Tuberculosis Among Foreign-Born Persons in the United States, 1993-1998

Elizabeth A. Talbot, MD
Marisa Moore, MD, MPH
Eugene McCray, MD
Nancy J. Binkin, MD, MPH

Context Immigration is a major force sustaining the incidence of tuberculosis (TB) in the United States.

Objective To describe trends and characteristics of foreign-born persons with TB and the implications for TB program planning and policy development.

Design, Setting, and Subjects Descriptive analysis of US TB surveillance data from case reports submitted from 1993 to 1998.

Main Outcome Measure Demographic and clinical characteristics of foreign-born persons with TB.

Results The number of TB cases among foreign-born persons increased 2.6%, from 7402 in 1993 to 7591 in 1998, and the proportion of US cases that were foreign-born increased from 29.8% to 41.6%. During 1993-1998, the TB case rate was 32.9 per 100000 population in foreign-born persons compared with 5.8 per 100000 in US-born persons. Six states reported 73.4% of foreign-born cases (California, New York, Texas, Florida, New Jersey, and Illinois). Approximately two thirds of these cases were originally from Mexico, the Philippines, Vietnam, India, China, Haiti, and South Korea. Among those for whom date of US entry was known, 51.5% arrived 5 years or less prior to the diagnosis of TB. Most were male and aged 25 to 44 years. During 1993-1996, the proportion receiving some portion of treatment under directly observed therapy increased from 27.3% to 59.1% and approximately 70% completed therapy in 12 months. The rate of primary resistance to isoniazid was 11.6% and to both isoniazid and rifampin was 1.7%.

Conclusions As the United States moves toward the goal of TB elimination, success will depend increasingly on reducing the impact of TB in foreign-born persons. Continued efforts to tailor local TB control strategies to the foreign-born community and commitment to the global TB battle are essential.

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THE WORLD HEALTH ORGANIZATION estimates that one third of the world's population is infected with the causative organism of tuberculosis (TB), *Mycobacterium tuberculosis*; that there are 8 million new cases of active TB annually; and that nearly 2 million persons die of TB each year.[1] Most infections, cases, and deaths occur in developing countries. In a number of developed countries with substantial levels of immigration, however, foreign-born persons increasingly contribute to the incidence of TB and sustain TB rates.[2-4]

Immigration has contributed substantially to changes in TB epidemiology in the United States during the last decade and is considered an important factor in the resurgence of TB during the late 1980s and early 1990s. Although the number of reported cases of TB has decreased steadily since the peak of the resurgence in 1992, the decline has been limited to persons born in the United States.[5,6] The success of TB control efforts depends on successfully defining the at-risk populations, which will assist in activities such as case finding, program planning to meet unique service needs, and targeting prevention efforts. To highlight national trends in characteristics of foreign-born TB patients and the potential implications for TB program planning and policy development, we analyzed data from the national TB surveillance system, which receives case reports on all TB patients included in annual state morbidity totals.

METHODS

All 50 states and the District of Columbia report TB cases to the national TB surveillance system using a standardized case report form.[7-9] We analyzed data from case reports submitted from 1993 through 1998. The case report collects information on demographic and clinical characteristics, including country of birth and selected TB risk factors. Information on immigration status is not collected.

Consistent with the standard definition used in national TB reporting, a US-born person was defined as a person who was born in the United States or its associated jurisdictions or was born in a foreign country but had at least 1 US parent. A person who did not meet these criteria was classified as foreign-born. If a case report did not include information regarding country of birth,

Author Affiliations: Division of Tuberculosis Elimination, National Center for HIV, STD and TB Prevention (Drs Talbot, Moore, McCray, and Binkin), and the Division of Applied Public Health Training, Epidemiology Program Office (Dr Talbot), Centers for Disease Control and Prevention, Atlanta, Ga.
Corresponding Author and Reprints: Marisa Moore, MD, MPH, Surveillance and Epidemiology Branch, Division of TB Elimination, Centers for Disease Control and Prevention, Mail Stop E-10, Atlanta, GA 30333 (e-mail: MMoore@cdc.gov).

Table 1. Tuberculosis Cases and Case Rates Among US-Born and Foreign-Born Persons, United States, 1993-1998

	Cases, No. (%) [Rate]*						
	1993	1994	1995	1996	1997	1998	Overall
US-born	17 418 (70.2) [7.4]	16 154 (67.6) [6.8]	14 649 (64.7) [6.1]	13 327 (63.4) [5.5]	11 872 (60.6) [4.9]	10 675 (58.4) [4.4]	84 095 (64.6) [5.8]
Foreign-born	7402 (29.8) [34.1]	7737 (32.4) [34.6]	7970 (35.2) [34.7]	7705 (36.6) [32.6]	7718 (39.4) [31.6]	7591 (41.6) [30.1]	46 123 (35.4) [32.9]
Total†	**24 820 (100)** [9.6]	**23 891 (100)** [9.2]	**22 619 (100)** [8.6]	**21 032 (100)** [7.9]	**19 590 (100)** [7.3]	**18 266 (100)** [6.8]	**130 218 (100)** [8.2]

*Rates are cases per 100 000 persons per year.
†Case reports that were missing information on country of birth (n = 1159) were excluded from this analysis.

it was excluded from analysis. The case report also includes information on the month and year of immigration to the United States. For reports that included only the year of immigration, July was assigned as the month.

California does not submit human immunodeficiency virus (HIV) test results to the surveillance system, but does submit the results of TB and acquired immunodeficiency syndrome (AIDS) registry crossmatches. California TB cases with an AIDS match were classified as HIV-positive; all others were classified as having an unknown HIV status.

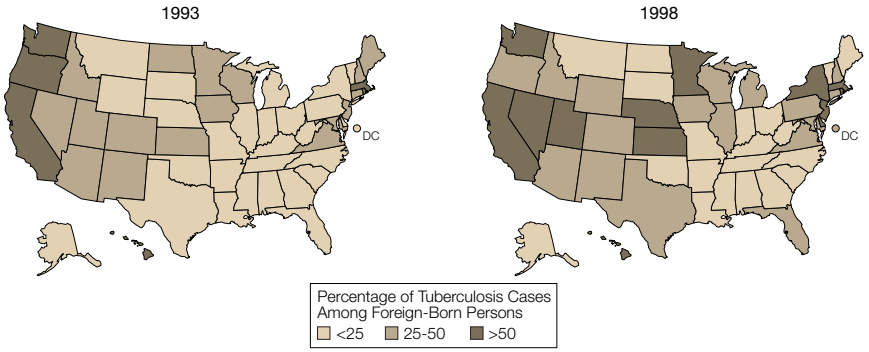
Annual population estimates by nativity, including estimates for specific age and sex groups, were obtained from the National Population Estimates, which contains post-1990 census estimates from the US Census Bureau.[10] The population of foreign-born persons from each birth country was obtained by applying the percentage reported in the 1990 census to the annual National Population Estimates for foreign-born persons.

Proportions were compared using the χ^2 test. Linear trends were tested by χ^2 for trend.

RESULTS

From 1993 through 1998, 131 377 new TB cases were reported from the 50 states and the District of Columbia. Of these, 84 095 cases (64.0%) occurred among persons born in the United States and 46 123 cases (35.1%) occurred in foreign-born persons; reports for 1159 cases (0.9%) were missing information on birth country and were excluded from analysis. As a result of the substantial decrease in the number of cases in US-born but not foreign-born persons during this period, the proportion of TB cases that occurred in foreign-born persons increased from 29.8% to 41.6% (TABLE 1). The rates for both US-born and foreign-born persons decreased during this period; however, the foreign-born rate remained at least 5 times higher than the US-born rate (Table 1). The 6 states that reported the most cases overall (California, New York, Texas, Florida, New Jersey, and Illinois) reported 77 238 (58.8%) of the US total TB cases and 33 834 (73.4%) of the TB cases in foreign-born persons. The number of states reporting more than 50% of TB cases among foreign-born persons increased from 6 in 1993 to 13 in 1998 (FIGURE).

Figure. Percentage of Tuberculosis Cases Reported Among Foreign-Born Persons by State, United States, 1993 and 1998



Birth Country and Duration of US Residence

The numbers of TB cases and case rates among foreign-born persons by birth country are shown in TABLE 2. In each of the 6 years of observation, approximately two thirds of foreign-born persons with TB had come to the United States from 1 of 7 countries: Mexico, the Philippines, Vietnam, China, India, Haiti, and South Korea. Among the 6 highest case-reporting states, Mexico was the most commonly reported birth country for foreign-born persons with TB in Texas, California, and Illinois and accounted for 59.5%, 33.0%, and 24.6% of these states' cases in foreign-born persons, respectively. In Florida, Haiti was the most common birth country (34.3%) and in New Jersey, India was most common (18.8%). In New York, 3 countries were each reported as the birth country for approximately 10% of foreign-born TB cases (China, the Dominican Republic, and Haiti). Table 2 shows overall and birth country–specific proportions of persons diagnosed with TB less than 1 year, 1 to 5 years, and more than 5 years after arrival in the United States.

Sociodemographic Characteristics

Numbers and percentages of TB cases and TB case rates in US-born and foreign-born persons during 1993-1998 are shown by age group and sex in TABLE 3. The majority of cases occurred in males in both the US-born and foreign-born populations. There was minimal variation by year. The largest numbers of cases among both US-born and foreign-born persons occurred in the 25- to 44-

Table 2. Tuberculosis Cases, Case Rates, and Duration of US Residence Among Foreign-Born Persons by Birth Country, 1993-1998

Birth Country	No. (%)	Case Rate*	Duration of US Residence, No. (%), y†		
			<1	1-5	>5
Mexico	10 814 (23.4)	35.5	1650 (18.0)	2459 (26.8)	5066 (55.2)
Philippines	6212 (13.5)	95.9	1979 (36.6)	1211 (22.4)	2221 (41.1)
Vietnam	5196 (11.3)	134.7	1327 (28.7)	1598 (34.5)	1706 (36.8)
India	2402 (5.2)	75.1	475 (24.2)	717 (36.5)	771 (39.3)
China	2332 (5.1)	62.0	333 (17.2)	508 (26.2)	1101 (56.7)
Haiti	1896 (4.1)	118.5	227 (16.8)	404 (29.9)	719 (53.3)
South Korea	1567 (3.4)	38.8	208 (16.0)	332 (25.5)	762 (58.5)
Other‡	15 704 (34.0)	18.1	2685 (21.3)	3680 (29.2)	6261 (49.6)
Total	**46 123** (100)	32.9	**8884** (23.1)	**10 909** (28.4)	**18 607** (48.5)

*Rates are cases per 100 000 persons per year.
†Excludes 7723 reports (16.7%) that were missing date of arrival in the United States.
‡Includes 186 countries, each of which was the birth country for less than 2% of foreign-born persons with tuberculosis.

Table 3. Tuberculosis Cases and Case Rates Among US-Born and Foreign-Born Persons by Sex and Age, United States, 1993-1998

	Cases, No. (%) [Rate]*	
	US-Born	Foreign-Born
Sex		
Male	55 593 (66.1) [7.9]	27 346 (59.3) [40.1]
Female	28 488 (33.9) [3.9]	18 765 (40.7) [26.0]
Unknown	14 (<0.1) [ND]	12 (<0.1) [ND]
Age, y		
<5	4286 (5.1) [3.7]	728 (1.6) [69.5]
5-17	2895 (3.4) [1.0]	2095 (4.5) [16.7]
18-24	3099 (3.7) [2.3]	5511 (12.0) [37.3]
25-44	28 633 (34.1) [6.5]	18 613 (40.4) [31.0]
45-64	22 993 (27.3) [8.1]	10 799 (23.4) [31.9]
≥65	22 156 (26.4) [12.0]	8369 (18.1) [46.7]
Unknown/missing	33 (<0.1) [ND]	8 (<0.1) [ND]
Total	84 095 (100) [5.8]	46 123 (100) [32.9]

*Rates are cases per 100 000 persons per year. ND indicates not determined.

year-old age group, but the highest rate among US-born persons occurred in those aged 65 years or older, and among foreign-born persons in those younger than 5 years.

TABLE 4 presents data on substance use, occupation, and residence history of US-born and foreign-born persons with TB. Drug use, excess alcohol use, unemployment, homelessness, and residence in a correctional or long-term care facility were reported more frequently for US-born persons. Among foreign-born persons reporting homelessness in the year prior to diagnosis, the most common countries of origin were Mexico (47.6%), Cuba (5.6%), El Salvador (4.1%), Guatemala (4.1%), and Haiti (3.7%). During 1994-1998 (the years with more than 70% of results known for each characteristic), the proportion of persons with TB who were substance users, homeless, or residents of a correctional facility was 29.3% for US-born persons compared with 9.3% for foreign-born persons.

Clinical Presentation and Treatment

Selected clinical characteristics are presented in TABLE 5. Among the 6 highest case-reporting states, the percentage of case reports with HIV test results for foreign-born persons ranged from 18.3% in Illinois to more than 50% in New York and Florida and for US-born persons from 33.0% in Illinois to 59.0% in New York. A higher proportion of US-born persons were infected with HIV. In both US-born and foreign born persons, nearly three fourths (72%) of TB patients with HIV infection were aged 25 to 44 years. More than half of the reported foreign-born persons with TB and HIV infection were from California (27.1%) or New York (26.4%). The majority were from 1 of 2 birth countries, Mexico (26.4%) and Haiti (23.8%).

During 1993 through 1998, a higher proportion of foreign-born persons were initially treated with at least the recommended 4-drug regimen. The proportion increased during the 6 years of observation from 38.8% to 71.0% among US-born persons and from 53.7% to 83.4% among foreign-born persons (χ^2 for trend, $P<.001$). Based on follow-up data available through 1996, a higher proportion of US-born persons received at least some part of their antituberculosis therapy as directly observed therapy. This proportion increased from 40.1% to 68.1% in US-born persons and from 27.3% to 59.1% in foreign-born persons (χ^2 for trend, $P<.001$). Among both US-born and foreign-born persons without known rifampin resistance, approximately 70% completed therapy within 12 months. The percentage completing therapy in 12 months increased from 64% in 1993 to 75% in 1996 (the year with the most recent data available) for both US-born and foreign-born persons (χ^2 for trend, $P<.001$).

Drug Resistance

TABLE 6 presents the frequency of drug resistance in *M tuberculosis* isolates from US-born persons, all foreign-born per-

sons, and foreign-born persons from the 7 most common countries of birth in 1993-1998. Susceptibility test results were available for initial isolates from more than 90% of both US-born and foreign-born persons with culture-positive TB. Among those without prior TB, US-born persons were less likely to have an isolate with any drug resistance, although rates of resistance to at least isoniazid and rifampin (multidrug-resistant TB [MDRTB]) were similar. The proportion with MDRTB decreased from 2.6% in 1993 to 1.0% in 1998 among US-born persons and from 2.3% to 1.5% among foreign-born persons (χ^2 for trend, $P<.01$). Among those with prior TB, US-born persons were also less likely to have an isolate with any drug resistance, and rates of MDRTB were significantly lower among US-born persons.

COMMENT

Our findings provide a current profile of foreign-born TB patients in the United States. The features in most striking contrast to US-born patients include the stable numbers of patients and substantially higher TB case rates during the study period. Tuberculosis case rates, however, should be interpreted with the understanding that populations of foreign-born persons may be underestimated. Also important to control and prevention efforts is the geographic variation in proportions of foreign-born TB patients and in countries of origin.

Based on extrapolation and assuming that changes in the number of US-born and foreign-born persons with TB continue to occur at the rate observed in 1993-1998, more than half of US cases may occur in foreign-born persons by the year 2002. The marked decrease in cases among US-born persons was an expected outcome of TB control efforts that prioritized prompt identification of persons with active TB and initiation and completion of appropriate therapy.[11] This approach primarily reduces ongoing transmission and the number of cases caused by recent infection. For complex reasons, this same programmatic approach has not been as effective in controlling rates among foreign-born persons, but it is likely related to a higher prevalence of latent infection in the foreign-born population.[5,12] Tuberculosis case reports do not include information to determine whether cases are a result of recent transmission or reactivation of latent infection; however, studies using DNA fingerprinting methods to evaluate evidence for recent transmission also support this inference.[13-15] Thus, interruption of transmission through treatment and contact investigations alone is insufficient to reduce TB cases among foreign-born persons, and efforts to prevent the transition from latent infection to active disease are needed to complement these core TB control activities.

Because of the considerable geographic variations in TB in foreign-born persons, approaches to controlling and preventing TB should be

Table 4. Sociodemographic Characteristics of US-Born and Foreign-Born Persons With Tuberculosis (TB), United States, 1993-1998

Characteristics*	Cases, No. (%)	
	US-Born (n = 84 095)	Foreign-Born (n = 46 123)
Excess alcohol use in the year prior to diagnosis		
Yes	14 476 (17.2)	2438 (5.3)
No	49 687 (59.1)	35 224 (76.4)
Unknown	19 932 (23.7)	8461 (18.3)
Injection drug use in the year prior to diagnosis		
Yes	3601 (4.3)	331 (0.7)
No	60 617 (72.1)	37 418 (81.1)
Unknown	19 877 (23.6)	8374 (18.2)
Noninjection drug use in the year prior to diagnosis		
Yes	7003 (8.3)	872 (1.9)
No	56 319 (67.0)	36 431 (79.0)
Unknown	20 773 (24.7)	8820 (19.1)
Occupation in 2 years prior to diagnosis†		
Unemployed	22 936 (41.9)	11 262 (32.3)
Health care worker	1629 (3.0)	1301 (3.7)
Migrant farm worker	281 (0.5)	971 (2.8)
Correctional facility employee‡	152 (0.3)	11 (<0.1)
Other	16 037 (29.3)	14 506 (41.5)
Multiple occupations	42 (<0.1)	53 (0.2)
Unknown	13 648 (24.9)	6819 (19.5)
Residence history§		
Homelessness in the year prior to diagnosis		
Yes	6399 (7.6)	1205 (2.6)
No	68 542 (81.5)	40 695 (88.2)
Unknown	9154 (10.9)	4223 (9.2)
TB diagnosed in correctional facility‡		
Yes	4225 (5.0)	924 (2.0)
No	78 123 (92.9)	44 625 (96.8)
Unknown	1747 (2.1)	574 (1.2)
TB diagnosed in long-term care facility‖		
Yes	4550 (5.4)	751 (1.6)
No	74 576 (88.7)	43 715 (94.8)
Unknown	4969 (5.9)	1657 (3.6)

*Sociodemographic characteristics such as drug and excess alcohol use are defined in the *Tuberculosis Information Management System User's Guide*[9] and were determined using a combination of self-report, medical documentation, and chart review.
†Includes persons aged 18 to 64 years only (n = 54 725 US-born and 34 923 foreign-born persons).
‡Correctional facilities included federal or state prisons, local jails, Immigration and Naturalization Service detention centers, and juvenile and other correctional facilities.
§Homelessness in the year prior to TB diagnosis does not exclude persons whose TB was diagnosed in a correctional or long-term care facility, but these 2 categories are mutually exclusive.
‖Long-term care facilities include nursing homes; drug or alcohol rehabilitation centers; and mental health, hospital-based, and residential long-term care facilities.

tailored locally to at-risk foreign-born populations.[16] Our findings concerning duration of residence in the United States prior to TB diagnosis have several implications for tailoring these approaches. In areas where the majority of TB cases are among recent arrivals, the emphasis should be on providing adequate follow-up for persons indicated as having TB by immigrant and refugee screening[17-20] and on screening new arrivals who have not undergone such screening. In contrast, in areas where the majority of cases have been in the United States several years prior to diagnosis, the emphasis may be better placed on screening for latent infection in foreign-born populations.

Table 5. Clinical Characteristics of US-Born and Foreign-Born Persons With Tuberculosis (TB), United States, 1993-1998

Clinical Characteristics	Cases, No. (%)	
	US-Born (n = 84 095)	Foreign-Born (n = 46 123)
History of TB*		
Yes	4447 (5.3)	2577 (5.6)
No	78 897 (93.8)	43 046 (93.3)
Unknown	751 (0.9)	500 (1.1)
TB case verification		
Culture-positive†	68 571 (81.5)	36 471 (79.1)
Smear-positive†	718 (0.9)	291 (0.6)
Clinical diagnosis†	9189 (10.9)	6608 (14.3)
Other criteria	5617 (6.7)	2753 (6.0)
Tuberculin skin test for any disease site		
Negative	13 487 (16.0)	4186 (9.1)
Positive	42 353 (50.4)	29 778 (64.6)
Not done	18 382 (21.9)	8210 (17.8)
Results unknown	9873 (11.7)	3949 (8.6)
Disease site		
Extrapulmonary only	12 783 (15.2)	9551 (20.7)
Pulmonary only	65 193 (77.5)	33 583 (72.8)
Pulmonary and extrapulmonary	6088 (7.2)	2981 (6.5)
Unknown	31 (<0.1)	8 (<0.1)
Sputum smear for acid-fast bacilli		
Positive	31 790 (44.6)	15 331 (41.9)
Negative	26 162 (36.7)	17 289 (47.3)
Not done	11 653 (16.4)	3601 (9.9)
Results unknown	1676 (2.4)	343 (0.9)
Sputum culture‡		
Mycobacterium tuberculosis-positive	49 811 (69.9)	26 182 (71.6)
Mycobacterium tuberculosis-negative	8660 (12.2)	6367 (17.4)
Not done	11 168 (15.7)	3524 (9.6)
Results unknown	1642 (2.3)	491 (1.3)
Chest radiograph‡		
Normal	2980 (4.2)	1098 (3.0)
Abnormal	65 423 (91.8)	34 806 (95.2)
Cavitary§	16 793 (25.7)	8155 (23.4)
Not done	1317 (1.9)	348 (1.0)
Results unknown	1561 (2.2)	312 (0.9)
Human immunodeficiency virus serostatus		
All ages		
Positive	13 424 (16.0)	3186 (6.9)
Negative	21 540 (25.6)	9849 (21.4)
Indeterminate	131 (0.2)	41 (0.1)
Results unknown	49 000 (58.3)	33 047 (71.6)
Aged 25-44 y		
Positive	9714 (33.9)	2311 (12.4)
Negative	8190 (28.6)	4605 (24.7)
Indeterminate	35 (0.1)	18 (0.1)
Results unknown	10 694 (37.3)	11 679 (62.7)

*A person with verified TB was considered to have had a prior episode of TB if TB was verified in the past and the person completed therapy or was lost to supervision for more than 12 consecutive months.
†See reference 9 for full description.
‡Includes only reports of cases with any pulmonary involvement (n = 71 281 US-born and 36 564 foreign-born persons).
§Percentage is among those with an abnormal chest radiograph findings.

Tuberculosis case rates were high in all age groups of foreign-born persons, including foreign-born children. Tuberculosis in children implies recent transmission in their communities. Since the source case for children is often an adult, foreign-born adults who infect their foreign-born children may contribute to this high rate.[21] Foreign-born adults may also infect their US-born offspring or other children in their care.[21,22] A child may also be infected during travel to the birth country of a parent.[22] Children should be considered high priority for evaluation and treatment during contact investigations.[23,24] Investigations to identify the source case for children are also recommended to prevent further transmission.[25]

Foreign-born persons with TB were less likely to have risk factors for TB, such as a history of homelessness, residence in a correctional facility, or excess alcohol or injection drug use. Moreover, less than 10% of cases in the foreign-born population occurred in persons with HIV coinfection, based on the minimum estimates provided by our data. Thus, the most important risk factor for establishing risk for TB for foreign-born persons appears to be previous residence in a country with a high rate of TB. However, the level of completeness of the data for these risk factors requires caution in interpreting differences because potential ascertainment bias may exist.

Our study extends previous reports of higher levels of isoniazid resistance in foreign-born persons.[26] A higher proportion of foreign-born patients started

Table 6. Persons Reported to Have Antituberculosis Drug–Resistant Isolates, US-Born and Foreign-Born by Birth Country, 1993-1998*

	Resistance					
	Isoniazid†		Multidrug†		Any‡	
	No Prior TB	Prior TB	No Prior TB	Prior TB	No Prior TB	Prior TB
US-born	3347 (5.7)	377 (11.1)	938 (1.6)	128 (3.8)	5669 (9.7)	532 (15.6)
Foreign-born						
Mexico	661 (9.2)	77 (22.4)	105 (1.5)	40 (11.7)	1208 (16.7)	101 (29.1)
Vietnam	651 (17.7)	68 (28.2)	47 (1.3)	23 (9.6)	1001 (27.1)	89 (36.9)
Philippines	586 (14.0)	66 (26.7)	58 (1.4)	25 (10.1)	761 (18.2)	75 (30.2)
China	174 (10.5)	53 (26.0)	25 (1.5)	17 (8.4)	261 (15.7)	59 (28.9)
India	188 (10.7)	12 (21.4)	32 (1.8)	3 (5.4)	260 (14.8)	13 (23.2)
Haiti	207 (14.5)	12 (27.9)	24 (1.7)	5 (11.6)	250 (17.5)	13 (30.2)
South Korea	142 (12.8)	51 (36.7)	26 (2.3)	20 (14.4)	186 (16.7)	58 (41.7)
All foreign-born	3716 (11.6)	469 (25.4)	551 (1.7)	196 (10.6)	5630 (17.5)	573 (30.9)

*For each drug category, the percentage of resistance was higher among patients with prior tuberculosis (TB) compared with those without prior TB ($P<.01$ for χ^2). For all categories except multidrug resistance (resistance to at least isoniazid and rifampin) with no prior TB, the percentage of resistance was higher among foreign-born persons than US-born persons ($P<.01$ for χ^2).
†Resistance to at least the drug or drugs indicated, but may also have resistance to additional first-line drugs, including isoniazid, rifampin, pyrazinamide, streptomycin, and ethambutol.
‡Resistance to at least 1 first-line drug.

initial antituberculosis drug regimens of at least 4 first-line drugs, although the proportions in both foreign-born and US-born patients increased during the study period. These findings may reflect increased awareness among health care professionals that high levels of isoniazid resistance exist among foreign-born persons and that initial drug regimens of 4 first-line drugs are recommended to prevent development of MDRTB when there are individual patient risk factors for resistance or when population levels of isoniazid resistance exceed 4%.[27]

Levels of drug resistance, especially isoniazid resistance, also have important implications for efforts to treat latent TB infection in some foreign-born populations. Isoniazid has been the standard for treating latent *M tuberculosis* infection in the absence of known contact to drug-resistant TB. However, high levels of isoniazid resistance in some foreign-born populations, including most of those contributing to the majority of TB cases in the United States, raise concern about the efficacy of isoniazid preventive therapy in these populations. Updated recommendations on the treatment of latent TB infection provide several alternative regimens.[23,28] Further study of the acceptability and cost-effectiveness of using alternative regimens in settings where rates of isoniazid-resistant TB are high will be helpful for planning future prevention efforts in foreign-born populations.[23]

As the United States moves toward the ultimate goal of TB elimination (<1 case per 1 million persons), success will depend increasingly on reducing the impact of TB in foreign-born persons.[29] A close relationship exists between the global TB crisis and the impact of the disease in the United States. For this reason, the Centers for Disease Control and Prevention supports international TB control efforts, as well as efforts to improve the prevention and control of TB among foreign-born persons in the United States.[30-33] Continued efforts to tailor local TB control strategies to the foreign-born community and commitment to the global TB battle are essential.

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There must be no barriers for freedom in inquiry. There is no place for dogma in science. The scientist is free, and must be free to ask any question, to doubt any assertion, to seek for any evidence, to correct any errors.
—J. Robert Oppenheimer (1904-1967)