

Executive Commentary

Highlights of 2014 Report

Since 1953, in cooperation with state and local health departments, the United States national tuberculosis program has collected information on each newly reported case of tuberculosis (TB) disease in the United States. Each individual TB case report (Report of Verified Case of Tuberculosis or RVCT) is submitted electronically. Following are the highlights of the 2014 report.

1. Updated case counts for each year from 1993 through 2013, in addition to new 2014 data.
2. Case count for 2014: 9,421 TB cases were reported to CDC from the 50 states and the District of Columbia (DC), representing a 1.5% decrease from 2013 (Table 1).
 - Twenty-one states reported increased case counts from 2013 (Table 30).
 - California, Texas, New York, and Florida accounted for 51% of the national case total (Table 31).
 - Asians exceeded all other racial or ethnic groups with the largest percentage of total cases (32%, Table 2). Almost all Asians with TB were in persons born outside the United States (95.5%, Table 3).
 - Hispanics comprised the second largest racial or ethnic group (29%, Table 2). Many Hispanics with TB were born in the United States (24.0%, Table 3)
 - Blacks or African Americans born in the United States represented 37% of TB cases in U.S.-born persons (Table 18) and accounted for 13% of the national case total.
 - Asians born outside the United States represented 46% of TB cases in foreign-born persons (Table 19) and accounted for 30% of the national case total.
3. Case rates: In 2014, the TB case rate declined from 3.02 to 2.96 per 100,000 persons, representing a 2.2% decrease from 2013 (Table 1).
 - Ten states and DC reported rates above the national average (Table 30).
 - The TB case rate was 1.2 per 100,000 for U.S.-born persons and 15.4 for foreign-born persons (Table 5).
 - Asians continued to have the highest case rate (17.8 per 100,000 persons) among all racial or ethnic groups (Table 2).
4. Burden among the foreign-born: In 2014, the percentage of cases occurring in foreign-born persons increased to 66% of the national case total (Table 5). This percentage has risen steadily since 1993.
 - In 35 states, and the District of Columbia, $\geq 50\%$ of TB cases occurred among foreign-born persons (Table 34).
 - The top five countries of origin of foreign-born persons with TB were Mexico, the Philippines, India, Vietnam, and China (Table 6).
5. Drug resistance: 1.0% of reported cases in 2014 had primary multidrug resistance, which is defined as no previous history of TB disease and resistance to at least isoniazid and rifampin (Table 9). This percentage has remained stable, fluctuating between 0.9% and 1.3% since 1996.
6. HIV status: In 2014, 6% of persons with TB were HIV positive.
 - The percentage of persons with TB who were HIV positive has dropped steadily since HIV test results were first reported in 1993 (Table 11).
7. Genotype surveillance coverage: In 2014, genotype surveillance coverage was 95.3%.
 - Genotype surveillance coverage has increased steadily since 2004. Thirty-nine states met or exceeded the national target of 94% genotype surveillance coverage in 2014 (Table 53). Among genotyped cases during 2012–2014, 21.6% were clustered, suggesting recent transmission (Table 23).

Tuberculosis in the United States

In 2014, the reported number of TB cases (9,421) and case rate (3.0 cases per 100,000) both decreased; these represented declines of 1.5% and 2.2%, respectively, compared to 2013. Since the 1992 TB resurgence peak in the United States, the number of TB cases reported annually has decreased by 65% (Table 1).

TB case rates vary by factors such as age, race and ethnicity, and country of origin. The proportion of total cases occurring in foreign-born persons has been increasing steadily since 1993. In 2014, 66% of TB cases occurred in foreign-born persons, an all-time high. Foreign-born persons have accounted for the majority of TB cases in the United States every year since 2001. Moreover, the case rate among foreign-born persons in 2014 was approximately 13 times higher than among U.S.-born persons (Table 5).

Tuberculosis deaths (compiled by the National Center for Health Statistics) increased by 8.8%, from 510 deaths in 2012 to 555 deaths in 2013. The number of TB deaths reported annually has decreased by 67% since 1992 (Table 1).

Age

Since 1993, TB case rates have declined annually for almost all age groups. In 2014, TB case rates continued the trend with declines in all age groups except children < 15 years of age and young adults 15-24 years old, which remained the same as the previous year at 0.8/100,000 and 2.2/100,000, respectively. The highest burden of disease continues to be among older adults. In 2014, adults \geq 65 years old had a case rate of 4.8 cases per 100,000, while children \leq 14 years old had the lowest rate at 0.8 cases per 100,000 (Table 4).

Race and Ethnicity

In 2003, the race and ethnicity category “non-Hispanic, Asian or Pacific Islander” was split into “non-Hispanic Asian” and “non-Hispanic Native Hawaiian or Other Pacific Islander.” In 2014, Asians had the highest TB case rate at 17.8 cases per 100,000, which was a slight decrease from 18.5 in 2013. Native Hawaiians or Other Pacific Islanders had the second-highest TB case rate at 16.9 cases per 100,000, which is an increase compared to 11.4 cases per 100,000 reported in 2013. Owing to low case numbers among Native Hawaiians or other Pacific Islanders, case rates fluctuate and changes must be interpreted with caution (Table 2).

Since 1993, TB case rates have declined in almost all racial and ethnic groups: among Hispanic or Latinos, the decline has been from 19.9 to 5.0 cases per 100,000 (-75%); among non-Hispanic blacks or African

Americans, from 28.5 to 5.1 cases per 100,000 (-82%); among American Indian or Alaska Natives, from 14.0 to 5.4 cases per 100,000 (-61%); among non-Hispanic whites, from 3.6 to 0.7 cases per 100,000 (-81%); and among Asians, from 41.2 to 18.7 cases per 100,000 (-55%). In 2014, the TB case rate for Asians remained over three times higher than that for Hispanics or blacks or African Americans (Table 2).

Origin of Birth

Since 1993, the TB case rate among U.S.-born persons has declined annually. In 2014, the TB case rate for U.S.-born persons was 1.2 cases per 100,000, representing an 84% decrease from 7.4 cases per 100,000 in 1993. The TB case rate among foreign-born persons also declined during the same interval, though the decline was less substantial. In 2014, the TB case rate among foreign-born persons was 15.4 cases per 100,000, representing a 55% decrease from 34.0 cases per 100,000 in 1993 (Table 5).

The proportion of TB cases among persons born in the United States has also declined annually since 1993. In 2014, 34% of TB cases were among U.S.-born persons compared to 69% in 1993 (Table 5). In 36 states, and the District of Columbia, \geq 50% of TB cases occurred among foreign-born persons. In 8 states (Colorado, Maine, Maryland, Massachusetts, Nebraska, New Jersey, New York, Utah, Virginia, Washington, Wisconsin), \geq 80% of TB cases occurred among foreign-born persons (Table 34).

Country of Origin and World Region

From 2010 through 2014, the top five countries of origin of foreign-born persons with TB were Mexico, the Philippines, India, Vietnam, and China (Table 6). The distribution of TB cases by world region of origin reflects immigration patterns among persons settling in the United States. Of the 6,215 TB cases reported among foreign-born persons in 2014, 37% occurred among persons born in the Americas region, and 32% occurred among persons born in the Western Pacific region (Table 20). From 1993 through 2014, the proportion of cases increased among persons born in the Eastern Mediterranean region (3% in 1993 to 5% in 2014), the Southeast Asia region (6% in 1993 to 14% in 2014), and the Africa region (2% in 1993 to 8% in 2014) (Table 20).

Multidrug-resistant Tuberculosis

The proportion of patients with primary multidrug-resistant (MDR) TB, which is defined as no previous history of TB disease and resistance to at least isoniazid and rifampin, decreased from 3% in 1993 to 1.3% in 1996. From 1996 to 2014, the percentage of primary

MDR TB cases has fluctuated between 1.3 and 0.9%. Since 1996, the percentage of U.S.-born patients with primary MDR TB has remained below 1%. However, of the total number of reported primary MDR TB cases, the proportion occurring in foreign-born persons increased from 25% (103 of 407) in 1993 to 85% (57 of 67) in 2014 (Table 9).

Extensively Drug-resistant Tuberculosis

CDC has included an updated case count of extensively drug-resistant (XDR) TB cases from 1993 to 2014 in the slide set that accompanies this report. XDR TB is defined as resistance to isoniazid and rifampin, plus resistance to any fluoroquinolone and at least one of three injectable second-line anti-TB drugs (i.e., amikacin, kanamycin, or capreomycin). Two cases were reported as XDR TB in 2014, compared to five cases in 2013, two cases in 2012, five cases in 2011, one case in 2010, and 0 cases in 2009. Of the 15 XDR TB cases reported since 2009, 11 were among foreign-born persons.

Tuberculosis Therapy

The proportion of TB patients prescribed an initial treatment regimen including isoniazid, rifampin, pyrazinamide, and ethambutol increased from 40.3% in 1993 to 85.4% in 2012. The proportion of patients who completed therapy within 1 year increased from 63.4% in 1993 to 89.4% in 2012 (the latest year for which complete outcome data are available). The proportion of persons receiving directly observed therapy for at least a portion of the treatment duration also increased from 36% in 1993 to 91% in 2012, the latest year for which complete outcome data are available (Table 10).

HIV Status

Between 2013 and 2014, the proportion of persons with TB who reported HIV test results has remained high at 89% for all ages and 95–93% for persons 25–44 years old (Table 11). The percentage of persons with TB who reported HIV test results and who were HIV-positive was 6% in 2014, representing a 7% decrease from 2011 (Table 11). Among persons 25–44 years of age, 9% of persons with TB who reported HIV test results were HIV-positive in 2014, decreasing from 11% in 2011 (Table 11). The percentages have declined since 1993, when 48% of persons with TB of all ages with HIV test results reported HIV-positive results; among persons between 25–44 years of age, the percentage was 63% in 1993 (Table 11). The American Thoracic Society and the Infectious Diseases Society of America recommend that all TB patients be counseled and tested for HIV.¹

¹ CDC. Treatment of tuberculosis. American Thoracic Society, CDC, and Infectious Diseases Society of America. MMWR 2003;52(No. RR-11).

Genotyping

TB genotyping is a laboratory-based analysis of the genetic material of the bacteria that cause TB disease. In the United States, routine genotyping of isolates from culture-positive TB cases started in 2004, and results are reported by CDC's National Tuberculosis Genotyping Service (NTGS). TB genotyping surveillance coverage, defined as the proportion of culture-positive TB cases with a genotype result, has increased from 52.6% in 2004 to 95.3% in 2014 (Table 13). TB genotype clusters are defined as two or more cases with matching genotypes in the same county during a 3-year time period. Cases that are clustered suggest recent transmission, while unique cases are more likely attributable to reactivation of infection that was acquired in the past. Among genotyped cases during 2012–2014, 21.6% were clustered (Table 23). During this period, the percentage of clustered cases among U.S.-born persons with TB was 35.5%, compared to 14.3% among foreign-born persons diagnosed with TB in the United States (Table 22). Among 4,544 cases in clusters during 2012–2014, 908 cases were in 93 high-alert clusters, 1,036 cases were in 338 medium-alert clusters, and 2,600 cases were in 1,063 non-alerted clusters (Table 22; see Appendix D for cluster definitions). Among all cases genotyped in 2014, 1.6% had TB caused by *Mycobacterium bovis*, and the majority of these *M. bovis* cases (77.6%) were foreign-born (Table 15). Technical notes describe changes made in the *M. bovis* case definition, which resulted in a 13.9% reduction in the average of annual *M. bovis* case counts (n=105) compared to average annual counts that would have been reported without these changes (n=122).

United States Affiliated Pacific Islands (USAPI)

The USAPI consist of six jurisdictions in the Pacific Ocean: American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, Federated States of Micronesia, Republic of the Marshall Islands, and Republic of Palau. As a result of their affiliations with the United States, the USAPI receive U.S. federal government funding, including CDC cooperative agreement funding for domestic TB control program activities. In 2014, the USAPI had 410 reported cases of TB. Among these, 204 (50%) were male, 79 (19%) were aged less than 15 years and 123 (30%) were aged 25–44 years. In addition, 46 (11%) were not born in the USAPI jurisdictions or the United States, and of those, 41 (89%) emigrated from the Republic of the Philippines. Some other data highlights of the 410 reported USAPI cases are that 334 (81%) were diagnosed with pulmonary disease only, 185 (45%) had a positive culture for *Mycobacterium tuberculosis*; < 1% had MDR TB, and 127 (31%) were unemployed. Genotype surveillance coverage for USAPI was 92.4% in 2014.

Puerto Rico

In 2014, the Commonwealth of Puerto Rico reported 44 TB cases to CDC, a case rate of 1.2 per 100,000 persons. Among those cases, 33 (75%) were male, two (5%) were < 25 years old, and 35 (80%) were > 45 years old. Of the 44 reported cases, 7 were born outside of Puerto Rico, and of those, 5 (71%) emigrated from the Dominican Republic. The majority of reported cases (86%) were diagnosed with pulmonary disease only, 91% had positive cultures for *Mycobacterium tuberculosis*, none had MDR TB, and 39% were unemployed. Genotype surveillance coverage for Puerto Rico was 95.0% in 2014.

Summary

Both the absolute number of TB cases and the TB case rate in the United States have declined each year since 1993. The total case count of 9,421 and case rate of 3.0 per 100,000 persons represent steady progress toward the goal of TB elimination in the United States (< 1 case per 1,000,000 population). However, despite consistent declines in TB cases and case rates over the past 60 years, this year's decline in the rate of TB (-2.2%) was the smallest decrease in more than a decade. This minimal decline stresses the importance of refining our strategies in surveillance, contact investigations, and screening and treating contacts with latent TB infection. Focusing on populations at highest risk for TB and latent TB infection, such as persons born in high-burden countries, is also key.

Foreign-born persons continue to be disproportionately affected by TB; in 2014, the proportion of persons with TB who were foreign-born continued to increase to 66% of total cases. Global TB disease burden and the incidence in the United States are closely related, highlighting the need to strengthen existing support for TB control efforts abroad. This is particularly true as relates to the countries of origin of immigrants that contributed over half of the U.S. foreign-born TB patients in 2014: Mexico, the Philippines, India, Vietnam and China (Table 6). These top countries of birth for foreign-born persons with TB are further explored in Table 35, which provides data by state. Table 20 further analyzes all countries of birth for cases among foreign-born persons, and arranges the data by region; the largest proportion is from the Americas, followed by the Western Pacific region. In Table 21, an analysis of risk factors leading to TB disease is provided by origin of birth and race/ethnicity. Table 36 stratifies TB in foreign-born persons by their immigration status at first entry into the United States and Table 37 provides information on the number of years a foreign-born TB patient has been in the

United States; both of these tables show data at the state level. In Table 65, data on TB cases among foreign-born persons are available for metropolitan statistical areas.

CDC and the Division of Tuberculosis Elimination are seeking to strengthen surveillance capacity and support collaborations to address TB among persons who cross borders. Efforts are underway to enhance surveillance and measure burden of binational TB cases along the U.S.-Mexico border, an important region for focusing TB control efforts, as 20% of foreign-born TB cases were born in Mexico. To achieve TB elimination, intensified efforts are needed to address the persistent disparities that exist between U.S.-born and foreign-born persons. Ongoing surveillance and improved TB control and prevention activities, including a sustained focus on domestic TB control, a strengthened effort to diagnose and treat latent TB infection, and continued support of global TB control initiatives are especially necessary in light of the small decline of TB case rates in 2014.