Abstracts

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3525 AL-MUTAIRI, N.; AHMAD, S.; MOKADDAS, E. **Performance of the Genotype MTBDR assay for molecular detection of multidrug-resistant strains of** *Mycobacterium tuberculosis*. *Annals of Saudi Medicine* (2008) **28** (3) 203-206 Riyadh, Saudi Arabia; King Faisal Specialist Hospital and Research Centre [En, 18 ref.] Department of Microbiology, Kuwait University, Safat 13110, Kuwait. Email: suhail_ah@hsc.edu.kw

Genotype MTBR assay was evaluated using 25 multiple drug resistant (MDR) and 20 pan susceptible *M. tuberculosis* strains isolated in Kuwait. All pan susceptible strains reacted with all 5 *rpoB* wild-type (WT1-WT5) and *katG* WT probes. The 35 MDR strains exhibited 11 different hybridization patterns. Rifampicin resistance was detected in 33 of 35 isolates by lack of reaction with an *rpoB* WT proble and 28 of 33 isolates also reacted with an *rpoB* mutant probe. DNA sequencing or the *rpoB* gene confirmed the strip results. For isoniazid resistance a mutation at *katG315* was detected in 22 of 35 MDR strains by absence of a signal with a *katG* proble with 22 isolates also reacting with a *katG* T1 proble. DNA sequencing of the *katG315* DNA region confirmed the results.

3526 AMER BILAL; ABDUL BASEER; MOHAMMAD MUSLIM; FARIDULLAH; ARSHAD JAVAID; AFRIDI, M. Z.; KHAN, M. Y. **Surgical interventions in multidrug-resistant tuberculosis: retrospective analysis of 27 patients treated at a Tertiary Level Care Center.** *Pakistan Journal of Medical Sciences* (2008) **24** (3) 351-355 Karachi, Pakistan; Professional Medical Publications [En, 16 ref.] Dept. of Thoracic Surgery, PGMI, Lady Reading Hospital, Peshawar, Pakistan. Email: aamirct@hotmail.com

Objective: To assess the results of surgery for Multidrug-Resistant Tuberculosis (MDR-TB). Methodology: Retrospective analysis was done in 27 cases of multidrug-resistant tuberculosis in whom some surgical interventions were carried out at Department of Thoracic surgery, Lady Reading Hospital Peshawar between the years 2002 to 2007. There were 18 male and 9 female patients in the age group of 14-54 years. All were sputum positive at the time of surgery. Majority of patients were treated with pulmonary resections (pneumonectomy [n=07], bilobectomy [n=08] and lobectomy [n=10]), while primary thoracoplasty with apicolysis was done in two patients. Post operatively 2nd line anti tubercular chemotherapy was prescribed for 24 months. Results: There was one early and one late death. Postoperative complications were seen in three cases. One patient developed bronchopleural fistula with empyema. At a mean follow-up of one year bacteriological cure was achieved in 24 patients. Conclusion: Judiciously performed adjuvant surgery can yield excellent long term bacteriological cure with acceptable

mortality and morbidity in multidrug-resistant tuberculosis. Morbidity and drug compliance remain as problem areas.

3527 VRAY, M.; GERMANI. Y.; CHAN, S.; DUC, N. H.; SAR, B.; SARR, F. D.; BERCION, R.; RAHALISON, L.; MAYNARD, M.; L'HER. P.; CHARTIER. L.; MAYAUD, C. **Clinical features and etiology of pneumonia in acid-fast bacillus sputum smear-negative HIV-infected patients hospitalized in Asia and Africa.** *AIDS* (2008) **22** (11) 1323-1332 Hagerstown, USA; Lippincott Williams & Wilkins [En, 33 ref.] Institut Pasteur, 25 rue du Dr Roux, 75724 Paris Cedex 15, France. Email: vray@pasteur.fr

Objectives: To determine the main causes of acid-fast bacillus sputum smear-negative pneumonia in Asian and African HIV-infected patients. Design and setting: A prospective multicenter study (ANRS 1260) of consecutive hospitalized patients in tertiary hospitals in Phnom Penh, Ho Chi Minh City, Bangui and Dakar. Intervention: Use of the same clinical, radiological and biological methods at the four sites; regular quality controls of participating laboratories; final review of medical records by experts. Similar criteria used to establish diagnoses. Results: In all 462 patients were enrolled, 291 in Asia and 171 in Africa. The median CD4 cell count was 25 cells/µl. Radiological opacities were diffuse in 42% of patients and localized in 45%. Fiberoptic bronchoscopy was performed in 354 patients, at similar rates in the four sites. A definite and/or probable diagnosis was obtained in 375 patients (81%). *Pneumocystis jiroveci* pneumonia, bacterial pneumonia, AFB sputum smear-negative tuberculosis and other infections (fungi parasites, atypical mycobacteria) were diagnosed in respectively 47, 30, 17 and 12% of Asian patients and 3, 48, 26 and 5% of African patients. Conclusion: In South-East Asia, acid-fast bacillus smear-negative pneumonia is caused by a wide variety of pathogens. When possible, fiberoptic bronchoscopy must be performed rapidly if clinical data are not highly suggestive of bacterial pneumonia, *Pneumocystis jiroveci* pneumonia or tuberculosis. In contrast, in Africa, bacterial pneumonia and tuberculosis are responsible for the large majority of cases. Fiberoptic bronchoscopy should be restricted to patients with clinical and/or radiological findings not suggestive of bacterial pneumonia or tuberculosis, antibiotic failure and three consecutive negative sputum smears.

3528 WILKINS, J.J.; SAVIC, R.M.; KARLSSON, M.O.; LANGDON, G.; MCILLERON, H.; PILLAI, G.; SMITH, P.J.; SIMONSSON, U. S. H. **Population pharmacokinetics of rifampin in pulmonary tuberculosis patients, including a semimechanistic model to describe variable absorption.** *Antimicrobial Agents and Chemotherapy* (2008) **52** (6) 2138-2148 Washington, USA; American Society for Microbiology (ASM) [En, 74 ref.] Division of Clinical Pharmacology, Department of Medicine, Faculty of Health Sciences, University of Cape Town, Cape Town, South Africa. Email: Helen.McIlleron@uct.ac.za

This article describes the population pharmacokinetics of rifampin in South African pulmonary tuberculosis patients. Three datasets containing 2,913 rifampin plasma concentration-time data points, collected from 261 South African pulmonary tuberculosis patients aged 18 to 72 years and weighing 28.5 to 85.5 kg and receiving regular daily treatment that included administration of rifampin (450 to 600 mg) for at least 10 days, were pooled. A compartmental pharmacokinetic model was developed using nonlinear mixed-effects modeling.

Variability in the shape of the absorption curve was described using a flexible transit compartment model, in which a delay in the onset of absorption and a gradually changing absorption rate were modeled as the passage of drug through a chain of hypothetical compartments, ultimately reaching the absorption compartment. A previously described implementation was extended to allow its application to multiple-dosing data. The typical population estimate of oral clearance was 19.2 liters. h^{-1}, while the volume of distribution was estimated to be 53.2 liters. Interindividual variability was estimated to be 52.8% for clearance and 43.4% for volume of distribution. Interoccasional variability was estimated for CL/F (22.5%) and mean transit time during absorption (67.9%). The use of single-drug formulations was found to increase both the mean transit time (by 104%) and clearance (by 23.6%) relative to fixed-dose-combination use. A strong correlation between clearance and volume of distribution suggested substantial variability in bioavailability, which could have clinical implications, given the dependence of treatment effectiveness on exposure. The final model successfully described rifampin pharmacokinetics in the population studied and is suitable for simulation in this context.

3529 MALASPINA, A. C.; CAVALCANTI, H. R; LEITE. C. Q. F; MACHADO, S. M. A.; VIANA. B. H. J.; SILVA, R. M. G.; HAGE, E. F; FIGUEIREDO, W. M.; MARQUES. E.; FERRAZOLI, L.; ARBEX, M.; LESSI, M.; FONSECA, L. S.; RIGOUTS, L.; SAAD. M H. F. **Usefulness of *Mycobacterium tuberculosis* molecular typing in a tuberculosis low-endemic agro-industrial setting of Brazil.** *Japanese Journal of Infectious Diseases* (2008) 61 (3) 231-233 Tokyo, Japan; National Institute of Infectious Diseases (NIID) [En, 10 ref.] Faculdade de Ciencias Farmaceuticas, Universidade Estadual Paulista, Sao Paulo, Brazil. Email: saad@ioc.fiocruz.br

To highlight the transmission and major phylogenetic clades of *Mycobacterium tuberculosis*, a retrospective study was carried out at two health facilities in a small agro-industrial area in Sao Paulo, Brazil, that has a low tuberculosis incidence rate. *IS6110-RFLP* and spoligotyping were performed on the isolates, with the former revealing that 31.3% (35/112) of strains were clustered. Epidemiological links were found in 16 of the 35 clustered patients and were associated with transmission among patients living in public housing. Spoligotyping grouped 62.8% of the strains. The T genetic family predominated among the isolates. Of interest is that five strains had a pattern characteristic of African or Asian origin (ST535), and two others were of the rare localized type ST1888 (BRA, VEN). In addition, three new types - 1889, 1890, and 1891 - were identified. Spoligotyping showed that some ST may be circulating to or from Brazil, and RFLP revealed ongoing transmission in inadequately ventilated public-housing buildings. This may point to a failure in tuberculosis control policy.

3530 NOTO, S.; NUNZI, E. **Global and regional annual 'new case detection' of leprosy reported by World Health Organization.** *Leprosy Review* (2008) **79** (2) 124-127 Colchester, UK; LEPRA [En, 11 ref.] Padiglione Dermatologia Sociale, Az. Ospedaliera Universitaria S. Martino, Largo R. Benzi, 10, 16132 Genoa, Italy.

This article describes the annual trends of new leprosy cases reported globally and regionally (South East Asia, the Americas and Africa) by the WHO during 1985-2006. Data showed that globally, the annual new leprosy cases were relatively stable between 1985 and 1997, varying between 550000 and 700000 cases. Two major peaks were reported in 1998

and 2001, with 763262 new cases reported in 2001. Since 2001 there had been a steady decrease with 259017 cases reported in 2006. The same trend was observed in South East Asia, with 174118 cases reported in 2006. In the Americas, there were variations with a progressive increase from 30532 new cases in 1991 to 47612 in 2006. In the African region, the annual figures varied between 40000 and 55000 new cases during 1991-2001. In 2002, the last peak was reported with 48248 cases. The number of cases decreased to 45179 in 2005 and estimated to be about 30000 in 2006, confirming the decreasing trend in the region. Over this time period, international and national anti-leprosy policies have changed, with impact on detection of new leprosy cases.

3531 MCCORMICK, C. A.; SANTOSH RATH; PATRA, P. N.; PEREIRA, J.; WILKINSON, M. **A qualitative study of common functional problems experienced by people with complete ulnar nerve paralysis.** *Leprosy Review* (2008) **79** (2) 154-161 Colchester, UK; LEPRA [En, 12 ref.] School of Medicine, Health Policy and Practice, University of East Anglia, Norwich, UK. Email: celiaanne@doctors.org.uk

Objectives: To identify the most common functional problems caused by ulnar nerve palsy. This study is the first phase in the process of developing a patient-centred hand function questionnaire specific for ulnar palsy. Design: Twenty-five participants with complete irreversible ulnar nerve palsy were asked to record the 5 main problems they had because of their hand deformity in the week before they came to hospital. They ranked these problems in order of priority. The participants had all been referred to LEPRA-HOINA Leprosy Reconstructive Surgery Hospital, Muniguda, Orissa, India for tendon transfer surgery. Results: Thirty-nine problems were experienced by the participants; 37 of these were functional problems. Five problems had a prevalence of ≤40%, these were holding soap (68%), eating (56%), buttoning (48%), holding a glass (44%) and lifting small objects (44%). Further analysis according to whether the left or right hand was affected was performed; 92% of participants with right ulnar nerve palsy had a problem eating compared to only 20% of those with left ulnar palsy. Eating was ranked as the most important problem by 28% of participants, holding a glass by 12% and holding soap by 8%. Conclusions: Ulnar nerve palsy had an important impact on basic activities of daily living - eating, washing, and drinking. Not only are these activities themselves affected but the person with a hand deformity avoids social situations where it will be noticed. This study indicates that there is a need to identify and treat people who have ulnar nerve palsy in order that they can be integrated into society, become independent with activities of daily living and earn an income.

3532 LYON,S.; LYON,AC.; SILVA, R.C. DA.; GROSSI, M.A.DEF.; LYON, S. H.; BÜHRER-SÉKULA, S.; ROCHA, M. O. C. **A comparison of ML Flow serology and slit skin smears to assess the bacterial load in newly diagnosed leprosy patients in Brazil.** *Leprosy Review* (2008) **79** (2) 162-170 Colchester, UK; LEPRA [En, 7 ref.] Sanitary Dermatology Service, Hospital Eduardo de Menezes, Fundação Hospitalar do Estado de Minas Gerais (FHEMIG), Belo Avenida do Con torno, 4852, Sala 601, Bairro Funcionáros CEP 30110-100, Belo Horizonte, MG, Brazil. Email: sandralyon@ig.com.br

Introduction: The ML Flow test is an immunochromatographic assay that detects IgM antibodies against *M. leprae*-specific anti-phenolic glycolipid I (PGL-I). In addition to

slit skin smears stained by the Ziehl-Neelsen technique, it can be helpful in the operational classification of leprosy patients for treatment purposes. Objective: This work studied the relationship between antibody levels as detected by semi-quantitative ML Flow serologic test and bacterial load as quantified by slit skin smear. Methods: A total of 135 patients with newly detected leprosy at the reference service of the Sanitary Dermatology, Hospital Eduardo de Menezes, Minas Gerais, Brazil, had slit skin smears (registered as bacillary index BI) and an ML Flow test (registered qualitatively and semi-quantitatively) performed at admission. A logistic regression and agreement measures (k index) were calculated. Results: Slit skin smears were positive in 35.9% of patients, and 57.0% of patients were seropositive for PGL-I antibodies. Among the seropositive patients, 41.6% had 5 or fewer skin lesions, and 65.8% had more than one peripheral nerve involved. Slit skin smears were positive in only 3 seronegative patients (5.6%), and negative in 41.9% of seropositive patients. Patients with a BI of 4+ had an OR of 3.3 for being seropositive in comparison to those with a low BI. Conclusions: There is a correlation between serologic test and slit skin smear results. Therefore, an ML Flow test may become a useful tool in the clinical classification of leprosy, besides slit skin smears, which require a proper laboratory infrastructure and experienced personnel.

3533 GALVÃO, P. R. S.; FERREIRA, A. T.; MACIEL, M. DAS G. G.; ALMEIDA, R. P. DE; HINDERS, D.; SCHREUDER, P. A. M.; KERRPONTES, L. R. S. **An evaluation of the sinan health information system as used by the Hansen's disease control programme, Pernambuco State, Brazil.** *Leprosy Review* (2008) **79** (2) 171182 Colchester, UK; LEPRA [En, 12 ref.] Epidemiological Surveillance Department, State Health Secretariat, Pernambuco, Brazil. Email: pieter@hansen.org.br

Background: Since the introduction of the national notifiable diseases information system (SINAN) in Pernambuco State, Brazil in 1994, many problems have been encountered. The aim of this study was to evaluate the SINAN software, quality of data input, the transfer of the computerised data from the municipality to state levels, human resources and other factors associated with the health information system infrastructure (HIS). Methods: A cross-sectional study was carried out in Pernambuco state, North-Eastern Brazil, in 2005. A sample of health regions and municipalities was chosen. SINAN forms from those municipalities were analysed and the flow of notifications followed from municipal level to the regional and finally to the state. Professionals from health units, district, municipal and regional Hansen's Disease Control Programme (HDCP) and Epidemiological Surveillance System (ESS) coordinators, health secretaries and managers of the municipalities and health regions selected were interviewed. Results: SINAN software is functioning up to expectation. However, at all levels of the health system, serious weaknesses not related to the SINAN software were found, varying from lack of human resources (limited number of staff and staff development), lack of infrastructure (office space, computers, supplies, etc.) to an absence of effective coordination, management and supervision of the HIS. Conclusions: Lack of reliable, complete and timely information, and especially the lack of widespread analysis and use of available information in planning and management of health services were the main weaknesses found. Many areas need urgent attention: the quality of patient examination, recording and reporting, the timely processing of quality

data, the coordination and management of disease control programmes, and the use of HIS reports by the health services and health managers. Regular feedback, supportive supervision visits and annual reviews are essential to monitor the system and make sure that essential information is decentralised and used by the primary health services and HDCP coordination. Assessing the quality of services from a client perspective would give additional information for the identification of strengths and weaknesses of the Hansen's disease (leprosy) services.

3534 SLIM, F. J.; HOEKSMA, A. F.; MAAS, M.; FABER, W. R. **A clinical and radiological follow-up study in leprosy patients with asymptomatic neuropathic feet.** *Leprosy Review* (2008) **79** (2) 183-192 Colchester, UK; LEPRA [En, 17 ref.] Department of Rehabilitation Medicine, Academic Medical Centre, Meibergdreef 9, 1105 AZ Amsterdam Zuid-Oost, Netherlands. Email: f.j.slim@amc.uva.nl

A magnetic resonance imaging (MRI) study conducted in 2000 on 10 leprosy patients with neuropathic feet, without clinical complications such as ulcerations, osteomyelitis or Charcot deformities, revealed abnormalities in nine patients. with degradation, interruption of subcutaneous fat and effusion/synovitis, all located in the first metatarsophalangeal (MTP) region. Since these MRI abnormalities may precede clinical complications of the foot, a follow-up study was performed. A new evaluation was based on a clinical examination and an MRI of the same patients who participated in the initial study (Amsterdam, Netherlands). Four patients were lost to follow-up. Average follow-up period was 4-6 years. MRI abnormalities in the MTP 1 region in the first study were no longer visible in 3 patients, but were still present in 2 patients. In 6 patients, new MRI findings were found, without clinical evidence of ulceration, osteomyelitis or Charcot deformity. No relationship was found between MRI findings in the MTP 1 region at the start of the study and the development of foot ulcers, callus or skin fissures in the MTP 1 region during follow-up. It is concluded that MRI findings of interruption and infiltration of the subcutaneous fat in leprosy patients with uncomplicated neuropathic feet do not necessarily have any clinical implication for the development of future foot problems.

3535 MARTINOT, A; RIE. A VAN; MULANGU, S.; MBULULA, M.; JARRETT, N.; BEHETS, F.; BOLA, V.; BAHATI, E. **Baseline assessment of collaborative tuberculosisl HIV activities in Kinshasa, the Democratic Republic of Congo.** *Tropical Doctor* (2008) **38** (3) 137-141 London, UK; RSM Press Ltd [En. 6 ref.] Department of Epidemiology, School of Public Health, University of North Carolina at Chapel Hill, 2104-F McGavran-Greenberg Hall, Chapel Hill, NC 27599-7435, USA. Email: amanda_martinot@hms.harvard.edu

Ninety-two clinics were surveyed in 2005 as part of a baseline assessment of HIV activities in Tuberculosis (TB) clinics in Kinshasa, Democratic Republic of Congo. Some HIV activities were implemented in 58% of TB clinics. The majority of health had ≥1 health care worker (HCW) trained in either HIV counseling or testing (71 %). Fifty-three clinics offered counseling and testing to TB patients; twenty-two (42%) routinely offered HIV CT to all patients, while others used selective criteria. While most offered on-site counseling (92%) and testing (77%), not all 53 clinics had a HCW trained in counseling and only 31 had access to a counseling room. Cotrimoxazole prophylaxis was offered in

51% of clinics; antiretroviral treatment in 17%. Shortcomings in human resources, infrastructure and quality of services were revealed. Strengthening those clinics already implementing mv activities could be prioritized to achieve the goals set forward by the Global Plan to Stop TB.

3536 NGOMA, D.; MAKOMBE, S. D.; KAMOTO, K.; HARRIES, A. D. **World Health Organization Clinical Stage 3 disease conditions in HIV-infected patients who start antiretroviral therapy in Malawi.** *Tropical Doctor* (2008) **38** (3) 159-160 London, UK; RSM Press Ltd [En, 9 ref.] Kamuzu Central Hospital, PO Box 45, Lilongwe, Malawi. Email: adharries@malawi.net

There is little information about disease conditions that are diagnosed in patients diagnosed as having World Health Organization Clinical Stage 3 HIV who are started on antiretroviral therapy (ART) in Africa. We therefore conducted an audit in the central region of Malawi of patients registered for ART between January and September 2006. There were 4299 patients in Stage 3 of whom 4154 had data about their disease conditions. Only one condition was listed for 3880 patients. Of these, 1892 (48.8%) had unexplained weight loss, chronic fever or chronic diarrhoea, 822 (21.2%) had active/previous tuberculosis (TB) and 671 (17.3%) had a severe presumed bacterial infection. No patient was diagnosed as having haematological abnormalities. Nearly half the patients started on ART had a symptomatic, unspecified disease, (which may be obscuring important pathologies such as TB) and almost no laboratory assessment had taken place before the commencement of ART. These two areas need to be addressed in order to improve the management of patients starting on ART.

3537 SALDANHA, D.; NITIKA GUPTA; SHALINI SHENOY; VISHWAS SARALAYA **Prevalence of opportunistic infections in AIDS patients in Mangalore, Karnataka.** *Tropical Doctor* (2008) **38** (3) 172-173 London, UK; RSM Press Ltd [En, 6 ref.] Department of Microbiology, Kasturba Medical College, 'Clifton Dale', Marnamikatta, Mangalore, Karnataka 575 001, India. Email: tvshenoy@hotmail.com

A study was conducted to determine the prevalence of opportunistic infections in HIV-seropositive patients at Kasturba Medical College Hospital, Mangalore. Three hundred and seven HIV-positive patients were screened for various opportunistic pathogens. Tuberculosis was the most common infection followed by candidiasis, cryptosporidiosis and cryptococcal meningitis.

3538 LIN XU; CHONGSUVIVATWONG, V.; LIN LU; GEATER. A.; LIJUAN REN **Dose-response relationship between treatment delay of smear-positive tuberculosis patients and intra-household transmission: a cross-sectional study.** *Transactions of the Royal Society of Tropical Medicine and Hygiene* (2008) **102** (8) 797-804 Oxford, UK; Elsevier [En, 26 ref.] Yunnan Provincial Centers for Disease Control and Prevention, Yunnan, China. Email: xulinth@hotmail.com

In order to document the effect of treatment delay on tuberculosis (TB) latent infection among the household contacts of TB patients, a cross-sectional TB infection prevalence survey was conducted among household contacts in Yunnan Province, southern China. In total, 1360 household contacts of 393 smear-positive pulmonary TB patients were enrolled, together with 308 household contacts of 90 non-TB patients. Using the contacts of non-TB patients as the baseline of TB infection, there was a dose-response relationship between household infection and delay of TB treatment (TB

infection prevalence 9.7, 7.8, 19.9, 25.7 and 26.9% for non-TB case, TB case with delay ≤3 d, 30-60 d, 60-90 d and >90 d, respectively). Older age, TB index patient with lung cavitation, and sleeping in the same bedroom with a TB patient were all associated with an increased risk of being tuberculin-skin-test positive. In conclusion, 30 d delay in trentment seems to be the turning point at which a significant increase in risk for TB infection occurs. Apart from conventional indicators, magnitude of treatment delay should be considered as a performance indicator for TB control programmes in high-TB-burden countries. Measures for the detection of early cases should be intensified.

3539 STALENHOEF, J. E.; ALISJAHBANA, B.; NELWAN. E. J.; VENJONGEKRIJG, J. VAN DER; OTTEN HOFF, T. H. M.; MEER, J. W. M. VAN DER; NELWAN, R. H.; NETEA, M. G.; CREVEL, R. VAN **The role of interferon-gamma in the increased tuberculosis risk in type 2 diabetes mellitus.** *European Journal of Clinical Microbiology & Infectious Diseases* (2008) **27** (2) 97-103 Berlin, Germany; Springer-Verlag GmbH [En] Department of Internal Medicine, Radboud University Nijmegen Medical Center, 9101, 6500 HB Nijmegen, Netherlands. Email: R.vanCrevel@aig.umcn.nl

As patients with diabetes mellitus are at increased risk of developing tuberculosis, we hypothesized that this susceptibility to mycobacterial infection is due to a defective Th1-cytokine response. To explore this hypothesis, we examined four groups of subjects in Indonesia: 23 patients with tuberculosis, 34 patients with tuberculosis and diabetes, 32 patients with diabetes only and 36 healthy controls. Ex-vivo production of interferon (IFN)γ, tumour necrosis factor-α and interleukin (lL)-β, 6, 10, -12 and-4 was measured following stimulation with *Mycobacterium tuberculosis, Escherichia coli* lipopolysaccharide and phytohaemagglutinin. Patients with active tuberculosis were found to have lower IFNγ levels and a higher production of other pro-inflammatory cytokines and IL-4, both in the presence and absence of diabetes. Diabetes patients without tuberculosis, however, showed strongly reduced non-specific IFNγ production, which is essential for inhibition of the initial growth of *M. tuberculosis.* Our data suggest that a defective non-specific immune response in diabetes may contribute to an increased susceptibility to develop tuberculosis.

3540 GOPINATH, K.; KUMAR, S.; SINGH, S. **Prevalence of mycobacteremia in Indian HIV-infected patients detected by the MB/BacT automated culture system.** *European Journal of Clinical Microbiology & Infectious Diseases* (2008) **27** (6) 423-431 Berlin, Germany; Springer-Verlag GmbH (En] Division of Clinical Microbiology, Department of Laboratory Medicine, All India Institute of Medical Sciences (AIlMS), Ansari Nagar, New Delhi, 110029, India. Email: sarman_singh@yahoo.com

The use of automated blood cultures system, such as MB/BacT, has provided a novel opportunity for laboratories to diagnose mycobacteremia in HIV-infectcd patients. However, no such study has been carried out in India so far. This prospective study was conducted on 52 HIV-positive patients with suspected tuberculosis who were referred to our tertiary care hospital in New Delhi. In these patients, the prevalence of mycobacteremia was evaluated using the MB/BacT automated culture system (bioMérieux, France). Twenty-seven HIV-negative but suspected tuberculosis patients were also included for comparison. Mycobacteria could be isolated from sputa or

fecal samples of 20 HIV-positive patients (38.4%), and in nine (45%) of these 20 cases, mycobacteria could also be isolated simultaneously from their blood specimens. In the remaining 32 patients, all relevant non-hematological clinical samples remained negative for mycobacteria, but the pathogen could be detected from the blood samples of seven (21.87%) of these 32 patients. Therefore, only 25 (48%) clinically suspected patients remained negative in both Lowenstein-Jensen (L-J) and MB/BacT culture methods, and 12 of these responded to anti-tubercular treatment, while in the rest either non-tubercular diagnosis was established or they were lost to follow-up. The study revealed that low CD_4^+ counts and poor or no reactivity to purified protein derivative (PPD) were the best clinical predictors for the occurrence of mycobacteremia in HIV-positive patients. Of the 16 isolates from blood, 13 were diagnosed as *Mycobacterium tuberculosis* and one each were identified as *M. avium, M. kansasii,* and a mixed infection of *M. tuberculosis* and *M. avium* complex. The prevalence rate of mycobacteremia was significantly low (11.1%) in HIV-negative patients. In conclusion, this study showed that blood culture could be an important adjunct investigation for confirming the clinical diagnosis of tuberculosis in HIV -positive patients.

3541 CHANG, K. C.; LEUNG, C. C.; YEW, W. W.; KAM, K. M.; YIP, C. W.; MA, C. H.; TAM, C. M.; LEUNG, E. C. C.; LAW, W. S.; LEUNG, W. M. **Peak plasma rifampicin level in tuberculosis patients with slow culture conversion.** *European Journal of Clinical Microbiology & Infectious Diseases* (2008) **27** (6) 467-472 Berlin, Germany; Springer-Verlag GmbH [En] Tuberculosis and Chest Service, Centre for Health Protection, Department of Health, Wanchai Chest Clinic, 1/F, Wanchai Polyclinic, 99, Kennedy Road, Wanchai, Hong Kong. Email: kc_chang@dh.gov.hk

The clinical utility of therapeutic drug monitoring in tuberculosis has not been adequately evaluated by controlled clinical trials. To examine the relationship between slow culture conversion and peak plasma rifampicin level (Cmax-rfm) in a case-control study, patients with persistence of positive sputum smear despite at least 8 weeks of directly observed treatment with standard pyrazinamide-containing regimens were enrolled prospectively in government chest clinics from 16 December 2005 to 15 November 2006. Patients with multi drug-resistant tuberculosis, human immunodeficiency virus infection, or poor treatment adherence were excluded. Cases referred to patients with persistence of positive culture whereas controls had negative culture despite positive smear. Blood was checked at 2 and 4 hours post-dosing to capture Cmax-rfm. A cohort of 88 patients was identified. After excluding 16 patients, there were 36 controls and 36 cases. None had symptoms of malabsorption. Cmax-rfm was below 6 mg/l among 47% of controls and 44% of cases. Univariate and multiple logistic regression analyses showed no significant association between slow culture conversion and Cmax-rfm after logarithmic transformation. Thus, there is probably no association between Cmax-rfm and slow culture conversion.

3542 WORLD HEALTH ORGANIZATION **Buruli ulcer: progress report, 2004-2008.** *Weekly Epidemiological Record* (2008) **83** (17) 145-154 Geneva, Switzerland; World Health Organization [En, Fr] Avenue Appia 20, l211 Geneva 27, Switzerland.

This report provides an update on the global status of the epidemiology, treatment and control of Buruli ulcer, and then

summarizes the progress in the following research areas on Buruli ulcer during the 2004-08 period: transmission, diagnosis and antibiotic treatment.

3543 ALAVI, S. M.; SEFIDGARAN, G. H. **Tuberculin survey among school-aged children in Ahvaz, Iran, 2006.** *International Journal of Infectious Diseases* (2008) **12** (4) 406-409 Oxford, UK; Elsevier [En, 17 ref.] Jondishapoor Infectious and Tropical Diseases Research Center, Jondishapoor University of Medical Sciences, Ahvaz, Khuzestan, Iran. Email: alavi1329dr@yahoo.com

Background and objective: The tuberculin test is widely used for the diagnosis of tuberculosis (TB) in children, as it is the only one to provide evidence of infection with *Mycobacterium tuberculosis.* Our objective was to estimate the prevalence of TB infection, the annual risk of infection (ARI), and the incidence of active TB in school children. Methods: A cross-sectional study was carried out in Ahvaz, a city of southern Iran, in 2006. A questionnaire was used to collect information, including demographic characteristics, bacillus Calmette-Guerin (BCG) vaccination history, and household contact with active TB. Tuberculin testing was performed. Reactivity that measured <5 mm was considered negative, between 5 and 9 mm was considered doubtful, and ≥10 mm was considered positive. Chest radiographs were obtained as part of the evaluation for children with a positive result. Results: A total of 3906 children with a mean±standard deviation *(SD)* age of 10.59±2.63 years (51% female, 49% male) were entered into our study. Of these, 3338 children (85.5%) did not develop a reaction (0 mm), 243 (6.2%) had reactivity of 1-4 mm, 238 (6.1 %) had reactivity of 5-9 mm, and 87 (2.2%) had reactivity of ≥10 mm. More than 90% of the children had received the BCG vaccine in the first week of life. The ARI rate was 0.5% and the estimated case of smear-positive TB was approximately 25 per 100000 population. Only three children were diagnosed with active TB, a prevalence of 75 per 100000 population. Conclusions: Tuberculin testing using 5TU-PPD (5 tuberculin units of purified protein derivative) is a valuable diagnostic test for latent TB and active TB in childhood. BCG vaccination has no remarkable effect on the interpretation of tuberculin reactivity. The incidence rate of active pulmonary TB in children in the region of study is of concern.

3544 WORLD HEALTH ORGANIZATION **Trends in the epidemiology of leprosy - Viet Nam, 1983-2006.** *Weekly Epidemiological Record* (2008) **83** (24) 217-224 Geneva, Switzerland; World Health Organization [En, Fr] Avenue Appia 20, 1211 Geneva 27, Switzerland.

The profile of leprosy in Viet Nam from 1983 to 2006 is discussed in detail, with a focus on the significant improvements that have been made. Tables and figures containing data on the various epidemiological aspects of leprosy in Viet Nam from 1983 to 2006 are also presented; these include the prevalence and new-case detection of leprosy; special projects to promote community awareness and increase case-finding; trends in prevalence rate and newcase detection rate; proportion of females and proportion of grade-2 disabilities among new cases; proportion of females among new cases of leprosy; and proportion of children and patients with multi bacillary leprosy among newly detected cases.

3545 CHERN, J. P. S.; CHEN DUANRUNG; WEN TZAIHUNG **Delayed treatment of diagnosed pulmonary tuberculosis in Taiwan.** *BMC Public Health* (2008) **8** (236) (13 July 2008) London, UK; BioMed Central Ltd

[En, 34 ref.] Department of Family Medicine, Tao-Yuan General Hospital, Tao-Yuan, Taiwan. Email: jimmy .chern@msa.hinet.net, duan@ntu.edu.tw, wen_thung@hotmail.com

Background: Mycobacterium tuberculosis infection is an ongoing public health problem in Taiwan. The National Tuberculosis Registry Campaign, a case management system, was implemented in 1997. This study examined this monitoring system to identify and characterize delayed treatment of TB patients. Methods: Records of all tuberculosis cases treated in Taiwan from 2002 through 2005 were obtained from the National Tuberculosis Registry Campaign. Initiation of treatment more than 7 days after diagnosis was considered a long treatment delay. Results: The study included 31,937 patients. The mean day of delayed treatment was 3.6 days. Most patients were treated immediately after diagnosis. The relationship between number of TB patients and days of delayed treatment after diagnosis exhibited a Power-law distribution. The long tail of the power-law distribution indicated that an extreme number occur cannot be neglected. Tuberculosis patients treated after an unusually long delay require close observation and follow up. Conclusion: This study found that TB control is generally acceptable in Taiwan; however, delayed treatment increases the risk of transmission. Improving the protocol for managing confirmed TB cases can minimize disease transmission.

3546 WEI XIAOLIN; WALLEY, J. D.; LIANG XINYUAN; LIU FEIYING; ZHANG XIULEI; LI RENZHONG **Adapting a generic tuberculosis control operational guideline and scaling it up in China: a qualitative case study.** *BMC Public Health* (2008) **8** (260) (29 July 2008) London, UK; BioMed Central Ltd [En, 33 ref.] Nuffield Centre for International Health and Development, University of Leeds, Leeds, UK. Email: x.wei@leeds.ac.uk. j.d.walley@leeds.ac.uk, cindyliangxy@hotmail.com, liufeiying@163.com, leedsxz@yahoo.com.cn, sdlirenzhong@163.com

Background: The TB operational guideline (the *deskguide)* is a detailed action guide for county TB doctors aiming to improve the quality of DOTS, while the China national TB policy guide is a guide to TB control that is comprehensive but lacks operational usability for frontline TB doctors. This study reports the process of deskguide adaptation, its scale-up and lessons learnt for policy implications. Methods: The deskguide was translated, reviewed, and revised in a working group process. Details of the eight adaptation steps are reported here. An operational study was embedded in the adaptation process. Two comparable prefectures were chosen as pilot and control sites in each of two participating provinces. In the pilot sites, the deskguide was used with the national policy guide in routine in-service training and supervisory trips; while in the control sites, only the national policy guide was used. In-depth interviews and focus groups were conducted with 16 county TB doctors, 16 township doctors, 17 village doctors, 63 TB patients and 57 patient family members. Following piloting, the deskguide was incorporated into the national TB guidelines for county TB dispensary use. Results: Qualitative research identified that the deskguide was useful in the daily practice of county TB doctors. Patients in the pilot sites had a better knowledge of TB and better treatment support compared with those in the control sites. Conclusion: The adaptation process highlighted a number of general strategies to adapt generic guidelines into country specific ones: (1) local policy-makers

and practitioners should have a leading role; (2) a systematic working process should be employed with capable focal persons; and (3) the guideline should be embedded within the current programmes so it is sustainable and replicable for further scale-up.

3547 DATlKO, D. G.; YASSIN. M. A.; CHEKOL, L. T; KABETO, L. E.; LINDTJORN. B. **The rate of TB-HIV co-infection depends on the prevalence of HIV infection in a community.** *BMC Public Health* (2008) **8** (266) (30 July 2008) London, UK; BioMed Central Ltd [En, 30 ref.] Southern Nations, Nationalities and Peoples' Regional Health Bureau, P.O. Box 149, Awassa, Ethiopia. Email: danieljohn42@yahoo.com, gda050@student.uib.no, mayassin@liv.ac.uk, leulki2k2@yahoo.com, lopisoe@yahoo.com, Bemt.Lindtjorn@cih.uib.no

Background: A complex interaction exists between tuberculosis (TB) and human immunodeficiency virus (HIV) infection at an individual and community level. Limited knowledge about the rate of HI V infection in TB patients and the general population compromises the planning, resource allocation and prevention and control activities. The aim of this study was to determine the rate of HIV infection in TB patients and its currelation with the rate HIV infection in pregnant women attending antenatal care (ANC) in Southern Ethiopia. Methods: All TB patients and pregnant women attending health institutions for TB diagnosis and treatment and ANC were consecutively enrolled in 2004-2005. TB diagnosis, treatment and HIV testing were done according to the national guidelines. Blood samples were collected for anonymous HIV testing. We used univariate and multivariate logistic regression analysis to determine the risk factors for HIV infection and linear regression analysis to determine the correlation between HIV infection in TB patients and pregnant women. Results: Of the 1308 TB patients enrolled, 226 (18%) (95%CI: 15.8-20.0) were HIV positive. The rate of HIV infection was higher in TB patients from urban 25% (73/298) than rural areas 16% (149/945) [AOR=1.78, 95%CI: 1.27-2.48]. Of the 4199 pregnant women attending ANC, 155 (3.8%) [95%CI: 3.2-4.4] were HIV positive. The rate of HIV infection was higher in pregnant women from urban (7.5%) (801 1066) than rural areas (2.5%) (75/3025) [OR=3.19, 95% CI: 2.31-4.41]. In the study participants attending the same health institutions, the rate of HIV infection in pregnant women correlated with the rate of HIV infection in TB patients (R^2=0.732). Conclusions: The rate of HIV infection in TB patients and pregnant women was higher in study participants from urban areas. The rate of HIV infection in TB patients was associated with the prevalence of HIV infection in pregnant women attending ANC.

3548 LEUNG, C. C.; LAM, T. H.; CHAN, W. M.; YEW, W. W.; HO, K S.; LEUNG, G. M.; LAW, W. S.; TAM, C. M.; CHAN, C. K; CHANG, K. C. **Diabetic control and risk of tuberculosis: a cohort study.** *American Journal of Epidemiology* (2008) **167** (12) 1486-1494 Cary, USA; Oxford University Press [En, 39 ref.] Tuberculosis and Chest Service, Department of Health, Hong Kong. Email: cc_leung@dh.gov.hk

Diabetes mellitus is associated with tuberculosis. A cohort of 42,116 clients aged 65 years or more, enrolled at 18 Elderly Health Service centres in Hong Kong in 2000, were followed up prospectively through the territory-wide tuberculosis registry for development of tuberculosis from 3 months after enrollment to December 31,2005, by use of their identity card numbers as unique identifier. The effects of diabetes mellitus and

diabetic control on tuberculosis risk were assessed with adjustment for sociodemographic and other background variables. Diabetes mellitus was associated with a modest increase in the risk of active, culture-confirmed, and pulmonary (with or without extrapulmonary involvement) but not extrapulmonary (with or without pulmonary involvement) tuberculosis, with adjusted hazard ratios of 1.77 (95% confidence interval: 1.41,2.24),1.91 (95% confidence interval: 1.45, 2.52), 1.89 (95% confidence interval: 1.48, 2.42), and 1.00 (95% confidence interval: 0.54, 1.86), respectively. Diabetic subjects with haemoglobin A1c<7% at enrollment were not at increased risk. Among diabetic subjects, higher risks of active, culture-confirmed, and pulmonary but not extrapulmonary tuberculosis were observed with baseline haemoglobin A1c>7% (vs. <7%), with adjusted hazard ratios of 3.11 (95% confidence interval: 1.63, 5.92), 3.08 (95% confidence interval: 1.44, 6.57), 3.63 (95% confidence interval: 1.79,7.33), and 0.77 (95% confidence interval: 0.18,3.35), respectively.

3843 OTTMANl, S.; OBERMEYER, Z.; BENCHEIKH, N.; MAHJOUR, J. **Knowledge, attitudes and beliefs about tuberculosis in urban Morocco.** *Eastern Mediterranean Health Journal* (2008) **14** (2) 298-304 Alexandria, Egypt; World Health Organization, Regional Office for the Eastern Mediterranean [En, ar, fr, 16 ref.] Stop TB Department, World Health Organization, Geneva, Switzerland. Email: ziad_obermeyer @hms.harvard.edu

We sought to characterize conceptions of tuberculosis (TB) in an urban population in Morocco. Thus 301 subjects, some being treated for TB (patients) and some attending health facilities for other conditions (non-patients), in 2 Moroccan cities were surveyed. Most patients did not identify their illness as TB referring instead to a body region or symptom. Non-patients tended to cite causative factors related to living conditions, home and family. There was considerable stigma associated with TB. Most non-patients knew that TB was treatable, but few were aware that diagnosis and treatment were free. Popular understandings of TB aetiology and transmission in this population differ from the biomedical view, highlighting the need for better communication about the disease.

3844 BICAKCI, Z.; PARLAK, M. **A neglected cause of cervical lymphadenitis. *Oropharyngeal tularemia.*** *Saudi Medical Journal* (2008) **29** (7) 1059-1061 Riyadh, Saudi Arabia; Saudi Medical Journal Armed Forces Hospital [En, 5 ref.] Department of Pediatrics, Faculty of Medicine, Kafkas University, A. D. Pasaçayiri 36300 Kars, Turkey. Email: zaferbicakcib@yahoo.com.tr

The outcomes of 12 cases of oropharyngeal tularaemia with cervical lymphadenitis diagnosed between 2006 and 2007 in Kars, Turkey are described. The mean age was 30±18.9 years (10-75 years) and 9 of the cases were female. The mean delay of diagnosis was 30 days (1-45 days). The patients were treated with intramuscular streptomycin (1 g/day) and oral doxycycline (200 mg/day) for 14 days. None of the patients expired.

3845 IRAM BOKHARI; SHAH, S. S. H.; INAMULLAH; ZAHID MEHMOOD; ALl, S. U.; ASADULLAH KHAN **Tubercular fistula-in-ano.** *JCPSP, Journal of the College of Physicians and Surgeons Pakistan* (2008) **18** (7) 401-403 Karachi, Pakistan; College of Physicians and Surgeons Pakistan [En, 20 ref.] Department of General Surgery, Jinnah Postgraduate Medical Centre, Karachi, Pakistan. Email: i_bokhari@hotmail.com

Objective: To determine the frequency of tuberculosis in recurrent fistula-in-ano. Study Design: Case series. Place and Duration of Study: This study was conducted in Surgical Ward-3, Jinnah Postgraduate Medical Centre in Karachi, Pakistan, during 1998-2007. Patients and Methods: The study included 100 cases of recurrent fistula-in-ano not responding to conventional surgery. Patients with other co-morbidities such as diabetes mellitus, bleeding disorders or with the evidence of pulmonary, abdominal or intestinal tuberculosis were excluded from this study. Fistulogram was performed in all patients. All the patients were subjected to fistulectomy followed by histopathology of the resected specimen. After confirmation of the disease, antituberculous treatment was immediately started and response to treatment was observed after 6 months. Results: Out of the 100 studied patients, 11 cases had biopsy proven tuberculosis in the fistula. All the patients were male. The fistulae were low type, single and usually located posteriorly (n=9) with everted margins. Ten were located within 3 cm of the anus. Fistulogram revealed single internal opening. Comparative statistics of tuberculous fistula-in-ano with fistulas due to specific inflammation revealed no major differences. The diagnosed patients of tubercular fistulae-in-ano were observed for at least 6 months after starting antituberculous treatment. They all responded well to antitubercular treatment and the fistulae healed without any complication such as recurrence or anal stenosis within 6 months. Conclusion: Tuberculosis should be suspected in case of recurrent fistulae-in-ano, so as to avoid unusual delay in the treatment and miseries to the patient. Appropriate antituberculous therapy leads to healing within 6 months.

3846 SOUMYA SWAMINATHAN; HANNA, L. E.; SUNDARAMURTHI, J. C.; LEONARD, A; ANGAYARKANNI, B.; FRANCIS, A. C.; LAKSHMI, S.; KAUSTUV NAYAK **Prevalence and pattern of cross-reacting antibodies to HIV in patients with tuberculosis.** *AIDS Research and Human Retroviruses* (2008) 24 (7) 941-946 New Rochelle, USA; Mary Ann Liebert, Inc. [En, 22 ref.] Division of HIV/AIDS, Tuberculosis Research Center, Indian Council of Medical Research, Mayor V.R. Ramanathan Road, Chetput, Chennai 600 031, India. Email: doctorsoumya@yahoo.com

In many countries, HIV testing among tuberculosis (TB) patients is recommended so that both infections are appropriately treated. Cross-reacting antibodies to HIV antigens have been reported for several conditions, including TB, leprosy, malaria, and rheumatoid arthritis. To study the pattern and prevalence of crossreacting antibodies to HIV antigens, we examined sera from 153 HIV-negative TB patients and 40 healthy individuals in Chennai, south India. We also studied the differences in cross-reactivity of various HIV antigens using two different Western blot kits. Of the 153 samples studied, 80 were tested using HIV Western blot and 73 were tested using INNOLIA. Most patients in the study had concordantly negative ELISA and rapid tests, and no subject had a positive Western blot. However, seven TB patients had antibodies that cross-reacted with HIV antigens, giving rise to an indeterminate result. While p51/55 was the most frequently recognized antigen in the Western blot assay, antibodies to sgpl20 was most frequently identified in INNOLIA. Sequence similarities between the two organisms could be responsible for eliciting cross-reacting antibodies, since a few related epitopes were identified in HIV and *Mycobacterium.* These findings could have potential implications for the development of diagnostics and vaccines.

3847 SANKAR, M. M.; KRISHNAMOORTHY GOPINATH; ROOPAK SINGLA; SARMAN SINGH ***In-vitro*** **antimycobacterial drug susceptibility testing of non-tubercular mycobacteria by tetrazolium microplate assay.** *Annals of Clinical Microbiology and Antimicrobials* (2008) **7** (15) (11 July 2008) London, UK; BioMed Central Ltd [En, 22 ref.] Clinical Microbiology Division, Department of Laboratory Medicine, All India Institute of Medical Sciences, New Delhi, India. Email: sankar.mm@gmail.com. kgnath@gmail.com, rupaks@lrs.nic.in, sarman_singh@yahoo.com

Background: Non-tubercular mycobacteria (NTM) has not been given due attention till the recent epidemic of HIV. This has led to increasing interest of health care workers in their biology, epidemiology and drug resistance. However, timely detection and drug susceptibility profiling of NTM isolates are always difficult in resource poor settings like India. Furthermore, no standardized methodology or guidelines are available to reproduce the results with clinical concordance. Objective: To find an alternative and rapid method for performing the drug susceptibility assay in a resource limited settings like India, we intended to evaluate the utility of Tetrazolium microplate assay (TEMA) in comparison with proportion method for reporting the drug resistance in clinical isolates of NTM. Methods: A total of fifty-five NTM isolates were tested for susceptibility against Streptomycin, Rifampicin, Ethambutol, Ciprofloxacin, Ofloxacin, Azithromycin, and Clarithromycin by TEMA and the results were compared with agar proportion method (APM). Results: Of the 55 isolates, 23 (41.8%) were sensitive to all the drugs and the remaining 32 (58.2%) were resistant to at least one drug. TEMA had very good concordance with APM except with minor discrepancies. Susceptibility results were obtained in the median of 5 to 9 days by TEMA. The NTM isolates were highly sensitive against Ofloxacin (98.18% sensitive) and Ciprofloxacin (90.09% sensitive). *M. mucogenicum* was sensitive only to Clarithromycin and resistant to all the other drugs tested. The concordance between TEMA and APM ranged between 96.4-100%. Conclusion: Tetrazolium Microplate Assay is a rapid and highly reproducible method. However, it must be performed only in tertiary level Mycobacteriology laboratories with proper bio-safety conditions.

3848 LAZZARINI, L. C. O.; SPINDOLA, S. M.; BANG, H. J.; GIBSON, A. L.; WEISENBERG, S.; CARVALHO, W. DA S.; AUGUSTO, C. J.; HUARD, R. C.; KRITSKI, A. L.; Ho, J. L. **RD^{Rio}** ***Mycobacterium tuberculosis*** **infection is associated with a higher frequency of cavitary pulmonary disease.** *Journal of Clinical Microbiology* (2008) **46** (7) 2175-2183 Washington, USA; American Society for Microbiology (ASM) [En, 60 ref.] Division of International Medicine and Infectious Diseases, Department of Medicine, Weill Medical College of Cornell University, 525 East 68th St., New York, NY 10021, USA. Email: jlho@med.cornell.edu

Molecular genotyping has shown *Mycobacterium tuberculosis* lineages to be geographically restricted and associated with distinct ethnic populations. Whether tuberculosis (TB) caused by some *M. tuberculosis* lineages can present with a differential clinical spectrum is controversial because of very limited clinical data. We recently reported on the discovery of RD^{Rio} *M. tuberculosis,* a Latin American-Mediterranean sublineage that is the predominant cause of TB in Rio de Janeiro, Brazil. To investigate the

clinical attributes of TB caused by RD^{Rio} strains, we studied a cohort of TB cases from Belo Horizonte, Brazil, in which clinical information recorded on a standardized questionnaire was collected at the time of microbiological testing. These patients were referred for culture and drug susceptibility testing because of the clinical suspicion of "complicated" TB, as demonstrated by high rates of multidrug resistance (12%) and cavitary TB (80%). We performed spoligotyping and RD^{Rio} genotyping on the *M. tuberculosis* strains and analyzed the clinical data from these patients. RD^{Rio} *M. tuberculosis* accounted for 37% of the total TB burden. Multivariate analysis found a significant association between TB caused by RD^{Rio} strains and pulmonary cavitation and residence in Belo Horizonte. Since cavitary TB is associated with higher sputum bacillary load, our findings support the hypothesis that RD^{Rio} *M. tuberculosis* is associated with a more "severe" disease as a strategy to increase transmission. Future studies are needed to confirm these observations and to better define the contribution of RD^{Rio} *M. tuberculosis* to the global TB epidemic.

3849 MONOT, M.; HONORE, N.; BALIERE, C.; JI BAOHONG; SOW, S.; BRENNAN, P. J.; COLE, S. T. **Are variable-number tandem repeats appropriate for genotyping *Mycobacterium leprae?*** *Journal of Clinical Microbiology* (2008) **46** (7) 2291-2297 Washington, USA; American Society for Microbiology (ASM) [En, 25 ref.] Unite de Génétique Moléculaire Bactérienne, Institut Pasteur, Paris, France. Email: stewart.cole@epfl.ch

Comparative genomics analysis of the Tamil Nadu strain of *Mycobacterium leprae* has uncovered several polymorphic sites with potential as epidemiological tools. In this study we compared the stability of two different markers of genomic biodiversity of *M. leprae* in several biopsy samples isolated from the same leprosy patient. The first type comprises five different variable-number tandem repeats (VNTR), while the second is composed of three single nucleotide polymorphisms (SNP). Contrasting results were obtained, since no variation was seen in the SNP profiles of *M. leprae* from 42 patients from 7 diffen'nt locations in Mali whereas the VNTR protiles varied considerably. Furthermore, since variation in the VNTR pattern was seen not only between different isolates of *M. leprae* but also between biopsy samples from the same patient, these VNTR may be too dynamic for use as epidemiological markers for leprosy.

3850 GRANDJEAN, L.; MARTIN, L.; GILMAN, R. H.; VALENCIA, T.; HERRERA, B.; QUINO, W.; RAMOS, E.; RIVERO, M.; MONTOYA, R; ESCOMBE, A. R.; COLEMAN, D.; MITCHISON, D.; EVANS, C. A. **Tuberculosis diagnosis and multidrug resistance testing by direct sputum culture in selective broth without decontamination or centrifugation.** *Journal of Clinical Microbiology* (2008) **46** (7) 2339-2344 Washington, USA; American Society for Microbiology (ASM) [En, 22 ref.] Laboratorios de Investigación y Desarrollo, Departamento de Microbiología, Facultad de Ciencias, Universidad Peruana Cayetano Heredia, Lima, Peru. Email: caevans@jhsph.edu

Tuberculosis culture usually requires sputum decontamination and centrifugation to prevent cultures from being overgrown by contaminating bacteria and fungi. However, decontamination destroys many tuberculous bacilli, and centrifugation often is not possible in resource-poor settings. We therefore assessed the performance of *Mycobacterium tuberculosis* culture with

unprocessed samples plated directly by using tuberculosis-selective media and compared this procedure to conventional culture using centrifuge decontamination. Quadruplicate aliquots of strain H37RV were cultured in 7H9 broth with and without selective antimicrobials and after centrifuge decontamination. The subsequent comparison was made with 715 sputum samples. Split paired sputum samples were cultured conventionally with centrifuge decontamination and by direct culture in tuberculosis-selective media containing antibiotics. Centrifuge decontamination reduced tuberculosis H37RV colonies by 78% ($P<0.001$), whereas direct culture in tuberculosis-selective media had no inhibitory effect. Similarly, in sputum cultures that were not overgrown by contaminants, conventional culture yielded fewer tuberculosis colonies than direct culture ($P<0.001$). However, the sensitivity of conventional culture was greater than that of direct culture, because samples were less affected by contamination. Thus, of the 340 sputum samples that were tuberculosis culture positive, conventional culture detected 97%, whereas direct culture detected 81 % ($P<0.001$). Conventional and direct cultures both took a median of 8.0 days to diagnose tuberculosis ($P=0.8$). In those direct cultures that detected drug resistance or susceptibility, there was a 97% agreement with the results of conventional culture (Kappa agreement statistic, 0.84; $P<0.001$). Direct culture is a simple, low-technology, and rapid technique for diagnosing tuberculosis and determining drug susceptibility. Compared to that of conventional culture, direct culture has reduced sensitivity because of bacterial overgrowth, but in basic laboratories this deficit may be outweighed by the ease of use.

3851 PANTUKOSIT, P.; ARPORNSUWAN, M.; SOOKANANTA, K. **A diphtheria outbreak in Buri Ram, Thailand.** *Southeast Asian Journal of Tropical Medicine and Public Health* (2008) **39** (4) 690-696 Bangkok, Thailand; SEAMEO TROPMED Network [En, 9 ref.] Pediatrics Department, Buri Ram Hospital, Buri Ram 31000, Thailand. Email: pantavee_alp@yahoo.co.th

In May 1996 there was an outbreak of diphtheria in Buri Ram, Thailand which infected 31 patients, 8 males and 23 females. The mean age of the patients was 8±5 years. Seventy-four percent had a history of childhood vaccinations. Common signs and symptoms included fever (100%) which was low grade in 61%, sore throat (90%), upper airway obstruction (3%), and hoarseness (10%). Pseudomembranes (seen in 100%) were located on the tonsils (71%), pharynx (22%), larynx (9.6%), and uvula (6%). The mean duration of symptoms prior to admission was 2 days with a range of 1 to 5 days. Complications included upper airway obstruction (10%) and cardiac complications (10%). There were no neurological complication or deaths. There were negative associations between cardiac complications, severity of disease and previous diphtheria vaccination. The ages varied from children to adults. Early recognition and prompt treatment decreased complications and mortality in this group of patients when compared with Chiang Mai and Sirikit National Institute of Child Health (QSNICH) studies.

3852 WANG, C. S.; CHEN, H. C.; YANG, C. J.; WANG, W. Y.; CHONG, J. W.; HWANG, J. J.; HUA, G. M. S. **The impact of age on the demographic, clinical, radiographic characteristics and treatment outcomes of pulmonary tuberculosis patients in Taiwan.** *Infection* (2008) **36** (4) 335-340 Munich,

Germany; Urban & Vogel GmbH [En, 30 ref.] Dept. of Internal Medicine, Kaohsiung Municipal Hsiao-Kang Hospital. Kaohsiung Medical University, Kaohsiung, Taiwan. Email: yyw0302@yahoo.com.tw

Background: The characteristics of pulmonary tuberculosis (TB) in the elderly are different from young patients. This leads to delay in diagnosis and higher mortality from TB in the aged population. The aim of this study was to investigate the impact of age on the demographic, clinical, radiographic characteristics, and treatment outcomes of pulmonary TB patients in Taiwan. Materials and Methods: We performed a retrospective analysis of the medical charts and chest radiographs of 83 elderly (≥60 years old) and 74 young (<60 years old) culture-proven pulmonary TB patients from 1 August 2003 to 31 July 2006. Results: Elderly patients showed lower frequencies of infectious TB contact history, alcoholism, cavity, and positive acid-fast bacilli sputum smears. In contrast, the elderly population had higher frequencies of chronic obstructive lung disease, heart failure, stroke, dyspnea, lower lung field involvement, pleural effusion and mortality. There were no differences between these two groups regarding sex, initial body weight, previous TB disease, hospital admission, diabetes mellitus, end-stage renal disease, neoplasm, liver cirrhosis, upper lung field involvement, cure, and treatment completion. Furthermore, age of 60 and older, lower initial body weight less than 50 kg, coexisting medical diseases, and extensive radiographic disease were factors independently associated with unfavorable outcomes. Conclusions: Elderly patients with pulmonary TB are more likely to present with negative sputum smears, cavity-negative lesions, lower lung field involvement and pleural effusion on chest radiographs. The prognosis is poor for the elderly pulmonary TB patients with lower body weight, coexisting medical diseases, and extensive radiographic disease.

3853 MEHTAR, S. **Lowbury lecture 2007: infection prevention and control strategies for tuberculosis in developing countries - lessons learnt from Africa.** *Journal of Hospital Infection* (2008) **69** (4) 321-327 Amsterdam, Netherlands; Elsevier [En, 15 ref.] Academic Unit for Infection Prevention and Control, Department of Community Health, Faculty of Health Sciences, Stellenbosch University and Tygerberg Hospital, 3 Aristea Road, Durbanville, Cape Town, Western Cape 7550, South Africa. Email: smehtar@sun.ac.za

The World Health Organization ranks South Africa among the top ten of high-burden countries for tuberculosis (TB). The Western Cape Province has the highest prevalence of TB in the country. Studies performed in healthcare facilities both at Tygerberg Hospital and from Kwa-Zulu Natal province indicate a significant risk for nosocomial transmission of tuberculosis. An audit of provision for infection prevention and control (IPC) programmes revealed that although there were adequate supplies of protective clothing, the greatest need was for training and understanding of IPC principles among healthcare workers. In establishing national IPC guidelines for TB in South Africa, it has become evident that most of these were derived from existing guidelines in developed countries. Though the principles were sound, the practices were not realistic for developing economies and generally not implemented in healthcare facilities. Factors that influence a robust TB management programme are poverty, concurrent human immunodeficiency virus infection, overcrowding, ignorance of the disease and a varied level of health service

delivery. It is recommended that a foundation of sound knowledge should be established upon which best practices should be built within the framework of good IPC principles.

3854 MUNIM, A.; RAJAB, Y.; BARKER, A.; DANIEL, M.; WILLIAMS, B. **Risk of *Mycobacterium tuberculosis* infection in Somalia: national tuberculin survey 2006.** *Eastem Mediterranean Health Journal* (2008) **14** (3) 518-530 Alexandria, Egypt; World Health Organization, Regional Office for the Eastern Mediterranean [En, ar, fr, 19 ref.] World Health Organization, Hargeisa, Somalia. Email: munima@som.emro.who.int

To estimate the annual risk of tuberculosis (TB) infection (ARTI) in Somalia a tuberculin survey was conducted in February/March 2006. Stratified cluster sampling was carried out within the 18 regions and 101 randomly selected primary schools. Tuberculin testing was done in 10 680 grade 1 schoolchildren. Transverse tuberculin reaction size was measured 72 hours later. The number of children with a satisfactory test read was 10 364. The overall BCG coverage was 54%. Based on frequency distribution of tuberculin reaction sizes, the ARTI in Somalia was estimated at 2.2% (confidence interval: 1.5%-3.2%). There was an annual decline of 2.6% comparing with a previous study in 1956.

3855 KUMAR, P.; SRIVATSAVA, M. V. P.; SINGH, S.; PRASAD, H. K. **Filtration of cerebrospinal fluid improves isolation of mycobacteria.** *Journal of Clinical Microbiology* (2008) **46** (8) 2824-2825 Washington, USA; American Society for Microbiology (ASM) [En, 11 ref.] Department of Biotechnology, All India Institute of Medical Science, New Delhi 110029, India.

A simple method for concentrating mycobacteria that may be present in the cerebrospinal fluid (CSF) sample and increasing the sensitivity of detection of mycobacteria by conventional and/or automated systems is described. In this procedure, 0.5-2 ml of CSF was filtered through a sterile 0.45 µm filter. The CSF container was washed twice with one ml of saline. The wash fluid along with the sample was loaded into a syringe. The entire fluid volume was filtered. The residue present on the membrane was used for inoculating Lowenstein-Jensen (LJ)/Mycobacterium growth indicator tube (MGIT 960) medium. 125 CSF samples were collected from patients suspected having tuberculous meningitis admitted to a hospital in New Delhi, India. 50 samples were inoculated into MGIT tubes were incubated in the BACTEC MCIT 960 instrument and 75 samples were smeared on LJ slants. Growth on LJ medium was detected after 3-4 weeks while with MGIT culture, growth was detected after 10 days. Six mycobacterial isolates were obtained with LJ medium slants and 12 isolates were recovered from MGIT tubes. The isolation rate on MCIT 960 is 24% with the present filtration method compared to 7.4-18.36% reported in previous studies.

3856 AFFOLABI, D.; SANOUSSJ, N.; ODOUN, M.; MARTIN, A; KOUKPEMEOJI, L.; PALOMINO, J. C.; KESTENS, L.; ANAGONOU, S.; PORTAELS, F. **Rapid detection of multidrug-resistant *Mycobacterium tuberculosis* in Cotonou (Benin) using two low-cost colorimetric methods: resazurin and nitrate reductase assays.** *Journal of Medical Microbiology* (2008) **57** (8) 1024-1027 Reading, UK; Society for General Microbiology [En, 23 ref.] Laboratoire de Référence des Mycobactéries, BP 817, Cotonou, Benin. Email: affolabi_dissou@yahoo.fr

We have evaluated two simple, rapid and low-cost colorimetric methods for

the detection of multidrug-resistant *Mycobacterium tuberculosis*. A total of 151 *M. tuberculosis* strains were tested for resistance to rifampicin (RMP) and isoniazid by resazurin microplate assay (REMA) and nitrate reductase assay (NRA) in comparison with the conventional proportion method (PM) on Löwenstein-Jensen medium. A complete agreement was found between NRA and PM, while one false RMP-susceptible result was found by REMA. REMA and NRA tests are rapid and inexpensive, and could be good alternatives to the conventional PM in low-resource countries.

3857 ANG, C. F.; ONG, C. S.; RUKMANA, A; THI, K. L. P.; YAP, S. F.; NOEOW, Y. F.; HO, M. L.; SUDIRO, T. M.; BELA. B.; JORDAAN, A. M.; STREICHER, E. M.; VICTOR, T. C. **An overview of the phenotypic and genotypic characteristics of multidrug-resistant *Mycobacterium tuberculosis* isolates from four Asian countries.** *Journal of Medical Microbiology* (2008) **57** (8) 1039-1040 Reading, UK; Society for General Microbiology [En, 10 ref.] Infectious Disease Section, Medical Research Laboratory, Department of Medicine, University of the Philippines, Philippine General Hospital, Manila, Philippines. Email: chiasui@gmail.com

This multicentre study focused on Indonesia, Malaysia, the Philippines and Vietnam, which have a high incidence of tuberculosis (TB) and where little is known about the variation in drug-resistant strains of *Mycobacterium tuberculosis*. Standard genotypic and phenotypic methods were used to give an overview of the characteristics of multidrug-resistant (MDR) isolates. A total of 103 MDR *M. tuberculosis* isolates (resistant to at least rifampicin and isoniazid) were included (51 from the Philippines, 22 from Vietnam, 18 from Indonesia and 12 from Malaysia). The isolates were chosen from culture collections of each of the participating countries, dating from 1996 to 2006. About one-third of the isolates belonged to the Beijing strain. The predominance of the EAI family (39.8%; 41 of 103) was evident, with most coming from the Philippines (29 of 41). The LAM family was present in the 3 countries, except Vietnam, and 3 of the isolates belonged to the Haarlem family. Other known strain families that were less represented included MANU, T and U. There were 15 isolates that could not be classified. Mutations in the cluster 1 region of the *rpoB* gene, commonly associated with rifampicin resistance, were found in 91.3% (94 of 103) of the isolates. The majority of the isolates had mutations at codons 531 (53.4%),526 (25.2%) and 516 (4.9%). Isoniazid-resistance-related mutations in the *katG* and *inhA* genes were detected in 77 (74.8%) of the MDR isolates: 75 isolates had mutations in the *katG* gene codon 315 and only 2 isolates had mutations in the *inhA* promoter region.

3858 SALLEH, S. A; HUSSIN, S.; RAHMAN, M. M. **Nested PCR for the rapid detection of TB from pleural fluid at HUKM Malaysia.** *Pakistan Journal of Biological Sciences* (2008) **11** (13) 1728-1732 Faisalabad, Pakistan; ANSInet, Asian Network for Scientific Information [En, 6 ref.] Department of Medical Microbiology and Immunology, Faculty of Medicine, Universiti Kebangsaan Malaysia, Cheras, 56000, Kuala Lumpur, Malaysia.

The aim of the present study is rapid detection of tuberculosis from pleural effusion of suspected patients. Molecular technique nested polymerase chain reaction (PCR) was used for the purpose. A total of 67 pleural fluid collected at Hospital University Kebangsaan, Malaysia during May 2005 to

October 2006 were sent to Microbiology Laboratory. Detection rate of *Mycobacterium tuberculosis* in pleural effusion was 0% by acid-fast bacilli staining and 1.5% by culture on Lowenstein-Jensen medium. *Mycobacterium tuberculosis* was detected by PCR in 9% of the cases. PCR of pleural fluid had 19% sensitivity and 96% specificity, compared to AFB staining (0% sensitivity and 100% specificity) and culture (4% sensitivity and 100% specificity). PCR also has 67% positive predictive value (PPV) and 72% negative predictive value (NPV) in detecting *M. tuberculosis.* Culture of pleural fluid has 100% PPV and 71 % NPV while AFB staining has 0% PPV and 31 % NPV. This preliminary study showed that PCR is a rapid method for detection of *M. tuberculosis* in pleural fluid but its sensitivity is not up the marked.

3859 POPE, D. S.; DELUCA, A. N.; KALI, P.; HAUSLER, H.; SHEARD, C.; HOOSAIN, E.; CHAUDHARY, M. A; CELENTANO, D. D.; CHAISSON, R. E. **A cluster-randomized trial of provider-initiated (opt-out) HIV counseling and testing of tuberculosis patients in South Africa.** *JAIDS, Journal of Acquired Immune Deficiency Syndromes* (2008) **48** (2) 190-195 Hagerstown, USA; Lippincott Williams & Wilkins [En]

Objective: To determine whether implementation of provider-initiated human immunodeficiency virus (HIV) counseling would increase the proportion of tuberculosis (TB) patients who received HIV counseling and testing. Design: Cluster-rdndomized trial with clinic as the unit of randomization. Setting: Twenty, medium-sized primary care TB clinics in the Nelson Mandela Metropolitan Municipality, Port Elizabeth, Eastern Cape Province, South Africa. Subjects: A total of 754 adults (18 years and older) newly registered as TB patients in the 20 study clinics. Intervention: Implementation of provider-initiated HIV counseling and testing. Main Outcome Measures: Percentage of TB patients HIV counseled and tested. Secondary: Percentage of patients with HIV test positive, and percentage of those who received cotrimoxazole and who were referred for HIV care. Results: A total of 754 adults newly registered as TB patients were enrolled. In clinics randomly assigned to implement provider-initiated HIV counseling and testing, 20.7% (73/352) patients were counseled versus 7.7% (31/402) in the control clinics (P=0.011), and 20.2% (n=71) versus 6.5% (n=26) underwent HIV testing (P=0.009). Of those patients counseled, 97% in the intervention clinics accepted testing versus 79% in control clinics (P=0.12). The proportion of patients identified as HIV infected in intervention clinics was 8.5% versus 2.5% in control clinics (P=0.044). Fewer than 40% of patients with a positive HIV test were prescribed cotrimoxazole or referred for HIV care in either study arm. Conclusions: Provider-initiated HIV counseling significantly increased the proportion of adult TB patients who received HIV counseling and testing, but the magnitude of the effect was small. Additional interventions to optimize HIV testing for TB patients urgently need to be evaluated.

3860 NORRGREN, H. R.; BAMBA, S.; LARSEN, O.; SILVA, Z. DA; AABY, P.; KOIVULA, T.; ANDERSSON, S. **Increased prevalence of HTLV-1 in patients with pulmonary tuberculosis coinfected with HIV, but not in HIV-negative patients with tuberculosis.** *JAlDS, Joumal of Acquired Immune Deficiency Syndromes (2008)* **48** (5) 607-610 Hagerstown, USA; Lippincott Williams & Wilkins [En]

Background: Few and inconclusive results have been presented regarding the

influence of human T-lymphotropic virus 1 (HTLV-1) infection on the risk of acquiring tuberculosis (TB). Methods: In 1994-1997, we performed a prospective study on hospitalized adult patients with pulnlonary TB in Guinea-Bissau and compared the clinical outcome in HIV-2 and HIV-negative patients. We determined the prevalence of HTLV-1 in all patients screened and diagnosed with TB in that study and compared the infection rate with a serosurvey of HTLV-1 in a population sample from a community-based study conducted at the same time and in the same city. Results: In the TB group, a total of 32 (11.4%) of 280 patients were positive for HTLV-1. This was significantly higher compared with the population-based group in which 74 (3.5%) of 2117 were HTLV-1 positive [crude odds ratio (OR)=3.6; 95% confidence interval (CI) 2.2 to 5.6, P<0.001]. However, in a logistic regression analysis controlling for age, gender, and HIV result, the difference was no longer significant (OR=1.61; 95% CI 0.95 to 2.70, P=0.074). In HIV-negative patients, no association was found between HTLV-1 and TB (OR=1.18; 95% CI 0.48 to 2.89, P=0.71), whereas a significant association was found in HIV-positive patients (OR=2.41; 95% CI 1.26 to 4.61, P=0.008). Conclusions: The immunosuppressive effect of HTLV -1 alone was not enough to increase the risk of TB in a highly endemic country, but HTLV-1 increased the risk of TB among HIV-infected individuals.

3861 MINOR, O. LE; GERMANI, Y.; CHARTIER, L.; NGUYEN HUU LAN; LAN, N. T. P.; DUC, N. H.; LAUREILLARD, D.; FONTANET, A; SAR, B.; SAMAN, M.; CHAN, S.; LHER, P.; MAYAUD, C.; VRAY, M. **Predictors of pneumocystosis or tuberculosis in HIV-infected Asian patients with AFB smear-negative sputum pneumonia.** *JAIDS. Journal of Acquired Immune Deficiency Syndromes* (2008) **48** (5) 620-627 Hagerstown, USA; Lippincott Williams & Wilkins [En]

Objectives: To identify predictors of Pneumocystis jiroveci pneumonia (PCP) or pulmonary tuberculosis (TB) in acid-fast bacillus smear-negative HIV-infectcd patients and to develop clinical prediction rules. Design: A cohort study conducted in consecutive hospitalized Asian patients. Methods: Multivariate analyses were performed on the Cambodian sample to determine clinical, radiological, and biological predictors of PCP or TB at hospital admission. The Vietnamese sample was kept for independent validation. Results: In Cambodia, the gold standard technique for TB and PCP were fulfilled in 172 (27 cases) and 160 (84 cases) patients, respectively. For TB, independent predictors included the following: headache [odds ratio (OP) 3.0; 95% confidence interval (CI) 1.04 to 8.6], localized radiological opacity (OR 5.8; 95% CI 1.9-17.9), and mediastinal adenopathy (OR 10.1; 95% CI 3.5 to 29.0); and for PCP: resting oxygen saturation <90% (OR 3.3; 95% CI 1.3 to 8.5 for resting arterial oxygen saturation >=80%; and OR 9.1; 95% CI 1.8 to 44.5 for resting arterial oxygen saturation <80%), trimethoprim-sulphamethoxazole prophylaxis (OR 0.1; 95% CI 0.04 to 0.6), and diffuse radiological shadowing (OR 7.0; 95% CI 2.7 to 18.6). PCP risk predicted by a score based on these 3 factors ranged from 3% to 92% (Cambodia). When tested on Vietnamese patients (n=69, 38 with PCP), the score maintained correct predictive ability (c-index=0.72) but with poor calibration. Conclusions: The PCP score could provide a useful clinical tool to identify PCP among acid-fast bacillus smear-negative pneumonia and start specific therapy.

3862 RAO, V. G.; GOPI, P. G.; YADAV, R.; SADACHARAM, K.; BHAT,J.; SUBRAMANI, R.; ANVIKAR, A. R.; TIWARI, B. K.; VASANTHA, M.; BHONDELEY, M. K.; GADGE, V.; EUSUFF, S. I.; SHUKLA, G. P. **Tuberculous infection in Sabaria, a primitive tribal community of Central India.** *Transactions of the Royal Society of Tropical Medicine and Hygiene* (2008) **102** (9) 898-904 Oxford, UK; Elsevier [En, 27 ref.] Regional Medical Research Centre for Tribals, Indian Council of Medical Research, Nagpur Road, P.O. Garha, Jabalpur 482003, India. Email: drvgrao@rediffmail.com

A cross-sectional tuberculin survey was carried out to estimate the prevalence of tuberculous infection and the annual risk of tuberculosis infection (ARTI) among children of Saharia, a primitive ethnic group in Madhya Pradesh, Central India. A total of 1341 children aged 1-9 years were subjected to tuberculin testing with 1 TU of PPD RT 23 and the reaction sizes were read after 72 h. The proportion of BCG scar-positive children was 34.6%. The frequency distribution of children by reaction sizes indicated a clearcut anti-mode at 11 mm and a mode at 18 mm at the right-hand side of the distribution. The prevalence of infection among children irrespective of BCG scar was estimated as 20.4% (95% CI 18.2-22.5%) and the ARTI was 3.9% (95% CI 3.5-4.3%). The corresponding figures were 21.1 % (95% CI 18.3-23.8%) and 3.9% (95% CI 3.4-4.5%) among BCG scar-negative children and 19.0% (95% CI 15.4-22.5%) and 4.0% (95% CI 3.2-4.8%) among BCG scar-positive children. The findings of the present study show a high prevalence of tuberculous infection and high ARTI in this primitive ethnic group. There is an urgent need to further intensify tuberculosis control measures on a sustained and long-term basis in this area.

3863 MULDER, A. A.; BOERMA, R. P.; BAROGUI, Y.; ZINSOU, C.; JOHNSON, R. C.; GBOVI, J.; WERF, T. S. VAN DER; STIENSTRA, Y. **Healthcare seeking behaviour for Buruli ulcer in Benin: a model to capture therapy choice of patients and healthy community members.** *Transactions of the Royal Society of Tropical Medicine and Hygiene* (2008) **102** (9) 912-920 Oxford, UK; Elsevier [En, 28 ref.] Department of Internal Medicine, University Medical. Center Groningen, P.O. Box 30.001,9700 RB Groningen, Netherlands. Email: y.stienstra@int.umcg.nl

Buruli ulcer is a devastating condition emerging in West Africa. We investigated why patients often report late to the hospital. Health seeking behaviour determinants and stigma were studied by in-depth interviews in patients treated in hospital *(n=107),* patients treated traditionally *(n=46)* of whom 22 had active disease, and healthy community control subjects *(n=107).* We developed a model capturing internal and external factors affecting decision making. With increasing severity, extent and duration of Buruli ulcer, a shift of influencing factors on health seeking behaviour appears to occur. Factors causing delay in presenting to hospital were the use of traditional medicine before presenting at the treatment centre; costs and duration of admission; disease considered not serious enough; witchcraft perceived as the cause of disease; and fear of treatment, which patients expected to be amputation. This study confirms the importance of self-treatment and traditional healing in this area. Our study was performed before antimicrobial treatment was introduced in Benin; we suggest that this model and the results from this analysis should be used as a baseline from which to measure the influence of the introduction of antimicrobial treatment on health seeking behaviour for Buruli ulcer in Benin.

4220 AYUO, P. O.; DIERO, L. O.; OWINO-ONG'OR, W. D.; MWANGI, A. W. **Causes of delay in diagnosis of pulmonary tuberculosis in patients attending a referral hospital in Western Kenya.** *East African Medical Journal* (2008) **85** (6) 263-268 Nairobi, Kenya; Kenya Medical Association [En, 15 ref.] Department of Medicine, School of Medicine, Moi University, P.O. Box 4606, Eldoret, Kenya.

Objective : To determine the length of delays from onset of symptoms to initiation of treatment of pulmonary tuberculosis (PTB). Design : Cross-sectional study. Setting : Chest/TB clinic, Moi Teaching and Referral Hospital (MTRH), Eldoret, Kenya. Subjects : Newly diagnosed smear positive pulmonary tuberculosis (PTB) patients. Results : Two hundred and thirty patients aged between 12 and 80 (median; 28.5) years were included in the study. They comprised 148 (64.3%, median 30 years) males and 82 (35.7%, median 28 years) females. One hundred and two (44%) came from urban and 128 (56%) came from rural setting covering a median distance of 10 (range 0-100) kilometres and paying Kshs 20 (range 0-200) to facility. Cough was the commonest symptom reported by 228 (99.1%) of the patients followed by chest pain in 214 (80%). The mean patient delay was 11 ± 17 weeks (range: 1-78 weeks) with no significant difference between males and females, the mean system delay was 3 ± 5 weeks (range: 0-39 weeks). The median patient, health systems and total delays were 42, 2, and 44 days respectively for all the patients. Marital status, being knowledgeable about TB, distance to clinic and where help is sought first had significant effect on patient delay. Conclusion: Patient delay is the major contributor to delay in diagnosis and initiation of treatment of PTB among our patients. Therefore TB control programmes in this region must emphasise patient education regarding symptoms of tuberculosis and timely health seeking behaviour.

4221 YANG XIAOYAN; ZHANG NINGMEI; DIAO XIANG; MAO XIU; LI YOUPING **Epidemiological analysis of pulmonary tuberculosis in Sichuan Province, China, 2000-2006.** *International Journal of Infectious Diseases* (2008) **12** (5) 534-541 Oxford, UK; Elsevier [En, 30 ref.] Chinese Evidence-Based Medicine Center, West China Hospital, Sichuan University, Chengdu 610041, Sichuan Province, China. Email: ccebm@126.com

Objectives : To investigate the epidemiological features ofpulmonary tuberculosis in Sichuan Province, China, for the period 2000-2006. Materials and methods: Data from the China Information System for Disease Control and Prevention, the World Health Organization, and the high caseload provinces in China were collected. This was a descriptive study, and the Besag and Newell method was applied. Results : From 2000 to 2006. the incidence rate of pulmonary tuberculosis increased from 54 to 103/100 000, the mortality rate increased from 0.02 to 0.30/100 000, and the case-fatality rate increased from 0.04% to 0.29%. The age groups 20-24, 65-69, and 70-74 years had higher incidences. There were more cases and deaths in males compared to females. Peasants contributed the most to caseloads (64%) and deaths (69%) in the total population. The north and west regions of Sichuan Province had higher incidences. Sichuan had a higher incidence, mortality rate, and case-fatality rate than both the national level and Henan Province between 2001 and 2003. It also had a higher prevalence of active tuberculosis and smear-positive pulmonary tuberculosis than the national level and Guangdong Province after 1990.

Multidrug-resistant tuberculosis is a major problem in China compared to India and Indonesia. Conclusions: Sichuan should be the most important province in China with regard to tuberculosis prevention and control, especially for male peasants from the north and west regions and the active pulmonary tuberculosis and sputum smear-positive cases. The major challenge is multidrug-resistant tuberculosis.

4222 GLYNN, J. R.; MURRAY, J.; BESTER, A.; NELSON, G.; SHEARER, S.; SONNENBERG, P. **Effects of duration of HIV infection and secondary tuberculosis transmission on tuberculosis incidence in the South African gold mines.** *AIDS* (2008) **22** (14) 1859-1867 Hagerstown, USA; Lippincott Williams & Wilkins [En, 39 ref.] Department of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, Keppel St, London WC1E 7HT, UK. Email: Judith.glynn@lshtm.ac.uk

Background : HIV increases the risk of tuberculosis directly, through immunosuppression, and indirectly, through onward transmission of *Mycobacterium tuberculosis* from the increased caseload. We assess the contribution of these two mechanisms by time since seroconversion to HIV. Methods : The incidence of new pulmonary tuberculosis was estimated in a retrospective cohort study of South African gold miners over 14 years. HIV tests were done in random surveys in 1992-1993, and in clinics. One thousand nine hundred fifty HIV-positive men with seroconversion intervals of less than 3 years were identified and linked to medical, demographic and occupational records. They were compared with men who were HIV-negative in a survey, with no later evidence of HIV. Analyses were censored when men were diagnosed with tuberculosis, died or left the mine. Results: Tuberculosis incidence rose soon after HIV infection, reaching 1.4/100 person-years (95% confidence interval 1.1-1.9) within 2 years, and 10.0/100 person-years (95% confidence interval 6.5-15.5) at 10 or more years. By 11 years from seroconversion, nearly half the men had tuberculosis. Among 5702 HIV-negative men, tuberculosis incidence was 0.48/ 100 person-years (95% confidence interval 0.33-0.70) in 19911993 and doubled over the period of the study (after adjusting for age). Age-adjusted model estimates suggest that half the increase in tuberculosis incidence by time since HIV infection was attributable to increasing incidence over calendar period - the indirect effect. Conclusion: For the first time, we have shown that the increase in tuberculosis risk by time since seroconversion reflects both direct effects of HIV increasing susceptibility, and indirect effects due to onward transmission. Innovative and sustained public health measures are needed to reduce *Mycobacterium tuberculosis* transmission.

4223 LÓPEZ-GATELL, H.; COLE, S. R.; MARGOLICK, J. B.; WITT, M. D.; MARTINSON, J.; PHAIR, J. P.; JACOBSON, L. P. **Effect of tuberculosis on the survival of HIV-infected men in a country with low tuberculosis incidence.** *AIDS* (2008) **22** (14) 1869-1873 Hagerstown, USA; Lippincott Williams & Wilkins [En, 24 ref.] Directorate of Epidemiology, Ministry of Health, Mexico City, Mexico. Email: hlgatell@jhsph.edu

Background: Evidence regarding the effeet of tuberculosis (TB) on HIV disease progression at the population level remains inconclusive. Method: We estimated the effect of incident TB on time to AIDS-related death, using a marginal structural Cox model. Results: Between 1984 and 2005, 2882 HIV-infected men in the Multicenter AIDS Cohort Study contributed 21 914 person-years while followed for a median of 5.4

years. At study entry, the median CD4 cell count and HIV-1 RNA viral load were 533 cells/ µl (interquartile range: 365-737) and 12953 copies/ml (interquartile range: 2453-48 540), respectively. This study was performed in a setting with a modest exposure to HAART; 8295 of 23 801 (35%) person-years were followed during the HAART era. Fifteen men incurred incident TB, yielding a TB incidence of 7 (95% confidence interval: 4-14) per 10 000 person-years and 1072 died of AIDS-related causes. Accounting for potential confounders, including CD4 cell count and viral load, the hazard of AIDS-related death was 2.4 times more for the person-time with TB compared to the person-time without TB (95% confidence interval: 1.2-4.7). Conclusions: Results underscore the importance of avoiding TB by using preventive interventions such as treatment of latent TB infection, particularly in populations with a large prevalence of HIV/TB co-infected individuals.

4224 ZHANG. X. F.; LV, Y.; XUE, W. J.; WANG, B.; LIU, C.; TIAN, P. X.; YU, L.; CHEN, X. Y.; LIU, X. M. **Mycobacterium tuberculosis infection in solid organ transplant recipients: experience from a single center in China.** *Transplantation Proceedings* (2008) **40** (5) 1382-1385 New York, USA; Elsevier [En, 9 ref.] Department of Hepatobiliary Surgery, First Affiliated Hospital, Medical College, Xi'an Jiaotong University, Xi'an, China. Email: luyiI69@126.com

Objective: We sought to explore the prevalence, clinical manifestations, diagnostic procedures, and treatment of tuberculosis (TB) after solid organ transplantation. Patients and Methods: In this study, we retrospectively analyzed data of 1947 renal transplant recipients and 85 liver transplant recipients. Results: TB developed in 28 organ transplant recipients with a prevalence of 1.38% (28/2032). The median interval between transplantation and development of TB was 32 months (range, 1-142 months). *Mycobacterium tuberculosis* isolation, histologic signs of caseating granulomas, and TB-DNA detection directly supported the diagnosis in 10 (35.71%), 7 (25.00%), and 5 (17.86%) patients, respectively. In addition, 6 patients (21.43%) highly suspected of TB infection received tentative antituberculosis treatment with favorable responses. Most renal transplant recipients (22/25; 78.57%) received isoniazid, rifampicin (or rifabutin), and ethambutal (or pyrazinamide) for a mean duration of 10 months (range, 6-14 months). Three liver transplant recipients received a different protocol: isoniazid, rifabutin, ethambutol, and ofloxacin for 3 months; then isoniazid and rifabutin for 6 months. Upon follow-up, 8 subjects (28.57%) died; 5 of the deaths were related to TB. During the antituberculosis therapy, toxic hepatitis was seen in 12 patients (42.86%); cyclosporine levels decreased in 15 patients (53.57%); and allograft rejection developed in 6 of them. Conclusions: The peak incidences of TB in liver and kidney transplantations are in the first year and after the first year posttransplantation, respectively. Response to antituberculosis treatment should be considered to make a diagnosis among patients highly suspected of TB infections. Except in special circumstances, antituberculosis treatment protocols including isoniazid and rifampicin for about 10 months seem significantly effective and tolerable for non-liver transplant patients. Fluoroquinolones should be emphasized in posttransplantation TB treatment.

4225 MAHOMED, H.; SHEA, J.; KAFAAR, F.; HAWKRIDGE, T.; HANEKOM, W. A.; HUSSEY, G. D. **Are adolescents ready for tuberculosis vaccine trials?** *Vaccine* (2008) **26** (36) 4725-4730 Amsterdam, Netherlands;

Elsevier [En, 12 ref.] South African Tuberculosis Vaccine Initiative, Institute of Infectious Disease and Molecular Medicine, University of Cape Town Health Sciences Faculty, Anzio Road, Observatory, Cape Town 7925, South Africa. Email: hassan.mahomed@ucl.ac.za

Tuberculosis (TB) vaccine trials are planned in adolescents in a high tuberculosis burden rural area near Cape Town, South Africa. To determine the knowledge and attitudes of adolescents about tuberculosis, vaccines and vaccine trials, a representative sample of adolescent learners was chosen from high schools in the trial area. A questionnaire was administered and focus group discussions held with the group and a sample of their parents. The questionnaire response rate was 65%. Knowledge of tuberculosis was fair 63.7% but knowledge of vaccines poor 41.9% based on a TB and vaccine knowledge score, respectively. Willingness to participate in vaccine trials will be influenced by the type of procedures involved (60% willing to answer questions, 43% willing to be examined, 32% willing to undergo skin tests and 39% willing to undergo blood draw). In general, better knowledge was statistically associated with greater willingness to participate in study procedures except for the blood draw. The focus group discussions showed that adolescents and their parents were positive about participating in vaccine trials but concerns about safety and the provision of adequate information should be considered when planning TB vaccine trials. This study suggests that TB vaccine trials would be acceptable amongst adolescents in this community with certain provisos.

4226 NGOWI, B. J.; MFINANGA, S. G.; BRUUN, J. N.; MORKYE, O. **Pulmonary tuberculosis among people living with HIV/AIDS attending care and treatment in rural northern Tanzania.** *BMC Public Health* (2008) **8** (341) (30 September 2008) London, UK; BioMed Central Ltd [En, 32 ref.] Haydom Lutheran Hospital, Mbulu District, Manyara Region, Tanzania. Email: ber-nard.ngowi@student.uib.no, b_ngowi@yahoo.co.uk, gsmfinanga@yahoo.com, j.n.bruun@medisin.uio.no, johan.nikolai.bruun@unn.no, odd.morkve@cih.uib.no

Background: Tuberculosis is the commonest opportunistic infection and the number one cause of death in HIV/AIDS patients in developing countries. To address the extent of the tuberculosis HIV coinfection in rural Tanzania we conducted a cross sectional study including HIV/AIDS patients attending a care and treatment clinic from September 2006 to March 2007. Methods: Sputum samples were collected for microscopy, culture and drug susceptibility testing. Chest X-ray was done for those patients who consented. Blood samples were collected for CD4+ T cells counts. Results: The prevalence of tuberculosis was 20/233 (8.5%). Twenty (8.5%) sputum samples were culture positive. Eight of the culture positive samples (40%) were smear positive. Fifteen (75%) of these patients neither had clinical symptoms nor chest X-ray findings suggestive of tuberculosis. Nineteen isolates (95%) were susceptible to rifampicin, isoniazid, streptomycin and ethambutol (the first line tuberculosis drugs). One isolate (5%) from HIV tuberculosis coinfected patients was resistant to isoniazid. No cases of multi-drug resistant tuberculosis were identified. Conclusion: We found high prevalence of tuberculosis disease in this setting. Chest radiograph suggestive of tuberculosis and clinical symptoms of fever and cough were uncommon findings in HIV/tuberculosis coinfected patients. Tuberculosis can occur at any stage of CD4+ T cells depletion.

4227 LAWN, S. D.; HARRIES, A. D.; ANGLARET, X.; MYER, L.; WOOD, R. **Early mortality among adults accessing antiretroviral treatment programmes in sub-Saharan Africa.** *AIDS* (2008) **22** (15) 1897-1908 Hagerstown, USA; Lippincott Williams & Wilkins [En, 92 ref.) Desmond Tutu HIV Centre, Institute of lnfectious Disease and Molecular Medicine, Faculty of Health Sciences, University of Cape Town, Anzio Road, Observatory 7925, Cape Town, South Africa. Email: stevelawn@yahoo.co.uk

Two-thirds of the world's HIV-infected people live in sub-Saharan Africa, and more than 1.5 million of them die annually. As access to antiretroviral treatment has expanded within the region; early pessimism concerning the delivery of antiretroviral treatment using a large-scale public health approach has, at least in the short term, proved to be broadly unfounded. Immunological and virological responses to ART are similar to responses in patients treated in high-income countries. Despite this, however, early mortality rates in sub-Saharan Africa are very high; between 8 and 26% of patients die in the first year of antiretroviral treatment, with most deaths occurring in the first few months. Patients typically access antiretroviral treatment with advanced symptomatic disease, and mortality is strongly associated with baseline CD4 cell count less than 50 cells/[mu]1 and WHO stage 4 disease (AIDS). Although data are limited, leading causes of death appear to be tuberculosis, acute sepsis, cryptococcal meningitis, malignancy and wasting syndrome. Mortality rates are likely to depend not only on the care delivered by antiretroviral treatment programmes, but more fundamentally on how advanced disease is at programme enrolment and the quality of preceding healthcare. In addition to improving delivery of antiretroviral treatment and providing it free of charge to the patient, strategies to reduce mortality must include earlier diagnosis of HIV infection, strengthening of longitudinal HIV care and timely initiation of antiretroviral treatment. Health systems delays in antiretroviral treatment initiation must be minimized, especially in patients who present with advanced immunodeficiency.

4228 CARDONA-CASTRO, N.; BELTRÁN-ALZATE, J. C.; MANRIQUE-HERNÁNDEZ, R. **Survey to identify *Mycobacterium leprae*-infected household contacts of patients from prevalent regions of leprosy in Colombia.** *Memórias do Instituto Oswaldo Cruz* (2008) **103** (4) 332-336 Rio de Janeiro, Brazil; Instituto Oswaldo Cruz [En, 29 ref.] Instituto Colombiano de Medicina Tropical, Universidad CES, Cra 43A No. 52 Sur-99, Sabaneta, Antioquia, Colombia. Email: ncardona@ces.edu.co

Leprosy in Colombia is in the post-elimination phase; nevertheless, there are regions of this country where the incidence is still around 3-4/100,000. Early detection of leprosy patients is a priority for achieving control and elimination of leprosy; however, the clinical exam is not very sensitive and thus, the majority of patients are diagnosed only when they demonstrate lesions, and damage to the nerves and skin has already occurred. The goal of the present study was to identify *Mycobacterium leprae* infection and immune responses in household contacts (HHC) of leprosy patients from three prevalent regions of Colombia. Clinical examination, the Mitsuda test, evaluation of IgM anti-PGL-I in the serum, the bacillar index (BI), and polymerase chain reaction (PCR) from nasal swabs (NS) were performed for 402 HHC of 104 leprosy patients during a cross-sectional survey. Positive titers for IgM anti-PGLI were found for 54 HHC, and PCR-positive NS for 22. The Mitsuda reaction was

negative for 38 HHC, although three were positive for IgM anti-PGL-I titers. The data document that leprosy transmission among HHC is still occurring in a non-endemic country.

4229 FENG JIA YIH; SU WEIJUIN; TSAI CHENGCHIEN; CHANG SHICHUAN **Clinical impact of *Mycobacterium tuberculosis* W-Beijing genotype strain infection on aged patients in Taiwan.** *Journal of Clinical Microbiology* (2008) **46** (9) 3127-3129 Washington, USA; American Society for Microbiology (ASM) [En, 21 ref.] Chest Department, Taipei Veterans General Hospital, National Yang-Ming University, 201, Shih-Pai Road, Taipei 112, Taiwan. Email: scchang@vghtpe.gov.tw

The impact of W-Beijing genotype *Mycobacterium tuberculosis* on treatment outcome was evaluated in 249 newly diagnosed tuberculosis patients. No significant difference in the treatment outcome was found between the W-Beijing and non-W-Beijing groups. However, a poor outcome was more common in the elderly patients (≥65 years) infected with the W-Beijing strain.

4230 PARDILLO, F. E. F.; BURGOS, J.; FAJARDO, T. T.; CRUZ, E. DELA; ABALOS, R.M.; PAREDES, R.M.D.; ANDAYA, C. E. S.; GELBER, R. H. **Powerful bactericidal activity of moxifloxacin in human leprosy.** *Antimicrobial Agents and Chemotherapy* (2008) **52** (9) 3113-3117 Washington, USA; American Society for Microbiology (ASM) [En, 37 ref.] Leonard Wood Memorial Center for Leprosy Research, Cebu, Philippines. Email: ikgelber@hotmail.com

In a clinical trial of moxifloxacin in eight multi bacillary leprosy patients, moxifloxacin proved highly effective. In all trial patients, a single 400-mg dose of moxifloxacin resulted in significant killing (P≤0.006) of *Mycobacterium leprae*, ranging from 82% to 99%, with a mean of 91%. In all instances, no viable bacilli were detected with an additional 3 weeks of daily therapy, this observed rapid bactericidal activity being matched previously only by rifampin. On moxifloxacin therapy, skin lesions cleared exceedingly rapidly with definite improvement observed consistently after eight doses and progressive resolution continuing for the 56 days of the trial. Side effects, toxicities, and laboratory abnormalities were mild, not requiring discontinuation of therapy.

4231 DEPS, P. D.; LOCKWOOD, D. N. J. **Leprosy occurring as immune reconstitution syndrome.** *Transactions of the Royal Society of Tropical Medicine and Hygiene* (2008) **102** (10) 966-968 Oxford, UK; Elsevier [En, 18 ref.] Department of Social Medicine, Federal University of Espirito Santo, Vitoria-ES, Brazil. Email: patricia.deps@lshtm.ac.uk.pdeps@uol.com.br

Immune reconstitution inflammatory syndrome (IRIS) may occur in HIV-infected patients after starting highly active antiretroviral therapy (HAART). Since 2003, 19 cases were published as IRIS. Leprosy has been reported as an example of an IRIS, and it is important that this syndrome should be recognized in leprosyendemic areas. The case definition of leprosy as IRIS is based on clinical presentation of leprosy, evidence of immune restoration and timing of onset. Case definition should include the following: (I) leprosy and/or leprosy type I reaction presenting within six months of starting HAART; (2) advanced HIV infection; (3) low CD4+ count before start HAART; (4) CD4+ count increasing after HAART has been started. Although pathogenic mechanisms are still unclear, it is likely that leprosy-associated IRIS will be increasingly reported in those countries endemic for both diseases

and as access to HAART becomes more widely available.

4232 WALSH, D. S.; PORTAELS. F.; MEYERS, W. M. **Buruli ulcer (*Mycobacterium ulcerans* infection).** *Transactions of the Royal Society of Tropical Medicine and Hygietle* (2008) **102** (10) 969-978 Oxford, UK; Elsevier [En, many ref.] United States Army Medical Research Unit-Kenya (USAMRU-K), Walter Reed Project, PO Box 54, Kisumu, 10400, Kenya. Email: dwalsh@wrpksm.org

Mycobacterium ulcerans is an emerging infection that causes indolent, necrotizing skin lesions known as Buruli ulcer (BU). Bone lesions may include reactive osteitis or osteomyelitis beneath skin lesions, or metastatic osteomyelitis from lymphohematogenous spread of *M. ulcerans*. Pathogenesis is related to a necrotizing and immunosuppressive toxin produced by *M. ulcerans*, called mycolactone. The incidence of BU is highest in children up to 15 years old, and is a major public health problem in endemic countries due to disabling scarring and destruction of bone. Most patients live in West Africa, but the disease has been confirmed in at least 30 countries. Treatment options for BU are antibiotics and surgery. BCG vaccination provides short-term protection against *M. ulcerans* infection and prevents osteomyelitis. HIV infection may increase risk for BU, and renders BU highly aggressive. Unlike leprosy and tuberculosis, BU is related to environmental factors and is thus considered non-communicable. The most plausible mode of transmission is by skin trauma at sites contaminated by *M. ulcerans*. The reemergence of BU around 1980 may be attributable to environmental factors such as deforestation, artificial topographic alterations and increased manual agriculture of wetlands. The first cultivation of *M. ulcerans* from nature was reported in 2008.

4233 RAJAPAKSA, U. S.; VICTOR. T. C.; PERERA. A. J.; WARREN. R. M.; SENEVIRATHNE, S. M. P. **Molecular diversity of *Mycobacterium tuberculosis* isolates from patients with pulmonary tuberculosis in Sri Lanka.** *Transactions of the Royal Society of Tropical Medicine and Hygiene* (2008) **102** (10) 997-1002 Oxford, UK; Elsevier [En, 23 ref.] Department of Microbiology, Faculty of Medicine, University of Colombo, P.O. Box 271, Kynsey Road, Colombo 08, Sri Lanka. Email: ushanir@yahoo.com

The strain diversity of 100 *Mycobacterium tuberculosis* isolates collected over a period of 18 months from tuberculosis (TB) cases in Sri Lanka was studied by spoligotyping. When compared to the international spoligotyping database, 43 spoligotype patterns were identified, of which 20 were previously described. The majority of isolates (72.45%) were clustered into major genetic group 1, and the most common spoligotype pattern belonged to the Beijing (STl) strain family. All the Beijing strain isolates belonged to more recently evolved sublineages of *M. tuberculosis.* The characterization of Sri Lankan *M. tuberculosis* isolates by spoligotyping shows a heterogeneous pattern. The physical separation from the main Indian peninsula may be responsible for the different patterns observed between the two countries. An in-depth field study is needed to understand the spread and the true epidemiology of this infection.

4234 MAHENDRADHATA, Y.; AHMAD, R. A.; KUSUMA, T. A.; BOELAERT. M.; WERF. M. J. VANDER; KIMERLING, M. E.; STUYFT. P. VANDER **Voluntary counselling and testing uptake and HIV prevalence among tuberculosis patients in Jogjakarta, Indonesia.** *Transactions of the Royal Society of Tropical Medicine and Hygiene* (2008) **102** (10) 1003-1010 Oxford, UK;

Elsevier [En, 32 reL] Epidemiology and Disease Control Unit, Public Health Department, Institute of Tropical Medicine, Nationalestraat 155, Antwerp, Belgium. Email: yodi_mahendradhata@yahoo.co.uk

We aimed to establish HIV prevalence and uptake of unlinked anonymous testing and voluntary counselling and testing (VCT) among tuberculosis (TB) patients in Jogjakarta, Indonesia. We introduced unlinked anonymous HIV testing for TB patients attending directly observed treatment, short-course services between April and December 2006. Patients were additionally offered VCT services. Of 1269 TB patients who were offered unlinked anonymous testing, 989 (77.9%; 95% CI 75.6-80.1 %) accepted. HIV prevalence was 1.9% (95% CI 1.6-2.2%). HIV infections were less frequently diagnosed among TB patients who attended a public health centre [odds ratio (OR) 0.15; 95% CI 0.03-0.70] rather than public hospital. They were more frequent in TB patients with a university education background (OR 5.16; 95% CI 1.01-26.63) or a history of HIV testing (OR 57.87; 95% CI 9.42-355.62). Of the 989 patients who accepted unlinked anonymous testing, only 133 (13.4%; 95% CI 11.5-15.7%) expressed interest in VCT. Of these, 52 (39.1%; 95% CI 31.2-47.6%) attended VCT, but interest was higher among students and those offered VCT by public health centres. The HIV prevalence in Jogjakarta is higher than expected and needs to be monitored cautiously. Unlinked anonymous HIV testing is well accepted and can be implemented with modest additional efforts.