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325 LAUREILLARD, D.; MARCY, O.; MADEC, Y.; CHEA, S.; CHAN, S.; BORAND, L.; FERNANDEZ, M.; PRAK, N.; KIM, C.; DIM, B.; NERR-IENET, E.; SOK, T.; DELFRAISSY, J. F.; GOLDFELD, A. E.; BLANC, F. X. **Paradoxical tuberculosis-associated immune reconstitution inflammatory syndrome after early initiation of antiretroviral therapy in a randomized clinical trial.** *AIDS* (2013) **27** (16) 2577-2586 Hagerstown, USA; Lippincott Williams & Wilkins, Inc. [En, 46 ref.] French National Agency for Research on AIDS and Viral Hepatitis (ANRS), Ho Chi Minh City, Vietnam. Email: xavier.blanc@bct.aphp.fr

OBJECTIVE: To analyze cases of paradoxical tuberculosis associated immune reconstitution inflammatory syndrome (TB-IRIS) in the CAMbodian Early versus Late Introduction of Antiretrovirals (CAMELIA) randomized trial designed to compare early (2 weeks) versus late (8 weeks) antiretroviral therapy (ART) initiation after tuberculosis treatment onset in Cambodia (NCT00226434). METHODS: ART-naive adults with CD4+ cell count of 200 cells/µl or less, newly diagnosed tuberculosis, and at least one follow-up visit after ART initiation were included in this analysis. Each case of suspected TB-IRIS was systematically validated by two physicians not involved in patients' management. Factors associated with occurrence of TB-IRIS were identified using the Cox proportional hazard model. RESULTS: Among 597 patients, 26% experienced TB-IRIS with an incidence rate of 37.9 cases per 100 person-years [95% confidence interval (CI) 32.4-44.4]. Main clinical manifestations included new or worsening lymphadenopathy (77.4%) and fever (68.4%). Chest radiograph revealed new or worsening abnormalities in 53.4%. Symptoms resolved in 95.5% of patients. Six deaths were directly related to TB-IRIS. Initiating ART early increased the risk of TB-IRIS by 2.61 (95% CI 1.84-3.70). Extrapulmonary or disseminated tuberculosis, CD4+ cell count of 100 cells/µl or less, and HIV RNA concentration more than 6 $\log_{10}$ copies/m1 were also significantly associated with higher risk of TB-IRIS. CONCLUSION: Shortening the delay between tuberculosis treatment onset and ART initiation to 2 weeks was associated with an increased risk of developing TB-IRIS. However, TB-IRIS was generally easily managible. Given the marked reported survival advantage of early T initiation after tuberculosis treatment onset, these data indicate at fear of TB-IRIS should not be an impediment to early ART in adults with advanced immunodeficiency in resource-limited, high burden settings.

326 OWUSU-SEKYERE, E. **The Buruli ulcer morbidity in the Amansie West District of Ghana: a myth or reality?** *Journal of Public Health and Epidemiology* (2013) **5** (10) 402-409 Nairobi, Kenya; Academic Journals [En, 25 ref.] Department of Development Studies, University for Development Studies, Wa, Ghana. Email: oseturbo@yahoo.com

Although there is a lot of literature on the possible causes of Buruli ulcer (BU), no one is sure where the bacterium lives in the environment. It is also a mystery how the mycobacterium enters the human body, although it is clear the bacterium is unable to do so by itself. There is therefore a lot of myth about the disease epidemiology. This research has shown that the myth surrounding the cause of the disease and the origin of the disease pathogen has affected the treatment option sought by patients and the intervention strategies put in place by health expects in the Amansie West District of Ghana. Whereas some patients in the Amansie west district associate the disease with witchcraft and magico-religious beliefs, the study showed that the disease is associated with aquatic environment that have been disturbed either through mining or intense agricultural activity. The aim of this paper is therefore to expand the frontiers of the argument by examining some of the predisposing factors and to identify the spatial pattern in the distribution of BU in the Amansie West District. The paper concludes that despite the myth, the disease causing organism thrives well in arsenic rich aquatic environment. However because of the widely rooted wrong perception, any attempt to manage the disease must first target the myth, in order to manage the reality.

327 CARDOSO, L. P. V.; DIAS, R. F.; FREITAS, A. A.; HUNGRIA, E. M.; OLIVEIRA, R. M.; COLLOVATI, M.; REED, S. G.; DUTHIE, M. S.; STEFANI, M. M. A. **Development of a quantitative rapid diagnostic test for multibacillary leprosy using smart phone technology.** *BMC Infectious Diseases* (2013) **13** (497) (23 October 2013) London, UK; BioMed Central Ltd [En, 37 ref.] Tropical Pathology and Public Health Institute, Federal University of Goias, 235th Street, Sector Universitario, 74605-050 Goiania-Goias, Brazil. Email: mariane.stefani@pq.cnpq.br

BACKGROUND: Despite efforts to eliminate leprosy as public health problem, delayed diagnosis and disabilities still occur in many countries. Leprosy diagnosis remains based on clinical manifestations and the number of clinicians with expertise in leprosy diagnosis is in decline. We have developed a new immuno-chromatographic test with the goal of producing a simple and rapid system that can be used, with a minimal amount of training, to provide an objective and consistent diagnosis of multi-bacillary leprosy. METHODS: The test immobilizes two antigens that have been recognized as excellent candidates for serologic diagnosis (the PGL-I mimetic, ND-O, and LID-1), on a nitro-cellulose membrane. This allows the detection of specific IgM and IgG antibodies within 20 minutes of the addition of patient sera. Furthermore, we coupled the NDO-LID® rapid tests with a new cell phone-based test reader platform (Smart Reader®) to provide objective interpretation that was both quantifiable and consistent. RESULTS: Direct comparison of serologic responses indicated that the rapid test detected a greater proportion of leprosy patients than a lab-based PGL-I ELISA. While positive responses were detected by PGL-I ELISA in 83.3% of multibacillary patients and 15.4% of paucibacillary patients, these numbers were increased to 87% and 21.2%, respectively, when a combination of the NDO-LID® test and Smart Reader@ was used. Among multibacillary leprosy the sensitivity of NDO-LID® test assessed by Smart Reader@ was 87% (95% CI, 79.2-92.7%) and the specificity was 96.1% (95% CI, 91.7- 98.6%). The positive predictive value and the negative predictive value of NDO-LID® tests were 94% (95% CI, 87.4-97.8%) and 91.4% (95% CI, 85.9-95.2%), respectively. CONCLUSION: The widespread provision of rapid diagnostic tests to facilitate the diagnosis or prognosis of multi-bacillary leprosy could impact on leprosy control

programs by aiding early detection, directing appropriate treatment and potentially interrupting *Mycobacterium leprae* transmission.

328 ABDELMALEK. R.: MEBAZAA, A.; BERRICHE, A.; KILANI, B.; BEN OSMAN, A.: MOKNI. M.: BENAISSA. H. T. **Cutaneous tuberculosis in Tunisia.** *Medecine et Maladies Infectieuses* (2013) **43** (9) 374-378 Issy-les-Moulineaux. France; Elsevier Masson SAS [En, fr, 20 ref.] Service des maladies infectieuses, faculte de !Tiede-cine de Tunis, universite Tunis EL Manar, hopital la Rabta, Tunis. Tunisia. Email: rimabdelmalek@gmail.com, amebazaa@yahoo.fr. berriche.ai @gmail.com, badreddine.kilani@rns.tn

INTRODUCTION: Tuberculosis is endemic in Tunisia-Pulmonary tuberculosis is the most common presentation in our country. Cutaneous presentations are rare (1-2% of cases). The diagnosis of cutaneous tuberculosis (CT) is difficult. Histological and clinical presentiions are polymorphous, many differential diagnoses-are available, and it is difficult to isolate *Mycobacterium*. OBJECTIVE: We had for aim to study the epidemiological and clinical features of CT in Tunisia, and to compare presentations before and after 1990. PATIENTS AND METHODS: We conducted a retrospective study between January 1991 and December 2011, in which we included all cases of CT observed at the Infectious Diseases and Dermatology Units of the Tunis la Rabta Hospital. RESULTS: Hundred and thirty-seven patients were included, with a mean age of 43.8 years; 72.3% were female patients. Hundred and fifty locations were observed, most of which on the head and neck. Scrofuloderma was the most frequent presentation, observed in 65% of cases. The diagnosis was confirmed by histology and/or microbiology in 75.8% of cases. The treatment was prescribed for a mean 11.3 months, leading to full recovery in most cases. CONCLUSION: CT is still reported in Tunisia. The diagnosis relies mainly on histology. Controlling this mutilating tuberculosis requires a global control of this disease, and especially lymph node location, given the high rate of scrofuloderma.

329 AHMAD, S. R.; VELHAL, G. D. **Study of treatment out-come of new sputum smear positive TB cases under dots-strategy.** *International Journal of Pharma and Bio Sciences* (2013) **4** (3) B-1215-B-1222 Andrapradesh, India; International Journal of Pharma and Bio Sciences [En, 23 ref.] Department of Community Medicine, Deccan College of Medical Sciences, Santosh Nagar, Hyderabad-500 058, India.

BACKGROUND: In India every year, 1.8 million new cases of TB occur, of which about 0.8 million are sputum positive pulmonary TB cases. This study attempts to find out the treatment outcomes of smear positive cases and factors that affect the outcome. METHODOLOGY: Community based prospective observational study was conducted in urban slums, of Mumbai. Total 281 newly diagnosed sputum smear positive' TB cases were selected, followed-up, and treatment outcome was, obtained within 1 month after completion of continuous phase of treatment. RESULTS: Tuberculosis is common among the illiterates; (nearly 60%) and labourers (53%), people below poverty line (90%), living in overcrowded houses (75%). In the present study, 42.7% were cured, 24.56% were treatment completed, 8.19% had died, and 4.98% were failure and 19.57% were defaulters after treatment. The cure rates and treatment completion were comparatively better in the age groups of 0-49 years (44.50 & 26.7%) and among females (53.85% & 32.31%). Defaulter, Death and failure are more in labourer (22.78%, 9.49% & 7.59%) and illiterates (26.79%, 10.71% & 6.55%). Cure rates and treatment completion are low among smokers (39.1% & 21.85%) and tobacco chewer

(29.73% & 16.22%). CONCLUSION: Lower cure rates and high defaulters are found to be associated with illiteracy and smoking, which can be modified by IEC and focus service delivery on high risk groups.

330 MASSENET, D.; FALL, D.; DIOP, M.; TALL, S. A.; HUTTINGER, E.; RIVEAU, G. **[Spatiotemporal distribution of tuberculosis cases in the city of Saint-Louis Senegal from 2008-2011.]** Repartition spatio-temporelle des cas de tuberculose dans la ville de Saint-Louis du Senegal entre 2008-2011. Revue d'Epidemiologie et de Sante. Publique (2013) **61** (5) 421-428 Paris, France; Elsevier Masson [Fr, en, 18 ref.] Biomedical Research, Centre Espoir Pour la Sante, Saint-Louis, Senegal. Email: denis.massenet @yahoo.fr

BACKGROUND: We studied the incidence of tuberculosis in the health district of Saint-Louis, Senegal over a period of 4 years (2008-2011). One thousand three hundred and eighty-six cases were identified, producing an annual standardized incidence ratio of 129 cases per 100,000 inhabitants. RESULTS: Men in the 15-24 year old age group were more likely to be affected, and diagnosis was more common in the second half of the year. Treatment compliance was excellent (96%), and the cure rate of patients with a TB-positive microscopic examination was 95%. The overall treatment failure rate was 1% and the 6-month morality was 2%. Seropositivity, measured in volunteer patients (48%) was 3%. CONCLUSION: A spatial and temporal map of tuberculosis in the city of Saint-Louis, Senegal has been established. A cluster appears to be very likely in Guet Ndar, a particularly dense population zone in a fishing area. There is also a possible secondary cluster at Pikine.

331 HUANG WEICHANG; CHEN CHAOHSIEN; HUANG CHENCHENG: WU KUNMING: CHIOU CHIENSHUN; LIN CHENFU: CHEN JIANNHW. A. SHEN GWANHAN. **A reduction in anti-tuberculosis drug resistance after the implementation of the national "STOP TB" program in Central Taiwan, 2003-2007.** *Japanese Journal of Infectious Diseases* (2013) **66** (2) 89-95 Tokyo, Japan; National Institute of Infectious Diseases (NIID) [En, 26 ref.] Division of Chest Medicine, Department of Internal Medicine, Taichung Veterans General Hospital, No. 160, Sec. 3, Chung-Kang Rd., Taichung 40705, Taiwan. Email: shengwanhan @gmail.com

The aim of this study was to determine the performance of the national "STOP TB" program in central Taiwan during 2003-2007 by examining trends in the combined drug resistance to first-line anti-tuberculosis (TB) drugs among clinical *Mycobacterium tuberculosis* isolates. Using 4,819 clinical *M. tuberculosis* isolates obtained from two mycobacteriology referral laboratories, the resistance to drugs was measured and analyzed along with the treatment outcomes in notified TB patients. The proportion of isolates showing total resistance, and multidrug-resistant tuberculosis (MDR-TB) isolates were 17.7% and 3.67%, respectively. More number of MDR-TB isolates showed high-level resistance to isoniazid (84.18%) and streptomycin (SM) (30.51%); low level resistance to ethambutol (EMB) (61.58%), SM (41.81%), and pyrazinamide (66.1%); and resistance to ofloxacin (30.4%). However, fewer isolates showed high-level resistance to EMB (19.77%), levofloxacin (17.9%), moxifloxacin (19.6%), kanamycin (8.9%), amikacin (8.9%), and capreomycin (8.9%). Of these MDR-TB isolates, 7.1% were extensively drug-resistant. Trends in combined drug resistance to all the first-line anti-TB drugs and the incidence of MDR-TB were stable during the 2 years (2003-2004) before the implementation of the national "STOP TB" program. After the "STOP TB" program, there were significant declines in the incidence of MDR-

TB during 2005-2007 in central Taiwan as well as improved TB-treatment outcomes. Thus, the national "STOP TB" program had a significant positive impact on TB control in central Taiwan.

332 BABALIK, A.; KILICASLAN, Z.; CANER, S. S.; GUNGOR, G.; ORTAKOYLU, M. G.; GENCER, S.; MCCURDY, S. A. **A registry based cohort study of pulmonary tuberculosis treatment out-comes in Istanbul, Turkey.** *Japanese Journal of Infectious Diseases* (2013) **66** (2) 115-120 Tokyo, Japan; National Institute of Infectious Diseases (MID) [En, 31 ref.] Department of Pulmonology, Sureyyapasa Chest Diseases and Thoracic Surgery Training and Research Hospital, Istanbul, Turkey. Email: aylinbabalik@gmail.com

The aim of this study is to evaluate the treatment outcomes and identify factors associated with adverse tuberculosis treatment out-comes for bacteriologically confirmed pulmonary tuberculosis. Treatment outcomes of pulmonary tuberculosis were evaluated retrospectively among 11,186 smear- and/or culture-positive patients treated between 2006 and 2009 in Istanbul, Turkey. Adverse treatment outcomes were identified in 1,010 (9.0%) patients including death (1.8%), treatment default (6.1%), and treatment failure (1.1%). Factors associated with adverse treatment outcomes included being born abroad (odds ratios [OR], 5.38; 95% confidence intervals [CI], 3.67-7.91), history of tuberculosis treatment (OR, 3.77; 95% CI, 3.26-4.36), age >65 years (OR, 2.79; 95% CI, 2.21-3.53), and male gender (OR, 1.91; 95% CI, 1.59-2.27). Death was most strongly associated with age >65 years (OR, 45.1; 95% CI, 27.0-75.6), followed by treatment default with history of interrupted treatment (OR, 11.6; 95% CI, 8.94-15.1), and treatment failure with prior history of treatment failure (OR, 17.1; 95% CI, 6.97-41.6). Multidrug resistance was strongly associated with adverse treatment outcomes (OR, 10.8; 95% CI, 8.02-14.6). Age >65 years, male sex, being born abroad, and history of treatment failure were found to be risk factors for adverse treatment out-comes. Hence, patients with any of these characteristics should be carefully monitored and treated aggressively.

675 BOTHA, L.; PITTIUS, N. C. G. VAN; HELDEN, P. D. VAN **Mycobacteria and disease in southern Africa.** In *International Wildlife Tuberculosis Conference, Skukuza, South Africa*, 9-12 September 2012. Transboundary and Emerging Diseases (2013) **60** (s1) 147-156 Berlin, Germany; Wiley-Blackwell [En, many ref.] DST/NRF Centre of Excellence for Biomedical Tuberculosis Research/Medical Research Council (MRC) Centre for Molecular and Cellular Biology, Division of Molecular Biology and Human Genetics, Faculty of Health Sciences, Stellenbosch University, PO Box 19063, Tygerberg 7505, South Africa. Email: pvh@sun.ac.za

The genus Mycobacterium consists of over 120 known species, some of which (e.g. *M. bovis* and *M. tuberculosis*) contribute extensively to the burden of infectious disease in humans and animals, whilst others are commonly found in the environment but may rarely if ever be disease-causing. This paper reviews the mycobacteria found in southern Africa, focussing on those in the *M. tuberculosis* complex as well as the non-tuberculous mycobacteria (NTM), identifying those found in the area and including those causing disease in humans and animals, and outlines some recent reports describing the distribution and prevalence of the disease in Africa. Difficulties in diagnosis, host preference and reaction, immunology and transmission are discussed.

676 MATHURIA, J. P.; SAMARIA, J. K.; SRIVASTAVA, G. N.; MATHURIA, B. L.; OJHA, S. K.; SHAMPA ANUPURBA **Primary and acquired drug resistance patterns of *Mycobacterium tuberculosis* isolates in India: a multicenter**

study. *Journal of Infection and Public Health* (2013) **6** (6) 456-464 Oxford, UK; Elsevier Ltd [En] Department of Microbiology, Institute of Medical Sciences, Banaras Hindu University, Varanasi 221 005, India. Email: jiteshl4l @gmail.com

Tuberculosis is the most prevalent infection worldwide. The emergence of drug-resistant *Mycobacterium tuberculosis* (*M. tuberculosis*) isolates emphasizes that it is necessary to monitor drug resistance of the organism against anti-tubercular drugs. We analyzed 327 *M. tuberculosis* isolates from patients who were cared for at three different health care centers, hereinafter known as study areas (SAs), in North India. Of the 327 total *M. tuberculosis* isolates, 255 were from a tertiary health care center (Varanasi, Uttar Pradesh [SA-1]), 48 were from a District tuberculosis center (Sawai Madhopur, Rajasthan [SA-2]), and 24 were from a different District tuberculosis center (Buxar, Bihar [SA-3]). Drug susceptibility testing against first-line antibiotics (viz. isoniazid, rifampicin, streptomycin, and ethambutol) was conducted for all the isolates using 1% proportional method. We found that the rates of acquired resistance were consistently higher than the rates of initial drug resistance. In new, untreated cases, a higher degree of MDR-TB was observed at SA-1 (13.3%) and SA-3 (25.0%), whereas it was observed in only 7.1% of the isolates at SA-2. In previously treated patients, MDR cases were found in 35.7% of the isolates from SA-1, 66.6% of the isolates from SA-2, and 43.8% of the isolates from SA-3. Resistance to a single drug was found at a much lower rate, ranging from 0.0 to 6.3% in new cases as well as previously treated cases. In conclusion, the primary resistance of *M. tuberculosis* is low, but acquired drug resistance is slightly higher in North India.

677 CHKHARTISHVILI, N.; KEMPKER, R. R.; DVALI, N.; ABASH-IDZE, L.; SHARAVDZE, L.; GABUNIA, P.; BLUMBERG, H. M.; RIO, C. DEL; TSERTSVADZE, T. **Poor agreement between interferon-gamma release assays and the tuberculin skin test among HIV-infected individuals in the country of Georgia.** *BMC Infectious Diseases* (2013) **13** (513) (1 November 2013) London, UK; BioMed Central Ltd [En, 38 ref.] Infectious Diseases, AIDS and Clinical Immunology Research Center, 16 Al. Kazbegi Avenue, Tbilisi, 0160, Republic of Georgia. Email: nikoloch@yahoo.com

BACKGROUND: Improved tests to diagnose latent TB infection (LTBI) are needed. We sought to evaluate the performance of two commercially available interferon-gamma release assays (IGRAs) compared to the tuberculin skin test (TST) for the diagnosis of LTBI and to identify risk factors for LTBI among HIV-infected individuals in Georgia, a country with high rates of TB. METHODS: HIV-patients were enrolled from the National AIDS Center in Tbi-lisi, Georgia. After providing informed consent, each participant completed a questionnaire, had blood drawn for QuantiFERON-TB Gold in-Tube (QFT-GIT) and T-SPOT.TB testing and had a TST placed. The TST was read at 48-72 hrs with mm induration considered positive. RESULTS: Between 2009-2011, 240 HIV-infected persons (66% male) with a median age of 38 years and a median CD4 count of 255 cells/ill (IQR: 124-412) had diagnostic testing for LTBI performed. 94% had visible evidence of a BCG scar. The TST was positive in 41 (17%) patients; QFT-GIT in 70 (29%); and T-SPOT.TB in 56 (24%). At least one diagnostic test was positive in 109 (45%) patients and only among 13 (5%) patients were all three tests positive. Three (1%) QFT-GIT and 19 (8%) T-SPOT.TB test results were indeterminate. The agreement among all pairs of tests was poor: QFT-GIT vs. T-SPOT.TB (K=0.18, 95% CI .07-.30), QFT-GIT vs. TST (K=0.29, 95% CI .16-.42), and TST vs. T-SPOT.TB (x=0.22, 95% CI

.07-.29). Risk factors for LTBI varied by diagnostic test and none showed associations between positive test results and well-known risk factors for TB, such as imprisonment, drug abuse and immunological status. CONCLUSIONS: A high proportion of HIV patients had at least one positive diagnostic test for LTBI; however, there was very poor agreement among all tests. This lack of agreement makes it difficult to know which test is superior and most appropriate for LTBI testing amon V-infected patients. While further follow-upsuidieselp determine the predictive ability of different LTBI tests, improved modalities are needed-for accurate detection of LTBI and assessment of risk of developing active TB among HIV-infected patients.

678 KELAM, M. A.; GANIE, F. A.; SHAH, B. A.; GANIE, S. A.; WANI, M. L.; NASIR-U-DIN WANI; MASARATUL GANI **The diagnostic efficacy of adenosine deaminase in tubercular effusion.** *Oman Medical Journal* (2013) **28** (6) 417-421 Al-Azaiba, Oman; Oman Medical Specialty Board [En, 27 ref.] Department of General Medicine, SKIMS, Soura, Kashmir-190 011, India. Email: farooq.ganie @ymail.com

OBJECTIVE: This study aims to evaluate the diagnostic efficacy of adenosine deaminase in tubercular effusions. METHODS: This study was conducted at the Department of General Medicine and Cardiovascular and Thoracic Surgery, SKIMS, for a period of two years between November 2008 and November 2010. A total of 57 patients presenting with pleural effusions during the two-year study period, who presented with clinical manifestations suggestive of tuberculosis (i.e., the presence of productive cough, low-grade fever, night sweats, weight loss, and chest pain, especially if these symptoms last weeks) were included in the study. If the patients presented with less than two of these symptoms, and especially if the clinical manifestations were of <4 weeks duration, they were excluded from the study. RESULTS: The mean adenosine deaminase activity level in all the 57 patients was 109 U/L while the mean adenosine deaminase activity levels in pleural TB patients was 80 U/, and 64 U/L in the controls (p=0.381). Considering 40 U/L as the cut off, the results were positive in 35 out of 39 tuberculosis patients and 9 out of 18 controls. The sensitivity of adenosine deaminase for tubercular effusions worked out to be 90%, with only 50% specificity. CONCLUSION: This study suggests that the estimation of adenosine deaminase activity in pleural fluid is a rapid diagnostic tool for differentiation of tubercular and non tubercular-effusions. The sensitivity and specificity of adenosine deaminase for tubercular effusions in this study was 90% and 50% respectively.

679 CHAISATHAPHOL, T.; JITMUANG, A. **Disseminated *Mycobacterium avium* complex infection in patients with autoantibody to interferon-gamma.** *Journal of Infectious Diseases and Antimicrobial Agents* (2013) **30** (2) 101-107 Bangkok, Thailand; Infectious Disease Association of Thailand [En, 26 ref.] Division of Infectious Diseases and Tropical Medicine, Depart-ment of Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, 2 Prannok Road, Bangkok-Noi, Bangkok 10700, Thailand. Email: anupop.jit @mahidol.ac.th *Mycobacterium avium* complex (MAC) is known as one of common opportunistic infection in advanced AIDS patient. Other immunodeficiency syndromes, especially in helper T-cell, interferon (IFN)-g, interleukin (IL)-12 pathways are also risk for MAC and intracellular organism infection. Autoantibody to interferon-gamma has been increasingly reported and most cases are Asian population. The clinical presentation from several case series demonstrated severe disseminated MAC infection, sometimes co-infected with other

organisms such as non-Typhi Salmonella and rapidly growing mycobacteria. The combination of antimycobacterial agents is a mainstay of treatment. Immunosuppressive or immuno-modulatory agents as adjunctive therapy for prevention of relapsed disease should be further studied to optimize the outcome.

680 CHEN BANCHENG; YE TINGLU; YU BO; ZHONG QILI; SHAO YONG; ZHANG JIE; HU XIAOPING; PAN HUIQING **[Clinical analysis of seven cases of leprosy misdiagnosed.]** *Chinese Journal of Dermatovenereology* (2013) **27** (9) 944-946 Shaanxi, China; Chinese Journal of Dermatovenereology [Ch, en, 7 ref.] Department of Dermatology, Peking University Shenzhen Hospital, Shenzhen 518036, China. Email: chenbangcheng@medmail.com.cn, yubomd@hotmail.com

OBJECTIVE: To enhance the knowledge of leprosy in order to avoid misdiagnosed. METHODS: Seven cases of leprosy which were misdiagnosed were retrospectively analyzed from the clinical features, and the possible reason. RESULTS: All seven cases were clinically atypical. They were misdiagnosed as deep fungi infection, erythema nodosum, eczema, cutaneous pseudolymphoma, erythema annulare centrifugum, leiomyoma and lupus erythematosus tumidus. The misdiagnosis period ranged from two mouths to six years. CONCLUSION: The clinical manifestations of leprosy are complex, and easy to be mis-diagnosed, and we should enhance the knowledge of leprosy to avoid misdiagnosis.

681 KHALIL, K. F.; ASMA AMBREEN; TARIQ BUTT **Comparison of sensitivity of quantiFERON-TB gold test and tuberculin skin test in active pulmonary tuberculosis.** *JCPSP, Journal of the College of Physicians and Surgeons Pakistan* (2013) **23** (9) 633-636 Karachi, Pakistan; College of Physicians and Surgeons Pakistan [En, 21 ref.] Department of Pulmonology, Fauji Foundation Hospital, Rawalpindi, Pakistan. Email: khalil.kanwal @gmail.com

OBJECTIVE: To compare the sensitivity of tuberculin skin test (TST) and quantiFERON-TB gold test (QFT-G) in active pulmonary tuberculosis. STUDY DESIGN: Analytical study. PLACE AND DURATION OF STUDY: Department of Pulmonology, Fauji Foundation - Hospital, Rawalpindi, from July 2011 to January 2012. METHODOLOGY: Q-aantiFERON-TB gold test (QFT-G) was evaluated and compared it with tuberculin skin test (TST) in 50 cases of active pulmonary tuberculosis, in *M. tuberculous* infection was suspected on clinical, radiological arid microbiological grounds. Sensitivity was determined against positive growth for *Mycobacterium tuberculosis*. RESULTS: Out of 50 cases, 43 were females and7 were males. The mean age was 41.84 ± 19.03 years. Sensitivity of QFT-G was 80% while that of TST was 28%. CONCLUSION: QFT-G has much higher sensitivity than TST for active pulmonary tuberculosis. It is unaffected by prior BCG administration and prior exposure to atypical mycobacteria. A positive QFT-G result can be an adjunct to diagnosis in patients having clinical and radiological data compatible with pulmonary tuberculosis.

682 PATEL, V. B.; THERON, G.; LENDERS, L.; MATINYENA, B.; CONNOLLY, C.; RAVESH SINGH; COOVADIA, Y.; NDUNG'U, T.; DHEDA, K. **Diagnostic accuracy of quantitative PCR (Xpert MTB/RIF) for tuberculous meningitis in a high burden setting: a prospective study.** *PLoS Medicine* (2013) **10** (10) e1001536 San Francisco, USA; Public Library of Sciences (PLoS) [En, 41 ref.] Department of Neurology, University of KwaZulu-Natal, Durban, South Africa. Email: patelv@ukin.ac.za, keertan.dheda@uct.ac.za

BACKGROUND: Tuberculous meningitis (TBM) is difficult to diagnose promptly. The utility of the Xpert MTB/RIF test for the diagnosis of TBM

remains unclear, and the effect of host and sample-related factors on test performance is unknown. This study sought to evaluate the sensitivity and specificity of Xpert MTB/RIF for the diagnosis of TBM. METHODS AND FINDINGS: 235 South-African patients with a meningeal-like illness were categorised as having definite (culture or Amplicor PCR positive), probable (anti-TBM treatment initiated but microbiological confirmation lacking), or non-TBM. Xpert MTB/RIF accuracy was evaluated using 1 ml of uncentrifuged and, when available, 3 ml of centrifuged cerebrospinal fluid (CSF). To evaluate the incremental value of MTB/RIF over a clinically based diagnosis, test accuracy was compared to a clinical score (CS) derived using basic clinical and laboratory information. Of 204 evaluable patients (of whom 87% were HIV-infected), 59 had definite TBM, 64 probable TBM, and 81 non-TBM. Overall sensitivity and specificity (95% CI) were 62% (48%-75%) and 95% (87%-99%), respectively. The sensitivity of Xpert MTB/RIF was significantly better than that of smear microscopy (62% versus 12%; p=0.001) and significantly better than that of the CS (62% versus 30%; p=0.001; C statistic 85% [79%-92%]). Xpert MTB/RIF sensitivity was higher when centrifuged versus uncentrifuged samples were used (82% [62%-94%] versus 47% [31%-61%]; p=0.004). The combination of CS and Xpert MTB/ RIF (Xpert MTB/RIF performed if CS<8) performed as well as Xpert MTB/RIF alone but with a -10% reduction in test usage. This overall pattern of results remained unchanged when the definite and probable TBM groups were combined. Xpert MTB/RIF was not useful in identifying TBM among HIV-uninfected individuals, although the sample was small. There was no evidence of PCR inhibition, and the limit of detection was 80 colony forming units per millilitre. Study limitations included a predominantly HIV-infected cohort and the limited number of culture-positive CSF samples. CONCLUSIONS: Xpert MTB/RIF may be a good rule-in test for the diagnosis of TBM in 14W-infected individuals from a tuberculosis-endemic setting, particularly when a centrifuged CSF pellet is used. Further studies are required to confirm these findings in different settings.

683 KAFOROU, M.; WRIGHT, V. J.; ONI, T.; FRENCH, N.; ANDER-SON, S. T.; BANGANI, N.; BANWELL, C. M.; BRENT, A. J.; CRAMPIN. A. C.; DOCKRELL, H. M.; ELEY, B.; HEYDERMAN, R. S.; H1B BERD, M. L.; KERN, F.; LANGFORD, P. R.; LING LING; MENDELSON, M.; OTTENHOFF, T. H.; ZGAMBO, F.; WILKINSON, R. J.; COIN, L. J.; LEVIN, M. **Detection of tuberculosis in HIV-infected and uninfected African adults using whole blood RNA expression signatures: a case-control study.** *PLoS Medicine* (2013) **10** (10) e1001538 San Francisco, USA; Public Library of Sciences (PLoS) [En, 40 ref.] Section of Paediatrics and Wellcome Trust Centre for Clinical Tropical Medicine, Division of Infectious Diseases, Department of Medicines Imperial College London, London, UK. Email: m.levin@imperial.ac.uk

BACKGROUND: A Major impediment to tuberculosis control in Africa is the difficulty in diagnosing active tuberculosis (TB), particularly in the context of HIV infection. We hypothesized that a unique host blood RNA transcriptional signature would distinguish TB from other diseases (OD) in HIV-infected and uninfected patients, and that this could be the basis of a simple diagnostic test. METHODS AND FINDINGS: Adult case-control cohorts were established in South Africa and Malawi of HIV-infected or uninfected individuals consisting of 584 patients with either TB (confirmed by culture of *Mycobacterium tuberculosis* [M.TB] from sputum or tissue sample in a patient under investigation for TB), OD (i.e., TB was considered in the differential diagnosis but then excluded), or

healthy individuals with latent TB infection (LTBI). Individuals were randomized into training (80%) and test (20%) cohorts. Blood transcriptional profiles were assessed and minimal sets of significantly differentially expressed transcripts distinguishing TB from LTBI an re-identified in the training cohort. A 27 transcript signature distinguis from LTBI and a 44 transcript signature distinguished TB from OD. To evaluate our signatures, we used a novel computational method to calculate a disease risk score (DRS) for each patient. The classification based on this time was first evaluated in the test cohort, and then validated in an independent publically available dataset (GSE19491). In our test cohort, the DRS classified TB from LTBI (sensitivity 95%, 95% CI [87-100]; specificity 90%, 95% CI [80-97]) and TB from OD (sensitivity 93%, 95% CI [83-100]; specificity 88%, 95% CI [74-97]). In the independent validation cohort, TB patients were distinguished both from LTBI individuals (sensitivity 95%, 95% CI [85-100]; specificity 94%, 95% CI [84-100]) and OD patients (sensitivity 100%, 95% CI [100-100]; specificity 96%, 95% CI [93-100]). Limitations of our study include the use of only culture confirmed TB patients, and the potential that TB may have been misdiagnosed in a small proportion of OD patients despite the extensive clinical investigation used to assign each patient to their diagnostic group. CONCLUSIONS: In our study, blood transcriptional signatures distinguished TB from other conditions prevalent in 11W-infected and uninfected African adults. Our DRS, based on these signatures, could be developed as a test for TB suitable for use in HIV endemic countries. Further evaluation of the performance of the signatures and DRS in prospective populations of patients with symptoms consistent with TB will be needed to define their clinical value under operational conditions.

684 DUANGRITHI, D.; THANACHARTWET, V.; DESAKORN, V.; JITRUCKTHAI, P.; PHOJANAMONGKOLKIJ, K.; RIENTHONG, S.; CHU-CHOTTAWORN, C.; PITISUTTITHUM, P. **Impact of diabetes mellitus on clinical parameters and treatment outcomes of newly diagnosed pulmonary tuberculosis patients in Thailand.** *International Journal of Clinical Practice* (2013) **67** (11) 1199-1209 Oxford, UK; Wiley-Blackwell [En, 10 ref.] Department of Clinical Tropical Medicine, Faculty of Tropical Medicine, Mahidol University, 420/6 Rajvithee Road, Ratchathevee, Bangkok 10400, Thailand. Email: vipa.tha@mahidol.ac.th

BACKGROUND: To assess the clinical and laboratory parameters, response to therapy and development of antituberculosis (TB) drug resistance in pulmonary TB (PTB) patients with diabetes mellitus (DM) and without DM. METHODS: Using a prospective design, 227 of 310 new cases of culture-positive PTB diagnosed at the Queen Savang Vadhana Memorial Hospital and the Chonburi Hospital between April 2010 and July 2012 that met the study criteria were selected. Data regarding clinical and laboratory parameters, drug susceptibility and treatment outcomes were compared between PTB patients with DM and those without DM. To control for age, the patients were stratified into two age groups (<50 and 50 years) and their data were analysed. RESULTS: Of the 227 patients, 37 (16.3%) had DM, of which 26 (70.3%) had been diagnosed with DM prior to PTB diagnosis and 11 (29.7%) had developed DM at PTB diagnosis. After controlling for age, no significant differences were found between the two groups regarding mycobacterium burden, sputum-culture conversion rate, evidence of multidrug-resistant tuberculosis, frequency of adverse drug events from anti-TB medications, treatment outcomes and relapse rate. The presenting symptoms of anorexia (p=0.050) and haemo-

ptysis (p=0.036) were observed significantly more frequently in PTB patients with DM, while the presenting symptom of cough was observed significantly more frequently in PTB patients without DM (p=0.047). CONCLUSIONS: Plasma glucose levels should be monitored in all newly diagnosed PTB patients and a similar treatment regimen should be prescribed to PTB patients with DM and those without DM in high TB-burden countries.

685 HELMI SULAIMAN; SASHEELA PONNAMPALAVANAR; MUN KEINSEONG; ITALIANO, C. M. **Cervical abscesses due to co-infection with Burkholderia pseudomallei, Salmonella enterica serovar Stanley and *Mycobacterium tuberculosis* in a patient with diabetes mellitus.** *BMC Infectious Diseases* (2013) **13** (527) (9 November 2013) London, UK; BioMed Central Ltd [En, 20 ref.] Division of Infectious Diseases, Department of Medicine, University Malaya Medical Centre, Kuala Lumpur, Malaysia. Email: Edenhelmi@gmail.com

BACKGROUND: Infections due to *Mycobacterium tuberculosis*, *Burkholderia pseudomallei* and non-typhoidal Salmonella cause significant morbidity and mortality throughout the world. These intracellular pathogens share some common predisposing factors and clinical features. Co-infection with two of these organisms has been reported previously but, to our knowledge, this is the first time that infection with all three has been reported in one person. Case presentation In September 2010, a 58-year-old diabetic Malaysian male presented with fever and a fluctuant mass on the right side of his neck. *B. pseudomallei* was isolated from an aspirate of this lesion and there was radiological evidence of disseminated infection in the liver and spleen. The recurrence of clinical symptoms over ensuing months prompted further aspiration and biopsy of a cervical absce4 and underlying lymph nodes. Salmonella enterica serovar Staulpyand then *M. tuberculosis* were identified from these specimens by culture and molecular methods. The patient responded to targeted medical management of each of these infections. CONCLUSION: In endemic settings, a high index of suspicion and adequate tissue sampling are imperative in identifying these pathogenic organisms. Diabetes was identified as a predisposing factor in this case while our understanding of other potential risk factors is evolving.

686 KHETSURIANI, N.; ZAKIKHANY, K.; JABIROV, S.; SAPAROVA, N.; URSU, P.; WANNEMUEHLER, K.; WASSILAK, S.; EFSTRATIOU, A.; MARTIN, R. **Seroepidemiology of diphtheria and tetanus among children and young adults in Tajikistan: nationwide population-based survey, 2010.** *Vaccine* (2013) **31** (42) 4917-4922 Oxford, UK; Elsevier Ltd [En, 28 ref.] Team Lead for the European Region, Disease Eradication and Elimination Branch, Global Immunization Division, Center for Global Health, Centers for Disease Control and Prevention (CDC), 1600 Clifton Road, MS-A04, Atlanta, GA 30333, USA. Email: nck7@cdc.gov

BACKGROUND: Tajikistan had a major diphtheria outbreak (10,000 cases) in the 1990s, which was controlled after nationwide immunization campaigns with diphtheria-tetanus toxoid in 1995 and 1996. Since 2000, only 52 diphtheria cases have been reported. However, in coverage surveys conducted in 2000 and 2005, diphtheria-tetanus-pertussis vaccine coverage was lower than administratively reported estimates raising concerns about potential immunity gaps. To further assess population immunity to diphtheria in Tajikistan, diphtheria antibody testing was included in a large-scale nationwide serosurvey for vaccine-preventable diseases conducted in connection with a poliomyelitis outbreak in 2010.

In addition, the serosurvey provided an opportunity to assess population immunity to tetanus. METHODS: Residents of all regions of Tajikistan aged 1-24 years were included in the serosurvey implemented during September-October 2010. Participants were selected through stratified cluster sampling. Specimens were tested for diphtheria antibodies using a Vero cell neutralization assay and for tetanus antibodies using an anti-tetanus IgG ELISA. Antibody concentrations IU/ml were considered seropositive. RESULTS: Overall, 51.4% (95% CI, 47.1%-55.6%) of participants were sero-positive for diphtheria and 78.9% (95% CI, 74.7%-82.5%) were seropositive for tetanus. The lowest percentages of seropositivity for both diseases were observed among persons aged 10-19 years: diphtheria seropositivity was 37.1% (95% CI, 31.0%-43.7%) among 10-14 year-olds, and 35.3% (95% CI, 29.9%-41.1%) among 15-19 year-olds; tetanus seropositivity in respective age groups was 65.3% (95% CI, 58.4%-71.6%) and 70.1% (95% CI, 64.5%-75.2%). CONCLUSIONS: Population immunity for diphtheria in Tajikistan is low, particularly among 10-19 year-olds. Population immunity to tetanus is generally higher than for diphtheria, but is suboptimal among 10-19 year-olds. These findings highlight the need to improve routine immunization service delivery, and support a one-time supplementary immunization campaign with diphtheria-tetanus toxoid among birth cohorts aged 1-19 years in 2010 (3-21 years in 2012) to close immunity gaps and prevent diphtheria outbreaks.

687 DEPONTI, G. N.; SILVA, D. R.; COELHO, A. C.; MULLER, A. M.; DALCIN, P. DE T. R. **Delayed diagnosis and associated factors among new pulmonary tuberculosis patients diagnosed at the emergency departmgnt of a tertiary care hospital in Porto Ale-gre, South Brazil: a prospective patient recruitment study.** *BMC Infectious Diseases* (2013) **13** (538) (13 November 2013) London, UK; BioMed Central Ltd [En, 36 ref.] Universidade Fed-eral do Rio Grande do Sul (UFRGS), Programa de Pos-Graduacao em Ciencias Pneumologicas da UFRGS, Servigo de Pneumologia, Hospital de Clinicas de Porto Alegre (HCPA), Porto Alegre, Brazil. Email: gracideponti @yahoo.com.br

BACKGROUND: Control of tuberculosis (TB) depends on early diagnosis and treatment at the primary health care level. However, many patients are still diagnosed late with TB at hospitals. The present study aimed to investigate the delay in diagnosis of TB patients at the emergency department. METHODS: This was a prospective study in a general, tertiary care, university-affiliated hospital of a city with a high prevalence of TB in Brazil. New TB patients years diagnosed with pulmonary TB at the emergency department of Hospital de Clinicas de Porto Alegre were prospectively recruited between February 2010 and January 2012. The consenting patients meeting our inclusion criteria were interviewed using a pre-tested questionnaire. We evaluated the delay in time until diagnosis and identified factors associated with delayed diagnosis (patient and health care system delays). RESULTS: We included 153 patients. The median total time of delay, patient delay, and health care system delay were 60 (inter quartile range [IQR]: 30-90.5 days), 30 (IQR: 7-60 days), and 18 (IQR: 9-39.5 days) days, respectively. The factors that were independently associated with patient delay (time days) were crack (odds ratio [OR]=4.88, p=0.043) and cocaine (OR=6.68, p=0.011) use. The factors that were independently associated with health care system delay (time days) were weight loss (OR=2.76, p=0.025), miliary pattern (OR=5.33, p=0.032), and fibrotic changes (OR=0.12, p=0.013) on chest X-ray. CONCLUSIONS: Patient delay appears to be the

main problem in this city with a high prevalence of TB in Brazil. The main factor associated with patient delay is drug abuse (crack and cocaine). Our study shows substance abuse programs need to be aware of control of TB, with health interventions focusing on TB education programs.

688 GLER, M. T.; GUILATCO, R.; CAOILI, J. C.; ERSHOVA, J.; CEGIELSKI, P.; JOHNSON, J. L. **Weight gain and response to treatment for multidrug-resistant tuberculosis.** *American Journal of Tropical Medicine and Hygiene* (2013) **89** (5) 943-949 Deerfield, USA; American Society of Tropical Medicine and Hygiene [En, 26 ref.] Tropical Disease Foundation, Makati City, Philippines. Email: tarcelasg@yahoo.com, rsguilatco@gmail.com, janice.caoili@gmail.com, jhe3@cdc.gov, gzc2@cdc.gov, jhe3@cdc.gov, gzc2@cdc.gov, jlj@case.edu

Alternatives to culture are needed in high burden countries to assess whether response to treatment of multidrug-resistant-tuberculosis (MDR-TB) is satisfactory. The objective was to assess the association of weight gain and treatment outcome. The methods included analysis of clinical, bacteriologic, and weight from 439 MDR-TB patients in the Philippines. Odds ratios (ORs) were calculated to determine whether 5% weight gain during the first 6 months of treatment was associated with outcome. Three hundred and ten (71%) patients were cured and 129 (29%) had poor out-comes (death, defaulted, or failed treatment). Fifty-three percent were underweight (body mass index [BMI] <18.5 kg/m2) before treatment. Five percent weight gain after completing 3 months of treatment was associated with good outcome among patients who were underweight before treatment (OR 2.1; 95% confidence interval [CI], 1.05 to 4.4). Baseline weight and degree of weight change during the first 6 months of treatment can help identify persons who are more likely to have poor outcomes and require other interventions.

689 S UNTORNS UT, P.; KASEMSUPAT, K.; S ILA IR ATANA, S.; WONG-SUVAN, G.; JUTRAKUL, Y.; WUTHIEKANUN, V.; DAY, N. P. J.; PEACOCK, S. J.; LIMMATHUROTSAKUL, D. **Prevalence of melioidosis in patients with suspected pulmonary tuberculosis and sputum smear negative for acid-fast bacilli in northeast Thailand.** *American Journal of Tropical Medicine and Hygiene* (2013) **89** (5) 983-985 Deerfield, USA; American Society of Tropical Medicine and Hygiene [En, 13 ref.] Mahidol-Oxford Tropical Medicine Research Unit, Faculty of Tropical Medicine, Mahidol, University, 420/6 Rajvithi Road, Bangkok 10400, Thailand. Email: pornpan @tropmedres.ac, gumphol @tropmedres.ac, lek@ tropmedres.ac, direk@tropmedres.ac, kriangsak_kp@hotmail.com, snautiluz@gmail.com, yaowa_ju@yahoo.com, nickd@tropmedres.ac, sharon @ tropmedres.ac, sp10@sanger.ac.uk

The clinical and radiological features of pulmonary melioidosis can mimic tuberculosis. We prospectively evaluated 118 patients with suspected pulmonary tuberculosis who were acid-fast bacilli (AFB) smear negative at Udon Thani Hospital, northeast Thailand. Culture of residual sputum from AFB testing was positive for *Burkholderia pseudomallei* in three patients (2.5%; 95% confidence interval [CI] 0.5-7.3%). We propose that in melioidosis endemic areas, residual sputum from AFB testing should be routinely cultured for *B. pseudomallei*.

690 KAI, M.; NAKATA, N.; MATSUOKA, M.; SEKIZUKA, T.; KURODA, M.; MAKINO, M. **Characteristic mutations found in the ML0411 gene of *Mycobacterium leprae* isolated in Northeast Asian countries.** *Infection, Genetics and Evolution* (2013) **19,** 200-204 Amsterdam, Netherlands; Elsevier B.V. [En, 23 ref.] Department of Mycobacteriology, Leprosy Research Center, National Institute of Infectious Diseases,

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Genome analysis of *Mycobacterium leprae* strain Kyoto-2 in this study revealed characteristic nucleotide substitutions in gene ML0411, compared to the reference genome *M. leprae* strain TN. The ML0411 gene of Kyoto-2 had six SNPs compared to that of TN. All SNPs in ML0411 were non-synonymous mutations that result in amino acid replacements. In addition, a seventh SNP was found 41 by upstream of the start codon in the regulatory region. The seven SNP sites in the ML0411 region were investigated by sequencing in 36 *M leprae* isolates from the Leprosy Research Center in Japan. The SNP pattern in 14 of the 36 isolates showed similarity to that of Kyoto-2. Determination of the standard SNP types within the 36 stocked isolates revealed that almost all of the Japanese strains belonged to SNP type III, with nucleotide substitutions at position 14676, 164275, and 2935685 of the *M. leprae* TN genome. The geographical distribution pattern of east Asian *M. leprae* isolates by discrimination of ML0411 SNPs was investigated and interestingly turned out to be similar to that of tandem repeat numbers of GACATC in the rpoT gene (3 copies or 4 copies), which has been established as a tool for *M. leprae* genotyping. All seven Korean *M. leprae* isolates examined in this study, as well as those derived from Honshu Island of Japan, showed 4 copies of the 6-base tandem repeat plus the ML0411 SNPs observed in *M. leprae* Kyoto-2. They are termed Northeast Asian (NA) strain of *M. leprae*. On the other hand, many of isolates derived from the Okinawa Islands of Japan and from the Philippines showed 3 copies of the 6-base tandem repeat in addition to the *M. leprae* TN ML0411 type of SNPs. These results demonstrate the existence of *M. leprae* strains in Northeast Asian region having characteristic SNP patterns.

691 QUAGLIA, A.; KARLSSON, M.; LARSSON, M.; TAYLOR, W. R.; NGUYEN THI NGOC DIEP; DAO TUYET TRINH; NGUYEN VU TRUNG; NGUYEN VAN KINH; WERTHEIM, H. F. L. **Total lactate dehydro-genase in cerebrospinal fluid for identification of bacterial meningitis.** *Journal of Medical Microbiology* (2013) **62** (11) 1772-1773 Reading, UK; Society for General Microbiology [En, 5 ref.] Department of Clinical Science and Education, Sachsska Children's Hospital, Sodersjukhuset, Karolinska Institutet, Stockholm, Sweden. Email: heiman.wertheim@gmail.com

The aim of this study was to investigate if total lactate dehydrogenase (LDH) is increased in cerebrospinal fluid (CSF) samples from adult patients with bacterial meningitis (BM) compared to aseptic meningitis and controls. Stored CSF samples from adult patients diagnosed with acute bacterial meningitis (ABM, n=40), tuberculous meningitis (TBM, n=9) and viral (aseptic) meningoencephalitis (n=10) and control samples from patients without meningitis and with normal CSF (n=10) admitted between June 2007 and October 2008 at the National Hospital for Tropical Diseases, Hanoi, Vietnam, were tested. The bacterial pathogens detected were *Streptococcus suis* (32 cases), *S. pneumoniae* (6 cases) and *Neisseria meningitidis* (2 cases). The detected viruses were herpes simplex virus (9 cases) and varicella-zoster virus (one case). The median (interquartile range (IQR)) LDH activity in each group was 104 (52-238) U/litre for ABM. 83 (35-351) U/litre for aseptic meningitis, 61 (33-98) U/litre for TBM and 11 (9-30) U/ litre for controls. The median (IQR) WBC was 1750 (285-300) for the bacterial group, 99 (38-317) for the aseptic meningitis group, 391 (250-442) for the tuberculous group and 14 (9-40) for the controls. One-way analysis of variance (ANOVA) showed

that the difference between the different forms of meningitis and controls was statistically significant. The post hoc analysis showed that the level of LDH activity in cases of ABM was significantly higher than that of the controls (P<0.0001), while no significant difference to cases of aseptic meningitis (P=0.777) and TBM (P=0.089) was seen. Controls had significantly lower levels of LDH activity than the bacterial (P<0.0001) and the aseptic groups (P=0.007), but did not differ significantly compared to the tuberculous cases (P=0.189). Any difference in LDH between cases of aseptic men-ingitis and TBM-vas not seen (P=0.248). It is suggested that LDH is a potential complementary biomarker to WBC, which differs significantly between bacterial and aseptic meningitis while showing overlap between no meningitis and viral meningitis.

692 CRUZ, H. L. A. DA; SILVA, R. C. DA; SEGAT, L.; CARVALHO, M. S. Z. DE M. G. DE; BRANDAO, L. A. C.; GUIMARAES, R. L.; SANTOS, F. C. F.; LIRA, L. A. S. DE; MONTENEGRO, L. M. L.; SCHINDLER, H. C.; CROVELLA, S. **MBL2 gene polymorphisms and susceptibility to tuberculosis in a northeastern Brazilian population.** In *First Meeting of the Latin American Network of Molecular Epidemiology and Evolutionary Genetics of Infectious Disease* (LAN-MEEGID), La Paz, Bolivia, 25-27 April 2012. [Edited by Tibayrenc, M.]. Infection, Genetics and Evolution (2013) 19, 323-329 Amsterdam, Netherlands; Elsevier B.V. [En, 45 ref.] Department of Immunology, Aggeu Magalhaes Research Center-CPqAM/ FIOCRUZ, Av. Prof. Moraes Rego, s/n°, CEP 50.670-420 Recife, Pernambuco, Brazil. Email: crovelser@gmail.com

The innate immune system represents the first line of host defense against pathogens. Genetics factors regulating the immune responses play a role in the susceptibility to infectious diseases, such as tuberculosis (TB). We analyzed MBL2 promoter and exon 1 functional single nucleotide polymorphisms (SNPs) in a group of 155 TB patients and 148 healthy controls in order to evaluate their influence on the onset of infection and TB development. There was no association between MBL2 -550 HL promoter polymorphisms and susceptibility to develop TB, but hetero-zygous-221 Y/X genotype was significantly more frequent in pulmonary TB patients than controls. Moreover, MBL2 exon 10 allele, was significantly associated with susceptibility to TB development in general (p=0.023, OR=1.61, 95% CI 1.05-2.49) and pulmonary TB (p=0.0008, OR=2.16, 95% CI 1.35-3.46); C allele at codon 57, as well as A/C genotype, were significantly more frequent in TB patients than in controls. Our results indicate that MBL2 polymorphisms, especially at codon 57, could be considered as risk factors for TB development.

693 GUNAYDIN, M.; YANIK, K.; EROGLU, C.; SANIC, A.; CEYHAN, I.; ERTURAN, Z.; DURMAZ, R. **Distribution of nontuberculous mycobacteria strains.** *Annals of Clinical Microbiology and Anti-microbials* (2013) **12** (33) (21 November 2013) London, UK; BioMed Central Ltd [En, 33 ref.] Department of Medical Microbiology, Faculty of Medicine, Ondokuz Mayis University, Samsun, Turkey. Email: murat@omu.edu.tr

AIM: Mycobacteria other than tuberculosis (MOTT) cause increasingly serious infections especially in immunosuppressive patients by direct transmission from the environment or after colonization. However, identification of these species is difficult because of the cost and difficulties in defining to species level. Identi-fication and distribution of these species can help clinician in the choice of treatment. MATERIALS AND METHODS: A total of 90 MOTT strains obtained from four different centers were included in the study. These strains were

identified by sequence analysis of 16S rRNA and Hsp65 genetic regions. RESULTS: Accordingly, within the 90 MOTT strains, 17 different species were identified. In order of frequency, these species were *M. gordonea* (n=21), *M. abscessus* (n=13), *M. lentiflavum* (n=9), *M. fortuitum* (n=8), *M. intracellulare* (n=6), *M. kumamotonense* (n=6), *M. neoaurum* (n=5), *M. chimaera* (n=5), *M. alvei* (n=5), *M. peregrinum* (n=3), *M. canariasense* (n=3), *M. flavescens* (n=1), *M. mucogenicum* (n=1), *M. chelonae* (n=1), *M. elephantis* (n=1), *M. terrae* (n=1) and *M. xenopi* (n=1). Most frequently identified MOTT species according to the geographical origin were as follows: *M. abscessus* was the most common species either in Istanbul or Malatya regions (n=6, n=6, consequently). While *M. kumamotonense* was the most frequent species isolated from Ankara region (n=6), *M. gordonea* was the most common for Samsun region (n=14). CONCLUSION: Our study revealed that frequency of MOTT varies depending on the number of clinical samples and that frequency of these species were affected by the newly identified species as a result of the use of novel molecular methods. In conclusion, when establishing diagnosis and treatment methods, it is important to know that infections caused by unidentified MOTT species may vary according to the regions in Turkey. The results of the study showed that there were differences in the frequency of MOTT species in the different geographical regions of Turkey.

694 BURKI, T. K. **Leprosy and the rhetoric of elimination.** *BMJ* (2013) **347** (F6142) (18 October 2013) London, UK; *BMJ Publishing Group* [En, 8 ref.] This paper examines the current status of leprosy elimination in India, highlighting underestimations in leprosy trends submitted to national control program reports and the prevalent social stigma associated with the disease.

695 GOUS, N.; CUNNINGHAM, B.; KANA, B.; STEVENS, W.; SCOTT, L. E. **Performance monitoring of *Mycobacterium tuberculosis* dried culture spots for use with the GeneXpert system within a national program in South Africa.** *Journal of Clinical Microbiology* (2013) **51** (12) 4018-4021 Washington, USA; American Society for Microbiology (ASM) [En, 8 ref.] Department of Molecular Medicine and Haematology, School of Pathology, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa. Email: natasha.gous@gmail.com

The use of dried culture spots (DCSs) has been reported in the verification of GeneXpert instruments as being "fit for purpose" for the South African National implementation program. We investigated and compared the performance of the DCSs for verification across different bulk batches, testing the settings and cadre of staff; and the Xpert MTB/RIF assay version. Four bulk batches (V005 to V008) were used to prepare (i) 619 DCS panels for laboratory testing on G3 or G4 cartridges by a technologist, (ii) 13 DCS panels (batch V005) used for clinic verification on G3 cartridges by a nurse or lay counselor, and (iii) 20 DCS panels (batch V005) used for the verification of 10 GeneXpert 16 module instruments in mobile vehicles on the G3 cartridge performed by a scientist. The stabilities of the DCSs over 6 months at 4°C, room temperature, and 37°C were, investigated. The mean cycle threshold (CT) and standard deviation (SD) for probe A were calculated. The proportions of variability in the CT values across bulk batches, assay versions, and settings and cadre of staff were determined using regression analysis. Overall, the DCSs demonstrated SDs of 3.3 (n=660) for the G3 cartridges and 3.8 (n=1,888) for the G4 cartridges, with an overall error rate of 1.5% and false rifampin resistance rate of 0.1%. The proportions of variability (R2) in the CT values explained by

batch were 14%, by setting and cadre of staff, 5.6%, and by assay version, 4.2%. The most stable temperature in a period of up to 6 months was 37°C (SD, 2.7). The DCS is a robust product suitable for storage, transport, and use at room temperature for the verification of the GeneXpert instrument, and the testing can be performed by non-laboratory-trained personnel in non-laboratory settings.

696 LEE, Y. M.; PARK, K. H.; KIM, S. M.; PARK, S. J.; LEE, S. O.; CHOI, S. H.; KIM, Y. S.; Woo, J. H.; KIM, S. H. **Risk factors for false-negative results of T-SPOT.TB and tuberculin skin test in extrapulmonary tuberculosis.** *Infection* (2013) **41** (6) 1089-1095 Munich, Germany; Springer Medizin Urban & Vogel GmbH [En, 30 ref.] Department of Infectious Diseases, Asan Medical Center, University of Ulsan College of Medicine, 388-1 Pungnapdong, Songpagu, Seoul, 138-736, Korea Republic. Email: kimsunghanmd@hotmail.com

Purpose T-SPOT. TB, a recently developed T cell-based assay, has shown promise in diagnosing extrapulmonary tuberculosis (EPTB). However, a limited number of reports have compared the risk factors for false-negative results of tuberculin skin tests (TSTs) and T-SPOT.TB assays in patients with EPTB. We, thus, conducted a prospective, blinded, observational study to evaluate the risk factors for false-negative T-SPOT.TB and TST results in patients with EPTB. METHODS: Between April 2008 and November 2011, all adult patients with suspected EPTB were prospectively enrolled at Asan Medical Center, Seoul, South Korea (an intermediate TB-burden country). Only patients with confirmed and probable EPTB who underwent TST and T-SPOT.TB were included in the final analysis. RESULTS: Of the 324 patients who underwent both TST and T-SPOT.TB testing, 128 patients with 96 (75%) culture or polymerase chain reaction (PCR) confirmed and 32 (25%) probable EPTB were finally analyzed. T-SPOT.TB assays were less likely to yield false-negative results than TSTs [17% (22/128) vs. 54% (69/128), p<0.001]. In a multivariate analysis, miliary TB was associated with false-negative TSTs [odds ratio (OR)=5.3; 95% confidence interval (CI) 1.7-16.1], while immunosuppression showed a trend toward false-negative TSTs (OR=2.5; 95% CI 0.9-6.8). Conversely, lymph node TB (OR=0.2; 95% CI 0.1-0.5) and skeletal TB (OR=0.2; 95% CI 0.1-0.5) were associated with true-positive TST results. The only risk factor for false-negative T-SPOT.TB results was TB meningitis (OR=2.6; 95% CI 1.0-6.6). CONCLUSIONS: Our findings suggest that T-SPOT.TB has a better sensitivity to diagnose EPTB than TST, especially in patients with immuno-suppression or miliary TB.

697 NYAMOGOBA, H. D. N.; KIKUVI, G.; MPOKE, S.; WAIYAKI, P. G.; SOOLINGEN, D. **VAN Ziehl-Neelsen microscopy in the diag-nosis of tuberculosis in settings of high human immunodeficiency virus prevalence.** *East African Medical Journal* (2012) p9, (8) 263-271 Nairobi, Kenya; Kenya Medical Association [En]

OBJECTIVE: To determine the accuracy of Ziehl-Neelsen microscopy in the diagnosis of TB in settings of high HIV prevalence. DESIGN: Cross-sectional descriptive study. SETTING: Hospitals serving areas of high human immunodeficiency virus prevalence in western Kenya. The study was conducted between September 2007 and September 2009. RESULTS: In total, 341/872 (39.1%) of the TB suspects were positive in ZN, 53.1% (181/341) of them culture positive. Only 3.8% (20/531) of the ZN smear negatives were culture positive. Of the 695 suspects evaluated for both Mycobacterium and HIV infection, 255 (36.7%) were ZN smear positive, 42.7% of them HIV positive. Out of the 440 ZN smear negatives, 37% were HIV positive. Similarly, 168 suspects were culture positive, 46.4% of them HIV positive.

The HIV infection did not significantly reduce ZN smear positivity rate (P=0.42) and culture sensitivity (P=0.09). The ZN sensitivity and specificity were 88.1% and 79.7%, respectively. The predictive values were 58.0 (PPV), and 95.5% (NPV), respectively. However, the area under the ROC curve was 0.84, with 95% CI between 0.80-0.87 and (P<0.001). The ZN smear microscopy had a lesser ability to distinguish between TB and non-TB cases compared to culture. CONCLUSION: ZN microscopy causes a significant over-diagnosis of TB in set-tings of high HIV/AIDS prevalence. There is need for further studies on this subject taking into consideration the various confounding factors.

1044 REJA, A. H. H.; ABHISHEK DE; SUPRATIK BISWAS; AMITA-BHA CHATTOPADHYAY; GOBINDA CHATTERJEE; BASUDEV BHATTACHARYA; AARTI SARDA; ISHAD AGGARWAL **Use of fine needle aspirate from peripheral nerves of pure-neural leprosy for cytology and PCR to confirm the diagnosis: a pilot study.** *Indian Journal of Dermatology, Venereology & Leprology* (2013) **79** (6) 789-794 Mumbai, India; Medknow Publications [En, 16 ref.] Department of Biochemistry, Institute of Post Graduate Medical Education and Research, Kolkata, West Bengal, India.

BACKGROUND: The diagnosis of pure neural leprosy (PNL) remained subjective because of over-dependence of clinical expertise and a lack of simple yet reliable diagnostic tool. The criteria for diagnosis, proposed by Jardim et al., are not routinely done by clinicians in developing country as it involves invasive nerve biopsy and sophisti-cated anti-PGL-1 detection. We conducted a study using fine needle aspiration cytology (FNAC) coupled with Ziehl Neelsen staining (ZN staining) and Multiplex-Polymerase Chain Reaction (PCR) specific for *M. leprae* for an objective diagnosis of pure neural leprosy (PNL), which may be simpler and yet reliable. AIM: The aim of the study is to couple FNAC with ZN staining and multiplex PCR to diagnose pure neural leprosy patients rapidly, in simpler and yet reliable way. METHODS: Thirteen patients of PNL as diagnosed by two independent consultants were included as case, and 5 patients other than PNL were taken as control in the study. Fine needle aspiration was done on the affected nerve, and aspirates were evaluated for cytology, ZN staining and multiplex-PCR. RESULTS: Out of the 13 cases where fine needle aspiration was done, *M. leprae* could be elicited in the nerve tissue aspirates in 5 cases (38.4%) with the help of conventional acid-fast staining and 11 cases (84.6%) with the help of multiplex PCR. On cytological examination of the aspirates, only 3 (23%) cases showed specific epithelioid cells, whereas 8 (61.5%) cases showed non-specific inflammation, and 2 (15.3%) cases had no inflammatory cells. CONCLUSION: Our study demonstrates that in the field of laboratory diagnosis of PNL cases, FNAC in combination with ZN staining for acid-fast bacilli (AFB) and Multiplex-PCR can provide a rapid and definitive diagnosis for the majority of PNL cases. FNAC is a less-invasive, outdoor-based and simpler technique than invasive nerve biopsy procedure. Thus, this study may enlighten the future path for easy and reliable diagnosis of PNL.

1045 HASHEMI-SHAHRAKI, A.; DARBAN-SAROKHALIL, D.; HEI-DARIEN, P.; FEIZABADI, M. M.; DESHMIR-SALAMEH, S.; KHAZAEE, S.; ALAVI, S. M. ***Mycobacterium simiae:*** **a possible emerging pathogen in Iran.** *Japanese Journal of Infectious Diseases* (2013) **66** (6) 475-479 Tokyo, Japan; National Institute of Infectious Diseases (NIID) [En, 26 ref.] Infectious and Tropical Diseases Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. Email: darban@yahoo.com

Mycobacterium simiae has been reported worldwide, particularly from the Middle East. This organism has been recognized as a causative agent of pulmonary and disseminated infections. In this study, we used molecular methods to detect this organism from patients who were suspected of having tuberculosis. A total of 117 isolates of mycobacteria were evaluated from different regions of Iran. Isolates were identified using phenotypic methods and gene sequencing of 16S rRNA, rpoB, hsp65, and ITS. Of the 117 isolates, 12 *M. simiae* isolates (10.2%) were identified from different clinical samples, including bronchoalveolar lavage and sputum (n=8), blood (n=3), and lymph node biopsy (n=1). Three isolates (3/12, 25%) were recovered from blood samples of HIV cases when the CD4+ count was less than 50/4 There was no significant relationship between infection and age or gender. Infection with nontuberculous mycobacteria (NTM), including *M. simiae*, is the major problem among immunocompromised patients. The results of this study illustrated the importance of molecular methods for accurate and rapid detection of NTM infections in the treatment of nonresponding patients with suspected tuberculosis.

1046 CHIN, J. H.; MATEEN, F. J. **Central nervous system tuberculosis: challenges and advances in diagnosis and treatment.** *Current Infectious Disease Reports* (2013) **15** (6) 631-635 Philadelphia, USA; Current Medicine Group LLC [En, 33 ref.] School of Public Health, University of California, Berkeley, 50 University Avenue, Berkeley, CA 94720, USA. Email: chinj@asapp.org, Farrah.Mateen@gmail.com

Mycobacterium tuberculosis is one of the most prevalent human infections. Although the largest share of the burden of disease is in Africa and Asia, tuberculosis has a global footprint due to travel and migration. Resource constraints in many low- and middle-income countries are hampering efforts to control new infections and to prevent drug resistance. Infection of the central nervous system by *Mycobacterium tuberculosis* includes meningitis, tuberculoma, and abscess and carries a high morbidity and mortality. High clinical suspicion, combined with cerebrospinal fluid analysis and brain imaging studies, can improve the diagnostic certainty. The recent scale-up of nucleic acid amplification technology may allow earlier diagnosis of tuberculous meningitis in many regions of the world. Treatment of tuberculous infection of the central nervous system is usually empirical and follows conventional regimens for pulmonary tuberculosis. The optimal treatment regimen is still being elucidated and has been the subject of recent clinical trials.

1047 BERHE WELDEAREGAWI; YEMANE ASHEBIR; EJIGU GEB-EYE; TESFAY GEBREGZIABIHER; MEKONNEN YOHANNES; SEID MUSSA; HAFTU BERHE; ZERIHUN ABEBE **Emerging chronic non-communicable diseases in rural communities of Northern Ethiopia: evidence using population-based verbal autopsy method in Kilite Awlaelo surveillance site.** *Health Policy and Planning* (2013) **28** (8) 891-898 Oxford, UK; Oxford University Press [En, 24 ref.] Department of Public Health, Mekelle University, P.O. Box 1871, Mekelle, Ethiopia. Email: berheph@gmail.com

INTRODUCTION: In countries where most deaths are outside health institutions and medical certification of death is absent, verbal autopsy (VA) method is used to estimate population level causes of death. METHODS: VA data were collected by trained lay interviewers for 409 deaths in the surveillance site. Two physicians independently assigned cause of death using the International Classification of Diseases manual. RESULTS: In general, infectious and parasitic

diseases accounted for 35.9% of death, external causes 15.9%, diseases of the circulatory system 13.4% and perinatal causes 12.5% of total deaths. Mortalities attributed to maternal causes and malnutrition were low, 0:2 and 1.5%, respectively. Causes of death varied by age category About 22.1, 12.6 and 8.4% of all deaths of under 5-year-old children were due to bacterial sepsis of the newborn, acute lower respiratory infections such as neonatal pneumonia and prematurity including respiratory distress, respectively. For 5-15-year-old children, accidental drowning and submersion, accounting for 34.4% of all deaths in this age category, and accidental fall, accounting for 18.8%, were leading causes of death. Among 15-49-year-old adults, HIV/AIDS (16.3%) and tuberculosis (12.8%) were commonest causes of death, whereas tuberculosis and cerebrovascular diseases were major killers of those aged 50 years and above. CONCLUSION: In the rural district, mortality due to chronic non-communicable diseases was very high. The observed magnitude of death from chronic non-communicable disease is unlikely to be unique to this district. Thus, formulation of chronic disease prevention and control strategies is recommended.

1048 DANIEL, E.; RAO, P. S. S.; COURTRIGHT, P. **Facial sensory loss in multi-bacillary leprosy patients.** *Leprosy Review* (2013) **84** (3) 194-198 Colchester, UK; LEPRA [En, 8 ref.] Schieffelin Leprosy Research and Training Center, Karigiri, India. Email: ebdaniel@mail.med.uperin.edu

Sensation over the face was estimated using the Semmes-Weinstein's monofilament (target force 0.05 gms) in a cohort of multi-bacillary (MB) patients whose clinical and ocular characteristics were available at the time of leprosy diagnosis. Among the 190 MB patients examined, 56 (30%) had areas of sensory impairment somewhere on the face and 43 (23%) had sensory deficit over the lids and/or the Malar area. Lagophthalmos (adjusted OR 8.96, 95% CI 0.96-83.50), Type 1 reaction (aOR 2.47, 95% CI 1.11-5.52), history of reactions (aOR 6.36, 95% CI 2.40-16.85) and glove and stocking anaesthesia (aOR 3.49, 95% CI 1.40-8.70) were associated with impaired facial sensation. Hypoesthesia restricted to areas over the lids and/or Malar area showed a stronger association with lagophthalmos (aOR 17.5, 95% CI 1.98-154.36). Loss of facial sensation appears to be associated with lagophthalmos in MB patients.

1049 NEELMANI BENSE; PREMAL DAS; RAO, P. S. S.; JOHN, A. S. **Enhancing counselling strategies for leprosy patients through the Participation Scale.** *Leprosy Review* (2013) **84** (3) 199-208 Colchester, UK; LEPRA [En, 17 ref.] TLM Community Hospital, Naini, U.P, India. Email: sundarraopss@rocketmail.com

BACKGROUND & OBJECTIVES: Counsellors provide psychological support, appropriate education and coping skills to persons affected by adverse events. Counselling of leprosy patients is essential to enable them to cope with perceived stigma as well as managing severe enacted stigma at home, place of work or elsewhere. Professional counselling was instituted at the Leprosy Mission Community Hospital in Naini, Allahabad District, India, in 2004. In this paper we describe how the use of the Participation Scale helped in developing Counselling strategies for a variety of leprosy patients. MATERIAL & METHODS: A random sample of 250 leprosy patients visiting the hospital for the first time during 2011-2012 were chosen, 50 each from those with only hidden patches (Grade 0a), patients with visible patches (Grade 0b), those with only anaesthesia or weakness (Grade I), patients with paralytic deformities (Grade 2a), and patients with visible disabilities and ulcers (Grade 2b). The P-scale consisting of 18 items was administered in the local language (Hindi) and used by the Counsellor along with relevant clinical and socioeconomic

details. RESULTS: There were 84 women and 166 men, distributed in all the five categories. Overall, 142 patients out of 25.0,(56.8%) had no participation restrictions; 39 (15.6%) had milcrsocial restrictions; 20 (8.0%) had moderate, 28 (11.2%) had severe and 21 (8.4%) had extreme participation restrictions. Paradoxically, there were some cases without severe deformity who are also subjected to restrictions. Patients in Grades Oa and Ob, had practically no severe or even moderate restrictions in their social participation, but their perceived stigma was high, requiring suitable leprosy education, family counselling and coping skills to feel confident that they were capable of normal work like any of their peers. Counselling became more intensive in Grade 1 and for almost all in Grade 2, who experienced moderate to severe restrictions in meeting new people, participating in social activities and indulging in socioeconomic activities. Counselling for such groups of patients required multiple approaches, including in-depth leprosy education for regular treatment, self-care measures, mobilisation of coping skills, self-confidence and acceptance counselling, and follow-up counselling for those released from treatment after multidrug therapy. CONCLUSIONS & RECOMMENDATIONS: The P-scale provides essential information to enable a Counsellor to offer more meaningful and balanced counselling to leprosy-affected people, especially in coping with enacted stigma. Education oriented counselling and psychological supportive counselling are necessary adjuncts for clinical care and treatment. Client-oriented counselling allows clients to freely express their fears and anxieties, and promotes coping skills and confidence.

1050 CROSS, H. **The prevention of leprosy related disability as an integral component of the government health delivery programme in Indonesia: perspectives on implementation.** *Leprosy Review* (2013) **84** (3) 219-228 Colchester, UK; LEPRA [En, 1 ref.] American Leprosy Missions, 1 ALM Way, Greenville, SC 29601, USA. Email: hcross@leprosy.org

This paper presents a record of three interviews with groups of Ministry of Health personnel and consultants that took place in Jakarta, Indonesia in May 2012. Those contributing to the first interview were provincial and district supervisors with responsibility for leprosy. Those contributing to the second interview were consultants, three of whom were seconded to the Ministry of Health and one was a WHO consultant. A third interview was conducted with the Head and a technical staff member of the Sub Directorate of Leprosy and Yaws Control Programme, Ministry of Health, Indonesia. Leprosy control in Indonesia had been targeted for further enquiry after it became apparent, through an earlier survey of national programme managers and consultants, that the programme had been relatively successful in integrating POD into the government health delivery programme. The perspectives of significant representatives and actors in the national programme were recorded through the interviews undertaken in Jakarta. LIMITATIONS: This report does not purport to be a study of integration of leprosy services in Indonesia. The perspectives of representatives and significant actors are offered here to enhance understanding of factors that contributed to POD becoming a routine component of general health care in Indonesia. It is also declared here that no independent verification of statements was undertaken and that the effectiveness of measures taken to integrate leprosy related POD has not been independently evaluated.

1051 UDO, S.; CHUKWU, J.; OBASANYA, J. **Leprosy situation in Nigeria.** *Leprosy Review* (2013) **84** (3) 229-237 Colchester, UK; LEPRA [En,

11 ref.] The Leprosy Mission-Nigeria, House No. C83/C84, Fort Royal Homes Estate, Lugbe, FCT - Abuja, Nigeria. Email: sundayu@tlmnigeria.org

With an annual new case detection of 4000 people, a Grade 2 disability rate of 12%, and nearly 10% child ratio among new cases, leprosy remains a disease of public health importance in Nigeria. Faced with the reality of low endemicity; a declining budgetary allocation to leprosy control; and a pervasive loss of expertise; it is necessary for Nigeria to re-organise its leprosy control services to further reduce the burden of the disease and ensure quality care to people affected by leprosy.

1052 ROTHE, C.; SCHLAICH, C.; THOMPSON, S. **Healthcare-associated infections in sub-Saharan Africa.** *Journal of Hospital Infection* (2013) **85** (4) 257-267 Oxford, UK; Elsevier Ltd [En, 134 ref.] Department of Medicine, College of Medicine, University of Malawi, Private Bag 360, Chichiri, Blantyre 3, Malawi. Email: camilla.rothe@web.de

BACKGROUND: Healthcare-associated infections (HCAIs) are the most frequent adverse consequences of healthcare worldwide, threatening the health of both patients and healthcare workers (HCWs). The impact of HCAI is particularly felt in resource-poor countries, with an already overstretched health workforce and a high burden of community-acquired infection. AIM: To provide an overview of the current situation in sub-Saharan Africa with regards to the spectrum of HCAI, antimicrobial resistance, occupational exposure and infection prevention. METHODS: We reviewed the literature published between 1995 and 2013 and from other sources such as national and international agencies. FINDINGS: Sparse data suggest that HCAIs are widespread in sub-Saharan Africa, with surgical site being the dominant focus of infection. Nosocomial transmission of multidrug-resistant tuberculosis is a considerable concern, as is the prevalence of meticillin resistant *S. aureus* and resistant Enterobacteriaceae. In HCWs, vaccination rates against vaccine-preventable occupational hazards are low, as is reporting and subsequent human immunodeficiency virus-testing after occupational exposure. HCWs have an increased risk of tuberculosis relative to the general population. Compliance with hand hygiene is highly variable within the region. Injection safety in immunization programmes has improved over the past decade, mainly due to the introduction of autodestruct syringes. CONCLUSIONS: Despite the scarcity of data, the burden of HCAI in sub-Saharan Africa appears to be high. There is evidence of some improvement in infection prevention and control, though wide-spread surveillance data are lacking. Overall, measures of infection prevention and occupational safety are scarce.

1053 SUN, A. V,; MADHUKAR PAI; SALJE, H.; SRINATH SATY-ANARAYANA; SARANG DEO; DOWDY, D. W. **Modelling the impact of alternative strategies for rapid molecular diagnosis of tuberculosis in Southeast Asia.** *American Journal of Epidemiology* (2013) **178** (12) 1740-1749 Cary, USA; Oxford University Press [En, 43 ref.] Johns Hopkins University School of Medicine, Baltimore, Maryland, USA. Email: ddowdy@jhsph.edu

Novel diagnostic tests hold promise for improving tuberculosis (TB) control, but their epidemiologic impact remains uncertain. Using data from the World Health Organization (2011-2012), we developed a transmission model to evaluate the deployment of 3 hypothetical TB diagnostic tests in Southeast Asia under idealized scenarios of implementation. We defined diagnostics by their sensitivity for smear-negative TB and proportion of patients testing positive who initiate therapy ("point-of-care amenability"), with tests of increasing point-of-care amenability having lower

sensitivity. Implemented in the public sector (35% of care-seeking attempts), each novel test reduced TB incidence by 7%-9% (95% uncertainty range: 4%-13%) and mortality by 20%-22% (95% uncertainty range: 14%-27%) after 10 years. If also deployed in the private sector (65% of attempts), these tests reduced incidence by 13%-16%, whereas a perfect test (100% sensitivity and treatment initiation) reduced incidence by 20%. Annually detecting 20% of prevalent TB cases through targeted screening (70% smear negative sensitivity, 85% treatment initiation) also reduced incidence by 19%. Sensitivity and point-of-care amenability are equally important considerations when developing novel diagnostic tests for TB. Novel diagnostics can substantially reduce TB incidence and mortality in Southeast Asia but are unlikely to transform TB control unless they are deployed actively and in the private sector.

1054 CHEN SONGHUA; HUAI PENGCHENG; WANG XIAOMENG; ZHONG JIEMING; WANG XINTING; WANG KAI; WANG LIXIA; JIANG SHIWEN; LI JUN; PENG YING; MA WEI **Risk factors for multidrug resistance among previously treated patients with tuberculosis in eastern China: a case-control study.** *International Journal of Infectious Diseases* (2013) **17** (12) el116-e1120 Oxford, UK; Elsevier Ltd [En, 29 ref.] Zhejiang Provincial Center for Disease Control and Prevention, Hangzhou, China. Email: weima@sdu.edu.cn

BACKGROUND: Previous treatment has been documented as a major risk factor for multidrug-resistant tuberculosis (MDR-TB). However, risk factors for MDR-TB among previously treated patients in China are unclear. This study aimed to ascertain the risk factors for MDR-TB in this particular population in China. METHODS: A case-control study was conducted from July through August 2011 in five cities of Zhejiang Province. Cases were previously treated TB patients who had disease resistant to at least isoniazid and rifampin, whereas controls were previously treated TB patients who had disease sensitive to isoniazid and rifampin. RESULTS: Ninety-eight cases and 83 controls were identified. Multivariate analysis showed that a duration of first treatment of more than 8 months (odds ratio (OR) 2.18, 95% confidence interval (CI) 1.05-4.52), more than three prior episodes of anti-TB treatment (more than 2 months of continuous treatment as one episode) (OR 5.57, 95% CI 2.38-13.00), adverse effects of anti-TB medication (OR 3.63, 95% CI 1.79-736), and more than three TB foci in the lung (OR 2.17, 95% -CI 1.0S-4.37) were associated with MDR-TB in previously treated TB patients. Low family income (p=0.056) was marginally significant in the univariate analysis. CONCLUSIONS: Particular clinical diagnostic results, such as more than three TB foci in the lung, non-standard or irregular therapy, and adverse effects of anti-TB medication, were found to be associated with MDR-TB in previously treated TB patients. High quality directly observed treatment should be strengthened to ensure that the previously treated patients can receive standard and regular regimens.

1055 SOLARI, L.; SOTO, A.; AGAPITO, J. C. ACURIO, V.; VARGAS, D.; BATTAGLIOLI, T.; ACCINELLI, R. A.; GOTUZZO, E.; STUYFT, P. VAN DER **The validity of cerebrospinal fluid parameters for the diagnosis of tuberculous meningitis.** *International Journal of Infectious Diseases* (2013) **17** (12) el111-e1115 Oxford, UK; Elsevier Ltd [En, 30 ref.] Unit of General Epidemiology and Disease Control, Institute of Tropical Medicine of Antwerp, Nationalestraat 155, B-2000 Antwerp, Belgium. Email: lelysol @hotmail.com

OBJECTIVES: To assess the diagnostic validity of laboratory cerebrospinal fluid (CSF) parameters for discriminating between tuberculous menin-

gitis (TBM) and other causes of meningeal syndrome in high tuberculosis incidence settings. METHODS: From November 2009 to November 2011, we included patients with a clinical suspicion of meningitis attending two hospitals in Lima, Peru. Using a composite reference standard, we classified them as definite TBM, probable TBM, and non-TBM cases. We assessed the validity of four CSF parameters, in isolation and in different combinations, for diagnosing TBM: adenosine deaminase activity (ADA), protein level, glucose level, and lymphocytic pleocytosis. RESULTS: One hundred and fifty-seven patients were included; 59 had a final diagnosis of TBM (18 confirmed and 41 probable). ADA was the best performing parameter. It attained a specificity of 95%, a positive likelihood ratio of 10.7, and an area under the receiver operating characteristics curve of 82.1%, but had a low sensitivity (55%). None of the combinations of CSF parameters achieved a fair performance for 'ruling out' TBM. CONCLUSIONS: Finding CSF ADA greater than 6 U/1 in patients with a meningeal syndrome strongly supports a diagnosis of TBM and permits the commencement of anti-tuberculous treatment.

1056 PADMAPRIYADARSINI, C.; BHAVANI, P. K.; TANG, A.; HEMANTH KUMAR; PONNURAJA, C.; NARENDRAN, G.; HANNAH, E.; RAMESH, C.; CHANDRASEKAR, C.; WANKE, C.; SOUMYA SWAMINATHAN **Early changes in hepatic function among HIV-tuberculosis patients treated with nevirapine or efavirenz along with rifampin-based anti-tuberculosis therapy.** *International Journal of Infectious Diseases* (2013) **17** (12) el l54-e1159 Oxford, UK; Elsevier Ltd [En, 24 ref.] National Institute for Research in Tuberculosis, Mayor Sathiyamoorthy Salai, Chetput, Chennai 600 031, India. Email: doctorsoumya@yahoo.com

OBJECTIVES: To describe the longitudinal changes in hepatic function among HIV-infected tuberculosis (TB) patients receiving once-daily nevirapine (NVP)- or efavirenz (EFV)-based antiretroviral treatment (ART) along with rifampin-containing anti-TB treatment. METHODS: This was a nested study within a randomized clinical trial, taking place between May 2006 and June 2008 at the National Institute for Research in Tuberculosis, Chennai, India. Antiretroviral-naive HIV-infected TB patients were initiated on an intermittent short-course regimen and randomized to receive didanosine and lamivudine with either NVP (400 mg) or EFV (600 mg) once-daily. Blood was analyzed for alanine aminotransferase (ALT), aspartate aminotransferase (AST), serum alkaline phosphatase (SAP), and bilirubin at baseline, at ART initiation, fortnightly after ART initiation until 2 months, then monthly until 6 months and 6-monthly thereafter. RESULTS: Of the 168 patients included (79% men, median CD4 count 93 cells/mm3, median viral load 242 000 copies/ml), 104 were on EFV-based ART and 64 on NVP-based ART. There was a small but statistically significant elevation in ALT and SAP at 2 weeks and AST at 6 weeks after ART initiation. The proportion of patients with rate-limiting toxicity of liver enzymes was small. None had treatment terminated because of hepatotoxicity. CONCLUSION: Hepatotoxicity is not a major concern when HIV-infected TB patients, with normal base-line liver function initiate treatment for both infections simultaneously.

1057 SHAKAK, A. O.; KHALIL, E. A. G.; MUSA, A. M.; SALIH, K. A. E. M.; BASHIR, A. E. A.; AHMED, A. H.; IDRIS, F. E. M.; ELHASSAN, A. M.; SUDAN, TUBERCULOSIS RESEARCH GROUP **Prevalence of latent tuberculosis infection in Sudan: a case-control study comparing interferon-y release**

assay and tuberculin skin test. *BMC Public Health* (2013) **13** (1128) (5 December 2013) London, UK; BioMed Central Ltd [En, 34 ref.] Faculty of Medical Sciences, University of Shendi, Shendi, Sudan. Email: eltahirgasim@yahoo.ca

BACKGROUND: Most people exposed to *M. tuberculosis* show no evidence of clinical disease. Five to 10% of individuals with latent infection progress to develop overt disease during their life time. Identification of people with latent TB infection will increase case detection rates and may dictate new treatment policies to control tuberculosis. This study aimed to determine LTBI point prevalence in a population from Sudan using two different diagnostic methods: the tuberculin skin test (TST) and the IFN-y release assay (IGRA). METHODS: This was a prospective, community-based and case-controlled study. Following informed consent, household contacts (HHCs; n=98) of smear-positive index cases and Community controls (CCs; 186), were enrolled. Tuberculin skin test (TST), white blood stimulation with ESAT-6/CFP-10±TB7.7 antigens or purified protein derivative (PPD) and IFN-y levels determination with ELISA were performed. The levels of IFN-y and TST in duration between the CCs and the HHCs were compared using student t-test, Chi-square and Kappa coefficient. Pearson correlation test was used to compare TST and IFN-y. P levels of <0.05 were considered significant. RESULTS: TST in duration of mm gave an LTBI point prevalence of 327 cases/1000 individuals among HHCs compared to 126 case's/4000 individuals among CCs (p=0.000). PPD-induced IFN-y release assay gave an LTBI point prevalence of 418 cases/ 1000 individuals among HHCs compared to 301 cases/1000 individuals among CCs (p=0.06). On the other hand ESAT-6/CFP-10±TB7.7-induced IFN-y gave an LTBI point prevalence of 429 cases/1000 individuals among HHCs compared to 268 cases/1000 individuals among CCs (p=0.01). IFN-y productions levels induced by ESAT-6/CPF-10±TB7.7 antigens in HHCS and CCs were not significantly different from those induced by PPD (p=0.7). CONCLUSION: IFN-y release assay (IGRA) gave higher LTBI point prevalence compared to TST in HHCs and CCs. PPD gave comparable results to ESAT-6/CFP-10±TB7.7 antigens in whole blood IFN-y release, making it a cheap alternative to the recombinant antigens.

1058 UMOH, N. O.; ASUQUO, A. E.; ABIA-BASSEY, L.; ASIBONG, U. E.; POKAM, T. B. **Evaluation of Thin Layer Agar for rapid and accurate diagnosis of turberculosis in a resource limited setting.** *Mary Slessor Journal of Medicine* (2013) **12** (1) 12.1.10 Calabar, Nigeria; University of Calabar Teaching Hospital [En] Directorate of Public Health, Akwa Ibom State Ministry of Health, Uyo, Nigeria.

Lack of timely and accurate diagnosis constitutes formidable obstacles to tuberculosis (TB) control in Nigeria. The use of Thin Layer Agar (TLA) as an alternative rapid culture method for TB diagnosis was evaluated in Nigeria. Sputum specimens were decontaminated before inoculation onto Lowestein Jensen (LJ) slopes and quadrant TLA petri-plates containing 5 mg/ml paranitrobenzoic acid (PNB) in one compartment. Incubated TLA plates and LJ slopes were examined micro-scopically and macroscopically, respectively, at regular intervals for growth of *Mycobacterium tuberculosis* (MTB) complex. The mean time-to-detection of MTB complex on TLA and LJ media were 12 days a 32 days respectively. The sensitivity, overall accuracy, and net tive predictive value (NPV) of TLA were 95.6%, 98.5% and respectively, comparing favorably with the corresponding yak of 92.1%, 97.2% and 95.9% for LJ. The specificity and position predictive value

(PPV) were 100% for both methods. TLA p. formed better than the conventional LJ culture in the yield accuracy and speed of detection of MTB complex. The relation higher values of TLA alongside its lower cost implication in the study, suggest it may be a useful tool for rapid diagnosis of tuberculosis, especially in resource limited settings.

1059 MURHEKAR, M. V.; SRIHARI DUTTA; KAPOOR, A. N.; SA AJA BITRAGUNTA; RAJA DODUM; PRAMIT GHOSH; SWAMY, K.] MUKHOPADHYAY, K.; SOMORJIT NINGOMBAM; KAMLESH PARA, DEVEGOWDA RAVISHANKAR; BALRAJ SINGH; VARSHA SINC RAJESH SISODIYA; RAMARATNAM SUBRAMANIAN; TANA TAKT **Frequent exposure to suboptimal temperatures in vaccine col chain system in India: results of temperature monitoring in states.** *Bulletin of the World Health Organization* (2013) **91** (1 906-913 Geneva, Switzerland; World Health Organization [En, ch, fr, ru, es, 23 ref.] National Institute of Epidemiology, Indian Council of Medical Research, R127, Tamil Nadu Housing Boa] Ayapakkam, Ambattur, Chennai 600 077, India. Erna mmurhekar@gmail.com

OBJECLIVE: To estimate the proportion of time the vaccines the cold-chain system in India are exposed to temperatures of < or >8°C. METHODS: In each of 10 states, the largest district and t one most distant from the state capital were selected for study. Four boxes, each containing an electronic temperature recorder and two vials of diphtheria, pertussis and tetanus vaccine, were placed in t state or regional vaccine store for each study state. Two of the boxes were then shipped - one per facility - towards the two most peripheral health facilities where vaccine was stored in each study district. The boxes were shipped, handled and stored as if they we routine vaccine supplies. FINDINGS: In state, regional and district vaccine stores and peripheral health facilities, respectively, t temperatures in the boxes exceeded 8°C for 14.3%, 13.2%, 8.3 and 14.7% of their combined storage times and fell below 0°C 1 1.5%, 0.2%, 0.6% and 10.5% of these times. The boxes also six about 18% and 7% of their combined times in transit at <0 a >8°C, respectively. In shake tests conducted at the end of the study two thirds of the vaccine vials in the boxes showed evidence freezing. CONCLUSION: While exposure to temperatures above 8' occurred at every level of vaccine storage, exposure to subzero temperatures was only frequent during vaccine storage at peripheral facilities and vaccine transportation. Systematic efforts needed to improve temperature monitoring in the cold-chains tern in India.

1060 ALIANNEJAD, R.; ABTAHI, H.; SAFAVI, E.; DEILAMI, G. FIRUZBAKHSH, S.; MASSAHNIA, S.; POURANARAKI, M. Z. **[Diagnostic methods of active pulmonary TB.]** *Journal of Medical Council of Islamic Republic of Iran* (2013) **31** (2) Pe152-Pe 1 (En176) Tehran, Iran; Islamic Republic of Iran Medical Council [1 en, 80 ref.] T.U.M.S., Tehran, Iran. Ems respiratory_center@yahoo.com

Tuberculosis is considered a major cause of morbidity a mortality worldwide. According to the WHO report 9.4 million individuals were suffering from active TB in 2009. Diagnostic methods for active pulmonary TB include: clinical suspicion tuberculin skin test, acid fast bacilli stain, cultures for maycobacterium, and in recent years NNA (nucleic acid amplification). An ideal test for pulmonary active tuberculosis should be easily performed with rapid results, it should have high sensitivity specificity, low cost, technically easy to operate and reproducible results in a variety of settings, have the possibility of drug susceptibility testing and could distinguish *Mycobacterium tuberculosis* from other

mycobacteria. Direct smear sputum microscopy is primary method for diagnosing pulmonary tuberculosis but it la enough sensitivity and only about 44% of all new cases are detected by this method. Culture technique is still seen as the gold stand for active TB. Although, the sensitivity and specificity of culture high, this method is slow and time consuming and needs spec laboratory equipments. It not only provides the detection of various, mycobacterial species but also the examination of drug sensitivity It also provides the examination of genotype for epidemiological purposes if needed. Nucleic acid amplification tests (NAATs) be performed in one day, But NAAT are not (fully) standardization and the diagnostic accuracy is highly heterogeneous, and n experienced personnel and expensive equipments.

1061 BAIO, P. V. P.: RAMOS, J. N.; SANTOS, L. S. DOS; SORIANO, M. F.; LADEIRA. E. M.; SOUZA, M. C.; CAMELLO, T. C. F.; RIBEIRO, M. G.; HIRATA JUNIOR, R.; VIEIRA, V. V.; MATTOS-GUARALDI, A. L. **Molecular identification of Nocardia isolates from clinical samples and an overview of human nocardiosis in Brazil.** *PLoS Neglected Tropical Diseases* (2013) **7** (12) e2573 San Francisco, USA; Public Library of Sciences (PLoS) [En, 99 ref.] Universidade do Estado do Rio de Janeiro-UERJ, Faculdade de Ciencias Medicas, Departamento de Microbiologia, Imunologia e Patologia, Laboratorio de Difteria e Corinebacterias de Importancia Clinica-LDCIC, Centro Colaborador para Difteria da CGLAB/SVS/MS, Rio de Janeiro, Rio de Janeiro, Brazil. Email: vieira@ioc.fiocruz.br, veronicavianavieira@hotmail.com

BACKGROUND: *Nocardia* sp. causes a variety of clinical presentations. The incidence of nocardiosis varies geographically according to several factors, such as the prevalence of HIV infections, transplants, neoplastic and rheumatic diseases, as well as climate, socio-economic conditions and laboratory procedures for *Nocardia* detection and identification. In Brazil the paucity of clinical reports of *Nocardia* infections suggests that this genus may be underestimated as a cause of human diseases and/or either neglected or misidentified in laboratory specimens. Accurate identification of *Nocardia* species has become increasingly important for clinical and epidemiological investigations. In this study, seven clinical *Nocardia* isolates were identified by multi locus sequence analysis (MLSA) and their antimicrobial susceptibility was also determined. Most *Nocardia* isolates were associated to pulmonary disease. METHODOLOGY/PRINCIPAL FINDINGS: The majority of Brazilian human isolates in cases reported in literature were identified as *Nocardia* sp. Molecular characterization was used for species identification of *Nocardia nova*, *Nocardia cyriacigeorgica, Nocardia asiatica* and *Nocardia exalbida/gamkensis*. Data indicated that molecular analysis provided a different *Nocardia* speciation than the initial biochemical identification for most Brazilian isolates. All *Nocardia* isolates showed susceptibility to trimethoprim-sul-famethoxazole, the antimicrobial of choice in the treatment nocardiosis. *N. nova* isolated from different clinical specimens from one patient showed identical antimicrobial susceptibility patterns and two distinct clones. CONCLUSIONS/SIGNIFICANCE: Although Brazil is the world's fifth-largest country in terms of land mass and population, pulmonary, extrapulmonary and systemic forms of nocardiosis were reported in only 6 of the 26 Brazilian states from 1970 to 2013. A least 33.8% of these 46 cases of nocardiosis proved fatal. Interestingly, coinfection by two clones may occur in patients presenting nocardiosis. *Nocardia* infection may

be more common throughout the Brazilian territory and in other developing tropical countries than is currently recognized and MLSA should be used more extensively as an effective method for *Nocardia* identification.

1062 MAJDZADEH, R.; RAHMANI, K.; NASEHI, M. **What is the share of the country's researches in Iran's national tuberculosis guideline?** *Iranian Journal of Public Health* (2013) **42** (12) 1405-1413 Tehran, Iran; School of Public, Health and Institute of Public Health Research, Tehran University of Medical Sciences [En, 31 ref.] Dept. of Epidemiology and Biostatistics, School of Public Health, Tehran University of Medical Science, Tehran, Iran. Email: mnasehi@yahoo.com

BACKGROUND: Appraisal of clinical guideline, especially at the national level, has two potential benefits; one is the improvement of quality of care and the second is assessing the impact of research on an applied setting. On the other hand, Tuberculosis (TB) is a major infectious disease which has national guideline in many countries. The present study was performed to assess sources of information and level of evidence in Iran's national TB guideline. This could explore the impact of national research on day by day practice in the health system. METHODS: A list of main "recommendations" of the guideline was explored. Then, in cases that the cited study for any decision was available, the type of study and its evidence level was specified using a standard tool. In addition, the source of information (national/international) was determined. In other cases that no any specific citation was found, the data source of the recommendation was determined by the senior experts in the Center for Communicable Disease Control. RESULTS: Fifteen (48.3%) recommendations of the national guideline, out of 31 reviewed, had clearly cited at least one study. There was just one single national study which was utilized as the basis for the recommendations. All other sources were international guidelines, mainly World Health Organization's, and or international research. CONCLUSION: While, the methodology of the guideline development was not clear enough appropriately; the share of national research in development of the national guideline was insignificant.

1063 ENGELBRECHT, M. C.; RENSBURG, A. J. VAN **Tuberculosis infection control practices in primary healthcare facilities in three districts of South Africa.** *Southern African Journal of Epidemiology & Infection* (2013) **28** (4) 221-226 Johannesburg, South Africa; South African Institute for Medical Research [En, 29 ref.] Centre for Health Systems Research and Development, University of the Free State, Bloemfontein, South Africa. Email: engelmc@ufs.ac.za

South Africa has one of the highest incidence of tuberculosis in the world, which can partly be attributed to poor infection control in public healthcare (PHC) facilities. The aim of the study was to explore the extent of tuberculosis and infection control training, as well as facility-level managerial, administrative, environmental and personal protection, infection control measures, at PHC facilities. Cross-sectional surveys were conducted at 127 PHC facilities across three districts of South Africa. Data collection was achieved through interviews with tuberculosis nurses, observations of infection control practices and a review of the clinic records. Univariate analysis was performed using SPSSO version 17. Limited implementation of World Health Organization infection control measures was identified. In terms of facility controls, 43.3% of the clinics did not have an infection control committee and 40.9% did not have a clinic specific infection

control plan. In terms of administrative controls, 94.5% of clinics did not have the tuberculosis signs and symptoms screening tool, 48.8% did not separate coughing patients from other patients, and only 35.4% provided coughing patients with masks or tissues. In terms of environmental controls, only 18.9% of the clinics had an open window register. In terms of personal protection, there was a dire shortage of N95 respirators. In addition, only a third of the professional nurses and one in 10 community health workers had received training on infection control practices. Tuberculosis infection control training for PHC clinic staff, as well as the appropriate implementation of simple and inexpensive infection control measures, is required.

1064 COBAN, A. Y.; UZUN, M. **Rapid detection of multidrug-resistant *Mycobacterium tuberculosis* using the malachite green decolourisation assay.** *Memorias do Instituto Oswaldo Cruz* (2013) **108** (8) 1021-1023 Rio de Janeiro, Brazil; Instituto Oswaldo Cruz [En, 20 ref.] Department of Medical Microbiology, Medical School, Ondokuz Mayis University, Samsun, Turkey. yilmazden@hotmail.com

Early detection of drug resistance in *Mycobacterium tuberculosis* isolates allows for earlier and more effective treatment of patients. The aim of this study was to investigate the performance of the malachite green decolourisation assay (MGDA) in detecting isoniazid (INH) and rifampicin (RIF) resistance in *M. tuberculosis* clinical isolates. Fifty *M. tuberculosis* isolates, including 19 multidrug-resistant, eight INH-resistant and 23 INH and RIF-susceptible samples, were tested. The sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and agreement of the assay for INH were 92.5%, 91.3%, 92.5%, 91.3% and 92%, respectively. Similarly, the sensitivity, specificity, PPV, NPV and agreement of the assay for RIF were 94.7%, 100%, 100%, 96.8% and 98%, respectively. There was a major discrepancy in the tests of two isolates, as they were sensitive to INH by the MGDA test, but resistant by the reference method. There was a minor discrepancy in the tests of two additional isolates, as they were sensitive to INH by the reference method, but resistant by the MGDA test. The drug susceptibility test results were obtained within eight-nine days. In conclusion, the MGDA test is a reliable and accurate method for the rapid detection of INH and RIF resistance compared with the reference method and the MGDA test additionally requires less time to obtain results.

1065 COSTA, R. D.; MENDONCA, V. A.; SORIANI, F. M.; LYON, S.; PENIDO, R. A.; COSTA, A. M. D. D.; COSTA, M. D.; TERRA, F. DES.; TEIXEIRA, M. M.; ANTUNES, C. M. DE F.; TEIXEIRA, A. L. **Serial measurement of the circulating levels of tumour necrosis factor and its soluble receptors 1 and 2 for monitoring leprosy patients during multidrug treatment.** *Memorias do Instituto Oswaldo Cruz* (2013) **108** (8) 1051-1056 Rio de Janeiro, Brazil; Instituto Oswaldo Cruz [En, 38 ref.] Santa Casa de Misericordia de Belo Horizonte, Belo Horizonte, MG, Brazil. Email: vaafisio@hotmail.com

Leprosy is an infectious and contagious spectral disease accompanied by a series of immunological events triggered by the host response to the aetiologic agent, *Mycobacterium leprae*. The induction and maintenance of the immune/inflammatory response in leprosy are linked to multiple cell interactions and soluble factors, primarily through the action of cytokines. The purpose of the present study was to evaluate the serum levels of tumour necrosis factor (TNF)-a and its soluble receptors (sTNF-R1 and sTNF-R2) in leprosy patients at different stages of multidrug

treatment (MDT) in comparison with non-infected individuals and to determine their role as putative biomarkers of the severity of leprosy or the treatment response. ELISA was used to measure the levels of these molecules in 30 healthy controls and 37 leprosy patients at the time of diagnosis and during and after MDT. Our results showed increases in the serum levels of TNF-a and sTNF-R2 in infected individuals in comparison with controls. The levels of TNF-a, but not sTNF-R2, decreased with treatment. The current results corroborate previous reports of elevated serum levels of TNF-a in leprosy and suggest a role for sTNF-R2 in the control of this cytokine during MDT.