, Lusaka, Zambia; ⁶MediaBank, Dar es Salaam, Tanzania. Fax: (+1) 202 783 2818. e-mail: emintz@results.org

Aim: Africa suffers the highest TB rates in the world. Responding to this crisis, Africa's Ministers of Health declared TB a continent-wide emergency during the WHO Africa Regional meeting in August 2005. Since

then, the continent has seen the emergence of extensively drug-resistant TB (XDR-TB), which underscores the urgency of African countries to make controlling TB a national priority. In 2007, RESULTS Educational Fund (REF) undertook research to assess efforts by African countries to respond to the TB emergency declaration.

Methodology: REF analyzed WHO and national-level data for sub-Saharan African countries.

Results: In summer 2007, REF and African partners plan to present data in a 'report card' format displaying progress for each country based on: 1) declaration of a national emergency; 2) development of a TB/TB-HIV response plan since emergency declared; 3) increase in domestic resources by African countries in response to the emergency; 4) increase in resources by donors; and 5) epidemiological indicators. The report card will be used as an advocacy tool to raise awareness of African governments, primarily Ministers of Finance and Health and national TB control managers, around progress made (and not made) on TB.

Conclusion: It is anticipated that the report card will prove effective as an advocacy tool to generate increased awareness and acknowledgement of the limited progress to date in responding to Africa's TB emergency, and the fact that much more needs to be done.

PC-71573-12 Where do tuberculosis patients go for treatment before reporting to DOTS clinics in Southern Nigeria and why?

J C Okeibunor,¹ N G Onyeneho,¹ J N Chukwu,² E B Post.²
¹Department of Sociology/Anthropology, University of Nigeria, Nsukka, Enugu, Nigeria; ²German Leprosy and Tuberculosis Relief Association, Wuerzburg, Germany.

Fax: (+49) 931 7948160. e-mail: erik.post@dahw.de

Setting: Southern Nigeria.

Objective: We analyzed health-seeking patterns of persons with tuberculosis (TB) before reporting at the Directly Observed Treatment Short-course (DOTS) clinics for diagnosis and treatment.

Design: A total of 221 persons registered in the DOTS programme in 12 randomly selected rural and urban local government areas were interviewed using a semi-structured questionnaire.

Results: Perceived causes of TB influenced first choice of treatment. Patients re-evaluated initial choices and shop for alternatives in persistent TB. Patent medicine dealers (48%) and general hospitals (32%) were the first ports of call for most patients. Those with unscientific causative theories of tuberculosis such as witchcraft engaged more in multiple health-seeking than those who indicated bacterial infection ($P < 0.0001$). The respondents had a median diagnostic-delay of 90 days. Delay in commencement of DOTS treatment is attributable to ignorance among patients and poor attitude of health workers. Family relations played a decisive role in seeking help at DOTS clinics.

Conclusion: In view of the findings, it is recommended to address treatment delay through social mobilization of communities, through measures to improve health worker's attitude and through engaging patent medicine dealers in TB service delivery in this are.

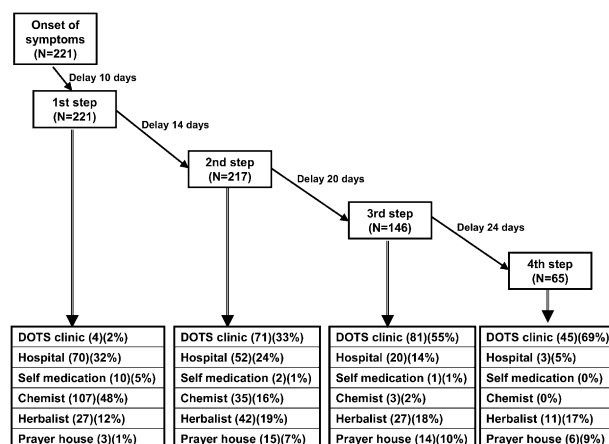


Figure Flow chart on health seeking steps among a majority of the TB patients with median delays, Southern Nigeria.

PC-71594-12 TB and HIV treatment knowledge among health care students and professionals at the University of Guyana

L Balfour,^{1,2} G Tasca,^{1,2,3} W Best Plummer,⁴ K Corace,^{1,2} P MacPherson,^{1,2} C Lafleur,^{5,6,7} J Ragunauth,^{8,9}

R Benedict,^{5,6,7} K Ramotar,^{1,2} W D Cameron.^{1,2} ¹University of Ottawa at the Ottawa Hospital, Ottawa, ²Ottawa Health Research Institute, Ottawa, ³Carleton University, Ottawa, Ontario, Canada; ⁴Department of Pharmacy, University of Guyana, Georgetown, Guyana; ⁵Canadian Society for International Health (CSIH), Ottawa, ⁶Public Health Strengthening in Guyana Project (PHSGP), Ottawa, ⁷Canadian International Development Agency (CIDA), Ottawa, Ontario, Canada; ⁸Genito-Urinary-Medical (GUM) Clinic, Georgetown, ⁹Ministry of Health, Georgetown, Guyana.

Fax: (+1) 613 737 8895. e-mail: lbalfour@ottawahospital.on.ca

Background: The prevalence of TB-HIV co-infection is very high in developing countries such as Guyana. From a health-care infrastructure building perspective, examining health care providers' knowledge of HIV and TB and the impact of educational initiatives aimed at reducing gaps in knowledge is important.

Objectives: Our goal was to examine TB and HIV treatment knowledge and the impact of targeted training among healthcare providers and health science students at the University of Guyana (UG).

Methods: At UG, 105 participants completed a TB knowledge scale and a validated HIV treatment knowledge scale. Participants indicated if they had previously attended any HIV or TB structured training sessions, such as those developed and provided through a partnership initiative between UG and the PHSGP.

Results: Health care respondents scored 66% correct on TB knowledge and 70% correct in HIV treatment knowledge. Participants who had attended structured

TB training had significantly higher TB knowledge than those without targeted training ($P < 0.05$; see Figure). Similarly, participants who had received targeted HIV training had significantly higher HIV treatment knowledge scores than those without targeted training ($P < 0.05$; see Figure). There were significant gaps in both HIV and TB knowledge regarding complex treatment issues (e.g., optimal adherence, drug resistance).

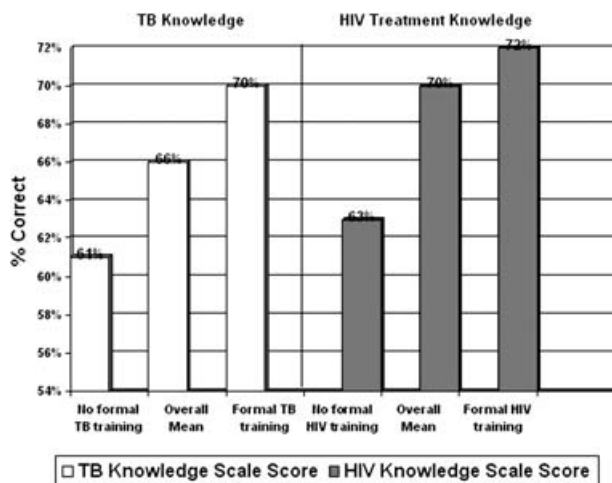


Figure TB and HIV Treatment Knowledge Scale scores in Guyana.

Conclusions: Evaluation of TB and HIV knowledge shows a positive association between targeted educational seminars and higher knowledge scores. These results highlight the importance of developing and providing ongoing targeted educational training to health care providers in order to increase awareness about complex HIV and TB care issues.

PC-71942-12 Exploring the gaps in provider knowledge and skills in TB case management: the Bangladesh scenario

S D Parveen,¹ A K Nag.² ¹University Research Co., LLC, Dhaka, ²University Research Co., LLC, Dhaka, Bangladesh. Fax: (+880) 29883634. e-mail: sdparveen@urc-chs.com

Introduction: It is estimated that there are 340 000 annual new TB cases in Bangladesh, annual incidence of Sputum Smear Positive TB is 103/100 000, and approximately 79 000 people die due to TB-related causes. With the high case detection and cure rates, at 64% and 83%, the challenge is to ensure provider compliance to standard for DOTS protocols through strengthened supervision and monitoring.

Methods: Facility and provider self-assessments conducted in 24 TB facilities as part of a quality improvement process, facilitated by Quality Assurance Project (QAP) of University Research Co., LLC. Six supervisors were trained in quality assessment, supervision and monitoring, for conducting self assessments on quarterly basis. Three quarters of visits have been completed.

Results: Provider knowledge improved dramatically between baseline assessment and third quarter. Major area of weakness was the steps of sputum collection. Provider skills scores in infection prevention, facility organization and filling TB Laboratory Register improved from 58, 64 and 90 percent to 82, 86.5 and 97 percent respectively, between baseline assessment and Quarter 3. Case detection and proportion of sputum smear positive TB cases improved, from 61 to 70 percent and 72 to 76 percent respectively.

Conclusion:

- 1 Systematic application of monitoring and supervision makes gap identification easier and helps foster a learning environment among staff.
- 2 Quantification of quality of care for problem identification makes it easier to develop focused interventions.
- 3 Supervisor-Provider partnerships offer greater scope for two-way sharing of lessons and technology transfer.

PC-71955-12 PLHAs risky behaviour a retardation of ART success

W Zulu. Action Alliance for Orphaned and Vulnerable Children, Lusaka, Zambia. Fax: (+260) 95383651. e-mail: wilsonzuluk@yahoo.co.uk

Objectives:

- 1 To examine risky behaviour among PLHAs on antiretroviral therapy.
- 2 Their sexual relationships and the frequency with which they engage in unprotected sex, and alcohol abuse.
- 3 Analyze factors propelling HIV re-infection and treatment failure in Zambia.

Methods: The study instrument was a questionnaire in which some answers were given orally and others in written. The sample consisted of 2000 PLHAs aged 15–45 on ART since 2004 in 15 ART centers in Lusaka.

Results: 61% PLHAs reported having unprotected sex with fellow PLHAs outside marriage and their wives. In the last thirty six months, 38% reported any syphilis and blamed medical practitioners for not screening them routinely. 73% thought unprotected sex with fellow PLHAs was safe. In contrast, others reported having multiple sex partners, 15% reported having sex under the influence of alcohol. With partners whose status was not known. 27% reported having unprotected sex to attain full sexual satisfaction. 30% thought partners taking trimune 40 can not re-infect themselves. 23% reported unexpected pregnancies.

Conclusion: The analysis of data suggests that PLHAs on ART are the core of vicious circle of STIs, HIV re-infection and transmission further data suggest alcohol abuse and unprotected sex undoing the ART success in Zambia with PLHAs developing ARV resistance and treatment failure. Group adherence counseling

sessions enhances long term adherence, increase understanding of ARVs immunological and virological response. This approach would be appropriate to achieve very high levels of medication adherence (>95%) required for optimal suppression of viral load.

PC-71977-12 Patient adherence to tuberculosis treatment: a systematic review of qualitative research

S A A Munro,^{1,2,3} S Lewin,^{1,2} H Smith,⁴ M Engel,⁵ A Fretheim,⁶ J Volmink.⁷ ¹Health Systems Research Unit, Medical Research Council, Cape Town, ²Primary Health Care Directorate, University of Cape Town, Cape Town, ³South African Cochrane Centre, Medical Research Council, Cape Town, South Africa; ⁴International Health Group, Liverpool School of Tropical Medicine, Liverpool, UK; ⁵Department of Medicine, University of Cape Town, Cape Town, South Africa; ⁶Norwegian Knowledge Centre for the Health Services, Oslo, Norway; ⁷University of Stellenbosch, Cape Town, South Africa. Fax: (+27) 219380483. e-mail: salla.munro@mrc.ac.za

Introduction: Poor adherence to tuberculosis treatment is common despite various interventions aimed at improving treatment completion. Lack of a comprehensive and holistic understanding of factors affecting treatment adherence is currently a major obstacle to finding effective solutions. This systematic review of qualitative studies aimed to understand the factors considered important by patients, carers and health care providers in contributing to tuberculosis medication adherence.

Methods: 19 electronic databases were searched for qualitative studies on patients', carers' or healthcare providers' perceptions of adherence to preventive or curative tuberculosis treatment using the free text terms 'Tuberculosis AND' (adherence OR compliance OR concordance). For included studies, data were extracted independently onto a standard form and a meta-ethnographic approach used to synthesize the findings.

Results: We screened 7814 citations and selected 44 articles that met the pre-specified inclusion criteria. Eight major themes emerged from the synthesis as affecting adherence to tuberculosis medication: the financial burden of treatment; the organisation of treatment and care; knowledge, attitudes and beliefs in relation to treatment; interpretations of illness and wellness; family, community, and household support; personal factors; side effects; and law and immigration. Further analysis of these themes resulted in a model of adherence that includes personal factors; social factors; structural factors; and health service factors.

Discussion: Adherence to tuberculosis medication is a complex, dynamic process which is influenced by a number of interacting factors. The results of the qualitative synthesis suggest that further attention should be paid to the development of patient-centred interventions and of interventions to address structural barriers to treatment adherence.

PC-72219-12 Expérience d'accompagnement sanitaire et psychosocial des jeunes femmes infectées par le VIH/SIDA

E V Voyamokode, E Y Yabada, T N Nzana, R B Betchem. Congrès National des Jeunes Femmes VIH+, Central African Republic. e-mail: voya_ed@yahoo.fr

Contexte et Objectifs : Le VIH/SIDA touche en grande partie les filles en âge de procréer. En Centrafrique, 50% des nouveaux cas concernent les jeunes de 15 à 24 ans et parmi lesquels 60% chez les jeunes femmes. Les structures socio sanitaires ne peuvent pas absorber tous les problèmes de cette frange de population, c'est pourquoi l'Association des jeunes femmes infectées s'est engagée en vue de :

- Apporter un soutien médical aux femmes et faciliter l'observance des traitements spécifiques (TB et ARV)
- Eduquer les femmes enceintes sur le dépistage comme moyen de prévention du VIH
- Encourager les activités génératrices de revenus
- Faire des plaidoyers pour le soutien social des femmes infectées et affectées

Méthodologie : Formation des leaders des femmes infectées et affectées par le VIH ; éducation et conseil sur le dépistage des maladies opportunistes ; témoignages sur la vie positive dans les centres de soins maternels et infantiles ; consultation gratuite et permanente des femmes et leurs enfants au niveau du centre ; visite à domicile des membres pour la sensibilisation de leurs partenaires et l'observance des médicaments ; appui aux familles pour les activités sociales.

Résultats : De 2004 à 2006 : 405 jeunes femmes sont impliquées ; 250 ont reçu la formation sur le counseling ; et 50% de leurs partenaires ont accepté de faire leurs tests ; 180 femmes et 145 hommes suivent régulièrement les traitements des infections opportunistes ; 95 enfants séropositifs sont orientés et suivis sous ARV pédiatrique ; 200 familles affectées organisent régulièrement les activités économiques.

Conclusion : Cette pratique constitue un atout important dans la communauté, c'est un complément indispensable au programme national, car elle a contribué à réduire le stress et la charge des services de santé dont les moyens sont limités.

TB OUTBREAKS AND DIAGNOSIS

PC-71186-12 The yield of tuberculosis contact investigations in the metropolitan area of Rotterdam

D Kidgell-Koppelaar, F M Burke, G de Vries. Department of Tuberculosis Control Municipal Public Health, Rotterdam, Netherlands. Fax: (+31) 10 4339950. e-mail: kidgelli@ggd.rotterdam.nl

Background: In a low-incidence (8/100 000) country like the Netherlands, contact investigation is an im-

portant intervention in tuberculosis (TB) control to interrupt the chain of transmission. The Departments of TB Control of the Municipal Public Health Services are assigned to execute these investigations by using the stone-in-the pond approach around cases of active TB in their catchment area.

Objective: To evaluate the extent and yield of all contact investigations linked to index cases with pulmonary TB in the metropolitan area of Rotterdam in 2005.

Results: The total number of patients with pulmonary TB in the metropolitan area of Rotterdam was 108 of which 51 were smear-positive. The Department of TB Control performed 75 contact investigations around these indexes with an average of 51 contacts per investigation. We examined 2113 contacts (56%) by tuberculin skin test and 1684, mainly bacille Calmette-Guérin (BCG) vaccinated contacts, by chest-radiography. The yield of all these examinations was 17 new cases of active TB and 219 contacts (10.4%) with a latent TB infection. Chemoprophylaxis was started in 69% of these contacts of whom 82% completed their treatment.

Conclusions: The yield of active TB cases identified in contact investigations in our area was high (448/100 000), but limited for latent TB infections due to the great number of BCG-vaccinated contacts who were only examined by chest-radiography. Implementation of interferon-gamma release assays for these contacts will be an important tool to increase the yield of latent TB infections in contact tracing in the metropolitan area of Rotterdam. The numbers for 2006 are not yet available but will be added.

PC-71347-12 Investigation of a tuberculosis outbreak in a social network, Connecticut, 2006

A M Buff,^{1,2} L E Sosa,^{1,3} A J Hoopes,⁴ D Buxton-Morris,⁵ T B Condren,³ J L Hadler,³ M N Lobato,² M B Haddad,² P K Moonan,² K Ijaz.² ¹Epidemic Intelligence Service, Office of Workforce and Career Development, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, ²Division of Tuberculosis Elimination (DTBE), CDC, Atlanta, Georgia, ³Connecticut Department of Public Health, Hartford, Connecticut, ⁴The CDC Experience Fellow, DTBE, CDC, Atlanta, Georgia, ⁵Uncas Health District, Norwich, Connecticut, USA. Fax: (+1) 404 639 8959. e-mail: abuff@cdc.gov

Background: High-risk groups continue to challenge tuberculosis (TB) control efforts even in low-incidence states. In 2006, eight TB cases in a social network and a ninth incarceration-related TB case were identified in Connecticut.

Methods: We interviewed adult patients to determine their contacts, activities, and locations frequented while they were contagious. *Mycobacterium tuberculosis* isolates were genotyped using standard molecular methods.

Results: All nine patients were U.S.-born, HIV-negative, and had pulmonary TB. All six adults were female,

aged 21–36 years. The three pediatric patients were aged 10–19 months. In 1996, the source patient had smear- and culture-positive TB but completed only 2 weeks of treatment. While contagious from February 2005 to May 2006, the source patient lived in six locations, including a correctional facility, where she shared sleeping accommodations with each of the secondary patients. Isolates from five secondary patients had the same spacer oligonucleotide typing and mycobacterial interspersed repetitive unit (MIRU) patterns except two isolates that differed by one repeat at a single MIRU locus. The source patient's isolates showed a mixed population of *M. tuberculosis* with both MIRU patterns.

Conclusions: The source patient's delayed diagnosis, unstable housing, and incarceration resulted in eight linked secondary TB cases. Adequate treatment of her initial TB in 1996 or early diagnosis of her recurrent TB in 2005 could have prevented this outbreak.

PC-71348-12 Investigation of *M. tuberculosis* transmission among sailors aboard USS Ronald Reagan–2006

A M Buff,^{1,2} S J Deshpande,^{1,3} T S Wofford,⁴ T W O'Hara,⁵ K Carrigan,⁵ N J Martin,⁶ J C McDowell,⁷ T A Harrington,² L A Lambert,² J E Oeltmann,² K Ijaz.² ¹Epidemic Intelligence Service, Office of Workforce and Career Development, Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, ²Division of Tuberculosis Elimination, CDC, Atlanta, Georgia, ³County of San Diego Health and Human Services Agency, San Diego, California, ⁴The CDC Experience Fellow, CDC, Atlanta, Georgia, ⁵U.S. Navy Environmental and Preventive Medicine Unit FIVE, San Diego, California, ⁶U.S. Naval Hospital Lemoore, Lemoore, California, ⁷Carrier Air Wing FOURTEEN, San Diego, California, USA. Fax: (+1) 404 639 8959. e-mail: abuff@cdc.gov

Background: Historically, extensive transmission of *Mycobacterium tuberculosis* has occurred on U.S. Navy ships. In July 2006, a sailor aboard USS *Ronald Reagan* was diagnosed with smear-positive, cavitary, pulmonary tuberculosis (TB). While he was contagious, 4980 sailors and 1225 civilians were aboard the ship.

Methods: We screened all sailors, evaluated the ship environment, and conducted a case-control study to determine factors associated with new positive tuberculin skin test (TST) results. Case-sailors were aboard ship during January–July 2006 and had a new positive TST result (≥ 5 mm). Randomly selected control-sailors were aboard during the same time and had a negative TST result (< 5 mm). All sailors had baseline TST results; those with prior positive TST results were excluded. We performed univariate and multivariate analysis.

Results: We identified no secondary TB disease. The patient slept in a compartment with air wing sailors; his bunk was 20 feet from an air intake that exhausted directly overboard. Seventy-five percent (92/123) of case-sailors and 69% (549/800) of control-sailors

completed questionnaires. Being born outside of the United States (AOR = 2.8, 95%CI = 1.6–5.1) and being a member of the air wing (AOR = 2.9, 95%CI = 1.8–4.6) were associated with new positive TST results. **Conclusions:** *M. tuberculosis* transmission was minimal (<3%) among sailors. Investigation results guided the strategy to screen 38 civilians who slept in the patient's berthing compartment, which saved resources by eliminating unnecessary testing and potential treatment for 1187 civilians.

PC-71453-12 Household TB screening and HIV testing

P Sicalwe,¹ K Shanaube,¹ H Ayles,^{1,2} P G Fausset,² N Beyers.³ ¹Zambart Project, University of Zambia, School of Medicine, Department of Medicine, Lusaka, Lusaka, Zambia; ²London School of Hygiene and Tropical Medicine, London, UK; ³Desmond Tutu TB Centre, Stellenbosch University, Tygerberg, South Africa. Fax: (+26) 01254710. e-mail: patosicalwe@yahoo.co.uk

Background: ZAMSTAR (Zambia South Africa TB and AIDS reduction Trial) is a community-randomised trial of 2 interventions to reduce the prevalence of TB at community level. One of the interventions under trial is household level TB-HIV collaborative activities and 8 sites in Zambia have been randomised to receive this intervention.

Method: Three communities with household interventions were selected. TB index cases were used as entry points to the household. Household members were enrolled after written informed consent. TB-HIV education was conducted as well as HIV counselling. TB screening was done using a symptom screen; those with symptoms were referred for sputum examination and chest X-ray. HIV testing was done either at home or the clinic.

Results: Over the 3-month period, 90 households were recruited with 287 adults members consenting for the intervention. Of these, 211 (73%) were counselled, 81 (38%) were tested for HIV and (72%) were HIV positive. Out of 124 adults screened for TB, 4 (3%) smear positives cases were diagnosed.

Conclusion: Household intervention contributed to identifying infectious TB cases (3%) and may improve HIV testing uptake.

PC-72066-12 Factors contributing to tuberculosis case detection: reviewing the evidence

L Blok, L P Dhakal, J V D Hombergh. Royal Netherlands Tropical Institute, Dept Development P, Amsterdam, Netherlands. Fax: (+31) 205688444. e-mail: l.blok@kit.nl

Objectives: To review evidence of individual patient and societal factors that influence TB service seeking in order to assess the determinants and gaps on health seeking and TB case detection through review of lit-

erature published between January 2000 and May 2006 based on pre-set criteria.

Main Results: Twelve studies assessing the presence of potentially delaying factors fulfilled the inclusion criteria. Three intervention studies fulfilling the criteria were also reviewed. Study populations included patients and healthy community members. Studies found a variety of factors that could possibly contribute to delay in seeking TB care such as old age, female sex, illiteracy and rural residence. Socio cultural factors such as gender inequity and stigma were present in the majority of the studies. Lack of knowledge and awareness about TB, leading to misconceptions on cause and curability was a frequent finding, but evidence on a causal relation with delay was mixed. Low satisfaction with formal TB services, distance and cost of treatment and transportation can lead to preference for informal services but a relationship with delay on TB diagnosis was not unequivocal.

Conclusion: Various factors are found present that potentially determine TB service seeking. The evidence regarding a causal link between presence of such factors and actual delay or their relative importance however is mixed. While recommendations are frequently made to expand awareness, improve attitude towards TB and extend accessibility of service, comprehensive research to substantiate their likely effect is still lacking.

PC-72112-12 Extensively drug-resistant (XDR) TB now more common than MDR-TB in Tugela Ferry, KwaZulu-Natal, South Africa

T Moll,¹ N Gandhi,² A W Sturm,³ J Andrews,⁴ N S Shah,² U Laloo,³ P Moodley,³ G Friedland.^{3,4} ¹Church of Scotland Hospital, Philanjalo, Tugela Ferry, KwaZulu-Natal, South Africa; ²Albert Einstein College of Medicine, Bronx, New York, USA; ³Nelson R Mandela School of Medicine, Durban, KwaZulu-Natal, South Africa; ⁴Yale University School of Medicine, New Haven, Connecticut, USA. Fax: (+1) 203 737 4051. e-mail: gerald.friedland@yale.edu

Background: In 2005, cases of extensively drug-resistant tuberculosis (XDR TB) were first identified in Tugela Ferry, KwaZulu-Natal, South Africa. XDR TB has subsequently been shown to be associated with nosocomial transmission and rapid and near universal mortality in HIV co-infected patients. The number of XDR TB cases has continued to increase. We sought to characterize the XDR cases further and compare their number and proportion with MDR TB cases.

Methods: Surveillance of all TB suspects with culture and drug susceptibility testing (DST) was initiated in June 2005 at Church of Scotland Hospital in Tugela Ferry. DST is routinely performed to isoniazid (H), rifampicin (R), ethambutol (E), streptomycin (S), ciprofloxacin (C) and kanamycin (K). We examined resistance patterns among all cases with at least HR resistance from June 2005 to March 2007.

Results: 386 patients with at least HR resistance (MDR TB) have been identified to date. Of these, 217 (56%) meet criteria for XDR TB (at least HRCK), while 169 (44%) meet criteria for only MDR TB, and not XDR TB. Among XDR TB cases, 120 (55%) were resistant to all 6 first and second line drugs tested (HRESCK), while 31 (14%) were HRCK resistant, 8 (4%) HRECK, and 58 (27%) only HRCK. Among MDR TB cases, the most common resistance patterns were HRS ($n = 110$, 51%), HR only ($n = 34$, 28%), HRES ($n = 17$, 14%). Mortality was greater among patients with XDR TB (84%) than MDR TB (65%) ($P < 0.001$). Higher mortality was seen among XDR TB patients with resistance to all 6 TB drugs tested: 88% in HRESCK vs. 80% in other XDR TB cases ($P < 0.20$).

Conclusions: XDR TB is now more common than MDR TB in Tugela Ferry, KwaZulu-Natal, South Africa. This finding is ominous since resistance to an increasing number of TB drugs may be related to a higher mortality. Efforts to reduce the ongoing occurrence and transmission of XDR TB strains are urgently needed.

PC-72137-12 Should concentrated smears be performed at all TB diagnostic centres?

A Kibet,¹ N G Buziba,¹ B Vanderpol,² E J Carter.³ ¹Moi University School of Medicine, Eldoret, Kenya; ²Indiana University School of Medicine, Indianapolis, Indiana, ³Warren Alpert School of Medicine at Brown University, Providence, Rhode Island, USA. Fax: (+1) 401 793 2266. e-mail: E_Jane_Carter@Brown.edu

Background: In the developing world emphasis has remained on the identification of smear positive pulmonary TB, primarily due to its contribution to transmission and ongoing community disease burden. Recent outbreaks of XDR TB have focused attention on laboratory support for TB Control Programs throughout the world. As part of a Find funded MGIT demonstration project to evaluate rapid culture impact on smear negative TB, TB laboratory services at Moi Teaching and Referral Hospital started performing concentrated smears as well as direct smears on all isolates as part of standard protocol.

Methods: The standard MGIT preparation protocol

was utilized (MycoPrep NAOH-NALC sodium citrate solution, vortex or hand mixing 15 minutes, centrifugation 20 minutes, re-suspension of pellets) prior to smearing and ZN staining the concentrated specimen slide.

Results: See Table.

Discussion: Although it has long been known that concentrated smear staining will improve yield, there has been little interest to date in adding this step in labs of the developing world. This data collected during a TB culture laboratory pilot program demonstrates the significant contribution that the addition of a concentrated smear can make in diagnosis. The ability to perform a concentrated smear in peripheral labs would assist greatly in TB care through rapid identification in at least 50% more cases.

PC-72158-12 Diagnosing pulmonary tuberculosis in the Peruvian Amazon: new methods in a resource-poor setting

O Boney,¹ C Evans,^{2,3,4} D Moore,^{2,4} L Caviedes,^{1,4} R Gilman.^{1,3} ¹Asociacion Benefica Prisma, Lima, Peru; ²Wellcome Centre for Clinical Tropical Medicine, Imperial College, London, UK; ³Johns Hopkins School of Public Health, Baltimore, Maryland, USA; ⁴Universidad Cayetano Heredia, Lima, Peru. Fax: (+51) 1 6165501. e-mail: oliverboney@hotmail.com

Background: TB kills over 2 million people a year and diagnostic difficulties hamper control.

Objective: To compare five different TB diagnostic techniques.

Design: A prospective comparison of the performance of two microscopy techniques, PCR, and two culture-based techniques.

Subjects: 185 patients with symptoms suggestive of TB.

Setting: A hospital clinic in the Peruvian Amazon and a university TB laboratory.

Methods: 185 patients provided 299 sputum samples that underwent TB testing TB by five diagnostic techniques.

Results: Immediate detection techniques: Ziehl-Nielsen (ZN) light microscopy, the current standard test, had 100% specificity but only 48% sensitivity (cost per sample US\$ 0.10). Auramine fluorescence microscopy had 99% specificity and 70% sensitivity (US\$ 0.10). The IS6610 PCR technique had 91% sensitivity, but only 87% specificity (US\$ 2.90).

Culture-based detection: Conventional Löwenstein-Jensen (LJ) culture (US\$ 0.14) had 87% sensitivity, a 26% contamination rate, and median time to positive culture of 22 days (IQR 9 days). Broth cultures with microscopic observation (MODS, US\$ 0.77) had 96% sensitivity, less contamination (4%; $P < 0.0001$), and more rapid detection (median 7.5 days, IQR 4 days; $P < 0.0001$). Delayed culture increased contamination rates in LJ ($P = 0.02$) but not MODS cultures ($P = 0.97$).

	Total no. processed	Direct smear positive	Concentrated smear positive	Total positive	Incremental increase by concentration
October 2006	277	40	19	59	47%
November 2006	214	33	39	72	118%
December 2006	132	27	26	53	96%
January–March 2007	552	77	39	119	50%

Contribution of additional samples: Availability of second sputum samples increased the sensitivity of microscopy (ZN by 33%, auramine by 30%; both $P > 0.05$) but did not significantly improve the performance of PCR (0%) or either culture technique (LJ 9.5%, MODS 6.7%).

Susceptibility testing: MODS (US\$ 1.80) provided antibiotic susceptibility results at the same time as positive culture detection, compared with a 5 week delay for MABA colorimetric testing (US\$ 6.87).

Conclusion: MODS doubled the sensitivity of TB diagnosis compared with ZN microscopy, and performed significantly better than conventional LJ culture and PCR techniques.

PC-72230-12 Computerising TB registers by using Internet facilities in Zambia: pilot in 'high workload' clinics in Lusaka

L M S Sigande, A C Chipwalu, N C K Chanda-Kasese, M M Mwamba, M M Munalula, H Ayles, A S Schaap.
Zambart Project, University of Zambia, Lusaka, Zambia.
e-mail: lucheka@zambart.org.zm

Introduction: Register keeping forms a key element in monitoring the NTB Control Programs. Not much is known on the quality of record keeping and quality of compiling register data into the standard quarterly reports.

Objective: Explore the use of Internet-based applications to capture TB-registers in Zambia. Study the quality of the TB-registers by comparing standard quarterly reports based on manual counts with computer counts.

Methods: Treatment registers for 2005 & 2006 of 4 'high workload' centres were entered line-by-line using web-based applications linked to a central database. For standard quarterly reporting, the TB-registers were manually counted by experienced clinical officers. We compared manually counts for quarterly reports with computerized counts.

Results: Electronic notification data showed that 1863 of the 6672 cases (28%) were likely to be diagnosed in another health center, but not recorded as Transferred In. Processing the electronic data resulted in 1581 cases that could not be classified due to missing data on patient-type, smear result, P/EP or due to inconsistent data. Manual counts of treatment outcomes showed more smear positive cases than extracted from the database (1991 versus 1536 cases). The cure rate is lower if calculated from the database (61%) than according to the quarterly reports (74%).

Discussion: We have shown that capturing TB-registers using low-bandwidth Internet applications, is feasible in Zambia. TB-registers lack completeness. We feel that record keeping is an extra burden for the health staff. Electronic TB-registers can help to highlight shortcomings and thereby improve register keeping. We assume that the counts of quarterly reports are

partly based on expert judgement of the incomplete records. Cases diagnosed in another health center are often recorded as new patients & can lead to double counting of TB-patients resulting in an overestimate of total notifications.

POSTER DISPLAY SESSIONS

MANAGEMENT OF PATIENT TREATMENT

PS-71109-12 Supplementary care for patients on DOT in high-burden cities in the State of Sao Paulo, Brazil

V Souza Pinto,^{1,2} R C De Paula,^{1,3} R Cunha Barbosa.³ ¹Task Force of National Tuberculosis Control Program from Ministry of Health, Sao Paulo, ²Emilio Ribas Institute for Infectious Diseases, Sao Paulo, ³University Sao Marcos, Sao Paulo, SP, Brazil.
Fax: (+55) 1130822772. e-mail: valdirpinto@uol.com.br

Introduction: Controlling tuberculosis (TB) contributes to reduce human suffering and the social and economic consequences for the ill, his/her family and society. One element of TB control strategy recommended by Brazil Ministry of Health (BMH) is DOTS for all patients with TB. The supplementary support for patients to promote adherence to treatment must be part in all Tuberculosis Control Program (TCP). Incentives are offered to patients in DOT (Supervised Treatment) to reduce risks of neglect of treatment, in other words, the patient must adhere to DOT. Those incentives referred to basic food package and to transport warranty (tickets) during DOT.

Objective: This study is an essay and a facilitative contribution of work, as a useful tool, to the access of incentives for DOT from TCP's high burden cities in the State of Sao Paulo.

Method: This is a descriptive and retrospective study that uses data by Evaluation and Control Instrument (ECI), a questionnaire survey, distributed by BMH about TCP on first semester of 2006.

Results: Data correspond to 48 from 73 high burden cities (65.8%). It was observed that 35 cities use DOT (72.9%). From cities that use DOT there are cities that offer only one type of incentive (37.1%) and those that offer both incentives as supplementary support (45.8%). Finally, there are cities (17.1%) that do not offer any kind of incentives to their patients in the use of DOT.

Conclusion: Since DOTS implementation in the State of Sao Paulo it has been working with municipalities' providers to warrant the access of patient to the treatment of TB. Since 2005 BMH in association with TCP of Sao Paulo counts on technical support of Task Force to work in the attempting to sensitize providers of PCT in the advocacy of TB as well as capacitating healthcare workers in the improvement of DOTS,

e.g., early case detection, diagnosis improvement, and quality of treatment with warranty of incentives that are essentials to the patient with TB.

IR	Legend	High Burden Cities	Estimated population (million)	Transport coupons	Patient in DOT	IR	Legend	High Burden Cities	Estimated population (million)	Transport coupons	Patient in DOT
1	A	Araucaria	189,657	164	3	25	L	Lima	275,554	0	x
2	B	Barral	115,565	0	x	26	M	Murillo	224,003	0	6
3	C	Cathala	129,751	3	6	27	Mu	Musil	413,943	0	14
4	D	Darrell	265,549	0	22	28	O	Ocasio	714,950	2,000	12
5	E	El Estero	43,763	0	20	29	P	Parrilla	105,350	0	x
6	F	Fernando de la Cruz	143,821	0	3	30	P	Parrilla	65,256	Yes	x
7	G	Guaracha	83,574	0	33	31	P	Parrilla	143,737	3,880	6
8	H	Herrera	49,512	0	3	32	P	Parrilla	110,213	41	2
9	I	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
10	J	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
11	K	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
12	L	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
13	M	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
14	N	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
15	O	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
16	P	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
17	Q	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
18	R	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
19	S	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
20	T	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
21	U	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
22	V	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
23	W	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
24	X	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
25	Y	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
26	Z	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
27	AA	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
28	AB	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
29	AC	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
30	AD	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
31	AE	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
32	AF	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
33	AG	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
34	AH	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
35	AI	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
36	AJ	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
37	AK	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
38	AL	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
39	AM	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
40	AN	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
41	AO	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
42	AP	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
43	AQ	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
44	AR	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
45	AS	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
46	AT	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
47	AU	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
48	AV	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
49	AW	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
50	AX	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
51	AY	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
52	AZ	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
53	BA	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
54	BB	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
55	BC	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
56	BD	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
57	BE	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
58	BF	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
59	BG	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
60	BH	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
61	BI	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
62	BJ	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
63	BK	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
64	BL	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
65	BM	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
66	BN	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
67	BO	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
68	BP	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
69	BQ	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
70	BR	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
71	BS	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
72	BT	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
73	BU	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
74	BV	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
75	BW	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
76	BX	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
77	BY	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
78	BZ	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
79	CA	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
80	CB	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
81	CC	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
82	CD	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
83	CE	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
84	CF	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
85	CG	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
86	CH	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
87	CI	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
88	CJ	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
89	CK	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
90	CL	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
91	CM	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
92	CN	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
93	CO	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
94	CP	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
95	CQ	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
96	CR	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
97	CS	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
98	CT	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
99	CU	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
100	CV	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
101	CW	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
102	CX	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
103	CY	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
104	CZ	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
105	DA	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
106	DB	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
107	DC	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
108	DD	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
109	DE	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
110	DF	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
111	DG	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
112	DH	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
113	DI	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
114	DJ	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
115	DK	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
116	DL	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
117	DM	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
118	DN	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
119	DO	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
120	DP	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
121	DQ	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
122	DR	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
123	DS	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
124	DT	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
125	DU	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
126	DV	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
127	DW	Campos de Jordao	389,634	0	11	33	P	Parrilla	245,306	72	56
12											

PS-71132-12 Involvement of grassroot doctors in a public-private-mix: project in Howrah (West Bengal)

M Roy Sengupta,¹ P K Mitra.² ¹St. Thomas Home, Howrah, West Bengal, ²German Leprosy Relief Association, Kolkata, West Bengal, India. Fax: (+91) 3326604481.
e-mail: drtvogt@web.de

Setting: The extensive urban slums of Howrah (West Bengal, India), in which unqualified grassroots doctors dominate the private health care sector for the poor.

Objective: To bring the high number of TB-patients, who are treated in an erratic way by grassroots doctors, under regular DOTS of the Revised National Tuberculosis Control Programme (RNTCP).

Methods: 198 grassroot doctors of the urban slums of Howrah were sensitized regarding the RNTCP and their options of cooperation. They were offered free diagnostic work-up of all referred TB-suspects by our NGO, and the choice of being themselves the DOTS provider for their identified TB-patients according to RNTCP-rules and under supervision of RNTCP- and Project-Staff, or to give the treatment of their referred patients to the hands of a local DOTS-center.

Results: Between September 2005 to March 2007, 2967 TB-suspects were referred to this Public Private Mix (PPM)-Project, and 435 TB-patients were identified, of whom 418 were eligible for and willing to be put on DOTS. So far, 165 patients out of those who were put on DOTS reached an outcome, out of them 82% a succesful one (with 6% death, 6% failure, 6%

default). Treatment outcomes of the patients who were treated by grassroots doctors as DOTS-providers were comparable to the outcomes of the patients who were treated in local DOTS-centers.

Conclusion: It is feasible to involve unqualified grass-root doctors in the RNTCP via a PPM-Project. To our knowledge this is the first urban PPM-project focusing on this group.

Case detection is favourable but the overall outcome needs further improvement.

PS-71152-12 Comparison of the effectiveness of DOT partners for treating private patients

L Gamiao, A Sarmiento, T Rodrigo. Philippine Coalition
Against Tuberculosis, Quezon City, Philippines.
Fax: (+632) 7819535. e-mail: leydo@yahoo.com

Introduction: In the Philippines, the private sector is a valuable resource that is available and widely utilized even by the lower income group. Prior to the adoption of Public-Private Mix (PPM) as a national strategy, the private sector run a parallel, non-uniform diagnosis and treatment standards. Presently, private physicians refer patient to PPM DOTS Units located nationwide. This study compares the effectiveness of a volunteer health worker, a family member and a clinic staff in ensuring treatment success.

Methods: Data of private patients from the TB Register of 70 PPMD units installed under the Global Fund project from April 2004 to March 2006 were processed and analyzed using Epi Info 6. and success rates were determined according to treatment partner.

Results: Of the 1401 new smear positive case enrolled for treatment, 838 (59.8%) patients opted to utilize a volunteer health worker as treatment partner, 406 (29.0%) a family member and 157 (11.2%) a clinic staff of the DOTS facility. Treatment success rates were 92.0%, 91.8%, and 92.9% respectively and test for significance using chi-square did not show significance between three options for treatment partner.

Conclusion: In ensuring treatment success for patients referred by private physicians, the following options maybe offered: facility based DOT with clinic staff as partner; 2) community based DOT with volunteer health worker as partner or a family based DOT, whichever is best suited to the patient.

PS-71167-12 Engaging private physicians in DOTS towards prevention of MDR-TB

T Rodrigo, L Gamiao, A Sarmiento. Philippine Coalition Against Tuberculosis, Quezon City, Philippines.
Fax: (+632) 7819535. e-mail: leydo@yahoo.com

Introduction: A Philippine survey conducted among 188 private physicians in 2001 revealed that 95% used chest X-ray as initial diagnostic tool for TB; only 16% follow the standard treatment recommended by the National TB Control Program (NTP) and treatment

variants from the NTP ranged from 21–37 depending on the category of treatment. In 2003, the NTP adopted the Public-Private Mix (PPM) strategy to synchronize the management and treatment of TB among all care providers.

Objective: To describe the process of engaging private physicians in DOTS; determine the number of private physicians engaged and cases enrolled under Global Fund PPMD project from 2004–2006 and its treatment outcome.

Methods: As part of the process for installing PPM DOTS facilities, physicians attended training on DOTS and entered into an agreement to refer patients to the PPMD facility. Physicians who have fulfilled requirements were certified and accredited.

Results: 70 PPM DOTS facilities installed under the Global Fund have engaged 2470 private physicians from 2004–2006 and referred 7559 patients. Treatment outcome of 1662 new smear positive PTB patients enrolled for DOT for 6 months using 2HRZE/4HR regimen resulted to a treatment success rate of 91%.

Conclusion: Engaging private physicians resulted to more patients being treated with NTP standard treatment regimen. High treatment success rate may suggest that PPMD is an effective strategy in preventing onset and proliferation of MDR-TB.

PS-71268-12 To compare treatment success rates among patients found by active or passive case finding during a ZAMS

A Nota,¹ H Ayles,¹ D Sinyangwe,¹ J Mutofwwe,¹ A Chuuka,¹ G Kashina,¹ N Beyers,² P Godfrey-Faussett,³ S Muvuma.⁴

¹ZAMBART Project, University of Zambia School of Medicine, Lusaka, Zambia; ²Desmond Tutu TB Centre, Stellenbosch University, Cape Town, South Africa; ³London School of Hygiene and Tropical Medicine, London, UK; ⁴Chongwe District Health Management Board, Chongwe, Zambia. Fax: (+260) 254 710. e-mail: amosnota@yahoo.com

Aim: To compare the treatment outcomes in patients found by either active or passive case finding in a community that participated in the ZAMSTAR TB-HIV prevalence survey for treatment outcomes.

Design: Prospective cohort of active and passive TB cases notified from May 2005 to May 2006 at Chongwe rural referral health centre, Zambia.

Methods: Review of cohort. All notified active and passive TB cases were evaluated for outcomes. These were compared for treatment success, case holding and default rates.

Results: Chongwe district notified 247 cases of which 74 (30%) were diagnosed through community active case finding by ZAMSTAR. All 173 passive cases and 68 active cases were evaluated for outcomes. Treatment success rates were 88.4% (153) for passive cases as compared to 83.8% (62) for active cases. 1.3% (1) of the active cases defaulted before 2 months of treat-

ment. Therefore the case holding rate for active cases was 98.7% compared to 100% for passive cases.

Conclusions: Improving TB case finding could help reduce TB at community level, which is the primary objective of the ZAMSTAR study. Case detection was increased by 74 cases (30%) during the ZAMSTAR prevalence survey using active case finding. Concerns around active case finding are that cases found wont complete treatment. We have shown that the treatment outcomes are no worse in those found by active compared to passive case finding.

PS-71277-12 Adverse events during tuberculosis treatment in a high burden setting

N Martins,^{1,2,3} P Morris,^{1,4} S Halpin,^{1,4} P M Kelly.^{1,4,5}

¹Menzies School of Health Research, Darwin, Northern Territory,

²School of Public Health & Community Medicine, University of New South Wales, Sydney, New South Wales, Australia;

³Universidade da Paz, Dili, Timor-Leste; ⁴Institute of Advanced Studies, Charles Darwin University, Darwin, Northern Territory,

⁵National Centre for Epidemiology & Population Health, Australian National University College of Medicine & Health Science, Canberra, Australian Capital Territory, Australia.

Fax: (+61) 61250740. e-mail: paul.kelly@anu.edu.au

Background: Drugs side-effects have been reported as one reason why patients default from their TB treatment in several settings, including in our own studies in Timor Leste.

Aim: To document the incidence of adverse events related to TB treatment, the management of these events, and the association with treatment outcome.

Method: 270 adult pulmonary TB patients were enrolled at 3 clinics in Dili. Data on adverse events were actively collected: weekly during the 2 month intensive phase (daily rifampicin, isoniazid, ethambutol and pyrazinamide) and fortnightly during the 6 month continuation phase (daily isoniazid and ethambutol).

Result: 95 (35.2%) study participants had symptoms consistent with a side effect of TB medications. The majority of first complaints (70.2%) occurred during the intensive phase. Itching (14.0%), gastro-intestinal symptoms and influenza syndrome (both 12.6%) were the commonest complaints. All adverse events were classified as minor, 73.7% requiring symptomatic treatment but no treatment interruptions. Patients with itch were significantly less likely to default (RR = 0.2, 95%CI: 0.05,0.83). Default rates in patients who experienced other adverse events were similar to those who did not experience adverse events.

Conclusion: Adverse events are common and although they are classified as minor by health care workers, patient perception may be quite different. More attention needs to be given to the identification and treatment of adverse events during TB treatment and on their influence on patient care. The surprisingly strong association between itching and treatment success requires further study.

PS-71318-12 Retreatment cases referred by private physicians and their treatment outcome

L Gamiao, T Rodrigo, A Sarmiento. Philippine Coalition Against Tuberculosis, Quezon City, Philippines.
Fax: (+632) 7819535. e-mail: leydo@yahoo.com

Introduction: Through the PPMD strategy, management and treatment of tuberculosis by all care providers have synchronized. The Global Fund Project installed 70 Public-Private DOTS units where private physicians can refer TB patients for diagnosis and treatment following the Philippine National TB Control Program (NTP) protocol.

Methods: Compare treatment outcomes of re-treatment TB cases classified as relapse, treatment failure, Return After Default (RAD) who were given the standard NTP regimen of 2HRZES/HRZE for the intensive phase and continuation phase.

Results: From 2004–2006, 375 re-treatment TB patients were referred by private physicians, 268 were classified as relapse, 67 RAD, and 40 treatment failure. Treatment success was lowest among the treatment failure cases (67.5%), highest among RAD (86.5%) and 80.9% among relapse cases.

Conclusions: The likelihood of being cured among the re-treated cases is highest in the RAD cases and lowest in failures. Adherence of patients to treatment regimen is highly recommended to attain high yield of success rate.

PS-71328-12 Food incentives to improve TB treatment outcomes: results of a randomised controlled trial in Timor-Leste

P M Kelly,^{1,2,3} N Martins,^{2,4,5} S Halpin,^{2,3} P Morris.^{2,3}
¹National Centre for Epidemiology & Population Health, Canberra, Australian Capital Territory, ²Menzies School of Health Research, Darwin, Northern Territory, ³Institute of Advanced Studies, Charles Darwin University, Darwin, Northern Territory, ⁴School of Public Health & Community Medicine, University of New South Wales, Sydney, New South Wales, Australia; ⁵Universidade da Paz, Dili, Timor-Leste.
Fax: (+61) 61250740. e-mail: paul.kelly@anu.edu.au

Background: Despite being used by TB control programs in several countries, there have been no randomised controlled trials examining food incentives to improve treatment outcomes.

Aim: To test the hypothesis that food is a cost-effective adjunctive therapy to enhance TB treatment compliance in Timor Leste.

Method: The trial was conducted in an operational setting in the 3 busiest TB clinics in the capital, Dili. 270 previously untreated adult pulmonary TB (PTB) patients were randomly assigned to two groups: intervention (nutritious, culturally appropriate food, $n = 139$) and control (nutritional advice, $n = 131$). Both groups received TB treatment according to the Timorese DOTS strategy guidelines. The primary outcome measure was treatment success (cure or treatment completion). Outcomes were assessed remotely, blinded to allocation status.

Results: The majority of TB patients were male, poor, lived close to the TB clinics and were malnourished at diagnosis (mean BMI = 17.1 kg/cm²). Compliance with DOT was high in both groups. The food intervention showed no impact on weight gain or treatment outcome on the full study sample. In a pre hoc but underpowered sub-group analysis of sputum smear positive patients, there was a 2-fold improvement in sputum clearance at 1 month (34 vs. 17%, $P = 0.2$) and a 10% absolute improvement in treatment success (75 vs. 65%, $P = 0.3$).

Conclusion: Food did not improve TB treatment outcomes in this group of patients in this setting. Food may improve treatment outcomes in sputum smear positive patients. Further studies in different settings and possibly measuring different outcomes are required.

PS-71574-12 Providing patient-centred TB treatment: Tanzanian experience

S M Egwaga,¹ P Grewal,² N S Range,³ F Lwilla,¹ A Mkopi,⁴ B Amuri,⁴ H Mshinda,⁴ H Vera.² ¹National TB and Leprosy Program, Ministry of Health, Dar Es Salaam, Tanzania, ²Health Care, Novartis Foundation for Sustainable Development, Basel, Switzerland; ³Microbiology, National Institute for Medical Research, Dar Es Salaam, ⁴Ifakara Health Research and Development Centre, Dar Es Salaam, Tanzania, United Rep.
Fax: (+255) 022 2150458. e-mail: hn_range@yahoo.co.uk

Background: Patient centered TB treatment (PCT) empowers TB patient to choose who supervises DOT and where, either at home or at health facility. There is no restriction on the choice of supporter. PCT builds on the growing recognition that patient empowerment is an important pillar for treatment adherence. PCT is being piloted in three districts of Tanzania to increase case detection and cure rates. The proof of principle of PCT rests on a cohort analysis and its value added to patients and their families.

Objectives: To assess whether cure rates of sputum smear positive TB patients under PCT are similar to those under health facility DOT.

Methodology: The original methodology of comparing cure rates of the two cohorts (HF-DOT) and home-based DOT (HB-DOT) in the study districts was changed as most patients opted for HB-DOT. The comparison will now be with historical cure rates for HB-DOT in the study districts as well as with current national cure rates. However there are limitations to the comparability with the use of different treatment regimens and formulations in the two groups. The current cohort uses 4FDCs and rifampicin in the continuation phase while historical does not.

Results: Of the 1494 TB patients recruited between April–Sept 2006, over 90% opted for HB-DOT. Majority (82%) of those opting for HB-DOT choose family members as treatment supporter and 11% choose spouses. Supporters' choices did not differ across the districts.

Conclusion: There has been lively debate on the type

of supporter who can be chosen. Preliminary analysis indicates that most patients choose a family member or spouse as a treatment supporter. Interviews with patients and their supporters highlight the comprehensive support that is willingly provided. Routine surveillance shows no early signs that patients are failing their therapy. The on-going formal analysis will provide confirmation.

PS-71637-12 Addressing psycho-social aspects of MDR-TB treatment through patient group discussions in Manila, Philippines

R V Lopiga, R Encarnacion, C Auer, M I D Quelapio, L E Macalintal, E K Maramba, R B Orillaza-Chi, M T Gler, T E Tupasi. Tropical Disease Foundation, Makati City, Philippines. Fax: (+63) 2 893 5847.
e-mail: christian.auer@tdf.org.ph

Background: The emotional and psycho-social distress associated with tuberculosis is partly due to the stigma attached to the disease and the financial burden on the family. For patients with MDRTB, this burden is often more severe as MDRTB treatment is prolonged and made more difficult by side effects of drugs and strict implementation of clinic-based direct observation of treatment.

Objective: To describe the emotional and psycho-social problems encountered by MDRTB patients on treatment as expressed in group discussions.

Questions	Common answers
What was your reaction when you were told you have MDRTB?	<ul style="list-style-type: none"> Sadness, worry Shock, fear, "Losing inner strength"
What helped and helps you in the treatment?	<ul style="list-style-type: none"> Support from family, others, and the MDRTB clinic Starting to feel better God/faith Hope in general
What hinders you, what are the obstacles in the treatment?	<ul style="list-style-type: none"> Side effects of the drugs The fear of not getting cured Inability to be the breadwinner/lack of money Living far away from the clinic "Psychological block" regarding treatment and nausea/vomiting
What are your fears?	<ul style="list-style-type: none"> Illness getting worse, hemoptysis, relapse Side effects (e.g. insomnia, vomiting, deafness, loss of appetite) Spreading the disease / Re-infection through co-patients Embarrassed to join people, fear to (re-)experience rejection
What are your worries?	<ul style="list-style-type: none"> Family members may also fall sick with MDRTB Body can no longer cope with the strong treatment The treatment-related vomiting may negatively affect treatment or result in prolongation of treatment Not getting well. No other options if this treatment fails Daily expenditures of the clinic-based treatment
What are your hopes?	<ul style="list-style-type: none"> Getting cured Co-patients are partners on the difficult road to cure Group discussion activities will calm down the troubled minds God and the promises of the Holy Scriptures.

Figure Key questions in the group discussions and common answers from MDR-TB patients on treatment.

Methods: The MDRTB treatment program of the Tropical Disease Foundation started offering peer group discussions, lead by clinical psychologists. The first series of weekly group discussions started in September 2005 among in-house patients. In January 2007, weekly group discussions in a second treatment center were started with MDRTB out-patients. The number of participants in a group discussion ranged from 10 to 22. We reviewed the minutes of the eight initial weekly group discussion meetings of both settings to describe the illness and treatment experience. **Results:** Fears about the disease, uncertainty about positive treatment outcome, anxiety due to side effects and the financial burden, and sadness owing to separation from family and feelings of rejection due to stigma were frequently expressed by the patients. The side effects of the drugs was a challenge to treatment. The group therapy sessions and support system it generated helped patients overcome these problems. The figure presents the psycho-social impact of the disease and the fears, worries and hopes of the patients. **Conclusion:** The psychological and spiritual dimension of MDRTB and its treatment is important and needs to be addressed. Through peer support dynamics that facilitate sharing of experiences, patients get encouragement and practical advice from each other.

PS-71638-12 Irregularity of MDR-TB treatment: frequency and main causes in the three treatment centres of Manila, Philippines

C Auer,¹ M B R Baliwagan,¹ V A Belen,¹ M T Gler,¹ L E Macalintal,¹ E K Maramba,¹ A Lumagod,¹ L O Raymond,¹ V S Lofranco,² R B Orillaza-Chi,¹ M I D Quelapio,¹ T E Tupasi.¹ ¹Tropical Disease Foundation, Makati City, ²Lung Center of the Philippines, Department of Health, Quezon City, Philippines. Fax: (+63) 2 893 5847.
e-mail: christian.auer@tdf.org.ph

Background: To enhance cure and avoid amplification of resistance, adherence to MDRTB treatment under direct observation is important. However, MDRTB treatment is unpleasant and many aspects of life combat with the need to go for treatment daily.

Objective: To describe the frequency and causes of treatment interruptions among MDRTB patients of 3 treatment centers in Manila: 1) MMC: Makati Medical Center, an out-patient clinic; 2) KASAKA: a clinic in a private TB hospital with 15 to 20 in-house patients and out-patients; and 3) LCP: Lung Center of the Philippines, a clinic in a large governmental hospital with 8 in-house patients and out-patients.

Methods: This is a review of clinic attendance sheets over a six-month period in these 3 MDRTB centers. For each month, the proportion of patients with no absences, 1–2 absences, 3–4 absences, 5–7 absences, 8–13 absences, and >13 absences per month was calculated. Reasons for absences were recorded.

Results: On average, only 51% of the patients had no treatment interruption in a month. 26% of the pa-

tients had more than 4 absences per month (Figure). The most commonly stated reason for treatment interruption was illness (e.g., the flu, headache, symptoms related to TB), followed by 'going home to province', side effects of the drugs, typhoon or floods, and being busy with work/job.

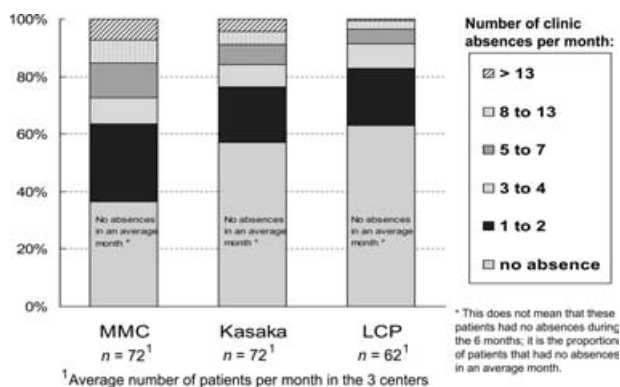


Figure Distribution of MDR-TB patients by the average number of treatment interruptions per month in three treatment centers of Manila, Philippines, September 2006 to February 2007.

Conclusion: Treatment interruptions are common. The lower rate of treatment interruptions in Kasaka and LCP may be attributed to the housing facility offered by both and to the fact that for the analysis in MMC, the decentralized patients (patients referred to local DOTS centers) were not included. Measures to improve treatment adherence are imperative and currently include patient referral to DOTS treatment sites in the communities where they live for the continuation phase and providing psycho-social support for patients. Which degree of irregularity of treatment negatively affects treatment outcome needs to be studied.

PS-71686-12 Family members as TB treatment supporters in hard to access areas of Nepal

S C Baral,^{1,2} J N Newell,² S B Pande,² P Malla,³ ¹Health Research and Social Development Forum (HERD), Kathmandu, Nepal; ²Nuffield Centre for International Health and Development, Leeds, UK; ³National Tuberculosis Centre, Bhaktapur, Nepal. Fax: (+977) 1 4102016. e-mail: sushilb@mos.com.np

Background: In the hill districts of Nepal, DOT provided at health facilities is not accessible to many patients: alternative methods of supervision and patient support are needed. As part of a larger randomised controlled trial started in 1999, family member supervision was implemented across five districts with a total population of 212 000, and was shown to be feasible and effective, with a success rate of 89%.¹ This strategy has been sustained from 1999 to the present. **Objective:** To better understand processes of family member supervision and patient support. **Method:** In-depth interviews ($n = 38$) and group dis-

cussions were performed with patients and supporters: thematic analysis was employed.

Findings: Patients reported that family members were well accepted as treatment supervisors, and provided good support. Allowing a family member to supervise treatment meant patients could access otherwise inaccessible TB treatment services. Clearly defined responsibilities of TB patients and treatment supporters, and continued health education during treatment, played important roles in ensuring successful treatment completion. The supporter handed responsibility to another person in the family if they were absent from home. However, some family members were not fully aware of their role as treatment supporter.

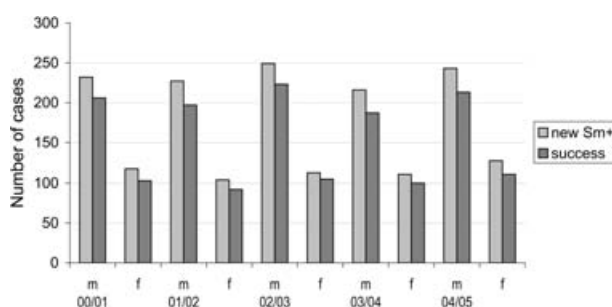


Figure Case finding and outcomes from family member DOT.

Conclusion: Family member treatment supporters could be used where health service DOT is infeasible. Continued health education and effective monitoring are vital.

¹ Newell et al. (2006) *Lancet*; 367: 903–9.

PS-71751-12 Community-based tuberculosis care (CBDOTS) using two patient-responsive strategies in Kampala, Uganda

D Mafigiri, J McGrath. Department of Anthropology, Case Western Reserve University, Cleveland, Ohio, USA. Fax: (+1) 216 368 5334. e-mail: david.kaawa@case.edu

Background: TB patients at the Uganda-Makerere University-Case Western Reserve University Research Collaboration Clinic (MUCWRU) in Kampala were treated under 2 patient-responsive strategies of the WHO approved CBDOTS relying on treatment supporters from their social networks.

Methods: Patients self-selected between home-based DOT (HMDOT) with a 'lay' treatment supporter and clinic-based DOT (CLDOT) with a health worker.

Results: 79.3% (69/87) selected HMDOT. Success rates were not significantly different between HMDOT (89.9%) and CLDOT (88.9%), but higher than WHO target. CBDOTS was highly regarded. Less stigma was perceived as 'self-selected' supporters were always available and did not require notifying anyone else. Some patients changed DOT plans due to confidentiality, stigma or infrequent supporters' availability. Fluidity of CBDOTS enabled patients to

cope with changes and maintain their adherence to therapy. This fluidity speaks to the need for flexibility when implementing DOTS in this context.

Conclusions: Both CBDOTS plans had similar success rates and achieved the WHO target. TB care in resource constraint settings can consider DOT as a flexible, support role that utilizes the social networks of patients to improve adherence and outcomes for long-term care seeking processes.

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PS-71753-12 Socio-psychological factors and treatment adherence of new tuberculosis patients in Russia

W Jakubowiak,¹ E Bogorodskaya,² S Borisov,² I Danilova,¹ O Lomakina,³ E Kourbatova.⁴ ¹WHO Office in the Russian Federation, Moscow, ²Research Institute of Phthisiopulmonology, Sechenov Moscow Medical Academy, Moscow, ³Serbsky Research Institute of Psychiatry, Moscow, ⁴Samara State Medical University, Division of TB and Lung Diseases, Samara, Russian Federation. Fax: (+7) 495 7872149. e-mail: w.jakubowiak@who.org.ru

Objectives: To study: 1) the impact of social, behavioral, emotional, and psychological factors on treatment adherence of new TB patients, 2) reasons for TB treatment default among non-adherent patients, and 3) to evaluate the organization of treatment and social support desired by patients to find possible interventions during both phases of treatment.

Methods: A prospective questionnaire-based case-control study was conducted among new pulmonary TB patients in four Russian regions (Orel, Vladimir, Belgorod Oblasts, and the Republic of Mari-El) during 01/04/2004–31/03/2005.

Results: A total of 87 non-adherent patients (cases) and 1302 adherent patients (controls) were interviewed. In multivariate analysis, non-adherence was independently associated with frequent alcohol use (OR = 3.69, 95%CI 2.12–6.42), low confidence in medical staff (OR = 1.21 per 1 point in summary score, 95%CI 1.11–1.32), and negative attitude towards treatment (OR = 2.65 per 1 point in summary score, 95%CI 2.03–3.46). The leading reasons for treatment default given by non-adherent patients were the need to earn money (30%), alcohol use (30%), and not perceiving themselves as being sick (25%). The majority of patients (67%) preferred outpatient treatment and monetary incentives (67%).

Conclusion: Patients at highest risk for non-adherence should be identified at the start of treatment and consulted by a psychologist and expert in substance abuse. A case management and patient-centered approach should be applied.

PS-71802-12 Civil society involvement in TB case management: an experience in three health districts in Burkina Faso

K M Drabo,¹ H Z Ouedraogo,¹ M Dembele,² F A G Assogba,¹ R Zerbo,¹ J B Ouedraogo,¹ B Dujardin,³ J Macq.³ ¹Institute of Health Sciences Research, Burkina Faso, Bobo Dioulasso, ²National Programme for TB Control, Ouagadougou, Burkina Faso; ³ESP-ULB, Brussels, Belgium. Fax: (+226) 20 97 48 68. e-mail: m_drabok@yahoo.fr

Introduction: Caring for TB patients involves de facto many actors, part of the health system but also of the patient social network.

Objective: To better coordinate care and ensure the civil society involvement, a TB committee has been put in place in three health districts from Burkina Faso.

Methods: Key actors, used as resources by TB patient during their search for care have been identified through interviewing 13 former and 23 actual TB patients. They have been involved in three successive meetings organised within each health district. This resulted in the creation of a TB committee. One sociologist followed these committees during one, by using a specific method for group dynamic (Van Campenhout group analysis method).

Results: Each TB committee is composed of 14 members representing the health system (nurses, traditional healers, etc.) the TB patients, and the civil society (Christians and traditional religions, Moslems, members of community organization, etc.). They initially focused mainly on IEC activities to sensitize people suspected of TB to go to health centre. After some meeting with TB patients, actions became more oriented towards helping TB patients to solve social and economic problems during their journey to cure. They contribute to better organise the supervision of drug intake and to join the lost of follow up cases.

Conclusion: The civil society could bring good support to improve the performance of health services if a sound organization is working. The participation of sociologists into the process may improve the efficiency of the civil society contributions.

PS-71890-12 Outcome and risk factors associated with default from treatment in a TB Control Programme, Carapicuíba City, Brazil

A A Vieira,^{1,2} S A Ribeiro.² ¹Tuberculosis Control Program of Carapicuíba City, Carapicuíba, São Paulo, ²Departamento de Medicina Preventiva da Escola Paulista de Medicina-UNIFESP, São Paulo, São Paulo, Brazil. Fax: (+55) 1141451878. e-mail: nantico@uol.com.br

Introduction: Tuberculosis (TB) is a problem of public health. The objectives of TB control is: to reduce mortality, morbidity and disease transmission; to prevent the development of drug resistance. A successful TB control program should identify the sources of infection in the community (70%) and has at least 85% of cure and completed treatment and less than

5% of defaulted rate, thereby cutting the chain of transmission.

Objectives: The aim of this study was to verify defaulted rates, and to identify significant risk factors associated to abandonment treatment by cohort and see which of them are better.

Methods: A mixed retrospective/prospective cohort of TB treatment was done: one from January 1st to December 31, 2003, cohort 1 (173 cases)—Self Administered Therapy (SAT) and other from July 1st 2004 to June 30, 2005, cohort 2 (187 cases)—Directly Observed Therapy Short-course (DOTS), data were analyzed by chi-square test or Fisher Exact Test (according *n*) and $P < 0.05$ and relative risk (RR). The cases were 173 and 187 recorded respectively.

Results: The defaulted rates decreased from 13.3% in the SAT to 5.9% in DOTS ($P < 0.05$). The variables associated statistically to defaulted are showed in the table.

Variables	Defaulted (SAT)		<i>P</i> value	Defaulted (DOTS)		<i>P</i> value
	Yes	No		Yes	No	
Sex						
Male	18	88	N/S	6	106	N/S
Female	5	62		5	70	
Employment						
Housewife/student	4	39	0.010	2	50	N/S
Formal	7	76		7	70	
Informal	12	33		2	51	
New TB case						
Yes	14	126	0.013	8	160	N/S
No	9	24		3	16	
Alcohol abuser						
Yes	7	16	0.015	3	13	N/S
No	16	134		7	110	
Contacts screened						
Yes	1	49	0.005	5	107	N/S
No	22	101		6	69	
Smear-positive TB						
Yes	13	97	N/S	7	94	N/S
No	7	31		3	49	

Discussion and conclusion: DOTS decreased defaulted rates close to WHO recommendations and produced better results in the outcome data of TB treatment, even in the cases with statistically risk factors of defaulted treatment found in SAT cases: informal employees (RR = 3.06), alcoholism abuser (RR = 3.10), previously treated for TB (RR = 2.73) and no contacts interviewed or screened (RR = 8.94). The implementation of the DOTS strategy in Carapicuibá City showed it's the most cost-effective way of preventing TB transmission and got up better results of treatment outcomes (cured/completed treatment).

PS-71929-12 DOTS and tuberculosis treatment outcomes of high HIV prevalence provinces in Thailand

P Khortwong,¹ P Satasit,¹ A Chitwarakorn,¹ W Somsong,² B Kradphuang,² S Jittimanee,² N Nateniyom,² S Thanprasertsuk.² ¹Principal Recipient Administrative Office-GFATM, Nonthaburi, ²TB Cluster, Bureau of AIDS, TB and STI, Department of Disease Control, Bangkok, Thailand. Fax: (+66) 25903313. e-mail: pkhortwong@gmail.com

As far as TB-HIV is concerned as the public problem in Thailand, in 2003–2005, National TB Program and National AIDS program have implemented and expanded TB-HIV collaborative activities through nationwide. Additional resources supported by the Global Fund have been implemented to strengthen DOTS strategy for TB cases and PLWHA in these areas.

The project has been implemented by using TB-HIV strategies as a Package of Care started in 2003. The crucial activities were implemented as follows: 1) established national TB-HIV coordinating board and linked to HIV regional advisory board; 2) developed guidelines for collaborative TB-HIV activities and capacity building for TB-HIV coordinators in all health facilities and levels; 3) accelerating DOTS services and improving quality of an early case detection and patient's compliance by using health education materials; 4) providing VCCT for TB cases and TB screening in PLWHA.

3709 health care workers were trained for improving TB-HIV integrated care for TB patient and PLWHA in 56 high prevalent HIV provinces. 40 887 PLWHA were received TB screening under this program. Meanwhile, 17 462 TB patients were received HIV counseling and testing. Moreover, among 7598 registered TB cases, outcomes analysis of cohort 2005 found that 5906 (77.73%) achieved treatment success, 839 (11.04%) died, 473 (6.23%) defaulted, 243 (3.20) transferred out, 137 (1.80%) failed respectively.

An integrated TB-HIV Program has been successfully implemented into local health care system. Further evaluation of risk factors for causes of deaths and other unfavorable outcomes among TB-HIV should be investigated in order to further improve treatment outcomes.

PS-71938-12 Community-based RNTCP-DOTS for better compliance

S M Abbas, R Singh, T Abraham. GLRA-ALES-India, New Delhi, Delhi, India. Fax: (+91) 01125549496. e-mail: rajbir@glra-ales-india.org

Introduction: Most of the slums dwellers are poor daily wagers. To earn their livelihood they go early in the morning at work and return home late in evening. Hence compliance is very poor in these type TB patients. They avail DOTS on the cost of loss of their wages; hence default rate is much higher than expected. Though the exact data of default rate exclusively for

the slums is not available however as per state TB control office's observation it is not less 14%, German Leprosy & TB Relief Association-India [GLRA-India] has started community based DOTS centres in the different 20 slums of Delhi in September 2005, to improve the compliance of DOTS.

Objective: To improve the compliance of DOTS through community DOT volunteers in slums of Delhi.

Method: 20 DOT volunteers selected each for one slum from 20 target slums to provide DOTS. The basic criteria selection was that the slum volunteer should be available in the community round the clock. These included cured patients, housewives, small shopkeepers, etc. After successful completion of training they provided 'patient wise boxes', treatment cards and other necessary logistics. Then the patients who had problem to avail DOTS at government time has been mobilized from the nearest microscopy cum DOTS center to these community DOTS centers with the help of DOT.

Result: The default rate of all four cohorts of 2006 was less than 3%.

Conclusion: The community based DOTS practices are very beneficial for the compliance of DOTS in the slums of Delhi.

PS-71981-12 A model for decentralised management of drug-resistant TB in a high-HIV-prevalence resource-limited setting

P Saranchuk,¹ L Makakole,² E Goemaere.³ ¹Medecins Sans Frontieres, Morija, Lesotho; ²Scott Hospital, Morija, Lesotho; ³Medecins Sans Frontieres, Cape Town, South Africa.
Fax: (+27) 213715061. e-mail: k.hilderbrand@msf.org.za

Background: Lesotho has the fourth highest TB incidence in the world, and the vast majority of TB patients are co-infected with HIV. The extent of drug-resistant (DR) TB is unknown, but probably similar to that seen in neighbouring South Africa. DR TB cases are currently referred to the National TB Programme (NTP) for management. However, there are currently only two inpatient beds available for management of DR TB in the country. Médecins Sans Frontières (MSF) supports decentralised HIV care and treatment in Scott Hospital Health Service Area (HSA), which is comprised of one district hospital and 14 rural primary health care clinics.

Methods: MSF is supporting the establishment of decentralised management of DR TB patients by assisting with: systematic sputum testing for culture and drug susceptibility testing, district hospital renovations to improve infection control and in particular to separate DR TB patients from other inpatients, acquisition of a reliable supply of second-line TB drugs from the NTP, nurse training, and personal protection of health care staff.

Results: Since DST results have been available (February 2007) there have been three confirmed cases of

MDR TB cases in Scott Hospital HSA, and this number is expected to accelerate. The feasibility of decentralised management of DR TB patients within Scott Hospital HSA will be evaluated. Decentralised management of DR TB is necessary in resource-limited settings where the burden of DR TB is expected to be high and specialised facilities are limited.

TB ADVOCACY AND COMMUNITY PARTICIPATION

PS-71402-12 Assessing the impact of TB IEC initiatives and strategies on TB prevention and control

J J Mahlangu. TBFREE (Nelson Mandela Aventis Project to Combat TB), Johannesburg, South Africa.
Fax: (+27) 11 256 3717.
e-mail: jerry.mahlangu@sanofi-aventis.com

Prevention and control of TB, and indeed MDR TB, rely to a large degree on the effectiveness of information, education and communication (IEC) initiatives and strategies. A major challenge of IEC initiatives and strategies, however, is measuring the 'output' and impact of these initiatives and providing meaningful data that can be used to obtain insight and to effect appropriate innovations and changes. This study develops a monitoring and evaluation framework for IEC initiatives and strategies focusing on output and impact. In particular, we develop a framework for strategy intervention and introduce measurements for monitoring and assessing behaviour as well as their relationships with incidence. Results are presented from a household and clinic study commissioned by TBFREE in South Africa, in which we also demonstrate methodology and call for the adoption of certain indicators and procedures as a standard for measuring the impact of IEC initiatives on TB prevention and control.

PS-71516-12 Development of indicators and instruments for advocacy, communication and social mobilisation in tuberculosis

S Tana,¹ P Heitkamp,² F X Budiyo.³ ¹Center for Health Policy and Social Studies, Yogyakarta, ²World Health Organization, Jakarta, ³Ministry of Health, Jakarta, Indonesia.
Fax: (+62) 274883528. e-mail: chpss_yk@yahoo.co.id

Background: Two major areas in national TB control program in Indonesia are community empowerment and local political commitment, which will be supported by a strong Advocacy, Communication and Social Mobilization (ACSM) strategies. Strong ACSM program need consistent monitoring and evaluation.

Objective: To develop sensitive and specific indicators for ACSM programs, which can be used in ACSM baseline as well as program monitoring and evaluation.

tion. The instruments were developed according to the indicators, and both were pilot-tested.

Method: Methods used included ACSM document review and focus-group discussions which involved NTP at various level, national TB key partners and private TB service providers. The indicators and instruments developed were piloted in two provinces in Indonesia.

Result: Indicators score categorized as input, output, outcome, impact, focusing on contribution within TB Control related to political commitment, case detection, and cure. Instruments mainly rely on questionnaires, supported by interviews, surveys, and self-assessment and provide qualitative and quantitative data.

Conclusion: The ACSM indicators can be efficiently used to compare the progress of ACSM programs and activities among provincial, district, health facilities and partner institution.

PS-71628-12 Community-based TB campaigns: low cost means of creating better impact to target communities

M G Gayoso,¹ M Villanueva,¹ O Merilles,² T Tupasi.² ¹Social Mobilization on TB Project, World Vision, Quezon City, ²Tropical Disease Foundation, Inc., Makati City, Philippines.
Fax: (+632) 3747650. e-mail: grace_gayoso@wvi.org

Background: Since 2003, World Vision's Global Fund supported TB project had been organizing and training community volunteers, called TB task forces, in TB case finding and holding, organizational development, and in conducting community TB classes and campaigns.

Goal: To maximize limited resources in increasing TB awareness and improving health-seeking behavior of the community through use of various local, creative TB campaign strategies.

Method: TB task forces, composed mostly of ordinary villagers and volunteers, were encouraged to plan, develop, and implement their own TB campaigns in their villages especially during World TB Day and Lung Month commemoration, which are suitable and acceptable in the community and infused with their local culture.

Result: Village-based, innovative TB campaigns were used in increasing communities' TB awareness such as float parades, election-style TB campaigns, puppet shows, mural paintings, jingle/slogan/poster making contests, community drama, beauty pageants, and mall exhibits. Such activities were facilitated using the communities' own dialect paving the way for better understanding of the community on TB.

Conclusion: Community-developed TB campaigns are focused and cover a specific population leading to a higher probability of reaching and creating a better impact to each project sites' target audience compared to doing a grandiose national/regional TB event commemoration that only covers a general popula-

tion and usually incurs a higher cost. It is a good low-cost strategy of capturing the target demographic and can be applied to other health projects that aim to increase awareness of its niche market on a particular disease.

PS-71682-12 TB advocacy, communication and social mobilisation in Indonesia

A Yuanita, N Nurhanita. Coalition for Healthy Indonesia, Jakarta, Indonesia. Fax: (+62) 0217986266.
e-mail: ade.yuanita@koalisi.org

Background: TB control efforts in Indonesia have largely focused on the quality TB services: uninterrupted drugs supply, training of medical staff, etc. Since 2001, Indonesia has reached high TB treatment success rate (85%) which is meeting the global target. However, there have only been limited efforts on the 'demand side' to build public and political support for wider information dissemination and behavior change initiatives. Coalition for Healthy Indonesia (KuIS) supported by the Indonesian National TB Program/GF-ATM has implemented a comprehensive Advocacy, Communication, and Social Mobilization (ACS) in 15 Districts since 2005. The ACS works were aimed at improving the level of local government commitment to TB control and contribute to the increase of CDR and CR.

Key Findings: After a year, KuIS noted many achievements through the ACS works. Based on the sound policy research, the team has a strong argument to convince the local policy makers through the public hearing, meetings, seminar and mass media. It has been encouraging to observe the increase trend of local budget for TB at 10 out of the 15 districts. District government in Pamekasan has increased the TB budget 46 folds compare to 2005 budget, from US\$ 174 to US\$ 8141. The project component also includes public education and social mobilization, which involving wider community to participate in TB Control. Evaluation survey showed 63.3% of respondents could list 3 basic symptoms of TB, and 61.3% believed that TB was not an embarrassing disease. Surprisingly, 99.5% respondents knew that a person with TB symptoms should go to a community health center. In Pandeglang District, for instance, CDR was significantly increased from 49% in 2005 to 70% in 2006. This figure may simply be a reasonable consequence of more informed public.

Conclusion: TB control is not in a vacuum context. Efforts to fight against TB could only be succeeded with the integrated approach and interventions

PS-71683-12 Generating the political will to Stop TB: a British all-party parliamentary group on global tuberculosis

L Holly, H Marsh, S Davie. RESULTS Education, CV31 2DP, UK.
Fax: (+44) 1926 435110. e-mail: helen@results-uk.org

Background: Until recently the profile of the global TB epidemic in the British Parliament was weak and lacking focus. In autumn 2006, after eighteen-months of intensive high-level advocacy to generate political commitment to tackle TB, RESULTS UK facilitated the formation of a new All-Party Parliamentary Group on Global Tuberculosis (APPG).

Methodology: RESULTS UK conducted a series of awareness-raising activities, including arranging UK advocacy tours for activists/experts from high TB and TB-HIV burden countries, organising Parliamentary delegations to endemic countries (e.g., Rwanda, Kenya, Ukraine) to see the impact of TB and TB-HIV first-hand, and developing Parliamentary activities, such as photography exhibitions, receptions, and adjournment debates.

Results: Since being launched in October 2006 the APPG has attracted 34 members from the House of Commons and House of Lords, arranged several influential and well-attended meetings and prompted questions and Motions in the House. Around World TB Day 2007 the APPG published an Agenda for Action, outlining eight key recommendations for the UK government, to shape its response to the global TB epidemic. The APPG traveled to India in March 2007 and participated in the launch of a similar APPG in the Indian Parliament.

Conclusion: Targeted advocacy can achieve increased political support for TB control and encourage greater, more coordinated Parliamentary activity on the issue. The model could be effectively replicated in other countries.

PS-71784-12 TB photovoice Thailand (TBPV): a project raising awareness on TB and HIV issues in Northern Thailand

N France, K Sangsuk. Health & Development Networks, Chiang Mai, Thailand. Fax: (+66) 053 418439.
e-mail: felicia@hdnet.org

Issues: TB and of HIV infection are increasing in Northern Thailand as elsewhere and the combination of the two diseases are posing a serious threat to public health. Patient centered approaches and empowerment are key strategies to addressing these problems.

Project Description: TBPV is a pilot project that uses photography and stories to stimulate dialogue among individuals and communities affected by TB and HIV in Northern Thailand. Through taking photographs, the participants raise real issues from their communities used for advocacy and intended to influence national TB policy.

Results: TBPV is a pilot project which has trained

participants to take photographs and write about the effects of TB on their lives. TBPV partners with four local health provider organizations in Chiang Dao and Muang districts. More than 1000 photos and 20 stories have been collected and shared in the communities by participant-facilitated small group dialogues. Participants show their photos to their communities and discuss TB-HIV issues. This project has also provided a unique channel for providers/patient interaction to strengthen health workers' understanding of the patient perspective. The project also coordinates TB and HIV/AIDS events such as World TB Day and Health Week.

Discussion: TBPV future efforts will continue to focus on empowerment and on advocating the issues raised through the dialogues in order to change TB policies in Northern Thailand. Additionally, specific issues related to the Thai cultural context around TB and HIV will help inform future TB and HIV programme development for prevention, education and care in Thailand.

PS-71895-12 Tuberculosis photovoice: mobilisation and empowerment in the hands of TB affected communities

R Lacson,¹ A Waller,¹ E Moya,² M Patterson,³ K Sangsuk,⁴ M Exter.⁵ ¹Amaya-Lacson TB Photovoice Project at USC Arnold School, Columbia, South Carolina, ²US-Mexico Border Health Association, El Paso, Texas, ³South Carolina Department of Health and Environmental Control, Columbia, South Carolina, USA; ⁴Health & Development Networks, Chiang Mai, Thailand; ⁵Instituto Brasileiro Inovacoes em Saude Social, Rio de Janeiro, Brazil. Fax: (+1) 803 540 1959.
e-mail: amayalacson@bellsouth.net

Issue: The Amaya-Lacson TB Photovoice Project mobilizes TB affected communities (survivors, caregivers, friends, family) to take action and become a presence in discussions and decision-making about policies and best practices for TB prevention, treatment, and elimination. As we have seen in the HIV/AIDS movement, mobilization and empowerment of affected communities can facilitate changes in the political and social climates.

Method: The Photovoice method mobilizes and empowers participants. This unique method entrusts cameras into the hands of participants who take photographs that help them identify and improve their communities. The photographs represent what is happening in the participants' lives and serve as a point for discussion about what can be done to change the present situation in regards to TB, stigma, education and other related issues.

Results: At this time, there are four TB Photovoice sites across the globe in Thailand, Brazil, and the United States (Texas-Mexico Border and South Carolina). A participant from each site will lead a simulation of the critical dialogue surrounding the photographs taken through this process. The participants will provide

testimonials of their experiences as a person affected by TB and reflect on the social/political changes made and the unintended positive consequences of this process. This presentation serves as an example for other countries that wish to adopt the Photovoice method as a means to mobilize TB affected communities. Implications for outcomes focusing on patient centered and led perspectives on the social aspects of TB illness and care (TB treatment adherence), quality of life issues including mental & social support, health communication campaigns, and the potential for improved TB patient's self management skills will also be discussed.

PS-71947-12 Public-private mix in the RNTCP: North-West Delhi, India

S M Abbas, R Singh, T Abraham. GLRA-ALES-India, New Delhi, Delhi, India. Fax: (+91) 01125549496. e-mail: rajbir@glra-ales-india.org

Introduction: GLRA—India in North-West District of Delhi, the capital of India, sensitized non-allopathic private practitioners on RNTCP-DOTS. Private practitioners in urban slums are usually point of first contact for the slum population.

Objectives: To estimate the improvement in the diagnostic practices of tuberculosis among the non-allopathic private practitioners by sensitizing them through providing the basic knowledge of RNTCP.

Methods: The baseline data was collected by two trained supervisors under the guidance of one medical officer trained in RNTCP, about the diagnosis practices of TB, through questionnaire based interview from 120 non-allopathic private practitioners. Among these one twenty (120) non-allopathic PPs, Seventy Two (72) were given 1 day RNTCP training by WHO-RNTCP consultants/District TB Officer of the District. After a gap of three months these PPs were again sensitized on RNTCP. Six months later a re-survey was conducted among these PPs by the same team to estimate the improvement in diagnosis.

Result: It was noticed after six months that majority of private practitioners gave first priority to sputum microscopy as mainstay of diagnosis.

Conclusion: Sputum microscopy, as a first priority diagnosis of tuberculosis can be achieved among the private practitioners very effectively through proper motivation and sensitization.

PS-71997-12 Advocacy, communication and social mobilisation activities: BRAC experience

A P Zabeen, I Begum, I Nayer, M A Islam. Bangladesh Rural Advancement Committee (BRAC) Health Programme, Dhaka, Bangladesh. Fax: (+880) 28823542. e-mail: rifat.m@brac.net

Objective: Advocacy, communication and social mobilization (ACSM) component is an important ele-

ment of BRAC's community based TB programme to enhance knowledge on TB among community to increase early diagnosis and treatment adherence.

Methodology: At community level female community health volunteers known as Shasthya Shebika provide information on TB during regular household visits. Information on TB also disseminated through radio, TV and cinema slides. Different advocacy workshops, round-table discussion, conferences and talk shows on TV with policy makers, professionals, media personnel, implementers and civil society representatives were conducted to generate support for DOTS. Street drama and folk songs were organized in remote areas by local popular entertainment group.

Result: In 2006, 1625 batches orientations were conducted with village doctors, religious leaders, opinion leaders, girl-guides and scouts and cured TB patients. A total of 43 round-table meetings were organized with journalists, civil society and professionals. In 2006, 148 newspaper articles on TB were published in national daily newspapers. In remote areas, 112 street dramas were organized. Case detection rate increased from 68% in 2005 to 80% in 2006 and maintaining a cure rate of about 93% in 2005.

Conclusion: ACMS activities empower people for accessing to services and to participate in the DOTS services.

PS-72145-12 Addressing political commitment to TB control in a district in South Africa

N P Mhlongo,^{1,2} E Mahlela,¹ T Dayimani,¹ T Mabunda.¹

¹University Research Co., Pretoria, ²Limpopo Department of Health, Polokwane, South Africa. Fax: (+27) 123421356.

e-mail: ntombim@healthprojects.co.za

Introduction: The TASC II TB Project is a project of University Research Co., funded by USAID to provide technical assistance to the South African National TB Control Program to achieve the WHO global TB targets and promote integration between the TB and HIV programs. The advocacy and social mobilization component of the project seeks to inspire grass roots advocacy for TB.

Background: Political commitment to controlling TB in South Africa has not been satisfactory at lower levels of the health care system. TB treatment outcomes particularly among communities most at risk of developing TB disease have remained low. A high percentage of people with active TB present very late into the disease and up to 13% do not complete their treatment.

Objectives: The project embarked on an innovative approach to engage Municipal Mayors in TB control within their communities through a week long TB Control Improvement Initiative involving the Local Mayor in Bela Bela sub district in Limpopo Province, to build a coordinated Community TB Control Approach that will identify undetected cases, ensure

early referrals for screening and treatment, and support treatment adherence.

Method: The Mayor was exposed to all the potential key stakeholders in TB control in the communities; local businesses to advocate for implementation of TB work place programs; CBOs and NGOs, visited hospitals, clinics, laboratories and held interviews with health care workers. Door to door visits in the communities were also conducted new cases identified and defaulters traced.

Results: Mayoral Commitment to partner in all TB control activities in the district and to provide leadership in coordinating district TB Control efforts. A 3 month improvement plan drawn, budget allocated for infection control measures and three local businesses introduced TB work place programs.

Conclusion: Involving local/district politicians in TB control can result in great improvements in TB programs.

PS-71456-12 Peak expiratory flow rate of panel beaters in Ile-Ife, Osun State, Nigeria

R A Adedoyin,¹ G E Erhabor,² A M Adebayo,¹ S A Ehrabor.²

¹Department of Medical Rehabilitation, Ile-Ife, Osun State,

²Department of Medicine, Ile-Ife, Osun State, Nigeria.

Fax: (+23) 8033829978. e-mail: radedoyi@yahoo.com

The massive importation of fairly used cars known as 'Tokunbo' coupled with increased road traffic accidents has increased the numbers of panel beaters in Nigeria. These individuals are exposed to environmental pollution by the nature of their job as they use petroleum products in the course of their job. Previous studies reported that petrol filling station attendants and ARC welders have lower lung function when compared with normal values and predictive value for sex and age. The aim of this study was to assess the lung function of the panel beaters. Peak Expiration Flow Rate (PEF) was determined using Wright's Peak Flowmeter. One hundred and thirty-six panel beaters within Ile-Ife town were recruited for the study. Subjects were asked to take in a deep breath and blow maximally into the device while in erect position. One hundred and thirty men with age and physical characteristics matched were equally tested for comparison. There was significant difference in PEF of panel beaters compare to control subjects. ($P < 0.001$). The mean PEF were (418.9 ± 93.9) and (532 ± 84.9) Litres/min for panel beaters and control individuals respectively. This study concluded that panel beaters have lower peak flow rate. The subjects may be prone to respiratory disorders.

PS-71657-12 Exploring models that work well to help TB patients to become credible partners in TB control

T Hasler,¹ L Davidson,² M Tembo,³ J Mapunda,⁴ M Banda,⁵ P Nhkonjera,⁶ I Mumba,⁷ J F Hassara,⁸ H F Amdal,¹ A Haaland.⁹ ¹LHL-The Norwegian Heart and Lung Patient Organisation, Oslo, Norway; ²Penduka TB Project, Windhoek, Namibia; ³Reigners in Life TB-HIV Support Group, Kitwe, Zambia; ⁴Mukiute TB-HIV Patient Association, Dar es Salaam, Tanzania, United Rep.; ⁵Paradiso TB Patient Association, Lilongwe, ⁶Reach Trust, Lilongwe, Malawi; ⁷Copperbelt Health Education Project, Kitwe, Zambia; ⁸Temeke Municipal, Dar Es Salaam, Tanzania, United Rep.; ⁹University of Oslo, Dept of Community Medicine, Oslo, Norway. Fax: (+47) 22223833. e-mail: th@lhl.no

Objectives:

- Train role models in how to empower TB patients—individuals and groups to become credible partners in TB control.
- Improve skills to communicate effectively in the field of TB and HIV/AIDS.
- Identify steps in the development of TB patient associations in different settings and learn from this.
- Exchange experiences on how to work together with and challenge formal and informal sector to improve conditions for TB patients to fight TB.

Representatives of TB support groups and associations, former TB Patients and health workers from Namibia, Zambia, Tanzania, Malawi and Norway met twice to share experiences on what works well when involving former TB patients in TB control. The different practises to empower TB patients, how to reduce stigma, communicate well and encourage patients to complete treatment were shared and discussed.

The reported results were that participants have:

- become empowered with modes of becoming open about living with hiv and fighting TB, their TB associations
- started to grow through more extensive networking and linking up with other support groups for TB patients
- improved cooperation and referral system of patients with the health care system
- improved cooperation with traditional healers
- increased contact with sponsors and donors
- establishment of expert committees of TB patients with the aim to establish a Expert TB Patient Strategy

Methods: The methods used were exchange visits, field visits, and facilitated discussions in plenary sessions, group works, role-plays and drama with 80 participants from Namibia, Zambia, Tanzania, Malawi, Norway.

Conclusion: Exploring different models of how to involve TB patients to become credible partners in TB control through exchange visits is empowering in itself. The participants of the exchange workshops have learned from each others models on how to strengthen TB patients becoming credible partners in TB control.

PS-71842-12 Home visits are an independent predictor of treatment success of patients involved in community care

L Crouzil,¹ H Ouedraogo,² M Dembele,³ J F Some,¹ A Combar,³ M Drabo.² ¹PAMAC, Ouagadougou, ²IRSS, Ouagadougou, ³PNT, Ouagadougou, Burkina Faso.
Fax: (+226) 50 30 18 14. e-mail: leatitia.crouzil@undp.org

Aim: To identify the patient and intervention factors associated to treatment success among patients involved in community tuberculosis care (CTC).

Methods: The CTC was implemented in 16 urban districts out of 55 districts of Burkina Faso from October 2005 to December 2006. It involved home-visits among others, which were undertaken to provide one or more of the following services: home location, psychosocial support, support of defaulters, and information-education-communication. Data were available for 638 patients who completed the treatment. We analysed treatment success according to patients variables (age, gender, education, matrimonial status, professional activity), and intervention variables (each category of service provided by home-visit, food incentive), using univariate analysis and then logistic regression. Adjusted relative-risks of treatment success, with 95% confidence interval (RR (95%CI)) were derived from the final model.

Results: At least one home-visit was done for 42.6% of patients. Among patients, 23% and 7.4% received 1–3 and >3 home-visit for psychosocial support (HVPS). The treatment success rate was 69.9%. In comparison to patient without any HVPS, the adjusted RR (95%CI) of treatment success were 0.94 (0.62–1.44) in case of 1–3 HVPS and 2.93 (1.20–7.10) in case of >3 HVPS. Treatment success was 2.24 (1.44–3.47) times higher among educated patients, as compared to the uneducated others.

Conclusions: Psychosocial support provided through home visit by trained community actors may determine treatment success if repeated more than three times. The frequency of such activity should be increased in order to improve the results of tuberculosis treatment.

PS-72074-12 Tuberculosis suspects identification by traditional healers and other community actors in Burkina Faso

L Crouzil,¹ H Ouedraogo,² M Dembele,³ J F Some,¹ A Combar,³ M Drabo.² ¹PAMAC, Ouagadougou, ²IRSS, Ouagadougou, ³PNT, Ouagadougou, Burkina Faso.
Fax: (+226) 50 30 18 14. e-mail: leatitia.crouzil@undp.org

Aim: To assess the quality of suspects' identification by traditional healers and other community actors.

Methods: A community-based TB intervention was implemented in Burkina Faso from October 2005 to December 2006. It consisted to public information-education-communication and to community-based TB care, by trained community actors. TB suspects were researched among the participants at the IEC ac-

tivities, the consultants of traditional healers, and the relative of TB patients during home-visit. They were referred at the TB reference centers to be first confirmed TB suspects and then got sputum examination if confirmed. Data were entered and analysed under Epi info 6.04fr. Results were expressed as percentages and compared by chi squared test. The quality of TB suspects' identification by community actors was assessed by the percentage of identified suspects who were confirmed suspects by the TB reference centers.

Results: Overall 876 suspects were identified and referred by the community actors (51.5% through IEC activities, 13.2% through home-visit and 35.3% by traditional healers). Among these TB suspects, 77.9% were confirmed TB suspect by the TB reference centers (74.7% in cases from IEC activities, 74.1% in cases from home-visit, and 85.5% in cases from traditional healers, $P = 0.001$). The TB positive cases represented 13.7% of suspects identified by community actors (14.1%, 15.0% and 13.2% of suspects identified through IEC activities, home-visits and by traditional healers respectively ($P = 0.886$)).

Conclusions: The quality of TB suspects' identification by trained community actors could be considered satisfying, especially that of traditional healers. Trained community actors may be helpful in suspects' identification and therefore TB detection in Burkina Faso.

PS-72089-12 Experience of community involvement in a DOTS programme in Rawalpindi District

Z Toor. National TB Control Programme, Islamabad, Pakistan.
Fax: (+92) 519210663. e-mail: zafartoor@hotmail.com

Background: National TB Control Program launched an extensive community involvement and empowerment program through involvement of GPs, cured TB patients and civil society. Community volunteers, through this program, are trained to facilitate case detection through DOTS observation and referring TB suspects to GPs. These community volunteers are supporting rapid expansion and universal coverage for increasing case detection rate which is still below the global targets of 70%. This community based volunteers are screened through local gatherings (Mohall Meetings) and provided extensive training to work as a treatment supporters in local urban settings where community based public health service either not existing or not being provided through community involvement. These community volunteers after one day training on treatment supporter module are assigned the responsibility to observe DOTS in newly diagnosed pulmonary TB patients. NTP compile and managed data base of these trained volunteers including community teachers, students, family members and local government representatives and disseminate to Urban Diagnostic Centers and other GPs involved in DOTS programs. These trained General Practitioners

provide support to suspect TB patients thorough diagnosis by referring them to designated laboratories for sputum microscopy after patient's consent.

Key Findings: This intervention significantly improved case detection and suspect identification in district Rawalpindi from 42% to 82% and default rate is declined to 5% from 14%.

Conclusion: Community and cured TB patient's involvement and empowerment through training proved to be a success providing in increase CDR and decrease in default rate.

PS-71677-12 Tuberculosis campaign 2007 in Indonesia: a multi-channel communication strategy

E Wulandari,¹ Y Anandita.² ¹World Health Organization, Jakarta, ²National TB Program, Jakarta, Indonesia.
Fax: (+62) 0215201164. e-mail: tika_wulandari@yahoo.com

Background:

Tuberculosis Prevalence Survey 2004.

- 77% of the respondents declared that they have knowledge of TB signs and symptoms, but only 59% of those could identify one main symptom and one additional symptom
- 58% of respondents, who have heard of TB, received TB-related information from electronic media, while 57.1% received the information through friends/parents/relatives

Pre-advertisement qualitative research 2007:

- Re-spondents are aware of TB but consistently linked the disease with bloody cough. Other forms of cough are deemed 'regular'.

Communication Objectives:

General Public

- To raise public awareness on tuberculosis main symptom: continuous/persistent productive cough for two weeks or more
- To promote government tuberculosis related service

Method:

- Media campaign (above the line): television commercial, radio commercial, newspaper advertorials. The theme of media campaign is '3B = Bukan Batuk Biasa (Not a Regular Cough)'
- Printed IEC Materials
- Events (below the line): music events, seminars
- Advocacy & publicity campaign: handover ceremonies, visits to patients/ex-patients/lung clinics, media briefing

Conclusions: Campaign was launched on World TB Day March 24, 2007. The overall effect of the campaign has not been measured, but approximately 70 articles in various media have been generated to date. Mid-term campaign evaluation will be available in November.

TB-HIV PROGRAMME LINKAGES: 2

PS-71822-12 Scale-up of HIV testing and counselling and access to ART among TB patients, Livingstone District, Zambia

C Kanene,¹ M Patel,² A Sishumba,³ P Nambala,³

N Mwananyambe,¹ B Miller,² A Nakashima,² A Mwinga.¹

¹Centers for Disease Control and Prevention, Lusaka, Zambia; ²Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ³Ministry of Health, Lusaka, Zambia.

Fax: (+1) 404 639 6499. e-mail: mrpatel@cdc.gov

Background: HIV testing and counseling (HIV TC) of TB patients was initiated at Livingstone General Hospital (LGH) in September 2004. TB clinic staff referred patients initially to off-site voluntary counseling and testing (VCT) sites, and later to on-site VCT; beginning in October 2006, TB staff provided HIV TC in the TB clinic.

Methods: From September 2004 to June 2006, LGH collected facility-specific TB data that included HIV TC variables on TB patients. In July 2006, LGH began to use the revised national TB register that included HIV TC and HIV care and treatment variables. We reviewed data from September 2004 to February 2007.

Results: The Table shows the trends in HIV TC of TB patients at LGH from September 2004 to February 2007. Acceptance of HIV testing increased yearly from 2004 to 2007, from 51.7% to 65.3% to 91.0% to 100%, respectively. From January to December 2006, TB staff referred 370 (89.8%) of the 412 TB patients who tested HIV-positive to HIV care and treatment; of these, 106(28.6%) started on anti-retroviral therapy (ART).

	TB patients TB patients	TB patients who received counseling	TB patients who accepted HIV testing	TB patients who tested HIV-positive
September to December 2004	252	178 (70.6%)	92 (51.7%)	68 (73.8%)
January to December 2005	624	366 (58.7%)	239 (65.3%)	196 (82%)
January to December 2006	709	608 (85.5%)	553 (91.0%)	412 (74.5%)
January to February 2007	101	93 (92%)	93 (100%)	44 (47.3%)

Conclusions: Acceptance of HIV testing by TB patients increased progressively after HIV TC was provided on-site and in the TB clinic. The low percentage of TB patients on ART demonstrates the challenge of referral and follow-up of patients between TB and ART sites. As countries expand the number and reach of sites providing ART, new approaches to increasing access of TB patients to ART may include provision of ART in the TB clinic.

PS-71833-12 Expansion of TB-HIV surveillance in BotswanaV M Gammino,¹ J J Mboya,² A Arwady,³ J Yoon,³ A Sheth,³ G Nkubito,² T H Roels,^{3,4} C D Wells,¹ T Samandari.^{1,3}¹Division of TB Elimination, Atlanta, Georgia, USA; ²National Tuberculosis Programme, Botswana Ministry of Health, Gaborone, ³BOTUSA Project, US Centers for Disease Control, Gaborone, Botswana; ⁴Global AIDS Program, US Centers for Disease Control, Atlanta, Georgia, USA.

Fax: (+1) 404 639 1566. e-mail: vmg0@cdc.gov

In an effort to expand TB-HIV surveillance, in 2005 the Botswana National TB Programme introduced revised TB registers and patient treatment cards consistent with WHO recommendations and rolled out a TB-HIV surveillance training curriculum nationwide. A cross-sectional baseline survey of 10 districts found that uptake of HIV testing among TB patients was 47% prior to implementation. In 2006, we conducted a process evaluation in the same 10 districts approximately one year after the training rollout. We visited 44 facilities and reviewed routine program data for 1078 patients; 22 facilities (50%) had implemented the revised registers and cards, 15 (34%) had implemented either the registers or the cards, and 7 (16%) had implemented neither. Program staff cited printing and distribution problems and training delays as the principal barriers to full implementation. Despite these issues, 62% of TB patients had an HIV test result recorded in the facility TB register. Children under 6 years old were less likely to be tested, with only 46% having an HIV result recorded ($P < 0.05$) as compared to patients 6 years and older. The HIV prevalence among TB patients with a result recorded in the register was 81%. In summary, uptake of HIV testing among TB patients increased between 2005 and 2006. The high prevalence of coinfection highlights the need for continued support of measures aimed at increasing routine HIV testing among TB patients in Botswana.

Methods: Patients registered at 14 TB clinics in 2006 in Kinshasa were offered HIV counseling and testing. Data was collected by nursing staff using revised TB treatment cards. Cotrimoxazole (CTX) prophylaxis was offered to all co-infected patients. Access to radiography, CD4 counts, and antiretroviral therapy was limited. Clinical characteristics and outcome were assessed by HIV status using Chi-square or Student's *t*-test as appropriate.

Results: Among 4105 TB patients, 3708 (90%) were tested for HIV, and 576 (17%) were co-infected. Compared to HIV negative patients, HIV infected patients were significantly older (35 vs. 30 years, $P < 0.0001$), more likely to be female (62% vs. 45%, $P < 0.0001$), have extrapulmonary TB (24% vs. 18%, $P < 0.001$), have sputum smear negative pulmonary TB (37% vs. 18%, $P < 0.0001$), and have a history of TB treatment (17% vs. 10%, $P < 0.0001$). Preliminary analysis of those with complete follow-up ($n = 1232$) revealed that co-infected patients were more likely to die during TB treatment (23% vs. 7%, $P < 0.0001$), and less likely to achieve treatment success (cure and treatment completion) if surviving (83% vs. 91%, $P < 0.01$). There was no difference in death rate among those who did and those who did not receive cotrimoxazole prophylaxis during TB treatment.

Conclusions: HIV-TB co-infected patients differ in their clinical presentation, are at higher risk of poor treatment outcome, and continue to die at unacceptably high rates, even if they initiated cotrimoxazole prophylaxis. Improved access to ART is thus urgently needed.

HIV status	Age, years	Male gender	Extra-pulmonary TB	Smear-negative pulmonary TB	Retreatment or recurrent TB	BCG scar	Dead	Cured (among survivors)
Positive	35.3	38.1	24.1	37.4	16.6	82.2	23.1	83.3
Negative	30.2	54.7	18.1	17.6	9.6	80.6	7.1	90.5
<i>P</i> value	<0.0001	<0.0001	0.0005	0.0001	<0.0001	0.37	<0.0001	0.006

PS-71912-12 Clinical presentation and treatment outcome of TB in HIV-infected and non-infected patients in Kinshasa, DRCD Fitzgerald,¹ K Vanden Driessche,² S Mulangu,³ S Bisuta,⁴ A Edmonds,² F Behets,² E Bahati,⁴ A Van Rie.² ¹School of Medicine, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, ²Department of Epidemiology, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA; ³School of Public Health, University of Kinshasa, Kinshasa, ⁴National TB Program, Kinshasa, Congo (Democratic Rep.). Fax: (+1) 919 966 4587. e-mail: david_fitzgerald@med.unc.edu

Aim: The effect of HIV on the clinical presentation of tuberculosis (TB) and outcome of TB treatment in sub-Saharan Africa has been described based on studies conducted during the early 1990s, at the start of the region's dual epidemic. We report data from collaborative HIV-TB activities integrated into routine TB care in Kinshasa, DRC.

PS-71983-12 High acceptability of cotrimoxazole and ART among TB patients offered integrated services in NairobiI V Engelgem,¹ B Telfer,¹ W Kizito,¹ V O Ombeka,² M E Raganoud,³ R Zachariah.³ ¹Medecins Sans Frontieres, Nairobi, ²National TB and Leprosy Control Programme, Nairobi, Kenya; ³Medecins Sans Frontieres, Medical Department (Operational Research), Brussels, Belgium. Fax: (+352) 335133. e-mail: zachariah@internet.lu

Setting: Three health care facilities offering integrated TB-HIV care, Kibera, Nairobi.

Objectives: To report on the acceptability of cotrimoxazole prophylaxis and antiretroviral treatment (ART) among newly registered HIV-infected individuals with tuberculosis (TB).

Methods: Review of TB registers and HIV data for the period January–December 2006.

Results: Out of a total of 361 newly registered TB patients, 247 (68%) were HIV-positive. This included 180 (73%) cases of pulmonary TB (PTB) and 67 (27%) cases of extra-pulmonary TB (EPTB). 225 (95%) HIV-TB co-infected individuals accepted cotrimoxazole for the prevention of opportunistic infections. Out of a total of 195 TB patients considered eligible for ART (EPTB, or PTB with a CD4 count <350 cells/ul), 20 (10%) were transferred out, 7 (4%) died, and 6 (3%) defaulted before ART initiation. Of the remaining 162 co-infected (ART eligible) patients still in the program, 125 (77%) accepted ART along with anti-TB treatment while 21(13%) are still in the ART preparation phase. 16 (10%) patients refused ART.

Conclusions: The high uptake of cotrimoxazole and ART in this resource-limited setting demonstrates the feasibility and value of an integrated approach to TB-HIV care and is of particular operational importance given high HIV related mortality currently faced by TB programs in sub-Saharan Africa.

PS-71992-12 Feasibility study on public-private partnership for TB, HIV and co-infection management in Hyderabad, India

S Salve,¹ B VijayaKrishnan,² J Subbanna,² A Kudale,¹ K Kielmann,³ J Porter,³ S Rangan,¹ P V R Rao.²

¹Maharashtra Association of Anthropological Sciences, Pune, Maharashtra, ²LEPRA Society, Secunderabad, Andhra Pradesh, India; ³London School of Hygiene and Tropical Medicine, London, UK. Fax: (+91) 02025897298. e-mail: solomon.salve@gmail.com

Background: As TB and HIV are posing major public health problems in India policy planners have initiated coordination programme activities in public sector. However existence of private sector as parallel system needed to be taken into consideration to ensure continuity of care for patients suffering from TB, HIV and co-infection.

Objective: To assess the feasibility of coordination between the public and private sectors for management of TB, HIV and co-infection by examining private medical practitioners' (PMPs) management practices.

Methodology: Cross-sectional survey of 311 PMPs, using a semi-structured interview schedule.

Results: In clinical practice, more PMPs have seen TB cases than HIV. Close to three-quarters of PMPs prefer private diagnostic centres for diagnosing TB and HIV. However, post diagnosis; more than two-thirds of PMPs refer their TB and HIV patients to public sector for further management. Roughly half of PMPs managing TB patients in their clinics prescribe multi-drug regimens. Very few of the PMPs who manage HIV prescribe ART. A third of the PMPs screen their TB-HIV patients for co-infection and lesser PMPs continue to manage their co-infected patients. A little more than third was aware about the public-private mix (PPM) initiative in RNTCP, though only few are presently participating. Almost all PMPs agreed on

the importance of getting involved in national programmes and many identified ways of building public-private partnerships.

Conclusion: Building on this evidence, public-private partnership linkages could be developed and implemented for effective management of TB, HIV and co-infected patients.

PS-72016-12 Experience of patients in accessing HIV-TB services in Sudan: case study of Khartoum State

L Ali,^{1,2} M Moukhayer,^{2,3} E Hamouda,² E Yousif,⁴ K H Adam,⁵ H Hussein,⁵ O Nemary.^{2,6} ¹National TB Program Research Unit, Khartoum, ²National Stop TB Board-Executive Committee, Khartoum, ³Ahfad University for Women-Faculty of Medicine, Odurman, Khartoum, ⁴National TB Program Manager, Khartoum, Khartoum, ⁵National TB Program information unit, Khartoum, ⁶Omdurman Hospital-HIV Care Centre, Odurman, Khartoum, Sudan. Fax: (+249) 183 772 182. e-mail: louratb@gmail.com

Introduction: With the Global Fund support, NTP and NAP launched collaborative TB-HIV activities. This study provides summaries of patients' difficulties in accessing services at health facilities.

Methods: Through questionnaires sample of 140 TB & HIV patients' from TB and HIV units' were interviewed.

Results: 69.3% talk over 30 minute on transportation to reach the centre. 49.3% of patients reported visiting more than one facility to access care. Only 73.6% know TB. 45.3% mentioned that TB spread by droplets, 35.7% by patients eating utensils and 36.4 by other patients' materials. Only 16.4% TB is fatal, while over 83% didn't heard of DOTS, only 36% visits TB centres if suspect TB. 50% know NTP exist; however, 50.9% of them don't know what the NTP offers to patients, 39.3% NTP offer free drugs. Interestingly over 92% know HIV, 59.3% of them heard about NAP, but only 46.4% reported that HIV is sexually transmitted. Of 42.9% HIV patients who developed TB, 16% were diagnosed at TB units. Of them 21.2% by sputum, 22.1% by X-ray. For treatment 31.4% referred to TB unit, 26.2% take 2 drugs. only 19.3% of the TB patients reported being informed about HIV testing. Of them 42.9% did pre-test counselling and 51% did post-test one. 45% of the total sample knows TB & HIV interlink.

Conclusion and recommendation: Patients reported poor knowledge of TB-HIV interlinks poor access to information and services. These findings necessitate strengthening of programmes collaboration, integration of services and referral system. Also staff training, develop and dissemination of IEC materials.

PS-72050-12 Mapping the progress of global collaborative TB-HIV activities

C Gunneberg,¹ B G Williams,¹ M Hosseini,¹ C Watt,¹ H Getahun,¹ F Scano,¹ R Lopez Olarte,¹ A Reid,² G Gargioni,¹ K Floyd,¹ C Dye,¹ P Nunn.¹ ¹Stop TB Department, THD Unit World Health Organization, Geneva, ²UNAIDS, Geneva, Switzerland. Fax: (+41) 22 791 1589. e-mail: gunnebergc@who.int

Objective: To monitor the global implementation of WHO recommended policy (1) on collaborative TB HIV activities. The latest data on country specific collaborative TB-HIV activities collected by WHO is presented.

Methods: All Tuberculosis Programmes from 211 countries and territories were asked to report on the number of TB patients who were tested for HIV, who tested positive for HIV, and who started Co-trimoxazole Preventive Therapy (CPT) and Anti Retroviral Treatment (ART), in 2005 and 2004. In 63 focus countries for TB and provision of IPT among people with HIV in 2005 was requested. Results are displayed graphically and on ARC View mapping package.

Results: In 2005, 59% of the 63 focus countries had policies relating to testing of TB patients and 56% for provision of CPT and 62% for ART respectively. Only 29% had infection control policies and 35% policies to screen HIV patients for TB. Of notified TB patients 7% were tested for HIV and 13% of the estimated number of HIV-positive TB patients were detected, a three-fold increase over 2004. Of the identified TB patients with HIV 66% were given co-trimoxazole preventive therapy and 24% anti-retroviral therapy. Of the global estimated number of HIV-positive TB patients 3% started ART. Screening for TB in PLWHA and IPT provision increased between 2004 and 2005 but reached only 1.4%, and 2% respectively of the 2006 STB Global Plan milestones. Treatment outcome data for 6627 smear positive TB patients with HIV in 41 countries shows death rates 4 times higher than for all patients with TB. Data will be displayed using the ARCView Mapping package.

Conclusions: In spite of the observed scale up of activities, HIV testing appears to be a major bottleneck to TB patients accessing ART and CPT. Increased efforts will be needed to reach Global Plan targets.

1 Interim Policy on Collaborative TB-HIV Activities, Stop TB Department and Department of HIV/AIDS, WHO Geneva, Switzerland 2004, WHO/HTM/TB/2004.330.

PS-72100-12 TB treatment outcome by HIV status: a comparative analysis

J Chukwu,^{1,2} E Aguwa.² ¹German Leprosy and TB Relief Association, Enugu, ²Department of Community Medicine, University of Nigeria, Enugu, Nigeria. Fax: (+234) 42452311. e-mail: jinchukwu2003@yahoo.com

Introduction: The German Leprosy and TB Relief Association supports TB control programmes in 14 states in southern Nigeria. In 2005, it started a pilot project

in TB-HIV collaboration. This paper presents a retrospective review of a 6-month cohort.

Objective: To compare the treatment outcome of new smear positive TB cases by HIV status.

Methods: Review of case records and capture of and analysis of data with SPSS-version 10. Age, sex, smear grading at months 0, 2, 5 and 7 were entered for each patient as well as the HIV status, cases with incomplete records were excluded from analysis.

Results: There was no significant difference between the two groups at 2 months (chi square 0.26, $P = 0.61$), 5 months (Fisher exact $P = 0.571$), 7 months (Fisher exact $P = 0.170$). Mean ages were also comparable (t test = 0.48, $P = 0.632$).

Conclusion: This result suggests that there is no difference in TB treatment outcomes by HIV status in this routine programme setting in southern Nigeria, Limitations of the study and implications will be discussed.

PS-72135-12 Implementation of TB-HIV collaborative activities in Georgia

N Kiria,¹ A Salakaia,¹ A Lochoshvili,² N Mdivani.² ¹National Center of TB and Lung Diseases, Tbilisi, ²Georgia Health and Social Projects Implementation Center, Tbilisi, Georgia. Fax: (+995) 32 910251. e-mail: nana_kiria@yahoo.com

Background: Georgia belongs to high TB and low HIV/AIDS prevalence countries. During the 1999–2005 TB-HIV coinfection cases were only detected by periodic testing of TB cases on HIV and also in case of occurring TB symptoms in HIV patients providing TB diagnostic services. During that years TB-HIV coinfection were fluctuated between 2.1–3.8%.

Aim: Evaluation of TB-HIV collaborative activities implemented by the NTP with the support of GFATM TB project in order to improve detection of TB-HIV coinfection.

Methods: The project included

- training of TB doctors in VCT,
- training of VCT centers' staff in TB screening issues,
- providing screening for TB patients on HIV,
- testing of HIV-positive patients on TB,
- screening of ID-users on TB symptoms.

The patients from several regions of Georgia (Tbilisi, Batumi, Zugdidi, Kutaisi, Abastumani) registered for TB treatment after VCT were tested for HIV using immuno-enzyme analysis and in case of positive results the diagnosis were confirmed by immuno-blotting. HIV-positive patients were investigated for TB by PPD test, sputum smear microscopy, X-ray. IDU-s were screened for TB by special questionnaire and in case of TB suspicion they were referred to NCTBLD for further investigation.

Results: In 2006 from 945 TB cases 2.22% (21 cases) were HIV-positive; from investigated 243 HIV-positive patients in 10 cases (4.12%) pulmonary or extrapulmonary TB were confirmed and in 33 (13.58%) cases

TB-infection were detected. In total 17.7% of cases were TB-HIV coinfectd.

From the TB cases detected by the screening of IDU-s 2 were TB-HIV coinfectd as well.

Conclusion: Considering the increasing problem of TB-HIV collaborative activities should be expanded and implemented countrywide.

PS-72136-12 A collaborative model concept in the integration of TB and HIV activities in selected facilities in South Africa

N P Mhlongo, S Mndaweni, B Kegakilwe. University Research Co., Pretoria, South Africa. Fax: (+27) 123421356. e-mail: ntombim@healthprojects.co.za

Introduction: The TASC II TB Project is a project of University Research Co., funded by USAID to provide technical assistance to the South African National TB Control Program and the TB-HIV program to achieve the WHO global TB targets and promote integration between the TB and HIV programs. The project works at all levels of the health care system—national, provincial, district and facilities.

Background: HIV is a major factor in driving the incidence of TB infections. It estimated that 60% of TB patients are co infected with HIV in South Africa. Reducing the burden of this dual infection requires functional integration strategies of the two programs. The integration should be implemented both at TB and HIV/AIDS program level as well as at clinical management level. Synergies in both programs should be exploited and enhanced.

Objective: To demonstrate a model for integrating TB and HIV programs at facility level which ensures that analysis, solution development and implementation of changes are done by the people closest to the problem resulting in quality improvements.

Methods: In the collaborative model, a number of facilities are brought together for a three day workshop focusing on quality improvement concepts in both the TB and HIV programs with emphasis on data collection. Practical exercises using own facility data for analysis and identification of gaps. A three month improvement plan is then formulated to address the challenges. Quarterly follow up workshops are then conducted for a day to share the improvements and address new challenges.

Results: Following the collaborative workshops, out of 22 facilities in one district, 14 facilities PTB cases diagnosed without smear were reduced by 10%. TB Case detection amongst HIV+ clients improved by 5%. At least 60% of TB patients were offered counseling and testing for HIV.

Conclusion: The collaborative model offers a way of implementing integrative strategies for both programs on a large scale.

PS-72207-12 Evaluating TB programmes at facility level: a case for integrated health service strengthening

V Scott,¹ J Caldwell,² V Azevedo,² P Naidoo,² V Zweigenthal.³ ¹School of Public Health, University of the Western Cape, Cape Town, ²City of Cape Town, Health Department, Cape Town, ³Metro District Health Services, Western Cape Department of Health, Cape Town, South Africa. Fax: (+27) 219592872. e-mail: verascott@mweb.co.za

We have evaluated the TB, HIV and STI services in 66 primary care facilities between 2003 and 2006. In this presentation we compare facilities audited in February 2006 with TB cure rates above 80%, around 65% and below 45%. In particular we adopt a health systems lens and look at indicators of access for clients at risk of TB, indicators of quality of the TB service, HIV detection and care in TB clients and key indicators of health system functioning in HIV and STI services.

Results are shown in the table. We note that the facilities with better TB outcomes have done consistently well in the indicators of a quality TB services while those with poor TB outcomes have not. However all facilities can still benefit from further integrated health system strengthening. We conclude that a health systems approach to evaluation is necessary to identify specific actions that can be taken by facilities to improve the quality of their TB service and their cure rates. Also, an integrated approach minimizes missed opportunities in TB and HIV detection and care.

Indicators	Facility						Measurement domain
	A	B	C	D	E	F	
Total TB caseload	48 296	1087	700	1906	635		TB case f&a*
Facility has a triage to fast track clients with chronic cough	No	Yes	Yes	Yes	No	Yes	TB case f&a*
% VCT clients screened for symptomatic TB	40	70	25	30	85	90	TB case f&a*
% HIV clients screened for symptomatic TB at each visit	0	80	14	30	27	70	TB case f&a*
% TB clients whose child contacts are recorded	75	22	0	14	20	60	TB case f&a*
New smear positive cure rates	90	81	66	67	39	42	TB cure & QoS†
TB clients' contact details recorded	100	100	80	80	70	0	TB cure & QoS†
Sputum results filed	100	100	60	38	29	100	TB cure & QoS†
Sputum recall dates noted	100	100	10	25	14	100	TB cure & QoS†
Correct regimen	100	100	80	100	80	90	TB cure & QoS†
VCT offered	78	90	90	78	100	100	HIV detect.‡
Bactrim prophylaxis for HIV+	100	0	40	83	50	100	HIV detect.‡

* TB case finding and access.

† TB cure and quality of service.

‡ HIV detection and care in TB clients.

PS-72209-12 Measuring the move towards an integrated HIV-TB-STI strategy in Cape Town

V Scott,¹ P Naidoo,² V Azevedo,² J Caldwell,² V Zweigenthal.³ ¹School of Public Health, University of The Western Cape, Cape Town, ²City of Cape Town, Health Department, Cape Town, ³Metro District Health Services, Provincial Health Department of The Western Cape, Cape Town, South Africa. Fax: (+27) 219592872. e-mail: verascott@mweb.co.za

We have evaluated the TB, HIV and STI services in 66 primary care facilities between 2003 and 2006. In this presentation we compare facilities audited in February 2006 with TB cure rates above 80%, around 65% and below 45%. In particular we adopt a health systems lens and look at indicators of access for clients at risk of TB, indicators of quality of the TB service, HIV detection and care in TB clients and key indicators of health system functioning in HIV and STI services.

Results are shown in the table. We conclude that a health systems approach to evaluation is necessary to identify specific actions that can be taken by facilities to improve the quality of their TB service and their cure rates. Also, an integrated approach to HIV, TB and STI minimizes missed opportunities in TB and HIV detection and care.

Measurement domain	Indicators	August 2004	February 2006
Training	% clinical staff trained to offer HIV counseling and test	26%	30%
Training	% clinical staff trained in HIV care	19%	40%
Training	% clinical staff trained in Syndromic Management of STIs	54%	42%
Integrated care for TB clients	% TB clients offered VCT	79%	94%
Integrated care for TB clients	% HIV positive TB clients, CD4 count done	Not done	65%
Integrated care for TB clients	% HIV positive TB clients, bacrim initiated	Not done	77%
Integrated care for VCT/HIV clients	% HIV clients assessed for symptomatic TB at each clinical visit	27%	51%
Integrated care for VCT/HIV clients	% HIV clients screened for STIs at each visit	21%	53%
Integrated care for VCT/HIV clients	% VCT clients assessed for symptomatic TB	44%	70%
Integrated care for VCT/HIV clients	% VCT clients were assessed for symptomatic STIs	46%	68%
Integrated care for STI clients	% STI clients offered VCT	52%	71%
Integrated care for STI clients	% STI clients, contraceptive needs assessed	52%	55%

PS-72212-12 Model of integrating TB and HIV at hospital level: Office of Disease Prevention and Control, 2005

L B Boonpendej, S B Boonnak, V H Hutanon, C T Techatraisak. Office of Disease Prevention and Control Bangkok, Bangkok, Thailand. e-mail: Lutaiboon@yahoo.com

The purpose of this quasi-experimental study was to establish model integration with TB and HIV in hospitals level, Office of Disease Prevention and Control.

Were assigned to be the experimental group, 21 hospitals. The comparison group, 22 hospitals.

It was conducted during May–September 2005.

Method was to work shop administrative personnel conference, training clinic TB to Vct, training clinic AIDS, work shop conference, supporting for anti HIV, CD4, CXR and AFB budget and monitoring.

The results showed that the personnel development for VCT, this results in statically improvement in knowledge, quality development improvement clinic TB and were to co-ordination, obstacles collaboration and record reporting. In deed experimental group clinic TB counseling for AIDS 65.6% testing 39.9% (203) HIV positive 33.5% (68) CD4 54.4% (37) ARV. Treatment 84.6% (11), clinic AIDS new HIV/AIDS counseling for TB 90.7% (255) interview for AIDS 25.7% (28) testing 35.7% (10) HIV positive 20.0% (2) CD4 and ARV treatment 0.0% (36) TB patient 27.8% (10) treatment for TB 100.0%.

The results advocated the model of integrating with TB and HIV—certainly effective to clinic TB and clinic AIDS co-ordination, TB and AIDS patients and HIV and AIDS patients they got care two diseases, it decrease die and increase success rate, AIDS patients have increase quality life. So it will be guideline in this future.

PS-72223-12 Expansion of HIV and TB co-infection control in Côte d'Ivoire, 2005–2006: progress and perspectives

A Akaki. National TB Control Program, Abidjan, Côte D'Ivoire. Fax: (+225) 21 24 36 69. e-mail: angennesa@yahoo.fr

Background: Côte d'Ivoire is very affected by the double pandemic of HIV and TB. The national HIV prevalence in adults is 4.7% and estimated TB incidence is 393 cases per 100 000 habitants. DOTS strategy was adopted and applied since 1995. HIV counselling and testing among TB patients started in 8 main TB clinics in 1994. This activity was supported by Projet RETRO-CI, an agency for collaboration between CDC Atlanta and the Ministry of Health to fight AIDS in Côte d'Ivoire. At the end of 2004, there was devolution and the leadership of HIV-TB co-infection control was given to national TB Program. **Methods:** TB patients registered in TB clinics were counselled and tested for HIV. HIV Rapid test was done to consented patients using Determine and

Genie 2. The HIV result was given to patients one week later. TB patients co-infected by HIV receive cotrimoxazole prophylaxis and laboratory exams (biological and immunological) is done to initiate antiretroviral therapy. Reports of TB-HIV activities are done by TB clinics and sent to national TB program for compilation and analysis.

Results: Process of HIV activity integration in TB clinics is ongoing. Among TB patients, 30% in 2005 and 36% in 2006 are counselled for HIV. TB-HIV positive was 38% in 2005 and 36% in 2006. In 2006 percentages of TB-HIV positive patients who started cotrimoxazole prophylaxis and ARV therapy are respectively 39% and 47%.

Conclusion: Integration of HIV activities in TB clinics in Côte d'Ivoire should be reinforced to cover progressively all TB clinics. Aspects of HIV CT guidelines and community mobilisation must be readapted to maximize the TB-HIV co-infection management. Also extension of HIV care throughout the whole country is essential to improve TB-HIV infected patients care and treatment.

Items	2005	%	2006	%
Operational TB clinics	69		85	
TB clinics with HIV activities	20	29	31	36
All TB notified cases	20 026		21 204	
TB patients counselled for HIV	6 071	30	7 614	36
TB patients tested for HIV	4 079	20	5 707	27
Announcement of HIV result	2 276	56	3 802	67
TB-HIV positive	1 551	38	2 081	36
Cotrimoxazole				
chimio prophylaxie therapy	590	38	970	39
ARV Therapy	216	14	813	47

DRUG RESISTANCE: 2

PS-71311-12 La morbidité hospitalière des tuberculoses pulmonaires à bacilles multirésistants dans un service spécialisé

L Baough,¹ G Ziouani,¹ N Rezgui,¹ S Khakha,¹ Y Laid,² N Zidounii.¹ ¹Centre Hospitalo-Universitaire Béni-Messous, Alger, ²Institut National de Santé Publique, Alger, Algérie. Fax: (+213) 21511767. e-mail: lbaough@hotmail.com

La tuberculose pulmonaire à bacilles multirésistants est retrouvée essentiellement chez les malades déjà traités ayant reçu une ou plusieurs cures de chimiothérapie.

Chez ces malades la mauvaise compliance au traitement reste la cause majeure de l'apparition de la résistance bactérienne.

Dans ce travail mené de 1997 à 2006 en pratique hospitalière, 111 cas de TP à bacilles multirésistants ont été enregistrés.

Ces cas représentent 9,25% des cas de tuberculose pulmonaire ayant nécessité une hospitalisation dans un service de pneumophthisiologie d'Alger.

L'analyse de ces patients à la fin de la cure de chimiothérapie de 21 mois comportant une phase initiale de 03 mois associant les médicaments suivant : ethionamide, ofloxacine, kanamycine, pyrazinamide et cycloserine et une phase d'entretien de 18 mois comportant l'administration d'ethionamide, ofloxacine, pyrazinamide (3 EthOCKZ/18 EthOZ) et durant les 12 mois qui suivent l'arrêt du traitement montre que :
—49% ont des examens de crachats négatifs à la fin de la période de chimiothérapie antituberculeuse.
—09% des malades excrétaient encore des bacilles après la cure de chimiothérapie de réserve.
—Les autres malades sont décédés, perdus de vue ou transférés.

Le traitement régulier des cas jamais traités et des cas déjà traités basés sur l'application des régimes standardisés des programmes nationaux recommandés par l'OMS et l'UICMR contenant de la rifampicine et de l'isoniazide ainsi que la surveillance rigoureuse de ces malades demeurent les moyens essentiels pour éviter l'apparition des cas à bacilles multirésistants.

PS-72000-12 Patterns of initial drug resistance among smear-positive pulmonary tuberculosis adults, Kampala, 1993–2001

A Okwera,^{1,2} H Luzze,^{1,2} J L Johnson,^{2,3} H Mayanja,^{2,4} C C Whalen,^{2,3} H Boom,^{2,3} R D Mugerwa.^{2,4} ¹National Tuberculosis and Leprosy Programme, Kampala, ²Uganda-Case Western Reserve University Research Collaboration, Kampala, Uganda; ³Division of Infectious Diseases, Case Western Reserve University and University Hospitals of Cleveland, Cleveland, Ohio, USA; ⁴Department of Medicine, Makerere University Medical School and Mulago Hospital, Kampala, Uganda. Fax: (+256) 41533531. e-mail: a_okwera@mucwru.or.ug

Background: Drug resistant and multi-drug resistant tuberculosis are obstacles in global tuberculosis (TB) control.

Setting: National Tuberculosis Treatment Centre, Mulago Hospital, Kampala, Uganda

Methods: Retrospective review of data of adult PTB patients who were enrolled in studies between 1993 and 2001. History and physical examination, complete blood count (CBC), body-mass index (BMI), sputum smear, culture and drug susceptibility testing and postero-antero chest X-rays were done and recorded in well designed questionnaires. All patients enrolled in the studies consented HIV counseling and testing. Data were analyzed using SAS 9.1.

Results: A total of 447 patients with drug susceptibility results were analyzed. 56% were females, their mean age was 29 years (SD 6.7), had a mean BMI of 18.8 Kg/M² (SD 2.5) and a mean Hgb of 11.2 g/dL (SD 2.0). 80% were HIV sero-positive. Patterns of mono resistance were: isoniazid 9.2%, rifampicin 1.6%, streptomycin 7.8%, pyrazinamide 0.54% and ethambutol 2.8%. Primary MDR-TB was low at 0.67% and resistance to isoniazid and ethambutol (EH) was 0.22%.

Conclusions: Initial drug resistance and MDR-TB rates are low among these patients despite the high proportion of HIV among these study patients.

PS-72020-12 Internal consilium for programmatic MDR-TB management: Makati, Philippines

R B Orillaza-Chi, A A Concepcion, M I Q Quelapio, L E Macalintal, M T Gler, L O Raymond, E K Maramba, T E Tupasi. Tropical Disease Foundation, Makati, Philippines. Fax: (+632) 7526021. e-mail: ruth_orillazamd@yahoo.com

Background: An Internal Consilium (IC) composed of clinicians and program coordinators of the Makati Medical Center (MMC) MDR-TB Management Program was formed in September 2005 to standardize the approach in managing drug-resistant TB (DRTB). **Objective:** To describe the processes in the discussions on case management carried out in IC meetings.

Materials and Method: A review of IC records and forms obtained from January to December 2006.

Results: Cases presented in the IC included those who were suspected and diagnosed to have DRTB. The IC met 44 times, spending 1–4 hrs per meeting. A total of 843 cases for 430 patients from the MMC Treatment Center and those from the two satellite treatment centers were presented. An average of 19 cases (range 5–88) was discussed per meeting. Majority of discussions focused on case management in 511 (60.6%), drug regimen design in 234 (27.8%), and treatment outcome in 97 (11.5%). Decisions were arrived at by consensus. Reasons for changes in regimen varied from a) shift to continuation phase in 90 (17.6%), b) adverse reactions in 302 (59.1%) and c) unavailability of drugs in 119 (23.2%). A patient could be presented several times (range: 1–9) for further clinical and programmatic management.

Conclusion: The IC is an effective venue for case management ensuring adherence to the guidelines set by the World Health Organization for drug-resistant cases. With the increasing number of cases being discussed, it will be necessary that IC be replicated in all the satellite treatment centers.

PS-72040-12 Clinical predictors of multidrug and extensively drug-resistant tuberculosis: Tugela Ferry, South Africa

J R Andrews,¹ N R Gandhi,² A P Moll,³ N S Shah,² A W Sturm,⁴ U Laloo,⁴ P Moodley,⁴ G H Friedland.¹ ¹Yale AIDS Program, Yale University School of Medicine, New Haven, Connecticut, ²Albert Einstein College of Medicine, Bronx, New York, USA; ³Church of Scotland Hospital and Philanjalo, Tugela Ferry, KwaZulu Natal, ⁴Nelson R Mandela School of Medicine, Durban, KwaZulu Natal, South Africa. Fax: (+1) 203 737 4051. e-mail: jason.andrews@yale.edu

Background: Early identification of drug-resistant (DR) TB is critical for reducing transmission and mortality. Clinical assessment may help target patients

for drug susceptibility testing (DST) and isolation in resource-limited settings. Clinical predictors of DR TB have not been evaluated in high HIV prevalence settings.

Methods: We performed a case-control study of patients with culture- and DST-confirmed multidrug-resistant (MDR), extensively drug-resistant (XDR) and non-MDR-TB diagnosed from June, 2005 to August, 2006 at Church of Scotland Hospital, KwaZulu Natal, South Africa.

Results: Of 52 MDR-TB, 61 XDR-TB, and 57 non-MDR-TB patients, HIV prevalence among tested patients was 93%, 100% and 94%, respectively. In bivariate analysis, compared with non-MDR-TB, MDR and XDR TB were associated with positive sputum smear ($P = 0.015$, $P = 0.005$), TB treatment in past year ($P < 0.0001$, $P < 0.001$), and hospitalization in prior two years ($P = 0.007$, $P = 0.004$). In multivariate analysis, TB treatment in the past year was a significant risk factor for both MDR and XDR TB (adjusted OR = 8.33 and 7.19); positive sputum smear was a significant risk factor for XDR-TB (adjusted OR = 2.79). 60% of XDR-TB patients and 40% of MDR-TB patients had no previous TB treatment. 74% of MDR-TB patients had resistance to streptomycin, while only 10% had previous streptomycin exposure. Seventeen patients with a prior isolate of non-MDR-TB had a subsequent isolate of MDR or XDR-TB, after a median of 132 days; resistance patterns and the short duration between isolates suggested exogenous re-infection, though genotyping data are pending.

Discussion: Readily available information may be useful clinical predictors for DR TB in this setting. Primary drug resistance, including exogenous re-infection, likely accounts for a significant proportion of MDR and XDR TB in this HIV co-infected population.

PS-72041-12 High mortality among patients with multidrug and extensively drug-resistant tuberculosis in Rural South Africa

J R Andrews,¹ N R Gandhi,² A P Moll,³ N S Shah,² A W Sturm,⁴ U Laloo,⁴ P Moodley,⁴ G H Friedland.¹ ¹Yale AIDS Program, Yale University School of Medicine, New Haven, Connecticut, ²Albert Einstein School of Medicine, Bronx, New York, USA; ³Church of Scotland Hospital and Philanjalo, Tugela Ferry, KwaZulu Natal, ⁴Nelson R Mandela School of Medicine, Durban, KwaZulu Natal, South Africa. Fax: (+1) 203 737 4051. e-mail: jason.andrews@yale.edu

Background: In the initial report of extensively drug-resistant (XDR) TB in a rural government hospital in South Africa, 52 of 53 (98%) of XDR-TB patients died within a median of 16 days from sputum collection. We sought to compare mortality of XDR-TB with multidrug-resistant (MDR) and non-MDR TB and further assess determinants of mortality in this setting. **Methods:** We performed an observational cohort study at the Church of Scotland Hospital, KwaZulu Natal

among MDR and XDR TB patients who began treatment between June, 2005 and August, 2006 with a comparison group of non-MDR-TB patients.

Results: Among 170 patients (61 XDR, 52 MDR (excluding XDR), 57 non-MDR), HIV co-infection prevalence among tested patients was 100%, 93%, and 94%, respectively. 26% of XDR and 27% of MDR-TB patients received second-line drugs (SLD). Mortality for the XDR, MDR and non-MDR groups was 85%, 73%, and 39%. Median survival from diagnostic sputum collection was 14, 22, and 190 days, respectively. In Cox Proportional Hazards model, positive sputum smear ($P = 0.003$), MDR-TB ($P = 0.028$), XDR-TB ($P = 0.002$), and CD4 count less than 200 cells/mm³ ($P = 0.037$) were risk factors for mortality. 5 of the 21 deaths (24%) in the initial group diagnosed with a non-MDR-TB occurred in patients who were subsequently diagnosed at a later date with MDR-TB or XDR-TB.

Discussion: Both XDR-TB and MDR-TB carry extremely high mortality rates in this high HIV-prevalence setting. Early detection, timely access to SLD, and antiretroviral therapy are urgently needed to reduce mortality.

PS-72072-12 Prognosis of chronic infectious tuberculosis in Beijing

X X He. Department of Tuberculosis Control, Beijing Institute, Beijing, China. Fax: (+86) 1062253913. e-mail: hexiaoxin68@sina.com.cn

Aim: To understand the prognosis of chronic infectious tuberculosis cases who occurred in DOTS project.

Methods: Firstly, to establish the definition of chronic infectious tuberculosis. Secondly, through reviewing medical history records and reviewing registry cards of tuberculosis cases, to find out all the chronic infectious cases among the tuberculosis cases registered since 1990 in Beijing. Then, to determine the treatment outcome for these chronic cases and their survival time by reviewing their medical history records and field interview. And lastly, survival analysis will be conducted to estimate probability for the chronic infectious case still be infectious at different time point.

Results: The chronic infectious tuberculosis case is the case who had been continuously sputum tubercle bacilli positive for more than 2 years. All 108 chronic infectious cases have been determined since 1990 in Beijing. The mean survival time for them is 38.9 months, among them, the longest one is 131 months, The shortest one is 1 month. Among them, 25% had died of tuberculosis, 4.6% had died of other diseases. 61.1% had been still infectious, and 9.3% had been cured.

Conclusion: In DOTS project, the chronic infectious cases are neither likely cured, nor likely died. Because of their long infectious period and high drug-resistance, it is imperative to explore the reasons for chronic infectious cases occurred.

PS-72081-12 Treatment success for isoniazid-resistant tuberculosis patients according to treatment status

E Argulian, C Hewison, J Faqirzai, N Hurtado. Médecins Sans Frontières French Section, Paris, France. Fax: (+33) 148066868. e-mail: nhurtado@paris.msf.org

Objective: Isoniazid resistance with or without streptomycin resistance is one of the most common resistance patterns seen in the world. The study compared treatment success rates in patients with isoniazid resistance with or without streptomycin resistance according to retreatment status.

Methods: 86 patients were diagnosed with isoniazid resistance with or without streptomycin resistance from January 2002 to December 2005 in Abkhazia within national tuberculosis program supported by Médecins Sans Frontières. All the patients were initially treated with category I or category II treatment. Upon determination of the resistance profile by drug sensitivity testing performed in supranational laboratory (Rome, Italy) the patients were treated with triple drug combination (rifampicin, ethambutol and pyrazinamide) for a total of 9 months.

Results: New cases had a higher treatment success rate compared to retreatment cases (85% vs. 59%, $P < 0.01$). In a multivariate logistic regression model that accounts for age, sex and streptomycin resistance; retreatment cases were 3.8 times less likely to be successfully treated compared to new cases (95% CI 1.3–10.7). Retreatment cases were more likely to experience an adverse outcome (death, failure or resistance amplification) when compared to new cases (4% vs. 27%, $P < 0.01$).

Conclusion: Results of this study strongly suggest that retreatment cases showing isoniazid resistance with or without streptomycin resistance might not be adequately treated with triple drug combination (rifampicin, ethambutol and pyrazinamide).

PS-72113-12 Lessons learnt: implementing Pilot DOTS-Plus in tertiary government hospital in Metro Manila, Philippines

V S Lofranco,¹ J R Gonong,¹ L O Raymond,² J A Rubio.¹
¹LCP-PH DU DOTS Center, Quezon City, ²Tropical Disease Foundation, Makati City, Philippines. Fax: (+632) 9298324. e-mail: vivs_lofranco@yahoo.com

The Lung Center of the Philippines (LCP) is a tertiary government hospital of the Department of Health. It is located in highly urbanized city in Metro Manila with a population of 2.7 million. In 2005, the hospital DOTS clinic of the LCP became the first government facility that started to diagnose and treat 52 multi-drug resistant TB (MDRTB) under the approved GLC proposal of the Makati Medical Center DOTS Plus pilot project. A tripartite agreement was signed between the Department of Health, Tropical Disease Foundation and the Lung Center of the Philippines sig-

nifying commitment and function. Hospital Circular Order was issued directing all physicians and visiting consultants to refer all MDRTB suspects to DOTS clinic, to access quality diagnosis and treatment if found drug resistant. Additional resources to procure second line drugs and construction of low cost building was provided by the management to treat and shelter patients coming from far flung areas outside Metro Manila. Capacity development through immersion of selected LCP staff from the DOTS clinic and laboratory was provided by the TDF staff. On-going patients have the initiative to organize as empowered support group to counsel other patients with adverse effects of the drugs as well as to act as treatment partner for patients compliance. Towards the end of 2006, total of 128 MDRTB have been enrolled of which 27 were cured; 4 defaulted, 12 died, 81 ongoing treatment, 4 trans-out to other treatment centers. The preliminary results have shown promising outcomes in the implementation of Programmatic Multi-Drug resistant TB Management (PMTM) in the government facility. It is our observation that limited resources in high TB burden country is not a barrier in TB control. Foremost, strong leadership and commitment, and engaging continuous partnership are important factors in the expansion of PMTM management in other parts of the country.

PS-72119-12 Profil radiologique corrélé à la bacilloscopie chez 37 patients atteints de tuberculose multi-résistante à Kinshasa

S Fueza Bisuta,^{1,2} Z Munogolo Kashongwe,¹ E Kabu Ndoma,³ N Kumfuidi Moyo.³ ¹Cliniques Universitaires de Kinshasa, médecine interne, Pneumologie, Kinshasa, ²PNT RDC, Kinshasa, ³Cliniques Universitaires de Kinshasa, service de Radiologie, Kinshasa, Congo (Democratic Rep.). Fax: (+243) 816567406. e-mail: ceirghei@yahoo.fr

Objectif : Ressortir les lésions radiologiques chez les patients multi résistants et corrélé la charge bacillaire des expectorations.

Méthodologie : Les patients ont été recrutés pendant 6 mois, de janvier à juin 2004 parmi les patients ayant présenté une tuberculose chronique.

Les examens bactériologiques des expectorations ont été réalisés au laboratoire national de référence des mycobactéries dépendant du programme national de lutte contre la tuberculose.

Une radiographie standard du thorax était faite au service de radiologie des cliniques universitaires.

La lecture des clichés radiographique par au moins trois différents lecteurs dont deux constants, un pneumologue et un radiologiste.

Le patient inclus devrait avoir une culture des expectorations positive et le test de sensibilité montrer une multi résistante confirmée au laboratoire.

Résultats : 34 patients ont présenté une résistance confirmée à la rifampicine et à l'isoniazide. Les trois

quarts des patients (75.7%) sont très bacillifères, 17 patients (46%) a une charge bacillaire de 3+ et 11 soit 29.7% avec 2+.

L'atélectasie était prédominante avec 28 de cas soit 75.7%, suivie de la fibrose pulmonaire : 23 cas (62.2%) et des lésions cavitaires 19(51.3%).

Les images alvéolaires sont retrouvées chez 13 patients (35.1%) alors que celles interstitielles chez 14 (34.7%).

Conclusion: Les images sont de maladie ancienne, les lésions traduisant une tuberculose active sont présentes pouvant justifier les fortes charges bacillaires.

PS-72148-12 Mutations responsible for *Mycobacterium tuberculosis* drug resistance in Morocco

I Chaoui,¹ R Sabouni,² A Jordaan,³ M Kourout,² M Akrim,² M Elmzibri,¹ T C Victor.³ ¹National Center of Sciences, Techniques and Nuclear en, Rabat, ²National Institute of Hygiene, Rabat, Morocco; ³Center of Medical Biochemistry, Cape Town, South Africa. Fax: (+212) 37 71 18 46. e-mail: im_chaoui@yahoo.fr

The incidence of tuberculosis (TB) in Morocco is high compared to other countries and the emergence of *Mycobacterium tuberculosis* (Mtb) strains, resistant especially to the first line drugs, has become a major concern because it threatens tuberculosis control programs worldwide. The culture and drug susceptibility testing of Mtb isolates requires a long time from a primary specimen (mostly sputum) to data analysis (a minimum of 6 weeks).

Molecular analysis, which allows the detection of Mtb drug resistance in a short time, can be used. The 'dot blot hybridization strategy' and sequencing have been designed to detect mutations in *rpoB*, *katG* and *inhA*, *emb*, *rrs* and *rpsL* genes conferring resistance to RIF, INH, EMB and SM.

A panel of mutant and/or wild type radiolabelled probes has been used. The results of dot blot analysis were then checked by direct sequencing analysis, and then compared with the phenotypic results (Drug Susceptibility Testing). The specificity was approximately 100% whereas the sensitivity was different for the four drugs. The mutations in limited number of codons of *rpoB*, *katG* and *inhA*, *rrs* and *rpsL* and *emb* genes were respectively identified in 43.9% RIFR, 81% INHR, 17.9% SMR and 34.8% EMBR.

Additional codons must be screened in order to find other mutations associated with the resistance to the different drugs. Hence, the identification of the resistance associated mutation is clinically informative whereas the lack of mutations in the target sequences must be interpreted with caution.

PS-72171-12 Relapse within 6 months of cure on Category I therapy as a risk factor for multidrug-resistant TB

J Saravia,^{1,2} H Cornejo.² ¹Health Ministry, Lima, Peru; ²Disa III Lim Anorte, Lima, Poland. Fax: (+51) 1 526 1504. e-mail: jcsaravias@hotmail.com

Background: Patients with history of tuberculosis treatment who present to the National Tuberculosis Program (NTP) with pulmonary or extrapulmonary tuberculosis are indicated to receive the Category II regimen (2HRESZ-1HREZ/5H2R2E2). Patients defined as relapsing include those persons with a new episode of active TB occurring after a documented cure on Category I therapy (2HREZ/4H2R2), and patient with relapse within 6 months of cure on category I therapy receive Retreatment Standardized regimen (KEZEtCxCsPAS) for high risk of MDR TB.

Objectives: Determine the prevalence of drug resistance to the first-line anti-TB medications among patients who relapses within 6 months of curing on Category I therapy.

Methods: Between January 1997 and May 2003, we reviewed all TB cases registered as relapsing within 6 months of having successfully received Category I therapy. All cases were identified in the NTP health centers that correspond to the 3 districts of the Northern cone of Lima (Independencia, Comas and Carabaylo). Drug resistance patterns were solicited at the time of diagnosis of the new TB episode.

Results: 62 patients were identified as relapsing within 6 months of curing on Category I therapy within the study period. Drug-resistance profiles were available for 39 patients (63%). 25 (64%) were resistant to at least one of the first-line anti-TB medications, 13 (33%) were resistant to both H and R and consequently classified as having MDR-TB, 20 (51%) were resistant to H, 16 (41%) were resistant to R, 15 (39%) were resistant to S, 7 (18%) were resistant to E, and 3 (8%) were resistant to Z.

Conclusions: The use of Category II therapy for this group of patients is questionable, a large percentage of patients demonstrated resistance to one or more medications used this regimen and, moreover, 33% had MDR-TB. This prevalence of drug-resistance is sufficient to indicate the use of a standardized regimen for MDR-TB in these patients instead of the Category II therapy.

PS-72172-12 Scaling up infection control measures in the context of drug-resistant tuberculosis and HIV

K Weyer,¹ P Jensen,² T Moll,³ E Nkhi,¹ B Margot,⁴ P Nunn,³ S Parsons,⁵ R Pray.⁶ ¹Medical Research Council, Pretoria, South Africa; ²Centers for Disease Control and Prevention, Atlanta, Georgia, USA; ³Church of Scotland Hospital, Tugela Ferry, KwaZulu-Natal Department of Health, Pietermaritzburg; ⁴Council for Scientific and Industrial Research, Pretoria, South Africa; ⁵World Health Organization, Geneva, Switzerland. Fax: (+27) 12 3255970. e-mail: kweyer@mrc.ac.za

Context: The intersection of tuberculosis (TB) and HIV epidemics has exacerbated public health, clinical and infection control (IC) challenges. Airborne TB transmission constitutes a major hazard in HIV/AIDS care and treatment settings, while multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB) necessitate that long-neglected TB infection control measures be re-visited and implemented urgently.

Challenges:

- 1 Aged health facilities, coupled with design limitations, to effectively accommodate growing patient loads and integrated TB-HIV services;
- 2 Historic neglect of airborne IC awareness and a growing tendency to focus on costly interventions at the expense of basic, sustainable measures;
- 3 A critical lack of expertise and human resource capacity to provide IC technical assistance.

Key needs:

- 1 Accelerating TB IC measures in HIV/AIDS care and treatment settings;
- 2 Addressing the particular risk of M(X)DR-TB transmission in vulnerable populations;
- 3 Improving health facility design and patient flow processes;
- 4 Expanding resources for IC technical assistance.

Partnership approach: Efforts to strengthen IC is regarded as one of the critical elements of M(X)DR-TB response plans. Recently published WHO resources include revised TB IC Guidelines and an Addendum focused on settings providing HIV care and treatment. An IC Subgroup, coordinating international policy development and resource mobilization, is operational under the Stop-TB Working Group on TB-HIV. Training of a core group of global IC consultants is in the final planning stage. SAMRC-USCDC collaboration through an International Training and Research Centre (ITRC) has developed standardized IC curricula and is providing training, technical assistance and facility-based infection control assessments in high-burden TB-HIV settings.

Results: From the first ITRC training courses and health facility assessments in SA will be presented.

PS-72173-12 Drug resistance patterns of patients who fail on Category I therapy in Lima, Peru

J Saravia, H Cornejo. Health Ministry, Lima, Peru. Fax: (+51) 1 526 1504. e-mail: jcsaravias@hotmail.com

Background: From 1996 to 2001, the Peruvian National Tuberculosis Program (NTP) utilized a reinforced Category II re-treatment in which the use of streptomycin was extended from 2 months to 3 months in the intensive phase (3HRESZ/5H2R2E2S2) for patients who failed Category I therapy (2HREZ/4H2R2). Starting in 2001, this reinforced Category II regimen was

replaced by a different standardized regimen consisting of second-line drugs (4KEZEtCx/14EZEtCx).

Objective: Determine the prevalence of drug resistance to first-line anti-TB medications, especially MDR-TB defined as resistance to isoniazid and rifampicin among patients who fail Category I therapy in order to evaluate the current standardized re-treatment regimen indicated for these patients.

Methods: Between January, 1997 and December, 2001, we reviewed all TB cases registered with the NTP documented as failing Category I therapy. All cases were identified in health centers that correspond to the 3 districts of the Northern cone of Lima (Independencia, Comas and Carabayllo). Drug resistance patterns were solicited by the treating pulmonary physician at the time of failure.

Results: 141 patients were identified as failing Category I therapy within the study period. Drug-resistance profiles were available for 112 patients (79%), 110 (98%) were resistant to at least one first-line anti-TB medication, 99 (90%) were resistant to both H and R and consequently classified as having MDR-TB, 68 (60%) were resistant to S, 63 (56%) were resistant to E, 49 (44%) were resistant to Z, and 32 (30%) were resistant to both E and Z.

Conclusions: The reinforced Category II regimen is inadequate for patients who fail Category I therapy. Because there exists an elevated risk of resistance to both ethambutol and pyrazinamide in this group of patients, either alternative re-treatment strategies or modifications to the current standardized re-treatment regimen (4KEZEtCx/14EZEtCx) are necessary.

PS-72192-12 TB-DST panel testing in Russia in 2005–2006

M Shulgina,¹ S Hoffner,² V Malakhov,¹ D Zallocco.³

¹National Centre for EQA in Laboratory Medicine, Moscow, Russian Federation; ²Swedish Institute for the Infectious Disease Control, Stockholm, Sweden; ³WHO TB Programme in RF, Moscow, Russian Federation. Fax: (+7) 4952255031. e-mail: shulgina@fsvok.ru

In 2005–2006 3 rounds of DST panel testing under WHO protocols had been held by Swedish SRL and the NCEQA with financial support of the WHO TB Programme in RF for 41 Russian TB laboratories. 17 laboratories participated in 3 rounds, 11 in two rounds, 14 in one round of PT.

Results: Of two first rounds are now available for evaluation. 7 laboratories demonstrated 100% efficiency for H and 6 for R testing in both rounds. There was an increase in the DST efficiency in two successive rounds. Three rounds of PT DST revealed a number of labs with high proficiency in TB 1st line drugs DST that can participate as reference labs in DRS projects.

PS-72195-12 La menace de la tuberculose multi-résistante en République de Côte d'Ivoire (RCI)

E Aka Danguy. PPH CHU COCODY, Abidjan, Côte D'Ivoire. Fax: (+225) 22481229. e-mail: akadanguy@yahoo.fr

Introduction : En Côte d'Ivoire, la lutte antituberculeuse a débuté en 1956. Les protocoles thérapeutiques sont passés de 36 mois à 6 mois de traitement courts. Aujourd'hui, en 2007, on n'est confronté à la menace de la tuberculose multi résistante.

Objectif : Analyser la situation de la tuberculose multi résistante en RCI.

Méthodologie : Audit des travaux des services de pneumologies et de bactériologie.

Résultats : Le RAI, qui était de 4 à Abidjan en 1960, est passé à 2 à la 2^{ème} enquête en 1986, puis est remonté à 3,5% Abidjan en 1993, à la 3^{ème} enquête. Les résultats du traitement, sous le protocole RHZ montre un taux de succès qui avoisine 67%. L'étude de la résistance du bacille de Koch réalisée entre 1995–1996, montre que la résistance primaire globale aux antituberculeux était de 13% et, la résistance à R+H, de 5,3%. Suite à cette étude et sur recommandation du Programme National de Lutte contre la tuberculose en 1998 un 4^{ème} médicament Ethambutol est introduit dans le régime thérapeutique depuis 2002. La 2^{ème} étude nationale de la résistance primaire des souches de *M. tuberculosis* aux antituberculeux, faite en 2006, montre que la résistance à RH est passée à 2,5%. Le taux de succès thérapeutique est à 75%. Malgré ces résultats, la multi résistance aux antituberculeux demeure une menace permanente pour le programme de lutte contre la tuberculose. Les études faites en milieu hospitalier, dans les services de pneumologies à Abidjan l'attestent. Chez des malades en situation d'échec ou de rechute, les proportions des bacilles tuberculeux résistant varient de 20% à 100%. 60 à 70% de ces malades vivent des cours communes et utilisent comme moyen de déplacement les transports en commun.

Conclusion : Cette menace peut être réduite si les principes de prescription des médicaments antituberculeux sont respectés et la prise en charge, correcte.

DOTS: PUBLIC-PRIVATE MIX

PS-71173-12 Social franchising with private practitioners: a unique experience for DOTS expansion

A K Ghauri,¹ S Madhavan,² V Lara,³ H Sadiq,⁴ R M Ayub,⁵ S Tahseen,⁶ L K Siddiqui,⁷ H Qureshi.⁸ ¹Communicable Diseases, Greenstar Social Marketing Pakis, Islamabad, ²Program Support Unit, Greenstar Social Marketing Pakis, Islamabad, ³Population Services International, Pakistan, Islamabad, ⁴National TB Control Program, Ministry of Health, Pakistan, Islamabad, ⁵GFATM Unit, National TB Control Program, Ministry of Health, Pakistan, Islamabad, ⁶National TB Control Program, Ministry of Health, Pakistan, Islamabad, ⁷Provincial TB Control Program, Department of Health, Balochistan, Quetta, ⁸PR GFATM, National AIDS Control Program, Pakistan, Islamabad, Pakistan. Fax: (+92) 512264436. e-mail: dakg2@yahoo.com

Background: Greenstar Social Marketing Pakistan is implementing one of the Global Fund supported TB DOTS project through public-private partnership, where NTP is providing technical supervision and monitoring services.

Methods: 1000 private practitioners, working in the urban slum and low income areas have been trained to provide quality TB Treatment services under DOTS protocol. Their clinics were branded through a unique logo, developed and registered by the name of 'Good-Life'. Marketing through electronic media including local cable TV channels and other IPC activities at the community level was done to promote the brand as symbol of quality service outlets for TB. Chest clinics are arranged periodically in the risk areas for active case finding. A number of private labs are contracted for sputum microscopy. The clinics and labs are linked with trained field staff to ensure regular follow up and supply of medicine to the patients at their homes.

Key Findings: The number of cases registered has gradually been increased to many folds from 44 in Q2 of 2005 to 2845 in Q4 of 2006. Around 11 000 cases were registered till the end of Feb 2007, resulting in a highly significant increase in CDR of the project districts with its contribution ranging from minimum 30% up to maximum 51%.

Challenges: Sustaining the interest and motivation of franchised network providers, quality assurance of lab services due to lack of adequate expertise in the project team, ensuring uninterrupted supply of drugs, sustaining the staff's motivation and enthusiasm are some of the major challenges to overcome.

Conclusion: The intervention seems quite effective in terms of identifying huge number of patients, earlier detection of the infected persons, reaching to the population in need, provision of services at their door-steps and ensuring treatment compliance resulting in reducing the risk of MDR TB.

PS-71181-12 Public-public and public-private mix for DOTS in China

G X He, S M Cheng, D M Hu, M Xu. National Centre for TB Control and Prevention, China CD, Beijing, China. Fax: (+86) 1083135306. e-mail: heguangxue@chinatb.org

Background: Public-Public and Public-Private Mix for DOTS (PPM DOTS) is implemented in the mainland of China with the population of 1.3 billion.

Objective: Through implementing PPM DOTS

- 1 To increase the case detection rate of pulmonary tuberculosis (PTB);
- 2 To increase the cure rate of PTB.

Methods: PPM DOTS in China including public-public mix e.g. TB institute-general hospital/township Health Center mix and public-private mix e.g. TB institute-village clinic mix. Also small part of TB institute in the General Hospital.

Results: The DOTS coverage rate was 100%, case detection rate was 79% and cure rate was 85% in 2006, the PPM DOTS played an important role in reaching high case detection rate and cure rate in China.

Conclusion:

- 1 The PPM DOTS in China is successfully implementing and different from other country.
- 2 The role and style of PPM DOTS is different in different area.
- 3 More TB Institute should be set up in general hospital.

Responsibility of each part of PPM DOTS

Responsibility	TB institute	General hospital	Township health center	Village clinic (1/3 private)
Identify TB suspects	+	+	+	+
Chest X-ray	+	+	+	—
Sputum microscopy	+	+/-	+/-	—
Registration	+	+/-	+/-	—
Report	+	+/-	+/-	—
Refer TB suspects	—	+	+	+
Diagnosis	+	+	+/-	—
Prescribe treatment	+	Small part	—	—
DOT	+	Small part	+	+
Retrieve defaulters	+	Small part	+	+
Training	+	+/-	+/-	+/-
Quality control	+	+	+/-	—

PS-71192-12 Contribution of commercial labs in ss+ve case finding in 5 large cities of Pakistan and their quality assessment

S Tahseen,¹ H Sadiq,¹ J Hayat,¹ A Ghouri.² ¹National Reference Laboratory, National Tuberculosis CON, Islamabad, ²Green star, Islamabad, Pakistan. Fax: (+92) 519210663. e-mail: sabiratahseen@yahoo.com

Aim: A global fund supported project implemented DOTs programme in 5 major urban cities with involvement of private practitioners and 89 commercial laboratories. The project implemented through GL/green star has made good progress in short period of time by contributing 7164 number of ss+ cases. Concerns

have been frequently raised on quality of laboratory services and created urgent demand for supervision and QA. National reference laboratory is assisting private sector in developing a criteria to enrol new laboratories or shortlist already involved one and implement EQA Programme by blinded rechecking. A quick situation analysis of these laboratories is ongoing to assess their enrolment eligibility, quality of services and feasibility to enrol them in regular EQA programme. **Design:** Cross sectional study conducted in March and April 2007.

Methods: All commercial laboratories are being assessed by the respective reference laboratories located in same city with the use of a standardized short checklist.

Results: Contribution of ss+ve by commercial versus public laboratories, training status of laboratory staff, quality of microscopes, staining reagents and smears, slide storage, reporting and recording, workload, lab indicators and results of on site rechecking will be presented.

Conclusion: Number of commercial laboratories which qualify enrolment criteria for DOTs Programme and their contribution in ssm+ve case finding in 2006.

PS-71220-12 P-DOT: nurse consultation of DOT delivery in UK community pharmacies

T W Rennie, W G Roberts. Northeast London Tuberculosis Network, London, UK. Fax: (+44) 02085107731. e-mail: timothy.rennie@homerton.nhs.uk

Introduction: UK TB patients at risk of negative outcome are recommended to have DOT. All DOT services in Northeast London are managed by TB clinics. It may be more convenient for patients to receive DOT in local community pharmacies. However, before introducing a service it is appropriate to consult stakeholders, including TB nurse specialists.

Method: TB nurses were presented with a DOT service scenario for delivery in community pharmacies. Nurses responded to an 8-item questionnaire and were interviewed using a semi-structured interview concerning anticipated benefits/problems of a Pharmacy-DOT service in relation to patients, nurses and clinics.

Results: Fifteen nurse specialists were interviewed. Most nurses (80%) responded that pharmacists could conduct DOT (table). However, almost as many (73%) also believed that relatives could supervise DOT. There was less agreement as to whether DOT is a skilled activity requiring TB specialist management. Nurse interviews revealed recognition of the convenience and accessibility of pharmacies. Nurses also acknowledged the development of rapport between patients and pharmacists. Nurses reported that as some patients already received their medication in pharmacies, it would be better to make this 'official'. However, there were frequent concerns over the handling of both poor patient attendance and adverse drug re-

actions. Nurses were also concerned about clinical responsibility and communication between different services. Nurses emphasised that DOT was more than an exercise in supervised medicine consumption.

Questionnaire item	Disagree (%)	Unsure (%)	Agree (%)
1 DOT supervision is a nursing role	8 (53)	2 (13)	5 (33)
2 DOT could be conducted by pharmacists	1 (7)	2 (13)	12 (80)
3 Patient relatives should not supervise treatment	11 (73)	3 (20)	1 (7)
4 DOT could be conducted by patient advocates	3 (20)	2 (13)	9 (60)
5 If DOT were not conducted by nurses, this would lead to a loss of nursing skills	10 (67)	4 (27)	1 (7)
6 DOT supervision is a skilled activity	4 (27)	3 (20)	8 (53)
7 DOT supervised by another HCP would not be to the detriment of the nurse-patient relationship	3 (20)	4 (27)	8 (53)
8 DOT patients are complicated cases which should be managed only by TB specialists	7 (47)	1 (7)	7 (47)

DOT = directly observed treatment; HCP = healthcare professional.

Conclusion: TB nurse specialists were positive regarding the P-DOT service. However, a number of concerns raised need addressing before new services are introduced.

PS-71254-12 Investigating geographical differences between DOT and non-DOT patients in Newham: GIS in Newham, London

T W Rennie, W G Roberts, D J Laycock. Northeast London Tuberculosis Network, London, UK. Fax: (+44) 02085107731. e-mail: timothy.rennie@homerton.nhs.uk

Introduction: In London, supervised treatment (DOT) is used for TB patients at risk of negative treatment outcome. A service providing DOT in community pharmacies is likely to be piloted in Newham borough. We sought to identify the best location of community pharmacies to provide DOT.

Method: TB patient notification postcodes (years 2001–2006; $n = 1218$) were entered into a GIS mapping program (Active®). Difference between DOT and non-DOT patients were sought, in particular, distance of residence from clinic. Distances were calculated for recent patients (year 2005) using RAC Route Planner® to validate findings.

Results: Overall, DOT and non-DOT patient location appeared to be similar (Figure): density for both patient groups was greatest around the TB clinic. This was verified with a sample of the patients data ($n = 250$) that suggested no difference between the mean distance of DOT and non-DOT patients from clinic (Mean distance DOT patients = 1.48 miles, mean distance

non-DOT patients = 1.45 miles; Mann-Whitney U test: $P = 0.781$).

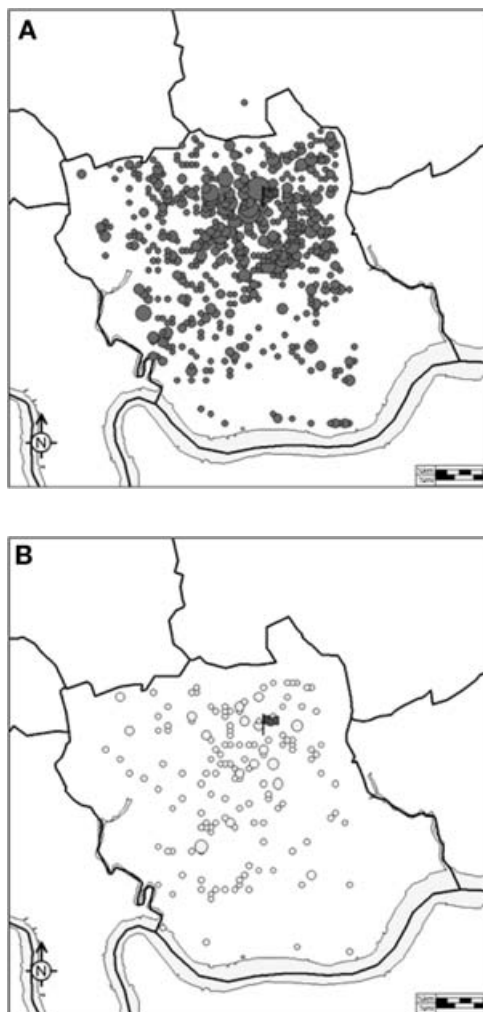


Figure A. Non-DOT TB patient locations. **B.** DOT patient locations.

Conclusion: Location of patients did not appear to be a factor for assigning DOT. A two-mile distance from TB clinic, therefore, seemed to be the ideal location for new community pharmacy DOT providers.

PS-71387-12 Role of private medical practitioners in TB care in Bangladesh: a cross-sectional study

A N Zafar Ullah,¹ R Huque,² V Begum,³ M K A Hyder,³ J N Newell,¹ A Islam.⁴ ¹Nuffield Centre for International Health and Development, Leeds, UK; ²Institute of Health Economics, Dhaka University, Dhaka; ³National TB Control Programme, Bangladesh, Dhaka; ⁴Bangladesh Rural Advancement Committee (BRAC), Dhaka, Bangladesh. Fax: (+44) 1133436779. e-mail: hss1anuz@leeds.ac.uk

Background: Bangladesh is committed to developing public private mix (PPM) for TB control.

Aim: To assess the role of private medical practitioners (PMPs) in TB control in order to inform development of the PPM.

Methods: A cross sectional study was carried out in four urban areas in Dhaka city involving the NTP and three NGO partners. Mapping of PMPs was carried out. Focus group discussions and a workshop were held with PMPs.

Results: Of the 250 PMPs identified, 97 showed interest in involvement in the PPM and agreed to be interviewed. PMPs were not aware of the NTP recommended regimen for treating TB: their prescribing pattern varied widely and was not related to TB case categorisation. X-ray was the preferred investigation of PMPs, who sent TB suspects to their preferred private-run laboratory for diagnostic tests. Virtually no PMP had knowledge of DOTS, and the great majority did not know the locations of neighbouring DOTS centres. The quality of care provided by the public sector was perceived as poor by PMPs, and they were therefore reluctant to refer TB patients to the NTP.

Conclusions: There is considerable potential for developing partnerships between the NTP and PMPs in confronting challenges of TB care in Dhaka; however, the issues identified in this study need to be adequately addressed.

PS-71438-12 Private sector Involvement in TB control and prevention is an approach to minimise the risk of MDR in Cambodia

K B Navy,¹ K Seak,¹ T E Mao,² B K Team,² S In,² R Suy.¹ ¹USAID Health System Strengthening in Cambodia, Phnom Penh, ²National Center for Tuberculosis and Leprosy Control, Phnom Penh, Cambodia. Fax: (+855) 23 221 433. e-mail: KBNavy@urc-chs.com

Background: Because more than 60% of TB suspects in Cambodia first seek care in the private sector and broad use of anti-TB second line drugs in the country, the NTP and its partners-CENAT, USAID-HSSC, Provincial Health Departments, Operational Districts piloted in one province and scaling up phase I of public private mix program into four provinces using private providers to increase case detection.

Objectives: To increase TB case detection and strengthening public-private partnerships in TB control to minimize the risk of MDR.

Method: A pilot was implemented in 94 private facilities in one OD of Battambang and scaling up to other 198 private facilities in 4 ODs between August 2006 and March 2007. Activities included development of comprehensive models of PPM, establishing PPM working group, developing standardized referral forms, developing training and IEC materials, training 304 of public providers and 343 private providers and conducting monthly monitoring, on the job training and data collection visits.

Results: From August 2005 to March 2007, 819 TB suspects were identified and referred to public DOTS facilities. Among them, 490 (59.82%) were presented at the public facilities. Of those, 458 (93.46%) had spu-

tum examinations and 84 (18.34%) were diagnosed as smear positive PTB, 44 (9.60%) as smear negative PTB, and 39 (8.51%) as EPTB. 158 (94.04%) were treated.

Conclusion: Private sector providers in Cambodia have become an important partner to increase the TB case detection as an approach to minimize the risk of MDR. Increasing awareness of using second line drugs properly in both public and private sector is urgently needed and should be done in the quarterly meetings held with service providers. Because 40% of referred clients did not show up at the TB treatment facilities, it is recommended that the program develop strategies for involving private providers in TB treatment and follow-up.

PS-71457-12 Theoretical selection of pharmacies to provide DOT in the community: a GIS approach in Hackney, London

T W Rennie, W G Roberts, T Sanghera. Northeast London Tuberculosis Network, London, UK. Fax: (+44) 02085107731. e-mail: timothy.rennie@homerton.nhs.uk

Introduction: The World Health Organisation 'DOTS' is not operated in the UK due to low TB prevalence. Instead, TB patients at risk of treatment non-completion have their treatment directly observed (DOT). Different approaches to providing DOT have been proposed including supervision in community pharmacies. We investigated whether pharmacies in one London borough (Hackney) could provide adequate coverage compared with clinic where DOT is routinely provided.

Method: DOT patient notification postcodes from 2005 were entered into a GIS mapping program (Active®). Two-mile radii (centroids) were mapped around the Hackney TB service postcode and around 3 ideally positioned pharmacies in Hackney. The patient capture rate was calculated and compared.

Results: 17 of 21 (85%) DOT patients live within 2 miles travelling distance from one of the selected pharmacies. However, all DOT patients resident in Hackney were within this catchment. This compared favourably with the clinic: only ten patients were within the 2-mile clinic catchment (48%).

Conclusion: Designation of DOT services to three key located pharmacies in Hackney would theoretically capture most patients within a 2-mile walking distance. This may be more convenient for patients who require supervision three-times weekly.

PS-71510-12 Sustainability of public-private mix for TB control in Nepal

S C Baral,^{1,2} J N Newell,³ P Malla,² S B Pande.³ ¹Health Research and Social Development Forum (HERD), Kathmandu, ²National Tuberculosis Centre, Bhaktapur, Nepal; ³Nuffield Centre for International Health and Development, Leeds, UK. Fax: (+977) 1 4102016. e-mail: sushilb@mos.com.np

Background: Public private mix (PPM) for TB control in Lalitpur, an urban area of Nepal, has been functioning since 1998.¹ The partnership involves private and public sectors, NGOs, the local municipality, and community volunteers. The PPM was developed in 1998 as a research project to assess the effectiveness of such a partnership. In 2003, Lalitpur Municipality took responsibility for coordinating the PPM with support from an NGO.

Objective: To assess the sustainability of the PPM following transfer to Lalitpur Municipality.

Methods: Sustainability was assessed using analysis of routine cohort data, and stakeholder interviews.

Results: The PPM has remained sustainable following transfer. Over the 7 years it has consistently achieved treatment success above 90% with less than 1% default. The original non-research stakeholders have remained fully involved. Responsibilities have been transferred to the local municipality without compromising service quality.

Interviewees reported the importance of regular communication among stakeholders and recognition of partners' inputs. Involvement of local volunteers accountable to a local NGO strengthened relationships between the various partners. The NGO played a vital role as an interface, and was essential in helping transfer responsibility to the local municipality in a sustainable way.

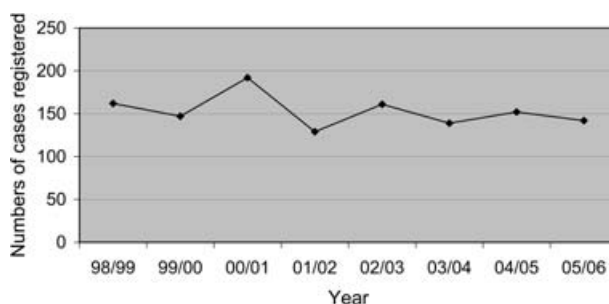


Figure New Sm+ cases registered in the PPP.

Conclusion: PPM for TB control can be sustained with only limited involvement of the NTP when the roles of key stakeholders are clearly identified.

¹ Newell et al. (2005). Bull WHO; 82: 92-8.

PS-71521-12 Hospital DOTS linkages in Bangladesh

K Hyder,¹ S Sultana,¹ V Begum,² M Rhaman.¹ ¹World Health Organization, National TB Control Program, Dhaka, ²National TB Control Program, DGHS, Dhaka, Bangladesh. Fax: (+880) 2 9884657. e-mail: khyder@dhaka.net

Introduction: While good progress has been made in DOTS expansion in primary health care networks, the NTP is presently expanding DOTS to public and private hospitals. Urban areas have an extensive mix of public sector providers, which include private and

medical college hospitals, specialist centers. NTP succeeded in implementation of DOTS Corners in almost all the medical colleges both public and private.

Objective: To expand DOTS linking with hospitals.

Methods: Identification of Medical Colleges both public and private. Involvement of staff, opening of DOTS Corner and implementation of DOTS.

Results: 14 Medical Colleges are involved, having plans for further expansion. The staffs were trained; drugs and other logistics were supplied. Suspects are referred and tested by sputum microscopy and treatment is started by a Medical Officer, in case of smear negative suspects further evaluated by the Resident Physician of the hospital. Once diagnosed is registered for DOT, the others staying far away are referred back to nearest DOTS Clinic for treatment and reporting. Severe complicated cases are admitted until required period then transferred back to nearest DOT center for completion of treatment.

During 2006, 1294 cases were detected, out of which 807 were smear positives, 31 relapses, 196 smear negatives and 260 were smear negative TB. There has been increase number of cases compared to 2005. The treatment success rate is 81.9 (2005). Details will be presented.

Conclusion: Learning lessons in implementation of DOTS in hospital settings will facilitate, accelerate, or improve expansion of DOTS to the hospital network. It is expected that the experiences from Bangladesh will interact with other countries to improve the scenario.

PS-71524-12 An overview on the public-private mix (PPM) models supported by the EMRO/TDR small grants scheme, WHO/EMRO

A Bassili,¹ A Seita,¹ S Baghdadi,¹ A Ayyash,² A Abdalbary,² H Sadik,³ E Elmoghazy,⁴ A Ayub,⁵ Z Khan.⁶ ¹Stop Tuberculosis, World Health Organization, Cairo, Egypt; ²National Tuberculosis Control Programme, Sanaa, Yemen; ³National Tuberculosis Control Programme, Rawalpindi, Pakistan; ⁴National Tuberculosis Control Programme, Cairo, Egypt; ⁵Institute of Public Health, Lahore, Pakistan; ⁶National Tuberculosis Control Programme, Kabul, Afghanistan. Fax: (+20) 22765414. e-mail: bassilia@emro.who.int

Aim: To make an overview on and draw lessons from the PPM models supported by the Eastern Mediterranean Regional Office of the WHO.

Methods: Several models were tested in 4 countries: Afghanistan, Pakistan, Egypt and Yemen. These consisted of engaging private providers by either referral and/or treatment of cases with notification. A tailored model to engage tertiary care hospitals in tuberculosis control has also been evaluated.

Results: The models showed significant improvement in tuberculosis case management among Non-National Tuberculosis Control Programme (NTP) health care providers such as better tuberculosis suspect management, reliance on sputum smear microscopy for diag-

nosis, patient categorization and treatment according to the guidelines, adherence to DOT, assigning treatment supporters to patients, better defaulter and contact tracing mechanisms and using the recommended recording and reporting system. Moreover, the models have all resulted in a significant increase in the case detection rate in the studied province or district(s), as well as an increase in the treatment success rate of cases managed by non-NTP providers.

Conclusion: The process of engaging non-NTP providers in tuberculosis control and its implementation should be tailored to each country situation.

PS-71540-12 TB services through DOTS in medical colleges hospitals of Bangladesh: an analysis

S Sultana,¹ K Khyder,¹ V Begum,² M Rahman.¹ ¹World Health Organization, National TB Control Program, Dhaka, ²National TB Control Program, DGHS, Dhaka, Bangladesh. Fax: (+880) 2 9884657. e-mail: sabera_s@yahoo.com

Introduction: TB is often neglected or not properly managed in academic hospitals of the country. The management of TB is a complex in tertiary level.

Objective: To analyze practices of medical colleges in management of TB.

Methods: Lists of medical colleges in both public and private prepared. Orientation on DOTS organized and DOTS Corner operational. Quarterly reports analyzed.

Results: Analysis of Medical College Hospitals comprising of out and in patients facilities shows a considerable number of TB suspects are not taken into care for its diagnosis prior to involvement through DOTS Corner. All Government and majority of the private Medical Colleges have initiated DOTS Corner to manage TB patients.

During 2006, 1294 cases were registered for treatment, out of which 807 were new smear positives, that is higher than the previous year and 592 (81.9%) cases treated successfully of the cases of 2005 (723). There is an increased commitment by the academicians to implement DOTS compared to 2005. Details will be presented.

Conclusion: NTP has taken considerable measures to involve academic institutes. Strategies to be in built in involving all Medical Colleges of the country for TB care.

PS-71553-12 Scaling up of public-private mix for DOTS: barriers and enablers—early experience from Bangladesh

A N Zafar Ullah,¹ V Begum,² J N Newell,¹ M K A Hyder,² A Islam.³ ¹Nuffield Centre for International Health and Development, Leeds, UK; ²National TB Control Programme, Bangladesh, Dhaka, ³Bangladesh Rural Advancement Committee (BRAC), Dhaka, Bangladesh. Fax: (+44) 1133436779. e-mail: hss1anuz@leeds.ac.uk

Background: The NTP, 3 NGOs and the University of Leeds have jointly developed a public-private mix

(PPM) model for TB control for urban Bangladesh, which has been implemented in four selected areas of Dhaka Metropolitan City since 2003. In these areas, case finding has almost doubled: the treatment success rate has exceeded 85%.

Objective: To assess and improve PPM scale up in urban areas.

Methods: Action research. Data were collected in February 2007 in 4 sites in Dhaka, 3 in Chittagong and 2 in Sylhet.

Results: Systematic implementation has led to greater and effective involvement of NGOs and PMPs, achieving increased case detection. There is growing interest and commitment by the NTP and collaborating partners to embark on scaling up PPM. Adequate resources are in place and a focal point has been identified to coordinate activities. PMP training plans have been drawn up, and there have been regular site visits from NTP and NGO programme managers. The NTP has provided guidelines and tools developed from the PPM pilot project.

Barriers to scaling up PPM reported by the implementing partners and PMPs included: poor networking and coordination between authorities and providers; absence of a system to monitor private sector health care services; lack of referral mechanisms; distrust among government and private sector partners; and private providers' time constraints.

Conclusions: There is a growing commitment to scale up PPM, and it appears feasible to implement PPM scale-up.

PS-71629-12 Sustaining the gains of public-private mix DOTS initiatives in the Philippines

T F Rodrigo, A G Sarmiento, L G Gamiao. Philippine Coalition Against Tuberculosis, Quezon City, Philippines. Fax: (+63) 7819536. e-mail: tfrodrigo@yahoo.com

Introduction: 70 Public-Private Mix DOTS (PPMD) facilities installed from 2004–2006 under the Global Fund (GF) project are presently operating in the Philippines. In 2006, 2222 new smear positive TB cases were detected from referrals of private physicians. This corresponds to 11% incremental increase in case detection rate (CDR) in 15 million population PPMD coverage or 2% for the total Philippine Population of 84 million. GF assistance to these units ends in 2008. Elements and strategies that will sustain PPMD project gains should be identified.

Methodology: A survey of 66 PPMD units was done to identify factors in successful PPMD installation and operation. In a national PPMD workshop, the success factors were analyzed and grouped according to sustainability element. Strategies to achieve sustainability were also developed.

Results: 5 elements were identified to sustain PPMD operations: 1) political viability expressed as support

of the local government & stakeholders from both the private and the public sector; 2) socio-cultural viability through provision of TB services responsive to needs & values of patients and communities; 3) financial viability through use of economic instruments; 4) technological viability ensuring attainment of 10% incremental increase in CDR due to referrals from private physicians, 85% success rate and 80% utilization rate by private physicians and 5) institutional viability.

Conclusion: Stakeholders and policymakers should install mechanisms that will ensure presence of 5 elements of sustainability so that PPMD initiatives continuously operate even beyond financial assistance from GF or other agencies.

PS-71684-12 Economic evaluation of public-private mix strategies for DOTS in Jogjakarta Province, Indonesia

Y Mahendradhata,^{1,2} A Probandari,^{3,4} R A Ahmad,¹ A Utarini,¹ C Basri,⁵ B Johns,⁶ A Karin-Hurtig,⁴ L Lindholm,⁴ M J Van der Werf,⁷ M E Kimerling,⁸ M Boelaert,² P Van der Stuyft.² ¹Faculty of Medicine, Gadjah Mada University, Yogyakarta, Indonesia; ²Public Health Department, Institute of Tropical Medicine Antwerp, Antwerp, Belgium; ³Faculty of Medicine, Sebelas Maret University, Solo, Indonesia; ⁴Umea University, Umea, Sweden; ⁵National Tuberculosis Control Programme, Jakarta, ⁶WHO Country Representative Office, Jakarta, Indonesia; ⁷KNCV, The Hague, Netherlands; ⁸Gorgas TB Initiative-UAB, Birmingham, Alabama, USA. Fax: (+62) 274549432. e-mail: ymahendradhata@itg.be

Objective: To evaluate the existing Public-Private Mix (PPM) strategies involving private practitioners and public/private hospitals for DOTS in Jogjakarta from an economic perspective.

Method: The costs and effects of PPM-DOTS strategies in Jogjakarta province were assessed using retrospective data and structured interviews. PPM-DOTS strategies were compared with DOTS delivered through public health centres only and non-DOTS treatment in hospitals. Costs were assessed in US\$ from the perspective of the public sector, private sector, and patients/attendants. Effectiveness was measured as the number of cases successfully treated.

Results: Hospitals and chest clinics in Jogjakarta municipality contributed most, notifying 676 (51.8%) new smear positive cases per year, while health centres reported 395 (30.3%), and private practitioners reported 232 (17.8%). However, treatment success rates were better in health centres (89%) and hospitals (83%) compared to private practitioners (63%). A total provider cost of US\$ 88 693.82 was estimated for case detection and management by the health centres in Jogjakarta municipality with an average cost per patient treated of US\$ 61.54.

Conclusions: Different PPM strategies are now employed in Jogjakarta with differences in effectiveness. Patients' costs, costing for PPM strategies and

cost-effectiveness analysis are awaiting data collection completion and will be reported by October 2007.

PS-71688-12 TB control in urban Bangladesh: a retrospective analysis

M H Khan,¹ A B M T Islam,¹ V Begum,² E Cooreman,¹ M A Alam,¹ M M Rahman,¹ M N Uddin,¹ S Sultana,² Q H Ferdousi,³ S M A Zahid,¹ M J Hossain.¹ ¹World Health Organization, Dhaka, ²National TB Control Programme, DGHS, Dhaka, ³Directorate General of Health Services, Dhaka, Bangladesh. Fax: (+88) 02 9884657. e-mail: mohiuddin_khn@yahoo.com

Introduction: Service provision and health seeking behaviour of urban dwellers varies significantly in the metropolitan areas of Bangladesh.

Objectives: To increase accessibility and enhance quality of DOTS services in metropolitan areas.

Methods: DOTS implemented in 6 City Corporations of Bangladesh from 2004 in collaboration with different NGOs. TB focal persons were assigned to coordinate the activities. To further strengthen activities one Monitoring Officer has been added for each of NGO area. DOTS corners were opened in most of the Medical College Hospitals. Regular training and refresher trainings were conducted for technical staff. Advocacy workshops were conducted to engage private practitioners. Community awareness campaigns were conducted in slums and under-served areas. Flexible and patient friendly mechanisms were adopted for better treatment adherence.

Results: A total of 20 147 TB patients registered in Metropolitan areas during 2006. The case detection rate for new smear positive reached to 66.83% with a sputum conversion rate 87% in 2006. The treatment success rate increased from 78% in 2004 to 84.5% in 2005.

Conclusion: Quality of TB control in Metropolitan areas of Bangladesh is improving steadily.

	2005	2006
New smear positive case	7 913	9 568
Re-treatment case	1 171	1 297
Smear negative pulmonary case	5 320	5 560
Extra-pulmonary	2 907	3 722
Total TB patients	17 311	20 147
Case detection rate	60%	67%

PS-71832-12 Strengthening tuberculosis control programme under the DOTS strategy in a big city, Lahore, Pakistan by developing PPMD

M Naeem,^{1,2} D Badar.¹ ¹Provincial TB Control Program Punjab Lahore, Pakistan; ²Research Institute of Tuberculosis, Tokyo, Japan. Fax: (+92) 429203750. e-mail: mnaeemdr307@yahoo.com

Background: Pakistan is high burden disease country for tuberculosis. DOTS Strategy was operationalised

in year 2000 and expanded rapidly in all 35 districts, but case detection rate is still low. Private sector is providing health services two third of population. There is need to involve private sector to increase case detection rate.

Objective: Increasing case detection rate of PTB and standardize case management of tuberculosis by the providers. Method; Study Design, Cohort study in district Lahore having population of 7.8 Million Exposure definitions: PPMD with Private Hospitals & General Practitioners. Exposure Group: Cohort of Patients with PTB NSS+ve registered during Q2 & Q3, 2006 in district Lahore Non Exposure Group: Historical cohort of Patients with PTB NSS+ve registered during Q4 2005 & Q1 2006 in District Lahore. Data was collected during intra district meetings.

Results: CDR of NSS+in exposure group in Q2 & Q3, 2006, is 103% and 113% respectively as compared to non exposure group, it is 10% and 14% in Q4 2005 & Q1 2006 respectively (*P* value 0.0000). Sputum conversion rate in exposure group is 82% and 84% as compared to non exposure group it is 89% and 74% (*P* value 0.8). Early default rate in exposure group is 9% and 11% as compared to non exposure group it is 5% and 7% (*P* value 0.8) Conclusion; PPMD significantly increases case detection rate. Although there is slight increase in default rate but it is not significant.

PS-71914-12 Integration of medical academic institutions and hospitals in the TB control programme of Bangladesh

M H Khan,¹ A B M T Islam,¹ E Cooreman,¹ V Begum,² M A Alam,¹ Q H Ferdousi,³ M J Hossain,¹ M N Uddin.¹ ¹World Health Organization Bangladesh, Dhaka, ²National TB Control Programme, Dhaka, ³Directorate General of Health Services, Dhaka, Bangladesh. Fax: (+88) 02 9884657. e-mail: mohiuddin_khn@yahoo.com

Introduction: National TB Control Program (NTP) is offering its TB services in medical academic institutions and hospitals through establishing DOTS corners. **Objective:** To include all medical academic institutions, and other secondary and tertiary level hospitals in DOTS network.

Methods: DOTS corner established in most of the medical institutions and government hospitals. NGOs were given responsibility to operate these DOTS corner in collaboration with the hospital authority. Advocacy workshops were conducted. TB suspects both from in-patient and out-patient department are referred to DOTS corner for sputum microscopy. After diagnosis patients residing in close proximity are registered in the DOTS corners; others are referred to the centre nearest to their residence for registration. Seriously ill indoor patients receive initial treatment through attending nurses and during discharge they are referred to their convenient nearest centre.

Results: A total of 3802 TB patients registered during 2006 in 33 hospitals. Sputum conversion rate increased from 82% in 2005 to 86.31% in 2006, and treatment success rate increased from 76% in 2004 to 83.2% in 2005.

Conclusion: Quality of DOTS services in medical institutions and hospital is improving gradually. Along side successful engaging of clinical professionals in DOTS could ultimately facilitate PPM initiatives in every area of the country.

	2005	2006
No. of hospitals involved	21	33
New smear positive	1476	1791
Re-treatment	421	427
Smear negative pulmonary	650	893
Extra-pulmonary	504	691
Total TB patients	3051	3802

PS-71945-12 Role of private pharmacies in central region of Afghanistan

A H Q Sanaie,^{1,2,3} H Ahmadzai,^{1,2,3} S Huseynova,^{1,2,3} L Nuzhat.^{1,2,3} ¹National TB control programme, Ministry of Public Health, Kabul, ²National TB control programme, Ministry of Public Health, Kabul, ³Stop TB department, World Health Organization, Kabul, Afghanistan. Fax: (+93) 128. e-mail: asanaie_afghan@yahoo.com

Background: Many patients including TB patients seek private treatment due to their easy access, in Afghanistan, either by going to a private practitioner first or by going directly to a private pharmacy, meanwhile TB patients are not recorded and reported and TB prescriptions duration of treatment are not standard.

National TB control program has plan to engage private pharmacies in TB control and to assess what potential contribution the private pharmacies can make and to identify inputs required to optimize their contribution this survey will be conducted.

Objectives: To assess the role of private pharmacies in TB treatment in central region of Afghanistan.

Method: This is a descriptive cross sectional study. A sample size of 660 registered pharmacies working in 6 provinces of central region of Afghanistan will be selected randomly from the list.

Result: Data has been collected through interview with private pharmacies and it under process of analysis. Result and conclusion will be shared later.

TB CONTROL IN SPECIAL POPULATIONS AND INSTITUTIONS

PS-71124-12 Tuberculosis control programme in a model district: an overview of the strategies adopted to achieve WHO targets

T Iqbal,¹ M Tsukamoto,² H Sadiq,³ D Badar,⁴ S Nawaz,¹ A A Chughtai.² ¹Executive District Office (Health), Govt. of Punjab, Gujrat, ²JICA TB Contro Project, Islamabad, ³National TB Control Program (NTP), Govt. of Pakistan, Islamabad, ⁴Provincial TB Control Program (PTP), Govt. of Punjab, Lahore, Pakistan. Fax: (+92) 053 9260105. e-mail: edohgujrat@yahoo.com

Gujrat is located in Punjab Province of Pakistan and its population is 2.3 million. DOTS was implemented in year 2004 and 12 diagnostic centers and 89 treatment centers were established. In year 2006, district achieved WHO targets of case detection and treatment outcome and reached CDR smear positive cases 75%, treatment success rate 90% and default rate 2%. This paper reviews the strategies adopted by the district, to achieve these targets.

TB Control program in the district is completely integrated with Primary Health Care delivery system. National/Provincial TB Programs and JICA are main technical and financial partners. All essential staff is trained and there is strong commitment and program ownership at all levels. Linkages between diagnostic and treatment centers are strong and all diagnostic centers conduct regular monthly meetings with attached treatment centers to discuss individual TB suspect and case management. Lady Health Worker's (LHWs) are fully involved in TB Program at district level and they are referring TB suspects to near health facility for diagnosis. Most of the treatment supporters are LHWs, for Directly Observed Treatment of Tuberculosis. District TB Coordinator and Laboratory Supervisor regularly visit diagnostic centers for monitoring and supervision. Surveillance system has been strengthened at district level to generate timely and correct reports and Electronic Reporting System has been adopted. EQA system is implemented and number of centers with major errors is decreasing. District is using drug boxes for improving TB drug management system. Drug boxes are being used successfully in all health facilities of the District. District took initiatives in Public Private Mix DOTS as well. Some Local Governmental and Non Governmental organizations have been involved in DOTS delivery system at district level.

PS-71288-12 TB in Lebanese prisons

M Y Saade. Ministry of Public Health-Tuberculosis Program, Beirut, Lebanon. Fax: (+961) 1 445734. e-mail: drantoinesaade@hotmail.com

Objectives: Evaluate MDR rate and TB prevalence in Lebanese prisons by periodical repetitive surveys.

Methodology: Between September and December 2006, around 5000 PPD skin test was performed to all prisoners and prison staff.

People with positive skin result (more than 10 mm), was oriented to chest X-ray.

In case of abnormalities, patients were subject to smear, culture and DST, and other examinations if needed.

All TB discovered patients were treated by DOTS strategy.

Result: This round that is the 4th, demonstrates the absence of MDR and the low TB prevalence in Lebanese prisons 80/10 000 (first prevalence evaluated in 1995 was 1400/100 000).

Conclusion: Repetitive surveys followed by DOTS strategy, lead to the control of MDR and decrease the prevalence of TB in prison.

PS-71344-12 Challenges encountered at the interface of laboratory and TB services

M P Loveday,^{1,2} V Sithebe,¹ Z Ndlela.² ¹Health Systems Trust, Pietermaritzburg, KwaZulu-Natal, ²TASC-TB, Pretoria, Gauteng, South Africa. Fax: (+27) 333471251.
e-mail: marian@hst.org.za

Methods: Retrospective record reviews of laboratory and clinic TB registers.

Results: Of the 348 patients diagnosed as smear positive in the laboratory register only 39% (136) were correctly recorded in the suspect and TB registers:

- Less than half (45% or 158) were recorded as smear positive
- Twelve percent (42) were recorded as negative
- Forty three percent (148) were not found

More than half of the patients (55% or 190) who were diagnosed as smear positive leaked from the system as they were recorded as smear negative in the suspect register or they could not be found in the suspect or TB registers.

Of the smears that were recorded as positive 3+, 43% were recorded correctly in the suspect and TB registers, but 48% 'leaked' from the system as they were either recorded as smear negative in the suspect register or could not found in the suspect and TB registers.

Conclusion: Problems at the interface of the laboratory support system and the delivery of TB services are leading to a considerable leakage of patients between those that are diagnosed as smear positive and those that are started on TB treatment.

PS-71408-12 'Sputnik': a model to improve TB treatment adherence among patients at high risk for default in Tomsk, Russia

I Y Gelmanova,¹ D Taran,¹ A Golubkov,^{1,2} R Mazitov,¹ S Mishustin,³ V T Golubchikova,³ T Nicholson,² E Nardell,^{2,4,5} S Keshavjee.^{2,4,5} ¹Partners in Health, Russia, Moscow, Russian Federation; ²Partners in Health, Boston, Massachusetts, USA; ³Tomsk Oblast Tuberculosis Services, Tomsk Oblast, Russian Federation; ⁴Brigham and Women's Hospital, Boston, Massachusetts; ⁵Harvard Medical School, Boston, Massachusetts, USA. Fax: (+1) 617 432 6958.
e-mail: skeshavjee@partners.org

Background: Despite the provision of TB treatment at multiple sites or at home, some TB patients continue to default from treatment due to alcoholism and other social problems. The Sputnik program was created to improve treatment completion among patients at high risk for default.

Methods: Patients who refused TB treatment or whose adherence was less than 70% of required doses were referred by a clinical committee. A team of two nurses and a driver found the patients and implemented interventions to provide DOT and social support.

We collected clinical and social data, including daily medication adherence. We measured interim effectiveness using adherence and the proportion of patients continuing treatment.

Results: We enrolled 16 patients (8 with MDR-TB) during the first three months of the program. Six had initially refused treatment or defaulted, and 10 had poor adherence. The mean age was 32; 69% were men; 63% suffered from alcoholism, 13% had substance dependence, 13% were homeless, and 19% were previously imprisoned. The mean adherence was 87% and 13 patients (81%) remained in treatment.

Conclusion: Preliminary data show that an intensive program of treatment accompaniment can substantially improve treatment adherence among patients at high risk for default.

PS-71410-12 Tuberculosis today: a blind future for the WHO DOTS strategy in sub-Saharan Africa

W M Wayengera. Medicine, Makerere University Faculty of Medicine, Kampala, Central, Uganda. Fax: (+256) 782 450 610.
e-mail: wmisaki@yahoo.com

Background: Following the development in the 1950s and 60s of effective therapy against TB, many thought tuberculosis would soon be eradicated. However, with the advent of HIV in the 1980s, this picture was distorted; and in 1999, the WHO ranked tuberculosis among the most serious health threats to the world. The WHO subsequently developed and adopted the DOTS strategy as a means to control (and possibly eradicated) this scourge. Practically however, the WHO-DOTS strategy faces many shortcomings today. **Objective:** To highlight the current challenges, and their predicted impact on the successful implemen-

tation of the WHO-DOTS strategy in sub-Saharan Africa

Design: Observational study.

Data source and study methods: We reviewed literature from about 50 journal articles, books, and websites published between 1990 and 2007 on the changing global picture of TB epidemiology. An oversight of on-ground challenges was gained from 3 years of active involvement in TB control strategies at the Ugandan national TB & Leprosy reference treatment center, reference labs, and the TB journal club at the faculty.

Study selection: Of particular interest were publications on the challenges to the successful implementation of the WHO-DOTS strategy in TB control with emphasis on sub-Saharan Africa-Uganda as a focal case observational reference.

Data analysis & Results: A qualitative literature review with bias towards challenges revealed that the greatest challenges to the success of TB control under the WHO-DOTS strategy in sub-Saharan Africa in the past 10–17 years have stemmed from 1) HIV-associated raises in prevalence, 2) inadequate infrastructure to allow for a 70% catchment, and 85% treatment success rate, 3) default from treatment, and 4) emergence of drug resistance. On ground experience highlighted the later two as major future challenges.

Conclusion: More strategies to address the above 4 challenges are called for to curtail growing TB rates here.

PS-71436-12 Treating tuberculosis under conditions of insecurity and instability in Galcayo, Somalia

K F L Fisher Liddle,¹ V S Sizaïre,² H C Cox.³ ¹Médecins Sans Frontières, Somalia, Nairobi, Kenya; ²Médecins Sans Frontières, Manson Unit, London, UK; ³Burnet Institut for Medical Research and Public Health, Melbourne, Australia.
Fax: (+44) 20 7404 4466.
e-mail: vinciane.sizaïre@london.msf.org

Background: Somalia suffers a violent civil conflict. Health care is extremely limited and restricted by unpredictable and regular violence. Médecins Sans Frontières (MSF) offers health care in 9 locations across south and central Somalia and provides tuberculosis treatment in the clan-divided town of Galcayo.

Method: MSF Holland runs TB programs in Galcayo North and South and in Burtinle (250 000 population). Due to security constraints, patients are offered treatment only if they commit to stay in Galcayo or Burtinle for the full course. MSF provides accommodation for patients who don't have relatives in town and food for all. Strict DOT is followed, but defaulter tracing is not feasible for security reasons.

Results: Between February 2005 and December 2006, 976, including 113 previously treated (12%) were admitted to the program; with an extra 6% defaulting

before admission. Overall, 34% were from outside the district, a significant number of patients coming even from the Ogaden region of Ethiopia. 68% were men. There is a high suspicion women are excluded from TB services, especially women coming from areas outside Galcayo town. Of 425 patients started on treatment in 2005, 83% were successfully treated, 5% died, 4% failed treatment and 5% defaulted (3% transfers).

Conclusion: The program is achieving good results, despite frequent evacuation of expatriate staff, due to the efforts of national staff and a focus on ensuring that patients are able to maintain treatment throughout the course. However, strict DOT and the commitment required from patients to stay in Galcayo for 6 months or longer might prevent some groups from seeking TB care. Women are often among these as they are usually the breadwinners in families and are in charge of care giving for children. In order to improve access, further innovative approaches that consider clan divisions, insecurity and gender roles are required.

PS-71441-12 Success of DOTS in tuberculosis control in Bangladesh

V Begum,¹ M M Rahman,² K A Haider,² A Alam,² M N Uddin,² S Sultana,² M H Khan.^{1,2} ¹NTP, Dhaka, ²WHO, Dhaka, Bangladesh. Fax: (+88) 02 9884657.
e-mail: drmdmojib@gmail.com

Introduction: Tuberculosis is a major public health problem in Bangladesh since long. Estimates suggest that daily approximately 875 new TB cases 180 TB deaths occur in this country. Bangladesh started DOTS strategy in 1993 to combat the problem.

Aim: To highlight the progress of tuberculosis control through DOTS in Bangladesh.

Methods: Data for NTP Data base were taken and analyzed.

Results: Since its inception DOTS was progressively expanded to cover all Upazilas by June 1998. By 2003, 99% of the country's population including those living in metropolitan cities was brought under DOTS services.

Case detection under DOTS increased rather slowly till 2001 to reach 28%. Then it increased rapidly to reach 46% in 2004, 61% in 2005 and 71% in 2006.

Treatment success rates under DOTS have been consistently high from the beginning and crossed the target of 85% in 2003. It improved further to reach 89% and 91.5% for the 2004 and 2005 cohort respectively.

Conclusion: Strong political commitment and unique collaboration between government and non-government allied organizations are the keys to the success of DOTS in Bangladesh.

PS-71500-12 DOTS implementation in prisons of Bangladesh

K Hyder,¹ V Begum,² S Sultana.¹ ¹World Health Organization, National TB Control Program, Dhaka, ²National TB Control Program, DGHS, Dhaka, Bangladesh. Fax: (+880) 2 9884657. e-mail: khyder@dhaka.net

Introduction: TB is huge problem in prisons of Bangladesh. There are 5–8 times more prisoners staying in the prisons at a time exceeding the normal capacity. TB easily transmitted among the prisoners. There are risks among inmates; staff and families are obvious considering diffusion to the general population.

Objective: To establish DOTS corner in all prisons.

Methods: Prisons identified, staff trained, drugs and logistics supplied by NTP linked with respective area NTP-Partners for case management.

Results: Service providers of major prisons of the country trained on DOTS during 2nd quarter of 2003. DOTS implemented in prisons of 2 big cities since last quarter of the same year further expanded to 18 in the country. During 2006, 401 were registered for treatment, out of which 263 were new smear positives. This is over three times the case detection among prisoners in general population. The treatment success rate is 61.6% of the cohort 2005. The transfer out rate is much higher 33.9% as they were released on bail. Presently the rate is same for the expanded prisons. Detail results will be presented.

Conclusion: Majority of the suspects are diagnosed by Chest Disease Clinics of respective prisons, follow up and referral linkages need to be strengthened to evaluate each cases transferred out.

PS-71549-12 CDC supervision of overseas US immigration medical screening for tuberculosis

D L Posey, T C Comans, M P Naughton, M V Cano, L S Ortega. Division of Global Migration and Quarantine, Centers for Disease Control and Prevention, Atlanta, Georgia, USA. Fax: (+1) 404 639 4441. e-mail: dposey@cdc.gov

Background: The Division of Global Migration and Quarantine (DGMQ), Centers for Disease Control and Prevention (CDC), has regulatory authority to supervise the required overseas pre-immigration screening for tuberculosis (TB), completed by >400 000 immigrants and 50 000 refugees yearly. To better detect and treat TB disease overseas, including multidrug-resistant TB, requirements were updated in 2007 to include TB cultures and DOT prior to immigration.

Methods: DGMQ designates teams to perform on-site visits using standardized evaluation tools and identify or help develop TB laboratories and treatment facilities.

Results: In 2007, teams are working in several countries, including the countries where the new requirements will first be implemented: Mexico, Philippines, Thailand, and Vietnam. A technical manual is being developed, an expert in TB laboratory development

has been contracted, and work is being coordinated with CDC's Division of Tuberculosis Elimination, U.S. Department of State, ministries of health, nongovernmental organizations, and other countries performing overseas pre-immigration TB screening.

Conclusion: The new TB requirements, which will be implemented during 2007 at initial sites, will lead to increases in TB infrastructure, assist in reducing U.S. foreign-born TB rate, and contribute to global control efforts. DGMQ technical guidance, development of infrastructure, and collaborations are essential in implementing the new TB screening requirements worldwide.

PS-71630-12 Reviving DOTS programme in disaster after South Asian earthquake

E J A Z Qadeer. World Health Organisation, Islamabad, Pakistan. Fax: (+92) 519210663. e-mail: drejazqadeer@ntp.gov.pk

In October 2005 a massive earth quake measuring 7.9 at rector scale hit the south East Asia. The most effected areas were Pakistan Held Azad Kashmir and NWFP Province of Pakistan. The destruction was massive along with almost 70 000 casualties and displacement of almost two million populations. The infrastructure of health including TB DOTS Program destroyed. Existent network of diagnostic and treatment centers become non functional, records was lost and health staff and patients were missing immediately after the earthquake. National TB control program joined the relief and rehabilitation program. A situation analysis was carried out to asses the extent of damage in the earthquake areas availability of diagnostic facilities, health workers and logistics were assessed.

On the basis of situation analysis National TB Control Program started a program with the partners to revive the TB Control activities in the earthquake areas.

A campaign was started to locate the TB patients who were registered and were on ATT before the earthquake. New diagnostic and treatment centers were established near the temporary shelters. New mechanism like mobile diagnostic services and field officers with motorcycles were placed providing ATT and DOT.

The concerted efforts and planned rehabilitation of health system led to increase in CDR From 20% to 60% after one year of the earthquake and a significant improvement in treatment outcome and decrease in default rate were observed.

PS-71736-12 Tuberculosis control for floating population in China

S W Jiang. National Center for Tuberculosis Control and Prevention, Beijing, China. Fax: (+86) 1083135105. e-mail: jiangsw@chinatb.org

Aim: To expand gradually the activities of tuberculosis control strategy nationwide for floating population in China.

Design: To analyze the recent situation of floating population and tuberculosis control for floating population.

Method: The information of floating population was collected and tuberculosis prevalence of floating population was analyzed.

Result: According to the data which from the population sample survey in 2005, there are 1.3628 billion population in China, among of them 147.35 million is floating population. Seventy four percent of floating population move to developed provinces. The age group of 15–45 years old occupied 80% in all floating population. The income per month is less 120 USD, among of them 65 USD per month is 45%. In the urban areas, the floating population live in crowded condition and work for long hours in low-wage job such as construction and restaurant work. Less than half of the floating population are long term residents. The pulmonary tuberculosis prevalence of floating population is higher than local resident population. Prevalence of smear positive of pulmonary tuberculosis (35/100 000) is higher than local residents (14/100 000) in Shanghai city. Prevalence of smear positive of pulmonary tuberculosis (16/100 000) is higher than local residents (7/100 000) in Beijing city. Cure rate of smear positive only 52.8% is very lower.

Conclusion:

- 1 The number of floating population is increasing quickly year by year. Because the live condition is poor and income is lower, the tuberculosis prevalence of floating population is higher than local residents. The problem of floating population tuberculosis control is one constrain to achieve the Millennium Development Goals.
- 2 Floating population tuberculosis control framework should be developed in China as soon as possible.
- 3 Expansion plan of Floating population tuberculosis control strategy nationwide should be developed and implemented gradually.

PS-71799-12 Tuberculosis infection control measures in waiting areas of HIV care and treatment clinics in Lusaka, Zambia

C Mwinga,¹ J Harris,¹ K Randels,¹ S Hatwiinda,¹ N Kancheya,¹ P Lumano-Mulenga,¹ E Sadoki,¹ M E Kimerling,² S Reid.^{1,2} ¹Center for Infectious Disease Research in Zambia (CIDRZ), Lusaka, Zambia; ²Department of Medicine, University of Alabama–Birmingham, Birmingham, Alabama, USA. Fax: (+260) 1 293 766. e-mail: Jennie.Harris@cidrz.org

Aim: To reduce the spread of TB in HIV Care and Treatment Clinic (HIV-CTC) waiting areas through simple infection control measures.

Background: The STOP-TB program promotes integration of TB and HIV care. Patients with undiagnosed TB increase the risk of TB transmission to immunocompromised patients in clinic waiting areas and attending health staff, a major concern in the era of multi-drug-resistant and extensively drug-resistant tuberculosis. As of February 2007, Lusaka district has 62 246 patients enrolled in HIV care and 16 000 new TB patients annually. Large patient numbers and inadequate infrastructure result in congestion of waiting areas.

Methods: An assessment of size, ventilation, and number of patients waiting in HIV-CTC at 3 primary health care centers was carried out. Social and environmental issues contributing to patient waiting preferences were discussed with staff. Plans for modifications to, or construction of, waiting areas with cost-estimates were developed, approval obtained, and structural modifications instituted.

Results: The median number of patients waiting at one time was 46 with range 5–224. Open areas were shunned in preference for corridors providing privacy and shelter. Modifications instituted ranged from veranda half-walls to a partially open shelter providing privacy and protection from the elements.

Conclusion: Relatively simple, low-cost structural modifications can be developed to create waiting areas with less crowding and improved ventilation. Such modifications should reduce nosocomial TB spread to high-risk clinic populations.

PS-71823-12 Small arms conflict in nomadic Pokot community and TB control

B Langat. National Leprosy and TB Programme, Eldoret, Kenya. Fax: (+254) 2060291. e-mail: morombilangat@yahoo.com

Background: Kenya is one of the countries with high burden of TB. TB control in nomadic brings a lot of challenges. This population has disproportionate high case notification but better treatment success rate.

Objective: To describe effect of episodic arms conflict on TB treatment outcomes among nomadic pokot community.

Design: Descriptive study.

Setting: West Pokot district, Kenya.

Study subjects: Notified TB cases between 2001–2005.

Data source: TB district registers, quarterly and annual cohort reports.

Main outcome measures: TB treatment success rate. TB out of controls.

Results: Treatment success rate ranges from 71–91% and out of control from 10–25% every quarter. Episodic rise in the out control is recorded during periods of flare up of arm conflicts. This was seen during election period-q3–4 2002. Similar rise is also seen in q1–2,

2005 following forceful attempt to disarm the Pokot community. Being hard to reach zone few of the re-treatment undergo MDR surveillance. Hence the true MDR TB prevalence cannot be gauged.

Conclusion: Small arm conflict among the nomadic population impacts negatively on established TB control program.

Handling of the conflict requires multi-sectoral approach with health sector as key partner.

PS-71903-12 Tuberculosis control in townships: a priority

A N A Militão Guedes,¹ Z Rocha Caldeira,² E Dale Sucupira,¹ V Bessa Ferreira.^{1,3} ¹Secretaria de Estado Da Saúde, Rio de Janeiro, Rio de Janeiro, ²Fundação Municipal de Saude de Niterói, Niterói, Rio de Janeiro, ³Fiocruz, Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+21) 22382752. e-mail: agmilitao@gmail.com

Aim: Appraise the effectiveness of actions carried out by the Brazilian health authority after the partnership with United States Agency for International Development (USAID) and Organization Pan-America of Health (OPAS) in six townships considered as priority, in Rio de Janeiro.

Method: Priority was given to six townships within Rio de Janeiro metropolitan area, where 85% of the state's TB cases occurred. Indicators were established to monitor medical assistance provided to TB patients, such as pulmonary TB cases showing positive bacilloscopy, for notified cases and for closed cases, cured patients and abandoned of treatment. Actions were directed according to each segment, aimed at promoting, protecting and preventing TB in the basic public health service network, increasing the scope of TB patients having access to quality health services within the state and guaranteeing funds.

Results: 4326 TB cases were reported in 2003 in the six townships. 81.53% of the cases were closed, 69.12% were cured and 18.20%, abandoned the treatment. In 2005, 4210 cases were notified, 80.5% were closed, 70.21% were cured and 14.01% abandoned the treatment. The desired percentages were 100% of closed cases, 85% of cure and 5% of abandoned. There was a reduction in the abandonment rate, which is still high, except for one township, where it was as low as 4.37%.

Conclusion: Sustained efforts must continue aimed at controlling TB, as findings fell short of established targets. Investments must be made in social and health assistance, as well as in permanent educational projects, both for health professionals and for population in general, as means of identifying more occurrences, concluded treatments and higher rate of cure.

PS-71918-12 Expansion of DOTS in prisons of Bangladesh

M H Khan,¹ A B M T Islam,¹ V Begum,² E Cooreman,¹ M N Uddin,¹ M J Hossain,¹ Q H Ferdousi.³ ¹World Health Organization Bangladesh, Dhaka, ²National TB Control Programme, Dhaka, ³Directorate General of Health Services, Dhaka, Bangladesh. Fax: (+880) 29884657. e-mail: mohiuddin_khn@yahoo.com

Introduction: Security measures and administrative formalities made TB services difficult to reach the prison communities. Continuation of treatment after release of the prisoners is another concern TB services. **Objective:** To establish a successful referral network of DOTS services for prisons in Bangladesh.

Methods: Either TB services were incorporated in prison health services or an NGO was assigned for a prison to implement DOTS. Monthly sputum collection sessions for TB suspects are conducted. Microscopy is done in the nearest microscopy centre. DOT is provided by the prison health staff. Released prisoners are transferred to the nearest DOTS centre to their residence for continuation of treatment.

Results: A total of 401 TB patients were registered during 2006 in 18 prisons. Among them, sputum conversion rate increased from 74% in 2005 to 77.18% in 2006, and treatment success rate decreased from 67% in 2004 to 63% in 2005. A significant portion of patients are being transferred out (18.93% and 35% respectively for sputum conversion and treatment success).

Conclusion: Retrieving treatment outcome of released prisoners is still a challenge for the program.

	2005	2006
New smear positive	344	268
Re-treatment	21	30
Smear negative pulmonary	89	59
Extra-pulmonary	24	44
Total TB patient	478	401

PS-71920-12 A survey for adoption of DOTS in prisons

V Begum,¹ M H Khan,² A B M T Islam,² S Sultana,¹ M M Rahman,² S A Ferdous,¹ E Cooreman.² ¹National TB Control Programme, DGHS, Dhaka, ²World Health Organization, Dhaka, Bangladesh. Fax: (+880) 29884657. e-mail: mohiuddin_khn@yahoo.com

Introduction: A consultative meeting was held during 3–5 June, 2006 to discuss possible interventions at prisons and conduct a monitoring survey in 10 prisons of Bangladesh.

Objectives: To adopt DOTS in prisons.

Methods: Data collected through questionnaire from 10 prisons. Workshop was held during September, 2006 for analysis of current situation basing on the collected information and for the preparation of future plan of action.

Result: A total of 36 588 prisoners were residing in 10 prisons during data collection. Two prisons had inmates more than 6000, whereas average capacity of prisons is 1500. Both in-patient and out-patient facilities were present in all of the prisons. The number of health care workers ranged from 1–7 in these prisons. Most of them (70%) have one graduate doctor. 1 to 3 paramedics work in most of the prisons, only one of them had no paramedics at all. AFB microscopy services were available in 5 (50%) of the prisons and only one of those prisons had X-ray facilities in addition. DOTS services are offered from 8 of the prisons, while NTP guidelines were available in 6 (60%) of them and lab guidelines were available in 3 (30%) of them. Drugs and logistics were regularly supplied in 8 (80%) of them. TB management training required for 2 of the prisons. Lab technicians were trained in 4 of the prisons. A total of 585 patients registered during 2005 in these prisons. Out of which 390 (67%) were smear positive, 169 (29%) were smear negative and 33 (6%) were extra pulmonary TB patients. During the period of data collection, 186 patients were receiving DOT from these prisons. Referral systems were in place in 8 prisons for the released prisoners. Health Education Sessions were being conducted in 8 (80%) of the prisons.

Conclusion: In most of the prisons inmates load is higher than the capacity. Ensuring treatment compliance of released prisoners is another concern.

PS-71927-12 Operational challenges implementing a community intervention in an industrial setting

L Coetzee, K Mngadi, M Luttig, F Popane. AURUM Institute for Health Research, Centurion, South Africa.
Fax: (+27) 126431383. e-mail: lcoetzee@auruminstitute.org

Background: A study of community-wide isoniazid TB preventive therapy is being evaluated among South African gold miners that aims to rapidly and significantly reduce TB incidence (Thibela TB).

Purpose: To describe the operational implementation of a community wide intervention in an industrialized setting to ensure the successful completion of the study within budget, timeline and to standard.

Approach: Two project phases of THIBELA TB, i.e. planning and execution, will be discussed with specific reference to:

- Community mobilization and stakeholder management with specific reference to operational implementation
- Establishment of infrastructure and facilities supporting protocol requirements, including 3 mobile study centers complete with remote data capturing and study medication dispensing capabilities
- Implementation of protocol procedures in compliance with regulatory, stakeholder, and GCP requirements
- Consenting individuals in vulnerable communities

- Confidentiality and study document management
- Data management and electronic data capturing
- Quality management of a paperless trial
- Resource management, including staff training
- Project schedule management
- Budget control

Contribution: Planning and execution of a project plan for the THIBELA TB community intervention posed a major challenge during which numerous constraints and risks were identified and managed. Lessons learnt, as well as suggest solutions, to ongoing challenging in a dynamic environment will be shared.

PS-71931-12 Impact of a food assistance programme on TB patients and their families in Afghanistan

A H Q Sanaie,^{1,2,3} H Ahmadzai,^{1,2,3} S Huseynova,^{1,2,3} R Khan.^{1,2,3} ¹National TB Control program, Ministry of Public Health, Kabul, ²National TB Control Program, Ministry of Public Health, Kabul, ³Stop TB Department, World Health Organization, Kabul, Afghanistan.
e-mail: ntpafgnewi@yahoo.com

Background: To offset opportunity costs of patients and their families, prevent attrition and retain patients in curative treatment, WFP is providing family food rations covering all Afghanistan, in support of MoPH and in partnership with WHO and NGOs.

Objectives: To determine the nutritional status, food needs and the impact of food assistance in TB management.

Method: Formative survey conducted based on provincial, geographical, socioeconomic status, food habit similarities and disease prevalences trend. A sample size of 500 TB patients was selected basing on facility availability, under DOT and quota sampling method.

Result: TB awareness, free TB drugs and food assistance were identified as a major motivation factors for taking and adhering to TB treatment. Women were over represented in the TB caseload. Household asset depletion, improved nutrition, household food security was reported and infant feeding practices among lactating mothers were not optimal.

Conclusion: National TB Control programme should include awareness building, free treatment and food assistance in order to promote increased case detection rate, cure rate and prevent treatment delay, attrition of the patients and theirs' families. The need to further investigate the reasons for the gender disparity in the TB caseload was emphasized.

PS-71966-12 Comprehensive guidelines for tuberculosis contact investigation in the Netherlands

J van den Hombergh,¹ J Woldman,² A Jacobi,³ P van Gerven.⁴ ¹Dpt. Development, Policy and Practice, KIT, Amsterdam, ²GGD Amsterdam Dpt. GHOR, Amsterdam, ³Centre for Infectious Disease Control (CIB), Bilthove, ⁴KNCV-Tuberculosis Foundation, The Hague, Netherlands. Fax: (+31) 205688444. e-mail: j.v.d.hombergh@kit.nl

Contact investigation (CI) is essential in TB control. Largely forgotten in high prevalence settings, where passive case finding and effective treatment are priority interventions, its importance is being reappraised, in particular in settings with high rates of HIV and TB co-infection. In the Netherlands contact investigation, routinely carried out around newly notified TB patients, contributes significantly to TB case finding. Following a large scale CI in 2005, the need for comprehensive guidelines emerged.

Methods: CIs conducted in the Netherlands were analysed. Medical legislation related to CI, which was reviewed. Cost benefit analysis for a sample of large scale investigations was carried out. Existing guidelines were reviewed. New guidelines for contact investigation in the form of a manual were developed and reviewed by an expert committee, the national TB Control Commission (CPT) and centre for Infectious Disease Control (CIB).

Results: CI contributes up to 10% in detection of active TB and <10% of investigations involve >100 contacts. Large scale CIs are laborious, costly, cause public unrest and may not always detect enough cases to justify the resources required. The guidelines present background and rationale for CI, including all technical aspects, judicial and civil societal implications. Practical algorithms describe moving from a confined investigation involving a few contacts to a large scale investigation involving thousands of potential contacts and outlines criteria for extension.

Conclusion: TB CI contributes to prevention of TB. Practical guidelines for its use are indispensable, not only to ensure accuracy of results but also to avoid unnecessary large scale and costly investigations, requiring massive resources and potentially causing individual and public anxiety. Given setting-specific aspects of contact investigation there is a need for generic guidelines, to be customized for each country-specific situation.

PS-72043-12 Availability of national policy for TB control in congregate settings in Africa

R Pray,¹ C Gunneberg,¹ F Scano,¹ A Reid,² H Getahun,¹ R Lopez Olarte,¹ G Gargioni,¹ P Nunn.¹ ¹Stop TB Department, THD Unit, World Health Organization, Geneva, ²UNAIDS, Geneva, Switzerland. Fax: (+41) 227911589. e-mail: pray@who.int

Background: In countries with a generalized HIV epidemic, outbreaks of TB/MDR-TB in congregate set-

tings primarily affect HIV-infected persons, largely due to the lack of proper infection control. Monitoring the availability of national infection control policies is a first step towards implementing country-level TB infection control measures.

Objective: To monitor self-reported presence of national policy for controlling the spread of TB in congregate settings in the African Region, 2005.

Methods: National Tuberculosis Programme Managers in 37 countries with a generalized HIV epidemic were asked 'In 2005, did you have a policy for controlling the spread of TB in congregate settings?' Data on HIV testing of TB patients and estimated country specific HIV positive TB cases, were also used in this analysis.

Results: 36 countries replied, and 30 answered the policy question: 13 : 'yes' and 17 'no'. The 37 countries have 79% of the estimated global HIV positive TB cases, and 28% of estimated incident global TB cases. The 13 countries that confirm having a national policy have 49% of global estimated HIV +ve TB cases, and in the 17 countries that don't have a policy, this figure is 23%. In 18 countries with data 13% of TB patients were tested for HIV, and of these 51% were found to be HIV positive.

Conclusions: The majority of African Countries with a generalized HIV epidemic did not report having a national Policy for TB control in congregate settings. These countries have 30% of the estimated global HIV+ TB cases, and HIV infection in tested tuberculosis patients is very high. This data points to an urgent need to highlight the importance of TB infection control, and focus expertise and funding to develop, promote and implement a global infection control strategy.

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PS-72092-12 Forced air heating as a strategy to reduce nosocomial TB transmission in resource-limited settings

H Ulens,¹ P Maes,¹ V Azavedo,² C McDermid,³ G Van Cutsem,³ E Goemaere,³ K Hilderbrand,² R Zachariah.⁴ ¹Water and sanitation unit, Medecins Sans Frontieres, Brussels, Belgium; ²City Health Services, Khayelitsha, Cape Town, ³Medecins Sans Frontieres, Khayelitsha, Cape Town, South Africa; ⁴Medecins Sans Frontieres, Medical Department (Operational Research), Brussels, Belgium. Fax: (+352) 335133. e-mail: zachariah@internet.lu

Issues: Health facilities are known to be 'hot spots' for tuberculosis (TB) transmission and prevention of nosocomial TB transmission is now of major operational significance particularly in sub-Saharan Africa given high annual TB case rates, and the growing incidence of MDR and XDR-TB.

Description: Environmental control measures such as UVI irradiation and filtration are technologies not

well adapted to be used due to the difficult access to resources for installation and maintenance. In such settings, other methods such as natural ventilation have been proven more efficient in TB infection control. Nevertheless, they often require major investment or changes to the existing infrastructure which is often too expensive and time consuming.

Lessons learned: Forced air heating is a known strategy already used in some settings to induce convective air currents or directional air-flow. This strategy could be adapted for preventing nosocomial TB transmission by inducing directional 'air-flow currents' or enhancing insufficient natural ventilation within pre-existing health facilities without making major infrastructural modifications.

Recommendations: There is an urgent need to assess the feasibility of this technique in existing health facilities. The strategy would be assessed in primary health facilities in Khayelitsha South Africa and reported at the conference.

PS-72128-12 TB in children in Dominican Republic, 2000–2006

B M Marcelino Martinez, A R Rodriguez Adalberto, J H Heredia Josefina. National TB Programm, Distrito Nacional, Santo Domingo, Dominican Republic. Fax: (+809) 5413422. e-mail: belkys_tb@yahoo.es

Introduction: The TB is health problem in the Dominican Republic. The notification of TB in children is indicator very important indicator for to evaluate the efficacy of the strategy in the National TB Program. The increase rate is evidence of TB transmission active.

Objectives: To describe the situation of TB in children in the Dominican Republic.

Methods: There checked the reports of data base, operational and epidemiology information of National TB Information System deposited to the PCT during the period 2000 and 2006. Be revised the information immunization National program. The population used is estimated business National statistics.

Results: The children TB case reduced between 2000 and 2006, TB children's represent the 5 and 10% among the TB cases, with prevalence rate registered between 12 and 14/100 000 habitants, more of 97% are new TB cases, smear positive (33 and 49%), extrapulmonary (20 and 28%), coinfection TB/VIH (5.3 and 10.3%). Were registered meningitis TB rate 0.2 y 1.6/100 000 children under 5 years.

Conclusion: The expansion of the strategy DOTS has contributed to reduce the rate of TB in children. The rate coinfection TB/VIH is higher. To surveillance the average BCG vaccination is very important for reduced the meningitis TB. The percentage of smear positive is evidence of transmission Tb in the community.

PS-72210-12 The TB treatment wheel: an aide to move from 'treatment completion' to 'cure'

J Caldwell. City of Cape Town Health Department, Cape Town, South Africa. Fax: (+27) 214214894. e-mail: judy.caldwell@capetwn.gov.za

In Cape Town, closing the gap between 'cured' and 'treatment completion' has been identified as a 'quick win' opportunity to improve TB treatment outcomes, especially in the most infectious (smear positive) TB patients. Many clients do not have repeat sputa done as required. We have developed an aide for clinicians, known as the TB treatment wheel, to assist them in complying with the repeat sputa policy.

The concept we have used is built on the gestational wheel used in obstetric practice to determine gestation dates. It was adapted to meet the requirements of the TB treatment guidelines. The TB treatment wheel is an easy guide to assist healthcare workers to note the dates on which new and retreatment TB patients on regimen 1 and 2 should be recalled for sputum collection, change to continuation phase and the termination date of their treatment. The information is entered up-front in the clinic and patient held records, enabling both patients and healthcare workers to easily identify key treatment milestones and note progress.

The treatment wheel is a useful tool to promote interaction with patients, provide information and illustrate the 'TB treatment journey' which the patient needs to undergo to get to the end of treatment. The wheel facilitates a relationship to get the patient more involved, to take responsibility for own health and empowers the patient to have some control over the treatment process, allowing the healthcare worker to play a more encouraging and supportive role.

The TB treatment wheel maps-out the 'sputum check' requirements during TB treatment, serving as a reminder to both patients and staff to comply with the sputum policy. Our experience in Cape Town is that, in using this wheel as part of our treatment programme, 'conversion' and 'cure' rates improved and eventually 'treatment interruption' was reduced.

PS-72216-12 TB control in Oshana Region, Namibia

K S Shiyagaya, L N Nambundunga, T L Lasarus, L K Kornelius. Ministry of Health and Social Services, Oshana, Namibia. Fax: (+264) 65 220303. e-mail: oshanais@iway.na

Introduction: Oshana region in Namibia is 5290 sq km in area, consists of ten constituencies with estimated population of 177 022 (2001 census) and annual growth rate of 1.6%. TB report for 2006 show tremendous improvement in TB control.

Activities implemented

- Emphasis on TB diagnosis based on sputum microscopy

- Implementation of revised NTCP recording and registration
- Trained 70 nurses and doctors on the revised TB guidelines
- Offered HIV counseling and testing services to TB patients
- Strengthened community involvement in TB control
- Implemented health facility based DOT
- Introduced Fixed Dose Combination anti-TB drugs
- Tracing of patients who interrupt or default from treatment

Results: Reported TB cases 2005 and 2006. Twenty (20%) percent of TB patients offered HIV testing, 71% were HIV positive. See tables below.

Table 1 Case finding report

	2005	2006
New smear positive PTB	269	298
New Smear Negative PTB	46	783
Extra Pulmonary TB	198	342
Re-treatment TB	35	41
Total TB cases reported	549	1470
Cases notified per 100 000 pop	321	845

Table 2 TB cohort analysis: 2004 and 2005

	Jan-Dec 2004	Jan-Dec 2005
TB cohort analysis		
Treatment Success Rate (Smear positive cases)	55%	75%
TB defaulter rate (Smear positive cases)	7%	4%
Treatment success rate (re-treatment cases)	19%	56%
Treatment defaulter rate (re-treatment cases)	13%	21%

Conclusions: TB control in Oshana region improved with capacity building, appointment of a District TB coordinator and implementation of revised guidelines.

PS-72226-12 Situation de la prise en charge de la TB et du VIH/SIDA à la prison civile d'Abidjan (MACA) en 2006

M K Kamate,¹ C B Kone,¹ E K Konan.² ¹Centre Antituberculeux Adjame, Abidjan, Lagunes, ²Maison d'Arrêt et de Correction d'Abidjan (Maca), Abidjan, Lagunes, Côte d'Ivoire. Fax: (+225) 20372215.
e-mail: mkamate@hotmail.com

Contexte : La Tuberculose et le VIH/SIDA sont des problèmes majeurs de santé dans les prisons du monde et plus particulièrement dans les pays en voie de développement.

La Maison d'Arrêt et de Correction d'Abidjan (MACA) ou Prison Civile a une population estimée à 4300 détenus. Elle possède une infirmerie et un dispensaire antituberculeux.

En 2005, 41 tuberculeux sont dépistés à la MACA, mais non conseillés ni testés au VIH. La forte séro-prévalence dans le pays (7%) et la situation particulière du VIH/SIDA dans les prisons entraînent une

analyse de la situation du VIH/SIDA et de sa prise en charge.

Objectifs :

- Décrire les résultats du dépistage volontaire du VIH/SIDA à la MACA
- Déterminer le niveau de coinfection TB/VIH à la MACA
- Décrire les résultats de la mise sous traitement anti-retroviral (ARV) des malades séropositifs

Methodologie : Etude prospective sur 275 détenus tous sexes confondus à la MACA, conseillés pour un test au VIH/SIDA du 02 Janvier au 31 Décembre 2006.

Parmi eux, dépistage de la tuberculose chez les suspects. Bilan initial pour un traitement ARV chez les patients séropositifs. Mise sous traitement ARV des patients éligibles.

Resultats : 275 patients conseillés, age moyen 23 ans, sexe ratio 5/1. Dépistage VIH/SIDA : 273 dépistés (99%), 2 refus (1%) ; 214 VIH Négatifs (78%) 59 VIH Positifs (22%). Dépistage Tuberculose/VIH : 61 Tuberculeux dépistés pour le VIH (61/273 soit 22%) dont 36TB/VIH Négatifs (59%), 25TB/VIH Positifs (41%).

Résultats traitement ARV/Cotrimoxazole des patients séropositifs éligibles : 22 sous traitement ARV (37%), 20 sous Cotrimoxazole (34%), 4 Décédés (7%), 13 Libérés de prison (22%).

Conclusion : Le dépistage VIH/SIDA est une nécessité dans les prisons. Forte prévalence du VIH/SIDA (22%) avec une coinfection TB/VIH élevée (41%). Traitement ARV et antituberculeux accessibles dans les prisons.

TB IN HIGH-BURDEN COUNTRIES: 4

PS-71772-12 An external review of internationally supported TB control projects in the Russian Federation

W Jakubowiak, I Danilova, D Pashkevich, A Korobitsyn. WHO Office in the Russian Federation, Moscow, Russian Federation. Fax: (+7) 495 7872149.
e-mail: w.jakubowiak@who.org.ru

Introduction: International collaboration has played a critical role in revision of the national TB control strategy in Russia. In 1994, the first territory started the TB control project based on the WHO strategy. Altogether there have been 50 projects working in the field of TB control, funded by 21 donors and implemented by 34 technical partners. A review of internationally supported TB control projects in the country was conducted by a panel of international experts in July 2006. One region was considered the 'control', i.e. where no international support for TB control has occurred.

Objectives: To assess all components of TB control in selected regions and document the impact originated by international collaboration.

Methods: Data analysis, site visits, and interviews of policy makers, stakeholders and partners, regional medical personnel and patients both in the civilian and penitentiary sectors.

Results: The international projects played a catalyzing role in the revision of the national TB control policy. Crucial components of TB control, such as detection, treatment, TB laboratory diagnosis, TB control activities in people living with HIV/AIDS (PLWHA) were revised and adopted. The capacity for TB control was strengthened, which facilitated the application for and implementation of the nationwide World Bank (WB) and Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) projects. However certain outcomes of the pilot projects are still suboptimal.

Conclusion: Recommendations were formulated based on the results of the review, among them to strengthen technical assistance and knowledge sharing rather than financial support; urgently address the threat of MDR/XDR-TB, TB-HIV and other challenges; and assist in establishing government training programs for TB managers and others.

PS-71994-12 Smear microscopy examination rate: a rational indicator for district-level programme performance in India?

A O O De Muynck,¹ S Sahu,¹ F Wares,¹ P K Dewan,¹ S S Lal,¹ L S Chauhan.² ¹Office of the WHO Representative of India, New Delhi, ²Central TB Division, Directorate General of Health Services, Ministry of Health and Family Welfare, New Delhi, India. Fax: (+91) 1123382483. e-mail: aimedemuynck@yahoo.com

Background: Sputum smear-positive (S+) case notification rate and case detection are key global TB programme indicators, but wide geographic and demographic variance in TB epidemiology makes interpretation challenging for local programme performance monitoring. In India, a system for internal quality assurance (QA) of smear microscopy services existed from 2000–2004, and external QA since 2004.

Aim: To explore the usability of TB suspect's examination rate as indicator for RNTCP performance monitoring.

Design: Retrospective cohort study of routinely collected RNTCP data.

Methods: Routinely-collected surveillance data from districts implementing the DOTS programme were analyzed for association between TB suspect's examination rate and S+ case notification rate.

Results: Sputum smear-positivity remained stable from 2000 to 2006 (median 12.2%, 25–75% range 12.1–12.8%), suggesting reasonably consistent microscopy quality. A strong association ($P = 0.003$) was observed between the case notification rate and the TB

suspect's examination rate (Figure), which was found in multivariate analysis to be independent of demographic, equity, health system, and DOTS implementation factors.

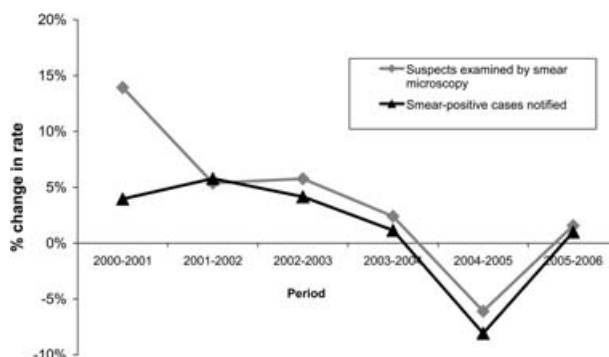


Figure Changes in TB suspect examination rate correlated with changes in smear positive case notification rate.

Discussion: In the Indian setting with quality-assured microscopy, changes in the rate of TB suspect's examination rate are independently associated with changes in S+ case notification rate.

Conclusion: TB suspect's examination rate may be a suitable indicator of case-finding activities at the district level, allowing a more close, prompt and effective monitoring of programme performance.

PS-72003-12 Treatment outcomes of tuberculosis in Brazil, 2001–2006

H Campos, L S Diniz, M A Hijjar, M J Procopio. Centro de Referencia Prof. Helio Fraga, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 25529500. e-mail: hisbello@globo.com

Aim: To present data regarding outcomes of tuberculosis treatment in Brazil during the period 2001–2006.

Method: Data was obtained from the Brazilian official system (SINAN), which includes diseases with compulsory notifications. Treatment outcomes from the cities where tuberculosis (TB) have higher incidence rates were compared with those where tuberculosis has a low incidence.

Results: According to the WHO, Brazil ranks 15th among the twenty-two countries where TB burden is higher worldwide over the last years. Notification rates in Brazil were around 80 thousand cases per year. Since the year 2000, one of the TB control national program's strategies has been to give priority to the cities with the highest rates of incidence. Among the 5500 cities all over Brazil, more attention and resources are being given to those that concentrate 80% of TB cases (around 300 cities). Overall, treatment outcomes during the period 2001–2006 (461 198 patients), were: cured/completed treatment = 56% (53–62%); died = 5% (5–6%); failed = 0%; defaulted = 9% (7–10%); transferred = 7% (6–8%); not evaluated = 21% (17–27%). When the cohort analysis compared treatment outcomes within the priority cities with

those in the cities where TB burden is lower, results were: cured/completed treatment = 58.3%/53.6%; died = 5.4%/5.4%; failed = 0.3%/0.2%; defaulted = 9.0%/5.8%; transferred = 6.1%/7.7%; not evaluated = 18.1%/25.1%.

Conclusion: Treatment success rates were higher in the cities where priority had been given. Although the default rate was apparently higher in these cities, it may be as a consequence of better quality of recording of information as in one fourth of the cases there was no information about outcome for the cities with lower prevalence rates.

PS-72018-12 Preliminary results of a tuberculosis prevalence survey in rural Western Kenya

A H van't Hoog,^{1,2} K Laserson,^{1,3} W Githui,⁴ H Meme,⁴ L Odeny,¹ J A Agaya,¹ B Muchiri,¹ J Odhiambo,⁵ M Ackers,^{5,6} B Marston,⁶ M W Borgdorff.² ¹Kenya Medical Research Institute, KEMRI/CDC program, Kisumu, Kenya; ²AMC/University of Amsterdam, Amsterdam, Netherlands; ³Centers for Disease Control and Prevention, Office of Global Health, Atlanta, Georgia, USA; ⁴Kenya Medical Research Institute, Centre for Respiratory Diseases Research, Nairobi; ⁵Centers for Disease Control and Prevention, Global AIDS Program, Nairobi, Kenya; ⁶Centers for Disease Control and Prevention, Global AIDS Program, Atlanta, Georgia, USA. Fax: (+254) 57 2022981. e-mail: avanthoog@ke.cdc.gov

Setting: A rural population of 136 000 with a TB notification rate of 400/100 000. HIV prevalence is 15% in adults and 75% in notified TB cases.

Objective: To determine the prevalence of smear(+) and culture(+) pulmonary tuberculosis (PTB).

Methods: Clusters of ~500 participants are sampled randomly, for a total sample of 20 000. All persons ≥15 years and resident for ≥1 month are eligible. Participants respond to a symptom questionnaire, undergo chest X-ray (CXR) at a mobile unit, and provide 2 sputum samples for fluorescence microscopy. Persons with CXR abnormalities or TB symptoms provide 1 additional sample for culture. TB cases are offered HIV testing and CD4 cell count.

Results: By 22 March 2007, 6425 participants are enrolled. Complete data is available from the first 9 clusters, and 4544 participants (63% females). 4273 (94%) produced the 2 required sputum samples. 862/4544 (19%) participants had TB symptoms and 4228 (93%) came for CXR, of which 1168 (28%) showed an abnormality. 26 persons with active PTB were identified, 14/26 (54%) female, median age was 40 (15–65); 19/26 (73%) were smear(+). 25 additional persons were already on TB treatment. Preliminary crude prevalence of PTB is 0.61% (0.38%; 0.84%). Of 15 active PTB cases with available HIV results 7 (47%) were infected, with median CD4 cell count 111 cells/μl (38–333).

Discussion: Preliminary TB prevalence is ~1.5 times the case notification rate. Approximately half of the

TB cases found were previously undetected, highlighting a need for intensified TB case finding.

PS-72022-12 A qualitative study of health-seeking behaviour of TB patients served in a rural setting in western Kenya

J G Ayisi,¹ A H van't Hoog,^{2,3} J A Agaya,² O Muhenje,⁴ B Marston.⁵ ¹Centre for Vector Biology & Control Research, Kenya Med, Kisumu, ²Kenya Medical Research Institute, KEMRI/CDC program, Kisumu, Kenya; ³Academic Medical Centre, University of Amsterdam, Amsterdam, Netherlands; ⁴US Centers for Disease Control and Prevention, Global AIDS Program, Nairobi, Kenya; ⁵US Centers for Disease Control and Prevention, Global AIDS Program, Atlanta, Georgia, USA. Fax: (+254) 5722981. e-mail: JAyisi@Kisian.Mimcom.net

Background: Delay in diagnosis of tuberculosis (TB) may contribute to poor outcomes and disease transmission. In preparation for a quantitative study, we conducted a qualitative pilot evaluation of potentially modifiable patient and provider related factors that delay diagnosis or impair adherence to care for symptomatic TB patients.

Methods: We selected all new pulmonary TB patients attending treatment for ≤1 month on scheduled TB clinic days at 9 public facilities in Siaya and Bondo Districts in September and October 2005, and administered semi-structured interviews using trained interviewers.

Results: Thirty-one participants were interviewed; 55% were aged 26–45 years, 13/31 (42%) were male. Reported time from initial symptoms to TB diagnosis ranged from 2 months to 9 years (median 11 months); 'lack of money' was the main reason reported for delay. 15 (48%) patients reported consulting a professional health care provider first upon feeling sick. 13 (42%) attended 3–6 providers before diagnosis. 16/31 (52%) did not perceive an HIV test as deterring TB suspects from seeking care. 30 had disclosed their TB disease to a close relative and did not feel stigmatized. Only 16% associated TB with cough, while 60% knew the duration and importance of completion of TB treatment.

Conclusion: This pilot study confirmed extensive delay (>2 months) in TB diagnosis and identified some reasons for delay, including poverty, that can be evaluated more thoroughly in a quantitative study.

PS-72027-12 Comparison of AFB smear and positivity rate in the diagnosis of pulmonary tuberculosis Brazil, 2001–2005

R Maia,¹ S V Jardim,¹ M Villatoro,² R G Abreu,³ S B Codenotti,⁴ M L Z Lise,⁴ V Souza Pinto,⁵ R A C Paula,⁵ R Rodrigues,² E A T Cunha,⁶ F Reis,¹ P Paine.⁷ ¹General Coordination of Public Health Laboratories/Epidemiological Surveillance Dept./Secretariat of Health Surveillance/Ministry of Health, Brazil, Brasília, ²Pan-American Health Organization, Brasília, ³Epidemiological Surveillance Dept./Secretariat of Health Surveillance/Ministry of Health, Brazil, Brasília, ⁴National Tuberculosis Control Program/Epidemiological Surveillance Dept./Secretariat of Health Surveillance/Ministry of Health, Brazil, Brasília, Distrito Federal, ⁵Task Force for the State of São Paulo of National Tuberculosis Control Program/Ministry of Health, Brazil, São Paulo, São Paulo, ⁶Public Health Laboratories of Mato Grosso do Sul, Campo Grande, Mato Grosso do Sul, ⁷United States Agency for International Development, Brasília, Distrito Federal, Brazil. Fax: (+55) 61 2107 4370. e-mail: rosalia.maia@saude.gov.br

Introduction: The Acid-Fast Bacilli Smear (AFB-smear) for tuberculosis (TB) is one of main axis of National Tuberculosis Control Program (NTCP) and also one of tool of DOTS strategy. In such case, the AFB-smear is the most useful resource by NTCP due to its simplicity, cost and quickness beyond diagnosis confirmation. **Objective:** To compare the positivity rate and the use of AFB-smear in the diagnosis of TB new cases from 2000 to 2005.

Method: It was analyzed the records of 63 838 and 69 700 new pulmonary tuberculosis cases, respectively into the TB Notification Information System (SINAN-TB) of Ministry of Health from 2000 to 2005. It was used the TABWIN software, version 3.4. for data tabulation.

Results: Among the total of pulmonary cases 83.4% were investigated with AFB-smear distributed in 62.7% of positivity and 20.7 negative cases in 2000. Comparing with data of 2005, it was observed that from 27 Federated Unities it was a lessening of positivity in 14 Federated Unities of all cases and also the investigation by AFB-smear reduced in 14 Federated Unities. However, considering the national consolidation, it was observed an increase of 1.0% of AFB-smear use. The higher increase occurred in the State of Mato Grosso do Sul with a positivity of 13.6% and 11.8% of AFB-smear investigation. Analyzing all 5 Brazilian geographical regions, 4 increase the AFB-smear investigation with a mean of 11.5%. The Northern region presented a lessening of 13.3%.

Conclusion: Despite the offer of AFB-smear for all suspects for pulmonary TB over 15 years old has been advocated, it has observed that more than 15.0% do not done it. Then, it recommends a major use of AFB-smear in order to improve the TB diagnosis in the country and also the use of culture for the convenient diagnosis of TB with the negative result of AFB-smear.

PS-72035-12 The risk of tuberculosis transmission in a hospital emergency department in a high prevalence area

A R Escombe,^{1,2,3} L Huaroto,⁴ E Ticona,⁴ M Burgos,⁵ I Sanchez,³ L Carrasco,⁴ F Flores,⁶ R H Gilman,^{6,7} D A J Moore.^{1,2,6} ¹Department of Infectious Diseases and Immunity, Imperial College London, London, ²Wellcome Trust Centre for Clinical Tropical Medicine, Imperial College London, London, UK; ³Asociacion Benefica PRISMA, Lima, Peru; ⁴Hospital Nacional Dos de Mayo, Lima, Peru; ⁵University of New Mexico, Albuquerque, New Mexico, USA; ⁶Universidad Peruana Cayetano Heredia, Lima, Peru; ⁷Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA. Fax: (+44) 2075943894. e-mail: rodescombe@yahoo.co.uk

Background: Emergency rooms (ERs) are important sites of nosocomial tuberculosis (TB) transmission. They are often overcrowded, and TB patients are likely to be untreated and thus highly infectious. TB infection control measures are often poorly implemented in ERs, especially in low resource settings.

Aims: To measure the burden of TB disease presenting to an ER in Lima (Peru) and TB infection risk amongst staff.

Methods: Over one year a sputum sample for TB culture was requested from all consenting patients spending >4 hours in the ER irrespective of presenting complaint. Consenting ER staff were tested at baseline and after one year using the Quantiferon ESAT-6 in-the-tube assay (QFN). Weekly work diaries were maintained. Room ventilation was measured using a carbon dioxide tracer gas technique.

Results: Of 845 ER attendances studied, TB was diagnosed in 174 (153 patients). 115 were sputum smear positive, accounting for 71% of 2246 TB patient hours in the ER, and 52 (30%) had MDR-TB. 33% had pre-existing TB diagnoses, 36% were TB suspects, and 31% were unsuspected, incidental TB diagnoses. At baseline 56% of 50 clinical and 20 non-clinical staff recruited were QFN positive. 27 of 31 baseline-negatives consented to follow-up testing after one year and 8 (30%, all clinical staff) tested positive. The calculated risk of acquiring TB infection (assuming zero risk outside the ER) was 0.0083 per 1000 person-hours ER exposure, equivalent to an infection incidence of 7271/100 000 per year. Despite room ventilation within guidelines for air changes/hour (mean 9.3), absolute ventilation per person was poor due to overcrowding in observation wards. Personal respirator use by staff was sporadic.

Discussion: ER staff in high prevalence settings are exposed to a high burden of TB in the workplace. A significant proportion of this TB may be unsuspected—31% of patients in this study. TB infection control should be a priority in emergency departments in high prevalence settings.

PS-72063-12 Why does successful TB control not reduce the disease case rate?

S Özkara,¹ S Arpaz,² S Keskin,² N Sezgin.² ¹Ataturk Chest Diseases Hospital, Ankara, ²Nazilli Tuberculosis Dispensary, Aydin, Turkey. Fax: (+90) 3123552135. e-mail: ozkaraseref@yahoo.com

Tuberculosis incidence in developed countries decreased 4–5% yearly prior to chemotherapy and 12–13% yearly during 1950–1980 period. Karel Styblo stated that case finding and treatment results in a 8% decrease in the incidence yearly (K. Styblo. Epidemiology of Tuberculosis, 1991). Our dispensary has a stabilized population rate of approximately 285 000. Case finding and treatment success were high in our region for many years. In addition to this, BCG vaccination and preventive drug therapy have been carried on. The objective of this study is to evaluate the effect of these applications on TB case rate. There were mean 98.5 (83–121) TB cases registered yearly in our dispensary for 11 years (between 1996–2006). 25.1% were extra-pulmonary and 74.8% were pulmonary cases. Smear positivity among whole cases were 42.1%. In 11 years only 3 cases defaulted. Treatment success rate was over 90%. Also cure rates have been more than 90% among smear positive cases. Preventive treatment was given to mean 2.5 persons for each TB case. Case rates per hundred thousand for all patients from 1996 to 2006 were 34.5, 42.3, 35.0; 39.5, 30.8, 29.1, 29.8, 38.3, 31.3, 35.5 and 33.5, respectively. Yearly decrease in the case rates were about 1.5%. Which factors may have an impact on this result? Progress in the TB control in the last 10 years, increase in notifications, increased rate of recorded patients to dispensary may have influences, but we do not think these factors are important for our dispensary. Styblo's statement about developed countries is controversial for our situation. For this reason, operational research is necessary in our region for this subject.

PS-72069-12 Challenges in the implementation of a TB prevalence survey in Western Kenya

J A Agaya,¹ A H van't Hoog,^{1,2} L Odeny,¹ J Onyango,³ B Muchiri.¹ ¹Kenya Medical Research Institute, KEMRI/CDC Program, Kisumu, Kenya; ²Academic Medical Centre, University of Amsterdam, Amsterdam, Netherlands; ³Centers for Disease Control and Prevention, Global AIDS Program, Kisumu, Kenya. Fax: (+254) 57 2022981. e-mail: Jagaya@ke.cdc.gov

Setting: A tuberculosis prevalence survey, initiated in August 2006 in a rural population of 136 000 monitored by demographic surveillance (DSS).

Method: The study targets 20 000 residents ≥ 15 years, and enrolled 6425 by March 2007. Participants are consented, interviewed, and requested for 2 sputum samples at home; and go for chest X-ray (CXR) at a mobile unit in their village. An additional sputum

sample for culture is requested in case of CXR abnormalities or suggestive symptoms. Identified TB cases are managed by the Ministry of Health TB treatment program.

Challenges:

Enrolment: Of the selected population from the DSS sampling frame, 34% had moved, died or could not be found. 11% of eligible persons refused participation.

X-ray: 93% of enrolled participants were X-rayed. Inaccessible roads due to bad weather, and equipment breakdowns interfered with X-ray appointments. Unfamiliarity with CXR procedures initially delayed participant flow.

Sputum collection: Only 3% did not give sputum; however, 34% of the samples given were saliva, and 20% were below the preferred quantity of 3ml.

Data management: Personal Digital Assistants (PDA) improve speed of data capturing, however combining all data sources into timely available results for the participant remains a challenge.

Lessons learnt: Planning, training, close supervision and attention to details are important for smooth operations. Instruction materials on sputum collection and CXR procedures improved understanding of study procedures.

PS-72070-12 Simulation and prediction of tuberculosis evolution in China

X X He. Department of Tuberculosis Control, Beijing Institute F, Beijing, China. Fax: (+86) 1062253913. e-mail: hexiaoxin68@sina.com.cn

Aim: To give an accurate prediction of national tuberculosis epidemic evolution.

Design: Firstly, to simulate the national tuberculosis epidemic evolution in 1990–2000 with an established theoretical model, then to evaluate the significance of the model by goodness of fit of simulated epidemic with surveyed epidemic parameters determined in 2000 national sampling tuberculosis survey, and then, national tuberculosis epidemic evolution is predicted with the evaluated model.

Results:

- Simulation of national tuberculosis epidemic evolution in 1990–2000: in the Tuberculosis Control Project area, the case number of new active tuberculosis (TB) decreased by 28.71%, with an annual decrease rate of 3.33%; in non-Project area, the case number of new active tuberculosis decreased by 11.32%, with an annual decrease rate of 1.19%.
- Goodness of fit: simulated active tuberculosis prevalences in the project and non-project area were 353.49/100 000 and 408.42/100 000 respectively; and the simulated smear positive tuberculosis prevalences were 99.09/100 000 and 123.04/100 000. They were all compatible with the surveyed prevalence parameters.

- Prediction of the epidemic evolution in 2000–2020: assuming that HIV infection maintains at 85/100 000, national tuberculosis epidemic decreased very slowly during 2000–2020. The active tuberculosis prevalence will decrease by 15.89%, the smear positive tuberculosis prevalence will decrease by 13.75% in project area; assuming that HIV infection increases at the current speed of 20%, the tuberculosis epidemic will reverse from decreasing to increasing during 2000–2020, the active tuberculosis prevalence will increase by 54.21%; the smear positive tuberculosis prevalence will increase by 63.88% in project area.

PS-72076-12 How was the Turkish National TB survey study (TUTSA) conducted?

S Özkan,¹ F Gümüşlü,² Ü Güllü,² S Ypek,² F Baykal,² M Akça,² S Özkara.³ ¹Central TB Dispensary, Ankara, ²Department of TB Control, MoH, Ankara, ³Atatürk Chest Diseases Hospital, Ankara, Turkey. Fax: (+90) 3123552135. e-mail: ozkaraseref@yahoo.com

Our purpose was to collect and analyse the case-based data of tuberculosis (TB) patients registered in 2005 by dispensaries, in conformity with the definitions of World Health Organisation (WHO). For the Turkish National Tuberculosis Survey Study (TUTSA) conducted by Epidemiology Section of TB Control Department, a data collection sheet and a guideline were prepared and piloted in 25 dispensaries. A special software was prepared, a network of 5 computers was built and staff was trained. TUTSA was demonstrated to dispensary doctors during training activities in June 2006. Patient records have been collected taking into account the principals of data confidentiality after accuracy and completeness checks conducted by Provincial TB Coordinators. The sheets arriving the TB Control Department have been assessed by experienced staff. Missing/erratic data have been completed/corrected via communication with dispensaries. Finding out that smear results were recorded but not all cultures and drug sensitivity testing (DST) results, these results were asked from 10 laboratories including National Reference Laboratory, Regional TB Laboratories and Laboratories of Chest Hospitals. Following pairing and confirmation of data, additional information was recorded. For instance 31% increase was observed in the information recorded in DST results following 888 additional data entry. A check of patient list revealed out that 2.4% of patients ($n = 499$) were recorded more than one (where 486 were double, 13 were triple) in different dispensaries with the same case definition. A single record was kept excluding the others. Case-based patient data have been reported to EuroTB and WHO. The case-based data of annual cohort of all TB patients countrywide has been collected and analysed for the first time by repeated confirmation and validation. Multiple recordings of pa-

tients have been eliminated. It is demonstrated that complete and accurate case-based TB data can be obtained by this system.

PS-72103-12 Tuberculosis mortality in Brazil: the metropolitan areas

L Marin-Leon, H B Oliveira. State University of Campinas, Campinas, Sao Paulo, Brazil. Fax: (+55) 1935218036. e-mail: leticia@fcm.unicamp.br

With the aim of studying the adult mortality from tuberculosis in metropolitan areas, in Brazil, it was performed a descriptive study. The number of deaths was obtained from the National mortality data bank, and was organized by sex in two age groups—20 to 59 years and 60 years and older, in the period 1996–2004. Population data were obtained from the national institute of statistics (IBGE). The metropolitan areas included were those in the national sample household survey (PNAD 2004) from which were obtained same socioeconomic variables, for a correlation analysis.

Respiratory TB accounts for 91% of TB cases in all the period in men 20–59 and declined from 95 to 92% in men 60 and older. In 2004 there were 2360 deaths from all forms of TB in these metropolitan areas, 24% less than in 1996. Both sex and age group showed a declining trend of respiratory TB mortality rate, in men 20–59 it diminished from 10.74/100 000 to 6.57/100 000 men; in old men from 36 to 23.25/100 000 men. Women had a much lower mortality; in 2004 the male/female ratio was 3.6 in the 20–59-age group and 3.5 in the older ones. In 2004 it was observed a positive correlation of TB mortality rate among men 20–59 with unemployment of the head of the house ($P = 0.023$); among older men correlation with living on a per capita earning of up to a quarter of minimum wage ($P = 0.043$); with the proportion of families in moderate or severe food insecurity ($P = 0.013$). Female TB mortality rate correlated with precarious work among the 20–59 age group ($P = 0.009$) and among the old ones with the proportion of households with more than one family ($P = 0.020$). Even though the trend is declining, metropolitan areas are of concern because they congregate 61% of the deaths of their state, provably because of the poor living conditions.

PS-72125-12 Undiagnosed infectious tuberculosis in Harare, Zimbabwe: HIV, past TB treatment and other risk factors

E L Corbett,^{1,2} T Bandason,² Y B Cheung,¹ B Makamure,² E Dauya,² R Matambo,² S S Munyati,^{2,3} G J Churchyard,^{1,4} A E Butterworth,^{1,2} S Mungofa,⁵ R J Hayes,¹ P R Mason.²

¹Infectious and Tropical Diseases, London School of Hygiene, London, UK; ²Biomedical Research and Training Institute, Harare, ³National Institute of Health Research, Harare, Zimbabwe; ⁴Aurum Institute, Johannesburg, South Africa; ⁵Harare City Health, Harare, Zimbabwe. Fax: (+263) 4735033. e-mail: elc1@ecoweb.co.zw

Background: Community-based surveys for undiagnosed TB provide a rigorous assessment of TB control that can be combined with incident data to estimate case-detection rates. Before the start of an intensified case-finding intervention, we carried out an HIV and TB prevalence survey in the high density residential suburbs of Harare.

Methods: All consenting adults in selected households (random 12% sample of 41 263 enumerated) answered a questionnaire, provided 'spot-morning' sputum for TB culture, and blood for HIV. TB suspects (>1 TB symptom, and/or screening culture positive) had screening smears read and were followed up to confirm or exclude TB.

Results: 10 079 (81%) participants provided sputum and 9076 (73%) provided blood. HIV prevalence was 21%. 40 participants were smear-positive and 66 culture-positive (prevalence: smear-positive 0.40%; culture-positive 0.66%). HIV was a significant risk factor for prevalent smear- and culture-positivity (unadjusted population attributable fractions [PAF] 35% and 42%, respectively), with male sex, middle age, being a recent (last 2 years) TB contact, and crowding also significant, whereas drinking and smoking were not. Past TB treatment was a significant risk factor for culture-positivity in HIV-negative (PAF 14%) but not HIV-positive (PAF 0.5%) participants ($P = 0.006$ for effect modification). Comparison with case-notification rates of HIV-positive and HIV-negative TB from the same suburbs implies delayed diagnosis, with duration of smear-positivity for HIV-negative patients double that of HIV-positive TB.

Conclusions: There is a substantial burden of undiagnosed infectious TB in urban Harare disproportionately affecting men, HIV-infected individuals, and households that are crowded or have recently been affected by TB. The main problem appears to be low case-detection rates, with suboptimal past TB treatment adding to the burden only in HIV-negative participants.

PS-72133-12 HIV co-infection and multidrug-resistant tuberculosis in Brazil

J L Rocha,¹ M D Dalcolmo,² L G Bastos,¹ J Keravec,¹

M A Hijjar.² ¹Projeto MSH, Rio de Janeiro, Rio de Janeiro, ²Centro de Referência Professor Hélio Fraga, Rio de Janeiro, Rio de Janeiro, Brazil. Fax: (+55) 2138331656.

e-mail: jorgeluiz.rocha@yahoo.com.br

Introduction: Tuberculosis control is priority worldwide and the HIV co-infection with MDR TB are hard challengers to control this endemic disease. Brazilian's Ministry of Health uses a standard scheme to treat all cases with five drugs, during 18 to 24 months.

Methods/Results: The CRPHF and Projeto MSH have developed a new data management information system for MDR TB, with 2559 cases registered since 1995. Consulting the system, the survey data about the HIV co-infection show: 98.3% have HIV test done and 7% are positive; 89% of them are acquired resistance; 71% are men; 60% are whites; 78% are between 24 to 44 years old; 87% are pulmonary cases (55% bilateral with cavity and 23% not cavity), 7% extra pulmonary and 5.5%, disseminated; 46% cured, 32% died, 12% defaulted and 10% failed.

Conclusions: In Brazil, MDR TB cases have not directly association with HIV infection. In comparing MDR TB cases with and without HIV co-infection, both groups present demography characteristics and pattern resistance similar; extra pulmonary and disseminated presentations are more often in co-infections cases. The outcome of the co-infected group was worse: the cure decreased 18%, the death increased 13% and defaulted, 4%.

PS-72146-12 Profile of patients with failure to the treatment of MDR-TB in the State of Sao Paulo from 1999–2004

M Oliveira. Health Secretary of Sao Paulo State-Surveillance Epid, São Paulo, São Paulo, Brazil. Fax: (+55) 1150714550. e-mail: viudeoli@terra.com.br

Multidrug-resistant tuberculosis defined as resistance to at least rifampicin (RIF), isoniazid (INH) and some-one drug of the therapeutic regimen used in Brazil, or failure to regimen III.

Objective: This study was to characterize the profile of patients notified to the Tuberculosis Control Program of the State of São Paulo, from November 1999 through December 2002 and treated with standardized regimen for MDR-TB and had failure to this treatment.

Methods: This was a retrospective study of 170 patients that had MDR-TB notifications and treated with standardized regimen for the health ministry of the Brazil for MDR-TB (amicacin, ofloxacin, terizidone, clofazimine and ethambutol) were 15 cases of failure had been identified.

Results: The variables analyzed were as follows: 53.3% (08/15) were male, predominantly in the 40–

49 age group; 13.3% (2/15) were diabetics and 6.7% (1/15) had AIDS. The pulmonary TB was present in 100% of the patients and had multiple cavities. From the 15 patients studied previously treated with average five treatments, 80% (12/15) were treated under DOT. Sensibility tests was available all patients was 100% resistant the RIF and INH, 73.3% resistant the streptomycin, 33.3% resistant the ofloxacin, 13.3% resistant the thezidion. Outcomes of chemotherapy: 33.3% (5/15) deaths, 40% (6/15) abandoned treatment and 26.7% (4/15) was failure treatment MDR-TB. **Conclusion:** It has necessity to speed the diagnosis and the sensibility test for MDR-TB, having better results of treatment.

PS-72153-12 Recurrent TB and death among patients successfully treated with individualised MDR-TB regimens in Lima, Peru

S Appleton,^{1,2} M Franke,^{1,2} J Bayona,^{1,2} K Chalco,¹ L Lecca,¹ Y Videla,¹ M Becerra,² S Shin,² M Murray,³ C Mitnick.²

¹Partners In Health/Socios En Salud Sucursal Peru, Boston, Massachusetts, ²Harvard Medical School, Boston, Massachusetts, ³Harvard School of Public Health, Boston, Massachusetts, USA. Fax: (+1) 617 432 6045. e-mail: sapppleto@hsph.harvard.edu

Background: Programs to treat patients with multi-drug-resistant tuberculosis (MDR-TB) have only recently been implemented and scaled up. Few reports exist where patients treated for MDR-TB have been followed after cure. Post-treatment follow up is essential for assessing the efficacy of MDR-TB therapy.

Aim: To determine the incidence of recurrent TB and mortality in patients classified as cured by an MDR treatment regimen, and to identify risk factors associated with these poor outcomes.

Design: We conducted a retrospective cohort study of patients initiating a fully supervised and individualized treatment regimen for MDR-TB in Lima, Peru between February 1999 and July 2002. At least once between the date of cure and the end of follow-up (December 31, 2006), we assessed the status of all patients classified as cured at the end of therapy.

Results: 440 (67.1%) of 656 patients who initiated an MDR-TB regimen in the enrollment period were classified as cured. 397 (90.2%) were interviewed and/or made at least one health center visit during the follow-up period. The median duration of follow-up was 19.4 months (IQR 10.7–27.0). A total of 17 patients were found to have recurrent TB and 7 patients died. The combined rate of recurrent TB and mortality was 3.1 per 1000 person-months (95%CI: 1.98, 4.61). After controlling for age, duration of the individualized regimen, and prior exposure to a standardized MDR-TB regimen, a diagnosis of diabetes mellitus (HR:5.68; 95%CI: 1.35,23.9) and time (months) to initial sputum culture conversion (HR: 1.14; 95%CI: 1.01, 1.29), remained significant predictors of recurrent TB and death.

Conclusions: This report describes the largest patient cohort followed after cure on MDR-TB therapy. The incidence of recurrent TB and death within the first 19 months after cure among patients who were cured by individualized regimens is low, suggesting that cure is sustainable in MDR-TB patients who receive adequate and supervised regimens.

PS-72157-12 Diabetes mellitus among MDR-TB patients enrolled under programmatic MDR-TB management in the Philippines

L M Macalintal,¹ J M Aragon,² M S Gler,¹ R B Orillaza,¹ M D I Quelapio,¹ T E Tupasi.¹ ¹Tropical Disease Foundation, Makati City, Metro Manila, ²Makati Medical Center, Makati City, Metro Manila, Philippines. Fax: (+632) 81202874. e-mail: tarcelasg@yahoo.com

Objective: To describe the prevalence of DM among MDRTB patients and the demographic features of these MDRTB patients with DM as well as their treatment outcomes.

Methods: Review of patient data among MDRTB patients diagnosed in the Makati Medical Center, Makati, Philippines from January 2001 to March 2007. And chart review among patients enrolled from 2001 to March 2007 who were diagnosed to have diabetes mellitus prior to treatment.

Results: Among 641 MDRTB patients enrolled from 2001 to March 2007, 129 were found to have DM. Among 75 DM patients who had data on FBS and creatinine level, 51 (68%) were male. Age ranged from 31 to 66 years old (average of 48.2 years) with average duration of DM of 5.68 years. Average BMI was 21.50 kg/m². Average BMI for patients without diabetes was 16.4 kg/m². Average FBS was 161.64 mg/dl. Thirty five (47%) patients are taking Oral Hypoglycemic Agents (OHA), 18 (24%) on insulin, 5 (7%) were not taking any medications, and 2 (3%) on combination of insulin and OHA, and 15 (20%) had no data. Eight (11%) patients have abnormal creatinine on baseline exam. Of the 43 patients who had outcomes, cure rate is 86% (37 patients), 7% (3 patients) died while on treatment, and 7% (3 patients) defaulted.

Conclusion: With 20%, the prevalence of DM among DM is very high, compared to the general population. However, with a good treatment program, a high cure rate could still be achieved even in patients with comorbidity such as DM. These patients need closer supervision and attention as they are more prone to complications during treatment.

PS-72184-12 Drug-resistant tuberculosis among paediatric household contacts of MDR-TB patients in Makati Medical Centre

M R Alcaneses,¹ G I Balane,¹ S R Pancho,¹ C S Palypayon,² T E Tupasi.¹ ¹Tropical Disease Foundation, Makati City, ²Department of Pediatrics Makati Medical Center, Makati City, Philippines. Fax: (+632) 8102874. e-mail: mralcaneses@yahoo.com

Objective: To describe the prevalence of drug-resistant tuberculosis among pediatric household contacts of MDRTB patients at a private-public mix DOTS in Makati Medical Center.

Methods: Records of 834 pediatric household contacts of 477 MDRTB index cases enrolled in PMTM program from 1999–2006 were reviewed.

Results: There were 395 males and 382 females. The number of patients with age <5 years were 240 (28.7%); 6–10 = 249 (29.8%); 11–15 = 218 (26.1%); and 16–18 = 127 (15.2%). One hundred of these cases had a history of TB treatment (16.4%); 388 (46.5%) of cases were symptomatic; PPD > 5 mm were observed in 203 patients (24.3%), chest X-rays with possible tuberculosis were seen in 37 (4.4%) of these cases, 684 (82%) with normal X-rays. AFB smears were taken in 96 patients (11.5%) showing positive smears in 1 (0.1%); culture-positive for *Mycobacterium tuberculosis* in 2 (2%), mono/polyresistance in 2 (0.2%) and MDRTB in 2 patients (0.2%). Of the four cases with drug resistance, only one had a history of prior treatment, 50% were asymptomatic, all four had abnormal chest X-rays but only one with cavitory TB.

Conclusion: Although the prevalence of MDRTB among pediatric cases is low in our population, these cases would have been missed if active contact screening were not done.

TB-HIV: 2

PS-71913-12 VCCT adequacy and treatment outcome of a cohort of TB-HIV co-infected patients in Myanmar

T L Lwin,¹ W M Maung,¹ S S S Shein,¹ T M M K Khaing,¹ M T Thwe,² A M S Soe,² H A Aung,² H Kluge,³ C C Casalini.³ ¹National TB Programme, Yangon, ²National AIDS Programme, Yangon, ³World Health Organization, Yangon, Myanmar. Fax: (+95) 1212605. e-mail: klugeh.whomm@undp.org

Background: Since 2005, two TBHIV pilot sites in Myanmar (covering a population of 528 609) are implementing joint TBHIV collaborative activities under the national AIDS and tuberculosis programmes and supported by WHO country office.

Objective: To evaluate the TBHIV activities.

Methods: Quarterly field missions for quantitative and qualitative monitoring.

Results: TB and STI/OI care is provided respectively by TB centre and STI clinic within the same compound, while ART is distributed at another health facility, at 0.5 miles distance from TB and STI services.

Pre and post-counseling for TB patients is offered at TB centre and HIV testing at STI clinic; TB patients or blood samples are referred for testing and the result is provided within a week.

Among 3296 TB patients notified up to December 2006, HIV VCCT has been offered to 58% with an acceptance rate of 52%. VCCT was accepted by 51 partners, among whom 20 (39%) were HIV positive.

Among 992 HIV positive TB cases (17% of those who accepted), 61% were PTB ss–, 34% PTB ss+, 5% EPTB, all receiving CPT during TB treatment. 9% of the patients were under ART. The majority were between 25–34 years of age.

Among the 2005 cohort of 70 TBHIV patients, 48 (69%) were successfully treated and 15 (21%) died.

Conclusion: VCCT is offered to a modest proportion of TB patients and acceptance is suboptimal. CPT is fully available; ART is available for a limited number of patients, due to geographical selection as limiting criteria.

PS-71968-12 Integrating HIV care and treatment with TB services in rural Kenya: a case study from Kericho District Hospital

E Obiero,¹ H Muttai,² J Bett,² C Sigei,² F Sawe,² J E Carter,³ T Hamm,⁴ D Shaffer.⁴ ¹Kenya Ministry of Health, Kericho, ²Kenya Medical Research Institute, Kericho, Kenya; ³Brown University, Providence, Rhode Island, USA; ⁴United States Military HIV Research Program, Kericho, Kenya. Fax: (+254) 052 30546. e-mail: hmuttai@wrp-kch.org

Context: In 2005, a combined TB-HIV clinic was opened at Kericho District Hospital in an effort to improve quality of service to co-infected patients.

Methods: Retrospective chart review.

Findings: During a 12 month period, the clinic evaluated 1226 TB patients, of whom 1155 (94.2%) were tested for HIV, and 577 (50.0%) were co-infected. Of the TB-HIV co-infected patients, 505 (87.5%) had pulmonary TB, and 72 (12.5%) had extra-pulmonary TB. Among patients with pulmonary TB, 440 (87.1%) had sputum smears done, 202 (45.9%) being sputum positive. Among 500 co-infected patients completing 8 months of TB therapy, 303 (60.6%) received anti-retroviral therapy based upon baseline CD4 distributions (cells/mm³): 99 (19.8%) < 50, 86 (17.2%) 51–100, 118 (23.6%) 101–200, and 197 (39.4%) > 200. The highest TB treatment success rate was among patients with CD4 counts 101–200 (76.3%). The lowest treatment success and highest mortality rates were among those with CD4 < 50, 61.6% and 21.2%, respectively.

Conclusions and Recommendations: Patients with TB-HIV co-infection often present with sputum negative,

pulmonary TB and advanced HIV. Our case study suggests that successful integration of HIV and TB services can occur in rural, resource limited settings with good clinical outcomes, although evaluation of co-infected patients early in their disease is necessary. Further studies evaluating best clinical practices regarding timing of antiretroviral therapy initiation are warranted.

PS-71986-12 Isolation and speciation of mycobacteria from AIDS patients in a rural teaching hospital in central India

R Narang,¹ P Narang,¹ A P Jain,² D K Mendiratta,¹ A Wankhade,¹ R Joshi,^{2,3} D Van Soolingen,⁴ T Van Laan,⁴ R A Ollar.⁵ ¹Microbiology, Mahatma Gandhi Institute of Medical Science, Wardha, Maharashtra, ²Medicine, Mahatma Gandhi Institute of Medical Sciences, Wardha, Maharashtra, India; ³Div. of Epidemiology, School of Public Health, University of California, Berkeley, Berkeley, California, USA; ⁴National Mycobacteria Reference Laboratory, Bilthoven, Bilthoven, Netherlands; ⁵Molecular Biology, St. Vincents Hospital, New York, New York, USA. Fax: (+91) 7152284333. e-mail: rxnarang@yahoo.com

Background: Mycobacterial infections are common opportunistic infections in AIDS patients. While *Mycobacterium tuberculosis* can cause disease at any stage of HIV infection, non-tuberculous mycobacteria (NTM) cause disease in patients with CD4 counts less than 200 cells/cumm. The present study was undertaken to speciate and characterize mycobacteria isolated from AIDS patients in a rural hospital in central India.

Methods: A cross-sectional observational study was conducted over one year period (2005–2006) at a rural teaching hospital in India. All consenting HIV seropositive individuals, of 18 years or more in age, with either low CD4 counts (<200 cells/mm³) or with active tuberculosis were included in the study. ZN stained smears were examined for all samples, and mycobacterial cultures were obtained on their blood (Using BACTEC 13A medium), sputum, stool and other clinically relevant samples (Using Löwenstein-Jensen and BACTEC 12B medium). Paraffin coated slides were used for isolation of NTM. Identification of the isolates was performed using phenotypic methods in our laboratory and genotypic methods in National Mycobacteria Reference Laboratory, Bilthoven, The Netherlands.

Results: Most of the 94 patients included in the study, were young (88% in age group 25–54 years), and had symptoms suggestive of TB (65%). A total of 16 mycobacterial isolates were isolated from 14 patients (14.89%), comprising of *M. tuberculosis* (9), MAC (3), *M. simiae* (3) and unidentifiable mycobacterial species (1). Mycobacteria were isolated from various samples viz. sputum (8 *M. tuberculosis*), stool (1 *M. avium* and 1 *M. simiae*) and blood (2 MAC, 2 *M. simiae*, 1 *M. tuberculosis* and 1 unidentifiable mycobacterial species). In two patients same species was recovered from both blood and stool.

Conclusion: Both *M. tuberculosis* and NTM are important pathogens in AIDS patients in our area. Mycobacterial isolates from such patients should be speciated as treatment is different for each species.

PS-71999-12 Risk of disseminated BCG disease in HIV-infected South African infants

A C Hesselning,¹ H Jansen,² A Whitelaw,³ W Brittle,¹ J Nuttal,² B Eley,² B J Marais,¹ M F Cotton,¹ H Rabie,¹ N Beyers,¹ H S Schaaf.¹ ¹Desmond Tutu TB Centre, Department Paediatrics and Child Health, Cape Town, ²Department of Paediatrics, University of Cape Town, Cape Town, ³Department of Medical Microbiology, University Cape Town and NHLS, Cape Town, South Africa. Fax: (+27) 21 9389719. e-mail: annekeh@sun.ac.za

Aim: To estimate the risk of disseminated BCG disease (dBCG) in HIV-infected infants.

Design: Prospective hospital-based surveillance study.

Methods: All clinical and laboratory-confirmed cases of dBCG disease in infants <1 year of age presenting to paediatric referral hospitals in Cape Town, South Africa, from January 2004–December 2006 were used as numerator data. Denominator data were obtained through estimating the total number of HIV-infected infants receiving BCG based on 98% vaccination coverage, combined with population data on the total number of HIV-infected infants based on maternal HIV prevalence (15.4–17.2%) and likely scenarios (5–10%) for the rate of vertical HIV transmission.

Results: There were 25 cases of dBCG; 24 in HIV-infected infants. The estimated risk of developing dBCG amongst HIV-infected infants was 938–1259/100 000, 586–802/100 000 and 468–630/100 000 vaccinees, assuming 5%, 8%, and 10% vertical HIV transmission, respectively.

Conclusions: The calculated risk of dBCG is considerably higher compared with earlier estimates. Improved surveillance is essential to more accurately estimate the safety of BCG in HIV-infected infants. The risks of BCG vaccination may outweigh the benefits in HIV-infected infants.

PS-72051-12 Aspects de la découverte de l'infection VIH associés avec la tuberculose primaire multi-drogue résistance

L M Marandici. Département des Institutions Prisonnières, Mi, Chisinau, Moldova. Fax: (+373) 22 77 43 03. e-mail: ludmilamarandici@yahoo.com

Le but : Etudier des nouveaux cas de la tuberculose (TB) aux patients infectés HIV pendant les années 2005–2006.

Résultats : Parmi les 315 patients des Institutions prisonnières infectés HIV (pendant deux ans) ont fait de la TB primaire 27 patients (8,6%). Ainsi, au 51,9% a été découverte l'infection HIV grâce au test obligatoire. Environ 70,3% des cas sont à l'âge de 25–35 ans. La

TB apparaît dans 59,2% sous le phénotype de l'immunité réduite, c'est-à-dire CD4 <200 cellules.

Dans la structure des formes cliniques prédomine dans 74% cas, la TB infiltrative, dans 18,5% cas la TB disséminée. La présence des destructions a été dans 29,6% cas. La méthode de la bactérioscopie a découvert 12 patients bacillaire (44,4%). Par la sémination de la spoute, à la micobacteria-tuberculosis ont enregistré croissance 48,1% cas, dont 61,5% ont eu multi-drogue résistance (MDR) aux médicaments de la 1-ère génération (6 cas-HRES, 2 cas-HRS), mais dans 15,5% cas a été établie la mono résistance (S). Le décès est arrivé en moyen pendant 2 mois de traitement, plus fréquemment à cause de la TB disséminée dans 60% cas, dont 50% ont été des formes MDR. Dans 33,% cas a été commencé la thérapie anti-retro virale avec EFV + 3TC + AZT. Une évolution favorable de la TB associée avec l'infection HIV a été enregistré dans 29,6% cas, la mort est arrivée dans 29,6% cas.

Conclusions : Croît le nombre des patients infectés HIV parmi les malades avec de la TB et se constate jusqu'à 61,5% de la TB primaire à MDR.

La TB accroît la diminution de l'immunité, étant la principale cause des décès suite à l'infection HIV.

PS-72053-12 Aspects de la découverte de l'infection VIH et de la tuberculose en prisons

L M Marandici, D S Doltu Svetlana. Département des Institutions Prisonnières, Mi, Chisinau, Moldova.
Fax: (+373) 22 77 43 03. e-mail: ludmilamarandici@yahoo.com

La République de Moldavie a une population d'environ 4 millions habitants. Dans les prisons du pays se trouvent 9000 personnes (0,2% du total de la population adulte). L'incidence globale de la tuberculose a été en 2003 de 108,4/100, en 2004—de 122,0/100 000, tant dit ce que dans les prisons de la République elle était de 15 fois plus grand (en 2003—de 1628/100 000 ; en 2004—de 1928/100 000). La découverte de la tuberculose dans la sphère des prisons, parmi les personnes qui s'adressent, est très active, à peu près dans 80% des cas (par le contrôle radiologique qui s'organise deux fois par an) et à l'investigation des symptomatiques (par la bactérioscopie de la spoute à BAAR). Le traitement anti-tuberculose de court durée est strictement surveillé, par des schémas standardisée recommandée par l'OMS (DOTS).

La tuberculose, étant une maladie d'indicateur HIV, on effectue des testes de la présence du virus HIV à tous les patients qui sont d'accord. Le taux des cas TB-HIV est en croissance, étant en 2004—de 3% ; en 2005—de 4% ; en 2006—de 6% du total des cas enregistrés pendant un an. Dans 1/3 des cas la diagnostique de la tuberculose a coïncidé à l'infection HIV. La mort suit à l'infection HIV par la progression de la tuberculose a survécu en 2005—dans 28% des cas, en 2006—dans 41% des cas, plus fréquemment par le

biais de la tuberculose disséminée avec une évolution fulminante. A partir de l'année 2004 dans les prisons de la République est utilisé le traitement anti-retro viral, administré et aux patients à tuberculose à une phase évoluée, de même à partir de l'année 2006 est introduit le traitement d'après DOTS+.

Conclusions : La combinaison de TB-HIV aux prisonniers des prisons de la Moldavie est en croissance suite à l'investigation obligatoire des patients avec tuberculose à HIV. La tuberculose est la cause des décès de 1/3 des personnes infectées avec le virus HIV.

PS-72054-12 Deaths from unrecognised disseminated tuberculosis in HIV infection

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

Aim: To determine the rate of bacteremic (disseminated) TB (dTB) among HIV-infected subjects in the prospective DARDAR TB vaccine study.

Methods: HIV-infected subjects with a CD4 count >200 and BCG scar were enrolled in Dar es Salaam, Tanzania. Subjects with a positive tuberculin skin test were administered 6 months of INH. Subjects were randomized to vaccine or placebo and followed every 3 months for the development of TB. Studies included chest X-ray, sputum AFB stain and culture, and blood culture using the automated MB/BacT.

Results: Among 1975 subjects 19 have been detected with dTB based on a positive blood culture. Most patients had fever and cough. Median CD4 was 45 and 3 (16%) were on antiretroviral therapy at the time of diagnosis. Prior TB was present in 2 (11%). Chest X-rays were suggestive of TB in 11 (65%), sputum AFB stains were positive in 5 (29%) and sputum cultures positive in 9 (56%). Median survival was 30 days versus a median time to positive blood culture of 53 days. Most patients were not diagnosed pre-mortem and mortality was 89%.

Conclusions: dTB in HIV has a high fatality rate. Since present methods of diagnosis are inadequate, empiric treatment algorithms are required.

PS-72058-12 Récidive de la tuberculose pulmonaire de l'infection VIH

D S Doltu. Département des Institutions Prisonnières, Mi, Chisinau, Moldova. Fax: (+373) 22 77 43 03.
e-mail: svedoltu@yahoo.com

But : Le but de l'étude a été d'apprécier certains aspects des récurrences de la tuberculose (TB) aux prisonniers infectés avec HIV, pendant les années 2005–2006.

Résultats : Au total ont été rapporté 372 des cas de récurrence, dont 29 (7,8%)—co-infectés avec HIV-TB.

L'infection HIV a été diagnostiquée, en même temps que la récurrence, à 27,6% patients, dont (96,5%) sont des hommes à l'âge de 25–30 ans. Dans 17,2% cas, une diminution est parvenue pendant la première année dès la fin du traitement. Dans la structure des formes cliniques, domine la TB infiltrative—76% et la TB disséminée—14%. La destruction pulmonaire a été découverte à 34,5% patients. La microscopie de la spoute à BAAR a été positive dans 58,6% cas. La sémination de la spoute à micobacteria-tuberculosis avec le test de la sensibilité aux drogues anti-tuberculose de la I-ère génération, a démontré la TB multi-drogue résistance (MDR) dans 75% cas de récurrence.

Les testes immunologiques, effectués au début du traitement de la TB, relate la diminution des indices CD4 inférieurs à 200 cellules dans 24% cas, ainsi que dans les limites de 200–499 cellules—dans 51,7% patients. Sous l'influence du traitement standardisé DOTS, II-ème catégorie, la récurrence TB a eu une dynamique positive dans 48,2% cas. Par la TB disséminée, dans les premières 2,5 mois du traitement, la mort est arrivée à 17,2% patients. La thérapie anti-retrovirale a été associée au traitement anti-tuberculose de la II-ème phase dans 27,5% cas.

Conclusions : Les récurrences TB pulmonaires aux prisonniers infectés avec HIV se manifestent dans 58,6% cas, par des processus infiltratives, massives bacillaires. Fréquemment on découvre TB-MDR (75%), qui sous le phène de l'immunité compromise, conduit au décès de 17,2% cas—prépondérant par la TB disséminée pendant les premiers 2 mois du traitement.

PS-72094-12 AIDS stigma associated with health-seeking delay among Thai TB patients

A M Kipp,¹ P Pungrasami,² S Sengupta,³ Q Balhith,³ S Choonuan,³ Y Kasetjaroen,² R P Strauss,¹ V Chongsuvivatwong,³ A Van Rie.¹ ¹University of North Carolina, Chapel Hill, North Carolina, USA; ²Tuberculosis Center 12, Yala, Yala, ³Prince of Songkla University, Hat Yai, Songkhla, Thailand. Fax: (+919) 9662089. e-mail: kipp@email.unc.edu

Background: Anecdotal evidence suggests that the HIV epidemic compounds existing TB stigma with HIV/AIDS associated stigma. We aimed to quantify AIDS and TB stigma among TB patients in Southern Thailand and determine the effect of AIDS and TB stigma on TB patient delay in seeking health care.

Methods: Four stigma scales were developed: TB stigma from community and patient perspective, and AIDS stigma from community and patient perspective. Scale scores were based on a Likert type response to the 10 to 12 items of each scale. Scores were summed and standardized to a 50 point scale. Community and patient scores were further summed to create a total TB and total AIDS scale standardized to 100 points. Scores greater than the mean standardized score were classified as 'high stigma'. Patient delay was calculated as time from first symptom to first doctor visit

with time greater than 21 days classified as 'delay'. The effect of TB and AIDS stigma on patient delay was analyzed using multivariate logistic regression with socio-demographic, clinical, and TB knowledge variables entered as covariates.

Results: Of 480 patients enrolled, 46 were excluded from analysis due to invalid reported date sequences or lack of symptoms. Mean stigma scores were 55.6 on the TB scale and 60.8 on the AIDS scale, while median patient delay was 20 days. TB stigma was not independently associated with patient delay (adjusted OR 0.83; 95%CI: 0.51, 1.34), while AIDS stigma was independently associated with patient delay (adjusted OR 1.61; 95%CI: 0.99, 2.62).

Conclusion: Using newly developed scales, we quantified the effect of TB and AIDS stigma on TB patient delay. High AIDS stigma was associated with delay while high TB stigma was not, independent of other factors such as age, sex, religion, income, clinical factors, and TB knowledge. Our findings indicate that AIDS associated stigma due to the dual TB-HIV epidemic may adversely affect TB patient health.

PS-72111-12 Prise en charge de la co-infection TB-VIH au Bénin

D C Capo-Chichi,¹ P Wachinou,¹ S Akpona,¹ S E Akinicho,² A de Souza,² A Fagbemi,² S Anagonou,¹ M Gninafon.¹

¹Programme National contre la Tuberculose, Cotonou,

²Programme National de Lutte contre le SIDA, Cotonou, Bénin. Fax: (+229) 33 70 57. e-mail: cadria2005@yahoo.fr

Objectif : Présenter les résultats de la prise en charge de la co-infection TB/VIH dans le cadre du projet « Integrated HIV Care for Tuberculosis Patients Living with HIV/AIDS (IHC) », de collaboration entre les Programmes Nationaux contre la Tuberculose (PNT) et de Lutte contre le Sida (PNLS) du Bénin et L'UICMR.

Méthode : Etude rétrospective, descriptive, faite sur les patients co-infectés pris en charge du 01/01—31/12/06 au Centre National Hospitalier de Pneumophtisiologie (CNHPP), le centre de référence du PNT.

Résultats : Durant la période ci-dessus :

—Parmi 1191 cas de tuberculose (TB) toutes formes confondues notifiés au CNHPP, 176 sont infectés par le VIH soit une séroprévalence de 15%.

—La tranche d'âge la plus touchée par la co-infection TB/VIH est 20–40 ans, avec une prédominance masculine : 93 hommes (53%) contre 83 femmes (47%).

—Les formes et types de TB chez les patients co-infectés se présentent comme suit : 126 patients des TB pulmonaire à microscopie + (TPM+) nouveaux cas (72%) ; 12 cas sont des TPM– (7%) ; 13 cas des TB extra pulmonaires (7%), et 25 cas de TPM+ sous traitement (14%), dont 2 cas se sont révélés des multi résistance.

Par ailleurs, 38 cas (22%) de TB/VIH, étaient précédemment connus comme personnes vivant avec le

VIH (PVVIH) par les services du PNLS avant d'être référés pour le diagnostic de la TB au cours de leur suivi. 32 patients (18%) sont mis sous antiretroviraux (ARV) et 95 patients (54%) sous cotrimoxazole seul. 10% des TB/VIH sont décédés et 1% des cas sont irréguliers au suivi.

Conclusion : La collaboration établie entre les 2 programmes dans le cadre du projet IHC permet :

- l'offre systématique des tests VIH à tous les tuberculeux diagnostiqués par le PNT
- la recherche systématique des cas de suspects de TB parmi les PVVIH suivies par le PNLS. Cette collaboration facilite également le suivi des TB/VIH nécessitant la prescription d'ARV et plus tard la surveillance au terme du traitement antituberculeux.

PS-72131-12 HIV prevalence in patients diagnosed with TB in the Monte Plata province, Dominican Republic, 2006

C F Ferrand Linares,¹ B M Marcelino Belkys.² ¹Provincial TB Program, Monte Plata, Monte Plata, ²National TB Program, Santo Domingo, Distrito Nacional, Dominican Republic. Fax: (+809) 5413422. e-mail: programatuberculosisrd@mail.com

Introduction: Human immunodeficiency virus (HIV) has played a key role in tuberculosis (TB), modifying its prevalence and clinical presentation. The effect by TB in Dominican Republic is estimated in 85 casos/100 000 people and 1% of the sexually active population lives with VIH, in some groups of population it is 5%.

Objectives: To describe the prevalence of HIV among TB patients attending health facilities in Monte Plata province as well as sociodemographic and clinical factors of patients coinfecting with TB and HIV.

Methods: A descriptive study that includes all the patients in TB program on four health care of the Monte Plata province. All patients after TB was diagnosed ($n = 75$) were tested for HIV antibodies with voluntary consenting testing. The patients were interviewed with customary design for this study and analyzed using Epi Info.

Results: Overall HIV prevalence was 14.0% in the 62 patient's interview. Higher HIV prevalence was observed in patients in the 35 to 44 year old adult, patients Yamasa precedence (20%), single (66.7%), immigrants (11.1%), intrapulmonary TB (11.1%) and homework (55.6%).

Conclusions: Health initiatives are urgently needed to promote disease prevention and control the incidence of HIV and infection TB-HIV, especially among homework, adults and single.

PS-72138-12 Malaria in TB-HIV+ admitted patients during the rainy season in Guinea-Bissau: prophylaxis in a hospital setting

R Colombatti,^{1,2} F Riccardi,^{1,3} C Silva Vieira,¹ A Coin.^{1,4} ¹Hospital Comunità di Sant'Egidio, Bissau, Guinea-Bissau; ²Dipartimento di Pediatria, Università degli Studi di Padova, Padova, ³Università di tor Vergata, Roma, ⁴Dipartimento di Clinica Medica, Padova, Italy. Fax: (+39) 02251065. e-mail: rcolombatti@gmail.com

Background: Patients admitted in hospitals are usually in severe clinical conditions or advanced TB-HIV. Rainy season increases malaria burden, especially in TB-HIV+ patients. Hospital 'Comunità di Sant'Egidio' (HCSE), National Reference Center for Tuberculosis in Bissau, West Africa, admits TB patients in severe conditions from the entire country. 52–60% of TB inpatients are HIV+.

Aim: Evaluate the effect of widespread environment and medical prophylaxis on overall mortality and malaria prevalence in TB-HIV+ admitted patients at HCSE during the rainy season.

Methods: In 2005 the only preventive measure were mosquito bed nets. From July to October 2006 all admitted patients received co-trimoxazole once daily. Since August 2006 all mosquito bed nets were treated with permethrin every 20 days and the 7500 sqm garden surrounding the hospital was spread with permethrin derivatives every 30 days until the end of the rainy season (November). Overall mortality and number of malaria positive blood films in admitted patients were compared between 2005 and 2006.

Results: 94% of the 104 hospital beds were occupied in both 2005 and 2006. 218 new patients were admitted during 2005 rainy season, 180 during 2006. 88/372 (23.65%) positive blood films were observed from August to November 2005 while 60/381 (15.7%) during same months of 2006. An average of 15 deaths per month was observed in 2005 rainy season, while 11 deaths per month in 2006.

Conclusion: Malaria environment and pharmacological prophylaxis is feasible in hospital settings in Africa and can be successful in reducing overall mortality and malaria prevalence in clinically severe TB-HIV+ patients. Bigger number of patients and implementing these measures since the beginning of the rainy seasons could yield to even better results.

PS-72142-12 TB-HIV collaborative education efforts in North Rift Valley, Kenya

B Langat,¹ A Gardner,² S Kimaiyo,² E J Carter.³ ¹National TB and Leprosy Program, Eldoret, ²Moi University School of Medicine, Eldoret, Kenya; ³Warren Alpert School of Medicine at Brown University, Providence, Rhode Island, USA. Fax: (+1) 401 793 2266. e-mail: E_Jane_Carter@Brown.edu

Background: Tuberculosis remains the leading cause of death in people living with HIV/AIDS. Early collaborative efforts focused on HIV screening in TB clinics

and TB screening in HIV clinics. We describe collaborative efforts between the National TB and Leprosy Program (NTLP) and AMPATH HIV Care Program to develop TB-HIV training modules and algorithms for North Rift Valley, Kenya.

Methods: Care issues were identified through review of NTLP treatment and laboratory registers, interviews with HIV and TB care providers, HIV chart review, and consult record review. Problems identified included lack of TB education for HIV providers, unclear local guidelines for diagnosis of smear negative/extrapulmonary TB, lack of guidelines sensitive to HIV issues in managing drug side effects (rash, hepatitis) and difficult situations (pregnancy), and inadequate knowledge of TB treatment outcome assessment.

Results: A training module consisting of 9 lectures was developed. Topics included basic information on TB diagnosis, treatment, and NTLP guidelines. Algorithms of care, specific to regional available services, were developed for smear negative diagnosis, extrapulmonary diagnosis, care management, and complications management. A 1 day training co-chaired by AMPATH HIV Care Director and the National Director of NTLP was held with 158 participants—all HIV care providers from 18 AMPATH HIV care sites and a TB care provider from each site. TB leadership remained present and involved through the workshop. Program CD was distributed to participants.

Discussion: As HIV care systems mature, deepening collaborations between TB and HIV programs are critical. Educational programs that both develop clear care guidelines adaptable to the locally expanding HIV care systems and delineate responsibilities must be developed and taught collaboratively for successful field implementation.

FIDELIS: LOOKING FORWARD, LOOKING BACK

PS-71178-12 FIDELIS case finding in urban and rural districts, Kenya

J R Ong'ang'o,¹ P O Mc Odida,² E Amukoye.¹ ¹Centre for Respiratory Diseases Research, KEMRI, Nairobi, ²International Medical Corps, Kenya, Nairobi, Kenya. Fax: (+254) 203873973. e-mail: jongango@kemri-nuitm.or.ke

Background: A FIDELIS project in an urban town, well served with accessible public health facilities but characterised with slum populations that have limited access to health care and also in rural districts that have vast area with sparsely distributed public health facilities that are inaccessible to a majority of the districts' population. Case notification rates of new smear positives (NSP) ranges from 64/100 000 population in the rural to 264/100 000 in the urban.

Methodology: To increase case detection the FIDELIS

project strategised on providing mobile microscopy clinics to screen coughers. On two days before each clinic the appropriate area communities were made aware of the clinic through mobile public address systems and placing of announcement posters at strategic places within the locality. On the clinic day, all TB symptomatics provided spot sputa and the following morning at the same venue the morning and second sputa were received.

Results: Between January to November 2006, a total of 36 mobile clinics were conducted. On average the number of TB suspects screened in each clinic was 55 and 73 respectively for urban and rural settings. Smear positivity among the urban setting was relatively low with a range from 2% to 5%, while in rural districts it ranged from 7% to 13%.

Conclusions: Screening of coughers through the clinics in the rural districts may be a more appropriate method of case finding than in the urban districts.

PS-71210-12 FIDELIS-supported enabling of DOTS implementation in 16 tertiary and private hospitals in Punjab, Pakistan

M A Khan,¹ H Sadiq,² D Baddar,³ N Naeem,³ J Saleem,¹ M Ahmad,¹ N Safdar,¹ H Jehangir.¹ ¹Association For Social Development, Islamabad, ²National TB Control Programme, Islamabad, ³Provincial TB Control Programme, Lahore, Pakistan. Fax: (+92) 0512871254. e-mail: asd@asd.com.pk

Introduction: Tertiary and private hospitals pose different set of challenges to implement DOTS. Effective DOTS implementation in hospitals would facilitate access and in turn would enhance the case detection and treatment success in urban areas.

Objectives: To enable 16 tertiary and private hospitals for effective planning, implementation and monitoring of DOTS.

Method: A baseline study identified the development gaps including: advocacy package for executives, planning guide, linking with PHC, intra-hospital monitoring guide, and operational guide for EQA of AFB testing in a hospital. This development needs have been addressed through DFID-supported Communicable Disease Research Programme. The enhanced guidelines/tools are being implemented in 16 FIDELIS-supported tertiary and private hospitals. The feasibility and effectiveness of guidelines would be assessed through a mix of quantitative and qualitative research methods, and refined through working group approach.

Result: Early implementation experiences indicate feasibility of DOTS implementation in tertiary and private hospitals. The implementation of enhanced implementation guidelines would increase the number of smear-positive TB cases registered (i.e. 563 to 4945), and treatment success to 80%.

Conclusion: The project would benefit about 12.2 million population with free of cost standardized TB DOTS services. The approach would be refined for scaling-up in other districts of Pakistan.

PS-71211-12 FIDELIS-supported enabling of supervision and monitoring in 16 districts and a province of Pakistan

A Khan,¹ H Sadiq,² D Baddar,³ N Naeem,³ N G Khokhar,¹ I Zafar,¹ N Safdar.^{1,2} ¹Association For Social Development, Islamabad, ²National TB Control Programme, Islamabad, ³Provincial TB Control Programme, Lahore, Pakistan.
Fax: (+92) 0512871254. e-mail: asd@asd.com.pk

Introduction: Effective supervision and monitoring at facility, district, regional and national level is the key to effective DOTS implementation. NTP Pakistan has introduced a system of quarterly monitoring meetings at district levels and above. FIDELIS-supported project has contributed to developing, implementing and refining the 'structured process' for the monitoring events at various hierarchical levels.

Objectives: To enable 16 districts as well as provincial and national programmes to implement 'structured monitoring events' at various hierarchical levels.

Method: A review of ongoing experiences identified the design and practice gaps in monitoring events. Through DFID-supported Communicable Disease Research Programme guidelines and tools developed for facility, district, provincial and national level monitoring events. The guidelines/tools are being implemented in 16 FIDELIS-supported districts. The feasibility and effectiveness of guidelines/tools would be assessed through a mix of quantitative and qualitative research methods, and refined through working group approach.

Result: Early implementation experiences indicate the need and feasibility of 'structured process' for DOTS monitoring events at various levels. The implementation of enhanced monitoring guidelines would help building the capacity and achieving the desired results i.e. increased TB case registration and successful treatments.

Conclusion: The structured monitoring events would be refined for scaling-up in other parts of Pakistan.

PS-71232-12 Community participation to improve case-finding and therapeutic adherence in Round V FIDELIS project in China

Y Lin, L X Zhang, E P Zhang. China Resource Center of the Union, Dong Cheng District, Beijing, China.
Fax: (+86) 10 65132672. e-mail: linzhao@public.bta.net.cn

Background: The one year Round V FIDELIS projects in Jiangxi, Shaanxi, Jilin and Chongqing were implemented in 192 counties (districts) out of 306 counties (districts) of the 4 provinces. Population coverage was 85.3 million, or 62.2% of the total population. Rapid DOTS expansion was beginning from 2003. The infrastructure and TB control staff were in existence, but case-finding level was insufficient. By the time of launching the FIDELIS projects, 66% of WHO estimated new smear positive cases was notified.

Methods: The case-finding target was delegated to

each county and district. Information on TB and the service availability was disseminated through various IEC and meetings with local government representatives, community leaders, school children and community health workers. In addition to TB control staff and hospital staff, the contractors get above community workers and volunteers involved in finding out suspects and improving patient adherence. Incentives were provided to them. During the implementation, 41 444 village doctors, 4695 township doctors, and many other local doctors (including prison doctor), 65 481 volunteers received training and involved in finding out TB suspects, including 60 000 school children, 2774 women's association staffs and 2505 village heads.

Results: By the end of February 2007, 36 094 new smear positive TB were detected, achieving 97% of the target. Treatment success rate has reached to 93–96%. Additional 6738 new smear positive cases were reported comparing with one year before. In the mean time, capacity to run TB control programme improved.

Conclusions: Involvement of community members and good mobilization lead to an active participation to TB control. It is able to contribute to improve case-finding and patient adherence as well as sustainable development. The innovative approach is suitable to be used not only in the FIDELIS project, but also in the national TB programme.

PS-71240-12 Increasing case-finding by training TB doctors in general hospitals as supervisors

L X Qiu, H Qin, W H Huang, J Hu. Jiangxi Provincial CDC, Nanchang, Jiangxi, China. Fax: (+86) 7918182641.
e-mail: fgcao@163.com

Aim: Study the process of cooperation between the organization for tuberculosis and hospital, make use of the national infectious disease internet-based reporting system. To increase case detection rate of new smear positive TB in the poor in Jiangxi Province.

Methods: Baseline survey was conducted in target project area at first. And then TB doctors in general hospitals were trained as supervisor to conduct reporting, referring and tracing. At same time, cases reported through internet were traced by TB units. Measures were taken which strengthened cooperation between the TB units and hospitals. The work system had been strengthened and the measure of incentive had been carried out to enhance the enthusiasm of county level in TB control. The effective strategy was formed which was about tracing tuberculosis cases reported by hospital in project area. After the project, indexes of case-detection were compared with those in the baseline survey.

Results: The referral rate increased from 70% to 98.8% in pilot hospital. And the arrival rate in total increased from 56.7% to 96.7%. 15309 new smear

positive TB cases were detected (among them 12 191 were limited access cases, 79.6% of total NSP), increased by 1603 compared with the same period in last year, which is 111.7% of total new smear positive cases last year. The case detection rate increased substantially, and the registration rate of new smear positive case increased from 48.18/100 000 to 53.81/100 000.

Conclusion: Through the implementation of FIDELIS project and using the national infectious disease internet-based reporting system, the cooperation between tuberculosis institute and hospital was better than before. The referral rate of tuberculosis cases in pilot area was enhanced obviously. The arrival rate in total and case detection rate was increased in evidence. Especially, the case detection of new smear positive TB patients in poverty was greatly promoted in Jiangxi province.

PS-71279-12 Analysis of the deferring condition in seeking medical service by 5903 smear-positive patients

H J Chen, Y Li Yang, J M Pan. TB Control Institution of Guizhou CDC, Guiyang, Guizhou, China.
Fax: (+86) 08516823963.
e-mail: chenhuijuan2005@yahoo.com.cn

Objective: To know the deferring degree in seeking medical service of new smear positive in Guizhou Province.

Methods: To analyze and evaluate the 5903 questionnaires which were designed by FIDELIS project for new smear positive TB patients who were limited to access TB center.

Results: 5903 new smear positive patients come from self-referring and referring by health institution accounting for 61%—3604/5903, and 33%—1947/5903, respectively. Patients who have cough or cough with sputum more than 3 weeks account for 78%—4532/5822. Patients who have suspect symptom and defer to seek medical service more than 8 weeks account for 41%—2249/5903. Patients who seek medical service directly in TB institute account for 8%—474/5903.

Conclusions: The deferring condition in seeking medical service of new smear positive patients is very serious in Guizhou Province. The rate of awareness of the TB institute should be increased. To strengthen propagandism about free treatment tuberculosis in TB institute and TB suspect symptom.

PS-71297-12 Impact of the FIDELIS projects on promoting and scaling up the national tuberculosis programme in the poorest areas

L Zhang, Y Lin, E P Zhang. China Resource Centre of The Union, China. Fax: (+86) 010 6444 7514.
e-mail: tbcenter@public.bta.net.cn

Background: Fidelis projects have been implemented since 2003 in 15 provinces, covered population of about 440 million. There were 11 and 5 provinces Fidelis projects completed one year and two years implementation respectively.

Methods: The poorest areas were prioritized in the selection of project site. People with limited access to health care were emphasized. Special policy, including patients' transportation fee supported, established sputum smear microscopy site in community health center and so on, was conducted for poorest people in case finding and treatment of tuberculosis.

Results: Of the 10 provinces completed phase I, 6 provinces were the poorest areas, most of located in the west part of China and in mountain areas. Patients with limited access to health care accounts for 84%. Target of smear positive cases to be detected were 53773 and 580420 (108%) cases were actually achieved. Cure rate was more than 90%. Established and improved three level networks of tuberculosis services and strengthened human resource capacity of tuberculosis.

Conclusions: Tuberculosis is closely linked to the poverty. Fidelis projects implemented in poverty areas of China to promote and scale up NTP, increased the tuberculosis case detection rate and improved the results of treatment.

PS-71381-12 A way towards the success of BRAC TB Programme in Afghanistan

T Rahman. Health Program, BRAC Afghanistan, Kabul, Afghanistan. Fax: (+93) 2201749.
e-mail: taufique_brac@yahoo.com

BRAC Afghanistan initiated a pilot community based TB control project in early 2004 in 2 districts of Parwan and Balkh provinces and expanded the TB control program with the technical and financial support by Fidelis in 34 districts and established 56 TB diagnostic centers in 2006, five mobile diagnostic teams in each province has one mobile diagnostic team and involved community health workers especially female CHW which was very challenging innovative approach in Afghanistan. In each province BRAC has one mobile diagnostic team thus BRAC has five mobile teams to cover all hard to reach and uncovered mountainous area, per month they are doing 64 mobiles according to plan. From first January 2006 up to 31st, January 2007 BRAC had detected 3019 SS+ (case detection was 76% female patient was 69% and cure rate was 90%) patients in own catchment's area. Out of them 2648 (87.7%) patients are limited access and 371 (12.3%) patients are non limited, Ministry of Public Health/NTP is now seriously considering this community based DOTS model in national policy. BRAC awarded by the ministry for its contribution for FIDELIS supported TB program in Afghanistan in 2006.

PS-71401-12 FIDELIS innovations strengthening TB control in Tanzania

D V Kamara,¹ S M Egwaga,¹ S G Hinderaker.² ¹NTP Tanzania, Dar es Salaam, Tanzania, United Rep.; ²Bergen University, Bergen, Norway. Fax: (+255) 22 21 24 500. e-mail: vedastusk@yahoo.com

Background: The one year Fidelis project was implemented in 14 districts of Tanzania. Population covered was 6.5 million. The project introduced new activities not routinely done by involving private providers and the community in tuberculosis services.

Methods: The project aimed at increasing case detection through three strategies; strengthening of public health facilities, public-private mix and introduction of patient-centred treatment (PCT).

Major interventions were:

- Training
- Hiring of laboratory technicians
- Sensitization
- Transferring fixed smears
- Recruitment of DOT supporters
- Opening new diagnostic centres
- Enhancement of supervision

Results:

- A total of 557 and 110 health care providers were trained on PCT and fixing smears respectively
- 32 laboratory technicians were recruited
- Over 1060 local leaders and influential people were sensitized on TB control
- 26 folk drama groups supported
- 4210 fixed smears produced 154 new smear positive (NSP)
- Over 1260 treatment supporters were recruited
- Project supported extra two days of supervisory visits every months to each site
- An additional of 491 (13% increase) NSP cases were detected

Conclusion: The project has significantly increased NSP notification and strengthened health care system in the districts.

PS-71498-12 Increasing case finding by involving PPMD in the Guizhou FIDELIS project

X Liu, S Jiang. National Center for TB Control, China CDC, Beijing, China. Fax: (+86) 10 83135306. e-mail: leon@chinatb.org

Setting: 88 counties with remote and poverty areas in Guizhou province, China.

Objective: To evaluate the approach of strengthening collaboration between the general hospital and the TB dispensary system to increase the case detection rate.

Method: To establish the cooperative mechanism between hospital and TB dispensary with referring and tracing TB suspects; using the epidemic surveillance system to seek and trace the suspects who reported by hospital and failed to register in TB dispensary; to

introduce the financial incentive for health workers to report, recommend and trace the suspects. Tuberculosis patients detected were treated with DOT.

Result: There were 12 478 new cases with smear positive detected in the project year (Phase I) from Nov. 2004 to Oct. 2005, occupying 76% of all SS+ cases. Compared with 6200 new SS+ cases detected in the previous year, it increased 101% additionally in the project year. The proportion of TB patients with limited access to health service was 83% within all the new SS+ cases detected. Among the smear positive patients, 4470 cases detected with referred by hospitals and 1427 cases were detected with tracing by TB dispensary. By evaluation, the approach of referring and tracing TB suspect would contributed 36% SS+ patients to case finding. During the period, the hospital system reported and referred 28 660 TB suspects with the National Internet based Reporting system, the overall arrival rate of TB suspects was 42%, the referral arrival rate was 24% and the tracing arrival rate was 31%. With cohort analysis of new smear positive cases detection, the cured rate was 84.5% and treatment completed rate was 89% in the phase I.

Conclusion: The approach was significantly effective to increase case finding. It directly supplied health service for the patients with limited access to health service in the remote and poverty.

PS-71566-12 Increase of detection rate of NSP TB by implementing the FIDELIS project in Jilin, China

S Y Xu, Y L Yuan, B H Qiu. Jilin Provincial Center for Disease Control and Prevent, Changchun, Jilin Province, China. Fax: (+86) 431 87976931. e-mail: linzhao@public.bta.net.cn

Background: The project covered 42 counties and 20.01 million population, accounting for 74% of the total population in Jilin. Most of the counties are in the remote area where patients have limited access to health care service. 80% of them have no medical insurance.

Methods: In Round V FIDELIS initiative, we used the internet-based disease reporting system (IBDRS) and set up the sputum smear microscopy site in township health center. TB staffs review the data on the IBDRS frequently and inform the township hospital to forward the names and contact details of cases and suspects to village doctors. The cases or suspects reported through regular system and IBDRS will be traced by village doctors. For patient easy to access the service, 42 sputum smear microscopy sites were set up at 42 township hospitals. DOT was carried out by village doctors to guarantee the systematic treatment. The monthly and quarterly reports are used for project quality control. To disseminate information on TB and the free diagnosis and free treatment, various IEC activities was undertaken. Incentives are provided to technician for detecting NSP cases, to township/village

doctors for tracing suspects, and to poor patients for visiting various levels of health facilities.

Results: The project has been implemented for 10 months and had 28 549 visits by the TB suspects. 7285 new smear positive cases were detected, or 25% increase compared with the cases detected in previous year in the same period. Of the 7285 NSP, 2182 were referred from general hospital, township health center; 484 were those traced back; 89% of them are those with LA. NSP registration rate has reached to 36.4/100 000 in project areas where only 273/100 000 in non-project areas.

Conclusions: Using IBDRS and setting up sputum smear microscopy sites in township hospitals supported by FIDELIS are effective ways to increase detection rate of NSP cases. It could be sustained and used in the long run fighting against TB.

PS-71711-12 Increase TB case detection

Q Y Wang. Chongqing Institution of TB Prevention and Treatment, Chongqing, China. Fax: (+86) 2368783692. e-mail: pigya@126.com

Objective: To evaluate the effect of FIDELIS project in three-gorge areas of Chongqing municipality for one year.

Methods: Such activities were carried out as training township/village doctors level by level to communicate with the villagers to improve their awareness of TB and recommend TB suspects to TB dispensaries or vicinal sputum examining points, setting up sputum examining points in township, putting out leaflets about TB knowledge and investigation cards of TB suspects in students, implementing incentive policy. The data from May 2006 to February 2007 were analyzed.

Results: The TB suspects and new sputum positive TB patients were increased by 46.8% and 10% respectively, comparing with that of the same phase last year. The registration rate of smear positive TB was increased from 34.8/100 000 to 37.8/100 000— $X^2 = 29.1$ ($P < 0.05$). The active TB cases recommended by township/village doctors accounted for 27.3% of the total which increased by 1.3% comparing with that of last year.

Conclusions: Conducting FIDELIS project in three-gorge areas has made great progress. It is an effective approach to improve case detection through recommendation of TB suspects by township/village doctors.

PS-71909-12 Impact of innovative approach of TB control in a district of Bangladesh

M H Khan,¹ N Akhter,² S A Hassan,³ M H Khan,⁴ Q H Ferdousi,⁵ M Khatun,⁴ N A Mahmuda,⁶ S Chowdhury,⁷ M M Rahman.⁵ ¹World Health Organization Bangladesh, Dhaka, Bangladesh; ²Graduate School of Medicine, Kanazawa University, Kanazawa; ³Environmental Science Division, Kanazawa University, Kanazawa, Japan; ⁴Upazila Health Complex, Kashba; ⁵Directorate General of Health Services, Dhaka; ⁶BRAC University, Dhaka; ⁷National Institute of Preventive and Social Medicine, Dhaka, Bangladesh. Fax: (+880) 29884657. e-mail: mohiuddin_khn@yahoo.com

Introduction: DOTS implementation in collaboration with NGO started in Brahmanbaria district in 2003.

Objectives: To increase and sustain case detection rate to at least 70% and treatment success rate 85% to reach Millennium Development Goals.

Methods: BRAC a national NGO was assigned to work with government for TB control. To accelerate case detection and to reach the limited accessed community, the NGO took several new approaches. The project was supported by FIDELIS. Private practitioners, cured TB patients, religious and other opinion leaders were oriented on DOTS and sensitized. Outreach sputum collection centres were conducted to reach the limited access population. DOT provided through female community health volunteers. An incentive scheme was introduced to ensure patient compliance.

Results: Out of 2650 TB patients detected in the district in 2006, 1854 were new smear positive, 120 were retreatment case, 531 were smear negative pulmonary case and 145 were extra-pulmonary case. Gradual increase of case detection over the last few years is shown in the table.

	2003	2004	2005	2006
Case detection rate	32%	62%	80%	86%
Sputum conversion rate	96%	98%	96%	98%
Treatment success rate	96%	98%	95%	

Conclusion: Case detection increased significantly.

PS-72064-12 Improving TB case detection and treatment success rates

A Noor,¹ S U Khan,¹ J Norman,¹ H Sadiq.² ¹Mercy Corps, Islamabad; ²National TB Control Programme, Islamabad, Pakistan. Fax: (+92) 51 2878081. e-mail: anoor@mercycorpsfield.org

The goal of this three-year European Union-Funded project, which is an expansion of a successful FIDELIS IV project, is to increase TB case detection and treatment success rates. Project methodology is to improve DOTS implementation through strengthening government health facilities and simultaneously mobilizing communities by advocacy, communication and social mobilization (ACSM) involving local

non-governmental organizations (NGOs) and Community Health Workers (CHWs) at district and sub-district levels. The project is being implemented in 13 districts of Sindh and Balochistan provinces of Pakistan, targeting 6.5 million people.

Results: Eighteen months into the project implementation a total of 9585 (1640 in Balochistan & 6398 in Sindh) all types of TB cases and 5412 (1168 in Balochistan & 3419 in Sindh) smear positive cases have been identified, with a CDR of 71%. Sputum conversion during this period is more than 90%. Total new smear positive cases successfully treated in the first six months of the project were 1555 which are 88% of the total. A total of 1909 health care providers including 1100 CHWs were trained. During this period 1290 ACSM activities have been conducted reaching out to 1.6 million beneficiaries.

Conclusion: Successful implementation of the FIDELIS project focusing on health facility strengthening, combined with ACSM, involving local NGOs and CHWs, is effective for scaling up similar DOTS interventions to increase case detection and treatment success rates even in hard to access areas of Pakistan.

PS-72082-12 Supplementing National Tuberculosis Programme activities through the FIDELIS project in Kenya

G N Karanja, J M Chakaya. Kenya Association for Prevention of Tuberculosis and Lung Disease, Nairobi, Kenya.
Fax: (+254) 202729692. e-mail: grace.gitonga@gmail.org

Background: A project on networking all health providers to increase access to DOTS services among the urban poor in Kenya has been undertaken in 21 districts since July 2006. On average the districts have a population of 500 000 each.

Methods: 20 DOTS representatives mainly nurses were recruited to work with district TB coordinators to increase case finding by engaging non public health providers in case finding of TB patients, community mobilisation, engaging school pupils in active case finding among their household members and using community leaders and volunteers in tracking referrals.

Results: 486 private providers, 210 chemist shop attendants have been engaged, 246 primary schools with 9427 pupils involved. 20 486 cases were registered during second half of 2006 compared to 17 246 same period in 2005 (18.7% increase).

Conclusion: DOTS representatives have been crucial in NTP-PPM and community links which have been lacking. Case finding for all TB patients has increased significantly due to the DOTS representatives' efforts. However, it's been difficult quantifying number of referrals from pupils therefore the need to devise incentive mechanisms for volunteers to facilitate referral tracking. To ensure sustainability, NTP needs to absorb DOTS representatives to the system and replicate these efforts in other districts.

PS-72149-12 Challenges to data collection and management in TB field projects: Fidelis round 3 and 5 project experience

L Kamle,¹ N Bhakta,² N G Buziba,² E J Carter.³ ¹Moi University School of Medicine, Eldoret, Kenya; ²University of Cincinnati College of Medicine, Cincinnati, Ohio, ³Warren Alpert School of Medicine at Brown University, Providence, Rhode Island, USA. Fax: (+1) 401 793 2266.
e-mail: E_Jane_Carter@Brown.edu

Background: Although accurate data collection (DC) and management (DM) are critical program functions, few reports discuss challenges encountered. As award-ees of both Round 3 and 5 Fidelis projects, we encountered a variety of challenges in DC and DM.

Methods: Round 3 project centered on one district and 9 sites. Round 5 project covered 1.5 provinces, 12 districts, and over 70 sites. Required data collection by Fidelis was identical in both rounds. Independently the project gathered additional information to assess overall TB control and program function. In Round 3 we also computerized the treatment register for all sites involved.

Results: In Round 3 one team member was in charge of all DC/DM. Records in the periphery were kept in variable order and intense education efforts were necessary in many sites. Falsification of peripheral records was identified early in one instance; corrective measures were immediately taken. Transportation for data collection visits was performed through local public transport without difficulty. A single project laptop was carried to the field for data management.

In Round V (expansion project) the geographic territory increased, including challenging terrain. DC was shared duty with 5 individuals, requiring training and supervision. All continued to travel by public transport; although feasible and inexpensive, this was extremely time consuming. Distances traveled strained ability to report in a timely manner. Supervision to identify data problems was limited. Paper records were used in the field.

Discussion: In developing expansion projects, DC and DM face additional challenges that require attention in the planning stages. Adequate personnel to provide supervision is critical. Seemingly minor details such as an unusually long rainy season and difficult terrain can impact DC. Flexibility and innovation are required to succeed.

AIR POLLUTION, ASTHMA AND TOBACCO

PS-71310-12 Perception of environmental risk in respiratory health of populations from Arzew region: preliminary results

A Snouber,¹ R Bessaoud,² B Belbachir,² A Saidi,³ M Tabet,³ M Hamdi,² Y Raho.³ ¹Faculty of Medecine, Oran, ²Anthropological Research Center, Oran, ³Technical Space Research Center, Oran, Algeria. Fax: (+213) 41 58 37 68. e-mail: asnouber@yahoo.fr

Objectives: To evaluate environmental risk in respiratory health according to populations from Arzew region and to increase the level of acceptance in order to realise a surveillance system.

Methods: It is an exploratory and descriptive study including populations from Arzew region. Cluster sampling concerned six municipalities (localisation of 40 districts) where 1000 married-couples were interviewed. The population studied was randomly located and at home interviewed throughout a questionnaire.

Results: Range age 35–50 years represent 44%, 61% are female and 38.4% male. 30% have a mean instruction level and 36% were illiterate. About environmental knowledge, 97% believe that pollution is responsible of health problems, air pollution in first position according 58% of interviewed persons. 52.4% think that their health was degraded since they live in this region (Arzew), 44% evoke unhealthy states among members of their family which 67% were respiratory diseases.

Conclusion: We conclude that populations from Arzew region are aware of the pollution danger and its repercussions of health, notably air pollution and its effects in respiratory health.

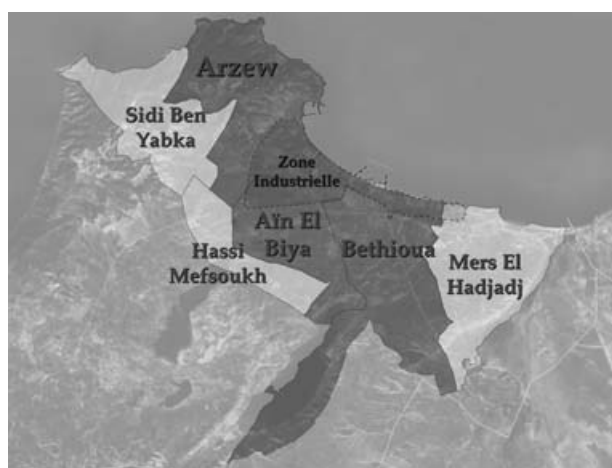


Figure Six municipalities studied.

PS-71149-12 Factors related to asthma and allergic diseases in schoolchildren of Maputo: a population based study

S Mavale-Manuel,^{1,2} A Pedro,¹ E Eduardo,¹ D Moreau,^{3,4} J de Blic,⁵ I Annesi-Maesano.^{4,5} ¹Maputo Central Hospital, Department of Paediatrics, Moz, Maputo, ²Eduardo Mondlane University, Faculty of Medecine, Maputo, Mozambique; ³INSERM, U707: EPAR, Paris, ⁴UPMC-Paris 6, Paris, ⁵Necker Enfants-Malades Hospital, Paediatric Pulmonology, Paris, France. Fax: (+258) 82 319 428 0. e-mail: mavale23@yahoo.co.uk

Background: Asthma and allergic diseases prevalence are increasing in some African countries, the causes remains understood. The objective of our study was to investigate the factors related to asthma, allergic rhinoconjunctivitis and atopic eczema in Mozambican schoolchildren.

Methods: 2383 children aged 6–7 years and 2630 aged 13–14 years were surveyed using the ISAAC protocol in a cross-sectional study in urban, suburban and semi-rural areas of Maputo.

Results: In 13–14 year, multivariate analysis show significant associations with asthmatics and overweight OR 2.13 (1.20–3.78), mother's education OR 1.37 (1.07–1.77), asthma in family member OR 1.63 (1.25–2.13) and presence of a dog at home OR 1.36 (1.03–1.80). Having a well at home was found to be protective against asthma OR 0.24 (0.77–0.80). The factors related to rhinoconjunctivitis are allergic family OR 1.34 (1.11–1.62) and having a dog at home OR 1.41 (1.16–1.72). The factors related to eczema were female sex OR 2.10 (1.58–2.79); and family allergy OR 2.01 (1.54–2.63). In 6–7 year children maternal smoking OR 2.10 (1.27–3.48); the use of paracetamol OR 1.82 (1.35–2.46) and the use of antibiotics in the first year of life OR 1.37 (1.06–1.76) were factors related to asthma. Maternal smoking OR 2.16 (1.22–3.82); the use of paracetamol OR 2.72 (1.79–4.11), the use of antibiotics in the first year of life OR 1.42 (1.06–1.92) were factors related to rhinoconjunctivitis. The only factors related to eczema were the use of paracetamol OR 2.72 (1.80–4.12) and the use of antibiotics in the first year of life OR 1.44 (1.07–1.95).

Conclusion: The traditional risk factors for asthma and allergies were the same in Maputo and in developed countries. Mother's education was found as risk factor for asthma and as having a important role in asthma severity.

PS-71150-12 Sensitisation to common allergens in Maputo

S Mavale-Manuel,^{1,2} A Cossa,¹ N Mutisse,¹ V Veronica,¹ D Moreau,^{3,4} J de Blic,⁵ I Annesi-Maesano.^{3,4} ¹Maputo Central Hospital, Department of Paediatrics, Moz, Maputo, ²University Eduardo Mondlane, Faculty of Medicine, Maputo, Mozambique; ³INSERM, U707: EPAR, Paris, ⁴UPMC-Paris 6, Paris, ⁵Necker Enfants-Malades Hospital, Paediatric Pulmonology, Paris, France. Fax: (+258) 82 319 428 0. e-mail: mavale23@yahoo.co.uk

Background: Few studies have considered allergic sensitisation in Africa. No study presenting allergen sensitization has been reported from Mozambique.

Methods: According to the ISAAC protocol, 157 adolescents having asthma, rhinoconjunctivitis and controls were identified and skin prick tested to common 12 allergens.

Results: 42% of adolescents had at least one positive Skin Prick Test (SPT). The prevalence of sensitisation was as follows: *Dermatophagoides pteronyssinus* (30.4%), *Dermatophagoides farinae* (24.7%), *Blomia tropicalis* (20.3%), cockroach (19%), *Alternaria alternata* (5.1%), white egg (4.4%), grass pollen mix (3.8%), 4 cereals (3.2%), cat (3.2%), peanut (2.5%), fish (1.3%) and tree pollens (1.3%). Among all sensitized adolescents, sensitization to house dust mite was the commonest (86.4%). 48.3% of asthmatics, 30.2% of rhinitics and 45% of control had at least one positive SPT. *Dermatophagoides pteronyssinus* was the principal allergen in all groups, and was more frequent in urban area ($P < .05$).

Conclusion: Allergen sensitization was frequent in Maputo (Mozambique), where the same allergens as in industrialised countries were observed.

PS-71250-12 Inhaler therapy in bronchial asthma: prescribing habits and technique in a developing country

M Irfan, M Naeem, A S Haque, S Aziz, F Shahabuddin, G Akbar, J A Khan. Pulmonary Section, Aga Khan University Hospital, Karachi, Pakistan. Fax: (+92) 21 4934294. e-mail: muhammad.irfan@aku.edu

Objectives: To study the prescriptions and inhaler technique of patients with asthma.

Setting: Chest clinic of Aga Khan University Hospital, a tertiary care teaching hospital in Karachi, Pakistan.

Methods and Results: 156 patients aged >12 who were using an inhaler for >6 months, underwent a questionnaire-based interview, medical records review & direct observation of inhaler technique (8 steps). Diagnosis of asthma was based on medical records. Mean age was 48 yrs. 52% were females. 90% of the patients were belongs to urban areas.

Prescription: The commonest prescribed drugs were salbutamol (62%), salmeterol/fluticasone combination (55%). Inhaled corticosteroids (ICS) were prescribed in 83% asthmatics. There was a higher trend in pre-

scribing ICS among younger patients in both groups with no sex discrimination. 77% of the patients were prescribed a spacer device & 55% admitted using it every time.

Technique: 84% informed that they have learned technique before using inhalers. Only 30% used a metered-dose inhaler (MDI) correctly. 71% used the MDI-spacer combination correctly. The most frequent errors with a MDI were failure to coordinate actuation/inhalation (52%) and inadequate breath-hold (52%). When a MDI-spacer combination was used, inadequate breath holding (58%) & early 2nd actuation (46%) were the weakest steps.

Conclusion: In patients with OAD, inhaled short & long-acting beta2 agonists along with ICS were the most frequently prescribed drugs. Simple MDIs were used correctly by only one third of the patients, where as the MDI-spacer combination was satisfactorily used by the majority. Reassurance and checking on each visit can improve the inhaler technique.

PS-71585-12 Prevalence of asthma in an adult workers community in Sudan

G Edaw,¹ M El Tigany,² M Nour,¹ A Khamis,² A El Sony,² O Musa.^{1,2} ¹Ribat University, Khartoum, ²Epi-Lab, Khartoum, Sudan. Fax: (+249) 83224496. e-mail: mai.eltigany@gmail.com

In a recent study as part of ISAAC phase three we found that the prevalence of asthma in children aged 13–14 years was 7.5% in Khartoum state, depends on answering ISAAC questionnaire. Asthma in adult is increasing worldwide; in Sudan there is no data available about asthma prevalence in adult.

Objectives: To study the prevalence of asthma in adult worker community in Sudan.

Methods: A cross sectional study was performed during the period from September 2006 to April 2007 in eight Sudanese universities, 1782 students & university employees were interviewed using modified adult version of Isaac questionnaire. The questionnaire includes personal data, asthma symptom, environmental factors, history of the disease and treatment. Pulmonary function and skin prick test for common allergens were performed in all asthma suspects.

Results: 46.3% of the sample were females, 10.7% of all subjects have asthma symptoms, reversibility test were positive in 5.7% of subjects with asthma symptoms, the commonest allergen sensitivity in asthmatic was for house dust.

Conclusion: The prevalence of asthma in adult Sudanese worker community is 10.7% & the commonest allergen is investigated is the dust mite.

PS-71820-12 Incidence of wheezing: a ten-year follow-up

K Löfdahl,¹ E Andersson,² J Brisman,² K Torén.^{1,2}

¹Department of Respiratory Medicine and Allergology, Göteborg, ²Department of Occupational and Environmental Medicine, Göteborg, Sweden. Fax: (+46) 31 417824. e-mail: kerstin.lofdahl@lungall.gu.se

Background: There have been few longitudinal studies of the incidence of wheezing among adults. Our aim was to estimate the incidence rate of wheezing in a general population and also to study the association between asthma, bronchitis and other symptoms at baseline and the incidence of wheeze.

Method: The study population was a random sample of 15 813 persons aged 20–50 years, who answered a questionnaire in 1993 with items of airway symptoms including occurrence of wheezing. In 2003 the questionnaire was repeated with addition of an item concerning the year when wheezing had started and weight and height. Obesity was defined as BMI > 30. Incidence of wheeze was calculated during ten years (1993–2003). Predictors for incidence of wheezing were modelled with Cox-regressions controlled for age, gender, smoking and obesity and also for asthma, bronchitis and rhinitis at baseline.

Results: 11 463 subjects from the random population answered a questionnaire in 2003 (72%). 2143 were excluded after reporting asthma or bronchitis symptoms or wheezing in 1993. 9320 (47.9% men) were left for analysis of incidence of wheeze from 1993 to 2003.

The incidence of wheeze was 4.1/1000 person-years (2.7 in never smokers; 8.1 in smokers).

The table shows the relative risks for wheezing related to different predictors.

Predictors	Relative risk or wheeze (adj. for age, gender, smoking)	95%CI interval
Baseline smoking	1.86	1.34–2.56
Baseline asthma-related symptoms	1.93	1.20–3.09
Baseline bronchitis	2.23	1.36–3.67
Baseline rhinitis	1.89	1.63–2.19
Obesity in 2003	1.78	1.47–2.16

Conclusions: In this population smoking, asthma, bronchitis, rhinitis but also obesity increased the risk of reporting wheeze. The incidence of wheeze was also strongly dependent of the definition of the baseline population.

PS-71853-12 Life-threatening asthma in Brazil, 1996–2006

H Campos. Centro de Referencia Prof. Helio Fraga, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 25529500. e-mail: hisbello@globo.com

Aim: To present data regarding hospitalizations and hospital deaths resulting from severe exacerbations of asthma in Brazil during the period 1998–2006.

Method: Data was obtained from the Brazilian official hospital records system (DATASUS), which includes those hospitals financed by the Public Health System, for the period 1998–2006 (ICD J45; Revision 10 of the International Classification of Diseases (ICD)). Data from 2006 includes the months from January to October.

Results: During 1998–2006, life threatening asthma was responsible for an estimated 38 763 hospitalizations per year, or an average of 106 per day. This figure corresponds to 13% of all hospitalizations for asthma reported by the Public Health System during that period. Between 1998 and 2003, there was an increasing trend, ranging from 30 169 hospitalizations caused by life threatening asthma in 1998 to 59 040 in 2003. From 2004 onwards, the numbers declined: 55 547 in 2004; 48 276 in 2005 and 33 407 from January to October of 2006. Globally, hospital mortality rates were approximately 0.3%.

Conclusion: Although 13% percent of all asthma hospitalizations financed by the Public Health System during 1998–2006 in Brazil were for cases of life threatening asthma, hospital mortality rates were low 0.3%, and this may reflect good in-hospital care.

PS-71860-12 Asthma as a cause of hospitalisations in Brazil, 1992–2006

H S Campos, M A Hijjar, M S Pedroso, M J Procopio. Centro de Referencia Prof. Helio Fraga, Rio de Janeiro, RJ, Brazil. Fax: (+55) 21 25529500. e-mail: hisbello@globo.com

Aim: To present data regarding hospitalizations resulting from asthma exacerbations in Brazil during the period 1992–2006.

Method: Data was obtained from the Brazilian official hospital records system (DATASUS), which includes hospitals financed by the Public Health System.

Results: From 1992 to 2006, respiratory diseases were the second most common cause of hospitalization (16%) at those hospitals financed by the Public Health System. During 1992–2006, asthma was responsible for an average of 324 237 hospitalizations per year (888 per day). This figure corresponds to 17% of all hospitalizations due to respiratory diseases and 3% of all hospitalizations reported by the Public Health System during that period. Hospital mortality is 0.3%. Asthma hospitalizations represented an average cost of US\$ 52 million per year during that period. The largest number of hospitalizations was at the extremes of age: 41% among those

aged 4 or less and 11% among those aged 65 years or more. Children were the most affected; as 59% of the hospitalizations were reported in the age group of less than 15 years old. There were no significant gender differences (49% men and 51% women). During 1998–2006, life threatening asthma was responsible for 38 763 hospitalizations per year, which represents 13% of all hospitalizations in that period.

Conclusion: 3% percent of all hospitalizations financed by the Public Health System during 1992–2006 in Brazil were in relation to asthma. Asthma hospitalizations represent an estimated cost of US\$ 52 millions per year for the Public Health System. Children were the more affected and the highest rates were observed among children under 5 years of age.

PS-71870-12 Asthma mortality in Brazil, 1979–2006

H Campos,¹ R M Fernandes,² M A Hijjar,¹ M J Procopio.¹

¹Centro de Referencia Prof. Helio Fraga, Rio de Janeiro, RJ, ²CGIAE/DASIS/SVS, Brasilia, DF, Brazil. Fax: (+55) 21 25529500. e-mail: hisbello@globo.com

Aim: To present data regarding asthma mortality in Brazil during the period 1979–2006.

Method: Data was obtained from the Brazilian official mortality system (SIM). For the period 1979–1995, data was used from the ICD 493 (Revision 9 of the International Classification of Diseases (ICD)). For 1996–2006, we used the ICD J45 (Revision 10 of the ICD). Data from 2006 includes the months from January to October.

Results: During 1979–2006, asthma was responsible for an average of 2155 deaths per year, or about 6 per day. For the whole period, there were some peaks but overall a generally stable trend. Overall, death coefficient per 100 000 habitants was 1.39; there were slightly more deaths amongst females (1.54/100 000 females vs 1.23/100 000 males). 16% of the deaths occurred amongst children younger than 5 years old and 58% of the deaths were among those aged 55 and over. Notably, there is a significant number of cases of mistaken diagnosis between asthma and COPD in the latter age group. 72% of the deaths occurred in a hospital environment and 26% at home.

Conclusion: During 1979–2006, asthma was responsible for an average of 6 deaths per day. 18% of the reported deaths occurred amongst children younger than 15 years. More than half of the deaths were reported among those older than 55. Almost three quarters of the deaths occurred in hospital, which may reflect less of the population having access to effective ambulatory care.

PS-72141-12 Exercise-induced asthma in schoolchildren in Fes city

M El Biaze,¹ H Rahimi,¹ K El Rhazi,² B Amara,¹ A Dassouli,³ C Nejari,² M C Benjelloun.¹ ¹Service de pneumologie, CHU Hassan II, Fes, ²Laboratoire d'épidémiologie et de médecine préventive, faculté de médecine, Fes, ³Faculté des sciences, Dhar El Mahraz, Fes, Morocco. Fax: (+212) 35619321. e-mail: melbiaze@gmail.com

Background: The incidence of exercise-induced asthma (EIA) in school children is not well documented. This study was designed to evaluate the prevalence of EIA in schoolchildren aged between 6 and 15 years in Fes city in Morocco.

Methods: The representative sample was obtained by sampling method, stratified by size of schools and presumed levels of pollution.

The number of subjects planned was 732 in 8 schools. The selected children and their parents filled in a questionnaire on their asthma or atopy history, symptoms related exercise and the history of familial atopy. A total of 636 children performed a submaximal exercise challenge by the outdoor free-running asthma screening test (6 minutes run) with achieving 80% of the maximal heart rate. The test was performed in March 2007 in mean humidity of 43.5% and mean temperature of 16.3°C. Spirometry is performed, by using Easyone® spirometer, before, just after exercise and at 5, 10, and 30 mn. Data of clinical symptoms and examination were recorded. EIA was defined as a reduction in the post-exercise FEV₁ >12% of the pre-exercise value and/or presence of related clinical symptoms after exercise.

Results: After exercise, 126 school children presented EIA: the prevalence of the EIA was 19.8%. Among these 126 school children, 64 presented a fall of FEV₁ >12% with clinical symptoms (56.1%), 12 presented clinical symptoms without significative fall of FEV₁ (9.5%). Only 11 children had FEV₁ <80% before exercise test. If we used more rigorous definition of EIA with a fall in FEV₁ >15% after exercise, the prevalence was 13.5%.

Conclusion: Prevalence of EIA was higher than that found in other studies even using more rigorous criteria. We didn't find study using similar methodology. Most studies used a questionnaire and/or peak flow meter to evaluate respiratory function. It seems that EIA is underdiagnosed. Management of the asthmatic child requires cooperation between the professionals dealing with school children.

PS-71122-12 Smoking and lung function in Sudan

A A Bashir,¹ O M Musa.² ¹Faculty of Medicine-Al/Imam Al/Mahdi University, Kosti, White Nile, ²Faculty of Medicine-National Ribat University, Khartoum, Khartoum, Sudan. Fax: (+249) 571822222. e-mail: amirali_22@hotmail.com

Objectives: This study aimed at determining prevalence of smokers among adult Sudanese, comparing

their lung functions with those of non-smokers and see the effect of smoking intensity and duration on lung function.

Design and settings: A cross-sectional study performed in 2005 in Sudan on 868 adult males and 681 adult females (above 18). Subjects completed a questionnaire containing personal data, cardiopulmonary disease history and smoking habit. Spirometry was performed for (FVC, FEV₁ and PEFr). Independent T-test used for significance ($P < 0.05$).

Results: Prevalence of smokers in adult Sudanese males was found to be 13.7%. Regional prevalences were: 24.6%, 8.3%, 12.1%, 12.4% and 10.1% for central, eastern, northern, western and southern Sudan respectively. Prevalences on age group-base: 7.7%, 13.5%, 20.3% and 9.8% for the age-groups: 18–25, 26–35, 36–50 and >50 respectively. When lung functions were compared between smokers and non-smokers, only a trend of decrease in lung function of smokers specially in FEV₁ was observed, but when lung functions were compared between smokers on smoking period and frequency bases. Significant decrease associated with increased period and increasing number of cigarettes/day was observed ($P < 0.05$). Female prevalence was 2.8%.

Conclusion: Prevalence of smokers was 13.7% in adult Sudanese males and 2.8% in females. Prevalence is high in age group of 36–50 and in Khartoum. FEV₁ and PEFr decrease with increasing the frequency and the duration of smoking.

PS-71352-12 The prevalence of tobacco consumption among teenagers in Russia

E S Scvortsova. Federal Public Health Institute, Moscow, Russian Federation. Fax: (+7) 495 619 3840. e-mail: Scvortsova@mednet.ru

The monitoring of smoking among about 20 000 senior school children in 15 big cities of 9 territorial-economic zones of the country in 2003–2004 years shown that the prevalence of tobacco consumption fluctuates from 15.0% to 67.7% among boys, amounted to 37% on the average, and from 10.7% to 55.4% among girls, amounted to 25.5% on the average. Risk group (everyday smoking) comprise from 12.1% to 67.4% among boys, total to average 34.1%, and from 6.8% to 53.4% among girls, compound to average 20.6%. The mainly motive of tobacco smoking is forming dependence to tobacco among both the boys (74.5%) and the girls (69.4%). The beginning smoking tobacco includes age period from 10 to 17 years. The largest number of boys (24%) starts to test of tobacco in age early 10 inclusive, in age 11–12—14.4%; 13–14 years—17.3%; 15–16 years—5.1%. The largest number of girls starts to test tobacco in the age of 13–14 years—23%; in the age of 11–12—12.8%; 15–16 years—7.8%. The primary motive first trial smoking is mere curiosity both among the boys (75.5%)

and the girls (81.2%). This primary motive tells, that in everyday life in Russia tobacco smoking is widely spread: in the family, in the street advertising, particularly secretive advertising on TV etc.

PS-71368-12 Anticipating the result of smoking cessation according to the Fagerstrom test

G H Heydari, M Arianpoor. Tobacco Control Unit of National Research Institute of Tehran, Tehran, Iran, Islamic Rep. of. Fax: (+98) 20109484. e-mail: ghrheydari@nrritld.ac.ir

Introduction: High nicotine dependency is one of the effective causes that makes the cessation harder for the smoker. There are quite a few ways to estimate the rate of nicotine dependency in practice and one of the most suitable and non-invasive ways is fagerstrom test.

Material and methods: Data obtained from all smokers who had participated in the group therapy smoking cessation courses of Tehran smoking cessation clinic. The questionnaires were designed based on these data and Nicotine dependency rate was evaluated via fagerstrom test (FT). The smokers declared that they were not smoking since the third session of the cessation course, then this claim confirmed by testing the expiratory carbon-monoxide rate.

Results: There were 987 samples in the study in which 786 persons (79.6%) were males. Evaluation the nicotine dependency rate showed that more than half of the smokers (544 persons, 52%) had high dependency, 330 smokers (33.8%) had the average dependency and 112 smokers (11.4%) had the low dependency.

At the end of the course 642 person were successful and rate of cessation was 65% (nonsmoking even one puff after third session) and 73 persons were notable to quit smoking (rate of failure was 7.4%). 272 persons was missed (27.6%). After diminishing the missing group, the rate of success in cessation was 89.6%.

The maximum rate of success in cessation was among the smokers with low Nicotine dependency (79 persons, 70.5%) and the minimum rate of success was among the smokers with high nicotine dependency (323 persons, 59.4%).

PS-72222-12 Évaluation des connaissances du tabagisme dans la population féminine à Abidjan

K B A Kouassi,¹ N K Koffi,¹ K H Horo,^{1,2} L N Nigie,³ A N G N'Guessan,² C G Godé,^{1,2} D O K Kpebo,² A N G N'Gom,¹ E A D Aka-Dangui,¹ B A Ahui,¹ S B Boka,¹ M T Tchamran.¹ ¹Pneumologie CHU Cocody Abidjan, Abidjan, ²ONG «Sauvons le Poumon», Abidjan, ³Service de bio statistique de Côte D'Ivoire BP V13, Abidjan, Côte D'Ivoire. Fax: (+225) 22 44 79 13. e-mail: bokokouassi@hotmail.com

Introduction : Le tabagisme est fléau qui ne cesse de croître dans les pays en développement. Les victimes sont les enfants et les femmes. Malheureusement

ces populations fragiles ignorent les conséquences du tabagisme.

Méthodologie : De janvier à août 2006, nous avons mené une étude transversale sur la connaissance du tabagisme chez les femmes à Abidjan. Les objectifs de cette étude étaient de déterminer la prévalence dans cette population et d'évaluer leurs connaissances sur le tabagisme. Le calcul de la taille de l'échantillon a été fait en tenant compte de la situation socio-économique, de leur niveau d'instruction et du lieu de résidence.

Résultats : Au total 1479 femmes ont été interrogées. La prévalence du tabagisme était de 13.6%. Ces fumeuses étaient majoritairement des sujets jeunes de 15 à 35 ans (91%) instruites (74.1%) mais le plus souvent sans profession (43.3%) ou étudiantes (28.3%). S'agissant des connaissances sur le tabagisme et ses conséquences, une proportion importante de non fumeuses (93.9%) savaient que le tabagisme était dangereux pour la santé contre 86.6% des fumeuses ($P = 0.000$). D'une façon générale, ce sont les pathologies pulmonaires, notamment le cancer broncho-pulmonaire, et les pathologies cardio-vasculaires qui étaient les plus citées. Concernant les conséquences spécifiques du tabagisme sur l'activité génitale de la femme, les risques sur la grossesse et le fœtus n'étaient pas connus par plus de la moitié des femmes interrogées. On notait d'ailleurs un taux élevé de fausses réponses surtout chez les fumeuses (46.7%) ($P = 0.033$). Sur la composition de la cigarette, la nicotine était la plus citée. Les non fumeuses (85.4%) assimilaient le tabac à une drogue contre 61.7% des fumeuses.

Conclusion : Au terme de cette étude on note une mauvaise connaissance du tabac et de ces complications dans la population féminine. Une sensibilisation de cette population s'impose.

PS-71487-12 Prevalence of cigarette smoking among youth of South-western Ethiopia

A Girmay. Federal Ministry of Health, Health Extension and Education Center, Addis Ababa, Ethiopia.
Fax: (+251) 111552242. e-mail: heabiy@yahoo.com

Background: At present, due to changing conditions due to civilization, urbanization and life style, the health of youth (15–29, Ethiopian Youth Policy) is increasingly at stake. Cigarette use is a health risk behavior often established during youth, extends in to adulthood, and is preventable.

Objective: To determine the magnitude of cigarette use from the survey conducted on health risk behavior among youth in Southwest Ethiopia.

Method: A cross-sectional community based study was conducted on 650 youth using semi-structured pre-tested questionnaire from December to November 2005/06.

Results: Six-hundred fourteen youth responded from the sample 650 youth making a response rate of 96%.

A little bit more than half 53.2% of the respondents were females and 46.8% were males. The majority, 41.7% of the respondents were in the age group 15 to 19 years. Religiously the majority 66.0% were Moslem. About 43.3% were illiterate and 43.1% were ever married.

Among these, 39 (6.1%) and 30 (4.7%) had life-time and current prevalence of cigarette use respectively. Life time cigarette smoking is positively and significantly associated with male sex and increasing age trend from 15–19 to 25–29 after adjusted for odds ratio.

Discussion: The result on use of cigarette findings was discussed with the reviewed literature.

Conclusion and recommendation: The need for designing health education programme in different settings is highly emphasized to combat the problem.

PS-71840-12 Coût de l'asthme en pays pauvre

E Birba,¹ A Zoubga,¹ M Ouédraogo.² ¹CHU Sanou Sourô, Bobo Dioulasso, ²CHU Yalgado Ouédraogo, Ouagadougou, Burkina Faso. Fax: (+226) 20972693.
e-mail: birbaemile@yahoo.fr

Introduction : L'asthme est une maladie chronique à impact socio économique important. Sa prévalence est 9,65% en population générale en milieu urbain de Bobo Dioulasso. Le but de notre étude est d'évaluer son coût, dans notre contexte de limitation des ressources.

Patients et méthodes : Nous avons mené sur 06 mois une enquête auprès de 75 patients asthmatiques. Ont été recherchés, les coûts directs (consultation, examens complémentaires, les soins hospitaliers) et les coûts indirects (absentéisme professionnel, mobilisation familiale).

Résultats : Les Coûts mensuels varient en fonction du degré de sévérité de l'asthme : de 32 à 150 euros. En hospitalisation les coûts atteignent 821 euros pour les cas d'asthme aigu grave.

Discussion : Les coûts de l'asthme sont prohibitifs par rapport au niveau général de revenu. En raison de sa forte prévalence, son impact socio économique est important. Une prise en charge adéquate contribuera à lutter contre la pauvreté.

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Hong-jin Duanmu, President
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About 1.6 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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Twenty-two developing countries carry the burden of 80 percent of the world's cases of TB, the second-leading killer among infectious diseases and primary cause of death among people with HIV/AIDS globally. Spreading through the air when people cough, sneeze, or simply speak, its current rate of infection is one person per second.

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² Source of all statistics cited: *Progress Report on the Global Plan to Stop Tuberculosis*, StopTB/World Health Organization, 2007.

² "America's Most Admired Companies" annual survey, 2007; *FORTUNE* magazine, March 19, 2007.
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Effective diagnostics for effective treatment



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FIND's TB product pipeline for multidrug-resistance

1. Liquid culture-based drug susceptibility test

Profile: The Mycobacterium Growth Indicator Tube (MGIT-TB) culture system.

Stage of development: Performance of liquid culture has been reviewed by WHO STAG in 2007 and recommended for inclusion in WHO guidelines.

Access in public sector: Beginning of 2008.

Industry partner: Becton, Dickinson and Company.

2. Rapid Speciation using Lateral Flow Immunoassay test

Profile: The Capilia® TB assay is a lateral flow, disposable, single-use test for species identification of TB from culture samples that uses a visual end-point and that requires no instrument.

Stage of development: Performance of a lateral flow immunochromatographic test for species identification of TB has been reviewed by WHO STAG in 2007 and recommended for inclusion in WHO guidelines.

Access in public sector: Beginning of 2008.

Industry partner: BL Labs Co Ltd. / TAUNS Co. Ltd.

3. Manual nucleic acid amplification test

Profile: Genotype MTBDRplus® assay is a polymerase chain reaction (PCR)-based assay for INH (isoniazid).

Stage of development: Currently under evaluation to assess its efficiency and effectiveness in five South African provinces.

Access in public sector: 2009.

Industry partner: Hain Lifescience GmbH.

4. Automated nucleic acid amplification test

Profile: Xpert TB assay, real time PCR-based, is an automated method to integrate sputum processing, DNA extraction, amplification and detection of TB DNA and rifampin-resistance encoding mutations.

Stage of development: The test is still in the developmental phase.

Access in public sector: 2010.

Industry partner: Cepheid.

FIND works through public private partnerships to develop simple, accurate and affordable diagnostics to fight poverty-related diseases at all levels of the health system

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For more information, please contact :
Global TB Department
Sandoz Private Limited
7th floor, Peninsula Towers, Peninsula Corporate Park,
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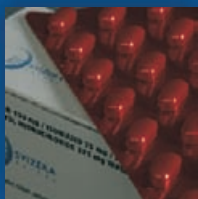


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