

Burden of Multidrug-Resistant Tuberculosis Among Immigrants and Refugees to the United States, 2010 - 2013

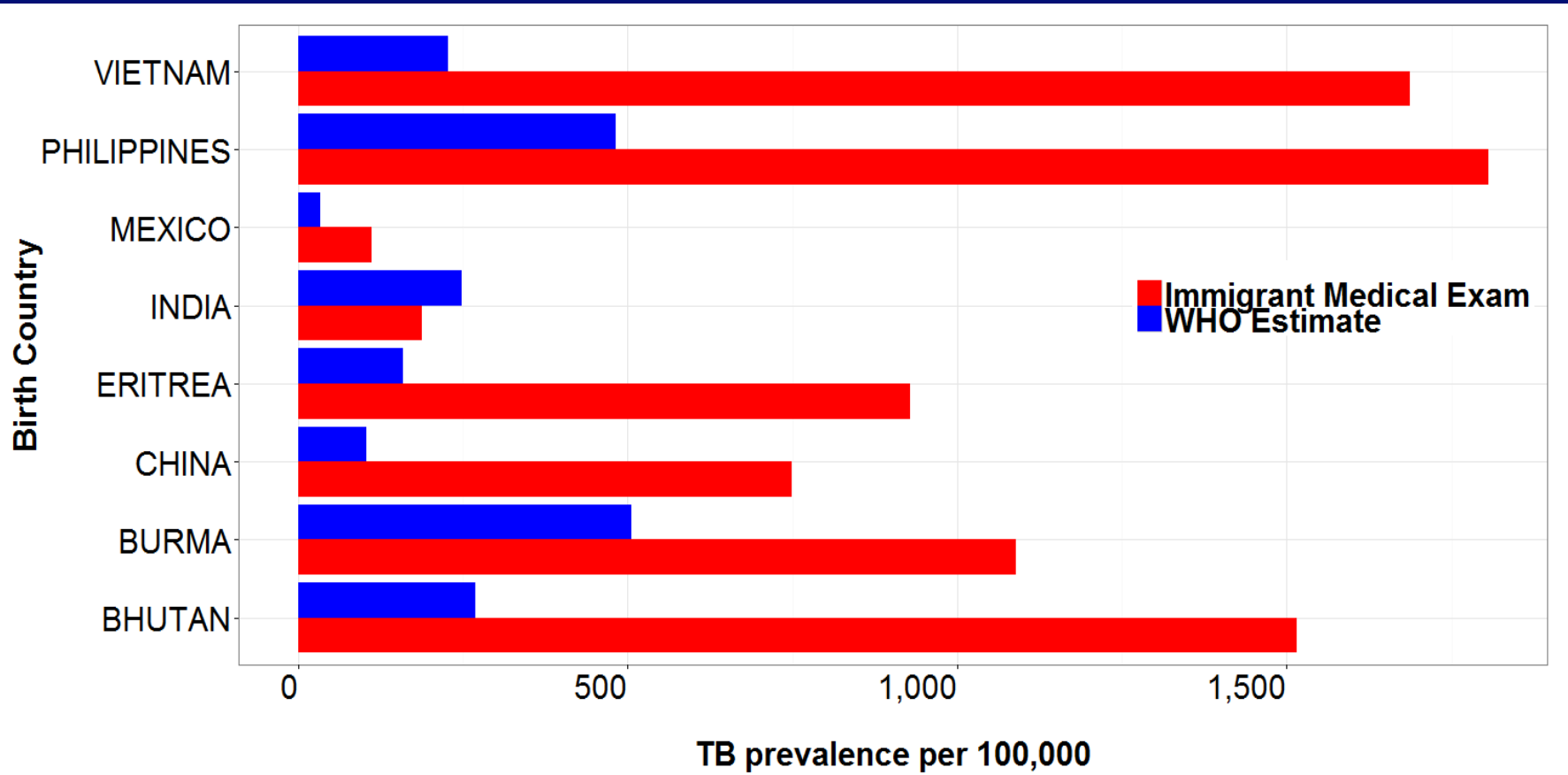
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Centers for Disease Control and Prevention, Atlanta, USA**

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TB Prevalence in Immigrants and Refugees Greater than Country-Specific WHO Estimate



MDR TB Cases Among US-bound Immigrants and Refugees (2010 – 2013)

Immigrants and refugee arrivals: 1,744,623

Refugees: 13%
Immigrants: 87%



TB cases^{**}: 6,806

Refugees: 20%
Immigrants: 80%



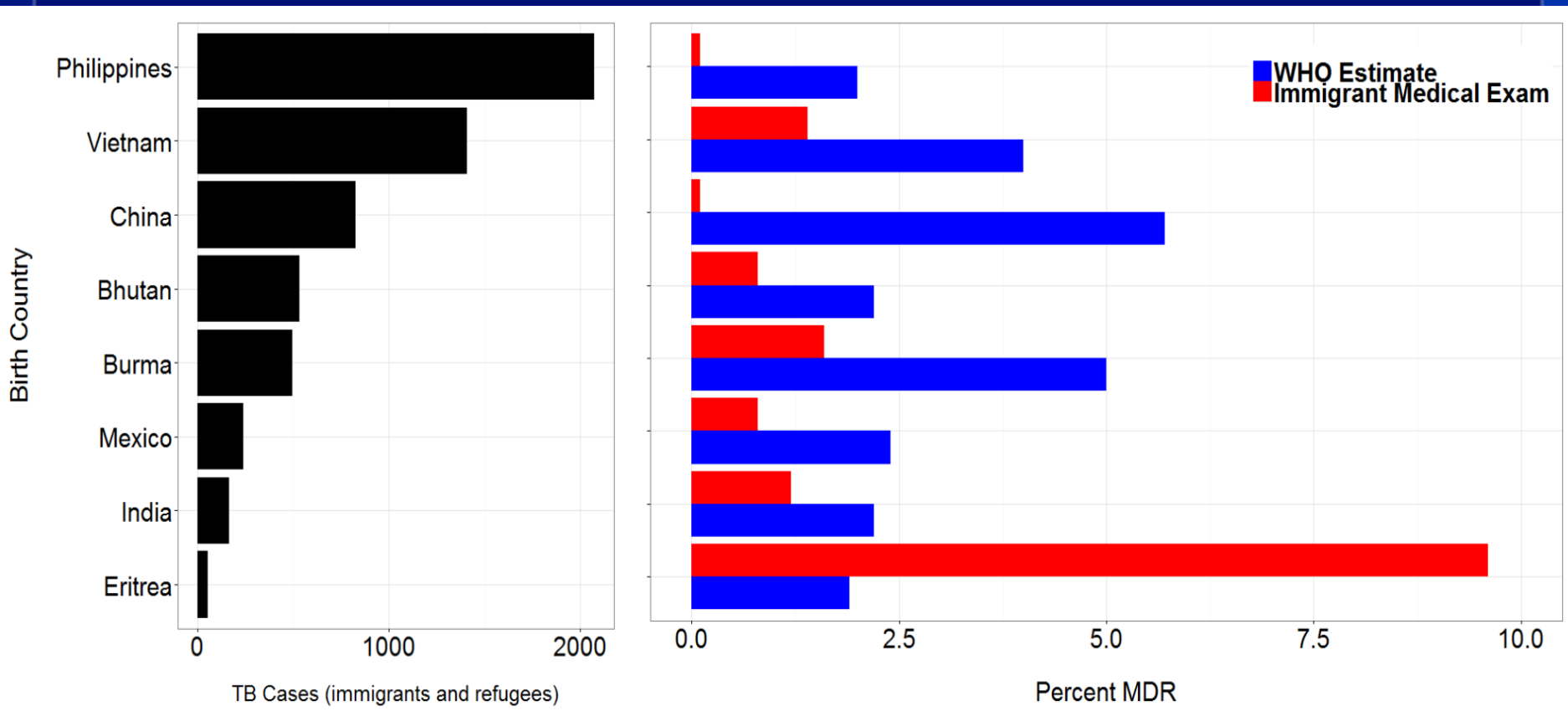
MDR TB cases: 48

Refugees: 40% (19)
Immigrants: 60% (29)

* \geq 15 years of age, arrived from 2010-2013;

** Diagnosed either during pre-immigration or post-arrival TB exams

MDR TB Percent by Country of Birth (2010 – 2013)



Percent MDR TB in foreign-born persons in the US is 1.7% (National TB Surveillance System, 2013; <http://www.cdc.gov/tb/statistics/surv/surv2013/>)

Discussion and Limitations

- **Underestimating MDR TB in immigrants and refugees**
 - Identifying cases through text parsing relies on how exam forms are completed
 - TB and MDR TB cases who defaulted on treatment would not arrive in the US
- **Immigrant and refugee population differ from in-country population**
- **HIV-associated TB in the context of immigration TB screening**
- **Lab-based confirmation of multidrug resistance in immigrants and refugees**
 - Possible some countries may overestimate MDR TB burden

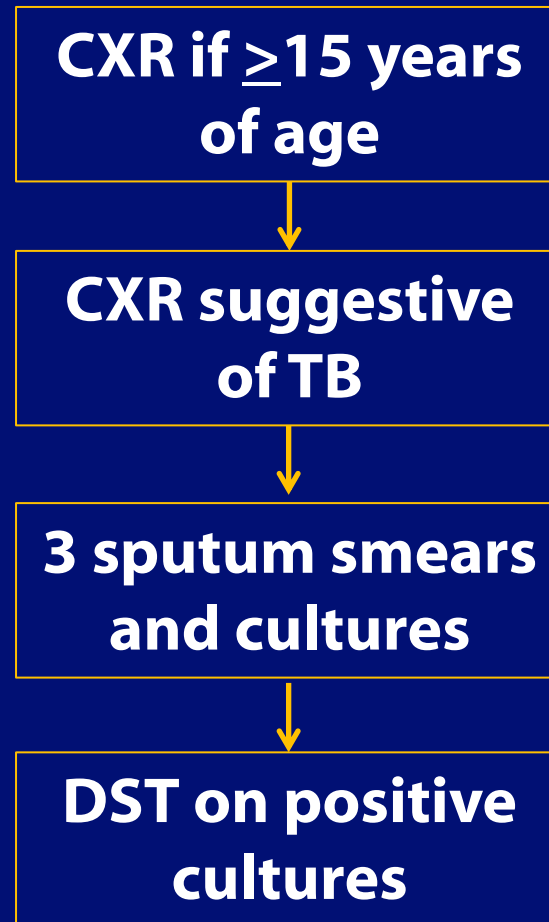
Thank you

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.



Culture-based Tuberculosis Screening for US-bound Immigrants and Refugees

- 2/3rd of TB cases in the US are among foreign-born
- Active screening of refugees and immigrants for TB prior to US arrival



Culture-based TB Diagnosis in US-bound Immigrants and Refugees

Pre-immigration

CXR suggestive of TB



3 sputum smears and cultures



DST on positive cultures

Post-arrival TB exam →

Post-immigration

TST/IGRA

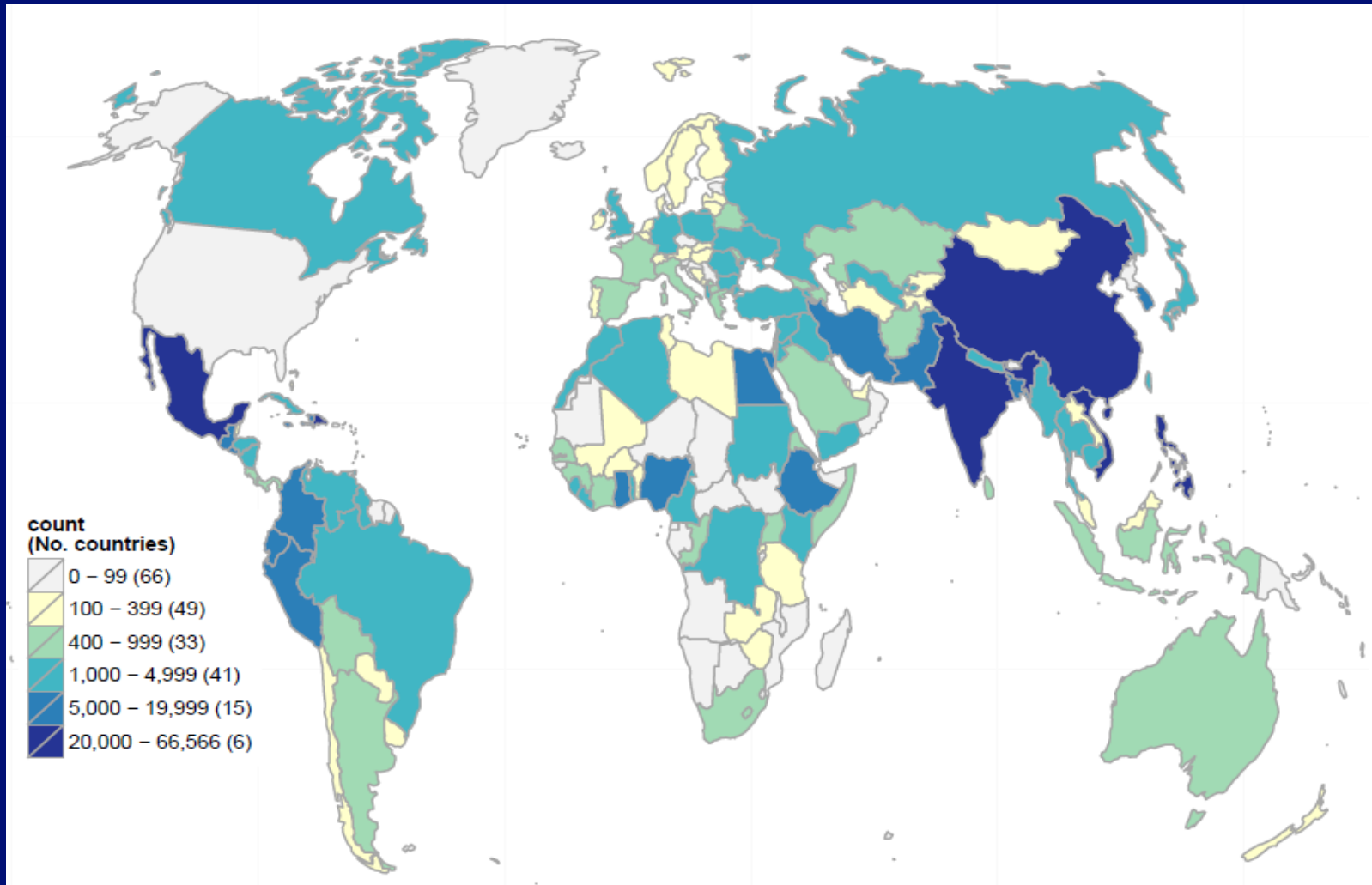


3 sputum smears and cultures



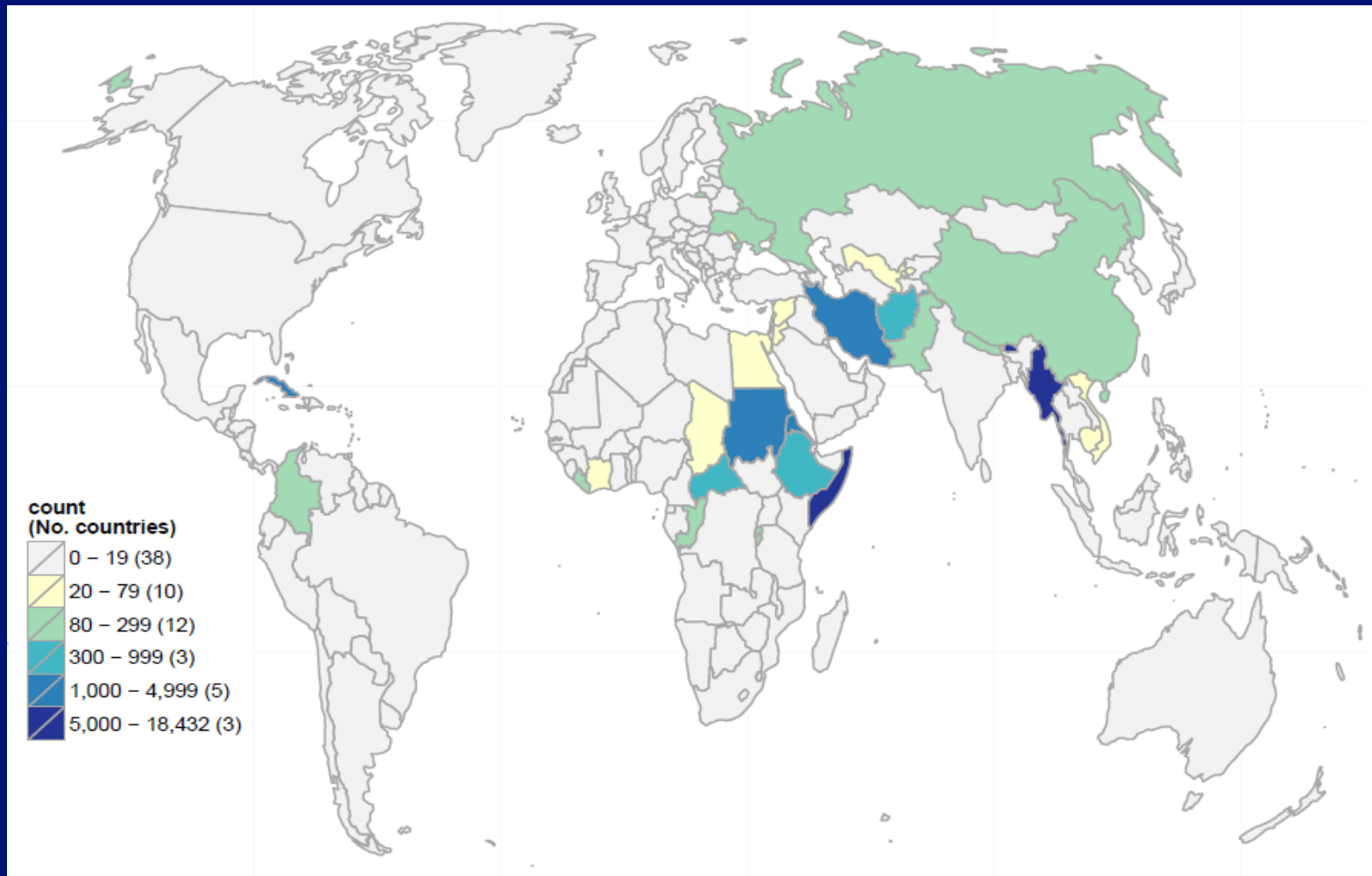
DST on positive cultures

Immigrants Arriving in the United States, 2011



Source: U.S. Department of Homeland Security, Yearbook of Immigration Statistics

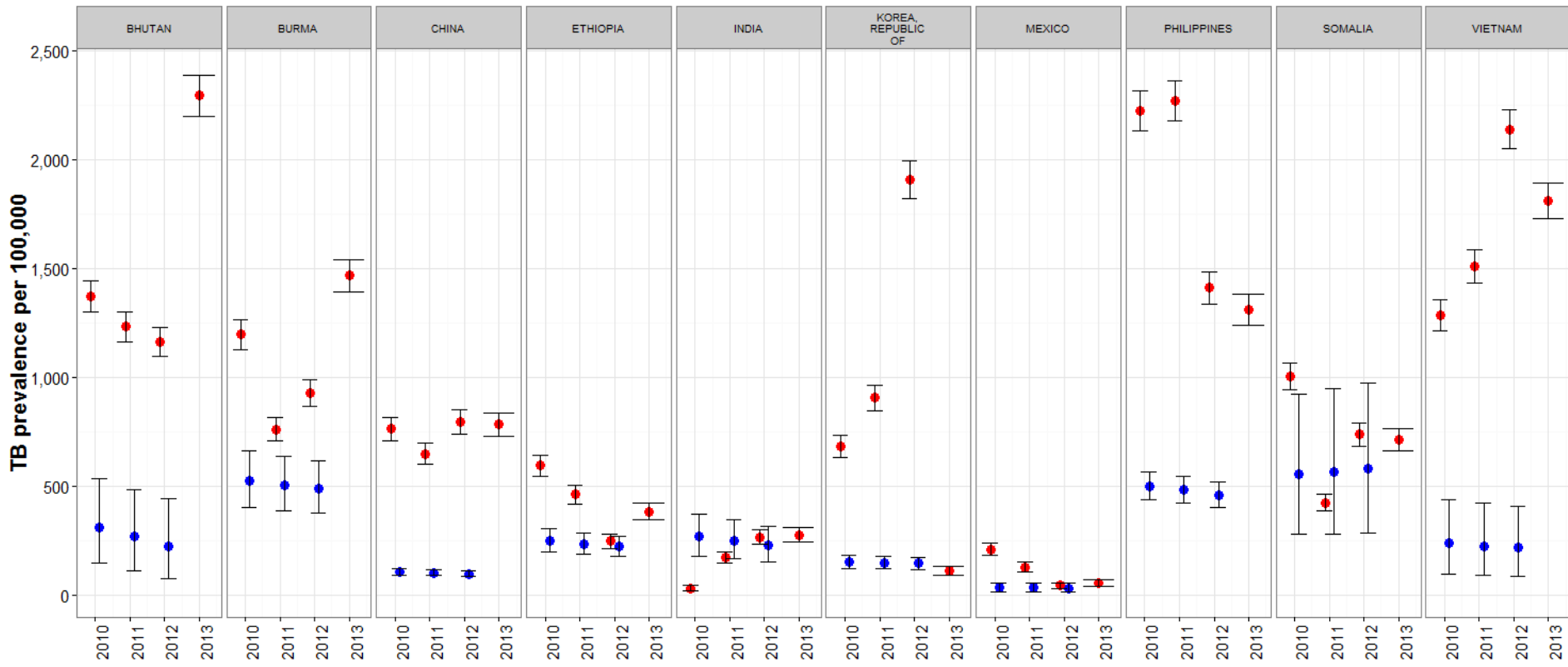
Refugees Resettling in the United States, 2013



Source: Worldwide Refugee Arrivals Processing System, U.S. Department of State

TB Prevalence

Data Source ● Visa Medical Exam ● WHO Estimate



Overseas Health Screening of U.S-bound Immigrants and Refugees

- **Pre-immigration mandatory medical examination**
- **Screen for conditions of public health significance (e.g. – Active TB)**
- **Conducted by physicians, appointed by the U.S Department of State (DoS)**
- **Medical exam findings are recorded on DoS forms**
- **Data from medical exam forms is entered into CDC's Electronic Disease Notification (EDN) system**

Tuberculosis Screening and Diagnosis for Immigrants and Refugees Following Arrival in the United States

- **TB exam in US is recommended <3 months since arrival when diagnosed with following conditions overseas:**
 - LTBI
 - Treated for active TB as an immigrant or refugee
 - CXR suggestive of TB but smear/culture negative
 - Contact of a TB case
- **TB exam in US involves:**
 - TST/IGRA
 - CXR
 - 3 sputum smears and cultures

Identifying Cases of Multidrug-resistant TB from Medical Exam Forms

- Text parsing techniques to identify MDR TB cases-
 - medical history comments, chest radiograph remarks
 - Key words - mdr, multidrug, resistant, multi-drug
 - Misspellings were accounted for in key words
 - Antituberculosis drugs – Use of Group 2 (injectable), 3 (flouroquinolones), AND 4 (bacteriostatic)
 - Negation terms were used to exclude false positive search results
 - Key words - no MDR, contact of a MDR TB case
- Case definition – (Presence of MDR TB key words OR drugs)
AND
Absence of negation terms

MDR TB By Country of Birth

Country	Immigrant status	TB cases* (N= 6,805)	MDR TB cases* (N = 48)	Percent MDR TB	WHO MDR TB Percent
Philippines	Immigrants	2,075	2	0.1	2.0
Vietnam	Immigrants	1,407	19 ⁴	1.4	4.0
China	Immigrants	825	1	0.1	5.7
Bhutan ¹	Refugees	533	4	0.8	2.2
Burma ²	Refugees	493	8	1.6	5.0
Mexico	Immigrants	240	2	0.8	2.4
India	Immigrants	164	2	1.2	2.2
Eritrea ³	Refugees	52	5	9.6	1.9

Note - 1 MDR TB case reported each in Ukraine, Russia, Peru, Moldova, N Korea

1 – Bhutanese refugees living in Nepal; 2 – Burmese refugees living in Thailand and Malaysia; 3 – Eritrean refugees living in Ethiopia; 4 – 1 MDR TB case from Vietnam is a refugee

Source: <http://www.who.int/tb/country/data/download/en/>

Description of MDR TB Cases (N = 48)

Characteristics, n (%)	MDR TB cases (N = 48)	Non-MDR TB cases (N = 6,758)
Age (Years)		
15 - 44	30 (63)	2,931 (43)
45 - 64	14 (29)	2,674 (40)
65+	4 (8)	1,153 (17)
Males, n(%)	28 (58)	3,737 (55)
Refugees	19 (40)	1330 (20)
Camp-based	15 (79)	1,038 (15)

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