Meeting Summary of the International Migration Symposium:

“International Tuberculosis Screening Standards and Strategies for Migrants Entering Lower Burden Countries”
(Addressing TB control and elimination among migrants and assisting source countries)

Participants:

Redentor Asis, MD, Philippines  Raj Kumar Songa, MD, India
Poonam Dhavan, MD, MPH, Philippines  Thomas Stuebner, MSPH, USA
Paul Douglas, MB, BS, FRACMA, Australia  Tamara Tayeb, MD, Saudi Arabia
Ahmed Raza Jan, MD, Pakistan  Patrick Theriault MD, Canada
Seiya Kato, MD, Japan  Luis Todd, MD, Mexico
Li Li, MD, China  Justin Waring, MB, BS, FRACP, Australia
Davide Mosca, MD, Switzerland  Dominik Zenner, MD, United Kingdom
Kathleen Moser, MD, MPH, USA

Speakers (did not participate in discussion):

Drew Posey, MD, MPH, USA  Erika Willacy, MPH, USA

Abstract

On 15 March 2014, a group of key stakeholders-- leaders and experts on tuberculosis (TB), migrant health and immigration screening guidelines -- met in Cape Town, South Africa, to discuss international TB screening standards and strategies for migrants entering low burden countries. Speakers presented evidence on the effectiveness of current screening practices that drew from domestic surveillance data, overseas operations research and expert knowledge. The objectives of the meeting were to discuss the importance of: 1. premigration screening among migrants as an important public health measure for receiving countries; 2. the impact and effectiveness of current screening algorithms of migrants; and 3. multiple perspectives on unified standards. The group reviewed published literature and weighed evidence on screening tools for active and latent tuberculosis.

Background

Tuberculosis is associated with migration from high incidence areas, as well as other socioeconomic and biological risk factors. Low and medium burden countries now face a growing majority of TB cases among foreign-born immigrants and refugees from endemic countries. Addressing TB among migrants is a key issue for TB elimination in lower burden settings and can help to inform and elevate programmatic standards of control in higher burden settings.

Global migration of populations has dramatically increased in recent decades due to ease of travel and a changing global economy. Long- and short-term migration due to immigration, work and education poses challenges in determining the necessity and degree of TB screening as it might impact public health in the receiving country. Migrants often travel back and forth between their countries of origin and resettlement, which further complicates migration and highlights the importance of linkages to good TB control in source countries with preventive processes in receiving countries. Migration screening requirements (pre-entry or at-entry) of long- and short-term migrants entering different lower TB burden countries vary considerably between receiving countries, yet these are often performed by the same Panel Physician.
sites, making screening complex. Diagnosis of TB disease and management of the individual migrant is a major benefit of these programs, where priorities for screening are primarily based on preventing the entry of active contagious tuberculosis. Screening programs have evolved more recently to include the diagnosis and treatment of pan-susceptible and multi-drug resistant TB, as well as diagnosis of latent TB infection (LTBI) (per US 2007 CDC Technical Instructions, TB screening program in Norway).

Australian surveillance data and recent publications from the UK and the USA (Pareek and Walter respectively) consistently show the importance of TB prevention in migrants entering with LTBI since these studies demonstrate that the majority of TB cases develop from post-entry TB reactivation and not from the entry of active TB. Therefore, there is a growing recognition of the importance of LTBI diagnosis and preventive treatment among migrants as an integral part of TB elimination in lower burden countries.

International migration screening experts from the Immigrant and Refugee Health Working Group (IRHWG) have discussed the development of uniform global migration standards for public health screening programs. Consistent screening guidelines across countries would enable Panel Physician sites to meet public health standards of all receiving countries while maximizing program efficiency and delivering the highest standard of care to migrants. Shared international protocols and standards would allow for participating countries to pool resources to support migrant health through improved quality, consistency, ethical standards, diagnostics and data, which can in turn inform World Health Organization (WHO) and national TB control programs.

Many Panel Physician sites now have outstanding surveillance capacity, state-of-art TB laboratories (capable of sputum smear, culture, drug susceptibility and interferon gamma release assay testing) and program staff trained in Directly Observed Therapy (DOT) delivery and standardized tuberculin skin testing that rival the best TB control programs in the world. The convergence of the growing capacity of Panel sites and the development of uniform international migration TB standards may represent a unique and unprecedented opportunity to improve tuberculosis control locally while contributing to TB elimination globally.

**Meeting Description**

The meeting participants and stakeholders included:

- Panel Physicians from Mexico, China, the Philippines, India and Pakistan
- Representatives from the Immigrant and Refugee Health Working Group (IRHWG) from the governments of Australia, Canada, the United Kingdom and the United States of America
- Delegates from TB control programs in Japan, Saudi Arabia, Australia and the USA
- Migration health experts from Switzerland and Philippines

Participation of representatives from CDC’s Division of Global Migration and Quarantine was limited to presentations. CDC had no part in setting the agenda of the meeting and did not participate in the structured discussions that followed presentations.

Logistics and other engagements prevented the involvement of accepted invitations from International Centre for Migration, Health and Development; World Health Organization (WHO) Stop TB Programme; and European Centre for Disease Control, all who have asked to be included in the meeting outcome documentation.

The symposium was sponsored by the International Panel Physicians Association (IPPA) and supported by QIAGEN, who provided logistic and organizational support as well as assistance with travel for some participants. Honoraria were not offered to any participants.
The meeting was co-chaired by Dr. Luis Todd, IPPA President and Panel Physician from Mexico, and Dr. Paul Douglas, Chief Medical Officer of the Department of Immigration in Australia, who presided over presentations on international immigration screening strategies and their effectiveness. Presentations were followed by structured discussion from the perspectives of migrant health experts, public health policy leaders, and Panel Physicians.

**Presentations**

**Dr. Paul Douglas**  
Chief Medical Officer and Global Manager Health  
Department of Immigration and Border Protection, Australia  
*International Screening Protocols and Effectiveness*

Dr. Douglas provided an overview of current tuberculosis (TB) international screening goals, their procedures, status of quality assurance and evidence of effectiveness. The most important public health priorities of TB screening are early identification and treatment, detection of new infections in contacts and targeted screening in high-risk groups.

Prevention, especially in the context of migrant health, is an important public health priority with benefits for both countries which send and receive migrants, incorporating early identification followed by effective and ethical treatment. In general, receiving countries have low and decreasing rates of TB but have observed an increase in the percentage of TB cases born overseas. Detection of multi-drug resistant TB (MDR) is often a weakness for TB programs with about 25% of MDR cases going undiagnosed. Emerging drug resistance doubled globally between 2011 and 2012.

Dr. Douglas explained that these phenomena, combined with increasing global travel and mobility, emphasize the need for strategic and effective immigration screening practices. He went on to outline international policy and recommendations from the WHO. The main aim of systematic screening for active TB is to ensure active TB is treated and to reduce poor outcomes and transmission. Dr. Douglas focused on Recommendation 7 of the recently published WHO principles and recommendations for *Systematic Screening for Active TB*, which states that screening may be considered for subpopulations with high levels of undetected TB (>1% prevalence), and for other subpopulations, including migrants. “Premigration screening requires special consideration since migrating populations may not be considered high-risk in their country of origin but are high-risk in destination country”.

Dr. Douglas discussed the general framework on TB and migration (per WRPO), which applies four components to specific populations to propose actions as described in WHA resolution 61.17. The principles of the general framework are: (1) monitoring migrant health, (2) policy and legal framework, (3) migrant sensitive health systems and (4) partnership (networks and multi-country frameworks). To guide screening, the principles and actions of the general framework are to be applied to specific migrant populations, including internal migrants, casual cross-border migrants, refugees and other displaced populations, labor migrants and irregular migrants.

Many factors influence screening including low incidence rates in receiving countries, cost versus benefit and variable sensitivity and specificity of tests. Other sensitivities include real or perceived discrimination, potential corruption, reactivation of latent TB and the role of poor living conditions. Dr. Douglas outlined six opportunities for screening: pre-entry/premigration, port of arrival, transit center, community post arrival screening, occasional screening in the community and follow up screening.
To discuss effectiveness of screening strategies, Dr. Douglas cited a comparative analysis of TB immigration screening programs from selected countries with high immigration and low TB rates (per Alvarez 2011). Temporary residents represent a significant source of TB, with most cases arising 2-3 years after arrival. Screening yield varied by country from 0.05% (Canada) to 0.22% (New Zealand). Among non-EU countries premigration screening had the highest screening yield (1.21%). Dr. Douglas pointed out that no two countries had a common approach and that cooperation between countries on research would be an asset to improve screening algorithms and make programs more evidence based. Without a program to manage LTBI in new arrivals, immigration screening of active PTB will have a limited impact.

**Dr. Justin Waring**  
Medical Director  
Western Australia Tuberculosis Control Program  
Chair, National Tuberculosis Advisory Committee, Australia  
*Migration and Tuberculosis in Australia*

Dr. Waring stated that migration is the crux of TB control in low incidence countries. Similar to the US, the percentage of TB among native-born citizens is decreasing, while the percentage of foreign-born cases is increasing. In Australia, 86%-88% of TB cases are born overseas. Both prevalence of disease and volume of migration affect TB rates. Nine out of the top ten countries that send immigrants to Australia are considered to have a high-burden of TB. Immigrants are represented by permanent residents, overseas students, refugees and others (predominately skilled laborers) and unauthorized entrants (54% of which are permanent; 46% are temporary).

A common misconception is that only people who are immunocompromised get TB, but most cases of TB among immigrants to Australia are found in young, fit healthy people who migrate for temporary purposes. In native Australians, most cases are found in older populations. Similar to other countries, Australia’s data shows that most immigrants develop TB within the first 4-5 years post-arrival, with a spike in rates during later years. Still, the risk of TB in migrants and current immigrants persists, as 38% of immigrants develop TB 10 years after arrival. Most of the older immigrants who develop TB are from Europe.

Many overseas students come from high-burden countries and represent the cases of TB which develop 4-5 years post-arrival. Education can be considered Australia’s third largest export, and is therefore an important source for tuberculosis in Australia. TB in health care workers (HCW) increased from 2002-2009, with the vast majority of cases detected in migrant HCWs.

Dr. Waring spoke at length about the dynamics of unauthorized maritime arrivals in Australia, which are somewhat unique because of Australia’s proximity to high-burden countries, such as Papa New Guinea, and the simple fact that Australia is an island. The mode of arrival of has implications for the post-migration health undertaking. Migrants who have abnormal premigration CXRs are assigned to health undertaking at receiving country clinics.

Dr. Waring described the 12-month report on pre-entry screening results of migrants from 2009-2010. 519 total cases were detected and a prevalence rate of 137 per 100,000 was found among the foreign-born compared to 6.1 per 100,000 among the native born population. Of cases found, by country 22% were from the Philippines, 17% from India, 17% from Vietnam and 8% from China. Most cases were of pulmonary TB detected by chest X-ray and many were culture negative.
Dr. Waring stated that there is a need for better and more comprehensive research on screening strategies. Changes in policy and politics have an impact on screening in Australia, and finding TB among migrants is critical for TB control.

**Dr. Dominik Zenner**  
Consultant Epidemiologist, Head of TB Screening Unit  
Public Health England  
Colindale, United Kingdom

*Tailored pre- and post-entry TB screening strategies for UK migrants*

Dr. Zenner described the epidemiology of tuberculosis in the United Kingdom and described current standards for pre- and post-entry screening. Although long-term trends of TB are currently stable in the UK (13.9 per 100,000), the number of cases and rate of TB have been increasing until 2006. Rates may fluctuate due to migration patterns and similar to the US, concentrate in certain urban centers and among particular high-risk groups. In the UK, NICE recommendations guide screening for high-risk populations.

Dr. Zenner reviewed the breakdown of immigrants to the UK by country of origin, as well as reason for immigration. The majority of TB in the UK occurs among migrants from high-burden countries. He described higher rates and case numbers among non-UK born compared to a lower rates among residents born in the UK.

The United Kingdom is drafting an updated TB screening strategy while considering migrants as a target population for LTBI screening. Current guidelines in the UK require pre-entry screening by Panel Physicians and follow-up LTBI screening post-arrival for applicants from high-burden countries. Dr. Zenner cited an unpublished systematic review that analyzed LTBI screening yields based on published papers of pre-entry screening schemes (R. Aldridge et al.). The findings varied by country and correlated with strata defined by WHO prevalence rates in the country of origin. However, UK visa applicants may not be representative of the country as a whole and expected rates for persons arriving from Somalia may be much higher than those from South Africa. This may be due to population differences in socioeconomic status of different migrant groups.

Dr. Zenner reviewed data from IOM clinics of 696,014 migrants from 2006-2013 who had abnormal CXR findings. Twenty nine thousand and seventy one people had an abnormal chest x-ray, and 578 cases of active TB were found with an increased screening yield likely due to sputum cultures.

Dr. Zenner mentioned that although pulmonary TB cases detected through pre-entry screening probably impacts on UK epidemiology, about 70-80% of cases that are diagnosed post-entry are the result of reactivation of LTBI. The majority of cases are detected within the first few years of arrival, but foreign-born populations can still be at risk ten years after arrival.

He reviewed literature on the cost-effectiveness of different screening strategies and cited two studies from the UK. One multicenter cohort study examined the cost-effectiveness of different cut-offs for incidence rate (Pareek et al.). The analysis showed that LTBI screening for immigrants from countries with a lower TB incidence threshold would have a lower yield and lower cost-effectiveness. The most cost effective threshold is screening populations from countries with TB rates > 250 per 100,000, but this would lead to too many missed LTBI cases. The UK therefore recommends post-entry screening with primary care organizations for immigrants from countries with TB rates greater than 150 per 100,000. Once in the UK, the actual decision for TB screening is determined by localities.

The second study analyzed the proportion of high and low tuberculosis (TB) burden primary care organizations (PCOs) that undertake further screening action in new immigrants who are referred for
LTBI screening. Paradoxically, localities with a higher burden of TB were less likely to screen for LTBI than were low-burden localities. More national coordination of LTBI screening practices is necessary to improve efforts.

TB rates in the UK are increasing and continue to be relatively high. The highest proportion of cases is among immigrants from countries with a high burden of TB. Two screening programs are being implemented in the UK to target newly arrived immigrants from countries with high TB incidence rates. A preliminary meta-analysis showed cost-effectiveness of pre-entry screening is linked to screening yields and systematic quality assurance. Public Health England guides national post-entry LTBI screening for migrants from countries with a TB incidence rate of ≥ 150 per 100,000, however more work is needed to implement national LTBI screening guidelines.

Dr. Drew Posey
Team Leader
Medical Assessment and Policy Team, Immigrant Refugee and Migrant Health Branch
Centers for Disease Control and Prevention, United States
*Migration and Overseas Tuberculosis Control*

Dr. Posey described an increasing in-flow of international migrants. Certain destination countries in North America (e.g., USA), Western Europe (e.g., UK) and the Middle East receive higher proportions of immigrants compared to other countries. In the US, TB rates have risen steadily since 1992, and in 2012, 63% of all TB cases occurred among the foreign-born.

Some of the top source countries for immigrants to the US have a high burden of TB disease. In the US, TB rates are declining overall, but the percentage of cases among foreign-born immigrants is increasing. Immigrants to the US are comprised of: refugees (60,000), immigrants (>1 million), non-immigrants, such as tourists and students (43 million) and other-undefined (122 million). The top five source countries for immigrants to the US are: Mexico, China, Philippines, India and Vietnam -- accounting for 54% of the foreign-born population in the US. During 2009-2010 there was a shift in source countries of immigrants and refugees to the US. The immigrant population shifted from predominately Hispanic origins to a majority from Asian origins. Refugee populations who had previously tended to originate in Europe now come predominately from countries in the Middle East.

Dr. Posey reviewed the *CDC Tuberculosis Technical Instructions for the Examination of Aliens*, which guides screening and treatment practices for US bound immigrants and refugees. The 2007 Technical Instructions (TBTIs) changed the screening algorithm from CXR and sputum-based detection to culture-based detection and ATS treatment standards using DOT. This change was based on a study that showed that smear-based case finding was only 34% sensitive compared to a “gold standard” which used sputum cultures (per Susan Maloney et. al., Arch Intern Med. 2006; 166:234-240). The 2007 TBTIs introduced LTBI screening with TST in children 2-14 in age in countries with a WHO-estimated TB incidence rate of ≥ 20 per 100 000. In 2009, IGRA was added as an alternative-screening test to TST.

The 2007 TBTIs were implemented and currently guide 608 Panel Physicians from 339 sites in 151 countries who perform overseas screening for US-bound immigrants and refugees. Dr. Posey discussed the implementation strategy, which initially focused on large-volume, high-burden source countries with the goal to implement in all countries. IRMH worked “in country” to develop the laboratory culture capacity and DOT infrastructure and to link Panel Physician programs with broader control efforts. Dr. Posey cited a study that found domestic financial returns are higher with overseas investment in TB control efforts (e.g., developing and improving laboratory practices and capacity) compared to improving screening algorithms alone (per Schwartzman).
The DOT capacity at Panel Physician screening sites reinforces the international standards for treatment delivery and trains health workers globally in DOT. During 2012, Panel Physicians diagnosed greater than 1,100 applicants with tuberculosis. Sixty percent of cases were smear-negative, culture-positive and represent the gain in diagnostic yield with the new TBTI. An early analysis of implementation efforts overseas showed steep decline in TB rates in California and New York (per IJTLD 2011;15(6):761-6). This can be estimated as annual savings by US health departments of greater than $20 million. The recent decreased rates of TB in foreign-born persons (within 1 year of arrival) and the increased number of persons diagnosed overseas suggests a causal relationship between the implementation of TBTI and the decline.

In summary, international migration is increasing and is a priority for receiving countries. Rigorous diagnostic and treatment can translate into more effective TB control, and efforts should be focused on these migrating populations in order to achieve global TB elimination goals.

Dr. Kathleen Moser
Director
San Diego County Tuberculosis Control Program and Refugee Health Program
California, United States

Outcomes of Panel Screening of Immigrants after US Arrival

Dr. Moser began by discussing the epidemiology of tuberculosis in the United States. Similar to the UK perspective, TB cases in the US are found in concentrated pockets with some areas experiencing little or no cases. Both situations present a challenge to address cases of TB with regard to resources, budget and capabilities. Overall, case rates have been declining but are higher among foreign-born populations. Dr. Moser reviewed an epidemiologic modeling study of TB (per Hill) that examined what is needed to reach TB elimination or 1 case per 1 million population. Reduction of 50% or 75% could only occur if LTBI screening and treatment efforts in the US were doubled or quadrupled, and accompanied by reduced importation of LTBI among foreign-born. According to Hill, even if imported LTBI were reduced by 50%, TB elimination would still not be attainable by 2020. Investment in foreign countries is needed to reduce TB and reach elimination in the US.

Dr. Moser mentioned that in the US, there is no national strategy or requirement for post-entry screening or follow-up for LTBI ‘Class B1’ or ‘Class B2’ or ‘Class B3,’ collectively B-classified cases. Some programs repeat the TST or IGRA test while others accept the overseas screening result. LTBI treatment is offered when the result is positive, but treatment is not mandatory and new arrivals can opt out. When immigrants enter the US with an abnormal CXR, a repeat CXR is done to determine if there have been any changes and three sputum samples are collected for smear and culture. Since the implementation of the TBTIs, the case finding rate is only 1%. New screening algorithms allow for the reporting of old “healed” TB, which carries high risk for progression to active disease. Receiving TB control programs are notified of these cases, which are prime candidates for preventive therapy.

Dr. Moser reviewed the algorithm used at San Diego TB Control for screening immigrants who are ‘Class B’ for tuberculosis and their outcomes. Of all immigrants who had Class B diagnosis for TB, 70% had an evaluation, which found that 1.3% had active TB, 23% had LTBI and 75% had no evidence of TB infection.

State TB programs in the US are impacted by flat-funding formulas, which are diminished further due to decreasing purchasing power over time. In addition, the formula funding approach used by the CDC does not include evaluation of immigrants with LTBI B-classifications. Since 2010, the evaluation rates of immigrants with B notifications have been dropping, with only 50%-60% completing evaluation.
In San Diego, 30%-40% of immigrants with LTBI B-notifications (B2 and B3) who are re-tested using IGRA are found positive for latent infection. A similar analysis of California state data was done and showed that increased use of IGRA has decreased the positivity rate by 40%. The data indicated that if panel sites use IGRA, only 23% of those with positive TST would be positive by IGRA, significantly reducing the need for follow-up. There is consistency of IGRA/TST results discordance although differences by country may result in bacillus-Calmet Guerin (BCG) vaccination practices. Among Filipino immigrants, only 15% of those with a positive TST were found positive by IGRA. With Mexican immigrants, the discordance is lower but would have reduced domestic follow-up in that group by 25%-30%.

Dr. Moser described how parents of immigrant children referred for follow up in San Diego county have been consistently willing to pay $69 USD for an IGRA because they understand the value of specificity and concept of “false treatment.”

Dr. Moser cited two examples of challenges of domestic follow-up of B-classified immigrants. Multiple interventions and resources are sometimes needed to bring in non-adherent patients, who may ultimately refuse preventive treatment. In many instances, how to follow up a contact of an active TB case is a source of confusion. Data on the source case is frequently lacking and patients cannot identify who may have been their primary exposure. Challenges arise even when patients consent to treatment, since toxic side effects can occur that require intensive patient management when alternative drug therapy is introduced.

Dr. Moser questioned the possibility of overseas treatment for immigrants with LTBI from high-burden countries using new short-course regimens (12 dose INH-rifapentine) (per MMWR December 9, 2011/60(48)1650-1653).

She noted that a large proportion of TB cases among migrants are not being addressed by pre-entry screening. She cited a study on the impact of newly arrived immigrants on TB rates in the US, which found that 37% of cases are attributed to students and short-term workers (per Liu). The study analyzed 11,500 cases of TB which occurred during first year of arrival. Forty-two percent (4,783) were among immigrants and refugees, 37% (4,211) among students/temp workers, 14% (1,589) among tourists/business travelers and 7% (834) among non-I-94 visitors (e.g., Mexico, Canada) (per Liu).

To address some of the gaps and challenges recognized by the TB control community, the CDC’s Advisory Council for the Elimination of Tuberculosis (ACET) has introduced a resolution to expand pre-entry screening to H1-B work visas and their families. ACET also resolved for CDC to modify the Technical Instructions for Panel Physicians to require the use of an IGRA test for all persons with a history of BCG vaccination or from a country known to have high coverage rates of BCG in their country’s population.

Dr. Luis Todd
Panel Physician, Medicos de Visas
President, International Panel Physicians Association
Ciudad Juárez, Mexico
State of the Art Panel Sites: Capabilities and Limitations in Mexico

Dr. Todd explained that Mexico provides the largest proportion of foreign-born TB cases to the USA. Many immigrants from Mexico to the USA do not undergo pre-entry screening, including more than 140,000 short-term workers, students and other long-term visitors from Mexico, in addition to many who come on a temporary visitors visa and stay in the country without ever undergoing a medical examination. Dr. Todd feels that the rate of TB among the Mexican born population in the USA truly reflects the rate
of TB within Mexico, as immigration from Mexico tends to be circular. Mexican Panel Physicians screen almost 100,000 permanent immigrants per year.

Dr. Todd mentioned that Mexican Panel Physicians have implemented modern technologies and have mainly focused on screening US-bound immigrants from Mexico. He witnessed the change in diagnosis of TB back in 2007; when Panel Physicians began using direct digital radiography systems in association with rapid liquid culture systems, fluorescent staining methods, molecular biology for identification of species and rapid drug resistance testing as well as developing and implementing a strict DOT program that treats patients based on their drug susceptibility pattern. Before the introduction of cultures, the Panel Physician screening program in Mexico was missing 60% of cases of active TB based on smear positivity alone. Introducing cultures into the screening algorithm has improved detection of positive cases four-fold. In Mexico, the Ministry of Health is still working towards implementing state DOT programs and building laboratory capacity to address drug resistance, and as such sputum culture is reserved only for treatment of failure cases.

According to WHO data, Mexico is not a high-burden country with a reported incidence rate of 15.7/100,000. Panel Physician sites in Mexico find higher rates with an incidence rate of 44/100,000. Between 2007 and 2011 in Mexico 366,968 persons were screened with 9,156 TB suspects, 164 of which were culture-positive for TB.

Mexican Panel Physicians also developed the expertise to perform Interferon Gamma Release Assays and are participating in the CDC’s Task Order #31, which is evaluating the use and predictive value of IGRAs in populations migrating to the US from Mexico, Vietnam and the Philippines. Preliminary data shows the value of their use in immigrants from these countries and thus has helped identify an intervention that will improve TB control locally while also contributing on a global scale.

Dr. Todd showed images of various facilities at Mexican Panel Physician sites, laboratory capacity, DOT program and staff delivering treatment. He also explained that since the 2007 TBTI, Panel Physician program’s introduction of the TB laboratory, several Mexican Microbiologists have been receiving training and are now very proficient with culture systems and species identification. TB clinicians are also being trained with the collaboration of international partners. This is a great example of how Panel Physicians laboratory and DOT capacity can enhance and support National TB Program development.

Dr. Redentor Asis
Panel Physician, St. Luke’s Extension Clinic (SLEC)
Manila, Philippines
State of the Art Panel Sites: Capabilities and Limitations in the Philippines

Dr. Asis described a state of the art panel site in Manila (SLEC) and showed images of the various advancements in laboratory equipment and diagnostic technology, integrated IT and streamlined processes. SLEC is a “one stop shop” across two campuses serving immigrants with modern facilities that process more than 60,000 visa applicants annually, with capacity for 150-210 applicants per week. Training and continued education is a big focus for all staff and is standardized.

SLEC developed its own computerized Medical Screening System integrating all facets of the medical screening process and including fraud-preventing biometric data which makes information fully accessible to all departments.

TB screening is supported by a fully-equipped laboratory capable of sputum culture and drug susceptibility testing (DST). Since using cultures, the majority of diagnosed cases are smear-negative and culture-positive. SLEC screens immigrants for US, Australia, Canada and New Zealand. Dr. Asis
remarked that the major points of difference in screening are age when CXR is required, requirements for contact investigation, and threshold of suspicion for CXR findings. Dr. Asis also commented on the need for international standards or agreement between the 5 governments.

Dr. Asis presented data from SLEC. In 2012, 59,693 applicants were screened with 6,385 (10%) suspected to have TB and having consented to sputum examination. Eleven% (719 out of 6,385) were diagnosed with active TB. Most were diagnosed by culture but 122 were culture-negative. Of those diagnosed with TB, 487 applicants underwent DOT.

Visa applicants from Canada and New Zealand do not have formal requirements for DOT. Pill count and sputum and CXR monitoring are suggested by Canada and undertaken as out-patients by SLEC, although adherence to treatment could not be ascertained for many applicants. Regarding active TB treatment, the DOT program is certified by the Department of Health and the Philippines Coalition Against Tuberculosis (PhilCAT). SLEC has an electronic DOT patient management system which flags patients who missed their appointment. Nurses act as case managers who monitor and electronically track toxicity and drug-o-grams.

Dr. Asis noted that sputum and schedule of chest X-ray monitoring varies by country. Outcomes of active TB treatment in 2012 included 88% of the US applicants with active TB were being enrolled in SLEC’ DOT program, whereas only 29% of Australian visa applicants were being treated under the SLEC DOT. This difference highlighted the various algorithms and instructions by destination country and related to applicants being directed to SLEC for investigation and treatment. However, there is not a formal pricing mechanism to cover this as an all-in-one fee and some applicants decide to access care elsewhere. Of applicants supervised by SLEC, 91.8% were treated to cure, 4% defaulted while under treatment and less than 1% transferred out, mostly for problematic MDR-TB. There were 16 US applicants who had treatment discontinued due to diagnosis of NTM or exclusion of myco.tuberculosis. And, 12.6% had mono-resistance to INH and 2.5% had MDR-TB.

Applicants who are members of migrating families are linked together via MSS, through a family ID code. This allows staff to view contacts for each applicant, enabling the Contact Evaluation Nurse to retrieve the names of the companions of applicants who have TB.

Contact tracing varies by destination country. For contacts of Canadian visa applicants, TST is performed once a source case is identified, while for USA contacts a TST or CXR is repeated on a quarterly basis until end of contact exposure or departure. In 2012, 270 contacts with positive TST were evaluated; 76 were pediatric cases and 18 were adults. Of 194 adult contacts, 43 had CXR suspicious for active TB. There was one applicant who developed active TB (smear-negative and culture-positive) at the 6-month follow-up period. Of the 53 contacts with negative TST results, 35 were pediatric cases and 18 were adults. At the 3-month follow-up, 11 of the 35 pediatric contacts converted to positive although all had normal CXR findings.

In 2012, US applicants aged 2-14 were screened at SLEC using TST. IGRA was available as an alternative but only applied at the applicants’ request due to cost. In this group, 3,022 out of 3,693 (82%) contacts that were traced tested positive by TST (using a cutoff point of 10 mm). Of those with TST positive results, 53 (1.8%) had CXRs suggestive of TB. Additionally 12 (1.8%) of those with negative TST results also had x-rays suggestive of active TB thereby raising the question of the value of the TST in the Filipino population. The TST-negative applicants who had an abnormal CXR had a history of TB treatment were contacts of sputum-positive cases, or were started on anti-TB treatment prior to the medical examination.
Dr. Asis concluded by reviewing some challenges and solutions to TB management at SLEC. Relocation of applicants can limit continuity of treatment and suggested one partner institution for maintenance of treatment as well as agreed financial arrangements. Other limitations are loss to follow up, multiple panel sites and x-ray shopping, cost of treatment and monitoring, MDR-TB and lack of legislative mandates. Solutions include internal and external quality assurances processes and audit recommendations, staff training at all levels, tailored IT system for immigrant medical screening and DOT patient management system.

**Dr. Poonam Dhavan**  
Senior Public Health and Research Specialist  
Migration Health Division, International Organization for Migration  
Manila, Philippines  
*Migrant TB Screening and the International Organization for Migration*

Dr. Dhavan explained that the goal of IOM’s migrant health division is to provide technically sound health screening for migrants. IOM was founded in the 1950’s and works in over 155 countries. IOM physicians have conducted medical exams for over 2.2 million screenings for immigrants and refugees over the past decade. The Migrant Health Division of IOM, amongst other activities, conducts Migrant Health Assessments (MHAs). In 2012, the division screened 116,078 refugees and 153,987 immigrants. TB screening is a key element of the MHA and is contributing to increased TB detection. Overall prevalence rates detected through the screening program are 563 per 100,000, with regional prevalence rates of 934 per 100,000 in Asia, 413 per 100,000 in Africa, 118 per 100,000 in Europe and 17 per 100,000 in the Middle East. Over 2,300 TB cases were found in 2012 with higher rates among subgroups of refugees, males and people from Asia.

US-bound immigrants are screened for LTBI using TST. IOM’s Migrant Health Division screens about 65,000 applicants aged 2-14 annually. Around 7% of immigrants and 11% of refugees under 14 are detected positive for LTBI through this process.

Dr. Dhavan described an unpublished analysis that compared prevalence estimates from MHA screening programs to WHO TB rates. The analysis showed that the active case yield is much higher for MHA programs compared to WHO estimated rates in the countries studied.

IOM is working to increase screening yield through improved diagnostics in radiology, quality control measures, human resources, infrastructure and partnerships in laboratory capacity building. She discussed the need to link with local health systems and form professional networks in source countries. Developments in the informatics system – “Migrant Management and Operational Systems Application” (MIMOSA) has helped to strengthen data collection. Dr. Dhavan also discussed the principles of WHOs framework for migrant health: (1) monitoring migrant health, (2) policy and legal framework, (3) migrant sensitive health systems and (4) partnership (networks and multi-country frameworks).

Dr. Dhavan described some evidence for TB screening programs and continuity of care. She states that IOM’s focus moving forward is to continue to provide core TB screening services, while respecting human rights and ethics. Health Assessments are a tool in global health, while TB is a critical component of migrant health. She cited research on the cost effectiveness of LTBI treatment and of domestic returns on foreign investment in TB control (per Zenner and Schwartzman).

Further integration of migrant health into global TB control efforts is imperative in preparedness for the post-2015 global TB elimination goals. Additional dimensions of TB screening that are without
consensus need to be addressed, such as LTBI screening. TB screening is coherent with WHO pillars of migrant health. The migrant health assessment should align with the public health framework. Dr. Dhavan concluded by saying that IOM hopes to continue to work with international partners, IRHWG and WHO. She mentioned that the IUATLD Migration Working Group might be interested in taking the agenda of this group forward.

**Structured Discussion**

Co-chairs led a structured discussion after conclusion of the presentations. The discussion was centered on the potential for a rationale to create international standards for migration screening and treatment of active TB in this cohort. The participants also considered if there should be a unified migration screening standard for active TB and LTBI.

The group discussed that TB among foreign-born populations in the US is decreasing, which may be correlated with pre-arrival TB screening and other regulations. TB programs in the US target newly arrived immigrants who are Class B (high suspicion for TB, but untreated overseas) because they are an important group for preventative treatment. Reduced rates of TB among foreign-born in the US could be due to positive culture identification overseas, post-arrival LTBI treatment, contact tracing or differences in population groups who are being screened (e.g., change is source countries of immigrants and refugees).

The group discussed validity of testing algorithms and whether the screening strategy should be focused on pre- or post-migration programs. Several participants agreed that standardized patient education and reporting methods would help to improve continuity of care and analyze TB control efforts. This issue raises concern for the ethical treatment, rights, care and involvement of patients. Most participants agreed that efforts should be coordinated but more evidence is needed to guide migrant screening standards.

It was recognized that governments and public health agencies are recognizing the value of immigration screening for global TB elimination and it was noted that this was to be the focus of upcoming discussions with ECDC and WHO in the coming months. It was further noted that increased research efforts in this area would be beneficial to “prove” the case but whatever goes forward in respect to international standards must encompass human factors and ethical principles.

Overall, there was support for linking pre-and post-entry screening efforts and strong interest in developing an LTBI screening and treatment strategy. However, most participants recognized that since LTBI is not transmissible and there is no clear consensus as to who requires treatment or what treatment, developing an agreed process for this is less likely in the immediate future. Some participants supported an international standard but expressed concern for legislative and economic barriers to their achievement.
After the open discussion, the group discussed international standards for TB screening within pre-assigned groups of Panel Physicians, migrant health experts and TB policy experts. Groups discussed the pros and cons of international standards, key components and stakeholders, as well as whom might lead the development of international migration screening standards.

There was agreement among the group that unified standards would ease the burden of reporting and increase the value of shared information. It was felt that the strategy could focus on three specific areas:

1. Active TB
2. Contacts of active TB cases with LTBI
3. LTBI generally

It was emphasized that international migration standards must be evidence-based and there is a need to develop methods to systematically collect and review the data.

Unified standards based on best practices could have a positive public health impact and maximize resources for all involved in these efforts. The group agreed that an unbiased third party should lead efforts in the development of unified standards.

**Action statement**

*This group calls on the Migration Health Committee of the International Union Against TB and Lung Disease (IUATLD) to create a “working group” to lead the discussion, the gathering of evidence and the development of guidelines for screening of TB in migrants, before or at entry. This group recommends that the working group initially focus on establishing a framework for active TB that addresses the WHO post-2015 global TB strategy. A name for the proposed working group should also be agreed upon. This group also calls for the IUATLD to investigate the role of screening for LTBI in this process. This group believes that the “working group” should include TB and migration experts from countries with high volumes of international migrants, Panel Physicians who undertake premigration screening and technical experts, such as from the World Health Organization.*