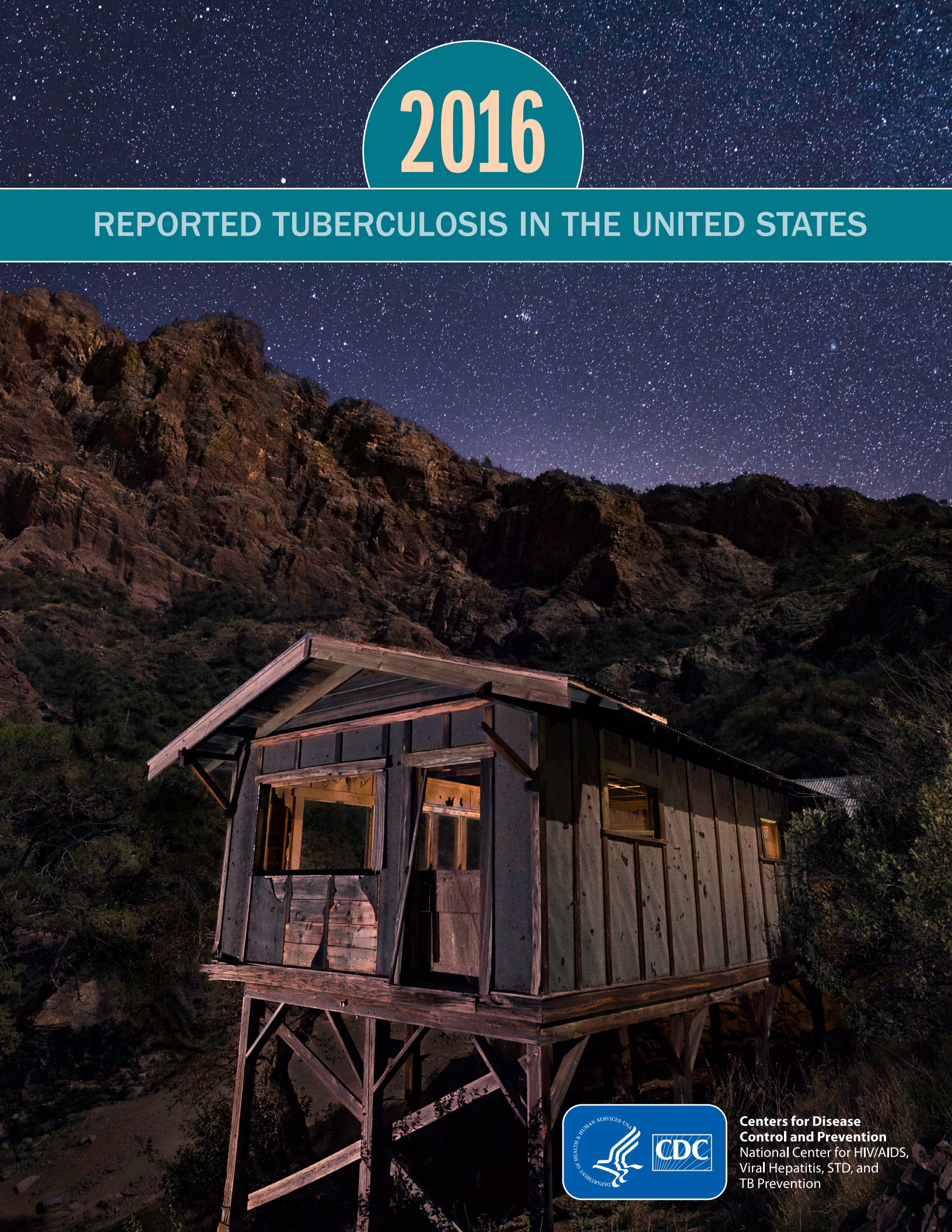
2016

REPORTED TUBERCULOSIS IN THE UNITED STATES



Centers for Disease Control and Prevention
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention

For more information, contact

Division of Tuberculosis Elimination
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control and Prevention
1600 Clifton Road NE
MS E-10
Atlanta, GA 30329
Phone: 404-639-8120
Internet Address: http://www.cdc.gov/tb/

Suggested Citation: Centers for Disease Control and Prevention (CDC). *Reported Tuberculosis in the United States, 2016*. Atlanta, GA: US Department of Health and Human Services, CDC; 2017.

Cover photograph: The dining hall of Boyd Sanatorium in Dripping Springs, part of the Organ Mountains–Desert Peaks National Monument in Doña Ana County, New Mexico, USA. This structure was built in 1910 by Nathan E. Boyd, MD, who operated a tuberculosis sanatorium during the early 1900s. Photograph courtesy of Wayne Suggs (2017), through written permission of the Bureau of Land Management. For further information about the monument, please see https://www.blm.gov/visit/omdp.

Reported Tuberculosis in the United States

2016

Publication Year 2017

Reported Tuberculosis in the United States, 2016
Centers for Disease Control and Prevention
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
Division of Tuberculosis Elimination

October 2017

Centers for Disease Control and Prevention ..... Brenda Fitzgerald, MD
Director

Office of Infectious Diseases ..... Rima Khabbaz, MD
Director

National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention ... Jonathan Mermin, MD, MPH
Director

Division of Tuberculosis Elimination ..... Philip LoBue, MD
Director

Communications, Education, and Behavioral Studies Branch ..... Maria Fraire Sessions, MPH
Acting Branch Chief

Data Management, Statistics, and Evaluation Branch ..... Roque Miramontes, PA-C, MPH
Branch Chief

Field Services Branch ..... Terence L. Chorba, MD, DSc
Branch Chief

Surveillance, Epidemiology, and Outbreak Investigations Branch ..... Thomas R. Navin, MD
Branch Chief

Surveillance Team ..... Adam J. Langer, DVM, MPH
Team Lead

This report was prepared by

Surveillance, Epidemiology, and Outbreak Investigations Branch
Division of Tuberculosis Elimination
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control and Prevention

Surveillance Team
Adam J. Langer, DVM, MPH, *Team Lead*
Shareen A. Iqbal, PhD, MPH
Robert Pratt, BS
Clarisse A. Tsang, MPH
Veronica Pickens, BA
Lilia P. Manangan, RN, MPH

Molecular Epidemiology Activity
Benjamin J. Silk, PhD, MPH, *Lead*
J. Steve Kammerer, MBA
Smita Ghosh, MS
Kala Marks, MPH
Julie L. Self, PhD, MPH

Others contributing to the production of this publication

Data Management, Statistics and Evaluation Branch
Sandy Price, PMP
Cynthia Adams[1]
Stacey Parker[1]
Katrina Williams[1]

Office of the Director
Philip LoBue, MD
Carla A. Winston, PhD

Molecular Epidemiology Activity
Clint McDaniel, MPH
Sarah Talarico, PhD, MPH

Surveillance Team
Lori R. Armstrong, PhD
Divia Forbes, MSPH
Elvin J. Magee, MPH, MS
Glenda Newell[2]

Communications, Education, and Behavioral Studies Branch

Field Services Branch

Laboratory Branch

Office of the Associate Director for Communication, Division of Creative Services, Graphics Services Branch

We gratefully acknowledge the contributions of all state and local health departments throughout the United States whose staff collected and reported the data used in this publication.

[1]CDC Information Management Systems Contractor
[2]This report is dedicated to Ms. Glenda Newell for her 43 years of federal public health service.

PREFACE

Reported Tuberculosis in the United States, 2016, presents summary data for tuberculosis (TB) cases verified and counted during 2016. Report of Verified Case of Tuberculosis (RVCT) forms are submitted to the Division of Tuberculosis Elimination (DTBE), National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP), Centers for Disease Control and Prevention (CDC), Atlanta, Georgia, by 60 reporting areas (the 50 states, the District of Columbia, New York City, Puerto Rico, and 7 other U.S.-affiliated jurisdictions in the Pacific Ocean and Caribbean Sea).

Reported Tuberculosis in the United States, 2016, is similar to previous publications (see page xi, #19) and contains an Executive Commentary, Technical Notes, seven major data sections, and appendixes. The Executive Commentary includes highlights of the 2016 data, and the Technical Notes section provides information about how the data were collected and reported; these two sections are included to help the reader interpret the data.

Other sections provided in the annual report are described as follows:

- **Morbidity Trend Tables** — Trends in the overall TB case counts and case rates for the United States, its territories, and freely associated states, by selected demographic, clinical, and genotypic characteristics.
- **Morbidity Tables, 2016** — Overall case counts and case rates for the United States and other jurisdictions, by selected demographic and genotypic characteristics.
- **Morbidity Tables, 2014** — Overall case counts for the United States, by selected demographic and clinical characteristics for the most recent year for which data are available for certain follow-up variables that require a longer data collection period.
- **Morbidity Tables, Reporting Areas, 2016** — TB case counts and case rates, by state and other jurisdictions, with tables of selected demographic and clinical characteristics.
- **Morbidity Tables, Reporting Areas, 2014** — Data for the most recent year for which data are available for selected follow-up variables that require a longer data collection period.
- **Morbidity Tables, Metropolitan Statistical Areas, 2016** — TB case counts and case rates, by metropolitan statistical areas (MSAs: see Technical Notes for further details), with tables of selected demographic and clinical characteristics.
- **Estimates of Recent Transmission, 2015–2016** — Estimates of genotyped case counts and percentages of cases attributed to overall and extensive recent transmission for the United States, by selected geographic, demographic, and clinical characteristics.
- **Surveillance Slide Set, 2016** — Figures from the annual surveillance slide set emphasizing key recent trends in TB epidemiology in the United States and selected jurisdictions. The slides with accompanying text can also be viewed and downloaded from http://www.cdc.gov/tb/.
- **Tuberculosis Case Definition for Public Health Surveillance** — Appendix A.
- **Recommendations for Reporting and Counting Tuberculosis Cases** — Appendix B.
- **National Surveillance for Severe Adverse Events Associated with Treatment for Latent Tuberculosis Infection — Reporting Information** — Appendix C.
- **Genotyping Background Information and Glossary** — Appendix D.

Previous Statistical Reports in this Series:

1. *Special Tuberculosis Projects, 1961–1965.* Atlanta: CDC; 1966.
2. *Special Tuberculosis Projects, December 1965.* Atlanta: CDC; 1966.
3. *Special Tuberculosis Projects, June 1966.* Atlanta: CDC; 1967.
4. *Special Tuberculosis Projects, December 1966.* Atlanta: CDC; 1967.
5. Summary Report. Atlanta: CDC; 1967.
6. *Special Tuberculosis Projects, June 1967.* Atlanta: CDC; 1968.
7. *Tuberculosis Program Reports, December 1967.* Atlanta: CDC; 1968.
8. *Tuberculosis Program Reports:* Tuberculin testing during 1966–1967 school year. Atlanta: CDC; 1968.
9. *Tuberculosis Program Reports:* Six Month Period Ending June 1968. Atlanta: CDC; 1969.
10. *Tuberculosis Program Reports:* Program Performance Analyses, June-December 1968. Atlanta: CDC; 1970.
11. *Tuberculosis Program Reports:* Tuberculin testing data, 1967–1968 school year. Atlanta: CDC; 1970.
12. *Tuberculosis Program Reports (1961–1969)*. Atlanta: CDC; 1970.
13. *Tuberculosis Program Reports:* Tuberculosis programs (1970–1973). Atlanta: CDC; 1971–1974.
14. *Reported Tuberculosis Data (1962–1973)*. Atlanta: CDC; 1963–1974.
15. *Tuberculosis Statistics: States and Cities (1974–1985)*. Atlanta: CDC; 1971–1986.
16. *Tuberculosis in the United States (1974–1986)*. Atlanta: CDC; 1976–1987.
17. *Tuberculosis Program Reports:* Tuberculosis program management in the United States, 1984. Atlanta: CDC; 1986.
18. *Tuberculosis Statistics in the United States (1987–1992)*. Atlanta: CDC: 1989–1993.
19. *Reported Tuberculosis in the United States (1993–2015)*. Atlanta: CDC: 1994–2016.

Contact information for the TB control offices in each reporting area is available at:
http://www.cdc.gov/tb/links/tboffices.htm

Contents

Executive Commentary

Executive Commentary

INTRODUCTION

Since 1953, the National Tuberculosis (TB) Surveillance System (NTSS) has collected information on each newly reported case of TB disease in the United States. In addition to the 50 United States and the District of Columbia (DC), CDC accepts TB case reports from five U.S. territories (American Samoa, Commonwealth of the Northern Mariana Islands, Guam, Puerto Rico, and the U.S. Virgin Islands) and three sovereign nations that have signed compacts of free association with the United States (Federated States of Micronesia, Republic of the Marshall Islands, and Republic of Palau); however, the information presented in this commentary is based on the case reports from the 50 states and DC, except where otherwise specified. CDC maintains TB surveillance data in an electronic database for all cases reported since 1993; reporting areas may update this information at any time. Small variations in historical data included in this report compared with previous reports are attributed to these updates. This annual summary contains information on TB cases reported to CDC during 1993–2016 by year that the reporting jurisdiction counted the case.

KEY FINDINGS

In 2016, the 50 states and the District of Columbia (herein referred to as the "United States") reported 9,272 TB cases to CDC, representing the lowest number of annual cases on record and a 2.9% decrease from 2015. The national TB incidence rate was 2.9 per 100,000 persons, a 3.6% decrease from 2015. While the reversal of the increase in cases observed in 2015 is a positive sign, the pace of TB's decline in the United States remains too slow to achieve TB elimination in this century.[1] As reported in earlier years, TB case counts are highest in four states: California, Texas, New York, and Florida. Together, they accounted for just over half of the cases reported by the 50 states and DC. Twelve states and DC reported incidence rates above the national average.

New Data: County-level estimates of recent transmission of TB disease, mapped as case counts, are included in this 2016 report. Nationally, CDC attributes about 14% of genotyped cases reported during 2015–2016 to recent transmission and approximately 86% to reactivated latent TB infection. CDC attributes an estimated 5% of genotyped cases to extensive recent transmission, defined as a plausible chain of transmission of ≥6 cases, including the plausible source case and 4 or more other cases within 3 years before a given case in the chain.

TB TREATMENT AND OUTCOME

Effective treatment of TB disease requires the use of multiple antimicrobial drugs at appropriate doses for sufficient periods to ensure both cure as well as to prevent the occurrence of drug resistance. CDC defines primary drug resistance as the presence of drug resistance in a patient who has no prior history of TB disease. The most common form of primary anti-TB drug resistance is isoniazid monoresistance, which occurred in 577 (8.7%) cases reported during 2016. Primary multidrug-resistant (MDR) TB (defined as resistance to both isoniazid and rifampin) occurred in 78 (1.2%) cases reported during 2016. The United States reported one extensively drug-resistant TB (defined as MDR TB that is additionally resistant to any fluoroquinolone and at least one of three injectable second-line anti-TB drugs) case in 2016. The percentage of TB cases that are drug resistant has remained stable for the last 20 years.

Among cases reported in 2014, the most recent year for which case completion data are available, 63.9% of TB patients received exclusively directly observed therapy (DOT) and an additional 29.0% of patients received a combination of DOT and self-administered therapy. These percentages have been stable since 2011. Many TB programs are exploring alternatives to traditional DOT, such as the use of videoconferencing or other electronic means of monitoring medication adherence; however, NTSS does not

currently distinguish these alternative strategies from traditional DOT.

Among patients expected to complete TB treatment within 1 year of diagnosis, 90.1% completed therapy within 1 year. An additional 6.5% (total of 96.6%) of these individuals eventually completed treatment. Among persons with TB reported in 2014, a total of 8,119 (88.6%) completed treatment, 568 (6.2%) died before completing treatment, and the remainder discontinued treatment for other reasons.

Among TB cases reported in 2014, a total of 774 (8.2%) died either before treatment could be started, or after starting treatment but before completing treatment. Among those who died, 287 (37.1%) were reported as having died because of TB disease or the adverse effects of TB treatment.

RISK FACTORS

Country of birth continues to be a risk factor for TB diagnosed in the United States because the risk of TB exposure varies by country. In 2016, 2,901 TB cases were reported in U.S.-born persons (defined as persons born in the United States or its territories, or born elsewhere to a U.S. citizen parent), compared with 6,351 cases in non-U.S.–born persons (31.3% vs 68.5%). In terms of incidence rates per 100,000 persons, U.S.-born persons had a TB rate of 1.1 compared with 14.7 among non-U.S.–born persons. Among non-U.S.–born persons reported with TB in 2016, the top five countries of birth were Mexico, the Philippines, India, Vietnam, and China.

Among the cases reported in non-U.S.–born persons in 2016, a total of 1,120 (17.6%) were diagnosed <1 year after first arrival in the United States, which is consistent with previous observations that the risk of developing TB disease among non-U.S.–born persons is greatest in the first 1–2 years after arrival in the United States. However, approximately equal percentages of TB cases among non-U.S.–born persons occur <10 years and ≥10 years after first arrival, demonstrating that the risk of developing TB disease remains substantial after >10 years residence in the United States. Additionally, case counts and rates among non-U.S.–born persons might have changed slightly from 2015 to 2016 because of a correction in this report of CDC's definition of non-U.S.–born to include persons born in the freely associated states of Federated States of Micronesia, Republic of the Marshall Islands, and Republic of Palau, who did not have a U.S. citizen parent. CDC made this correction to conform to U.S. Census Bureau definitions.[2]

TB continues to affect racial and ethnic minorities disproportionately compared with non-Hispanic whites. The TB incidence rate per 100,000 persons for non-Hispanic whites has remained stable at 0.6 for the past 3 years, while the incidence rate for other racial/ethnic groups ranges from 4.5 for Hispanics to 18.0 among non-Hispanic Asians (7.5–30 times the rate for non-Hispanic whites). However, the incidence rate for all racial/ethnic minority groups did decline from 2015.

Among U.S.-born persons reported with TB disease in 2016, non-Hispanic blacks were most commonly represented (1,068 cases, 36.8%), followed by non-Hispanic whites (915 cases, 31.5%) and Hispanics (603 cases, 20.8%). Among non-U.S.–born persons reported with TB disease in 2016, non-Hispanic Asians (3,045 cases, 47.9%) were the largest group, followed by Hispanics (1,987 cases, 31.3%) and non-Hispanic blacks (906 cases, 14.3%).

Among persons reported with TB in 2016, a total of 454 (5.6% of TB cases with test result information) were co-infected with human immunodeficiency virus (HIV). Of these patients with HIV/TB coinfection, 229 were 25–44 years of age (8.6% of TB cases in this age group with test result information). The percentage of HIV/TB co-infection has remained stable over the last 3 years. Additionally, diabetes mellitus continues to be an important clinical risk factor for TB dis

ease. In 2016, a total of 1,524 (16.4%) persons reported with TB also had diabetes.

Residence in congregate settings remains a risk factor for TB infection, which can subsequently progress to TB disease. Additionally, TB cases in congregate settings increase the risk of secondary cases and the difficulty of subsequent contact investigations. Among TB cases reported in 2016, healthcare providers diagnosed 328 (4.0%) cases among residents of correctional facilities, 430 (4.9%) cases in persons who experienced homelessness in the year preceding diagnosis, and 168 (1.9%) cases in persons who had resided in long-term care facilities in the year preceding diagnosis.

Substance use is also a risk factor for TB infection and for progression to TB disease. Among TB cases reported in 2016 with information on history of substance use in the year preceding TB diagnosis, 111 (1.3%) cases were among persons who reported injecting drugs, 599 (6.8%) reported using noninjectable drugs, and among TB cases diagnosed in persons ≥15 years of age, 875 (10.0%) reported excessive alcohol use.

GENOTYPING OF TB ISOLATES

TB genotyping is a laboratory-based analysis of the genetic material of the bacteria that cause TB. TB genotype clusters are defined in this report as two or more cases with matching genotypes in the same county during a 3-year time period. CDC identified clusters among 20.8% of genotyped cases during 2014–2016. During this period, the percentage of clustered cases among U.S.-born persons with TB was 34.8%, compared with 14.4% among non-U.S.–born persons.

However, not all clustered cases result from recent transmission. A new section of the annual report describes county-level estimates of recent transmission based on a plausible-source case method.[3] A map depicts overall recent transmission estimates as counts to describe the relative numbers of cases attributed to recent TB transmission. An additional map of counties with ≥10 genotyped cases shows extensive recent transmission estimates as percentages of all genotyped cases to identify areas disproportionately affected by extensive recent transmission. Nationally, CDC attributes about 14% of genotyped cases reported during 2015–2016 to overall recent transmission and an estimated 5% of genotyped cases to extensive recent transmission. As these estimates are refined and increasingly adopted into routine program use, it should become possible to monitor trends in control of recent TB transmission over time.

COUNTS AND RATES BY GEOGRAPHY

California (2,062 cases, 22.2%), Texas (1,250 cases, 13.5%), New York (768 cases, 8.3%), and Florida (639 cases, 6.9%) reported the greatest number of cases in 2016, and Hawaii (8.3), Alaska (7.7), California (5.3), and Texas (4.5) reported the highest incidence rates per 100,000 persons. While case counts were comparatively low in the U.S. territories and freely associated states, reported incidence rates per 100,000 persons ranged from zero in the U.S. Virgin Islands to 243.9 in the Republic of the Marshall Islands.

Among Metropolitan Statistical Areas (MSA) with ≥500,000 population in 2016, the New York-Newark-Jersey City MSA reported the greatest number of cases (917), followed by Los Angeles-Long Beach-Anaheim (756 cases), Houston-The Woodlands-Sugar Land (350 cases), and San Francisco-Oakland-Hayward (337 cases). However, McAllen-Edinburg-Mission, Texas (9.9), Urban Honolulu (8.9), San Jose-Sunnyvale-Santa Clara (8.1), and San Diego-Carlsbad (7.8) reported the highest incidence rates per 100,000 persons.

CONCLUSIONS

TB remains a serious problem in the United States even though it is both preventable and curable. Persons with TB are in every state, in rural areas and cities, in schools, workplaces, homes, and many other places where people are in close contact.

TB elimination (defined as <1 TB case per 1 million persons) would have widespread health, economic, and social benefits in the United States. The overall number of TB cases in the United States decreased from 2015 to 2016, after having increased from 2014 to 2015. While the United States continues to make slow progress toward TB elimination, statistical modeling suggests that new and expanded approaches will be required to achieve TB elimination in the United States.[1]

Current efforts to rapidly diagnose and treat TB disease are essential but insufficient to eliminate this lethal health threat. The United States needs to implement major new efforts to address latent TB infection (LTBI) to accelerate progress toward TB elimination. New essential programs consist of a surveillance system to monitor progress, scale-up of screening for LTBI in at-risk populations, increased adoption of short-course treatment regimens, engagement of affected communities and medical providers who serve those communities, and increased public health staffing for implementation and oversight. Such an effort would benefit greatly from the development of new tools, such as improved tests that indicate TB reactivation risk, and even shorter LTBI treatment regimens than currently exist.[4]

TB has afflicted individuals and communities for at least 9,000 years. It remains the leading infectious cause of death in the world, and TB infects one third of the world's population. The United States must implement increased LTBI-related activities concurrently with sustained, effective programs to diagnose and treat patients with TB disease and protect communities. This will require continued engagement with existing and new partners to better reach high-risk groups, conduct TB testing, and connect persons with LTBI or TB disease to care in order to prevent future TB cases.

REFERENCES

1. Hill AN, Becerra J, Castro KG. Modelling tuberculosis trends in the USA. Epidemiol Infect 2012; 140: 1862-1872.
2. About Foreign-Born Population. U.S. Census Bureau website https://www.census.gov/topics/population/foreign-born/about.html. Updated July 6, 2016. Accessed September 2, 2017.
3. France AM, Grant J, Kammerer JS, Navin TR. A field-validated approach using surveillance and genotyping data to estimate tuberculosis attributable to recent transmission in the United States. Am J Epidemiol 2015; 182: 799-807.
4. LoBue PA and Mermin JH. Latent tuberculosis infection: the final frontier of tuberculosis elimination in the USA. Lancet Infect Dis. 2017; S1473-3099(17)30248-7.

Technical Notes

Technical Notes

National Tuberculosis Surveillance System
Reporting areas (i.e., the 50 states, the District of Columbia (DC), New York City, Puerto Rico, and other U.S. jurisdictions in the Pacific Ocean and Caribbean Sea) provide information regarding tuberculosis (TB) cases to CDC's National TB Surveillance System (NTSS) by using a standard case report form, Report of Verified Case of Tuberculosis (RVCT). TB cases are verified according to the Tuberculosis Case Definition for Public Health Surveillance (Appendix A). TB cases are reported and counted according to the Recommendations for Reporting and Counting Tuberculosis Cases (Appendix B).

TB Case Definition
In 2009, the TB case definition was modified. TB cases are verified according to the following specified laboratory and clinical criteria (see Appendix A).

Laboratory Criteria for Diagnosis
A TB case may be verified by the laboratory case definition with at least one of the following criteria: (1) isolation of *Mycobacterium tuberculosis* complex from a clinical specimen; ***or*** (2) demonstration of *M. tuberculosis* complex from a clinical specimen by nucleic acid amplification test (NAAT), ***or*** (3) demonstration of acid-fast bacilli (AFB) in a clinical specimen when a culture has not been or cannot be obtained or is falsely negative or contaminated.

Clinical Case Criteria
A TB case may be verified by the clinical case definition in the presence of ***all*** of the following clinical criteria: (1) a positive tuberculin skin test (TST) result or positive interferon gamma release assay (IGRA) result for *M. tuberculosis*; ***and*** (2) other signs and symptoms compatible with TB (e.g., abnormal chest radiograph, abnormal chest computerized tomography [CT] scan, or other chest imaging study or clinical evidence of current disease); ***and*** (3) treatment with two or more anti-TB drugs; ***and*** (4) a completed diagnostic evaluation.

Provider Diagnosis
Provider diagnosis is not a component of the case definition for TB as described in Appendix A. However, when cases of TB are diagnosed but do not meet either the clinical or laboratory case definition, reporting areas have the option of verifying TB cases on the basis of provider diagnosis as described in Appendix B. Through 2008, the RVCT did not collect information regarding IGRA results. If an IGRA was performed in lieu of TST, the RVCT would have indicated that TST was not performed. Thus, culture- and smear-negative cases without a TST that were diagnosed by a positive IGRA result before 2008 were considered to have been confirmed by provider diagnosis. Starting in 2009, positive results for an IGRA have been included as part of the clinical case definition for TB confirmation. Anergic patients with a clinical presentation consistent with TB but without laboratory evidence of *M. tuberculosis* complex would also be an example of provider diagnosis and one that has not changed over time.

TB Case Verification Criteria Calculation
The software for TB surveillance developed by CDC includes a calculated variable for TB case verification called "Vercrit," which was modified in 2009. The new variables, Nucleic Acid Amplification Test (NAAT) Result, Interferon Gamma Release Assay (IGRA) for *Mycobacterium tuberculosis* at Diagnosis, and Initial Chest CT Scan or Other Chest Imaging Study were added in the Vercrit calculation.

Vercrit is calculated by using the following criteria in hierarchical order:

1. Positive culture.
2. Positive NAAT.
3. Positive AFB.
4. Clinical case confirmation.
5. Provider diagnosis.

Reporting and Counting of TB Cases
In 2009, the recommendations for reporting and counting of TB cases (Appendix B) were modi-

fied. TB cases that are verified but not countable for morbidity statistics are now reported to CDC as a measure of programmatic and case management burden. However, data for noncountable TB cases are incomplete and therefore are not included in this report.

The recommendations for counting TB cases among immigrants, refugees, and foreign visitors were revised on the basis of the 2007 recommendations in the *Technical Instructions for Tuberculosis Screening and Treatment for Panel Physicians*.[1] Regardless of panel physician classification or citizenship status, immigrants and refugees examined after arriving in the United States and receiving a diagnosis of clinically active TB requiring anti-TB medications should be reported and counted by the locality of their residence at the time of diagnosis. Foreign visitors with diagnosed TB receiving anti-TB therapy and planning to remain in the United States for ≥90 days should be reported and counted by the locality of current residence.

RVCT Variables

Data regarding demographic characteristics, clinical or laboratory diagnosis, initial treatment, and treatment outcomes are collected through the following three RVCT data collection reports:

1. **Report of Verified Case of Tuberculosis** — used for all patients with a verified TB case.
2. **Initial Drug Susceptibility Report (Follow-Up Report 1)** — used for all patients who had a culture that was positive for *M. tuberculosis* complex.
3. **Case Completion Report (Follow-Up Report 2)** — used for all patients who were alive when TB was diagnosed.

[1]CDC. Immigration Requirements: Technical Instructions for Tuberculosis Screening and Treatment 2009. Atlanta: CDC, Division of Global Migration and Quarantine, revised October, 2009; http://www.cdc.gov/immigrantrefugeehealth/pdf/tuberculosis-ti-2009.pdf.

The instructions for completing the RVCT forms and the definitions for all data items are available in Centers for Disease Control and Prevention (CDC). Report of Verified Case of Tuberculosis (RVCT) Instruction Manual. Atlanta, GA: U.S. Department of Health and Human Services, CDC; 2009. Available at: http://www.cdc.gov/tb/programs/rvct/InstructionManual.pdf.

Tabulation and Presentation of TB Data

This report presents summary data for TB cases counted by reporting areas through the end of 2016. TB cases are tabulated by year in which the reporting area verified that the patient had TB and included the patient in its official annual TB case count. Since 2004, the published report has reflected updated information regarding the numbers of cases of confirmed TB for each year from 1993 onward. Totals for the United States include data from the 50 states and DC.

Trend data are presented in Tables 1–15. Age group tabulations are based on the patient's age during the month and year the patient was reported to the health department as having a suspected TB case. State or metropolitan area data tabulations are based on the patient's residence at the time of TB diagnosis.

Rates

Rates are expressed as the number of cases reported each calendar year per 100,000 persons. Population denominators used in calculating TB rates were based on official census and midyear postcensal estimates from the U.S. Census Bureau. In Tables 1, 29, and 30, the U.S. total populations for 1990–1999 were taken from the Bridged-Race Intercensal Population Estimates for July 1, 1990–July 1, 1999 (ftp://ftp.cdc.gov/pub/health_statistics/nchs/datasets/nvss/bridgepop/documentationbridgedintercena1.doc); populations for 2000–2009 were taken from the U.S. Census Intercensal Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico for April 1, 2000–July 1, 2010 (https://www.census.gov/data/tables/time-series/demo/popest/intercensal-2000-2010-state.

html); and populations for 2010–2016 were taken from the U.S. Census Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2016 (https://www2.census.gov/programs-surveys/popest/tables/2010-2016/state/totals/nst-est2016-01.xlsx). Beginning in 2004, unrounded numbers were applied to calculate the annual percentage change in the TB case rate.

During 2003, two modifications were made to the RVCT form: (1) entries for multiple race (two or more races reported for a person) were allowed, and (2) the previous category of "Asian/Pacific Islander" was divided into "Asian" and "Native Hawaiian/Other Pacific Islander." To calculate rates for Tables 2 and 4, denominators for 1993–1999 were obtained from the U.S. Census Monthly Postcensal Resident Population, by single year of age, sex, race, and Hispanic origin (https://www.census.gov/data/datasets/time-series/demo/popest/1990s-national.html); denominators for 2000–2009 were obtained from U.S. Census Intercensal Estimates of the Resident Population by Sex, Race, and Hispanic Origin for the United States: April 1, 2000 to July 1, 2010 (https://www.census.gov/data/datasets/time-series/demo/popest/intercensal-2000-2010-state.html); and denominators for 2010–2016 were obtained from the U.S. Census Annual Estimates of the Resident Population by Sex, Race, and Hispanic Origin: April 1, 2010 to July 1, 2016 (https://www.census.gov/data/tables/2016/demo/popest/nation-detail.html).

The population source for nativity is the Current Population Survey, which is used to calculate case rates for U.S.- and non-U.S.–born persons with diagnosed TB. U.S.-born populations includes persons born in the 50 states and DC, those born abroad to U.S. parents, and those born in U.S. territories. In Table 5, the populations for U.S.- and non-U.S.–born persons for 1993 were obtained from Quarterly Estimates of the United States Foreign-born and Native Resident Populations: April 1, 1990–July 1, 1999 (http://www.census.gov/population/estimates/nation/nativity/fbtab001.txt). Denominators for computing the 1994–2016 rates were based on extrapolations from the U.S. Census Current Population Survey (accessed July 2016) through DataFerrett at: http://dataferrett.census.gov/). Denominators for computing 2016 rates in Table 17 were obtained from U.S. Census Annual Estimates of the Resident Population by Sex, Race, and Hispanic Origin: April 1, 2010 to July 1, 2016 (https://www.census.gov/data/tables/2016/demo/popest/nation-detail.html).

Mortality Data

The annual mortality rate is calculated as the number of deaths caused by TB in that year, divided by the estimated population for the year, multiplied by 100,000 (Table 1). The number of deaths was obtained from the CDC's National Center for Health Statistics, Multiple Cause of Death Files, 1999–2015, available from CDC's WONDER online database and released in 2017. Data were compiled from the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Finalized numbers of TB-related deaths for 2016 were unavailable at the time of this publication.

Drug Resistance

Drug-resistance patterns are displayed in separate tables with drug-resistance trend data by previous TB status and origin of birth. Isoniazid resistance and multidrug resistance are displayed in Tables 8 and 9, respectively.

Completion of Tuberculosis Therapy

Tables 10, 57, 58, and 59 present percentages of completion of TB therapy (COT). Data collected by RVCT Follow Up Report-2 forms regarding date and reason therapy was stopped (e.g., the patient completed the therapy or the patient died) were used to calculate COT percentages. Cases were stratified by the indicated length of therapy, based on American Thoracic Society, CDC, and Infectious Diseases Society of America treatment guidelines in effect during the period covered

and the patient's initial drug-susceptibility test results, age, and disease site.[2]

In Table 58, the first column lists the total number of cases reported during 2014. The remaining columns are grouped under two headings: therapy of ≤1 year indicated and therapy of >1 year indicated. Patients eligible to complete therapy in ≤1 year had to have been alive at time of diagnosis and initiated therapy with ≥1 drug. Eligible patients did not have rifampin resistance; did not die in ≤1 year after initiating therapy; did not move out of the country in ≤1 year after initiating therapy; and did not have meningeal TB, bone or joint TB, or TB of the central nervous system, regardless of age. Additionally, TB patients aged 0–14 years were ineligible to complete therapy in ≤1 year if they had disseminated disease (defined as miliary TB, a positive TB blood culture, or a positive NAAT on a blood specimen). Patients with culture-negative disease, those with an unknown culture status, and those with culture-positive disease but unknown initial drug-susceptibility test results were included under the category of therapy of ≤1 year indicated.

For the group with an indicated length of therapy of ≤1 year, percentages are displayed for both COT in ≤1 year and for COT regardless of duration (i.e., duration of therapy ≤1 year or >1 year). For COT ≤1 year, the numerator included only those patients completing therapy in ≤366 days (based on the dates therapy was started and stopped). Patients with missing dates were classified as "treatment not completed" for this calculation.

COT percentages, regardless of duration, were calculated by dividing the number of patients reported as having completed therapy by the number of total eligible patients. Patients with an outcome other than completed therapy (i.e., moved, lost to follow-up, refused treatment, or other) were classified as "treatment not completed." Patients with an unknown outcome were also classified as "treatment not completed." For the group of indicated therapy length >1 year, only COT percentages regardless of duration, are presented. Table 10 provides percentages for COT ≤1 year and for COT regardless of duration for the group with an indicated therapy of ≤1 year only. Table 57 presents COT percentages by ethnicity and non-Hispanic race and by state for those among whom therapy ≤1 year was indicated.

TB Disease Site

Miliary disease should be reported as a pulmonary form of TB (Tables 7, 37, and 38). Beginning in 2009, miliary disease could not be classified as a TB disease site because it is a clinical or a radiologic finding and should be recorded under Initial Chest Radiograph, Initial Chest CT Scan, or Other Chest Imaging Study. During 1997–2008, miliary disease was classified as both an extrapulmonary and a pulmonary form of TB. In publications before 1997, miliary disease was classified as extrapulmonary TB unless pulmonary disease was reported as the major TB disease site.

Reporting of HIV Status

Information regarding human immunodeficiency virus (HIV) status for persons with TB is displayed in Tables 11 and 50 for those persons not dead at diagnosis; Table 11 also lists trend data for persons aged 25–44 years. Reporting completeness for HIV status has significantly improved to 95% of TB patients tested among persons aged 25–44 years during 2016; however, this variable is still underreported across jurisdictions. Data regarding the HIV-infection status of persons reported with TB should be interpreted with caution because these data are not representative of all TB patients with HIV infection. HIV testing is performed after a patient receives counseling and gives informed consent. TB patients who are tested anonymously might choose not to share HIV testing results with their

[2]CDC. Treatment of Tuberculosis, American Thoracic Society, CDC, and the Infectious Diseases Society of America. MMWR 2003; 52 (No. RR-11): 1–77.

health care provider. TB patients managed in the private sector can receive confidential HIV testing, but results might not be reported to the health department's TB program. Additionally, certain factors can influence HIV testing among TB patients, including the extent to which testing is targeted or routinely offered to specific groups (e.g., males aged 25–44 years, injection-drug users, or homeless persons) and the availability of and access to HIV testing services. These data might overrepresent or underrepresent the proportion of TB patients known to be HIV-infected in a reporting area.

Primary Occupation for the Past Year

Table 47 reflects the modified 2009 RVCT variable, Primary Occupation Within the Past Year, which replaces the Occupation Within Past 24 Months of TB Diagnosis in previous reports. After the 2009 RVCT revision, Multiple Occupation was removed and the Retired and Not Seeking Employment categories were added.

Reason Therapy Was Stopped

Tables 12 and 55 now include a patient's adverse reaction to anti-TB drug therapy as an option for the reason therapy was stopped. The 2009 RVCT revision removed the option of Moved as a valid response to the variable Reason Therapy Stopped, and this option is therefore not reported after 2009. Those cases entered as Moved as reason therapy was stopped after 2009 are now included in the Unknown category.

Metropolitan Statistical Areas

Tables 60 through 64 present data by metropolitan statistical areas (MSAs) having an estimated 2016 population of ≥500,000 persons. MSAs are defined by the White House Office of Management and Budget (OMB), and the definitions were based on the application of the 2010 OMB standards for delineating MSAs to Census Bureau population estimates for 2012–2013 announced as of July 2015 (https://www.bls.gov/lau/lausmsa.htm).

The MSA definitions apply to all areas except the six New England states; for those states, the New England County Metropolitan Areas (NECMAs) are used. MSAs are named for a central city in the MSA or NECMA, can include multiple cities and counties, and can cross state boundaries. For example, the TB cases and case rates presented for DC in Table 29 include only persons residing within DC's geographic boundaries. However, the TB cases and case rates for the Washington, DC-MSA (Table 60) include persons residing within the multiple counties in the metropolitan area, including counties in Maryland, Virginia, and West Virginia. Cities or MSAs with incomplete or unavailable data were not included in the tables, and certain cities' or MSAs' total numbers might be underreported because of missing information.

National Tuberculosis Genotyping Service

National Tuberculosis Genotyping Service laboratories primarily use two genotyping methods: spoligotyping and MIRU–VNTR (mycobacterial interspersed repetitive units–variable number of tandem repeats). Both methods require only a minor amount of culture material, provide digital results, and are relatively quick. Retrospective 24-locus MIRU–VNTR for older isolates can be performed, if requested, and can help in further differentiating genotype clusters. All isolates are prepared for long-term storage at genotyping laboratories or CDC.

Tuberculosis Genotyping Information Management System

In March 2010, the Tuberculosis Genotyping Information Management System (TB GIMS) was launched by CDC as a secure Internet-based system to support ongoing use of TB genotyping data in TB control activities. TB GIMS facilitates systematic data collection of TB genotyping results, and it integrates genotyping results with epidemiologic data collected by NTSS to form a national and centralized database. Primary users of TB GIMS include TB laboratories that submit isolates for genotyping, national CDC-contracted genotyping laboratories, state and local TB con-

trol programs, and CDC programs that apply this information for TB control activities.

Genotyping results from the national genotyping laboratories or CDC are uploaded into TB GIMS as they become available. Line-listed data from the NTSS are also uploaded into TB GIMS weekly. After genotyping results have been linked to individual patient surveillance data in TB GIMS, the record is considered complete. These complete records are essential for the majority of the applications of TB genotyping, including all reports and maps as well as for using the outbreak detection system to identify potential chains of transmission and outbreaks. Twenty-four system updates have occurred for adding new reports, data management functions, and other tools since TB GIMS was released in March 2010. As of July 2017, a total of 579 local, state, and federal users have accessed the system.

Genotype Clustering

A genotype cluster comprises two or more cases in a jurisdiction during a specified period having *M. tuberculosis* isolates that share matching genotypes. The jurisdiction and period used vary on the basis of the specific application. Cases that are part of the same genotype cluster are likely to be related by TB transmission in some way; however, the cases might not be directly related (i.e., one person did not necessarily give TB to another person in the cluster) or recently related (i.e., both persons might have contracted TB from the same person, but the exposure might have happened years ago). In TB GIMS, clustering is defined as ≥2 cases with matching genotypes (spoligotype and 24-locus MIRU-VNTR) in a single county within a 3-year period.

Mycobacterium bovis

For culture-confirmed TB cases that have been genotyped, *Mycobacterium bovis* can be defined primarily on the basis of spoligotyping results. The genotype-based definition for *M. bovis* required either (1) the absence of spoligotyping spacers 3, 9, 16, and 39–43; the presence of ≥1 of the spacers 29–32; and the presence of ≥1 of the spacers 33–36; or (2) the absence of spacers 3, 9, 16, and 39–43 and ≥2 copies of the repeated sequence at MIRU locus 24; or (3) determination based on microbiologic expertise. Data reported for 2004–2016 exclude cases of bacillus Calmette-Guérin *M. bovis*, which were defined as spoligotype 676773777777600 with x, y, or z in the second MIRU position. Although cases of bacillus Calmette-Guérin *M. bovis* (defined as spoligotype 676773777777600 with x, y, or z in the second MIRU position) were reported during 2004–2016, they are excluded from this report.

Recent Transmission

Estimates are based on a plausible-source case method that is described in detail elsewhere.[3] Briefly, a given case is designated as attributed to recent transmission if a plausible source case with the following five characteristics can be identified in the national surveillance data: the same *M. tuberculosis* GENType, an infectious form of TB disease, patient's residential location within 10 miles, patient's age ≥10 years, and a diagnosis within the 2 years before the given case. These criteria were field-validated using local epidemiologic assessments of whether 1,188 cases in three states were actually due to recent transmission that was attributed to source cases reported during 1996–2000. Any given case with a plausible source case identified is included regardless of cluster size. Among cases attributed to overall recent transmission, a given case can also be attributed to extensive recent transmission if at least five other cases could be identified in a plausible transmission chain within 3 years prior to the given case.

[3]France AM, Grant J, Kammerer JS, Navin TR. A field-validated approach using surveillance and genotyping data to estimate tuberculosis attributable to recent transmission in the United States. Am J Epidemiol 2015; 182: 799-807.

Morbidity Trend Tables

Table 1. Tuberculosis Cases, Case Rates per 100,000 Population, Deaths, and Death Rates per 100,000 Population, and Percent Change: United States, 1953–2016

	Tuberculosis cases				Tuberculosis deaths			
			Percent change				Percent change	
Year	Number	Rate	Number	Rate	Number[1]	Rate[1]	Number	Rate
1953	84,304	52.6	—	—	19,707	12.4	—	—
1954	79,775	48.9	–5.4	–7.0	16,527	10.2	–16.1	–17.7
1955	77,368	46.6	–3.0	–4.7	15,016	9.1	–9.1	–10.8
1956	69,895	41.4	–9.7	–11.1	14,137	8.4	–5.9	–7.7
1957	67,149	39.0	–3.9	–5.8	13,390	7.8	–5.3	–7.1
1958	63,534	36.3	–5.4	–6.9	12,417	7.1	–7.3	–9.0
1959	57,535	32.4	–9.4	–10.7	11,474	6.5	–7.6	–8.5
1960	55,494	30.7	–3.5	–5.2	10,866	6.0	–5.3	–7.7
1961	53,726	29.2	–3.2	–4.9	9,938	5.4	–8.5	–10.0
1962	53,315	28.6	–0.8	–2.1	9,506	5.1	–4.3	–5.6
1963	54,042	28.6	1.4	0	9,311	4.9	–2.1	–3.9
1964	50,874	26.5	–5.9	–7.3	8,303	4.3	–10.8	–12.2
1965	49,016	25.2	–3.7	–4.9	7,934	4.1	–4.4	–4.7
1966	47,767	24.3	–2.5	–3.6	7,625	3.9	–3.9	–4.9
1967	45,647	23.0	–4.4	–5.3	6,901	3.5	–9.5	–10.3
1968	42,623	21.2	–6.6	–7.8	6,292	3.1	–8.8	–11.4
1969	39,120	19.3	–8.2	–9.0	5,567	2.8	–11.5	–9.7
1970	37,137	18.1	–5.1	–6.2	5,217	2.6	–6.3	–7.1
1971	35,217	17.0	–5.2	–6.1	4,501	2.2	–13.7	–15.4
1972	32,882	15.7	–6.6	–7.6	4,376	2.1	–2.8	–4.5
1973	30,998	14.6	–5.7	–7.0	3,875	1.8	–11.4	–14.5
1974[2]	30,122	14.1	–2.8	–3.4	3,513	1.7	–9.3	–5.6
1975	33,989	15.7	—	—	3,333	1.6	–5.1	–5.9
1976	32,105	14.7	–5.5	–6.4	3,130	1.5	–6.1	–6.3
1977	30,145	13.7	–6.1	–6.8	2,968	1.4	–5.2	–6.7
1978	28,521	12.8	–5.4	–6.6	2,914	1.3	–1.8	–7.1
1979[3]	27,669	12.3	–3.0	–3.9	2,007	0.9	–31.1	–30.8
1980	27,749	12.2	0.3	–0.7	1,978	0.9	–1.4	–3.3
1981	27,373	11.9	–1.4	–2.3	1,937	0.8	–2.1	–3.0
1982	25,520	11.0	–6.8	–7.7	1,807	0.8	–6.7	–7.6
1983	23,846	10.2	–6.6	–7.4	1,779	0.8	–1.5	–2.4
1984	22,255	9.4	–6.7	–7.5	1,729	0.7	–2.8	–3.6
1985	22,201	9.3	–0.2	–1.1	1,752	0.7	1.3	0.4
1986	22,768	9.5	2.6	1.6	1,782	0.7	1.7	0.8
1987	22,517	9.3	–1.1	–2.0	1,755	0.7	–1.5	–2.4
1988	22,436	9.2	–0.4	–1.3	1,921	0.8	9.5	8.5
1989	23,495	9.5	4.7	3.7	1,970	0.8	2.6	1.6
1990	25,701	10.3	9.4	8.2	1,810	0.7	–8.1	–9.2
1991	26,283	10.4	2.3	0.9	1,713	0.7	–5.4	–6.6
1992	26,673	10.4	1.5	0.1	1,705	0.7	–0.5	–1.8
1993	25,102	9.7	–5.9	–7.1	1,631	0.6	–4.3	–5.6
1994	24,206	9.2	–3.6	–4.7	1,478	0.6	–9.4	–10.5
1995	22,726	8.5	–6.1	–7.2	1,336	0.5	–9.6	–10.7
1996	21,210	7.9	–6.7	–7.8	1,202	0.4	–10.0	–11.1
1997	19,751	7.2	–6.9	–8.0	1,166	0.4	–3.0	–4.2
1998	18,286	6.6	–7.4	–8.5	1,112	0.4	–4.6	–5.7
1999	17,499	6.3	–4.3	–5.4	930	0.3	–16.4	–17.3
2000	16,308	5.8	–6.8	–7.8	776	0.3	–16.6	–17.5
2001	15,945	5.6	–2.2	–3.2	764	0.3	–1.5	–2.5
2002	15,055	5.2	–5.6	–6.5	784	0.3	2.6	1.7
2003	14,835	5.1	–1.5	–2.3	711	0.2	–9.3	–10.1
2004	14,499	5.0	–2.3	–3.2	657	0.2	–7.6	–8.4
2005	14,065	4.8	–3.0	–3.9	648	0.2	–1.4	–2.3
2006	13,728	4.6	–2.4	–3.3	652	0.2	0.6	–0.3
2007	13,281	4.4	–3.3	–4.2	554	0.2	–15.0	–15.8
2008	12,890	4.2	–2.9	–3.9	585	0.2	5.6	4.6
2009	11,517	3.8	–10.7	–11.4	529	0.2	–9.6	–10.4
2010	11,157	3.6	–3.1	–3.9	569	0.2	7.6	6.7
2011	10,509	3.4	–5.8	–6.5	539	0.2	–5.3	–6.0
2012	9,940	3.2	–5.4	–6.1	510	0.2	–5.4	–6.1
2013	9,561	3.0	–3.8	–4.5	555	0.2	8.8	8.1
2014	9,398	3.0	–1.7	–2.4	493	0.2	–11.2	–11.8
2015	9,547	3.0	1.6	0.8	470	0.1	–4.7	–5.4
2016	9,272	2.9	–2.9	–3.6	—	—	—	—

[1]Official tuberculosis mortality statistics were compiled by the National Center for Health Statistics, CDC (http://wonder.cdc.gov/mcd-icd10.html); accessed June 30, 2017.
[2]Case data after 1974 are not comparable to prior years due to changes in the surveillance case definition that became effective in 1975.
[3]The large decrease in death rate in 1979 occurred because late effects of tuberculosis (e.g., bronchiectasis or fibrosis) and pleurisy with effusion (without mention of cause) are no longer included in tuberculosis deaths.
Percent change in tuberculosis death rates is calculated with unrounded figures. See Technical Notes.
Note: The 1993 to 2016 tuberculosis case counts and rates were updated using the following sources: Bridged-Race 1990–1999 Intercensal Population Estimates for 1990–1999 (ftp://ftp.cdc.gov/pub/health_statistics/nchs/datasets/nvss/bridgepop/documentationbridgedintercena1.doc), Intercensal Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2000 to July 1, 2010 (https://www.census.gov/data/tables/time-series/demo/popest/intercensal-2000-2010-state.html) and Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2016 (http://www.census.gov/data/tables/2016/demo/popest/nation-total.html); accessed July 6, 2017.
Percentage change results reported to one decimal. See Surveillance Slides #2 and #3.

Table 2. Tuberculosis Cases, Percentages, and Case Rates per 100,000 Population by Hispanic Ethnicity and Non-Hispanic Race: United States, 1993–2016

Year	Total cases	Non-Hispanic																		Hispanic/Latino[4]			Unknown/ missing[5]	
		American Indian/ Alaska Native			Asian[1]			Black/African American			Native Hawaiian/Other Pacific Islander[2]			White			Multiple race[3]							
		No.	(%)	Rate	No.	(%)	Rate	No.	(%)	Rate	No.	(%)	Rate	No.	(%)	Rate	No.	(%)	Rate	No.	(%)	Rate	No.	(%)
1993	25,102	272	(1.1)	14.4	3,454	(13.8)	42.2	8,947	(35.6)	29.1	—	—	—	6,903	(27.5)	3.6	—	—	—	5,137	(20.5)	20.4	389	(1.5)
1994	24,206	327	(1.4)	17.1	3,639	(15.0)	42.8	8,383	(34.6)	26.9	—	—	—	6,572	(27.2)	3.4	—	—	—	5,019	(20.7)	19.2	266	(1.1)
1995	22,726	319	(1.4)	16.5	3,840	(16.9)	43.4	7,554	(33.2)	23.9	—	—	—	5,972	(26.3)	3.1	—	—	—	4,834	(21.3)	17.8	207	(0.9)
1996	21,210	287	(1.4)	14.7	3,666	(17.3)	39.9	7,097	(33.5)	22.2	—	—	—	5,487	(25.9)	2.8	—	—	—	4,492	(21.2)	16.0	181	(0.9)
1997	19,751	264	(1.3)	13.3	3,683	(18.6)	38.6	6,604	(33.4)	20.4	—	—	—	4,824	(24.4)	2.5	—	—	—	4,217	(21.4)	14.5	159	(0.8)
1998	18,286	254	(1.4)	12.7	3,516	(19.2)	35.6	5,823	(31.8)	17.8	—	—	—	4,475	(24.5)	2.3	—	—	—	4,089	(22.4)	13.5	129	(0.7)
1999	17,499	242	(1.4)	11.9	3,519	(20.1)	34.5	5,549	(31.7)	16.8	—	—	—	4,227	(24.2)	2.2	—	—	—	3,864	(22.1)	12.3	98	(0.6)
2000	16,308	232	(1.4)	11.0	3,392	(20.8)	31.3	5,148	(31.6)	15.0	—	—	—	3,638	(22.3)	1.9	—	—	—	3,803	(23.3)	10.7	95	(0.6)
2001	15,945	226	(1.4)	10.7	3,499	(21.9)	30.9	4,782	(30.0)	13.7	—	—	—	3,346	(21.0)	1.7	—	—	—	4,009	(25.1)	10.8	83	(0.5)
2002	15,055	185	(1.2)	8.7	3,322	(22.1)	28.2	4,467	(29.7)	12.7	—	—	—	3,042	(20.2)	1.6	—	—	—	3,973	(26.4)	10.3	66	(0.4)
2003	14,835	179	(1.2)	8.3	3,460	(23.3)	29.3	4,159	(28.0)	11.7	64	(0.4)	15.7	2,792	(18.8)	1.4	37	(0.2)	0.9	4,105	(27.7)	10.2	39	(0.3)
2004	14,499	157	(1.1)	7.2	3,335	(23.0)	27.3	4,070	(28.1)	11.4	63	(0.4)	15.0	2,631	(18.1)	1.3	34	(0.2)	0.8	4,181	(28.8)	10.1	28	(0.2)
2005	14,065	155	(1.1)	7.1	3,201	(22.8)	25.3	3,954	(28.1)	10.9	54	(0.4)	12.4	2,570	(18.3)	1.3	46	(0.3)	1.0	4,044	(28.8)	9.4	41	(0.3)
2006	13,728	165	(1.2)	7.5	3,297	(24.0)	25.2	3,730	(27.2)	10.2	52	(0.4)	11.6	2,387	(17.4)	1.2	39	(0.3)	0.8	4,049	(29.5)	9.1	9	(0.1)
2007	13,281	133	(1.0)	6.0	3,447	(26.0)	25.5	3,476	(26.2)	9.4	95	(0.7)	20.6	2,207	(16.6)	1.1	24	(0.2)	0.5	3,875	(29.2)	8.4	24	(0.2)
2008	12,890	136	(1.1)	6.1	3,396	(26.3)	24.3	3,280	(25.4)	8.8	69	(0.5)	14.5	2,142	(16.6)	1.1	41	(0.3)	0.8	3,801	(29.5)	8.0	25	(0.2)
2009	11,517	102	(0.9)	4.5	3,205	(27.8)	22.3	2,869	(24.9)	7.6	73	(0.6)	15.0	1,817	(15.8)	0.9	48	(0.4)	0.9	3,371	(29.3)	6.8	32	(0.3)
2010	11,157	151	(1.4)	6.7	3,188	(28.6)	21.6	2,675	(24.0)	7.0	96	(0.9)	19.2	1,759	(15.8)	0.9	42	(0.4)	0.7	3,231	(29.0)	6.4	15	(0.1)
2011	10,509	132	(1.3)	5.8	3,160	(30.1)	20.8	2,408	(22.9)	6.3	82	(0.8)	16.1	1,645	(15.7)	0.8	56	(0.5)	1.0	3,005	(28.6)	5.8	21	(0.2)
2012	9,940	133	(1.3)	5.8	3,045	(30.6)	19.4	2,245	(22.6)	5.8	65	(0.7)	12.5	1,563	(15.7)	0.8	57	(0.6)	0.9	2,789	(28.1)	5.3	43	(0.4)
2013	9,561	124	(1.3)	5.3	3,097	(32.4)	19.2	2,088	(21.8)	5.3	62	(0.6)	11.6	1,414	(14.8)	0.7	51	(0.5)	0.8	2,699	(28.2)	5.0	26	(0.3)
2014	9,398	114	(1.2)	4.8	3,083	(32.8)	18.5	2,012	(21.4)	5.1	91	(1.0)	16.7	1,243	(13.2)	0.6	80	(0.9)	1.3	2,748	(29.2)	5.0	27	(0.3)
2015	9,547	145	(1.5)	6.1	3,295	(34.5)	19.1	1,996	(20.9)	5.0	102	(1.1)	18.3	1,236	(12.9)	0.6	52	(0.5)	0.8	2,699	(28.3)	4.8	22	(0.2)
2016	9,272	112	(1.2)	4.7	3,195	(34.5)	18.0	1,975	(21.3)	4.9	79	(0.9)	13.9	1,208	(13.0)	0.6	64	(0.7)	0.9	2,601	(28.1)	4.5	38	(0.4)

[1]Asian race category reporting includes Pacific Islander from 1993–2002.
[2]Native Hawaiian/Other Pacific Islander race first reported separately in 2003.
[3]Indicates two or more races reported for a person. Category first reported in 2003 and does not include persons of Hispanic/Latino origin.
[4]Persons of Hispanic ethnicity may be of any or multiple race.
[5]The higher count for unknown or missing race results for 1993–2001 reflect the impact of the transitional period of incorporating new race definitions for Asian, Native Hawaiian, and multiple race in 2003.

Note: Rates for 1993–1999 have been updated using Resident Population: Monthly Postcensal Resident Population, by single year of age, sex, race, and Hispanic origin (https://www.census.gov/data/datasets/time-series/demo/popest/1990s-national.html); accessed July 6, 2017. Denominators for computing 2000–2009 case rates were obtained from the Intercensal Estimates of the Resident Population by Sex, Race, and Hispanic Origin for the United States: April 1, 2000 to July 1, 2010 (https://www.census.gov/data/tables/time-series/demo/popest/intercensal-2000-2010-national.html; accessed July 6, 2017. Denominators for computing 2010–2016 case rates were obtained from the Annual Estimates of the Resident Population by Sex, Race, and Hispanic Origin: April 1, 2010 to July 1, 2016 (https://www.census.gov/data/tables/2016/demo/popest/nation-detail.html); accessed July 6, 2017.
Case counts for race categories (American Indian or Alaska Native, Asian, black/African American, Native Hawaiian/Other Pacific Islander, and white) do not include persons of Hispanic ethnicity or multiple race.
Data for all years updated through June 21, 2017.
See Technical Notes.
See Surveillance Slide #10.

Table 3. Tuberculosis Cases and Percentages by Hispanic Ethnicity and Non-Hispanic Race, and by Origin of Birth: United States, 1993–2016

	Non-Hispanic																			
	American Indian/ Alaska Native		Asian[1]		Black/African American		Native Hawaiian/Other Pacific Islander[2]		White		Multiple race[3]		Hispanic/Latino[4]		Unknown/ missing[5]	
	US-born	Non-U.S.–born	US-born	Non-U.S.–born	US-born	Non-U.S.–born	US-born	Non-U.S.–born	US-born	Non-U.S.–born	US-born	Non-U.S.–born	US-born	Non-U.S.–born	US-born	Non-U.S.–born
Year	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
1993	263 (97.0)	8 (3.0)	129 (3.7)	3,317 (96.3)	8,250 (92.9)	630 (7.1)	— —	— —	6,317 (92.3)	528 (7.7)	— —	— —	2,235 (44.0)	2,849 (56.0)	239 (77.1)	71 (22.9)
1994	322 (98.5)	5 (1.5)	162 (4.5)	3,467 (95.5)	7,576 (91.1)	738 (8.9)	— —	— —	6,009 (92.4)	494 (7.6)	— —	— —	1,989 (40.1)	2,967 (59.9)	122 (57.3)	91 (42.7)
1995	313 (98.1)	6 (1.9)	148 (3.9)	3,689 (96.1)	6,750 (89.4)	797 (10.6)	— —	— —	5,427 (91.1)	529 (8.9)	— —	— —	1,906 (39.6)	2,912 (60.4)	119 (60.7)	77 (39.3)
1996	281 (97.9)	6 (2.1)	157 (4.3)	3,502 (95.7)	6,301 (88.8)	793 (11.2)	— —	— —	4,967 (90.8)	504 (9.2)	— —	— —	1,603 (35.9)	2,859 (64.1)	76 (46.3)	88 (53.7)
1997	259 (98.5)	4 (1.5)	155 (4.2)	3,522 (95.8)	5,718 (86.7)	875 (13.3)	— —	— —	4,255 (88.6)	546 (11.4)	— —	— —	1,464 (34.9)	2,727 (65.1)	73 (48.0)	79 (52.0)
1998	249 (98.0)	5 (2.0)	139 (4.0)	3,371 (96.0)	4,972 (85.5)	845 (14.5)	— —	— —	3,914 (87.6)	553 (12.4)	— —	— —	1,280 (31.5)	2,785 (68.5)	55 (46.2)	64 (53.8)
1999	237 (97.9)	5 (2.1)	139 (4.0)	3,368 (96.0)	4,607 (83.3)	924 (16.7)	— —	— —	3,637 (86.3)	575 (13.7)	— —	— —	1,119 (29.2)	2,717 (70.8)	44 (55.7)	35 (44.3)
2000	226 (97.4)	6 (2.6)	139 (4.1)	3,243 (95.9)	4,106 (79.8)	1,038 (20.2)	— —	— —	3,102 (85.3)	534 (14.7)	— —	— —	1,015 (26.8)	2,770 (73.2)	44 (50.6)	43 (49.4)
2001	214 (95.1)	11 (4.9)	123 (3.5)	3,356 (96.5)	3,664 (76.7)	1,114 (23.3)	— —	— —	2,787 (83.6)	547 (16.4)	— —	— —	1,025 (25.7)	2,965 (74.3)	35 (46.1)	41 (53.9)
2002	183 (98.9)	2 (1.1)	125 (3.8)	3,187 (96.2)	3,401 (76.4)	1,051 (23.6)	— —	— —	2,547 (83.9)	490 (16.1)	— —	— —	979 (24.8)	2,974 (75.2)	28 (45.9)	33 (54.1)
2003	176 (98.3)	3 (1.7)	152 (4.4)	3,297 (95.6)	3,087 (74.4)	1,064 (25.6)	31 (48.4)	33 (51.6)	2,369 (85.0)	418 (15.0)	9 (24.3)	28 (75.7)	1,000 (24.5)	3,088 (75.5)	18 (52.9)	16 (47.1)
2004	154 (98.1)	3 (1.9)	145 (4.4)	3,182 (95.6)	2,972 (73.1)	1,096 (26.9)	27 (42.9)	36 (57.1)	2,211 (84.1)	418 (15.9)	14 (41.2)	20 (58.8)	1,064 (25.5)	3,107 (74.5)	14 (51.9)	13 (48.1)
2005	149 (96.1)	6 (3.9)	121 (3.8)	3,077 (96.2)	2,874 (72.8)	1,075 (27.2)	20 (37.0)	34 (63.0)	2,134 (83.1)	434 (16.9)	24 (52.2)	22 (47.8)	955 (23.7)	3,073 (76.3)	13 (35.1)	24 (64.9)
2006	162 (98.2)	3 (1.8)	130 (3.9)	3,164 (96.1)	2,595 (69.6)	1,132 (30.4)	16 (30.8)	36 (69.2)	1,959 (82.1)	426 (17.9)	11 (28.2)	28 (71.8)	983 (24.4)	3,051 (75.6)	3 (37.5)	5 (62.5)
2007	129 (97.0)	4 (3.0)	134 (3.9)	3,303 (96.1)	2,459 (71.0)	1,003 (29.0)	25 (26.3)	70 (73.7)	1,784 (81.2)	413 (18.8)	9 (37.5)	15 (62.5)	877 (22.8)	2,968 (77.2)	14 (77.8)	4 (22.2)
2008	133 (97.8)	3 (2.2)	149 (4.4)	3,243 (95.6)	2,239 (68.3)	1,041 (31.7)	13 (18.8)	56 (81.2)	1,754 (81.9)	387 (18.1)	16 (39.0)	25 (61.0)	921 (24.3)	2,876 (75.7)	12 (48.0)	13 (52.0)
2009	98 (96.1)	4 (3.9)	147 (4.6)	3,054 (95.4)	1,923 (67.1)	945 (32.9)	25 (34.2)	48 (65.8)	1,439 (79.2)	378 (20.8)	15 (31.3)	33 (68.8)	847 (25.2)	2,513 (74.8)	7 (22.6)	24 (77.4)
2010	149 (98.7)	2 (1.3)	129 (4.0)	3,059 (96.0)	1,770 (66.2)	903 (33.8)	38 (40.0)	57 (60.0)	1,423 (80.9)	335 (19.1)	16 (38.1)	26 (61.9)	806 (25.0)	2,420 (75.0)	0 (0)	15 (100.0)
2011	130 (98.5)	2 (1.5)	131 (4.1)	3,027 (95.9)	1,541 (64.0)	866 (36.0)	29 (35.4)	53 (64.6)	1,318 (80.1)	327 (19.9)	23 (41.1)	33 (58.9)	765 (25.5)	2,238 (74.5)	4 (19.0)	17 (81.0)
2012	132 (99.2)	1 (0.8)	122 (4.0)	2,921 (96.0)	1,347 (60.0)	898 (40.0)	24 (36.9)	41 (63.1)	1,264 (80.9)	298 (19.1)	21 (36.8)	36 (63.2)	692 (24.8)	2,096 (75.2)	25 (58.1)	18 (41.9)
2013	122 (98.4)	2 (1.6)	153 (4.9)	2,943 (95.1)	1,252 (60.0)	835 (40.0)	20 (32.3)	42 (67.7)	1,090 (77.1)	323 (22.9)	24 (49.0)	25 (51.0)	656 (24.3)	2,040 (75.7)	13 (52.0)	12 (48.0)
2014	114 (100.0)	0 (0)	139 (4.5)	2,943 (95.5)	1,185 (58.9)	827 (41.1)	40 (44.0)	51 (56.0)	966 (77.7)	277 (22.3)	26 (32.5)	54 (67.5)	651 (23.7)	2,094 (76.3)	8 (30.8)	18 (69.2)
2015	144 (99.3)	1 (0.7)	139 (4.2)	3,155 (95.8)	1,141 (57.2)	855 (42.8)	42 (41.2)	60 (58.8)	983 (79.5)	253 (20.5)	24 (46.2)	28 (53.8)	659 (24.5)	2,035 (75.5)	3 (13.6)	19 (86.4)
2016	110 (98.2)	2 (1.8)	146 (4.6)	3,045 (95.4)	1,068 (54.1)	906 (45.9)	32 (40.5)	47 (59.5)	915 (75.9)	290 (24.1)	21 (33.3)	42 (66.7)	603 (23.3)	1,987 (76.7)	6 (15.8)	32 (84.2)

[1]Asian race category reporting includes Pacific Islander from 1993–2002.

[2]Native Hawaiian/Other Pacific Islander race first reported separately in 2003.

[3]Indicates two or more races reported for a person. Category first reported in 2003 and does not include persons of Hispanic/Latino origin.

[4]Persons of Hispanic ethnicity may be of any or multiple race.

[5]The higher count for unknown or missing race results for 1993–2001 reflect the impact of the transitional period of incorporating new race definitions for Asian, Native Hawaiian, and multiple race in 2003.

Note: Case counts for race categories (American Indian/Alaska Native, Asian, black/African American, Native Hawaiian/Other Pacific Islander, and white) do not include persons of Hispanic/Latino origin or multiple race. Non-U.S.–born persons include those born outside the United States (including the U.S. territories), except persons born to at least one U.S. citizen parent. Data for all years updated through June 21, 2017.

See Technical Notes.

See Surveillance Slide #15.

Table 4. Tuberculosis Cases, Percentages, and Case Rates per 100,000 Population by Age Group: United States, 1993–2016

Year	Total cases	0–4			5–14			15–24			25–44			45–64			≥65			Unknown/missing	
		No.	(%)	Rate	No.	(%)	Rate	No.	(%)	Rate	No.	(%)	Rate	No.	(%)	Rate	No.	(%)	Rate	No.	(%)
1993	25,102	1,014	(4.0)	5.2	646	(2.6)	1.7	1,821	(7.3)	5.0	9,589	(38.2)	11.6	6,195	(24.7)	12.5	5,820	(23.2)	17.7	17	0.1
1994	24,206	995	(4.1)	5.1	664	(2.7)	1.8	1,832	(7.6)	5.1	9,043	(37.4)	10.9	6,126	(25.3)	12.0	5,540	(22.9)	16.7	6	0
1995	22,726	894	(3.9)	4.6	642	(2.8)	1.7	1,697	(7.5)	4.7	8,200	(36.1)	9.8	5,960	(26.2)	11.4	5,328	(23.4)	15.8	5	0
1996	21,210	770	(3.6)	4.0	586	(2.8)	1.5	1,637	(7.7)	4.5	7,564	(35.7)	9.0	5,572	(26.3)	10.4	5,076	(23.9)	14.9	5	0
1997	19,751	734	(3.7)	3.8	517	(2.6)	1.3	1,674	(8.5)	4.6	6,884	(34.9)	8.2	5,278	(26.7)	9.5	4,663	(23.6)	13.6	1	0
1998	18,286	638	(3.5)	3.4	439	(2.4)	1.1	1,543	(8.4)	4.1	6,335	(34.6)	7.6	4,954	(27.1)	8.7	4,377	(23.9)	12.7	0	0
1999	17,499	602	(3.4)	3.2	436	(2.5)	1.1	1,518	(8.7)	4.0	6,062	(34.6)	7.3	4,860	(27.8)	8.2	4,019	(23.0)	11.6	2	0
2000	16,308	544	(3.3)	2.8	420	(2.6)	1.0	1,618	(9.9)	4.1	5,576	(34.2)	6.6	4,635	(28.4)	7.4	3,515	(21.6)	10.0	0	0
2001	15,945	543	(3.4)	2.8	386	(2.4)	0.9	1,597	(10.0)	4.0	5,610	(35.2)	6.6	4,515	(28.3)	7.0	3,293	(20.7)	9.3	1	0
2002	15,055	556	(3.7)	2.9	388	(2.6)	0.9	1,498	(10.0)	3.7	5,288	(35.1)	6.3	4,182	(27.8)	6.3	3,142	(20.9)	8.8	1	0
2003	14,835	547	(3.7)	2.8	364	(2.5)	0.9	1,573	(10.6)	3.8	5,074	(34.2)	6.1	4,283	(28.9)	6.2	2,994	(20.2)	8.3	0	0
2004	14,499	549	(3.8)	2.8	403	(2.8)	1.0	1,603	(11.1)	3.8	4,940	(34.1)	5.9	4,192	(28.9)	5.9	2,811	(19.4)	7.8	1	0
2005	14,065	474	(3.4)	2.4	377	(2.7)	0.9	1,540	(10.9)	3.6	4,737	(33.7)	5.7	4,126	(29.3)	5.6	2,811	(20.0)	7.7	0	0
2006	13,728	482	(3.5)	2.4	321	(2.3)	0.8	1,532	(11.2)	3.6	4,690	(34.2)	5.7	4,039	(29.4)	5.4	2,663	(19.4)	7.2	1	0
2007	13,281	467	(3.5)	2.3	310	(2.3)	0.8	1,580	(11.9)	3.7	4,312	(32.5)	5.2	4,037	(30.4)	5.2	2,574	(19.4)	6.8	1	0
2008	12,890	496	(3.8)	2.4	289	(2.2)	0.7	1,443	(11.2)	3.3	4,238	(32.9)	5.1	3,928	(30.5)	5.0	2,496	(19.4)	6.4	0	0
2009	11,517	403	(3.5)	2.0	244	(2.1)	0.6	1,279	(11.1)	2.9	3,886	(33.7)	4.7	3,422	(29.7)	4.3	2,283	(19.8)	5.8	0	0
2010	11,157	365	(3.3)	1.8	271	(2.4)	0.7	1,199	(10.7)	2.7	3,668	(32.9)	4.5	3,429	(30.7)	4.2	2,225	(19.9)	5.5	0	0
2011	10,509	351	(3.3)	1.7	227	(2.2)	0.6	1,030	(9.8)	2.3	3,366	(32.0)	4.1	3,292	(31.3)	4.0	2,243	(21.3)	5.4	0	0
2012	9,940	261	(2.6)	1.3	226	(2.3)	0.5	1,019	(10.3)	2.3	3,120	(31.4)	3.8	3,114	(31.3)	3.8	2,199	(22.1)	5.1	1	0
2013	9,561	295	(3.1)	1.5	188	(2.0)	0.5	979	(10.2)	2.2	2,964	(31.0)	3.6	2,955	(30.9)	3.6	2,180	(22.8)	4.9	0	0
2014	9,398	263	(2.8)	1.3	195	(2.1)	0.5	961	(10.2)	2.2	2,821	(30.0)	3.4	2,956	(31.5)	3.5	2,202	(23.4)	4.8	0	0
2015	9,547	244	(2.6)	1.2	196	(2.1)	0.5	935	(9.8)	2.1	2,857	(29.9)	3.4	3,023	(31.7)	3.6	2,290	(24.0)	4.8	2	0
2016	9,272	224	(2.4)	1.1	163	(1.8)	0.4	938	(10.1)	2.2	2,827	(30.5)	3.3	2,849	(30.7)	3.4	2,264	(24.4)	4.6	7	0.1

Note: Previously published rates for 1993–1999 have been updated using Resident Population: Monthly Postcensal Resident Population, by single year of age, sex, race, and Hispanic origin (https://www.census.gov/data/datasets/time-series/demo/popest/1990s-national.html); accessed July 6, 2017). Denominators for computing 2000–2016 case rates were obtained from the Intercensal Estimates of the Resident Population by Sex and Age for the United States: April 1, 2000 to July 1, 2010 (https://www.census.gov/data/tables/time-series/demo/popest/intercensal-2000-2010-national.html), and Annual Estimates of the Resident Population for Selected Age Groups by Sex: April 1, 2010 to July 1, 2016 (https://www.census.gov/data/tables/2016/demo/popest/nation-detail.html); accessed July 6, 2017.
Data for all years updated through June 21, 2017.
See Technical Notes.
Zero % (0) denotes <0.05%.
See Surveillance Slides #7 and #8.

Table 5. Tuberculosis Cases, Percentages, and Case Rates per 100,000 Population by Origin of Birth: United States, 1993–2016

Year	Total cases	U.S.-born persons			Non-U.S.–born persons[1]			Unknown/missing	
		No.	(%)	Rate	No.	(%)	Rate	No.	(%)
1993	25,102	17,433	(69.4)	7.4	7,403	(29.5)	34.0	266	(1.1)
1994	24,206	16,180	(66.8)	6.8	7,762	(32.1)	36.1	264	(1.1)
1995	22,726	14,663	(64.5)	6.1	8,010	(35.2)	38.0	53	(0.2)
1996	21,210	13,385	(63.1)	5.6	7,752	(36.5)	32.0	73	(0.3)
1997	19,751	11,924	(60.4)	4.9	7,753	(39.3)	30.9	74	(0.4)
1998	18,286	10,609	(58.0)	4.4	7,623	(41.7)	28.9	54	(0.3)
1999	17,499	9,783	(55.9)	4.0	7,624	(43.6)	28.1	92	(0.5)
2000	16,308	8,632	(52.9)	3.5	7,634	(46.8)	26.5	42	(0.3)
2001	15,945	7,848	(49.2)	3.2	8,034	(50.4)	27.6	63	(0.4)
2002	15,055	7,263	(48.2)	2.9	7,737	(51.4)	25.5	55	(0.4)
2003	14,835	6,842	(46.1)	2.7	7,947	(53.6)	23.9	46	(0.3)
2004	14,499	6,601	(45.5)	2.6	7,875	(54.3)	23.2	23	(0.2)
2005	14,065	6,290	(44.7)	2.5	7,745	(55.1)	22.3	30	(0.2)
2006	13,728	5,859	(42.7)	2.3	7,845	(57.1)	21.7	24	(0.2)
2007	13,281	5,431	(40.9)	2.1	7,780	(58.6)	20.9	70	(0.5)
2008	12,890	5,237	(40.6)	2.0	7,644	(59.3)	20.2	9	(0.1)
2009	11,517	4,501	(39.1)	1.7	6,999	(60.8)	18.8	17	(0.1)
2010	11,157	4,331	(38.8)	1.6	6,817	(61.1)	17.8	9	(0.1)
2011	10,509	3,941	(37.5)	1.5	6,563	(62.5)	17.0	5	(0)
2012	9,940	3,627	(36.5)	1.3	6,309	(63.5)	16.0	4	(0)
2013	9,561	3,330	(34.8)	1.2	6,222	(65.1)	15.7	9	(0.1)
2014	9,398	3,129	(33.3)	1.1	6,264	(66.7)	15.5	5	(0.1)
2015	9,547	3,135	(32.8)	1.1	6,406	(67.1)	15.2	6	(0.1)
2016	9,272	2,901	(31.3)	1.1	6,351	(68.5)	14.7	20	(0.2)

[1]Includes persons born outside the United States (including the U.S. territories), except persons born to at least one U.S. citizen parent.

Note: Denominators for computing rates for year 1993 was obtained from Quarterly Estimates of the United States Foreign-born and Native Resident Populations: April 1, 1990–July 1, 1999 (http://www.census.gov/population/estimates/nation/nativity/fbtab001.txt); accessed July 6, 2017. Denominators for computing the 1994–2015 rates are based on the U.S. Census Bureau, Current Population Survey via Data Ferrett (http://dataferrett.census.gov/); accessed July 6, 2017.

Data for all years updated through June 21, 2017.

See Technical Notes.

Zero % (0) denotes <0.05%.

See Surveillance Slides #13, #14, #17, and #18.

Table 6. Tuberculosis Cases and Percentages Among Non-U.S.–Born Persons[1] by the Top 30 Countries[2] of Birth: United States, 2012–2016

	Year									
	2016		2015		2014		2013		2012	
Country of Birth	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Total Cases	**6,351**	**(100.0)**	**6,406**	**(100.0)**	**6,264**	**(100.0)**	**6,222**	**(100.0)**	**6,309**	**(100.0)**
Mexico	1,192	(18.8)	1,255	(19.6)	1,281	(20.5)	1,247	(20.0)	1,312	(20.8)
Philippines	790	(12.4)	818	(12.8)	756	(12.1)	781	(12.6)	771	(12.2)
India	589	(9.3)	582	(9.1)	479	(7.6)	495	(8.0)	531	(8.4)
Vietnam	494	(7.8)	522	(8.1)	501	(8.0)	457	(7.3)	453	(7.2)
China	383	(6.0)	425	(6.6)	420	(6.7)	376	(6.0)	354	(5.6)
Guatemala	189	(3.0)	189	(3.0)	180	(2.9)	214	(3.4)	194	(3.1)
Haiti	168	(2.6)	167	(2.6)	165	(2.6)	171	(2.7)	199	(3.2)
Ethiopia	151	(2.4)	144	(2.2)	142	(2.3)	159	(2.6)	162	(2.6)
Honduras	148	(2.3)	140	(2.2)	142	(2.3)	122	(2.0)	125	(2.0)
Myanmar	125	(2.0)	120	(1.9)	102	(1.6)	105	(1.7)	116	(1.8)
El Salvador	117	(1.8)	110	(1.7)	97	(1.5)	96	(1.5)	116	(1.8)
Korea, Republic of	97	(1.5)	89	(1.4)	92	(1.5)	99	(1.6)	109	(1.7)
Somalia	102	(1.6)	85	(1.3)	105	(1.7)	87	(1.4)	101	(1.6)
Nepal	105	(1.7)	79	(1.2)	78	(1.2)	72	(1.2)	81	(1.3)
Peru	67	(1.1)	82	(1.3)	91	(1.5)	91	(1.5)	79	(1.3)
Pakistan	84	(1.3)	85	(1.3)	89	(1.4)	78	(1.3)	68	(1.1)
Cambodia	66	(1.0)	87	(1.4)	74	(1.2)	71	(1.1)	78	(1.2)
Laos	70	(1.1)	68	(1.1)	70	(1.1)	89	(1.4)	64	(1.0)
Ecuador	69	(1.1)	71	(1.1)	74	(1.2)	80	(1.3)	65	(1.0)
Nigeria	91	(1.4)	74	(1.2)	50	(0.8)	68	(1.1)	58	(0.9)
Dominican Republic	61	(1.0)	64	(1.0)	68	(1.1)	62	(1.0)	74	(1.2)
Bangladesh	60	(0.9)	67	(1.0)	42	(0.7)	71	(1.1)	54	(0.9)
Bhutan	32	(0.5)	46	(0.7)	63	(1.0)	57	(0.9)	58	(0.9)
Kenya	46	(0.7)	50	(0.8)	49	(0.8)	48	(0.8)	58	(0.9)
Thailand	43	(0.7)	39	(0.6)	48	(0.8)	38	(0.6)	33	(0.5)
Colombia	50	(0.8)	45	(0.7)	36	(0.6)	37	(0.6)	25	(0.4)
Indonesia	39	(0.6)	39	(0.6)	29	(0.5)	34	(0.5)	41	(0.6)
Korea, Dem. Peoples Republic	23	(0.4)	30	(0.5)	30	(0.5)	37	(0.6)	47	(0.7)
Liberia	34	(0.5)	41	(0.6)	28	(0.4)	29	(0.5)	33	(0.5)
Cuba	27	(0.4)	32	(0.5)	44	(0.7)	25	(0.4)	30	(0.5)
All Others[3]	839	(13.2)	761	(11.9)	839	(13.4)	826	(13.3)	820	(13.0)

[1]Includes persons born outside the United States (including the U.S. territories), except persons born to at least one U.S. citizen parent.
[2]The top 30 countries were selected based on their ranked 5-year average number of TB cases.
[3]Includes not specified for country of origin.
Note: Data for all years updated through June 21, 2017. Countries are in descending order by total case count for all years combined.

Table 7. Tuberculosis Cases and Percentages by Case Verification Criterion and Site of Disease: United States, 1993–2016

Year	Total cases	Verification criterion[1]										Site of disease[5]			
		Positive culture		Positive NAA[2]		Positive smear		Clinical case definition		Provider diagnosis		Pulmonary[3]		Extra-pulmonary[4]	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
1993	25,102	20,306	(80.9)	—	—	185	(0.7)	3,088	(12.3)	1,523	(6.1)	21,153	(84.3)	3,940	(15.7)
1994	24,206	19,507	(80.6)	—	—	189	(0.8)	2,917	(12.1)	1,593	(6.6)	20,318	(83.9)	3,886	(16.1)
1995	22,726	18,265	(80.4)	—	—	189	(0.8)	2,749	(12.1)	1,523	(6.7)	18,887	(83.1)	3,834	(16.9)
1996	21,210	17,154	(80.9)	—	—	131	(0.6)	2,607	(12.3)	1,318	(6.2)	17,387	(82.0)	3,814	(18.0)
1997	19,751	15,979	(80.9)	—	—	155	(0.8)	2,411	(12.2)	1,206	(6.1)	16,239	(82.2)	3,509	(17.8)
1998	18,286	14,789	(80.9)	—	—	155	(0.8)	2,253	(12.3)	1,089	(6.0)	14,801	(81.0)	3,483	(19.0)
1999	17,499	13,994	(80.0)	—	—	172	(1.0)	2,103	(12.0)	1,230	(7.0)	14,065	(80.4)	3,431	(19.6)
2000	16,308	13,013	(79.8)	—	—	148	(0.9)	1,950	(12.0)	1,197	(7.3)	13,085	(80.3)	3,211	(19.7)
2001	15,945	12,750	(80.0)	—	—	123	(0.8)	1,886	(11.8)	1,186	(7.4)	12,724	(79.8)	3,217	(20.2)
2002	15,055	11,974	(79.5)	—	—	104	(0.7)	1,822	(12.1)	1,155	(7.7)	11,901	(79.1)	3,148	(20.9)
2003	14,835	11,683	(78.8)	—	—	116	(0.8)	1,783	(12.0)	1,253	(8.4)	11,805	(79.6)	3,020	(20.4)
2004	14,499	11,327	(78.1)	—	—	80	(0.6)	1,824	(12.6)	1,268	(8.7)	11,524	(79.5)	2,971	(20.5)
2005	14,065	10,957	(77.9)	—	—	96	(0.7)	1,797	(12.8)	1,213	(8.6)	11,125	(79.1)	2,934	(20.9)
2006	13,728	10,745	(78.3)	—	—	93	(0.7)	1,629	(11.9)	1,261	(9.2)	10,853	(79.1)	2,872	(20.9)
2007	13,281	10,425	(78.5)	—	—	69	(0.5)	1,496	(11.3)	1,291	(9.7)	10,591	(79.8)	2,687	(20.2)
2008	12,890	10,021	(77.7)	18	(0.1)	60	(0.5)	1,547	(12.0)	1,244	(9.7)	10,233	(79.4)	2,653	(20.6)
2009	11,517	8,883	(77.1)	57	(0.5)	73	(0.6)	1,777	(15.4)	727	(6.3)	9,007	(78.3)	2,496	(21.7)
2010	11,157	8,457	(75.8)	105	(0.9)	69	(0.6)	1,878	(16.8)	648	(5.8)	8,720	(78.2)	2,432	(21.8)
2011	10,509	8,087	(77.0)	121	(1.2)	61	(0.6)	1,678	(16.0)	562	(5.3)	8,327	(79.3)	2,178	(20.7)
2012	9,940	7,628	(76.7)	119	(1.2)	38	(0.4)	1,640	(16.5)	515	(5.2)	7,845	(79.0)	2,085	(21.0)
2013	9,561	7,368	(77.1)	149	(1.6)	47	(0.5)	1,509	(15.8)	488	(5.1)	7,582	(79.3)	1,975	(20.7)
2014	9,398	7,232	(77.0)	161	(1.7)	45	(0.5)	1,494	(15.9)	466	(5.0)	7,462	(79.5)	1,929	(20.5)
2015	9,547	7,408	(77.6)	180	(1.9)	46	(0.5)	1,465	(15.3)	448	(4.7)	7,629	(80.0)	1,913	(20.0)
2016	9,272	7,162	(77.2)	212	(2.3)	40	(0.4)	1,365	(14.7)	493	(5.3)	7,375	(79.7)	1,882	(20.3)

[1]Based on the public health surveillance case definition for tuberculosis; see Appendix A.
[2]Nucleic Acid Amplification test. Information not collected before 2008.
[3]Includes all cases among persons with pulmonary as the only site of disease, and persons with both pulmonary and extrapulmonary sites of disease.
[4]Includes cases among persons with extrapulmonary TB disease only.
[5]Excludes missing and unknowns.
Note: See Technical Notes.
Data for all years updated through June 21, 2017.

Table 8. Tuberculosis Cases and Percentages, by Resistance to Isoniazid (INH)[1], Origin of Birth, and Previous History of TB: United States, 1993–2016

Year	All INH-resistant[2]	Isoniazid resistant TB cases																	
		Total INH-resistant						U.S.-born INH-resistant[3]						Non-U.S.–born[3,4] INH-resistant					
		Previous TB			No previous TB			Previous TB			No previous TB			Previous TB			No previous TB		
		Eligible	No.	(%)	Eligible	No.	(%)	Eligible	No.	(%)	Eligible	No.	(%)	Eligible	No.	(%)	Eligible	No.	(%)
1993	1,534	982	161	(16.4)	16,601	1,367	(8.2)	668	83	(12.4)	11,808	789	(6.7)	301	75	(24.9)	4,665	564	(12.1)
1994	1,543	1,033	175	(16.9)	16,417	1,352	(8.2)	693	81	(11.7)	11,009	708	(6.4)	336	93	(27.7)	5,291	632	(11.9)
1995	1,351	958	168	(17.5)	16,023	1,173	(7.3)	592	77	(13.0)	10,340	554	(5.4)	364	91	(25.0)	5,652	618	(10.9)
1996	1,284	862	142	(16.5)	15,360	1,133	(7.4)	559	68	(12.2)	9,637	495	(5.1)	303	74	(24.4)	5,676	637	(11.2)
1997	1,195	742	109	(14.7)	14,449	1,078	(7.5)	455	35	(7.7)	8,696	435	(5.0)	286	74	(25.9)	5,708	640	(11.2)
1998	1,120	749	98	(13.1)	13,420	1,011	(7.5)	485	38	(7.8)	7,695	366	(4.8)	262	60	(22.9)	5,692	643	(11.3)
1999	1,000	669	82	(12.3)	12,659	900	(7.1)	382	25	(6.5)	7,011	284	(4.1)	284	55	(19.4)	5,596	614	(11.0)
2000	981	632	84	(13.3)	11,829	889	(7.5)	360	22	(6.1)	6,141	269	(4.4)	272	62	(22.8)	5,659	617	(10.9)
2001	897	629	87	(13.8)	11,514	800	(6.9)	324	28	(8.6)	5,570	241	(4.3)	302	59	(19.5)	5,908	558	(9.4)
2002	912	570	80	(14.0)	10,820	826	(7.6)	303	23	(7.6)	5,059	206	(4.1)	265	57	(21.5)	5,720	619	(10.8)
2003	904	524	65	(12.4)	10,752	823	(7.7)	253	16	(6.3)	4,853	213	(4.4)	271	49	(18.1)	5,869	606	(10.3)
2004	872	537	64	(11.9)	10,482	801	(7.6)	274	15	(5.5)	4,683	214	(4.6)	263	49	(18.6)	5,789	587	(10.1)
2005	842	507	70	(13.8)	10,065	761	(7.6)	240	18	(7.5)	4,396	188	(4.3)	267	52	(19.5)	5,652	567	(10.0)
2006	845	493	67	(13.6)	9,908	770	(7.8)	203	9	(4.4)	4,127	173	(4.2)	289	57	(19.7)	5,765	596	(10.3)
2007	798	496	71	(14.3)	9,646	715	(7.4)	206	14	(6.8)	3,838	163	(4.2)	288	57	(19.8)	5,755	548	(9.5)
2008	836	429	57	(13.3)	9,307	775	(8.3)	170	13	(7.6)	3,647	189	(5.2)	259	44	(17.0)	5,654	585	(10.3)
2009	764	341	52	(15.2)	7,742	652	(8.4)	115	6	(5.2)	3,014	187	(6.2)	225	46	(20.4)	4,720	465	(9.9)
2010	699	359	62	(17.3)	7,814	628	(8.0)	129	12	(9.3)	2,943	165	(5.6)	230	50	(21.7)	4,865	463	(9.5)
2011	754	345	59	(17.1)	7,556	688	(9.1)	137	9	(6.6)	2,701	173	(6.4)	208	50	(24.0)	4,852	515	(10.6)
2012	692	356	55	(15.4)	7,085	637	(9.0)	127	8	(6.3)	2,524	151	(6.0)	229	47	(20.5)	4,561	486	(10.7)
2013	675	301	48	(15.9)	6,866	622	(9.1)	98	8	(8.2)	2,286	131	(5.7)	203	40	(19.7)	4,575	491	(10.7)
2014	690	336	63	(18.8)	6,746	623	(9.2)	95	5	(5.3)	2,187	164	(7.5)	241	58	(24.1)	4,555	459	(10.1)
2015	681	316	51	(16.1)	6,946	627	(9.0)	100	7	(7.0)	2,185	147	(6.7)	216	44	(20.4)	4,756	479	(10.1)
2016	639	296	57	(19.3)	6,613	577	(8.7)	82	7	(8.5)	2,032	120	(5.9)	214	50	(23.4)	4,567	456	(10.0)

[1]Resistance to at least isoniazid. Isolates may be resistant to other drugs. Excludes cases with susceptibility testing not done or unknown for isoniazid. Cases have been susceptibility tested to at least isoniazid and rifampin.
[2]This column provides an overall total of all INH-resistant cases, including those where previous history of TB is unknown and origin or birth is unknown.
[3]Excludes cases where previous history of TB is unknown and cases where origin of birth is unknown.
[4]Includes persons born outside the United States (including the U.S. territories).
Note: Data for all years updated through June 21, 2017.

Table 9. Tuberculosis Cases and Percentages, by Multidrug Resistance (MDR)[1], Origin of Birth, and Previous History of TB: United States, 1993–2016

Year	All MDR[2]	Multidrug resistant TB cases																	
		Total MDR[3]						U.S.-born MDR[3]						Non-U.S.–born[3,4] MDR					
		Previous TB			No previous TB			Previous TB			No previous TB			Previous TB			No previous TB		
		Eligible	No.	(%)	Eligible	No.	(%)	Eligible	No.	(%)	Eligible	No.	(%)	Eligible	No.	(%)	Eligible	No.	(%)
1993	484	982	76	(7.7)	16,601	407	(2.5)	668	30	(4.5)	11,808	301	(2.5)	301	46	(15.3)	4,665	103	(2.2)
1994	431	1,033	74	(7.2)	16,417	353	(2.2)	693	35	(5.1)	11,009	238	(2.2)	336	38	(11.3)	5,291	110	(2.1)
1995	327	958	70	(7.3)	16,023	254	(1.6)	592	28	(4.7)	10,340	169	(1.6)	364	42	(11.5)	5,652	85	(1.5)
1996	250	862	43	(5.0)	15,360	207	(1.3)	559	21	(3.8)	9,637	104	(1.1)	303	22	(7.3)	5,676	102	(1.8)
1997	201	742	44	(5.9)	14,449	155	(1.1)	455	12	(2.6)	8,696	76	(0.9)	286	32	(11.2)	5,708	79	(1.4)
1998	155	749	23	(3.1)	13,420	132	(1.0)	485	6	(1.2)	7,695	55	(0.7)	262	17	(6.5)	5,692	76	(1.3)
1999	157	669	28	(4.2)	12,659	127	(1.0)	382	6	(1.6)	7,011	39	(0.6)	284	22	(7.7)	5,596	88	(1.6)
2000	146	632	26	(4.1)	11,829	120	(1.0)	360	2	(0.6)	6,141	40	(0.7)	272	24	(8.8)	5,659	80	(1.4)
2001	151	629	33	(5.2)	11,514	115	(1.0)	324	7	(2.2)	5,570	34	(0.6)	302	26	(8.6)	5,908	81	(1.4)
2002	158	570	26	(4.6)	10,820	132	(1.2)	303	3	(1.0)	5,059	35	(0.7)	265	23	(8.7)	5,720	97	(1.7)
2003	119	524	21	(4.0)	10,752	94	(0.9)	253	2	(0.8)	4,853	23	(0.5)	271	19	(7.0)	5,869	70	(1.2)
2004	128	537	27	(5.0)	10,482	100	(1.0)	274	4	(1.5)	4,683	26	(0.6)	263	23	(8.7)	5,789	74	(1.3)
2005	125	507	23	(4.5)	10,065	98	(1.0)	240	2	(0.8)	4,396	20	(0.5)	267	21	(7.9)	5,652	77	(1.4)
2006	124	493	20	(4.1)	9,908	103	(1.0)	203	1	(0.5)	4,127	19	(0.5)	289	19	(6.6)	5,765	84	(1.5)
2007	124	496	19	(3.8)	9,646	101	(1.0)	206	3	(1.5)	3,838	18	(0.5)	288	16	(5.6)	5,755	83	(1.4)
2008	107	429	19	(4.4)	9,307	88	(0.9)	170	3	(1.8)	3,647	21	(0.6)	259	16	(6.2)	5,654	67	(1.2)
2009	116	341	19	(5.6)	7,742	91	(1.2)	115	1	(0.9)	3,014	12	(0.4)	225	18	(8.0)	4,720	79	(1.7)
2010	105	359	16	(4.5)	7,814	87	(1.1)	129	2	(1.6)	2,943	14	(0.5)	230	14	(6.1)	4,865	73	(1.5)
2011	128	345	27	(7.8)	7,556	101	(1.3)	137	1	(0.7)	2,701	17	(0.6)	208	26	(12.5)	4,852	84	(1.7)
2012	89	356	12	(3.4)	7,085	77	(1.1)	127	0	(0)	2,524	13	(0.5)	229	12	(5.2)	4,561	64	(1.4)
2013	96	301	12	(4.0)	6,866	83	(1.2)	98	2	(2.0)	2,286	7	(0.3)	203	10	(4.9)	4,575	76	(1.7)
2014	94	336	24	(7.1)	6,746	70	(1.0)	95	0	(0)	2,187	10	(0.5)	241	24	(10.0)	4,555	60	(1.3)
2015	88	316	16	(5.1)	6,946	72	(1.0)	100	3	(3.0)	2,185	10	(0.5)	216	13	(6.0)	4,756	62	(1.3)
2016	97	296	18	(6.1)	6,613	78	(1.2)	82	0	(0)	2,032	8	(0.4)	214	18	(8.4)	4,567	70	(1.5)

[1]Resistance to at least isoniazid and rifampin. Isolates may be resistant to other drugs. Excludes cases with susceptibility testing not done or unknown for isoniazid and rifampin. Cases have been susceptibility tested to at least isoniazid and rifampin.

[2]This column provides an overall total of all MDR cases, including those where previous history of TB is unknown and origin or birth is unknown.

[3]Excludes cases where previous history of TB is unknown and cases where origin of birth is unknown.

[4]Includes persons born outside the United States (including the U.S. territories).

Note: Data for all years updated through June 21, 2017. One non-U.S.–born case had missing information on previous TB status and was excluded from the non-U.S.–born columns.

Table 10. Percentages of Tuberculosis Cases, by Initial Drug Regimen, Use of Directly Observed Therapy (DOT), and Completion of Therapy (COT): United States, 1993–2016

Year	Initial drug regimen[1,2]			Directly observed therapy[3]		Therapy ≤1 year indicated[4]	
	IR	IRZ	IRZE	DOT only	Both DOT and self-administered	COT ≤1 Year	COT ever
1993	(13.0)	(31.2)	(40.3)	(21.7)	(14.4)	(63.4)	(86.0)
1994	(7.0)	(23.3)	(55.7)	(28.1)	(20.5)	(68.6)	(86.8)
1995	(5.2)	(20.3)	(62.7)	(37.3)	(21.5)	(74.1)	(89.2)
1996	(4.2)	(17.5)	(67.3)	(42.5)	(22.4)	(76.8)	(90.2)
1997	(3.2)	(15.1)	(71.9)	(47.0)	(23.8)	(78.7)	(91.0)
1998	(2.6)	(12.9)	(74.3)	(47.7)	(26.6)	(81.2)	(92.2)
1999	(2.2)	(11.2)	(76.9)	(49.4)	(27.6)	(81.4)	(92.2)
2000	(2.0)	(10.4)	(78.5)	(52.5)	(25.8)	(82.2)	(92.5)
2001	(1.7)	(9.6)	(79.8)	(53.6)	(27.5)	(82.5)	(92.7)
2002	(1.8)	(8.9)	(80.3)	(55.4)	(27.8)	(83.0)	(92.5)
2003	(1.4)	(8.1)	(81.3)	(56.5)	(28.5)	(83.6)	(92.8)
2004	(1.5)	(6.4)	(82.4)	(58.9)	(27.7)	(84.3)	(92.6)
2005	(1.3)	(5.5)	(83.7)	(57.9)	(29.6)	(84.0)	(92.5)
2006	(1.2)	(4.8)	(83.3)	(57.5)	(30.4)	(84.8)	(93.2)
2007	(1.1)	(4.6)	(83.8)	(56.3)	(32.9)	(85.6)	(93.9)
2008	(1.0)	(3.5)	(84.2)	(56.4)	(33.5)	(86.1)	(93.3)
2009	(0.9)	(3.1)	(84.3)	(59.6)	(30.3)	(88.8)	(95.6)
2010	(0.8)	(2.8)	(84.5)	(59.3)	(31.1)	(89.7)	(96.1)
2011[5]	(0.7)	(2.6)	(85.2)	(62.2)	(29.2)	(89.7)	(96.4)
2012[5]	(0.6)	(2.0)	(85.4)	(61.8)	(29.1)	(90.1)	(96.4)
2013[5]	(0.5)	(2.3)	(84.5)	(63.2)	(28.8)	(89.8)	(96.2)
2014[5]	(0.3)	(2.2)	(85.3)	(63.9)	(29.0)	(90.1)	(96.6)
2015[5]	(0.4)	(2.0)	(85.2)	—	—	—	—
2016[5]	(0.4)	(1.7)	(84.8)	—	—	—	—

[1]Includes persons alive at diagnosis.

[2]I, isoniazid; R, rifampin; Z, pyrazinamide; E, ethambutol. Excludes cases with no information on initial drug regimen. In 2016, 0.8% received no initial drug therapy, 0.1% were started on one drug, and 12.2% had an initial drug regimen other than IR, IRZ, or IRZE.

[3]Includes persons alive at diagnosis with initial drug regimen of one or more drugs prescribed.

[4]Therapy ≤1 year indicated in persons alive at diagnosis with an initial regimen of one or more drugs prescribed, and who did not die within one year of initiating therapy. Persons with initial isolate rifampin resistant, or patient with bone and joint disease, meningeal disease or disease of the central nervous system, or pediatric patient (age <15) with miliary disease or positive blood culture or a positive nucleic acid amplification test on a blood specimen, and those who moved out of the country within one year of initiating treatment were excluded.

[5]Begining in 2011, those who moved out of country during treatment are excluded from the denominator of those eligible for COT.

Note: Data as of June 21, 2017.

See Technical Notes for details and for description of COT calculation.

See Surveillance Slides #30 and #31.

Table 11. Tuberculosis Cases[1] and Percentages Among Persons with HIV Test Results[2] and with HIV Coinfection by Age Group: United States, 1993–2016

Year	25–44 years old					All ages				
	Total No.	HIV test results		HIV positive		Total No.	HIV test results		HIV positive	
		No.	(%)	No.	(%)		No.	(%)	No.	(%)
1993	9,329	4,211	(45.1)	2,633	(62.5)	24,052	7,185	(29.9)	3,466	(48.2)
1994	8,805	4,288	(48.7)	2,524	(58.9)	23,273	7,644	(32.8)	3,403	(44.5)
1995	8,016	4,156	(51.8)	2,063	(49.6)	21,882	7,940	(36.3)	2,869	(36.1)
1996	7,400	4,246	(57.4)	1,757	(41.4)	20,441	8,595	(42.0)	2,461	(28.6)
1997	6,757	4,058	(60.1)	1,407	(34.7)	19,082	8,593	(45.0)	1,999	(23.3)
1998	6,261	3,810	(60.9)	1,194	(31.3)	17,745	8,158	(46.0)	1,755	(21.5)
1999	5,983	3,752	(62.7)	1,125	(30.0)	16,968	8,295	(48.9)	1,658	(20.0)
2000	5,499	3,476	(63.2)	917	(26.4)	15,888	7,990	(50.3)	1,398	(17.5)
2001	5,550	3,544	(63.9)	892	(25.2)	15,567	8,007	(51.4)	1,369	(17.1)
2002	5,237	3,475	(66.4)	822	(23.7)	14,725	7,924	(53.8)	1,344	(17.0)
2003	5,028	3,396	(67.5)	786	(23.1)	14,509	8,037	(55.4)	1,280	(15.9)
2004	4,886	3,399	(69.6)	655	(19.3)	14,208	8,415	(59.2)	1,150	(13.7)
2005	4,696	3,251	(69.2)	598	(18.4)	13,771	8,148	(59.2)	1,017	(12.5)
2006	4,648	3,270	(70.4)	546	(16.7)	13,412	8,231	(61.4)	927	(11.3)
2007	4,265	3,132	(73.4)	467	(14.9)	12,992	8,265	(63.6)	845	(10.2)
2008	4,203	3,089	(73.5)	399	(12.9)	12,639	8,165	(64.6)	792	(9.7)
2009	3,854	2,835	(73.6)	384	(13.5)	11,266	7,334	(65.1)	687	(9.4)
2010	3,632	2,759	(76.0)	311	(11.3)	10,911	7,436	(68.2)	596	(8.0)
2011[3]	3,333	3,048	(91.4)	331	(10.9)	10,268	8,712	(84.8)	649	(7.4)
2012	3,099	2,882	(93.0)	328	(11.4)	9,726	8,431	(86.7)	611	(7.2)
2013	2,939	2,789	(94.9)	258	(9.3)	9,350	8,362	(89.4)	536	(6.4)
2014	2,803	2,662	(95.0)	230	(8.6)	9,204	8,275	(89.9)	491	(5.9)
2015	2,842	2,721	(95.7)	205	(7.5)	9,342	8,433	(90.3)	456	(5.4)
2016	2,803	2,653	(94.6)	229	(8.6)	9,063	8,150	(89.9)	454	(5.6)

[1]Persons not dead at diagnosis.
[2]Includes persons with positive, negative, or indeterminate HIV test results and persons from California with co-diagnosis of TB and AIDS for the period 1993–2004, and those persons not dead at diagnosis. Rhode Island did not report HIV test results for years 1993–1997. HIV test results for Vermont are not included for years 2007–2013. HIV test results for California are not included for years 2005–2010.
[3]California began reporting HIV test results to CDC in 2011.
Note: Data as of June 21, 2017.
See Surveillance Slides #26 and #27.
HIV, human immunodeficiency virus.

Table 12. Tuberculosis Cases and Percentages, by Reason Tuberculosis Therapy Was Stopped: United States, 1993–2014

Year	Total cases[1]	Completed therapy		Adverse event		Moved[2]		Lost		Refused		Died[3]		Unknown[4]	
	No.	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
1993	23,740	18,043	(76.0)	0	(0)	1,120	(4.7)	1,086	(4.6)	223	(0.9)	3,053	(12.9)	215	(0.9)
1994	23,052	17,764	(77.1)	0	(0)	1,194	(5.2)	740	(3.2)	183	(0.8)	2,743	(11.9)	428	(1.9)
1995	21,705	17,306	(79.7)	0	(0)	969	(4.5)	570	(2.6)	155	(0.7)	2,396	(11.0)	309	(1.4)
1996	20,298	16,528	(81.4)	0	(0)	783	(3.9)	525	(2.6)	156	(0.8)	1,998	(9.8)	308	(1.5)
1997	18,930	15,673	(82.8)	0	(0)	667	(3.5)	444	(2.3)	119	(0.6)	1,755	(9.3)	272	(1.4)
1998	17,583	14,766	(84.0)	0	(0)	533	(3.0)	411	(2.3)	104	(0.6)	1,579	(9.0)	190	(1.1)
1999	16,861	14,234	(84.4)	0	(0)	456	(2.7)	359	(2.1)	104	(0.6)	1,437	(8.5)	271	(1.6)
2000	15,784	13,407	(84.9)	0	(0)	406	(2.6)	397	(2.5)	112	(0.7)	1,294	(8.2)	168	(1.1)
2001	15,409	13,242	(85.9)	0	(0)	378	(2.5)	402	(2.6)	99	(0.6)	1,121	(7.3)	167	(1.1)
2002	14,564	12,482	(85.7)	0	(0)	336	(2.3)	412	(2.8)	87	(0.6)	1,080	(7.4)	167	(1.1)
2003	14,379	12,418	(86.4)	0	(0)	313	(2.2)	390	(2.7)	84	(0.6)	994	(6.9)	180	(1.3)
2004	14,080	12,118	(86.1)	0	(0)	337	(2.4)	370	(2.6)	82	(0.6)	975	(6.9)	198	(1.4)
2005	13,677	11,727	(85.7)	1	(0)	323	(2.4)	340	(2.5)	90	(0.7)	986	(7.2)	210	(1.5)
2006	13,317	11,541	(86.7)	0	(0)	292	(2.2)	358	(2.7)	79	(0.6)	939	(7.1)	108	(0.8)
2007	12,906	11,347	(87.9)	0	(0)	241	(1.9)	327	(2.5)	73	(0.6)	819	(6.3)	99	(0.8)
2008	12,550	10,887	(86.7)	7	(0.1)	256	(2.0)	329	(2.6)	77	(0.6)	843	(6.7)	151	(1.2)
2009	11,182	9,829	(87.9)	22	(0.2)	96	(0.9)	165	(1.5)	82	(0.7)	682	(6.1)	306	(2.7)
2010	10,834	9,541	(88.1)	29	(0.3)	—	—	159	(1.5)	64	(0.6)	658	(6.1)	383	(3.5)
2011	10,210	8,988	(88.0)	28	(0.3)	—	—	127	(1.2)	70	(0.7)	688	(6.7)	309	(3.0)
2012	9,674	8,513	(88.0)	31	(0.3)	—	—	123	(1.3)	58	(0.6)	610	(6.3)	339	(3.5)
2013	9,282	8,173	(88.1)	40	(0.4)	—	—	99	(1.1)	68	(0.7)	584	(6.3)	318	(3.4)
2014	9,163	8,119	(88.6)	18	(0.2)	—	—	83	(0.9)	83	(0.9)	568	(6.2)	292	(3.2)

[1]Includes all cases in persons reported as alive at diagnosis and taking one or more TB drugs.
[2]In 2009 the "moved" response option was removed from the RVCT's reason therapy was stopped variable; see Technical Notes for details.
[3]Died = died of any cause (not only TB).
[4]Includes cases in persons reporting reason therapy stopped = other, missing, unknown, or moved (from 2010).
Note: Data for all years are updated through June 21, 2017.
Data complete to 2014. See Technical Notes for details.

Table 13. National Tuberculosis Genotyping Surveillance Coverage[1]: United States, 2004–2016

Year	Reported TB cases	Reported culture positive cases	Cases with genotype result	Genotype surveillance coverage
	No.	No.	No.	(%)
2004	14,499	11,327	5,954	(52.6)
2005	14,065	10,957	7,500	(68.4)
2006	13,728	10,745	7,529	(70.1)
2007	13,281	10,425	8,428	(80.8)
2008	12,890	10,021	8,178	(81.6)
2009	11,517	8,883	7,718	(86.9)
2010	11,157	8,457	7,748	(91.6)
2011	10,509	8,087	7,620	(94.2)
2012	9,940	7,628	7,236	(94.9)
2013	9,561	7,368	7,063	(95.9)
2014	9,398	7,232	6,991	(96.7)
2015	9,547	7,408	7,194	(97.1)
2016	9,272	7,162	6,903	(96.4)

[1]Genotype surveillance coverage is defined as the percentage of all culture positive tuberculosis (TB) cases for which there was a genotyped isolate.
Note: This table reflects genotyping surveillance coverage for the 50 states and the District of Columbia; for genotyping surveillance coverage of the U.S.-affiliated areas, please see Table 14.
See Surveillance Slide #33.

Table 14. National Tuberculosis Genotyping Surveillance Coverage[1]: United States-Affiliated Areas[2], 2004–2016

Year	Reported TB cases	Reported culture positive cases	Cases with genotype result	Genotype surveillance coverage
	No.	No.	No.	(%)
2004	288	213	19	(8.9)
2005	388	237	95	(40.1)
2006	344	211	84	(39.8)
2007	527	181	85	(47.0)
2008	553	240	72	(30.0)
2009	534	237	206	(86.9)
2010	618	309	279	(90.3)
2011	463	230	192	(83.5)
2012	493	248	225	(90.7)
2013	421	230	208	(90.4)
2014	462	234	219	(93.6)
2015	412	152	133	(87.5)
2016	498	215	196	(91.2)

[1]Genotype surveillance coverage is defined as the percentage of all culture positive tuberculosis (TB) cases for which there was a genotyped isolate

[2]The U.S.-affiliated areas include: American Samoa, Northern Mariana Islands, Federated States of Micronesia, Guam, Marshall Islands, Palau, Puerto Rico, and U.S. Virgin Islands.

Table 15. Genotyped Tuberculosis Cases with *Mycobacterium bovis*[1] by Origin of Birth: United States, 2004–2016

Year	Total genotyped cases	*Mycobacterium bovis* cases					
		Total		U.S.-born		Non-U.S.–born	
	No.	No.[2]	(%)	No.	(%)[3]	No.	(%)[3]
2004	5,954	73	(1.2)	23	(31.5)	50	(68.5)
2005	7,500	80	(1.1)	22	(27.5)	58	(72.5)
2006	7,529	116	(1.5)	25	(21.6)	90	(77.6)
2007	8,428	113	(1.3)	17	(15.0)	95	(84.1)
2008	8,178	129	(1.6)	29	(22.5)	100	(77.5)
2009	7,718	113	(1.5)	27	(23.9)	86	(76.1)
2010	7,748	108	(1.4)	20	(18.5)	88	(81.5)
2011	7,620	117	(1.5)	30	(25.6)	87	(74.4)
2012	7,236	109	(1.5)	18	(16.5)	91	(83.5)
2013	7,063	96	(1.4)	22	(22.9)	74	(77.1)
2014	6,991	109	(1.6)	24	(22.0)	85	(78.0)
2015	7,194	125	(1.7)	30	(24.0)	95	(76.0)
2016	6,903	106	(1.5)	17	(16.0)	89	(84.0)

[1]*M. bovis* cases were defined predominantly by spoligotyping results with missing spacers 3, 9, 16, and 39–43. Data exclude 118 cases of Bacillus Calmette-Guérin (BCG) *M. bovis*, which have x, y or z in the second MIRU position.
[2]This column reports all genotyped *M. bovis* cases, including those where origin of birth is unknown.
[3]Denominator is all *M. bovis* cases.

Morbidity Tables 2016

Table 16. Tuberculosis Cases and Percentages Among Non-U.S.–Born Persons[1], by the Top 30 Countries of Birth and Years in the United States Before TB Diagnosis: United States, 2016

Country of origin[2]	Total cases	No.Years in U.S.[3]											
		<1 Year		1–4		5–9		10–19		≥20		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Total	**6,351**	**1120**	**(17.6)**	**991**	**(15.6)**	**763**	**(12.0)**	**1237**	**(19.5)**	**1681**	**(26.5)**	**559**	**(8.8)**
Mexico	1,192	134	(11.2)	77	(6.5)	100	(8.4)	273	(22.9)	475	(39.8)	133	(11.2)
Philippines	790	92	(11.6)	78	(9.9)	98	(12.4)	169	(21.4)	262	(33.2)	91	(11.5)
India	589	124	(21.1)	158	(26.8)	78	(13.2)	111	(18.8)	81	(13.8)	37	(6.3)
Vietnam	494	52	(10.5)	59	(11.9)	56	(11.3)	102	(20.6)	175	(35.4)	50	(10.1)
China	383	39	(10.2)	66	(17.2)	58	(15.1)	79	(20.6)	109	(28.5)	32	(8.4)
Guatemala	189	42	(22.2)	46	(24.3)	30	(15.9)	36	(19.0)	23	(12.2)	12	(6.3)
Haiti	168	43	(25.6)	33	(19.6)	21	(12.5)	31	(18.5)	32	(19.0)	8	(4.8)
Ethiopia	151	37	(24.5)	41	(27.2)	26	(17.2)	26	(17.2)	11	(7.3)	10	(6.6)
Honduras	148	41	(27.7)	31	(20.9)	18	(12.2)	33	(22.3)	19	(12.8)	6	(4.1)
Myanmar	125	34	(27.2)	32	(25.6)	40	(32.0)	6	(4.8)	2	(1.6)	11	(8.8)
El Salvador	117	25	(21.4)	17	(14.5)	12	(10.3)	24	(20.5)	33	(28.2)	6	(5.1)
Nepal	105	33	(31.4)	42	(40.0)	18	(17.1)	9	(8.6)	0	(0)	3	(2.9)
Somalia	102	39	(38.2)	23	(22.5)	10	(9.8)	21	(20.6)	5	(4.9)	4	(3.9)
Korea, Republic of	97	3	(3.1)	5	(5.2)	8	(8.2)	15	(15.5)	58	(59.8)	8	(8.2)
Nigeria	91	33	(36.3)	31	(34.1)	8	(8.8)	6	(6.6)	9	(9.9)	4	(4.4)
Pakistan	84	12	(14.3)	9	(10.7)	13	(15.5)	13	(15.5)	28	(33.3)	9	(10.7)
Laos	70	1	(1.4)	1	(1.4)	1	(1.4)	12	(17.1)	44	(62.9)	11	(15.7)
Ecuador	69	9	(13.0)	12	(17.4)	6	(8.7)	15	(21.7)	18	(26.1)	9	(13.0)
Peru	67	13	(19.4)	6	(9.0)	9	(13.4)	22	(32.8)	15	(22.4)	2	(3.0)
Cambodia	66	2	(3.0)	3	(4.5)	4	(6.1)	6	(9.1)	40	(60.6)	11	(16.7)
Dominican Republic	61	9	(14.8)	10	(16.4)	11	(18.0)	10	(16.4)	15	(24.6)	6	(9.8)
Bangladesh	60	13	(21.7)	16	(26.7)	14	(23.3)	3	(5.0)	10	(16.7)	4	(6.7)
Colombia	50	8	(16.0)	8	(16.0)	4	(8.0)	13	(26.0)	14	(28.0)	3	(6.0)
Kenya	46	9	(19.6)	13	(28.3)	7	(15.2)	10	(21.7)	4	(8.7)	3	(6.5)
Thailand	43	11	(25.6)	9	(20.9)	2	(4.7)	6	(14.0)	9	(20.9)	6	(14.0)
Indonesia	39	11	(28.2)	4	(10.3)	4	(10.3)	9	(23.1)	7	(17.9)	4	(10.3)
Congo	38	23	(60.5)	9	(23.7)	1	(2.6)	5	(13.2)	0	(0)	0	(0)
Liberia	34	7	(20.6)	7	(20.6)	10	(29.4)	8	(23.5)	1	(2.9)	1	(2.9)
Sudan	33	13	(39.4)	7	(21.2)	0	(0)	10	(30.3)	1	(3.0)	2	(6.1)
Bhutan	32	10	(31.3)	15	(46.9)	6	(18.8)	0	(0)	0	(0)	1	(3.1)
All others[4]	818	198	(24.2)	123	(15.0)	90	(11.0)	154	(18.8)	181	(22.1)	72	(8.8)

[1]Includes persons born outside the United States (including the U.S. territories), except persons born to at least one U.S. citizen parent.
[2]Ranked by total case count.
[3]Among non-U.S.–born persons, the number of years since arrival in the United States before diagnosis with tuberculosis.
[4]Includes not specified for country of origin.
See Surveillance Slide #20.

Table 17. Tuberculosis Cases and Rates per 100,000 Population, by Hispanic Ethnicity and Non-Hispanic Race, Sex, and Age Group: United States, 2016

Race/ethnicity and sex	All ages		Age group													
			Under 5		5–14		15–24		25–44		45–64		≥65		Unknown	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Total cases	**9,272**	**2.9**	**224**	**1.1**	**163**	**0.4**	**938**	**2.2**	**2,827**	**3.3**	**2,849**	**3.4**	**2,264**	**4.6**	**7**	**—**
Male	5,639	3.5	127	1.2	64	0.3	530	2.4	1,624	3.8	1,892	4.6	1,396	6.4	6	—
Female	3,633	2.2	97	1.0	99	0.5	408	1.9	1,203	2.8	957	2.2	868	3.2	1	—
Unknown	0	—	0	—	0	—	0	—	0	—	0	—	0	—	0	—
Hispanic/Latino[1]	**2,601**	**4.5**	**107**	**2.1**	**53**	**0.5**	**313**	**3.3**	**900**	**5.2**	**731**	**6.6**	**496**	**12.5**	**1**	**—**
Male	1,668	5.7	66	2.5	17	0.3	206	4.2	592	6.6	510	9.2	276	16.1	1	—
Female	933	3.3	41	1.6	36	0.7	107	2.3	308	3.7	221	3.9	220	9.8	0	—
Unknown	0	—	0	—	0	—	0	—	0	—	0	—	0	—	0	—
American Indian/Alaska Native	**112**	**4.7**	**4**	**2.4**	**6**	**1.7**	**6**	**1.6**	**25**	**3.9**	**44**	**7.5**	**27**	**10.4**	**0**	**—**
Male	63	5.4	3	3.5	2	1.1	3	1.6	14	4.3	25	8.9	16	13.7	0	—
Female	49	4.0	1	1.2	4	2.3	3	1.6	11	3.4	19	6.2	11	7.7	0	—
Unknown	0	—	0	—	0	—	0	—	0	—	0	—	0	—	0	—
Asian	**3,195**	**18.0**	**29**	**2.9**	**35**	**1.7**	**315**	**13.6**	**968**	**16.4**	**903**	**20.5**	**943**	**44.7**	**2**	**—**
Male	1,827	21.6	18	3.5	11	1.1	168	14.4	484	17.3	556	27.5	588	64.5	2	—
Female	1,368	14.7	11	2.3	24	2.4	147	12.9	484	15.6	347	14.6	355	29.6	0	—
Unknown	0	—	0	—	0	—	0	—	0	—	0	—	0	—	0	—
Black/African American	**1,975**	**4.9**	**52**	**1.9**	**60**	**1.1**	**221**	**3.5**	**650**	**5.8**	**666**	**6.7**	**324**	**7.4**	**2**	**—**
Male	1,194	6.2	23	1.7	30	1.1	115	3.6	378	7.0	443	9.6	203	11.5	2	—
Female	781	3.7	29	2.1	30	1.1	106	3.4	272	4.7	223	4.2	121	4.6	0	—
Unknown	0	—	0	—	0	—	0	—	0	—	0	—	0	—	0	—

Table 17. (Con't) Tuberculosis Cases and Rates per 100,000 Population, by Hispanic Ethnicity and Non-Hispanic Race, Sex, and Age Group: United States, 2016

Race/ethnicity and sex	All ages		Age group													
			Under 5		5–14		15–24		25–44		45–64		≥65		Unknown	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Native Hawaiian/Other Pacific Islander	**79**	**13.9**	**8**	**19.6**	**2**	**2.4**	**13**	**15.3**	**28**	**15.3**	**16**	**12.6**	**12**	**24.4**	**0**	**—**
Male	44	15.4	3	14.3	2	4.8	6	13.7	18	19.1	9	14.4	6	26.2	0	—
Female	35	12.4	5	25.2	0	0.0	7	16.9	10	11.2	7	10.8	6	22.9	0	—
Unknown	0	—	0	—	0	—	0	—	0	—	0	—	0	—	0	—
White	**1,208**	**0.6**	**22**	**0.2**	**6**	**0.0**	**56**	**0.2**	**217**	**0.4**	**458**	**0.8**	**448**	**1.2**	**1**	**—**
Male	788	0.8	13	0.3	2	0.0	26	0.2	121	0.5	328	1.2	297	1.7	1	—
Female	420	0.4	9	0.2	4	0.0	30	0.3	96	0.4	130	0.4	151	0.7	0	—
Unknown	0	—	0	—	0	—	0	—	0	—	0	—	0	—	0	—
Multiple race[2]	**64**	**0.9**	**1**	**0.1**	**0**	**0.0**	**5**	**0.4**	**28**	**1.9**	**22**	**2.4**	**7**	**1.9**	**1**	**—**
Male	34	1.0	0	0.0	0	0.0	2	0.3	11	1.5	16	3.7	5	3.1	0	—
Female	30	0.9	1	0.2	0	0.0	3	0.5	17	2.2	6	1.3	2	1.0	1	—
Unknown	0	—	0	—	0	—	0	—	0	—	0	—	0	—	0	—
Unknown	**38**	**—**	**1**	**—**	**1**	**—**	**9**	**—**	**11**	**—**	**9**	**—**	**7**	**—**	**0**	**—**
Male	21	—	1	—	0	—	4	—	6	—	5	—	5	—	0	—
Female	17	—	0	—	1	—	5	—	5	—	4	—	2	—	0	—
Unknown	0	—	0	—	0	—	0	—	0	—	0	—	0	—	0	—

[1]Persons of Hispanic/Latino origin may be of any or multiple race.
[2]Indicates two or more races reported for a person, and does not include persons of Hispanic/Latino origin.
Note: Denominators for computing 2016 case rates were obtained from the U.S. Census Annual Estimates of the Resident Population by Sex, Age, Race, and Hispanic Origin: April 1, 2010 to July 1, 2016 (https://www.census.gov/data/tables/2016/demo/popest/nation-detail.html); accessed July 6, 2017.
Case counts for race categories (American Indian/Alaska Native, Asian, black/African American, Native Hawaiian/Other Pacific Islander, and white) are mutually exclusive and do not include persons of Hispanic/Latino origin or multiple race.
See Technical Notes.
See Surveillance Slides #9 and #11.

Table 18. Tuberculosis Cases Among U.S.-Born Persons, by Hispanic Ethnicity and Non-Hispanic Race, Sex, and Age Group: United States, 2016

Race/ethnicity and sex	Age group							
	All ages	Under 5	5–14	15–24	25–44	45–64	≥65	Unknown
Total cases	**2,901**	**190**	**94**	**274**	**622**	**1,008**	**709**	**4**
Male	1,887	107	43	160	370	729	474	4
Female	1,014	83	51	114	252	279	235	0
Unknown	0	0	0	0	0	0	0	0
Hispanic/Latino[1]	**603**	**97**	**35**	**109**	**161**	**115**	**86**	**0**
Male	377	58	14	69	97	89	50	0
Female	226	39	21	40	64	26	36	0
Unknown	0	0	0	0	0	0	0	0
American Indian/Alaska Native	**110**	**4**	**6**	**6**	**23**	**44**	**27**	**0**
Male	62	3	2	3	13	25	16	0
Female	48	1	4	3	10	19	11	0
Unknown	0	0	0	0	0	0	0	0
Asian	**146**	**21**	**13**	**46**	**41**	**10**	**14**	**1**
Male	87	13	6	27	19	8	13	1
Female	59	8	7	19	22	2	1	0
Unknown	0	0	0	0	0	0	0	0
Black/African American	**1,068**	**42**	**36**	**69**	**232**	**440**	**247**	**2**
Male	693	20	18	37	144	310	162	2
Female	375	22	18	32	88	130	85	0
Unknown	0	0	0	0	0	0	0	0
Native Hawaiian/Other Pacific Islander	**32**	**7**	**1**	**5**	**12**	**2**	**5**	**0**
Male	22	2	1	5	9	1	4	0
Female	10	5	0	0	3	1	1	0
Unknown	0	0	0	0	0	0	0	0
White	**915**	**18**	**3**	**36**	**143**	**384**	**330**	**1**
Male	627	11	2	17	82	285	229	1
Female	288	7	1	19	61	99	101	0
Unknown	0	0	0	0	0	0	0	0
Multiple race[2]	**21**	**1**	**0**	**1**	**8**	**11**	**0**	**0**
Male	15	0	0	1	5	9	0	0
Female	6	1	0	0	3	2	0	0
Unknown	0	0	0	0	0	0	0	0
Unknown	**6**	**0**	**0**	**2**	**2**	**2**	**0**	**0**
Male	4	0	0	1	1	2	0	0
Female	2	0	0	1	1	0	0	0
Unknown	0	0	0	0	0	0	0	0

[1]Persons of Hispanic/Latino origin may be of any or multiple race.
[2]Indicates two or more races reported for a person and does not include persons of Hispanic/Latino origin.
Note: Case counts for race categories (American Indian/Alaska Native, Asian, black/African American, Native Hawaiian/Other Pacific Islander, and white) are mutually exclusive and do not include persons of Hispanic ethnicity or multiple race.
See Technical Notes.
See Surveillance Slide #15.

Table 19. Tuberculosis Cases Among Non-U.S.–Born Persons[1], by Hispanic Ethnicity and Non-Hispanic Race, Sex, and Age Group: United States, 2016

Race/ethnicity and sex	Age group							
	All ages	Under 5	5–14	15–24	25–44	45–64	≥65	Unknown
Total cases	**6,351**	**34**	**69**	**661**	**2,200**	**1,837**	**1,547**	**3**
Male	3,741	20	21	368	1,251	1,160	919	2
Female	2,610	14	48	293	949	677	628	1
Unknown	0	0	0	0	0	0	0	0
Hispanic/Latino[2]	**1,987**	**10**	**18**	**202**	**736**	**615**	**405**	**1**
Male	1,284	8	3	135	493	420	224	1
Female	703	2	15	67	243	195	181	0
Unknown	0	0	0	0	0	0	0	0
American Indian/Alaska Native	**2**	**0**	**0**	**0**	**2**	**0**	**0**	**0**
Male	1	0	0	0	1	0	0	0
Female	1	0	0	0	1	0	0	0
Unknown	0	0	0	0	0	0	0	0
Asian	**3,045**	**8**	**22**	**268**	**927**	**893**	**926**	**1**
Male	1,739	5	5	141	465	548	574	1
Female	1,306	3	17	127	462	345	352	0
Unknown	0	0	0	0	0	0	0	0
Black/African American	**906**	**10**	**24**	**152**	**418**	**225**	**77**	**0**
Male	500	3	12	78	234	132	41	0
Female	406	7	12	74	184	93	36	0
Unknown	0	0	0	0	0	0	0	0
Native Hawaiian/Other Pacific Islander	**47**	**1**	**1**	**8**	**16**	**14**	**7**	**0**
Male	22	1	1	1	9	8	2	0
Female	25	0	0	7	7	6	5	0
Unknown	0	0	0	0	0	0	0	0
White	**290**	**4**	**3**	**20**	**73**	**72**	**118**	**0**
Male	160	2	0	9	39	42	68	0
Female	130	2	3	11	34	30	50	0
Unknown	0	0	0	0	0	0	0	0
Multiple race[3]	**42**	**0**	**0**	**4**	**19**	**11**	**7**	**1**
Male	18	0	0	1	5	7	5	0
Female	24	0	0	3	14	4	2	1
Unknown	0	0	0	0	0	0	0	0
Unknown	**32**	**1**	**1**	**7**	**9**	**7**	**7**	**0**
Male	17	1	0	3	5	3	5	0
Female	15	0	1	4	4	4	2	0
Unknown	0	0	0	0	0	0	0	0

[1]Includes persons born outside the United States (including the U.S. territories), except persons born to at least one U.S. citizen parent.
[2]Persons of Hispanic ethnicity may be of any race or multiple race.
[3]Indicates two or more races reported for a person and does not include persons of Hispanic/Latino origin.
Note: Case counts for race categories (American Indian/Alaska Native, Asian, black/African American, Native Hawaiian/Other Pacific Islander, and white) are mutually exclusive and do not include persons of Hispanic ethnicity or multiple race.
See Technical Notes.
See Surveillance Slide #15.

Table 20. Tuberculosis Cases Among Non-U.S.–Born Persons[1], by WHO Region and Country of Birth[2]: United States, 2016

African Region
Total cases = 578

Algeria	6	Ethiopia	151	Niger	2
Angola	7	Gabon	1	Nigeria	91
Benin	3	Gambia	5	Rwanda	4
Botswana	1	Ghana	23	Sao Tome and Principe	0
Burkina Faso	3	Guinea	15	Senegal	16
Burundi	3	Guinea-Bissau	0	Seychelles	0
Cameroon	16	Kenya	46	Sierra Leone	13
Cape Verde	4	Lesotho	0	South Africa	7
Central African Republic	5	Liberia	34	South Sudan	1
Chad	5	Madagascar	0	Swaziland	0
Comoros	0	Malawi	0	Tanzania, United Republic of	4
Congo, Republic of	38	Mali	5	Togo	3
Côte d'Ivoire	10	Mauritania	2	Uganda	7
Congo, Dem. Republic of	9	Mauritius	1	Zambia	2
Equatorial Guinea	2	Mozambique	6	Zimbabwe	5
Eritrea	22	Namibia	0		

Americas Region
Total cases = 2,218

Anguilla	0	Costa Rica	1	Netherland Antilles	0
Antigua and Barbuda	0	Cuba	27	Nicaragua	18
Argentina	10	Dominica	0	Panama	5
Bahamas	1	Dominican Republic	61	Paraguay	0
Barbados	0	Ecuador	69	Peru	67
Belize	4	El Salvador	117	St. Kitts and Nevis	0
Bermuda	0	Grenada	1	St. Lucia	1
Bolivia	14	Guatemala	189	St. Vincent & Grenadines	0
Brazil	18	Guyana	19	Suriname	1
British Virgin Islands	0	Haiti	168	Trinidad and Tobago	7
Canada	6	Honduras	148	Turks and Caicos Islands	0
Cayman Islands	0	Jamaica	11	Uruguay	2
Chile	0	Mexico	1,192	Venezuela	11
Colombia	50	Montserrat	0		

Eastern Mediterranean Region
Total cases = 320

Afghanistan	31	Lebanon	2	Sudan	33
Bahrain	0	Libyan Arab Jamahiriya	1	Syrian Arab Republic	5
Djibouti	3	Morocco	7	Tunisia	0
Egypt	4	Oman	0	United Arab Emirates	2
Iran, Islamic Republic of	9	Pakistan	84	West Bank and Gaza	0
Iraq	10	Qatar	1	Yemen	15
Jordan	2	Saudi Arabia	8		
Kuwait	1	Somalia	102		

Table 20. (Cont'd) Tuberculosis Cases Among Non-U.S.–Born Persons[1], by WHO Region and Country of Birth[2]: United States, 2016

European Region
Total cases = 160

Albania	6	Greece	4	Poland	6
Andorra	0	Hungary	2	Portugal	1
Armenia	2	Iceland	1	Romania	8
Austria	0	Ireland	3	Russian Federation	20
Azerbaijan	4	Israel	2	San Marino	0
Belarus	0	Italy	10	Serbia	1
Belgium	0	Kazakhstan	2	Slovakia	0
Bosnia and Herzegovina	17	Kyrgyzstan	4	Slovenia	0
Bulgaria	4	Latvia	2	Spain	4
Croatia	0	Lithuania	0	Sweden	0
Cyprus	0	Luxembourg	0	Switzerland	0
Czech Republic	1	Macedonia, TFYR	1	Tajikistan	2
Denmark	0	Malta	0	Turkey	6
Estonia	0	Moldova, Republic of	3	Turkmenistan	0
Finland	1	Monaco	0	Ukraine	23
France	5	Montenegro	0	United Kingdom	5
Georgia	4	Netherlands	0	Uzbekistan	5
Germany	1	Norway	0		

Southeast Asia Region
Total cases = 1,018

Bangladesh	60	Korea, DPR	23	Sri Lanka	2
Bhutan	32	Maldives	0	Thailand	43
India	589	Myanmar	125	Timor-Leste	0
Indonesia	39	Nepal	105		

Western Pacific Region
Total cases = 2,002

Australia	0	Korea, Republic of	97	Papua New Guinea	1
Brunei Darussalam	0	Lao PDR	70	Philippines	790
Cambodia	66	Marshall Islands	22	Samoa	0
China	383	Malaysia	10	Singapore	2
China, Hong Kong SAR	27	Micronesia (Fed. States of)	15	Solomon Islands	0
China, Macao SAR	0	Mongolia	12	Tokelau	0
Cook Islands	0	Nauru	0	Tonga	3
Fiji	2	New Caledonia	0	Tuvalu	0
French Polynesia	0	New Zealand	0	Vanuatu	0
Japan	8	Niue	0	Vietnam	494
Kiribati	0	Palau	0	Wallis and Futuna	0

Other[3]
Total Cases = 33

Unknown
Total cases = 22

[1]Includes persons born outside the United States (including the U.S. territories), except persons born to at least one U.S. citizen parent.
[2]Country as reported by patient.
[3]Includes country codes currently reported via the National Tuberculosis Surveillance System that are not represented by WHO member states.
Note: Regional composition of countries based on WHO Report *Global Tuberculosis Report 2016,* World Health Organization (http://www.who.int/tb/publications/global_report/en/).
Korea, DPR, Democratic People's Republic of Korea.
Lao PDR, Lao People's Democratic Republic.
Macedonia TFYR, the former Yugoslav Republic of Macedonia.
WHO, World Health Organization.

Table 21. Tuberculosis Risk Factors[1], by Origin and Race/Ethnicity: United States, 2016

		Total eligible cases[2]	MDR patient contact		Missed contact		Infectious TB patient contact		Incomplete LTBI therapy		TNF-α Inhibitors		Post-organ transplantation		Diabetes mellitus		Renal disease		Immuno-suppression		Other		None		Unknown	
			No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
	United States	**9,252**	**9**	**(0.1)**	**53**	**(0.6)**	**633**	**(6.8)**	**208**	**(2.2)**	**56**	**(0.6)**	**53**	**(0.6)**	**1,522**	**(16.5)**	**207**	**(2.2)**	**409**	**(4.4)**	**2149**	**(23.2)**	**4097**	**(44.3)**	**595**	**(6.4)**
U.S.-born	**U.S.-born total**	**2,901**	**4**	**(0.1)**	**33**	**(1.1)**	**367**	**(12.7)**	**87**	**(3.0)**	**11**	**(0.4)**	**20**	**(0.7)**	**358**	**(12.3)**	**56**	**(1.9)**	**154**	**(5.3)**	**827**	**(28.5)**	**1134**	**(39.1)**	**115**	**(4.0)**
	American Indian/ Alaska Native	110	1	(0.9)	1	(0.9)	22	(20.0)	7	(6.4)	0	(0)	1	(0.9)	18	(16.4)	6	(5.5)	4	(3.6)	22	(20.0)	48	(43.6)	2	(1.8)
	Asian	146	1	(0.7)	2	(1.4)	32	(21.9)	1	(0.7)	0	(0)	0	(0)	10	(6.8)	1	(0.7)	5	(3.4)	34	(23.3)	56	(38.4)	11	(7.5)
	Black/African American	1,068	1	(0.1)	15	(1.4)	132	(12.4)	40	(3.7)	1	(0.1)	5	(0.5)	145	(13.6)	25	(2.3)	47	(4.4)	304	(28.5)	398	(37.3)	53	(5.0)
	Hispanic/Latino[3]	603	0	(0)	5	(0.8)	99	(16.4)	6	(1.0)	1	(0.2)	3	(0.5)	90	(14.9)	11	(1.8)	15	(2.5)	149	(24.7)	261	(43.3)	19	(3.2)
	Multiple races[4]	21	0	(0)	2	(9.5)	2	(9.5)	0	(0)	0	(0)	1	(4.8)	2	(9.5)	0	(0)	1	(4.8)	5	(23.8)	5	(23.8)	3	(14.3)
	Native Hawaiian/ Other Pacific Islander	32	0	(0)	0	(0)	10	(31.3)	1	(3.1)	0	(0)	0	(0)	8	(25.0)	2	(6.3)	0	(0)	6	(18.8)	11	(34.4)	1	(3.1)
	White	915	1	(0.1)	8	(0.9)	70	(7.7)	32	(3.5)	9	(1.0)	10	(1.1)	84	(9.2)	11	(1.2)	81	(8.9)	305	(33.3)	354	(38.7)	24	(2.6)
	Unknown	6	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(16.7)	0	(0)	1	(16.7)	2	(33.3)	1	(16.7)	2	(33.3)

Table 21. (Con't) Tuberculosis Risk Factors[1], by Origin and Race/Ethnicity: United States, 2016

		Total eligible cases[2]	MDR patient contact		Missed contact		Infectious TB patient contact		Incomplete LTBI therapy		TNF-α inhibitors		Post-organ transplantation		Diabetes mellitus		Renal disease		Immuno-suppression		Other		None		Unknown	
			No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
	Non-U.S.–born total	**6,351**	**5**	**(0.1)**	**20**	**(0.3)**	**266**	**(4.2)**	**121**	**(1.9)**	**45**	**(0.7)**	**33**	**(0.5)**	**1,164**	**(18.3)**	**151**	**(2.4)**	**255**	**(4.0)**	**1322**	**(20.8)**	**2963**	**(46.7)**	**480**	**(7.6)**
Non-U.S.–born	American Indian/ Alaska Native	2	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(100.0)	0	(0)
	Asian	3,045	4	(0.1)	4	(0.1)	103	(3.4)	63	(2.1)	32	(1.1)	22	(0.7)	598	(19.6)	82	(2.7)	148	(4.9)	702	(23.1)	1333	(43.8)	237	(7.8)
	Black/African American	906	0	(0)	2	(0.2)	33	(3.6)	31	(3.4)	2	(0.2)	2	(0.2)	85	(9.4)	9	(1.0)	15	(1.7)	167	(18.4)	505	(55.7)	79	(8.7)
	Hispanic/Latino[3]	1,987	0	(0)	7	(0.4)	101	(5.1)	21	(1.1)	8	(0.4)	4	(0.2)	412	(20.7)	49	(2.5)	66	(3.3)	374	(18.8)	964	(48.5)	105	(5.3)
	Multiple races[4]	42	0	(0)	1	(2.4)	2	(4.8)	0	(0)	0	(0)	1	(2.4)	7	(16.7)	0	(0)	3	(7.1)	7	(16.7)	17	(40.5)	7	(16.7)
	Native Hawaiian/ Other Pacific Islander	47	0	(0)	3	(6.4)	14	(29.8)	1	(2.1)	0	(0)	0	(0)	16	(34.0)	3	(6.4)	0	(0)	8	(17.0)	10	(21.3)	3	(6.4)
	White	290	1	(0.3)	3	(1.0)	9	(3.1)	5	(1.7)	3	(1.0)	4	(1.4)	43	(14.8)	7	(2.4)	22	(7.6)	59	(20.3)	123	(42.4)	39	(13.4)
	Unknown	32	0	(0)	0	(0)	4	(12.5)	0	(0)	0	(0)	0	(0)	3	(9.4)	1	(3.1)	1	(3.1)	5	(15.6)	9	(28.1)	10	(31.3)

[1]Includes the number of risk factors reported (which may be more than one per case) and the number of cases with no information on additional risk factors. The sum of risk factors is greater than the total number of cases because more than one risk factor may be selected per case.
[2]Excludes TB risk factor information for 20 cases with unknown origin.
[3]Persons of Hispanic/Latino origin may be of any or multiple race.
[4]Indicates two or more races reported for a person, and does not include persons of Hispanic/Latino origin.
Note: Case counts for race categories (American Indian/Alaska Native, Asian, black/African American, Native Hawaiian/Other Pacific Islander, and white) are mutually exclusive and do not include persons of Hispanic ethnicity or multiple race.

Table 22. Characteristics of Tuberculosis Cases in GENType Clusters[1], by Alert Levels Based on Log-Likelihood Ratios (LLR)[2]: United States, 2014–2016

Case characteristics	Unique		Clustered		Alert levels for clustered cases[3]					
					Non-alerted (LLR <5)		Medium (LLR 5–<10)		High (LLR ≥10)	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Total	**16,655**	**(79.2)**	**4,387**	**(20.8)**	**2,487**	**(56.7)**	**1,021**	**(23.3)**	**879**	**(20.0)**
Origin of birth										
U.S-born	4,311	(65.2)	2,301	(34.8)	902	(39.2)	654	(28.4)	745	(32.4)
Non-U.S.–born	12,327	(85.6)	2,077	(14.4)	1,579	(76.0)	365	(17.6)	133	(6.4)
Unknown or missing	17	(65.4)	9	(34.6)	6	(66.7)	2	(22.2)	1	(11.1)
Race and ethnicity										
Hispanic/Latino	4,565	(76.9)	1,371	(23.1)	830	(60.5)	370	(27.0)	171	(12.5)
American Indian/Alaska Native	146	(48.3)	156	(51.7)	18	(11.5)	42	(26.9)	96	(61.5)
Asian	6,385	(86.5)	996	(13.5)	843	(84.6)	107	(10.7)	46	(4.6)
Black/African American	3,029	(70.9)	1,246	(29.1)	531	(42.6)	299	(24.0)	416	(33.4)
Native Hawaiian/Other Pacific Islander	97	(53.3)	85	(46.7)	40	(47.1)	20	(23.5)	25	(29.4)
White	2,251	(81.7)	503	(18.3)	213	(42.3)	172	(34.2)	118	(23.5)
Multiple race	127	(84.7)	23	(15.3)	10	(43.5)	7	(30.4)	6	(26.1)
Unknown or missing	55	(88.7)	7	(11.3)	2	(28.6)	4	(57.1)	1	(14.3)
Age group (years)										
0–4	72	(38.7)	114	(61.3)	47	(41.2)	45	(39.5)	22	(19.3)
5–14	104	(63.4)	60	(36.6)	31	(51.7)	11	(18.3)	18	(30.0)
15–24	1,621	(75.7)	521	(24.3)	286	(54.9)	140	(26.9)	95	(18.2)
25–44	5,023	(77.9)	1,426	(22.1)	774	(54.3)	354	(24.8)	298	(20.9)
45–64	5,056	(75.5)	1,639	(24.5)	892	(54.4)	371	(22.6)	376	(22.9)
≥65	4,773	(88.4)	627	(11.6)	457	(72.9)	100	(15.9)	70	(11.2)
Unknown	6	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)
Disease site										
Pulmonary only	11,836	(77.3)	3,473	(22.7)	1,925	(55.4)	823	(23.7)	725	(20.9)
Extrapulmonary	2,898	(86.8)	440	(13.2)	294	(66.8)	93	(21.1)	53	(12.0)
Both	1,911	(80.2)	472	(19.8)	266	(56.4)	105	(22.2)	101	(21.4)
Unknown	10	(83.3)	2	(16.7)	2	(100.0)	0	(0)	0	(0)
Sputum smear										
Positive	7,675	(76.4)	2,372	(23.6)	1,299	(54.8)	601	(25.3)	472	(19.9)
Negative	6,850	(81.1)	1,598	(18.9)	952	(59.6)	309	(19.3)	337	(21.1)
Not done	2,111	(83.6)	414	(16.4)	234	(56.5)	110	(26.6)	70	(16.9)
Unknown or missing	19	(86.4)	3	(13.6)	2	(66.7)	1	(33.3)	0	(0)
Cavitary disease[4]										
Yes	167	(77.7)	48	(22.3)	23	(47.9)	14	(29.2)	11	(22.9)
No	1,358	(79.4)	352	(20.6)	199	(56.5)	76	(21.6)	77	(21.9)
Unknown or missing	4	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)

Table 22. (Con't) Characteristics of Tuberculosis Cases in GENType Clusters[1], by Alert Levels Based on Log-Likelihood Ratios (LLR)[2]: United States, 2014–2016

Case characteristics	Unique		Clustered		Alert levels for clustered cases[3]					
					Non-alerted (LLR <5)		Medium (LLR 5–<10)		High (LLR ≥10)	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Homeless within past year										
Yes	627	(53.2)	552	(46.8)	188	(34.1)	138	(25.0)	226	(40.9)
No	15,930	(80.6)	3,824	(19.4)	2,291	(59.9)	881	(23.0)	652	(17.1)
Unknown or missing	98	(89.9)	11	(10.1)	8	(72.7)	2	(18.2)	1	(9.1)
Excess alcohol use within the past year										
Yes	1,470	(62.2)	895	(37.8)	367	(41.0)	235	(26.3)	293	(32.7)
No	14,965	(81.3)	3,444	(18.7)	2,085	(60.5)	776	(22.5)	583	(16.9)
Unknown or missing	220	(82.1)	48	(17.9)	35	(72.9)	10	(20.8)	3	(6.3)
Injecting illicit drug use within past year										
Yes	175	(55.9)	138	(44.1)	57	(41.3)	42	(30.4)	39	(28.3)
No	16,306	(79.6)	4,186	(20.4)	2,391	(57.1)	962	(23.0)	833	(19.9)
Unknown or missing	174	(73.4)	63	(26.6)	39	(61.9)	17	(27.0)	7	(11.1)
Noninjecting illicit drug use within past year										
Yes	906	(56.9)	685	(43.1)	275	(40.1)	193	(28.2)	217	(31.7)
No	15,575	(81.0)	3,644	(19.0)	2,176	(59.7)	813	(22.3)	655	(18.0)
Unknown or missing	174	(75.0)	58	(25.0)	36	(62.1)	15	(25.9)	7	(12.1)
Resident of a correctional facility at the time of diagnosis										
Yes	499	(69.0)	224	(31.0)	116	(51.8)	34	(15.2)	74	(33.0)
No	15,585	(79.8)	3,933	(20.2)	2,246	(57.1)	946	(24.1)	741	(18.8)
Unknown or missing	571	(71.3)	230	(28.7)	125	(54.3)	41	(17.8)	64	(27.8)
HIV status										
Positive	832	(74.7)	282	(25.3)	143	(50.7)	61	(21.6)	78	(27.7)
Negative	13,958	(78.7)	3,783	(21.3)	2,131	(56.3)	892	(23.6)	760	(20.1)
Refused testing	478	(86.6)	74	(13.4)	48	(64.9)	15	(20.3)	11	(14.9)
Testing not offered	960	(83.3)	193	(16.7)	128	(66.3)	38	(19.7)	27	(14.0)
Unknown, missing or indeterminate	427	(88.6)	55	(11.4)	37	(67.3)	15	(27.3)	3	(5.5)
Multidrug-resistant TB										
Yes	232	(84.7)	42	(15.3)	35	(83.3)	7	(16.7)	0	(0)
No	16,090	(79.0)	4,269	(21.0)	2,416	(56.6)	993	(23.3)	860	(20.1)
Unknown or missing	333	(81.4)	76	(18.6)	36	(47.4)	21	(27.6)	19	(25.0)

[1]GENType clusters have two or more cases with matching spoligotype and 24-locus mycobacterial interspersed repetitive unit-variable number tandem repeat type (GENType) within a county during the specified 3-year time period.
[2]Alert levels are based on a log-likelihood ratio (LLR), which calculates the geographic concentration of a genotype in a county compared to the rest of the country during a 3-year period.
[3]There were 4,387 cases in 1,401 alerted clusters: 879 cases were in 86 (6.1%) high alert clusters; 1,021 cases were in 322 (23.0%) medium alert clusters, and 2,487 cases were in 993 (70.9%) nonalert clusters.
[4]Cavitary disease only assessed for persons with pulmonary TB and an abnormal x-ray.
Note: Case counts for race categories (American Indian/Alaska Native, Asian, black/African American, Native Hawaiian/Other Pacific Islander, and white) are mutually exclusive and do not include persons of Hispanic ethnicity or multiple race. Multiple race does not include persons of Hispanic ethnicity.
See Surveillance Slide #35

Table 23. Tuberculosis Cases and Clusters, by Cluster Size[1]: United States, 2014–2016

Cluster Size	Clusters		Clustered cases[2]	
	No.	(%)[3]	No.	(%)[4]
Total	**1,401**	**(100.0)**	**4,387**	**(100.0)**
2-case cluster	878	(62.7)	1,756	(40.0)
3-case cluster	263	(18.8)	789	(18.0)
4-case cluster	105	(7.5)	420	(9.6)
5-case cluster	43	(3.1)	215	(4.9)
6-case cluster	25	(1.8)	150	(3.4)
7-case cluster	26	(1.9)	182	(4.1)
8-case cluster	14	(1.0)	112	(2.6)
9-case cluster	10	(0.7)	90	(2.1)
≥10-case cluster	37	(2.6)	673	(15.3)

[1]Clusters have two or more cases with matching spoligotype and 24-locus mycobacterial interspersed repetitive unit-variable number tandem repeat type (GENType) within a county during the specified 3-year time period.
[2]Cases with matching spoligotype and 24-locus mycobacterial interspersed repetitive unit-variable number tandem repeat type (GENType) are members of a cluster within a county during the specified 3-year time period.
[3]Denominator is total number of clusters.
[4]Denominator is total number of cases.
See Surveillance Slide #34.

Table 24. Twenty-Five Most Frequently Reported GENTypes[1] Among Genotyped Tuberculosis Cases: United States, 2014–2016

GENType	PCRType[2]	Spoligotype	24-locus MIRU-VNTR		TB Cases with GENType[3]		Reporting Areas[4] with GENType
					No.	(%)	No.
G00012	PCR00002	000000000003771	223325173533	445644423328	175	(0.8)	28
G00010	PCR00002	000000000003771	223325173533	444534423428	166	(0.8)	20
G00016	PCR00041	677777477413771	254326223432	14a843263217	149	(0.7)	27
G05056	PCR00041	677777477413771	254326223432	14a943263217	111	(0.5)	25
G00013	PCR00016	700036777760731	222325143223	434534412334	81	(0.4)	17
G00017	PCR00803	000000000003771	222325173533	445644423328	74	(0.4)	20
G05625	PCR00231	700036777760771	222325133223	234634413334	71	(0.3)	11
G00011	PCR00015	777776777760601	224325153323	444234423337	70	(0.3)	21
G00015	PCR11884	000000000003771	223326171531	445544423228	67	(0.3)	10
G00019	PCR00309	000000000003771	222325173543	445644423328	67	(0.3)	17
G10345	PCR00160	777776777760601	224325143323	244234423337	66	(0.3)	11
G10508	PCR00015	777776777760601	224325153323	43-234422333	63	(0.3)	7
G12500	PCR00617	777777607760771	224226153321	543424115228	53	(0.3)	10
G00020	PCR01328	776377777760751	333325153222	351544223229	50	(0.2)	9
G01363	PCR00002	000000000003771	223325173533	445544423328	50	(0.2)	16
G11610	PCR08263	777777377560771	223425153322	242524223324	50	(0.2)	5
G03270	PCR01500	617776777760601	225325153324	444234423315	45	(0.2)	2
G00846	PCR00093	000000000003771	223325163533	445644423328	44	(0.2)	18
G08735	PCR00143	777000377760771	225125113322	143134423337	44	(0.2)	17
G00014	PCR00051	776037777760771	223125163324	242434223525	42	(0.2)	11
G00617	PCR00001	000000000003771	223321153643	344334233339	41	(0.2)	12
G00734	PCR00091	000000000003771	223325153533	445644423328	40	(0.2)	18
G00018	PCR00036	000000000003771	223425173563	344644623337	39	(0.2)	11
G00769	PCR00224	000000000003771	223325163333	444344223437	39	(0.2)	9
G05020	PCR00041	677777477413771	254326223432	14a843263215	39	(0.2)	10

[1]GENType is defined as a unique combination of spoligotype and 24-locus mycobacterial interspersed repetitive unit-variable number tandem repeat (MIRU-VNTR) type.
[2]PCRType is defined as a unique combination of spoligotype and 12-locus MIRU-VNTR; every GENType has a corresponding PCRType.
[3]Among 21,088 cases with GENTypes during 2014–2016.
[4]This table reflects common GENTypes for the 50 states and the District of Columbia; for common GENTypes in the U.S.-affiliated areas, please see Table 25.

Table 25. Five Most Frequently Reported GENTypes[1] Among Genotyped Tuberculosis Cases: United States-Affiliated Areas[2], 2014–2016

GENType	PCRType[3]	Spoligotype	24-locus MIRU-VNTR		TB Cases with GENType[4]		Reporting Areas with GENType
					No.	(%)	No.
G00017	PCR00803	000000000003771	222325173533	445644423328	136	(24.8)	5
G04942	PCR00041	677777477413771	254326223432	149843263217	12	(2.2)	3
G00016	PCR00041	677777477413771	254326223432	14a843263217	10	(1.8)	4
G00318	PCR00306	000000000003771	221325173533	444644423348	9	(1.6)	2
G01284	PCR00002	000000000003771	223325173533	44474442334A	9	(1.6)	3

[1]GENType is defined as a unique combination of spoligotype and 24-locus mycobacterial interspersed repetitive unit-variable number tandem repeat (MIRU-VNTR) type.
[2]The U.S.-affiliated areas include: American Samoa, Northern Mariana Islands, Federated States of Micronesia, Guam, Marshall Islands, Palau, Puerto Rico, and U.S. Virgin Islands.
[3]PCRType is defined as a unique combination of spoligotype and 12-locus MIRU-VNTR; every GENType has a corresponding PCRType.
[4]Among culture-positive genotyped TB cases during 2014–2016 (n = 548).

Morbidity Tables 2014

Table 26. Tuberculosis Cases and Percentages by Reason Tuberculosis Therapy Was Stopped and Type of Move: United States, 2014

Type of move	Total cases	Completed therapy		Adverse event		Lost		Refused		Died		Other[4]		Unknown	
	No.	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Moved in state[1]	289	240	(83.0)	1	(0.3)	4	(1.4)	3	(1.0)	15	(5.2)	24	(8.3)	2	(0.7)
Moved out of state[2]	297	242	(81.5)	1	(0.3)	14	(4.7)	1	(0.3)	8	(2.7)	23	(7.7)	8	(2.7)
Moved out of country[3]	373	165	(44.2)	1	(0.3)	19	(5.1)	3	(0.8)	11	(2.9)	166	(44.5)	7	(1.9)
Did not move	7,993	7,294	(91.3)	17	(0.2)	41	(0.5)	74	(0.9)	520	(6.5)	34	(0.4)	13	(0.2)
Unknown if moved	235	180	(76.6)	0	(0)	5	(2.1)	2	(0.9)	13	(5.5)	1	(0.4)	34	(14.5)

[1]Includes patients who were alive at diagnosis, started on treatment, and moved in state.
[2]Includes patients who were alive at diagnosis, started on treatment, and moved out of state.
[3]Includes patients who were alive at diagnosis, started on treatment, and moved out of the country; transnational referrals were provided for 255 (68.4%) TB patients who moved out of the country.
[4]Therapy was discontinued for a known reason other than those listed (e.g., patient moved outside the United States, or patient moved from state A to state B, and although state A notified state B, state B never followed up).
Note: There may be differences in the way jurisdictions determine treatment completion for patients who moved out of the country; some reporting jurisdictions may be classifying all patients who moved out of the country as 'other' for reason therapy stopped.
Moving in and out of state or country is not mutually exclusive. Two patients moved twice, and one patient moved but did not indicate moving in state, out of state or out of country.

Table 27. Deaths Among Reported Tuberculosis Cases, by Age Group: United States, 2014

	Total			Dead at diagnosis						Died after diagnosis						
	Total deaths reported	Deaths related to TB disease or therapy[1]		Total dead at TB diagnosis	TB a cause of death		TB not a cause of death		Cause of death unknown/missing		Total died during therapy	Related to TB therapy/disease[2]		Unrelated to TB therapy/disease		Cause of death unknown/missing	
Age group	No.	No.	(%)	No.	No.	(%)	No.	(%)	No.	(%)	No.	No.	(%)	No.	(%)	No.	(%)
Total	**774**	**287**	**(37.1)**	**194**	**62**	**(32.0)**	**99**	**(51.0)**	**33**	**(17.0)**	**580**	**225**	**(38.8)**	**253**	**(43.6)**	**102**	**(17.6)**
0–4	4	3	(75.0)	2	1	(50.0)	1	(50.0)	0	(0)	2	2	(100.0)	0	(0)	0	(0)
5–14	0	0	…	0	0	…	0	…	0	…	0	0	…	0	…	0	…
15–24	10	5	(50.0)	1	1	(100.0)	0	(0)	0	(0)	9	4	(44.4)	5	(55.6)	0	(0)
25–44	68	32	(47.1)	18	8	(44.4)	6	(33.3)	4	(22.2)	50	24	(48.0)	21	(42.0)	5	(10.0)
45–64	220	86	(39.1)	53	24	(45.3)	20	(37.7)	9	(17.0)	167	62	(37.1)	73	(43.7)	32	(19.2)
≥65	472	161	(34.1)	120	28	(23.3)	72	(60.0)	20	(16.7)	352	133	(37.8)	154	(43.8)	65	(18.5)

[1]Includes patients who were dead at diagnosis or died during therapy, for which TB or TB therapy was indicated as a cause of death.
[2]Three patient deaths during therapy were related to TB therapy.
Note: Ellipses (...) indicate that the percentage cannot be calculated and the denominator is 0.

Table 28. Sputum Culture Conversion, by Age Group: United States, 2014

Age group	Total sputum culture positive[1]	Sputum culture conversion documented[2]		Sputum culture conversion not documented[3]		Sputum culture conversion unknown		Reason sputum culture conversion not documented													
								Cannot produce sputum		Sputum not collected		Died		Refused		Lost to follow-up		Other		Unknown	
	No.	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Total	**5,166**	**4602**	**(89.1)**	**511**	**(9.9)**	**53**	**(1.0)**	**28**	**(5.5)**	**121**	**(23.7)**	**216**	**(42.3)**	**9**	**(1.8)**	**18**	**(3.5)**	**96**	**(18.8)**	**23**	**(4.5)**
0-4	2	0	(0)	2	(100.0)	0	(0)	1	(50.0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(50.0)	0	(0)
5-14	27	26	(96.3)	1	(3.7)	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
15-24	580	524	(90.3)	51	(8.8)	5	(0.9)	5	(9.8)	24	(47.1)	3	(5.9)	2	(3.9)	1	(2.0)	14	(27.5)	2	(3.9)
25-44	1,629	1,497	(91.9)	116	(7.1)	16	(1.0)	11	(9.5)	38	(32.8)	14	(12.1)	0	(0)	10	(8.6)	34	(29.3)	9	(7.8)
45-64	1,724	1,558	(90.4)	148	(8.6)	18	(1.0)	5	(3.4)	33	(22.3)	69	(46.6)	3	(2.0)	5	(3.4)	29	(19.6)	4	(2.7)
≥65	1,204	997	(82.8)	193	(16.0)	14	(1.2)	5	(2.6)	26	(13.5)	130	(67.4)	4	(2.1)	2	(1.0)	18	(9.3)	8	(4.1)

[1]Among persons who were alive at diagnosis and had positive sputum culture.
[2]Among persons who had sputum culture conversion documented at any time.
[3]Among persons who were alive at diagnosis, had positive culture, and did not have documented culture conversion (excludes patients with unknown culture conversion).

Morbidity Tables
Reporting Areas, 2016

Table 29. Tuberculosis Cases and Case Rates per 100,000 Population: Reporting Areas, 2016 and 2015

Reporting Area	Cases		Case rates		Rank according to rate		Population estimates July 1, 2016
	2016	2015	2016	2015	2016	2015	
United States	9,272	9,547	2.9	3.0	—	—	323,127,513
Alabama	112	119	2.3	2.5	20	21	4,863,300
Alaska	57	68	7.7	9.2	2	1	741,894
Arizona	188	198	2.7	2.9	17	13	6,931,071
Arkansas	91	90	3.0	3.0	10	9	2,988,248
California	2,062	2,131	5.3	5.5	4	4	39,250,017
Colorado	64	73	1.2	1.3	43	39	5,540,545
Connecticut	52	70	1.5	2.0	37	29	3,576,452
Delaware	16	22	1.7	2.3	31	23	952,065
District of Columbia	25	33	3.7	4.9	6	5	681,170
Florida	639	602	3.1	3.0	9	10	20,612,439
Georgia	302	320	2.9	3.1	12	8	10,310,371
Hawaii	119	127	8.3	8.9	1	2	1,428,557
Idaho	18	11	1.1	0.7	46	51	1,683,140
Illinois	342	343	2.7	2.7	18	18	12,801,539
Indiana	109	116	1.6	1.8	33	31	6,633,053
Iowa	48	38	1.5	1.2	35	44	3,134,693
Kansas	39	36	1.3	1.2	40	41	2,907,289
Kentucky	91	67	2.1	1.5	23	36	4,436,974
Louisiana	127	119	2.7	2.5	16	19	4,681,666
Maine	23	18	1.7	1.4	29	38	1,331,479
Maryland	220	176	3.7	2.9	7	12	6,016,447
Massachusetts	190	192	2.8	2.8	15	16	6,811,779
Michigan	133	131	1.3	1.3	41	40	9,928,300
Minnesota	168	150	3.0	2.7	11	17	5,519,952
Mississippi	61	73	2.0	2.4	24	22	2,988,726
Missouri	101	92	1.7	1.5	32	37	6,093,000
Montana	4	9	0.4	0.9	51	49	1,042,520
Nebraska	28	33	1.5	1.7	36	32	1,907,116
Nevada	56	85	1.9	2.9	26	11	2,940,058
New Hampshire	15	13	1.1	1.0	45	48	1,334,795
New Jersey	294	326	3.3	3.6	8	7	8,944,469
New Mexico	39	47	1.9	2.3	27	24	2,081,015
New York State[1]	203	188	1.8	1.7	28	34	11,207,616
New York City	565	575	6.6	6.8	3	3	8,537,673
North Carolina	219	199	2.2	2.0	21	27	10,146,788
North Dakota	22	9	2.9	1.2	13	46	757,952
Ohio	140	143	1.2	1.2	42	43	11,614,373
Oklahoma	78	67	2.0	1.7	25	33	3,923,561
Oregon	70	76	1.7	1.9	30	30	4,093,465
Pennsylvania	173	200	1.4	1.6	39	35	12,784,227
Rhode Island	12	30	1.1	2.8	44	15	1,056,426
South Carolina	102	104	2.1	2.1	22	25	4,961,119
South Dakota	12	17	1.4	2.0	38	28	865,454
Tennessee	103	131	1.5	2.0	34	26	6,651,194
Texas	1,250	1,334	4.5	4.9	5	6	27,862,596
Utah	20	37	0.7	1.2	50	42	3,051,217
Vermont	5	7	0.8	1.1	47	47	624,594
Virginia	205	212	2.4	2.5	19	20	8,411,808
Washington	205	207	2.8	2.9	14	14	7,288,000
West Virginia	14	10	0.8	0.5	48	52	1,831,102
Wisconsin	40	69	0.7	1.2	49	45	5,778,708
Wyoming	1	4	0.2	0.7	52	50	585,501
American Samoa[2]	1	4	1.8	7.4	—	—	54,194
Fed. States of Micronesia[2]	126	103	120.3	97.9	—	—	104,719
Guam[2]	75	76	46.1	47.0	—	—	162,742
Marshall Islands[2]	179	136	243.9	188.4	—	—	73,376
N. Mariana Islands[2]	27	27	50.5	51.6	—	—	53,467
Puerto Rico[2]	69	52	2.0	1.5	—	—	3,411,307
Republic of Palau[2]	21	14	98.4	65.8	—	—	21,347
U.S. Virgin Islands[2]	—	—	—	—	—	—	102,951

[1]Excludes New York City.
[2]Not ranked with the U.S. regions or included with the U.S. totals.
Note: Denominators for computing 2015 and 2016 rates for states, the District of Columbia, and Puerto Rico were obtained from U.S. Census Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico (April 1, 2010 to July 1, 2016) (https://www2.census.gov/programs-surveys/popest/tables/2010-2016/state/totals/nst-est2016-01.xlsx) and totals for other U.S.-affiliated areas were obtained from the International Data Base (http://www.census.gov/population/international/data/idb/informationGateway.php); accessed July 6, 2017.
See Technical Notes.
See Surveillance Slide #4.

Table 30. Tuberculosis Cases and Case Rates per 100,000 Population, Ranked and Grouped by Number of Cases: United States and the District of Columbia, 2016 and 2015

Reporting area	2016		2015		2015–2016 % change		Overall rank by 2016 rate
	No.	Rate	No.	Rate	No.	Rate	
Total	**9,272**	**2.9**	**9,547**	**3.0**	**–2.9**	**–3.6**	**—**
≥500 cases in 2016							
California	2,062	5.3	2,131	5.5	–3.2	–3.9	3
Texas	1,250	4.5	1,334	4.9	–6.3	–7.8	4
New York[1]	768	3.9	763	3.9	0.7	0.7	5
Florida	639	3.1	602	3.0	6.1	4.3	9
100–499 cases in 2016							
Illinois	342	2.7	343	2.7	–0.3	0.0	18
Georgia	302	2.9	320	3.1	–5.6	–6.6	12
New Jersey	294	3.3	326	3.6	–9.8	–9.9	8
Maryland	220	3.7	176	2.9	25.0	24.6	7
North Carolina	219	2.2	199	2.0	10.1	8.8	21
Virginia	205	2.4	212	2.5	–3.3	–3.8	19
Washington	205	2.8	207	2.9	–1.0	–2.7	14
Massachusetts	190	2.8	192	2.8	–1.0	–1.4	15
Arizona	188	2.7	198	2.9	–5.1	–6.6	17
Pennsylvania	173	1.4	200	1.6	–13.5	–13.4	38
Minnesota	168	3.0	150	2.7	12.0	11.2	11
Ohio	140	1.2	143	1.2	–2.1	–2.2	41
Michigan	133	1.3	131	1.3	1.5	1.4	40
Louisiana	127	2.7	119	2.5	6.7	6.4	16
Hawaii	119	8.3	127	8.9	–6.3	–6.5	1
Alabama	112	2.3	119	2.5	–5.9	–6.1	20
Indiana	109	1.6	116	1.8	–6.0	–6.3	32
Tennessee	103	1.5	131	2.0	–21.4	–22.0	33
South Carolina	102	2.1	104	2.1	–1.9	–3.2	22
Missouri	101	1.7	92	1.5	9.8	9.5	31
<100 cases in 2016							
Arkansas	91	3.0	90	3.0	1.1	0.8	10
Kentucky	91	2.1	67	1.5	35.8	35.4	23
Oklahoma	78	2.0	67	1.7	16.4	15.9	25
Oregon	70	1.7	76	1.9	–7.9	–9.4	29
Colorado	64	1.2	73	1.3	–12.3	–13.8	42
Mississippi	61	2.0	73	2.4	–16.4	–16.4	24
Alaska	57	7.7	68	9.2	–16.2	–16.6	2
Nevada	56	1.9	85	2.9	–34.1	–35.4	26
Connecticut	52	1.5	70	2.0	–25.7	–25.5	36
Iowa	48	1.5	38	1.2	26.3	25.8	34
Wisconsin	40	0.7	69	1.2	–42.0	–42.1	48
Kansas	39	1.3	36	1.2	8.3	8.3	39
New Mexico	39	1.9	47	2.3	–17.0	–17.0	27
Nebraska	28	1.5	33	1.7	–15.2	–15.7	35
District of Columbia	25	3.7	33	4.9	–24.2	–25.4	6
Maine	23	1.7	18	1.4	27.8	27.6	28
North Dakota	22	2.9	9	1.2	144.4	144.1	13
Utah	20	0.7	37	1.2	–45.9	–47.0	49
Idaho	18	1.1	11	0.7	63.6	60.7	47
Delaware	16	1.7	22	2.3	–27.3	–27.9	30
New Hampshire	15	1.1	13	1.0	15.4	15.0	44
West Virginia	14	0.8	10	0.5	40.0	40.8	47
Rhode Island	12	1.1	30	2.8	–60.0	–60.0	43
South Dakota	12	1.4	17	2.0	–29.4	–30.0	37
Vermont	5	0.8	7	1.1	–28.6	–28.4	46
Montana	4	0.4	9	0.9	–55.6	–56.0	50
Wyoming	1	0.2	4	0.7	–75.0	–75.0	51

[1]Includes New York City.

Note: Denominators for computing 2015 and 2016 rates for states and the District of Columbia were obtained from U.S. Census Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico (April 1, 2010 to July 1, 2016) (https://www2.census.gov/programs-surveys/popest/tables/2010-2016/state/totals/nst-est2016-01.xlsx); accessed July 6, 2017.

This page intentionally left blank

Table 31. Tuberculosis Cases and Percentages, by Age Group: Reporting Areas, 2016

Reporting Area	Total cases	Under 5		5–14		15–24		25–44		45–64		≥65		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
United States	**9,272**	**224**	**(2.4)**	**163**	**(1.8)**	**938**	**(10.1)**	**2,827**	**(30.5)**	**2,849**	**(30.7)**	**2,264**	**(24.4)**	**7**	**(0.1)**
Alabama	112	3	(2.7)	1	(0.9)	6	(5.4)	38	(33.9)	39	(34.8)	25	(22.3)	0	(0)
Alaska	57	2	(3.5)	5	(8.8)	4	(7.0)	14	(24.6)	24	(42.1)	8	(14.0)	0	(0)
Arizona	188	0	(0)	3	(1.6)	24	(12.8)	66	(35.1)	42	(22.3)	53	(28.2)	0	(0)
Arkansas	91	3	(3.3)	2	(2.2)	12	(13.2)	27	(29.7)	28	(30.8)	19	(20.9)	0	(0)
California	2,062	34	(1.6)	17	(0.8)	175	(8.5)	505	(24.5)	647	(31.4)	684	(33.2)	0	(0)
Colorado	64	2	(3.1)	1	(1.6)	5	(7.8)	12	(18.8)	25	(39.1)	19	(29.7)	0	(0)
Connecticut	52	1	(1.9)	0	(0)	6	(11.5)	21	(40.4)	12	(23.1)	12	(23.1)	0	(0)
Delaware	16	1	(6.3)	0	(0)	1	(6.3)	9	(56.3)	4	(25.0)	1	(6.3)	0	(0)
District of Columbia	25	0	(0)	0	(0)	3	(12.0)	13	(52.0)	5	(20.0)	4	(16.0)	0	(0)
Florida	639	13	(2.0)	10	(1.6)	42	(6.6)	194	(30.4)	222	(34.7)	158	(24.7)	0	(0)
Georgia	302	9	(3.0)	10	(3.3)	24	(7.9)	90	(29.8)	112	(37.1)	57	(18.9)	0	(0)
Hawaii	119	2	(1.7)	2	(1.7)	6	(5.0)	23	(19.3)	39	(32.8)	47	(39.5)	0	(0)
Idaho	18	4	(22.2)	0	(0)	2	(11.1)	2	(11.1)	4	(22.2)	6	(33.3)	0	(0)
Illinois	342	10	(2.9)	3	(0.9)	37	(10.8)	102	(29.8)	89	(26.0)	98	(28.7)	3	(0.9)
Indiana	109	3	(2.8)	4	(3.7)	14	(12.8)	48	(44.0)	27	(24.8)	13	(11.9)	0	(0)
Iowa	48	0	(0)	0	(0)	8	(16.7)	19	(39.6)	15	(31.3)	6	(12.5)	0	(0)
Kansas	39	0	(0)	0	(0)	6	(15.4)	17	(43.6)	8	(20.5)	8	(20.5)	0	(0)
Kentucky	91	1	(1.1)	0	(0)	8	(8.8)	27	(29.7)	33	(36.3)	22	(24.2)	0	(0)
Louisiana	127	3	(2.4)	2	(1.6)	8	(6.3)	45	(35.4)	48	(37.8)	21	(16.5)	0	(0)
Maine	23	0	(0)	0	(0)	4	(17.4)	8	(34.8)	7	(30.4)	4	(17.4)	0	(0)
Maryland	220	3	(1.4)	3	(1.4)	27	(12.3)	81	(36.8)	63	(28.6)	43	(19.5)	0	(0)
Massachusetts	190	3	(1.6)	5	(2.6)	27	(14.2)	66	(34.7)	40	(21.1)	49	(25.8)	0	(0)
Michigan	133	5	(3.8)	3	(2.3)	11	(8.3)	36	(27.1)	38	(28.6)	40	(30.1)	0	(0)
Minnesota	168	7	(4.2)	12	(7.1)	24	(14.3)	66	(39.3)	33	(19.6)	26	(15.5)	0	(0)
Mississippi	61	3	(4.9)	1	(1.6)	7	(11.5)	13	(21.3)	21	(34.4)	16	(26.2)	0	(0)
Missouri	101	2	(2.0)	0	(0)	16	(15.8)	37	(36.6)	23	(22.8)	23	(22.8)	0	(0)
Montana	4	0	(0)	0	(0)	1	(25.0)	1	(25.0)	2	(50.0)	0	(0)	0	(0)
Nebraska	28	2	(7.1)	1	(3.6)	6	(21.4)	9	(32.1)	5	(17.9)	5	(17.9)	0	(0)
Nevada	56	3	(5.4)	0	(0)	6	(10.7)	23	(41.1)	11	(19.6)	13	(23.2)	0	(0)
New Hampshire	15	0	(0)	1	(6.7)	1	(6.7)	7	(46.7)	4	(26.7)	2	(13.3)	0	(0)
New Jersey	294	6	(2.0)	5	(1.7)	30	(10.2)	90	(30.6)	88	(29.9)	74	(25.2)	1	(0.3)

Table 31. (Cont'd) Tuberculosis Cases and Percentages, by Age Group: Reporting Areas, 2016

Reporting Area	Total cases	Under 5		5–14		15–24		25–44		45–64		≥65		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
New Mexico	39	1	(2.6)	1	(2.6)	5	(12.8)	9	(23.1)	13	(33.3)	10	(25.6)	0	(0)
New York State[1]	203	7	(3.4)	3	(1.5)	30	(14.8)	64	(31.5)	58	(28.6)	41	(20.2)	0	(0)
New York City	565	7	(1.2)	4	(0.7)	62	(11.0)	191	(33.8)	176	(31.2)	125	(22.1)	0	(0)
North Carolina	219	9	(4.1)	4	(1.8)	15	(6.8)	70	(32.0)	68	(31.1)	53	(24.2)	0	(0)
North Dakota	22	0	(0)	1	(4.5)	7	(31.8)	7	(31.8)	7	(31.8)	0	(0)	0	(0)
Ohio	140	0	(0)	5	(3.6)	12	(8.6)	51	(36.4)	37	(26.4)	35	(25.0)	0	(0)
Oklahoma	78	1	(1.3)	5	(6.4)	12	(15.4)	24	(30.8)	21	(26.9)	15	(19.2)	0	(0)
Oregon	70	4	(5.7)	1	(1.4)	9	(12.9)	23	(32.9)	19	(27.1)	14	(20.0)	0	(0)
Pennsylvania	173	7	(4.0)	2	(1.2)	15	(8.7)	51	(29.5)	48	(27.7)	50	(28.9)	0	(0)
Rhode Island	12	0	(0)	1	(8.3)	2	(16.7)	3	(25.0)	3	(25.0)	3	(25.0)	0	(0)
South Carolina	102	5	(4.9)	10	(9.8)	7	(6.9)	24	(23.5)	38	(37.3)	18	(17.6)	0	(0)
South Dakota	12	0	(0)	0	(0)	0	(0)	6	(50.0)	5	(41.7)	1	(8.3)	0	(0)
Tennessee	103	4	(3.9)	1	(1.0)	6	(5.8)	35	(34.0)	33	(32.0)	24	(23.3)	0	(0)
Texas	1,250	44	(3.5)	25	(2.0)	158	(12.6)	395	(31.6)	412	(33.0)	216	(17.3)	0	(0)
Utah	20	1	(5.0)	1	(5.0)	2	(10.0)	4	(20.0)	3	(15.0)	9	(45.0)	0	(0)
Vermont	5	0	(0)	0	(0)	0	(0)	1	(20.0)	3	(60.0)	1	(20.0)	0	(0)
Virginia	205	2	(1.0)	7	(3.4)	15	(7.3)	76	(37.1)	66	(32.2)	39	(19.0)	0	(0)
Washington	205	6	(2.9)	0	(0)	25	(12.2)	67	(32.7)	64	(31.2)	43	(21.0)	0	(0)
West Virginia	14	0	(0)	0	(0)	0	(0)	3	(21.4)	3	(21.4)	8	(57.1)	0	(0)
Wisconsin	40	1	(2.5)	1	(2.5)	5	(12.5)	13	(32.5)	14	(35.0)	3	(7.5)	3	(7.5)
Wyoming	1	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)
American Samoa[2]	1	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)
Fed. States of Micronesia[2]	126	24	(19.0)	16	(12.7)	24	(19.0)	28	(22.2)	30	(23.8)	4	(3.2)	0	(0)
Guam[2]	75	7	(9.3)	5	(6.7)	5	(6.7)	17	(22.7)	29	(38.7)	12	(16.0)	0	(0)
Marshall Islands[2]	179	21	(11.7)	27	(15.1)	20	(11.2)	42	(23.5)	48	(26.8)	21	(11.7)	0	(0)
N. Mariana Islands[2]	27	6	(22.2)	3	(11.1)	3	(11.1)	8	(29.6)	5	(18.5)	2	(7.4)	0	(0)
Puerto Rico[2]	69	0	(0)	1	(1.4)	2	(2.9)	17	(24.6)	27	(39.1)	22	(31.9)	0	(0)
Republic of Palau[2]	21	0	(0)	1	(4.8)	1	(4.8)	5	(23.8)	11	(52.4)	3	(14.3)	0	(0)
U.S. Virgin Islands[2]	0	0	…	0	…	0	…	0	…	0	…	0	…	0	…

[1]Not including New York City.
[2]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 32. Tuberculosis Cases and Percentages by Hispanic Ethnicity and Non-Hispanic Race: Reporting Areas, 2016

Reporting area	Total Cases	Hispanic/Latino[1]		American Indian/ Alaska Native		Asian		Black/African American		Native Hawaiian/ Other Pacific Islander		White		Multiple race[2]		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
United States	**9,272**	**2,601**	**(28.1)**	**112**	**(1.2)**	**3,195**	**(34.5)**	**1,975**	**(21.3)**	**79**	**(0.9)**	**1,208**	**(13.0)**	**64**	**(0.7)**	**38**	**(0.4)**
Alabama	112	15	(13.4)	0	(0)	9	(8.0)	54	(48.2)	0	(0)	30	(26.8)	4	(3.6)	0	(0)
Alaska	57	0	(0)	41	(71.9)	11	(19.3)	2	(3.5)	1	(1.8)	2	(3.5)	0	(0)	0	(0)
Arizona	188	91	(48.4)	19	(10.1)	35	(18.6)	21	(11.2)	4	(2.1)	18	(9.6)	0	(0)	0	(0)
Arkansas	91	13	(14.3)	1	(1.1)	16	(17.6)	17	(18.7)	14	(15.4)	30	(33.0)	0	(0)	0	(0)
California	2,062	705	(34.2)	5	(0.2)	1,078	(52.3)	104	(5.0)	14	(0.7)	147	(7.1)	7	(0.3)	2	(0.1)
Colorado	64	25	(39.1)	0	(0)	14	(21.9)	16	(25.0)	0	(0)	9	(14.1)	0	(0)	0	(0)
Connecticut	52	17	(32.7)	0	(0)	23	(44.2)	7	(13.5)	0	(0)	5	(9.6)	0	(0)	0	(0)
Delaware	16	3	(18.8)	0	(0)	5	(31.3)	5	(31.3)	0	(0)	3	(18.8)	0	(0)	0	(0)
District of Columbia	25	1	(4.0)	0	(0)	4	(16.0)	19	(76.0)	0	(0)	1	(4.0)	0	(0)	0	(0)
Florida	639	167	(26.1)	0	(0)	104	(16.3)	222	(34.7)	2	(0.3)	140	(21.9)	4	(0.6)	0	(0)
Georgia	302	44	(14.6)	0	(0)	70	(23.2)	149	(49.3)	0	(0)	39	(12.9)	0	(0)	0	(0)
Hawaii	119	1	(0.8)	0	(0)	96	(80.7)	1	(0.8)	16	(13.4)	3	(2.5)	1	(0.8)	1	(0.8)
Idaho	18	11	(61.1)	1	(5.6)	3	(16.7)	1	(5.6)	0	(0)	1	(5.6)	0	(0)	1	(5.6)
Illinois	342	95	(27.8)	0	(0)	137	(40.1)	75	(21.9)	0	(0)	34	(9.9)	0	(0)	1	(0.3)
Indiana	109	23	(21.1)	0	(0)	43	(39.4)	17	(15.6)	2	(1.8)	23	(21.1)	1	(0.9)	0	(0)
Iowa	48	4	(8.3)	0	(0)	20	(41.7)	9	(18.8)	1	(2.1)	11	(22.9)	2	(4.2)	1	(2.1)
Kansas	39	7	(17.9)	0	(0)	14	(35.9)	10	(25.6)	0	(0)	8	(20.5)	0	(0)	0	(0)
Kentucky	91	13	(14.3)	0	(0)	17	(18.7)	21	(23.1)	0	(0)	39	(42.9)	1	(1.1)	0	(0)
Louisiana	127	23	(18.1)	0	(0)	14	(11.0)	44	(34.6)	0	(0)	36	(28.3)	9	(7.1)	1	(0.8)
Maine	23	1	(4.3)	0	(0)	5	(21.7)	11	(47.8)	0	(0)	6	(26.1)	0	(0)	0	(0)
Maryland	220	38	(17.3)	0	(0)	84	(38.2)	79	(35.9)	0	(0)	12	(5.5)	3	(1.4)	4	(1.8)
Massachusetts	190	40	(21.1)	0	(0)	64	(33.7)	49	(25.8)	0	(0)	32	(16.8)	2	(1.1)	3	(1.6)
Michigan	133	8	(6.0)	1	(0.8)	53	(39.8)	34	(25.6)	0	(0)	37	(27.8)	0	(0)	0	(0)
Minnesota	168	12	(7.1)	1	(0.6)	58	(34.5)	88	(52.4)	1	(0.6)	8	(4.8)	0	(0)	0	(0)
Mississippi	61	3	(4.9)	0	(0)	8	(13.1)	30	(49.2)	0	(0)	20	(32.8)	0	(0)	0	(0)
Missouri	101	13	(12.9)	0	(0)	26	(25.7)	33	(32.7)	2	(2.0)	27	(26.7)	0	(0)	0	(0)
Montana	4	0	(0)	0	(0)	0	(0)	1	(25.0)	0	(0)	3	(75.0)	0	(0)	0	(0)
Nebraska	28	8	(28.6)	0	(0)	7	(25.0)	5	(17.9)	0	(0)	6	(21.4)	2	(7.1)	0	(0)
Nevada	56	14	(25.0)	1	(1.8)	18	(32.1)	15	(26.8)	0	(0)	6	(10.7)	1	(1.8)	1	(1.8)
New Hampshire	15	2	(13.3)	0	(0)	7	(46.7)	3	(20.0)	1	(6.7)	2	(13.3)	0	(0)	0	(0)
New Jersey	294	98	(33.3)	0	(0)	121	(41.2)	49	(16.7)	0	(0)	25	(8.5)	1	(0.3)	0	(0)

Table 32. (Cont'd) Tuberculosis Cases and Percentages by Hispanic Ethnicity and Non-Hispanic Race: Reporting Areas, 2016

Reporting area	Total cases	Hispanic/Latino[1]		American Indian/ Alaska Native		Asian		Black/African American		Native Hawaiian/ Other Pacific Islander		White		Multiple race[2]		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
New Mexico	39	25	(64.1)	5	(12.8)	5	(12.8)	1	(2.6)	0	(0)	3	(7.7)	0	(0)	0	(0)
New York State[3]	203	50	(24.6)	1	(0.5)	68	(33.5)	42	(20.7)	0	(0)	38	(18.7)	0	(0)	4	(2.0)
New York City	565	124	(21.9)	0	(0)	260	(46.0)	109	(19.3)	1	(0.2)	50	(8.8)	12	(2.1)	9	(1.6)
North Carolina	219	58	(26.5)	6	(2.7)	39	(17.8)	80	(36.5)	2	(0.9)	30	(13.7)	4	(1.8)	0	(0)
North Dakota	22	0	(0)	2	(9.1)	9	(40.9)	7	(31.8)	0	(0)	4	(18.2)	0	(0)	0	(0)
Ohio	140	8	(5.7)	1	(0.7)	46	(32.9)	47	(33.6)	0	(0)	38	(27.1)	0	(0)	0	(0)
Oklahoma	78	18	(23.1)	12	(15.4)	17	(21.8)	11	(14.1)	1	(1.3)	15	(19.2)	1	(1.3)	3	(3.8)
Oregon	70	19	(27.1)	2	(2.9)	24	(34.3)	7	(10.0)	5	(7.1)	12	(17.1)	1	(1.4)	0	(0)
Pennsylvania	173	21	(12.1)	1	(0.6)	73	(42.2)	44	(25.4)	0	(0)	32	(18.5)	2	(1.2)	0	(0)
Rhode Island	12	3	(25.0)	0	(0)	4	(33.3)	3	(25.0)	0	(0)	2	(16.7)	0	(0)	0	(0)
South Carolina	102	11	(10.8)	0	(0)	17	(16.7)	56	(54.9)	1	(1.0)	17	(16.7)	0	(0)	0	(0)
South Dakota	12	0	(0)	4	(33.3)	2	(16.7)	5	(41.7)	0	(0)	1	(8.3)	0	(0)	0	(0)
Tennessee	103	12	(11.7)	0	(0)	19	(18.4)	45	(43.7)	0	(0)	27	(26.2)	0	(0)	0	(0)
Texas	1,250	670	(53.6)	1	(0.1)	234	(18.7)	234	(18.7)	1	(0.1)	107	(8.6)	3	(0.2)	0	(0)
Utah	20	8	(40.0)	2	(10.0)	4	(20.0)	1	(5.0)	3	(15.0)	2	(10.0)	0	(0)	0	(0)
Vermont	5	0	(0)	0	(0)	4	(80.0)	0	(0)	0	(0)	1	(20.0)	0	(0)	0	(0)
Virginia	205	40	(19.5)	0	(0)	90	(43.9)	50	(24.4)	0	(0)	23	(11.2)	2	(1.0)	0	(0)
Washington	205	30	(14.6)	5	(2.4)	101	(49.3)	30	(14.6)	7	(3.4)	26	(12.7)	0	(0)	6	(2.9)
West Virginia	14	0	(0)	0	(0)	2	(14.3)	4	(28.6)	0	(0)	8	(57.1)	0	(0)	0	(0)
Wisconsin	40	8	(20.0)	0	(0)	13	(32.5)	8	(20.0)	0	(0)	9	(22.5)	1	(2.5)	1	(2.5)
Wyoming	1	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
American Samoa[4]	1	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)
Fed. States of Micronesia[4]	126	3	(2.4)	0	(0)	2	(1.6)	0	(0)	118	(93.7)	0	(0)	0	(0)	3	(2.4)
Guam[4]	75	0	(0)	0	(0)	26	(34.7)	0	(0)	47	(62.7)	0	(0)	0	(0)	2	(2.7)
Marshall Islands[4]	179	0	(0)	0	(0)	2	(1.1)	0	(0)	176	(98.3)	0	(0)	0	(0)	1	(0.6)
N. Mariana Islands[4]	27	0	(0)	1	(3.7)	18	(66.7)	0	(0)	7	(25.9)	0	(0)	0	(0)	1	(3.7)
Puerto Rico[4]	69	65	(94.2)	0	(0)	3	(4.3)	0	(0)	0	(0)	1	(1.4)	0	(0)	0	(0)
Republic of Palau[4]	21	0	(0)	0	(0)	5	(23.8)	0	(0)	16	(76.2)	0	(0)	0	(0)	0	(0)
U.S. Virgin Islands[4]	0	0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...

[1]Persons of Hispanic/Latino origin may be of any or multiple race.

[2]Indicates two or more races reported for a person and does not include persons of Hispanic/Latino origin.

[3]Excludes New York City.

[4]Not included in U.S. totals.

Note: Case counts for race categories (American Indian/Alaska Native, Asian, black/African American, Native Hawaiian/Other Pacific Islander, and white) are mutually exclusive and do not include persons of Hispanic ethnicity or multiple race.

Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

See Technical Notes.

Table 33. Tuberculosis Cases and Percentages, U.S.-Born and Non-U.S.–Born Persons[1]: Reporting Areas, 2016

Reporting area	Total cases	U.S.-born persons		Non-U.S.–born persons[1]		Unknown origin	
		No.	(%)	No.	(%)	No.	(%)
United States	**9,272**	**2,901**	**(31.3)**	**6,351**	**(68.5)**	**20**	**(0.2)**
Alabama	112	86	(76.8)	26	(23.2)	0	(0)
Alaska	57	46	(80.7)	11	(19.3)	0	(0)
Arizona	188	58	(30.9)	130	(69.1)	0	(0)
Arkansas	91	51	(56.0)	40	(44.0)	0	(0)
California	2,062	386	(18.7)	1,661	(80.6)	15	(0.7)
Colorado	64	17	(26.6)	47	(73.4)	0	(0)
Connecticut	52	8	(15.4)	44	(84.6)	0	(0)
Delaware	16	5	(31.3)	11	(68.8)	0	(0)
District of Columbia	25	8	(32.0)	17	(68.0)	0	(0)
Florida	639	254	(39.7)	385	(60.3)	0	(0)
Georgia	302	159	(52.6)	142	(47.0)	1	(0.3)
Hawaii	119	19	(16.0)	100	(84.0)	0	(0)
Idaho	18	8	(44.4)	10	(55.6)	0	(0)
Illinois	342	85	(24.9)	257	(75.1)	0	(0)
Indiana	109	33	(30.3)	76	(69.7)	0	(0)
Iowa	48	8	(16.7)	40	(83.3)	0	(0)
Kansas	39	8	(20.5)	31	(79.5)	0	(0)
Kentucky	91	41	(45.1)	50	(54.9)	0	(0)
Louisiana	127	85	(66.9)	42	(33.1)	0	(0)
Maine	23	4	(17.4)	19	(82.6)	0	(0)
Maryland	220	35	(15.9)	185	(84.1)	0	(0)
Massachusetts	190	23	(12.1)	166	(87.4)	1	(0.5)
Michigan	133	53	(39.8)	80	(60.2)	0	(0)
Minnesota	168	16	(9.5)	152	(90.5)	0	(0)
Mississippi	61	48	(78.7)	13	(21.3)	0	(0)
Missouri	101	44	(43.6)	57	(56.4)	0	(0)
Montana	4	3	(75.0)	1	(25.0)	0	(0)
Nebraska	28	6	(21.4)	22	(78.6)	0	(0)
Nevada	56	16	(28.6)	40	(71.4)	0	(0)
New Hampshire	15	2	(13.3)	13	(86.7)	0	(0)
New Jersey	294	61	(20.7)	233	(79.3)	0	(0)
New Mexico	39	14	(35.9)	25	(64.1)	0	(0)
New York State[2]	203	47	(23.2)	156	(76.8)	0	(0)
New York City	565	87	(15.4)	478	(84.6)	0	(0)
North Carolina	219	110	(50.2)	109	(49.8)	0	(0)
North Dakota	22	6	(27.3)	16	(72.7)	0	(0)
Ohio	140	59	(42.1)	81	(57.9)	0	(0)
Oklahoma	78	39	(50.0)	39	(50.0)	0	(0)
Oregon	70	20	(28.6)	50	(71.4)	0	(0)
Pennsylvania	173	57	(32.9)	116	(67.1)	0	(0)
Rhode Island	12	4	(33.3)	8	(66.7)	0	(0)
South Carolina	102	79	(77.5)	23	(22.5)	0	(0)
South Dakota	12	5	(41.7)	7	(58.3)	0	(0)
Tennessee	103	63	(61.2)	40	(38.8)	0	(0)
Texas	1,250	516	(41.3)	734	(58.7)	0	(0)
Utah	20	5	(25.0)	15	(75.0)	0	(0)
Vermont	5	1	(20.0)	4	(80.0)	0	(0)
Virginia	205	39	(19.0)	166	(81.0)	0	(0)
Washington	205	44	(21.5)	158	(77.1)	3	(1.5)
West Virginia	14	9	(64.3)	5	(35.7)	0	(0)
Wisconsin	40	21	(52.5)	19	(47.5)	0	(0)
Wyoming	1	0	(0)	1	(100.0)	0	(0)

[1]Includes persons born outside the United States (including the U.S. territories), except persons born to at least one U.S. citizen parent.
Note: See Surveillance Slide #16

This page intentionally left blank

Table 34. Tuberculosis Cases and Percentages Among Non-U.S.–Born Persons[1], by Top Seven Countries of Birth: Reporting Areas, 2016

Reporting area	Total cases	Country of Origin																	
		Mexico		Philippines		India		Vietnam		China		Guatemala		Haiti		All others[2]		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
United States	**6,351**	**1,192**	**(18.8)**	**790**	**(12.4)**	**589**	**(9.3)**	**494**	**(7.8)**	**383**	**(6.0)**	**189**	**(3.0)**	**168**	**(2.6)**	**2,528**	**(39.8)**	**18**	**(0.3)**
Alabama	26	4	(15.4)	5	(19.2)	2	(7.7)	2	(7.7)	1	(3.8)	4	(15.4)	1	(3.8)	7	(26.9)	0	(0)
Alaska	11	0	(0)	7	(63.6)	0	(0)	0	(0)	1	(9.1)	0	(0)	0	(0)	3	(27.3)	0	(0)
Arizona	130	58	(44.6)	7	(5.4)	12	(9.2)	5	(3.8)	2	(1.5)	6	(4.6)	2	(1.5)	38	(29.2)	0	(0)
Arkansas	40	7	(17.5)	1	(2.5)	7	(17.5)	1	(2.5)	2	(5.0)	1	(2.5)	1	(2.5)	20	(50.0)	0	(0)
California	1,661	412	(24.8)	377	(22.7)	119	(7.2)	197	(11.9)	140	(8.4)	46	(2.8)	0	(0)	370	(22.3)	0	(0)
Colorado	47	18	(38.3)	2	(4.3)	3	(6.4)	3	(6.4)	0	(0)	0	(0)	0	(0)	21	(44.7)	0	(0)
Connecticut	44	1	(2.3)	4	(9.1)	7	(15.9)	2	(4.5)	2	(4.5)	3	(6.8)	1	(2.3)	24	(54.5)	0	(0)
Delaware	11	1	(9.1)	0	(0)	2	(18.2)	1	(9.1)	0	(0)	1	(9.1)	0	(0)	6	(54.5)	0	(0)
District of Columbia	17	0	(0)	1	(5.9)	0	(0)	0	(0)	2	(11.8)	0	(0)	0	(0)	14	(82.4)	0	(0)
Florida	385	36	(9.4)	29	(7.5)	16	(4.2)	31	(8.1)	6	(1.6)	28	(7.3)	90	(23.4)	149	(38.7)	0	(0)
Georgia	142	24	(16.9)	2	(1.4)	29	(20.4)	9	(6.3)	3	(2.1)	8	(5.6)	5	(3.5)	59	(41.5)	3	(2.1)
Hawaii	100	1	(1.0)	69	(69.0)	1	(1.0)	4	(4.0)	7	(7.0)	0	(0)	1	(1.0)	17	(17.0)	0	(0)
Idaho	10	5	(50.0)	1	(10.0)	0	(0)	0	(0)	1	(10.0)	0	(0)	0	(0)	3	(30.0)	0	(0)
Illinois	257	62	(24.1)	39	(15.2)	48	(18.7)	6	(2.3)	11	(4.3)	2	(0.8)	2	(0.8)	85	(33.1)	2	(0.8)
Indiana	76	14	(18.4)	5	(6.6)	6	(7.9)	2	(2.6)	2	(2.6)	1	(1.3)	1	(1.3)	45	(59.2)	0	(0)
Iowa	40	3	(7.5)	1	(2.5)	6	(15.0)	2	(5.0)	0	(0)	1	(2.5)	0	(0)	27	(67.5)	0	(0)
Kansas	31	5	(16.1)	1	(3.2)	3	(9.7)	5	(16.1)	1	(3.2)	1	(3.2)	0	(0)	15	(48.4)	0	(0)
Kentucky	50	9	(18.0)	4	(8.0)	4	(8.0)	2	(4.0)	0	(0)	1	(2.0)	0	(0)	30	(60.0)	0	(0)
Louisiana	42	5	(11.9)	4	(9.5)	3	(7.1)	5	(11.9)	2	(4.8)	1	(2.4)	0	(0)	22	(52.4)	0	(0)
Maine	19	0	(0)	0	(0)	1	(5.3)	2	(10.5)	1	(5.3)	0	(0)	1	(5.3)	14	(73.7)	0	(0)
Maryland	185	7	(3.8)	15	(8.1)	21	(11.4)	14	(7.6)	6	(3.2)	8	(4.3)	4	(2.2)	110	(59.5)	0	(0)
Massachusetts	166	1	(0.6)	1	(0.6)	15	(9.0)	15	(9.0)	10	(6.0)	5	(3.0)	13	(7.8)	104	(62.7)	2	(1.2)
Michigan	80	4	(5.0)	4	(5.0)	15	(18.8)	3	(3.8)	3	(3.8)	0	(0)	0	(0)	51	(63.8)	0	(0)
Minnesota	152	4	(2.6)	4	(2.6)	15	(9.9)	7	(4.6)	1	(0.7)	2	(1.3)	0	(0)	119	(78.3)	0	(0)
Mississippi	13	2	(15.4)	1	(7.7)	3	(23.1)	2	(15.4)	0	(0)	0	(0)	0	(0)	5	(38.5)	0	(0)
Missouri	57	6	(10.5)	2	(3.5)	8	(14.0)	5	(8.8)	3	(5.3)	0	(0)	0	(0)	33	(57.9)	0	(0)
Montana	1	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)

Table 34. (Cont'd) Tuberculosis Cases and Percentages Among Non-U.S.–Born Persons[1], by Top Seven Countries of Birth: Reporting Areas, 2016

Reporting area	Total cases	Country of origin																	
		Mexico		Philippines		India		Vietnam		China		Guatemala		Haiti		All others[2]		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Nebraska	22	4	(18.2)	1	(4.5)	1	(4.5)	2	(9.1)	0	(0)	3	(13.6)	0	(0)	11	(50.0)	0	(0)
Nevada	40	8	(20.0)	15	(37.5)	2	(5.0)	2	(5.0)	0	(0)	1	(2.5)	0	(0)	12	(30.0)	0	(0)
New Hampshire	13	0	(0)	2	(15.4)	2	(15.4)	1	(7.7)	0	(0)	0	(0)	0	(0)	8	(61.5)	0	(0)
New Jersey	233	15	(6.4)	40	(17.2)	43	(18.5)	8	(3.4)	9	(3.9)	6	(2.6)	9	(3.9)	102	(43.8)	1	(0.4)
New Mexico	25	16	(64.0)	1	(4.0)	1	(4.0)	1	(4.0)	0	(0)	2	(8.0)	0	(0)	4	(16.0)	0	(0)
New York State[3]	156	7	(4.5)	10	(6.4)	14	(9.0)	3	(1.9)	4	(2.6)	8	(5.1)	8	(5.1)	101	(64.7)	1	(0.6)
New York City	478	34	(7.1)	30	(6.3)	21	(4.4)	3	(0.6)	114	(23.8)	5	(1.0)	22	(4.6)	249	(52.1)	0	(0)
North Carolina	109	25	(22.9)	6	(5.5)	9	(8.3)	7	(6.4)	6	(5.5)	5	(4.6)	0	(0)	45	(41.3)	6	(5.5)
North Dakota	16	0	(0)	1	(6.3)	0	(0)	2	(12.5)	0	(0)	0	(0)	0	(0)	13	(81.3)	0	(0)
Ohio	81	1	(1.2)	2	(2.5)	11	(13.6)	4	(4.9)	6	(7.4)	4	(4.9)	0	(0)	52	(64.2)	1	(1.2)
Oklahoma	39	13	(33.3)	0	(0)	2	(5.1)	0	(0)	0	(0)	3	(7.7)	0	(0)	21	(53.8)	0	(0)
Oregon	50	9	(18.0)	1	(2.0)	5	(10.0)	10	(20.0)	3	(6.0)	1	(2.0)	0	(0)	21	(42.0)	0	(0)
Pennsylvania	116	3	(2.6)	7	(6.0)	19	(16.4)	16	(13.8)	4	(3.4)	2	(1.7)	6	(5.2)	59	(50.9)	0	(0)
Rhode Island	8	0	(0)	0	(0)	1	(12.5)	1	(12.5)	1	(12.5)	0	(0)	0	(0)	5	(62.5)	0	(0)
South Carolina	23	3	(13.0)	3	(13.0)	8	(34.8)	1	(4.3)	1	(4.3)	1	(4.3)	0	(0)	6	(26.1)	0	(0)
South Dakota	7	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	6	(85.7)	1	(14.3)
Tennessee	40	8	(20.0)	2	(5.0)	7	(17.5)	2	(5.0)	2	(5.0)	1	(2.5)	0	(0)	18	(45.0)	0	(0)
Texas	734	318	(43.3)	27	(3.7)	56	(7.6)	67	(9.1)	12	(1.6)	24	(3.3)	0	(0)	230	(31.3)	0	(0)
Utah	15	4	(26.7)	1	(6.7)	1	(6.7)	0	(0)	0	(0)	0	(0)	0	(0)	9	(60.0)	0	(0)
Vermont	4	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	4	(100.0)	0	(0)
Virginia	166	6	(3.6)	22	(13.3)	23	(13.9)	13	(7.8)	5	(3.0)	3	(1.8)	0	(0)	94	(56.6)	0	(0)
Washington	158	23	(14.6)	31	(19.6)	13	(8.2)	26	(16.5)	9	(5.7)	1	(0.6)	1	(0.6)	53	(33.5)	1	(0.6)
West Virginia	5	0	(0)	1	(20.0)	1	(20.0)	0	(0)	0	(0)	0	(0)	0	(0)	3	(60.0)	0	(0)
Wisconsin	19	5	(26.3)	1	(5.3)	3	(15.8)	0	(0)	0	(0)	0	(0)	0	(0)	10	(52.6)	0	(0)
Wyoming	1	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)

[1]Includes persons born outside of the United States (including the U.S. territories), except persons born to at least one U.S. citizen parent.
[2]Includes 135 countries.
Note: See Surveillance Slide #19.

Table 35. Tuberculosis Cases and Percentages Among Non-U.S.–Born Persons[1], by Immigration Status at First Entry: Reporting Areas, 2016

Reporting area	Total cases	Asylee/parolee		Employment visa		Family/fiance visa		Immigrant visa		Refugee		Student visa		Tourist visa		Other immigration status[2]		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
United States	**6,351**	**32**	**(0.5)**	**142**	**(2.2)**	**181**	**(2.8)**	**1684**	**(26.5)**	**398**	**(6.3)**	**189**	**(3.0)**	**126**	**(2.0)**	**1,376**	**(21.7)**	**2,223**	**(35.0)**
Alabama	26	0	(0)	1	(3.8)	4	(15.4)	1	(3.8)	0	(0)	5	(19.2)	0	(0)	15	(57.7)	0	(0)
Alaska	11	0	(0)	0	(0)	1	(9.1)	4	(36.4)	0	(0)	0	(0)	0	(0)	0	(0)	6	(54.5)
Arizona	130	0	(0)	0	(0)	0	(0)	0	(0)	1	(0.8)	0	(0)	0	(0)	0	(0)	129	(99.2)
Arkansas	40	0	(0)	2	(5.0)	0	(0)	12	(30.0)	0	(0)	4	(10.0)	0	(0)	6	(15.0)	16	(40.0)
California	1,661	9	(0.5)	27	(1.6)	61	(3.7)	681	(41.0)	64	(3.9)	42	(2.5)	43	(2.6)	362	(21.8)	372	(22.4)
Colorado	47	0	(0)	2	(4.3)	2	(4.3)	14	(29.8)	8	(17.0)	0	(0)	3	(6.4)	14	(29.8)	4	(8.5)
Connecticut	44	1	(2.3)	0	(0)	4	(9.1)	22	(50.0)	1	(2.3)	4	(9.1)	7	(15.9)	5	(11.4)	0	(0)
Delaware	11	0	(0)	2	(18.2)	1	(9.1)	0	(0)	0	(0)	0	(0)	0	(0)	3	(27.3)	5	(45.5)
District of Columbia	17	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	17	(100.0)
Florida	385	8	(2.1)	20	(5.2)	9	(2.3)	143	(37.1)	5	(1.3)	5	(1.3)	5	(1.3)	67	(17.4)	123	(31.9)
Georgia	142	0	(0)	7	(4.9)	6	(4.2)	52	(36.6)	12	(8.5)	7	(4.9)	6	(4.2)	26	(18.3)	26	(18.3)
Hawaii	100	0	(0)	0	(0)	1	(1.0)	38	(38.0)	1	(1.0)	0	(0)	1	(1.0)	0	(0)	59	(59.0)
Idaho	10	0	(0)	1	(10.0)	1	(10.0)	0	(0)	1	(10.0)	1	(10.0)	0	(0)	2	(20.0)	4	(40.0)
Illinois	257	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	257	(100.0)
Indiana	76	0	(0)	0	(0)	0	(0)	29	(38.2)	22	(28.9)	3	(3.9)	0	(0)	2	(2.6)	20	(26.3)
Iowa	40	0	(0)	1	(2.5)	2	(5.0)	11	(27.5)	15	(37.5)	2	(5.0)	1	(2.5)	5	(12.5)	3	(7.5)
Kansas	31	1	(3.2)	2	(6.5)	0	(0)	13	(41.9)	4	(12.9)	7	(22.6)	1	(3.2)	3	(9.7)	0	(0)
Kentucky	50	0	(0)	1	(2.0)	1	(2.0)	5	(10.0)	15	(30.0)	2	(4.0)	2	(4.0)	23	(46.0)	1	(2.0)
Louisiana	42	0	(0)	2	(4.8)	4	(9.5)	10	(23.8)	1	(2.4)	2	(4.8)	0	(0)	3	(7.1)	20	(47.6)
Maine	19	3	(15.8)	2	(10.5)	0	(0)	0	(0)	6	(31.6)	1	(5.3)	1	(5.3)	1	(5.3)	5	(26.3)
Maryland	185	2	(1.1)	6	(3.2)	17	(9.2)	85	(45.9)	11	(5.9)	6	(3.2)	7	(3.8)	39	(21.1)	12	(6.5)
Massachusetts	166	0	(0)	1	(0.6)	7	(4.2)	35	(21.1)	6	(3.6)	6	(3.6)	9	(5.4)	1	(0.6)	101	(60.8)
Michigan	80	0	(0)	6	(7.5)	2	(2.5)	46	(57.5)	8	(10.0)	8	(10.0)	2	(2.5)	1	(1.3)	7	(8.8)
Minnesota	152	3	(2.0)	8	(5.3)	7	(4.6)	33	(21.7)	67	(44.1)	8	(5.3)	8	(5.3)	8	(5.3)	10	(6.6)
Mississippi	13	0	(0)	1	(7.7)	1	(7.7)	0	(0)	1	(7.7)	2	(15.4)	0	(0)	2	(15.4)	6	(46.2)
Missouri	57	0	(0)	3	(5.3)	3	(5.3)	6	(10.5)	14	(24.6)	9	(15.8)	0	(0)	5	(8.8)	17	(29.8)
Montana	1	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)
Nebraska	22	0	(0)	0	(0)	0	(0)	4	(18.2)	5	(22.7)	1	(4.5)	0	(0)	2	(9.1)	10	(45.5)

Table 35. (Con't) Tuberculosis Cases and Percentages Among Non-U.S.–Born Persons[1], by Immigration Status at First Entry: Reporting Areas, 2016

Reporting area	Total cases	Asylee/parolee		Employment visa		Family/fiance visa		Immigrant visa		Refugee		Student visa		Tourist visa		Other immigration status[2]		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Nevada	40	0	(0)	1	(2.5)	0	(0)	29	(72.5)	2	(5.0)	1	(2.5)	2	(5.0)	2	(5.0)	3	(7.5)
New Hampshire	13	0	(0)	2	(15.4)	0	(0)	1	(7.7)	5	(38.5)	0	(0)	2	(15.4)	1	(7.7)	2	(15.4)
New Jersey	233	0	(0)	6	(2.6)	0	(0)	129	(55.4)	5	(2.1)	7	(3.0)	8	(3.4)	77	(33.0)	1	(0.4)
New Mexico	25	0	(0)	1	(4.0)	1	(4.0)	14	(56.0)	1	(4.0)	1	(4.0)	0	(0)	7	(28.0)	0	(0)
New York State[3]	156	1	(0.6)	5	(3.2)	8	(5.1)	26	(16.7)	28	(17.9)	12	(7.7)	5	(3.2)	69	(44.2)	2	(1.3)
New York City	478	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	478	(100.0)
North Carolina	109	0	(0)	6	(5.5)	3	(2.8)	7	(6.4)	3	(2.8)	2	(1.8)	0	(0)	85	(78.0)	3	(2.8)
North Dakota	16	0	(0)	2	(12.5)	0	(0)	6	(37.5)	8	(50.0)	0	(0)	0	(0)	0	(0)	0	(0)
Ohio	81	0	(0)	3	(3.7)	2	(2.5)	7	(8.6)	6	(7.4)	5	(6.2)	0	(0)	5	(6.2)	53	(65.4)
Oklahoma	39	0	(0)	1	(2.6)	4	(10.3)	5	(12.8)	4	(10.3)	4	(10.3)	0	(0)	5	(12.8)	16	(41.0)
Oregon	50	1	(2.0)	2	(4.0)	3	(6.0)	16	(32.0)	5	(10.0)	4	(8.0)	0	(0)	5	(10.0)	14	(28.0)
Pennsylvania	116	1	(0.9)	6	(5.2)	6	(5.2)	65	(56.0)	10	(8.6)	4	(3.4)	3	(2.6)	7	(6.0)	14	(12.1)
Rhode Island	8	0	(0)	0	(0)	0	(0)	2	(25.0)	2	(25.0)	1	(12.5)	0	(0)	0	(0)	3	(37.5)
South Carolina	23	0	(0)	3	(13.0)	2	(8.7)	0	(0)	0	(0)	2	(8.7)	0	(0)	2	(8.7)	14	(60.9)
South Dakota	7	0	(0)	0	(0)	0	(0)	0	(0)	3	(42.9)	1	(14.3)	0	(0)	0	(0)	3	(42.9)
Tennessee	40	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	40	(100.0)
Texas	734	1	(0.1)	7	(1.0)	15	(2.0)	125	(17.0)	38	(5.2)	14	(1.9)	8	(1.1)	509	(69.3)	17	(2.3)
Utah	15	0	(0)	1	(6.7)	0	(0)	4	(26.7)	3	(20.0)	1	(6.7)	0	(0)	5	(33.3)	1	(6.7)
Vermont	4	0	(0)	1	(25.0)	0	(0)	0	(0)	3	(75.0)	0	(0)	0	(0)	0	(0)	0	(0)
Virginia	166	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	166	(100.0)
Washington	158	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	158	(100.0)
West Virginia	5	0	(0)	0	(0)	1	(20.0)	1	(20.0)	1	(20.0)	1	(20.0)	1	(20.0)	0	(0)	0	(0)
Wisconsin	19	1	(5.3)	0	(0)	2	(10.5)	3	(15.8)	3	(15.8)	3	(15.8)	1	(5.3)	1	(5.3)	5	(26.3)
Wyoming	1	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)

[1]Includes persons born outside of the United States (including the U.S. territories), except persons born to at least one U.S. citizen parent.
[2]Other immigration status includes (but is not limited to) non-U.S.–born persons who were not required to obtain a visa or persons with no official immigration status (i.e., undocumented).
[3]Excludes New York City.

Table 36. Tuberculosis Cases and Percentages Among Non-U.S.–Born Persons[1], by Number of Years in the United States: Reporting Areas, 2016

Reporting area	Total cases	<1 Year		1–4		5–9		10–19		≥20		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
United States	**6,351**	**1,120**	**(17.6)**	**991**	**(15.6)**	**763**	**(12.0)**	**1,237**	**(19.5)**	**1,681**	**(26.5)**	**559**	**(8.8)**
Alabama	26	3	(11.5)	8	(30.8)	3	(11.5)	8	(30.8)	4	(15.4)	0	(0)
Alaska	11	0	(0)	1	(9.1)	1	(9.1)	4	(36.4)	4	(36.4)	1	(9.1)
Arizona	130	44	(33.8)	13	(10.0)	11	(8.5)	27	(20.8)	22	(16.9)	13	(10.0)
Arkansas	40	12	(30.0)	7	(17.5)	6	(15.0)	10	(25.0)	5	(12.5)	0	(0)
California	1,661	175	(10.5)	147	(8.9)	151	(9.1)	299	(18.0)	613	(36.9)	276	(16.6)
Colorado	47	8	(17.0)	5	(10.6)	5	(10.6)	7	(14.9)	14	(29.8)	8	(17.0)
Connecticut	44	10	(22.7)	7	(15.9)	7	(15.9)	11	(25.0)	9	(20.5)	0	(0)
Delaware	11	0	(0)	5	(45.5)	2	(18.2)	2	(18.2)	2	(18.2)	0	(0)
District of Columbia	17	3	(17.6)	6	(35.3)	2	(11.8)	5	(29.4)	1	(5.9)	0	(0)
Florida	385	68	(17.7)	61	(15.8)	50	(13.0)	90	(23.4)	103	(26.8)	13	(3.4)
Georgia	142	22	(15.5)	26	(18.3)	27	(19.0)	32	(22.5)	30	(21.1)	5	(3.5)
Hawaii	100	25	(25.0)	7	(7.0)	5	(5.0)	21	(21.0)	30	(30.0)	12	(12.0)
Idaho	10	4	(40.0)	0	(0)	0	(0)	1	(10.0)	5	(50.0)	0	(0)
Illinois	257	48	(18.7)	54	(21.0)	15	(5.8)	59	(23.0)	75	(29.2)	6	(2.3)
Indiana	76	13	(17.1)	16	(21.1)	10	(13.2)	11	(14.5)	5	(6.6)	21	(27.6)
Iowa	40	0	(0)	3	(7.5)	1	(2.5)	1	(2.5)	0	(0)	35	(87.5)
Kansas	31	10	(32.3)	6	(19.4)	5	(16.1)	8	(25.8)	2	(6.5)	0	(0)
Kentucky	50	19	(38.0)	13	(26.0)	7	(14.0)	7	(14.0)	4	(8.0)	0	(0)
Louisiana	42	7	(16.7)	9	(21.4)	10	(23.8)	9	(21.4)	7	(16.7)	0	(0)
Maine	19	10	(52.6)	4	(21.1)	0	(0)	4	(21.1)	1	(5.3)	0	(0)
Maryland	185	40	(21.6)	35	(18.9)	31	(16.8)	42	(22.7)	35	(18.9)	2	(1.1)
Massachusetts	166	37	(22.3)	40	(24.1)	23	(13.9)	25	(15.1)	34	(20.5)	7	(4.2)
Michigan	80	22	(27.5)	19	(23.8)	7	(8.8)	10	(12.5)	18	(22.5)	4	(5.0)
Minnesota	152	39	(25.7)	36	(23.7)	18	(11.8)	37	(24.3)	21	(13.8)	1	(0.7)
Mississippi	13	3	(23.1)	1	(7.7)	3	(23.1)	3	(23.1)	2	(15.4)	1	(7.7)
Missouri	57	19	(33.3)	14	(24.6)	7	(12.3)	10	(17.5)	7	(12.3)	0	(0)
Montana	1	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)
Nebraska	22	6	(27.3)	6	(27.3)	4	(18.2)	5	(22.7)	1	(4.5)	0	(0)
Nevada	40	7	(17.5)	4	(10.0)	4	(10.0)	13	(32.5)	11	(27.5)	1	(2.5)
New Hampshire	13	4	(30.8)	1	(7.7)	2	(15.4)	2	(15.4)	1	(7.7)	3	(23.1)
New Jersey	233	30	(12.9)	33	(14.2)	29	(12.4)	52	(22.3)	46	(19.7)	43	(18.5)
New Mexico	25	8	(32.0)	1	(4.0)	2	(8.0)	3	(12.0)	11	(44.0)	0	(0)
New York State[2]	156	36	(23.1)	33	(21.2)	15	(9.6)	33	(21.2)	37	(23.7)	2	(1.3)
New York City	478	61	(12.8)	82	(17.2)	78	(16.3)	89	(18.6)	127	(26.6)	41	(8.6)
North Carolina	109	18	(16.5)	22	(20.2)	14	(12.8)	20	(18.3)	13	(11.9)	22	(20.2)
North Dakota	16	0	(0)	4	(25.0)	7	(43.8)	5	(31.3)	0	(0)	0	(0)
Ohio	81	18	(22.2)	24	(29.6)	12	(14.8)	13	(16.0)	14	(17.3)	0	(0)
Oklahoma	39	13	(33.3)	4	(10.3)	5	(12.8)	3	(7.7)	9	(23.1)	5	(12.8)
Oregon	50	6	(12.0)	8	(16.0)	6	(12.0)	6	(12.0)	7	(14.0)	17	(34.0)
Pennsylvania	116	11	(9.5)	28	(24.1)	24	(20.7)	23	(19.8)	30	(25.9)	0	(0)
Rhode Island	8	2	(25.0)	2	(25.0)	0	(0)	2	(25.0)	2	(25.0)	0	(0)
South Carolina	23	4	(17.4)	5	(21.7)	3	(13.0)	6	(26.1)	5	(21.7)	0	(0)
South Dakota	7	0	(0)	3	(42.9)	2	(28.6)	2	(28.6)	0	(0)	0	(0)
Tennessee	40	10	(25.0)	8	(20.0)	11	(27.5)	6	(15.0)	5	(12.5)	0	(0)
Texas	734	184	(25.1)	112	(15.3)	90	(12.3)	124	(16.9)	224	(30.5)	0	(0)
Utah	15	5	(33.3)	2	(13.3)	1	(6.7)	3	(20.0)	4	(26.7)	0	(0)
Vermont	4	3	(75.0)	0	(0)	0	(0)	0	(0)	1	(25.0)	0	(0)
Virginia	166	22	(13.3)	29	(17.5)	26	(15.7)	49	(29.5)	40	(24.1)	0	(0)
Washington	158	26	(16.5)	29	(18.4)	19	(12.0)	31	(19.6)	36	(22.8)	17	(10.8)
West Virginia	5	0	(0)	1	(20.0)	0	(0)	1	(20.0)	3	(60.0)	0	(0)
Wisconsin	19	5	(26.3)	5	(26.3)	2	(10.5)	3	(15.8)	1	(5.3)	3	(15.8)
Wyoming	1	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)

[1]Includes persons born outside of the United States (including the U.S. territories), except persons born to at least one U.S. citizen parent.

[2]Excludes New York City.

Table 37. Tuberculosis Cases and Percentages, by Pulmonary and Extrapulmonary Disease: Reporting Areas, 2016

Reporting area	Total cases	Pulmonary[1]		Extrapulmonary[2]		Both pulmonary/ extrapulmonary	
		No.	(%)	No.	(%)	No.	(%)
United States	**9,272**	**6,455**	**(69.6)**	**1,882**	**(20.3)**	**920**	**(9.9)**
Alabama	112	99	(88.4)	11	(9.8)	2	(1.8)
Alaska	57	47	(82.5)	9	(15.8)	1	(1.8)
Arizona	188	136	(72.3)	35	(18.6)	17	(9.0)
Arkansas	91	70	(76.9)	17	(18.7)	4	(4.4)
California	2,062	1,488	(72.2)	359	(17.4)	215	(10.4)
Colorado	64	35	(54.7)	22	(34.4)	7	(10.9)
Connecticut	52	32	(61.5)	16	(30.8)	4	(7.7)
Delaware	16	12	(75.0)	3	(18.8)	1	(6.3)
District of Columbia	25	16	(64.0)	9	(36.0)	0	(0)
Florida	639	493	(77.2)	90	(14.1)	56	(8.8)
Georgia	302	210	(69.5)	60	(19.9)	31	(10.3)
Hawaii	119	88	(73.9)	14	(11.8)	15	(12.6)
Idaho	18	15	(83.3)	1	(5.6)	2	(11.1)
Illinois	342	210	(61.4)	84	(24.6)	48	(14.0)
Indiana	109	78	(71.6)	15	(13.8)	14	(12.8)
Iowa	48	25	(52.1)	13	(27.1)	7	(14.6)
Kansas	39	32	(82.1)	6	(15.4)	1	(2.6)
Kentucky	91	74	(81.3)	15	(16.5)	2	(2.2)
Louisiana	127	107	(84.3)	18	(14.2)	1	(0.8)
Maine	23	16	(69.6)	4	(17.4)	3	(13.0)
Maryland	220	121	(55.0)	77	(35.0)	22	(10.0)
Massachusetts	190	126	(66.3)	39	(20.5)	23	(12.1)
Michigan	133	68	(51.1)	53	(39.8)	11	(8.3)
Minnesota	168	95	(56.5)	55	(32.7)	18	(10.7)
Mississippi	61	45	(73.8)	13	(21.3)	3	(4.9)
Missouri	101	76	(75.2)	16	(15.8)	9	(8.9)
Montana	4	3	(75.0)	0	(0)	1	(25.0)
Nebraska	28	19	(67.9)	8	(28.6)	1	(3.6)
Nevada	56	35	(62.5)	16	(28.6)	4	(7.1)
New Hampshire	15	10	(66.7)	2	(13.3)	2	(13.3)
New Jersey	294	195	(66.3)	66	(22.4)	33	(11.2)
New Mexico	39	23	(59.0)	10	(25.6)	6	(15.4)
New York State[3]	203	115	(56.7)	62	(30.5)	26	(12.8)
New York City	565	367	(65.0)	118	(20.9)	80	(14.2)
North Carolina	219	141	(64.4)	45	(20.5)	33	(15.1)
North Dakota	22	15	(68.2)	7	(31.8)	0	(0)
Ohio	140	101	(72.1)	39	(27.9)	0	(0)
Oklahoma	78	54	(69.2)	18	(23.1)	6	(7.7)
Oregon	70	43	(61.4)	22	(31.4)	5	(7.1)
Pennsylvania	173	111	(64.2)	45	(26.0)	17	(9.8)
Rhode Island	12	5	(41.7)	6	(50.0)	1	(8.3)
South Carolina	102	63	(61.8)	27	(26.5)	12	(11.8)
South Dakota	12	10	(83.3)	1	(8.3)	1	(8.3)
Tennessee	103	73	(70.9)	18	(17.5)	12	(11.7)
Texas	1,250	961	(76.9)	191	(15.3)	98	(7.8)
Utah	20	14	(70.0)	5	(25.0)	1	(5.0)
Vermont	5	3	(60.0)	1	(20.0)	1	(20.0)
Virginia	205	128	(62.4)	50	(24.4)	27	(13.2)
Washington	205	125	(61.0)	54	(26.3)	25	(12.2)
West Virginia	14	7	(50.0)	6	(42.9)	1	(7.1)
Wisconsin	40	19	(47.5)	11	(27.5)	10	(25.0)
Wyoming	1	1	(100.0)	0	(0)	0	(0)
American Samoa[4]	1	1	(100.0)	0	(0)	0	(0)
Fed. States of Micronesia[4]	126	118	(93.7)	7	(5.6)	1	(0.8)
Guam[4]	75	72	(96.0)	3	(4.0)	0	(0)
Marshall Islands[4]	179	123	(68.7)	40	(22.3)	16	(8.9)
N. Mariana Islands[4]	27	27	(100.0)	0	(0)	0	(0)
Puerto Rico[4]	69	64	(92.8)	0	(0)	5	(7.2)
Republic of Palau[4]	21	19	(90.5)	2	(9.5)	0	(0)
U.S. Virgin Islands[4]	0	0	…	0	…	0	…

[1]Includes cases with pulmonary listed as the only site of disease.
[2]Includes cases with pleural, lymphatic, bone and/or joint, meningeal, peritoneal, genitourinary, or other site, excluding pulmonary, listed as site of disease.
[3]Excludes New York City.
[4]Not included in U.S. totals.
Note: Fifteen cases had missing and/or unknown site of disease.
Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 38. Extrapulmonary Tuberculosis Cases and Percentages by Site of Disease: Reporting Areas, 2016

Reporting area	Total extrapulm. cases[1]	Total extrapulm. sites[2]	Site of disease															
			Pleural		Lymphatic		Bone or joint		Genitourinary		Meningeal		Peritoneal		Laryngeal		Other	
			No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
United States	**1,882**	**1,983**	**320**	**(16.1)**	**710**	**(35.8)**	**192**	**(9.7)**	**91**	**(4.6)**	**84**	**(4.2)**	**121**	**(6.1)**	**2**	**(0.1)**	**463**	**(23.3)**
Alabama	11	11	2	(18.2)	2	(18.2)	1	(9.1)	0	(0)	0	(0)	1	(9.1)	1	(9.1)	4	(36.4)
Alaska	9	9	4	(44.4)	0	(0)	0	(0)	1	(11.1)	0	(0)	2	(22.2)	0	(0)	2	(22.2)
Arizona	35	35	9	(25.7)	11	(31.4)	1	(2.9)	5	(14.3)	0	(0)	2	(5.7)	0	(0)	7	(20.0)
Arkansas	17	17	4	(23.5)	7	(41.2)	2	(11.8)	0	(0)	0	(0)	0	(0)	1	(5.9)	3	(17.6)
California	359	376	64	(17.0)	127	(33.8)	32	(8.5)	17	(4.5)	13	(3.5)	26	(6.9)	0	(0)	97	(25.8)
Colorado	22	25	3	(12.0)	9	(36.0)	1	(4.0)	2	(8.0)	0	(0)	1	(4.0)	0	(0)	9	(36.0)
Connecticut	16	18	3	(16.7)	6	(33.3)	1	(5.6)	1	(5.6)	1	(5.6)	2	(11.1)	0	(0)	4	(22.2)
Delaware	3	3	0	(0)	1	(33.3)	0	(0)	1	(33.3)	1	(33.3)	0	(0)	0	(0)	0	(0)
District of Columbia	9	9	2	(22.2)	4	(44.4)	1	(11.1)	0	(0)	0	(0)	0	(0)	0	(0)	2	(22.2)
Florida	90	93	15	(16.1)	23	(24.7)	11	(11.8)	3	(3.2)	6	(6.5)	4	(4.3)	0	(0)	31	(33.3)
Georgia	60	62	13	(21.0)	19	(30.6)	9	(14.5)	2	(3.2)	0	(0)	5	(8.1)	0	(0)	14	(22.6)
Hawaii	14	15	4	(26.7)	5	(33.3)	0	(0)	2	(13.3)	2	(13.3)	1	(6.7)	0	(0)	1	(6.7)
Idaho	1	1	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Illinois	84	89	19	(21.3)	36	(40.4)	8	(9.0)	2	(2.2)	5	(5.6)	3	(3.4)	0	(0)	16	(18.0)
Indiana	15	16	2	(12.5)	7	(43.8)	2	(12.5)	0	(0)	1	(6.3)	1	(6.3)	0	(0)	3	(18.8)
Iowa	13	16	2	(12.5)	5	(31.3)	2	(12.5)	0	(0)	1	(6.3)	1	(6.3)	0	(0)	5	(31.3)
Kansas	6	6	1	(16.7)	3	(50.0)	1	(16.7)	0	(0)	0	(0)	1	(16.7)	0	(0)	0	(0)
Kentucky	15	15	0	(0)	5	(33.3)	1	(6.7)	2	(13.3)	0	(0)	1	(6.7)	0	(0)	6	(40.0)
Louisiana	18	20	4	(20.0)	6	(30.0)	2	(10.0)	1	(5.0)	1	(5.0)	0	(0)	0	(0)	6	(30.0)
Maine	4	4	0	(0)	3	(75.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(25.0)
Maryland	77	82	15	(18.3)	34	(41.5)	8	(9.8)	3	(3.7)	1	(1.2)	6	(7.3)	0	(0)	15	(18.3)
Massachusetts	39	41	4	(9.8)	21	(51.2)	2	(4.9)	2	(4.9)	1	(2.4)	2	(4.9)	0	(0)	9	(22.0)
Michigan	53	56	6	(10.7)	16	(28.6)	3	(5.4)	1	(1.8)	1	(1.8)	1	(1.8)	0	(0)	28	(50.0)
Minnesota	55	60	4	(6.7)	35	(58.3)	8	(13.3)	2	(3.3)	1	(1.7)	2	(3.3)	0	(0)	8	(13.3)
Mississippi	13	14	4	(28.6)	4	(28.6)	1	(7.1)	0	(0)	2	(14.3)	1	(7.1)	0	(0)	2	(14.3)
Missouri	16	16	3	(18.8)	6	(37.5)	0	(0)	0	(0)	1	(6.3)	0	(0)	0	(0)	6	(37.5)
Nebraska	8	8	1	(12.5)	2	(25.0)	2	(25.0)	0	(0)	0	(0)	0	(0)	0	(0)	3	(37.5)
Nevada	16	18	3	(16.7)	4	(22.2)	2	(11.1)	2	(11.1)	2	(11.1)	1	(5.6)	0	(0)	4	(22.2)
New Hampshire	2	3	1	(33.3)	0	(0)	0	(0)	0	(0)	1	(33.3)	0	(0)	0	(0)	1	(33.3)
New Jersey	66	71	18	(25.4)	28	(39.4)	4	(5.6)	5	(7.0)	2	(2.8)	5	(7.0)	0	(0)	9	(12.7)
New Mexico	10	11	2	(18.2)	2	(18.2)	2	(18.2)	2	(18.2)	0	(0)	0	(0)	0	(0)	3	(27.3)

Table 38. (Con't) Extrapulmonary Tuberculosis Cases and Percentages by Site of Disease: Reporting Areas, 2016

Reporting area	Total extrapulm. cases[1]	Total extrapulm. sites[2]	Site of disease															
			Pleural		Lymphatic		Bone or Joint		Genitourinary		Meningeal		Peritoneal		Laryngeal		Other	
			No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
New York State[3]	62	65	9	(13.8)	24	(36.9)	6	(9.2)	4	(6.2)	4	(6.2)	7	(10.8)	0	(0)	11	(16.9)
New York City	118	132	14	(10.6)	46	(34.8)	25	(18.9)	7	(5.3)	6	(4.5)	10	(7.6)	0	(0)	24	(18.2)
North Carolina	45	48	8	(16.7)	17	(35.4)	6	(12.5)	1	(2.1)	3	(6.3)	2	(4.2)	0	(0)	11	(22.9)
North Dakota	7	8	1	(12.5)	5	(62.5)	1	(12.5)	0	(0)	0	(0)	0	(0)	0	(0)	1	(12.5)
Ohio	39	39	4	(10.3)	15	(38.5)	7	(17.9)	2	(5.1)	2	(5.1)	3	(7.7)	0	(0)	6	(15.4)
Oklahoma	18	18	8	(44.4)	4	(22.2)	0	(0)	0	(0)	0	(0)	1	(5.6)	0	(0)	5	(27.8)
Oregon	22	22	3	(13.6)	10	(45.5)	1	(4.5)	0	(0)	0	(0)	2	(9.1)	0	(0)	6	(27.3)
Pennyslvania	45	46	4	(8.7)	14	(30.4)	5	(10.9)	4	(8.7)	2	(4.3)	7	(15.2)	0	(0)	10	(21.7)
Rhode Island	6	6	2	(33.3)	1	(16.7)	2	(33.3)	0	(0)	0	(0)	0	(0)	0	(0)	1	(16.7)
South Carolina	27	28	2	(7.1)	13	(46.4)	3	(10.7)	0	(0)	1	(3.6)	2	(7.1)	0	(0)	7	(25.0)
South Dakota	1	1	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)
Tennessee	18	21	3	(14.3)	9	(42.9)	0	(0)	2	(9.5)	2	(9.5)	1	(4.8)	0	(0)	4	(19.0)
Texas	191	196	29	(14.8)	65	(33.2)	19	(9.7)	7	(3.6)	17	(8.7)	9	(4.6)	0	(0)	50	(25.5)
Utah	5	6	2	(33.3)	2	(33.3)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(33.3)
Vermont	1	1	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Virginia	50	51	5	(9.8)	23	(45.1)	4	(7.8)	2	(3.9)	1	(2.0)	5	(9.8)	0	(0)	11	(21.6)
Washington	54	58	9	(15.5)	25	(43.1)	4	(6.9)	4	(6.9)	2	(3.4)	3	(5.2)	0	(0)	11	(19.0)
West Virginia	6	6	4	(66.7)	1	(16.7)	1	(16.7)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Wisconsin	11	11	0	(0)	4	(36.4)	1	(9.1)	2	(18.2)	0	(0)	0	(0)	0	(0)	4	(36.4)
Wyoming	0	0	0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
American Samoa[4]	0	0	0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
Fed. States of Micronesia[4]	7	7	2	(28.6)	3	(42.9)	1	(14.3)	0	(0)	0	(0)	1	(14.3)	0	(0)	0	(0)
Guam[4]	3	3	0	(0)	1	(33.3)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(66.7)
Marshall Islands[4]	40	40	23	(57.5)	7	(17.5)	1	(2.5)	1	(2.5)	0	(0)	7	(17.5)	0	(0)	1	(2.5)
N. Mariana Islands[4]	0	0	0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
Puerto Rico[4]	0	0	0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
Republic of Palau[4]	2	2	1	(50.0)	1	(50.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
U.S. Virgin Islands[4]	0	0	0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...

[1]Excludes cases with pumonary site of disease and cases with site not stated.
[2]Patient might have more than one extrapulmonary site of disease.
[3]Excludes New York City.
[4]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.
See Technical Notes.

Table 39. Tuberculosis Risk Factors[1]: Reporting Areas, 2016

Reporting area	Total	MDR patient contact		Missed contact		Infectious TB patient contact		Incomplete LTBI therapy		Diabetes mellitus		Renal disease		TNF-α inhibitors		Post-organ transplantation		Immuno-suppression		Other		None		Missing[2]	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
United States	**9,272**	**9**	**(0.1)**	**53**	**(0.6)**	**634**	**(6.8)**	**208**	**(2.2)**	**1,524**	**(16.4)**	**210**	**(2.3)**	**56**	**(0.6)**	**53**	**(0.6)**	**409**	**(4.4)**	**2,155**	**(23.2)**	**4,101**	**(44.2)**	**600**	**(6.5)**
Alabama	112	0	(0)	4	(3.6)	23	(20.5)	4	(3.6)	9	(8.0)	0	(0)	0	(0)	1	(0.9)	6	(5.4)	10	(8.9)	61	(54.5)	0	(0)
Alaska	57	0	(0)	0	(0)	17	(29.8)	4	(7.0)	2	(3.5)	1	(1.8)	0	(0)	0	(0)	0	(0)	1	(1.8)	32	(56.1)	0	(0)
Arizona	188	1	(0.5)	0	(0)	4	(2.1)	4	(2.1)	39	(20.7)	4	(2.1)	1	(0.5)	1	(0.5)	3	(1.6)	28	(14.9)	121	(64.4)	0	(0)
Arkansas	91	0	(0)	3	(3.3)	21	(23.1)	11	(12.1)	7	(7.7)	1	(1.1)	0	(0)	0	(0)	3	(3.3)	21	(23.1)	36	(39.6)	1	(1.1)
California	2,062	1	(0)	6	(0.3)	84	(4.1)	27	(1.3)	464	(22.5)	75	(3.6)	13	(0.6)	9	(0.4)	91	(4.4)	613	(29.7)	870	(42.2)	37	(1.8)
Colorado	64	0	(0)	0	(0)	2	(3.1)	2	(3.1)	20	(31.3)	6	(9.4)	0	(0)	1	(1.6)	2	(3.1)	3	(4.7)	35	(54.7)	0	(0)
Connecticut	52	0	(0)	0	(0)	1	(1.9)	0	(0)	6	(11.5)	1	(1.9)	0	(0)	0	(0)	1	(1.9)	25	(48.1)	21	(40.4)	0	(0)
Delaware	16	0	(0)	0	(0)	0	(0)	2	(12.5)	1	(6.3)	0	(0)	0	(0)	0	(0)	1	(6.3)	10	(62.5)	3	(18.8)	0	(0)
District of Columbia	25	1	(4.0)	0	(0)	0	(0)	0	(0)	1	(4.0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(8.0)	21	(84.0)	0	(0)
Florida	639	0	(0)	6	(0.9)	54	(8.5)	18	(2.8)	75	(11.7)	13	(2.0)	0	(0)	4	(0.6)	58	(9.1)	140	(21.9)	295	(46.2)	0	(0)
Georgia	302	0	(0)	2	(0.7)	48	(15.9)	16	(5.3)	51	(16.9)	6	(2.0)	2	(0.7)	2	(0.7)	13	(4.3)	78	(25.8)	130	(43.0)	5	(1.7)
Hawaii	119	0	(0)	0	(0)	8	(6.7)	4	(3.4)	47	(39.5)	4	(3.4)	0	(0)	0	(0)	2	(1.7)	18	(15.1)	46	(38.7)	4	(3.4)
Idaho	18	0	(0)	0	(0)	6	(33.3)	0	(0)	5	(27.8)	1	(5.6)	1	(5.6)	0	(0)	0	(0)	0	(0)	4	(22.2)	3	(16.7)
Illinois	342	0	(0)	2	(0.6)	41	(12.0)	6	(1.8)	48	(14.0)	12	(3.5)	3	(0.9)	4	(1.2)	18	(5.3)	35	(10.2)	197	(57.6)	3	(0.9)
Indiana	109	0	(0)	0	(0)	12	(11.0)	3	(2.8)	17	(15.6)	0	(0)	1	(0.9)	1	(0.9)	5	(4.6)	17	(15.6)	56	(51.4)	2	(1.8)
Iowa	48	0	(0)	0	(0)	1	(2.1)	4	(8.3)	5	(10.4)	0	(0)	1	(2.1)	0	(0)	7	(14.6)	0	(0)	22	(45.8)	9	(18.8)
Kansas	39	0	(0)	0	(0)	1	(2.6)	0	(0)	5	(12.8)	0	(0)	1	(2.6)	0	(0)	2	(5.1)	3	(7.7)	26	(66.7)	1	(2.6)
Kentucky	91	0	(0)	0	(0)	10	(11.0)	2	(2.2)	11	(12.1)	2	(2.2)	1	(1.1)	0	(0)	10	(11.0)	30	(33.0)	35	(38.5)	0	(0)
Louisiana	127	0	(0)	6	(4.7)	5	(3.9)	1	(0.8)	20	(15.7)	1	(0.8)	1	(0.8)	1	(0.8)	5	(3.9)	10	(7.9)	54	(42.5)	25	(19.7)
Maine	23	0	(0)	0	(0)	3	(13.0)	2	(8.7)	2	(8.7)	0	(0)	0	(0)	0	(0)	3	(13.0)	5	(21.7)	9	(39.1)	0	(0)
Maryland	220	1	(0.5)	2	(0.9)	13	(5.9)	2	(0.9)	34	(15.5)	5	(2.3)	5	(2.3)	1	(0.5)	9	(4.1)	33	(15.0)	123	(55.9)	4	(1.8)
Massachusetts	190	0	(0)	1	(0.5)	7	(3.7)	3	(1.6)	11	(5.8)	7	(3.7)	0	(0)	1	(0.5)	0	(0)	36	(18.9)	132	(69.5)	3	(1.6)
Michigan	133	0	(0)	0	(0)	4	(3.0)	10	(7.5)	10	(7.5)	2	(1.5)	1	(0.8)	3	(2.3)	5	(3.8)	47	(35.3)	0	(0)	58	(43.6)
Minnesota	168	1	(0.6)	0	(0)	13	(7.7)	8	(4.8)	17	(10.1)	1	(0.6)	0	(0)	1	(0.6)	6	(3.6)	72	(42.9)	67	(39.9)	0	(0)
Mississippi	61	0	(0)	0	(0)	2	(3.3)	2	(3.3)	3	(4.9)	0	(0)	0	(0)	0	(0)	1	(1.6)	52	(85.2)	6	(9.8)	1	(1.6)
Missouri	101	0	(0)	0	(0)	18	(17.8)	0	(0)	10	(9.9)	1	(1.0)	0	(0)	0	(0)	13	(12.9)	16	(15.8)	51	(50.5)	2	(2.0)
Montana	4	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	4	(100.0)	0	(0)	0	(0)
Nebraska	28	0	(0)	1	(3.6)	5	(17.9)	1	(3.6)	4	(14.3)	1	(3.6)	0	(0)	0	(0)	1	(3.6)	6	(21.4)	3	(10.7)	6	(21.4)
Nevada	56	0	(0)	0	(0)	2	(3.6)	1	(1.8)	14	(25.0)	0	(0)	0	(0)	0	(0)	2	(3.6)	3	(5.4)	34	(60.7)	1	(1.8)
New Hampshire	15	0	(0)	1	(6.7)	2	(13.3)	1	(6.7)	3	(20.0)	1	(6.7)	0	(0)	0	(0)	0	(0)	3	(20.0)	8	(53.3)	0	(0)
New Jersey	294	0	(0)	2	(0.7)	17	(5.8)	4	(1.4)	58	(19.7)	8	(2.7)	1	(0.3)	2	(0.7)	32	(10.9)	30	(10.2)	153	(52.0)	10	(3.4)
New Mexico	39	0	(0)	0	(0)	3	(7.7)	0	(0)	7	(17.9)	3	(7.7)	0	(0)	2	(5.1)	1	(2.6)	12	(30.8)	16	(41.0)	0	(0)

Table 39. (Con't) Tuberculosis Risk Factors[1]: Reporting Areas, 2016

Reporting area	Total	MDR patient contact		Missed contact		Infectious TB patient contact		Incomplete LTBI therapy		Diabetes mellitus		Renal disease		TNF-α inhibitors		Post-organ transplantation		Immuno-suppression		Other		None		Missing[2]	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
New York State[3]	203	0	(0)	0	(0)	10	(4.9)	4	(2.0)	34	(16.7)	4	(2.0)	4	(2.0)	1	(0.5)	10	(4.9)	34	(16.7)	116	(57.1)	0	(0)
New York City	565	0	(0)	2	(0.4)	19	(3.4)	8	(1.4)	92	(16.3)	7	(1.2)	11	(1.9)	1	(0.2)	30	(5.3)	28	(5.0)	0	(0)	391	(69.2)
North Carolina	219	0	(0)	5	(2.3)	24	(11.0)	11	(5.0)	36	(16.4)	4	(1.8)	2	(0.9)	3	(1.4)	9	(4.1)	71	(32.4)	102	(46.6)	8	(3.7)
North Dakota	22	0	(0)	0	(0)	3	(13.6)	2	(9.1)	3	(13.6)	1	(4.5)	0	(0)	0	(0)	0	(0)	2	(9.1)	12	(54.5)	1	(4.5)
Ohio	140	0	(0)	1	(0.7)	10	(7.1)	6	(4.3)	21	(15.0)	2	(1.4)	2	(1.4)	1	(0.7)	7	(5.0)	16	(11.4)	73	(52.1)	1	(0.7)
Oklahoma	78	0	(0)	2	(2.6)	15	(19.2)	3	(3.8)	13	(16.7)	0	(0)	0	(0)	0	(0)	6	(7.7)	19	(24.4)	36	(46.2)	0	(0)
Oregon	70	1	(1.4)	1	(1.4)	3	(4.3)	0	(0)	10	(14.3)	2	(2.9)	1	(1.4)	0	(0)	4	(5.7)	14	(20.0)	38	(54.3)	1	(1.4)
Pennsylvania	173	0	(0)	1	(0.6)	6	(3.5)	3	(1.7)	23	(13.3)	5	(2.9)	1	(0.6)	4	(2.3)	9	(5.2)	35	(20.2)	95	(54.9)	3	(1.7)
Rhode Island	12	0	(0)	0	(0)	0	(0)	0	(0)	2	(16.7)	1	(8.3)	0	(0)	0	(0)	0	(0)	2	(16.7)	7	(58.3)	0	(0)
South Carolina	102	0	(0)	0	(0)	17	(16.7)	8	(7.8)	11	(10.8)	3	(2.9)	0	(0)	1	(1.0)	8	(7.8)	2	(2.0)	56	(54.9)	0	(0)
South Dakota	12	0	(0)	0	(0)	1	(8.3)	1	(8.3)	1	(8.3)	0	(0)	0	(0)	0	(0)	1	(8.3)	4	(33.3)	5	(41.7)	0	(0)
Tennessee	103	0	(0)	0	(0)	10	(9.7)	7	(6.8)	9	(8.7)	1	(1.0)	0	(0)	1	(1.0)	8	(7.8)	19	(18.4)	54	(52.4)	0	(0)
Texas	1,250	1	(0.1)	2	(0.2)	62	(5.0)	1	(0.1)	190	(15.2)	11	(0.9)	0	(0)	4	(0.3)	0	(0)	472	(37.8)	569	(45.5)	0	(0)
Utah	20	0	(0)	1	(5.0)	0	(0)	1	(5.0)	7	(35.0)	0	(0)	1	(5.0)	0	(0)	0	(0)	1	(5.0)	10	(50.0)	0	(0)
Vermont	5	0	(0)	0	(0)	0	(0)	1	(20.0)	1	(20.0)	0	(0)	0	(0)	0	(0)	1	(20.0)	5	(100.0)	0	(0)	0	(0)
Virginia	205	0	(0)	0	(0)	10	(4.9)	3	(1.5)	29	(14.1)	9	(4.4)	0	(0)	2	(1.0)	7	(3.4)	23	(11.2)	135	(65.9)	0	(0)
Washington	205	0	(0)	1	(0.5)	14	(6.8)	5	(2.4)	28	(13.7)	2	(1.0)	2	(1.0)	1	(0.5)	7	(3.4)	33	(16.1)	101	(49.3)	18	(8.8)
West Virginia	14	1	(7.1)	0	(0)	0	(0)	1	(7.1)	5	(35.7)	0	(0)	0	(0)	0	(0)	1	(7.1)	5	(35.7)	4	(28.6)	0	(0)
Wisconsin	40	1	(2.5)	1	(2.5)	3	(7.5)	1	(2.5)	3	(7.5)	2	(5.0)	0	(0)	0	(0)	1	(2.5)	7	(17.5)	21	(52.5)	1	(2.5)
Wyoming	1	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)
American Samoa[4]	1	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Fed. States of Micronesia[4]	126	0	(0)	1	(0.8)	34	(27.0)	0	(0)	6	(4.8)	0	(0)	0	(0)	0	(0)	0	(0)	60	(47.6)	14	(11.1)	11	(8.7)
Guam[4]	75	0	(0)	0	(0)	11	(14.7)	0	(0)	25	(33.3)	2	(2.7)	0	(0)	0	(0)	1	(1.3)	1	(1.3)	17	(22.7)	19	(25.3)
Marshall Islands[4]	179	4	(2.2)	2	(1.1)	51	(28.5)	0	(0)	57	(31.8)	1	(0.6)	0	(0)	0	(0)	0	(0)	11	(6.1)	64	(35.8)	4	(2.2)
N. Mariana Islands[4]	27	0	(0)	0	(0)	11	(40.7)	2	(7.4)	4	(14.8)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(3.7)	9	(33.3)
Puerto Rico[4]	69	0	(0)	0	(0)	13	(18.8)	2	(2.9)	12	(17.4)	0	(0)	1	(1.4)	0	(0)	0	(0)	7	(10.1)	34	(49.3)	0	(0)
Republic of Palau[4]	21	0	(0)	0	(0)	3	(14.3)	0	(0)	7	(33.3)	0	(0)	0	(0)	0	(0)	4	(19.0)	0	(0)	8	(38.1)	0	(0)
U.S. Virgin Islands[4]	0	0	…	0	…	0	…	0	…	0	…	0	…	0	…	0	…	0	…	0	…	0	…	0	…

[1]Includes the number of risk factors reported (which may be more than one per case) and the number of cases with no information on additional risk factors. The sum of risk factors is greater than the total number of cases because more than one risk factor may be selected per case.
[2]None of the options for additional risk factors was selected.
[3]Excludes New York City.
[4]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 40. Primary Reason for Tuberculosis Evaluation[1]: Reporting Areas, 2016

Reporting area	Total	TB symptoms		Abnormal chest radiograph		Contact investigation		Targeted testing		Health care worker		Administrative testing		Immigrant medical exam		Incidental lab result		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
United States	**9,272**	**5,178**	**(55.8)**	**1,884**	**(20.3)**	**345**	**(3.7)**	**355**	**(3.8)**	**20**	**(0.2)**	**67**	**(0.7)**	**204**	**(2.2)**	**1,117**	**(12.0)**	**102**	**(1.1)**
Alabama	112	39	(34.8)	41	(36.6)	7	(6.3)	4	(3.6)	0	(0)	0	(0)	1	(0.9)	20	(17.9)	0	(0)
Alaska	57	22	(38.6)	9	(15.8)	8	(14.0)	13	(22.8)	0	(0)	0	(0)	0	(0)	4	(7.0)	1	(1.8)
Arizona	188	96	(51.1)	20	(10.6)	3	(1.6)	48	(25.5)	0	(0)	0	(0)	3	(1.6)	18	(9.6)	0	(0)
Arkansas	91	23	(25.3)	27	(29.7)	6	(6.6)	7	(7.7)	0	(0)	3	(3.3)	3	(3.3)	21	(23.1)	1	(1.1)
California	2,062	1,226	(59.5)	422	(20.5)	54	(2.6)	36	(1.7)	3	(0.1)	21	(1.0)	45	(2.2)	237	(11.5)	18	(0.9)
Colorado	64	54	(84.4)	3	(4.7)	1	(1.6)	5	(7.8)	0	(0)	0	(0)	0	(0)	1	(1.6)	0	(0)
Connecticut	52	36	(69.2)	5	(9.6)	1	(1.9)	1	(1.9)	0	(0)	2	(3.8)	0	(0)	7	(13.5)	0	(0)
Delaware	16	13	(81.3)	2	(12.5)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(6.3)	0	(0)
District of Columbia	25	18	(72.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	7	(28.0)	0	(0)
Florida	639	260	(40.7)	213	(33.3)	21	(3.3)	9	(1.4)	3	(0.5)	0	(0)	13	(2.0)	119	(18.6)	1	(0.2)
Georgia	302	146	(48.3)	77	(25.5)	27	(8.9)	7	(2.3)	1	(0.3)	0	(0)	10	(3.3)	27	(8.9)	7	(2.3)
Hawaii	119	61	(51.3)	17	(14.3)	6	(5.0)	0	(0)	0	(0)	4	(3.4)	14	(11.8)	15	(12.6)	2	(1.7)
Idaho	18	7	(38.9)	3	(16.7)	4	(22.2)	0	(0)	0	(0)	1	(5.6)	1	(5.6)	2	(11.1)	0	(0)
Illinois	342	215	(62.9)	66	(19.3)	7	(2.0)	2	(0.6)	0	(0)	4	(1.2)	10	(2.9)	38	(11.1)	0	(0)
Indiana	109	54	(49.5)	15	(13.8)	7	(6.4)	3	(2.8)	3	(2.8)	1	(0.9)	14	(12.8)	12	(11.0)	0	(0)
Iowa	48	31	(64.6)	5	(10.4)	0	(0)	1	(2.1)	1	(2.1)	3	(6.3)	1	(2.1)	3	(6.3)	3	(6.3)
Kansas	39	14	(35.9)	7	(17.9)	0	(0)	7	(17.9)	0	(0)	1	(2.6)	0	(0)	10	(25.6)	0	(0)
Kentucky	91	54	(59.3)	22	(24.2)	3	(3.3)	3	(3.3)	0	(0)	0	(0)	1	(1.1)	8	(8.8)	0	(0)
Louisiana	127	81	(63.8)	27	(21.3)	5	(3.9)	1	(0.8)	1	(0.8)	0	(0)	2	(1.6)	6	(4.7)	4	(3.1)
Maine	23	14	(60.9)	3	(13.0)	1	(4.3)	0	(0)	0	(0)	0	(0)	2	(8.7)	3	(13.0)	0	(0)
Maryland	220	132	(60.0)	40	(18.2)	3	(1.4)	9	(4.1)	0	(0)	2	(0.9)	3	(1.4)	24	(10.9)	7	(3.2)
Massachusetts	190	107	(56.3)	64	(33.7)	2	(1.1)	2	(1.1)	0	(0)	1	(0.5)	2	(1.1)	11	(5.8)	1	(0.5)
Michigan	133	76	(57.1)	32	(24.1)	3	(2.3)	2	(1.5)	0	(0)	1	(0.8)	5	(3.8)	14	(10.5)	0	(0)
Minnesota	168	136	(81.0)	1	(0.6)	8	(4.8)	6	(3.6)	0	(0)	1	(0.6)	15	(8.9)	1	(0.6)	0	(0)
Mississippi	61	14	(23.0)	25	(41.0)	5	(8.2)	1	(1.6)	0	(0)	0	(0)	0	(0)	16	(26.2)	0	(0)
Missouri	101	62	(61.4)	9	(8.9)	3	(3.0)	7	(6.9)	0	(0)	0	(0)	3	(3.0)	3	(3.0)	14	(13.9)
Montana	4	3	(75.0)	1	(25.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Nebraska	28	12	(42.9)	3	(10.7)	3	(10.7)	1	(3.6)	0	(0)	0	(0)	0	(0)	1	(3.6)	8	(28.6)
Nevada	56	31	(55.4)	7	(12.5)	3	(5.4)	2	(3.6)	0	(0)	1	(1.8)	3	(5.4)	9	(16.1)	0	(0)
New Hampshire	15	8	(53.3)	4	(26.7)	1	(6.7)	0	(0)	0	(0)	0	(0)	1	(6.7)	1	(6.7)	0	(0)
New Jersey	294	171	(58.2)	58	(19.7)	8	(2.7)	1	(0.3)	2	(0.7)	2	(0.7)	4	(1.4)	48	(16.3)	0	(0)
New Mexico	39	23	(59.0)	10	(25.6)	0	(0)	4	(10.3)	0	(0)	0	(0)	1	(2.6)	1	(2.6)	0	(0)

Table 40. (Con't) Primary Reason for Tuberculosis Evaluation[1]: Reporting Areas, 2016

Reporting area	Total	TB symptoms		Abnormal chest radiograph		Contact investigation		Targeted testing		Health care worker		Administrative testing		Immigrant medical exam		Incidental lab result		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
New York State[2]	203	93	(45.8)	45	(22.2)	6	(3.0)	7	(3.4)	1	(0.5)	2	(1.0)	1	(0.5)	42	(20.7)	6	(3.0)
New York City	565	357	(63.2)	95	(16.8)	10	(1.8)	19	(3.4)	0	(0)	4	(0.7)	8	(1.4)	71	(12.6)	1	(0.2)
North Carolina	219	92	(42.0)	52	(23.7)	10	(4.6)	1	(0.5)	0	(0)	1	(0.5)	0	(0)	63	(28.8)	0	(0)
North Dakota	22	17	(77.3)	2	(9.1)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	3	(13.6)	0	(0)
Ohio	140	46	(32.9)	56	(40.0)	1	(0.7)	2	(1.4)	0	(0)	2	(1.4)	3	(2.1)	30	(21.4)	0	(0)
Oklahoma	78	38	(48.7)	18	(23.1)	7	(9.0)	2	(2.6)	0	(0)	0	(0)	2	(2.6)	10	(12.8)	1	(1.3)
Oregon	70	54	(77.1)	7	(10.0)	2	(2.9)	1	(1.4)	0	(0)	2	(2.9)	1	(1.4)	3	(4.3)	0	(0)
Pennsylvania	173	109	(63.0)	32	(18.5)	3	(1.7)	5	(2.9)	0	(0)	2	(1.2)	5	(2.9)	17	(9.8)	0	(0)
Rhode Island	12	5	(41.7)	5	(41.7)	0	(0)	0	(0)	0	(0)	0	(0)	1	(8.3)	1	(8.3)	0	(0)
South Carolina	102	31	(30.4)	32	(31.4)	16	(15.7)	1	(1.0)	0	(0)	0	(0)	0	(0)	22	(21.6)	0	(0)
South Dakota	12	5	(41.7)	2	(16.7)	2	(16.7)	0	(0)	0	(0)	0	(0)	0	(0)	3	(25.0)	0	(0)
Tennessee	103	50	(48.5)	32	(31.1)	2	(1.9)	0	(0)	0	(0)	0	(0)	2	(1.9)	17	(16.5)	0	(0)
Texas	1,250	732	(58.6)	186	(14.9)	66	(5.3)	130	(10.4)	0	(0)	3	(0.2)	19	(1.5)	109	(8.7)	5	(0.4)
Utah	20	13	(65.0)	4	(20.0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(5.0)	2	(10.0)	0	(0)
Vermont	5	4	(80.0)	1	(20.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Virginia	205	157	(76.6)	26	(12.7)	7	(3.4)	3	(1.5)	1	(0.5)	3	(1.5)	0	(0)	8	(3.9)	0	(0)
Washington	205	109	(53.2)	36	(17.6)	11	(5.4)	1	(0.5)	3	(1.5)	0	(0)	4	(2.0)	22	(10.7)	19	(9.3)
West Virginia	14	7	(50.0)	5	(35.7)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(14.3)	0	(0)
Wisconsin	40	19	(47.5)	10	(25.0)	2	(5.0)	1	(2.5)	1	(2.5)	0	(0)	0	(0)	4	(10.0)	3	(7.5)
Wyoming	1	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
American Samoa[3]	1	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)
Fed. States of Micronesia[3]	126	81	(64.3)	2	(1.6)	38	(30.2)	0	(0)	0	(0)	1	(0.8)	1	(0.8)	1	(0.8)	2	(1.6)
Guam[3]	75	40	(53.3)	12	(16.0)	15	(20.0)	1	(1.3)	0	(0)	0	(0)	4	(5.3)	2	(2.7)	1	(1.3)
Marshall Islands[3]	179	119	(66.5)	50	(27.9)	9	(5.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(0.6)
N. Mariana Islands[3]	27	17	(63.0)	4	(14.8)	6	(22.2)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Puerto Rico[3]	69	20	(29.0)	33	(47.8)	14	(20.3)	0	(0)	0	(0)	0	(0)	0	(0)	2	(2.9)	0	(0)
Republic of Palau[3]	21	16	(76.2)	2	(9.5)	1	(4.8)	0	(0)	0	(0)	0	(0)	2	(9.5)	0	(0)	0	(0)
U.S. Virgin Islands[3]	0	0	…	0	…	0	…	0	…	0	…	0	…	0	…	0	…	0	…

[1]Each TB patient has only one primary reason for TB evaluation.
[2]Excludes New York City.
[3]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 41. Tuberculosis Cases and Percentages, by Residence in and Type of Correctional Facilities,[1] Ages ≥15 Years: Reporting Areas, 2016

Reporting Area	Total cases	Cases with information on residence in correctional facilities		Cases reported as residents of correctional facilities[2]	
		No.	(%)	No.	(%)
United States	**8,878**	**8,273**	**(93.2)**	**328**	**(4.0)**
Alabama	108	108	(100.0)	3	(2.8)
Alaska	50	50	(100.0)	2	(4.0)
Arizona	185	185	(100.0)	47	(25.4)
Arkansas	86	86	(100.0)	2	(2.3)
California	2,011	2,006	(99.8)	50	(2.5)
Colorado	61	61	(100.0)	3	(4.9)
Connecticut	51	51	(100.0)	0	(0)
Delaware	15	15	(100.0)	0	(0)
District of Columbia	25	25	(100.0)	0	(0)
Florida	616	616	(100.0)	9	(1.5)
Georgia	283	283	(100.0)	6	(2.1)
Hawaii	115	113	(98.3)	0	(0)
Idaho	14	14	(100.0)	0	(0)
Illinois	326	326	(100.0)	2	(0.6)
Indiana	102	102	(100.0)	1	(1.0)
Iowa	48	44	(91.7)	0	(0)
Kansas	39	39	(100.0)	0	(0)
Kentucky	90	89	(98.9)	3	(3.4)
Louisiana	122	118	(96.7)	3	(2.5)
Maine	23	23	(100.0)	0	(0)
Maryland	214	214	(100.0)	1	(0.5)
Massachusetts	182	181	(99.5)	1	(0.6)
Michigan	125	125	(100.0)	0	(0)
Minnesota	149	149	(100.0)	0	(0)
Mississippi	57	57	(100.0)	1	(1.8)
Missouri	99	97	(98.0)	5	(5.2)
Montana	4	4	(100.0)	0	(0)
Nebraska	25	24	(96.0)	0	(0)
Nevada	53	53	(100.0)	0	(0)
New Hampshire	14	14	(100.0)	0	(0)
New Jersey	282	282	(100.0)	2	(0.7)
New Mexico	37	37	(100.0)	5	(13.5)
New York State[5]	193	193	(100.0)	2	(1.0)
New York City	554	548	(98.9)	8	(1.5)
North Carolina	206	206	(100.0)	3	(1.5)
North Dakota	21	21	(100.0)	2	(9.5)
Ohio	135	135	(100.0)	0	(0)
Oklahoma	72	72	(100.0)	4	(5.6)
Oregon	65	65	(100.0)	3	(4.6)
Pennsylvania	164	164	(100.0)	2	(1.2)
Rhode Island	11	11	(100.0)	0	(0)
South Carolina	87	87	(100.0)	0	(0)
South Dakota	12	12	(100.0)	0	(0)
Tennessee	98	98	(100.0)	2	(2.0)
Texas	1,181	606	(51.3)	145	(23.9)
Utah	18	18	(100.0)	1	(5.6)
Vermont	5	5	(100.0)	0	(0)
Virginia	196	195	(99.5)	2	(1.0)
Washington	199	197	(99.0)	8	(4.1)
West Virginia	14	14	(100.0)	0	(0)
Wisconsin	35	34	(97.1)	0	(0)
Wyoming	1	1	(100.0)	0	(0)
American Samoa[6]	1	1	(100.0)	0	(0)
Fed. States of Micronesia[6]	86	86	(100.0)	0	(0)
Guam[6]	63	61	(96.8)	1	(1.6)
Marshall Islands[6]	131	131	(100.0)	2	(1.5)
N. Mariana Islands[6]	18	18	(100.0)	0	(0)
Puerto Rico[6]	68	68	(100.0)	1	(1.5)
Republic of Palau[6]	20	20	(100.0)	0	(0)
U.S. Virgin Islands[6]	...	...	...	...	...

Table 41. (Con't) Tuberculosis Cases and Percentages, by Residence in and Type of Correctional Facilities,[1] Ages ≥15 Years: Reporting Areas, 2016

Federal prison		State prison		Local jail		Juvenile facility[3]		Other type of facility		Unknown/ missing		Cases with information on ICE custody[4]		Cases under ICE custody	
No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
41	**(12.5)**	**59**	**(18.0)**	**101**	**(30.8)**	**1**	**(0.3)**	**120**	**(36.6)**	**6**	**(1.8)**	**320**	**(97.6)**	**123**	**(38.4)**
0	(0)	2	(66.7)	1	(33.3)	0	(0)	0	(0)	0	(0)	3	(100.0)	0	(0)
0	(0)	1	(50.0)	0	(0)	0	(0)	1	(50.0)	0	(0)	2	(100.0)	0	(0)
4	(8.5)	0	(0)	4	(8.5)	0	(0)	39	(83.0)	0	(0)	47	(100.0)	25	(53.2)
0	(0)	2	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(100.0)	0	(0)
6	(12.0)	6	(12.0)	21	(42.0)	0	(0)	16	(32.0)	1	(2.0)	50	(100.0)	17	(34.0)
1	(33.3)	0	(0)	1	(33.3)	0	(0)	1	(33.3)	0	(0)	2	(66.7)	2	(100.0)
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	(0)	5	(55.6)	3	(33.3)	0	(0)	1	(11.1)	0	(0)	9	(100.0)	3	(33.3)
0	(0)	0	(0)	5	(83.3)	0	(0)	1	(16.7)	0	(0)	6	(100.0)	1	(16.7)
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	(0)	0	(0)	2	(100.0)	0	(0)	0	(0)	0	(0)	2	(100.0)	0	(0)
0	(0)	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	(0)	1	(33.3)	1	(33.3)	0	(0)	1	(33.3)	0	(0)	3	(100.0)	1	(33.3)
0	(0)	1	(33.3)	2	(66.7)	0	(0)	0	(0)	0	(0)	3	(100.0)	1	(33.3)
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)	1	(100.0)	1	(100.0)
1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	(0)	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	...
0	(0)	5	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	4	(80.0)	0	(0)
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	(0)	0	(0)	0	(0)	0	(0)	2	(100.0)	0	(0)	2	(100.0)	2	(100.0)
0	(0)	0	(0)	1	(20.0)	0	(0)	4	(80.0)	0	(0)	5	(100.0)	1	(20.0)
0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(100.0)	2	(100.0)	1	(50.0)
2	(25.0)	1	(12.5)	3	(37.5)	0	(0)	2	(25.0)	0	(0)	8	(100.0)	3	(37.5)
1	(33.3)	0	(0)	2	(66.7)	0	(0)	0	(0)	0	(0)	3	(100.0)	0	(0)
0	(0)	2	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(100.0)	0	(0)
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
2	(50.0)	2	(50.0)	0	(0)	0	(0)	0	(0)	0	(0)	4	(100.0)	2	(50.0)
0	(0)	1	(33.3)	2	(66.7)	0	(0)	0	(0)	0	(0)	3	(100.0)	0	(0)
0	(0)	0	(0)	2	(100.0)	0	(0)	0	(0)	0	(0)	2	(100.0)	0	(0)
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	(0)	0	(0)	2	(100.0)	0	(0)	0	(0)	0	(0)	2	(100.0)	0	(0)
23	(15.9)	29	(20.0)	45	(31.0)	1	(0.7)	46	(31.7)	1	(0.7)	140	(96.6)	56	(40.0)
0	(0)	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	(0)	1	(50.0)	1	(50.0)	0	(0)	0	(0)	0	(0)	2	(100.0)	0	(0)
1	(12.5)	0	(0)	0	(0)	0	(0)	5	(62.5)	2	(25.0)	8	(100.0)	7	(87.5)
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	(0)	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)
0	(0)	2	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(100.0)	0	(0)
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)
0	...	0	...	0	...	0	...	0	...	0	...	0	...	0	...
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

[1]Resident of correctional facility at time of TB diagnosis. Percentage based on 52 reporting areas (50 states, New York City, and the District of Columbia).
[2]Percent of those with known status.
[3]Excludes youth who are <15 years of age.
[4]Immigration and Customs Enforcement (ICE) detainment among cases who were residents in correctional facilities.
[5]Excludes New York City.
[6]Not included in U.S. totals.

Note: Ellipses (…) indicate that the percentage cannot be calculated, and the denominator is 0.

See Surveillance Slide #28.

Table 42. Tuberculosis Cases and Percentages, by Homeless Status,[1] Ages ≥15 Years: Reporting Areas, 2016

Reporting area	Total cases	Cases with information on homeless status		Cases reported as being homeless[2]	
		No.	(%)	No.	(%)
United States	**8,878**	**8,816**	**(99.3)**	**430**	**(4.9)**
Alabama	108	108	(100.0)	4	(3.7)
Alaska	50	50	(100.0)	2	(4.0)
Arizona	185	179	(96.8)	8	(4.5)
Arkansas	86	86	(100.0)	5	(5.8)
California	2,011	2,004	(99.7)	122	(6.1)
Colorado	61	61	(100.0)	4	(6.6)
Connecticut	51	51	(100.0)	1	(2.0)
Delaware	15	15	(100.0)	0	(0)
District of Columbia	25	25	(100.0)	3	(12.0)
Florida	616	598	(97.1)	29	(4.8)
Georgia	283	283	(100.0)	24	(8.5)
Hawaii	115	113	(98.3)	6	(5.3)
Idaho	14	14	(100.0)	0	(0)
Illinois	326	326	(100.0)	17	(5.2)
Indiana	102	102	(100.0)	0	(0)
Iowa	48	44	(91.7)	1	(2.3)
Kansas	39	39	(100.0)	4	(10.3)
Kentucky	90	90	(100.0)	6	(6.7)
Louisiana	122	120	(98.4)	5	(4.2)
Maine	23	23	(100.0)	2	(8.7)
Maryland	214	214	(100.0)	2	(0.9)
Massachusetts	182	181	(99.5)	6	(3.3)
Michigan	125	124	(99.2)	4	(3.2)
Minnesota	149	149	(100.0)	5	(3.4)
Mississippi	57	57	(100.0)	3	(5.3)
Missouri	99	97	(98.0)	7	(7.2)
Montana	4	4	(100.0)	1	(25.0)
Nebraska	25	24	(96.0)	0	(0)
Nevada	53	53	(100.0)	2	(3.8)
New Hampshire	14	14	(100.0)	1	(7.1)
New Jersey	282	282	(100.0)	6	(2.1)
New Mexico	37	35	(94.6)	7	(20.0)
New York State[3]	193	191	(99.0)	5	(2.6)
New York City	554	551	(99.5)	11	(2.0)
North Carolina	206	206	(100.0)	12	(5.8)
North Dakota	21	21	(100.0)	0	(0)
Ohio	135	133	(98.5)	9	(6.8)
Oklahoma	72	70	(97.2)	4	(5.7)
Oregon	65	65	(100.0)	11	(16.9)
Pennsylvania	164	164	(100.0)	4	(2.4)
Rhode Island	11	11	(100.0)	0	(0)
South Carolina	87	87	(100.0)	2	(2.3)
South Dakota	12	12	(100.0)	1	(8.3)
Tennessee	98	98	(100.0)	4	(4.1)
Texas	1,181	1,180	(99.9)	64	(5.4)
Utah	18	18	(100.0)	1	(5.6)
Vermont	5	5	(100.0)	0	(0)
Virginia	196	196	(100.0)	6	(3.1)
Washington	199	194	(97.5)	7	(3.6)
West Virginia	14	14	(100.0)	0	(0)
Wisconsin	35	34	(97.1)	2	(5.9)
Wyoming	1	1	(100.0)	0	(0)
American Samoa[4]	1	1	(100.0)	0	(0)
Fed. States of Micronesia[4]	86	86	(100.0)	1	(1.2)
Guam[4]	63	61	(96.8)	1	(1.6)
Marshall Islands[4]	131	131	(100.0)	0	(0)
N. Mariana Islands[4]	18	18	(100.0)	0	(0)
Puerto Rico[4]	68	68	(100.0)	3	(4.4)
Republic of Palau[4]	20	20	(100.0)	0	(0)
U.S. Virgin Islands[4]	0	0	...	0	...

[1]Homeless within past 12 months of TB diagnosis. Percentage based on 52 reporting areas (50 states, New York City, and the District of Columbia).
[2]Percent of those with known status.
[3]Excludes New York City.
[4]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.
See Surveillance Slide #29

Table 43. Tuberculosis Cases and Percentages, by Residence in Long-Term Care Facilities,[1] Ages ≥15 Years: Reporting Areas, 2016

Reporting area	Total cases	Cases with information on residence in long-term care facilities		Cases reported as residents of long-term care facilities[2]	
		No.	(%)	No.	(%)
United States	**8,878**	**8,845**	**(99.6)**	**168**	**(1.9)**
Alabama	108	108	(100.0)	1	(0.9)
Alaska	50	50	(100.0)	0	(0)
Arizona	185	185	(100.0)	1	(0.5)
Arkansas	86	86	(100.0)	2	(2.3)
California	2,011	2,006	(99.8)	47	(2.3)
Colorado	61	61	(100.0)	0	(0)
Connecticut	51	51	(100.0)	1	(2.0)
Delaware	15	15	(100.0)	0	(0)
District of Columbia	25	25	(100.0)	0	(0)
Florida	616	616	(100.0)	5	(0.8)
Georgia	283	283	(100.0)	1	(0.4)
Hawaii	115	113	(98.3)	3	(2.7)
Idaho	14	14	(100.0)	1	(7.1)
Illinois	326	326	(100.0)	11	(3.4)
Indiana	102	102	(100.0)	2	(2.0)
Iowa	48	44	(91.7)	0	(0)
Kansas	39	39	(100.0)	0	(0)
Kentucky	90	90	(100.0)	7	(7.8)
Louisiana	122	120	(98.4)	1	(0.8)
Maine	23	23	(100.0)	0	(0)
Maryland	214	208	(97.2)	2	(1.0)
Massachusetts	182	181	(99.5)	3	(1.7)
Michigan	125	125	(100.0)	2	(1.6)
Minnesota	149	149	(100.0)	2	(1.3)
Mississippi	57	57	(100.0)	1	(1.8)
Missouri	99	97	(98.0)	4	(4.1)
Montana	4	4	(100.0)	0	(0)
Nebraska	25	24	(96.0)	0	(0)
Nevada	53	53	(100.0)	1	(1.9)
New Hampshire	14	14	(100.0)	0	(0)
New Jersey	282	282	(100.0)	11	(3.9)
New Mexico	37	37	(100.0)	2	(5.4)
New York State[3]	193	193	(100.0)	6	(3.1)
New York City	554	548	(98.9)	9	(1.6)
North Carolina	206	206	(100.0)	4	(1.9)
North Dakota	21	21	(100.0)	0	(0)
Ohio	135	135	(100.0)	3	(2.2)
Oklahoma	72	72	(100.0)	4	(5.6)
Oregon	65	65	(100.0)	1	(1.5)
Pennsylvania	164	164	(100.0)	8	(4.9)
Rhode Island	11	11	(100.0)	0	(0)
South Carolina	87	87	(100.0)	3	(3.4)
South Dakota	12	12	(100.0)	0	(0)
Tennessee	98	98	(100.0)	2	(2.0)
Texas	1,181	1,181	(100.0)	11	(0.9)
Utah	18	18	(100.0)	0	(0)
Vermont	5	5	(100.0)	0	(0)
Virginia	196	196	(100.0)	1	(0.5)
Washington	199	196	(98.5)	4	(2.0)
West Virginia	14	14	(100.0)	1	(7.1)
Wisconsin	35	34	(97.1)	0	(0)
Wyoming	1	1	(100.0)	0	(0)
American Samoa[4]	1	1	(100.0)	0	(0)
Fed. States of Micronesia[4]	86	85	(98.8)	0	(0)
Guam[4]	63	57	(90.5)	1	(1.8)
Marshall Islands[4]	131	130	(99.2)	0	(0)
N. Mariana Islands[4]	18	16	(88.9)	0	(0)
Puerto Rico[4]	68	68	(100.0)	15	(22.1)
Republic of Palau[4]	20	20	(100.0)	0	(0)
U.S. Virgin Islands[4]	0	0	...	0	...

[1]Resident of long-term care facility at time of TB diagnosis. Percentage based on 52 reporting areas (50 states, New York City, and the District of Columbia).
[2]Percent of those with known status.
[3]Excludes New York City.
[4]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 44. Tuberculosis Cases and Percentages, by Injecting Drug Use,[1] Ages ≥15 Years: Reporting Areas, 2016

Reporting area	Total cases	Cases with information on injecting drug use		Cases reporting injecting drug use	
		No.	(%)	No.	(%)
United States	**8,878**	**8,751**	**(98.6)**	**111**	**(1.3)**
Alabama	108	108	(100.0)	2	(1.9)
Alaska	50	49	(98.0)	0	(0)
Arizona	185	181	(97.8)	3	(1.7)
Arkansas	86	86	(100.0)	1	(1.2)
California	2,011	1,963	(97.6)	23	(1.2)
Colorado	61	60	(98.4)	2	(3.3)
Connecticut	51	51	(100.0)	0	(0)
Delaware	15	15	(100.0)	1	(6.7)
District of Columbia	25	25	(100.0)	0	(0)
Florida	616	610	(99.0)	2	(0.3)
Georgia	283	279	(98.6)	5	(1.8)
Hawaii	115	113	(98.3)	1	(0.9)
Idaho	14	12	(85.7)	0	(0)
Illinois	326	323	(99.1)	5	(1.5)
Indiana	102	102	(100.0)	0	(0)
Iowa	48	45	(93.8)	0	(0)
Kansas	39	39	(100.0)	0	(0)
Kentucky	90	90	(100.0)	2	(2.2)
Louisiana	122	119	(97.5)	4	(3.4)
Maine	23	23	(100.0)	0	(0)
Maryland	214	212	(99.1)	0	(0)
Massachusetts	182	181	(99.5)	2	(1.1)
Michigan	125	124	(99.2)	2	(1.6)
Minnesota	149	149	(100.0)	0	(0)
Mississippi	57	56	(98.2)	0	(0)
Missouri	99	97	(98.0)	3	(3.1)
Montana	4	4	(100.0)	0	(0)
Nebraska	25	23	(92.0)	0	(0)
Nevada	53	53	(100.0)	1	(1.9)
New Hampshire	14	14	(100.0)	0	(0)
New Jersey	282	279	(98.9)	2	(0.7)
New Mexico	37	36	(97.3)	2	(5.6)
New York State[2]	193	187	(96.9)	0	(0)
New York City	554	545	(98.4)	3	(0.6)
North Carolina	206	206	(100.0)	3	(1.5)
North Dakota	21	21	(100.0)	2	(9.5)
Ohio	135	132	(97.8)	0	(0)
Oklahoma	72	70	(97.2)	4	(5.7)
Oregon	65	63	(96.9)	0	(0)
Pennsylvania	164	164	(100.0)	2	(1.2)
Rhode Island	11	11	(100.0)	0	(0)
South Carolina	87	84	(96.6)	1	(1.2)
South Dakota	12	12	(100.0)	0	(0)
Tennessee	98	98	(100.0)	1	(1.0)
Texas	1,181	1,181	(100.0)	22	(1.9)
Utah	18	18	(100.0)	0	(0)
Vermont	5	5	(100.0)	0	(0)
Virginia	196	196	(100.0)	4	(2.0)
Washington	199	189	(95.0)	1	(0.5)
West Virginia	14	14	(100.0)	2	(14.3)
Wisconsin	35	33	(94.3)	3	(9.1)
Wyoming	1	1	(100.0)	0	(0)
American Samoa[3]	1	1	(100.0)	0	(0)
Fed. States of Micronesia[3]	86	86	(100.0)	0	(0)
Guam[3]	63	59	(93.7)	0	(0)
Marshall Islands[3]	131	131	(100.0)	0	(0)
N. Mariana Islands[3]	18	18	(100.0)	0	(0)
Puerto Rico[3]	68	68	(100.0)	4	(5.9)
Republic of Palau[3]	20	20	(100.0)	0	(0)
U.S. Virgin Islands[3]	0	0	...	0	...

[1]Injecting drug use within past 12 months of TB diagnosis. Percentage based on 52 reporting areas (50 states, New York City, and the District of Columbia).
[2]Excludes New York City.
[3]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 45. Tuberculosis Cases and Percentages, by Noninjecting Drug Use,[1] Ages ≥15 Years: Reporting Areas, 2016

Reporting area	Total cases	Cases with information on noninjecting drug use		Cases reporting noninjecting drug use	
		No.	(%)	No.	(%)
United States	**8,878**	**8,759**	**(98.7)**	**599**	**(6.8)**
Alabama	108	108	(100.0)	15	(13.9)
Alaska	50	49	(98.0)	15	(30.6)
Arizona	185	182	(98.4)	30	(16.5)
Arkansas	86	86	(100.0)	5	(5.8)
California	2,011	1,966	(97.8)	119	(6.1)
Colorado	61	60	(98.4)	3	(5.0)
Connecticut	51	51	(100.0)	2	(3.9)
Delaware	15	15	(100.0)	1	(6.7)
District of Columbia	25	25	(100.0)	1	(4.0)
Florida	616	612	(99.4)	43	(7.0)
Georgia	283	279	(98.6)	31	(11.1)
Hawaii	115	113	(98.3)	1	(0.9)
Idaho	14	12	(85.7)	0	(0)
Illinois	326	323	(99.1)	21	(6.5)
Indiana	102	102	(100.0)	7	(6.9)
Iowa	48	45	(93.8)	1	(2.2)
Kansas	39	39	(100.0)	3	(7.7)
Kentucky	90	90	(100.0)	5	(5.6)
Louisiana	122	117	(95.9)	10	(8.5)
Maine	23	23	(100.0)	1	(4.3)
Maryland	214	210	(98.1)	2	(1.0)
Massachusetts	182	181	(99.5)	4	(2.2)
Michigan	125	124	(99.2)	7	(5.6)
Minnesota	149	149	(100.0)	1	(0.7)
Mississippi	57	56	(98.2)	6	(10.7)
Missouri	99	97	(98.0)	5	(5.2)
Montana	4	4	(100.0)	1	(25.0)
Nebraska	25	23	(92.0)	2	(8.7)
Nevada	53	53	(100.0)	5	(9.4)
New Hampshire	14	14	(100.0)	1	(7.1)
New Jersey	282	279	(98.9)	3	(1.1)
New Mexico	37	36	(97.3)	3	(8.3)
New York State[2]	193	190	(98.4)	8	(4.2)
New York City	554	546	(98.6)	33	(6.0)
North Carolina	206	206	(100.0)	21	(10.2)
North Dakota	21	21	(100.0)	2	(9.5)
Ohio	135	133	(98.5)	9	(6.8)
Oklahoma	72	71	(98.6)	9	(12.7)
Oregon	65	63	(96.9)	6	(9.5)
Pennsylvania	164	164	(100.0)	3	(1.8)
Rhode Island	11	11	(100.0)	0	(0)
South Carolina	87	83	(95.4)	7	(8.4)
South Dakota	12	12	(100.0)	1	(8.3)
Tennessee	98	98	(100.0)	12	(12.2)
Texas	1,181	1,181	(100.0)	108	(9.1)
Utah	18	18	(100.0)	0	(0)
Vermont	5	5	(100.0)	0	(0)
Virginia	196	196	(100.0)	8	(4.1)
Washington	199	190	(95.5)	9	(4.7)
West Virginia	14	13	(92.9)	1	(7.7)
Wisconsin	35	34	(97.1)	8	(23.5)
Wyoming	1	1	(100.0)	0	(0)
American Samoa[3]	1	1	(100.0)	0	(0)
Fed. States of Micronesia[3]	86	86	(100.0)	0	(0)
Guam[3]	63	59	(93.7)	0	(0)
Marshall Islands[3]	131	131	(100.0)	4	(3.1)
N. Mariana Islands[3]	18	18	(100.0)	0	(0)
Puerto Rico[3]	68	68	(100.0)	8	(11.8)
Republic of Palau[3]	20	20	(100.0)	0	(0)
U.S. Virgin Islands[3]	0	0	...	0	...

[1]Noninjecting drug use within past 12 months of TB diagnosis. Percentage based on 52 reporting areas (50 states, New York City, and the District of Columbia).
[2]Excludes New York City.
[3]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 46. Tuberculosis Cases and Percentages, by Excess Alcohol Use,[1] Ages ≥15 Years: Reporting Areas, 2016

Reporting area	Total cases	Cases with information on excess alcohol use		Cases reporting excess alcohol use	
		No.	(%)	No.	(%)
United States	**8,878**	**8,748**	**(98.5)**	**875**	**(10.0)**
Alabama	108	108	(100.0)	16	(14.8)
Alaska	50	49	(98.0)	16	(32.7)
Arizona	185	182	(98.4)	29	(15.9)
Arkansas	86	86	(100.0)	11	(12.8)
California	2,011	1,962	(97.6)	143	(7.3)
Colorado	61	60	(98.4)	6	(10.0)
Connecticut	51	51	(100.0)	3	(5.9)
Delaware	15	15	(100.0)	1	(6.7)
District of Columbia	25	25	(100.0)	2	(8.0)
Florida	616	614	(99.7)	73	(11.9)
Georgia	283	278	(98.2)	43	(15.5)
Hawaii	115	113	(98.3)	6	(5.3)
Idaho	14	13	(92.9)	1	(7.7)
Illinois	326	322	(98.8)	37	(11.5)
Indiana	102	102	(100.0)	13	(12.7)
Iowa	48	45	(93.8)	4	(8.9)
Kansas	39	39	(100.0)	5	(12.8)
Kentucky	90	90	(100.0)	9	(10.0)
Louisiana	122	116	(95.1)	16	(13.8)
Maine	23	23	(100.0)	1	(4.3)
Maryland	214	207	(96.7)	9	(4.3)
Massachusetts	182	181	(99.5)	6	(3.3)
Michigan	125	124	(99.2)	12	(9.7)
Minnesota	149	149	(100.0)	7	(4.7)
Mississippi	57	56	(98.2)	7	(12.5)
Missouri	99	97	(98.0)	7	(7.2)
Montana	4	4	(100.0)	0	(0)
Nebraska	25	20	(80.0)	1	(5.0)
Nevada	53	53	(100.0)	4	(7.5)
New Hampshire	14	14	(100.0)	4	(28.6)
New Jersey	282	279	(98.9)	13	(4.7)
New Mexico	37	36	(97.3)	9	(25.0)
New York State[2]	193	191	(99.0)	14	(7.3)
New York City	554	548	(98.9)	9	(1.6)
North Carolina	206	206	(100.0)	24	(11.7)
North Dakota	21	21	(100.0)	3	(14.3)
Ohio	135	132	(97.8)	15	(11.4)
Oklahoma	72	70	(97.2)	13	(18.6)
Oregon	65	65	(100.0)	13	(20.0)
Pennsylvania	164	164	(100.0)	9	(5.5)
Rhode Island	11	11	(100.0)	0	(0)
South Carolina	87	83	(95.4)	15	(18.1)
South Dakota	12	12	(100.0)	2	(16.7)
Tennessee	98	98	(100.0)	17	(17.3)
Texas	1,181	1,180	(99.9)	188	(15.9)
Utah	18	18	(100.0)	1	(5.6)
Vermont	5	5	(100.0)	1	(20.0)
Virginia	196	196	(100.0)	13	(6.6)
Washington	199	187	(94.0)	16	(8.6)
West Virginia	14	13	(92.9)	1	(7.7)
Wisconsin	35	34	(97.1)	7	(20.6)
Wyoming	1	1	(100.0)	0	(0)
American Samoa[3]	1	0	(0)	0	(0)
Fed. States of Micronesia[3]	86	85	(98.8)	1	(1.2)
Guam[3]	63	57	(90.5)	2	(3.5)
Marshall Islands[3]	131	130	(99.2)	24	(18.5)
N. Mariana Islands[3]	18	18	(100.0)	0	(0)
Puerto Rico[3]	68	68	(100.0)	9	(13.2)
Republic of Palau[3]	20	20	(100.0)	2	(10.0)
U.S. Virgin Islands[3]	0	0	...	0	...

[1]Excess alcohol use within past 12 months of TB diagnosis. Percentage based on 52 reporting areas (50 states, New York City, and the District of Columbia).
[2]Excludes New York City.
[3]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 47. Tuberculosis Cases and Percentages, by Primary Occupation, Ages ≥15 Years: Reporting Areas, 2016

Reporting area	Total cases	Cases with information on occupation		Percentage of cases by occupation[1]						
		No.	(%)	Unemployed	Health care worker	Correctional employee	Migrant worker	Retired	Not seeking employment	Other
United States	**8,878**	**8,654**	**(97.5)**	**(23.7)**	**(3.4)**	**(0.1)**	**(1.3)**	**(16.8)**	**(16.2)**	**(38.4)**
Alabama	108	108	(100.0)	(12.0)	(3.7)	(0)	(0)	(13.9)	(36.1)	(34.3)
Alaska	50	50	(100.0)	(30.0)	(0)	(0)	(2.0)	(12.0)	(22.0)	(34.0)
Arizona	185	172	(93.0)	(11.0)	(2.9)	(0)	(2.3)	(24.4)	(16.9)	(42.4)
Arkansas	86	85	(98.8)	(25.9)	(7.1)	(0)	(1.2)	(27.1)	(5.9)	(32.9)
California	2,011	1,972	(98.1)	(17.2)	(3.5)	(0.2)	(2.8)	(25.4)	(18.0)	(32.9)
Colorado	61	60	(98.4)	(8.3)	(1.7)	(0)	(5.0)	(16.7)	(28.3)	(40.0)
Connecticut	51	51	(100.0)	(9.8)	(2.0)	(0)	(0)	(19.6)	(15.7)	(52.9)
Delaware	15	15	(100.0)	(6.7)	(6.7)	(0)	(0)	(13.3)	(0)	(73.3)
District of Columbia	25	25	(100.0)	(72.0)	(0)	(0)	(0)	(4.0)	(0)	(24.0)
Florida	616	558	(90.6)	(53.4)	(2.7)	(0.2)	(1.4)	(8.4)	(1.8)	(32.1)
Georgia	283	274	(96.8)	(36.1)	(1.8)	(0)	(1.5)	(17.2)	(9.5)	(33.9)
Hawaii	115	112	(97.4)	(23.2)	(0.9)	(0)	(0)	(20.5)	(10.7)	(44.6)
Idaho	14	14	(100.0)	(7.1)	(0)	(0)	(7.1)	(35.7)	(14.3)	(35.7)
Illinois	326	324	(99.4)	(18.2)	(3.7)	(0)	(0.3)	(20.1)	(19.4)	(38.3)
Indiana	102	102	(100.0)	(18.6)	(6.9)	(0)	(1.0)	(10.8)	(14.7)	(48.0)
Iowa	48	45	(93.8)	(11.1)	(4.4)	(0)	(0)	(8.9)	(22.2)	(53.3)
Kansas	39	39	(100.0)	(5.1)	(12.8)	(0)	(0)	(7.7)	(33.3)	(41.0)
Kentucky	90	90	(100.0)	(12.2)	(1.1)	(0)	(2.2)	(13.3)	(38.9)	(32.2)
Louisiana	122	109	(89.3)	(16.5)	(2.8)	(0)	(2.8)	(13.8)	(25.7)	(38.5)
Maine	23	23	(100.0)	(4.3)	(0)	(0)	(4.3)	(8.7)	(39.1)	(43.5)
Maryland	214	212	(99.1)	(13.2)	(4.2)	(0.9)	(0.9)	(12.7)	(18.4)	(49.5)
Massachusetts	182	180	(98.9)	(26.1)	(5.0)	(0)	(0)	(24.4)	(7.2)	(37.2)
Michigan	125	125	(100.0)	(60.8)	(1.6)	(0)	(0)	(0)	(0)	(37.6)
Minnesota	149	148	(99.3)	(8.8)	(6.1)	(0)	(0)	(3.4)	(36.5)	(45.3)
Mississippi	57	53	(93.0)	(30.2)	(5.7)	(0)	(0)	(24.5)	(1.9)	(37.7)
Missouri	99	92	(92.9)	(14.1)	(2.2)	(0)	(0)	(19.6)	(18.5)	(45.7)
Montana	4	4	(100.0)	(25.0)	(0)	(0)	(0)	(25.0)	(25.0)	(25.0)
Nebraska	25	19	(76.0)	(15.8)	(0)	(0)	(0)	(15.8)	(10.5)	(57.9)
Nevada	53	52	(98.1)	(7.7)	(5.8)	(0)	(0)	(17.3)	(21.2)	(48.1)
New Hampshire	14	14	(100.0)	(21.4)	(7.1)	(0)	(0)	(7.1)	(7.1)	(57.1)
New Jersey	282	281	(99.6)	(17.8)	(4.3)	(0)	(1.1)	(13.5)	(18.5)	(44.8)
New Mexico	37	35	(94.6)	(5.7)	(0)	(0)	(0)	(17.1)	(51.4)	(25.7)
New York State[2]	193	183	(94.8)	(30.6)	(4.4)	(0)	(1.6)	(16.9)	(6.0)	(40.4)
New York City	554	548	(98.9)	(28.5)	(4.2)	(0)	(1.8)	(14.8)	(7.1)	(43.6)
North Carolina	206	206	(100.0)	(27.7)	(1.5)	(0)	(1.9)	(19.4)	(7.8)	(41.7)
North Dakota	21	21	(100.0)	(4.8)	(14.3)	(0)	(0)	(0)	(9.5)	(71.4)
Ohio	135	135	(100.0)	(20.0)	(3.0)	(0)	(0.7)	(15.6)	(22.2)	(38.5)
Oklahoma	72	70	(97.2)	(37.1)	(7.1)	(0)	(0)	(11.4)	(10.0)	(34.3)
Oregon	65	62	(95.4)	(21.0)	(1.6)	(0)	(1.6)	(16.1)	(21.0)	(38.7)
Pennsylvania	164	162	(98.8)	(17.9)	(6.2)	(0)	(0)	(27.8)	(8.0)	(40.1)
Rhode Island	11	11	(100.0)	(9.1)	(0)	(0)	(0)	(27.3)	(18.2)	(45.5)
South Carolina	87	87	(100.0)	(21.8)	(2.3)	(0)	(0)	(16.1)	(16.1)	(43.7)
South Dakota	12	12	(100.0)	(8.3)	(8.3)	(0)	(0)	(0)	(41.7)	(41.7)
Tennessee	98	98	(100.0)	(22.4)	(3.1)	(0)	(0)	(17.3)	(14.3)	(42.9)
Texas	1,181	1,172	(99.2)	(30.9)	(2.6)	(0.2)	(0.3)	(9.9)	(20.2)	(35.9)
Utah	18	18	(100.0)	(5.6)	(0)	(0)	(0)	(44.4)	(16.7)	(33.3)
Vermont	5	5	(100.0)	(20.0)	(0)	(0)	(0)	(0)	(80.0)	(0)
Virginia	196	196	(100.0)	(14.3)	(3.6)	(0)	(0)	(12.2)	(12.8)	(57.1)
Washington	199	182	(91.5)	(4.9)	(2.2)	(0)	(1.1)	(12.1)	(33.5)	(46.2)
West Virginia	14	14	(100.0)	(14.3)	(7.1)	(0)	(0)	(57.1)	(0)	(21.4)
Wisconsin	35	28	(80.0)	(17.9)	(7.1)	(0)	(0)	(3.6)	(39.3)	(32.1)
Wyoming	1	1	(100.0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
American Samoa[3]	1	1	(100.0)	(0)	(0)	(0)	(0)	(100.0)	(0)	(0)
Fed. States of Micronesia[3]	86	82	(95.3)	(53.7)	(1.2)	(0)	(0)	(1.2)	(29.3)	(14.6)
Guam[3]	63	59	(93.7)	(16.9)	(1.7)	(1.7)	(0)	(15.3)	(33.9)	(30.5)
Marshall Islands[3]	131	130	(99.2)	(46.2)	(1.5)	(0.8)	(0.8)	(13.1)	(15.4)	(22.3)
N. Mariana Islands[3]	18	18	(100.0)	(0)	(0)	(0)	(44.4)	(0)	(16.7)	(38.9)
Puerto Rico[3]	68	68	(100.0)	(19.1)	(1.5)	(1.5)	(0)	(19.1)	(39.7)	(19.1)
Republic of Palau[3]	20	20	(100.0)	(30.0)	(5.0)	(0)	(25.0)	(15.0)	(5.0)	(20.0)
U.S. Virgin Islands[3]	0	0	...	...	...	...	...	...	...	...

[1]Occupation within past 12 months of TB diagnosis. Overall U.S. percentage based on 52 reporting areas (50 states, New York City, and the District of Columbia).
[2]Excludes New York City.
[3]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 48. Tuberculosis Cases and Percentages, by Initial Drug Regimen: Reporting Areas, 2016

Reporting area	Total Cases	Cases in persons alive at diagnosis	Cases with information on initial drug regimen[1]		Percentage of cases in persons with initial drug regimen[2,3]		
			No.	(%)	IR	IRZ	IRZE[3]
United States	**9,272**	**8,968**	**8,872**	**(98.9)**	**(0.4)**	**(1.7)**	**(85.5)**
Alabama	112	109	109	(100.0)	(0)	(2.8)	(89.0)
Alaska	57	56	56	(100.0)	(0)	(1.8)	(85.7)
Arizona	188	185	185	(100.0)	(0.5)	(1.1)	(92.4)
Arkansas	91	84	82	(97.6)	(0)	(1.2)	(95.1)
California	2,062	1,944	1,917	(98.6)	(0.3)	(0.9)	(89.2)
Colorado	64	60	59	(98.3)	(0)	(1.7)	(69.5)
Connecticut	52	52	52	(100.0)	(0)	(1.9)	(19.2)
Delaware	16	16	16	(100.0)	(0)	(0)	(68.8)
District of Columbia	25	25	25	(100.0)	(0)	(0)	(80.0)
Florida	639	622	620	(99.7)	(0.3)	(1.9)	(91.1)
Georgia	302	292	288	(98.6)	(0)	(2.1)	(33.7)
Hawaii	119	115	114	(99.1)	(0)	(0)	(91.2)
Idaho	18	16	16	(100.0)	(0)	(18.8)	(62.5)
Illinois	342	330	324	(98.2)	(0.3)	(4.3)	(85.2)
Indiana	109	108	108	(100.0)	(0)	(0.9)	(91.7)
Iowa	48	44	43	(97.7)	(0)	(0)	(90.7)
Kansas	39	38	36	(94.7)	(0)	(0)	(100.0)
Kentucky	91	88	88	(100.0)	(0)	(0)	(85.2)
Louisiana	127	123	123	(100.0)	(0)	(3.3)	(95.9)
Maine	23	23	23	(100.0)	(0)	(8.7)	(78.3)
Maryland	220	220	220	(100.0)	(0)	(1.8)	(86.4)
Massachusetts	190	184	183	(99.5)	(5.5)	(1.1)	(72.7)
Michigan	133	133	131	(98.5)	(2.3)	(3.8)	(88.5)
Minnesota	168	168	166	(98.8)	(0)	(4.2)	(79.5)
Mississippi	61	59	59	(100.0)	(0)	(10.2)	(72.9)
Missouri	101	96	96	(100.0)	(0)	(1.0)	(80.2)
Montana	4	4	4	(100.0)	(0)	(0)	(75.0)
Nebraska	28	28	28	(100.0)	(0)	(3.6)	(89.3)
Nevada	56	54	54	(100.0)	(1.9)	(1.9)	(87.0)
New Hampshire	15	15	15	(100.0)	(0)	(0)	(66.7)
New Jersey	294	284	281	(98.9)	(0.7)	(3.2)	(87.5)
New Mexico	39	39	38	(97.4)	(0)	(2.6)	(94.7)
New York State[4]	203	199	199	(100.0)	(0.5)	(3.0)	(85.9)
New York City	565	553	546	(98.7)	(0.2)	(1.3)	(86.1)
North Carolina	219	212	212	(100.0)	(0)	(0.9)	(76.9)
North Dakota	22	22	22	(100.0)	(0)	(4.5)	(86.4)
Ohio	140	136	132	(97.1)	(0)	(0)	(75.8)
Oklahoma	78	71	71	(100.0)	(0)	(4.2)	(88.7)
Oregon	70	69	69	(100.0)	(2.9)	(1.4)	(89.9)
Pennsylvania	173	167	165	(98.8)	(0)	(0)	(89.7)
Rhode Island	12	12	12	(100.0)	(0)	(0)	(91.7)
South Carolina	102	98	98	(100.0)	(0)	(3.1)	(88.8)
South Dakota	12	11	11	(100.0)	(0)	(0)	(36.4)
Tennessee	103	100	100	(100.0)	(0)	(2.0)	(78.0)
Texas	1,250	1,230	1,213	(98.6)	(0.4)	(1.2)	(91.6)
Utah	20	20	20	(100.0)	(0)	(0)	(90.0)
Vermont	5	5	5	(100.0)	(20.0)	(0)	(40.0)
Virginia	205	201	200	(99.5)	(0)	(0)	(96.0)
Washington	205	196	189	(96.4)	(0)	(1.1)	(85.7)
West Virginia	14	13	13	(100.0)	(0)	(0)	(84.6)
Wisconsin	40	38	35	(92.1)	(0)	(2.9)	(88.6)
Wyoming	1	1	1	(100.0)	(0)	(0)	(100.0)
American Samoa[5]	1	1	1	(100.0)	(0)	(0)	(100.0)
Fed. States of Micronesia[5]	126	126	126	(100.0)	(0)	(0)	(98.4)
Guam[5]	75	73	72	(98.6)	(0)	(2.8)	(91.7)
Marshall Islands[5]	179	175	174	(99.4)	(0)	(4.6)	(92.0)
N. Mariana Islands[5]	27	27	27	(100.0)	(0)	(22.2)	(7.4)
Puerto Rico[5]	69	64	64	(100.0)	(0)	(15.6)	(76.6)
Republic of Palau[5]	21	21	21	(100.0)	(0)	(0)	(100.0)
U.S. Virgin Islands[5]	0	0	0	...	...	...	...

[1]Includes persons who were alive at diagnosis and started on one or more drug.
[2]Overall U.S. percentage based on 52 reporting areas (50 states, New York City, and the District of Columbia).
[3]I, isoniazid; R, rifampin; Z, pyrazinamide; E, ethambutol. Cases with other drugs prescribed in addition to these regimens are excluded.
[4]Excludes New York City.
[5]Not included in U.S. totals.
Note: Excluding cases with no information on drug regimen, 75 (0.8%) persons were not started on any drugs, 10 (0.1%) were started on one drug, and 1,093 (12.2%) had an initial multiple drug regimen other than IR, IRZ, or IRZE.
Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 49. Culture-Positive Tuberculosis Cases and Percentages with Drug-Susceptibility Results, by Resistance to Isoniazid or Multidrug Resistance: Reporting Areas, 2016

Reporting area	Total culture positive cases	Cases with initial drug-susceptibility testing performed[1]		Resistance[2]			
				Isoniazid[1]		Isoniazid and rifampin[1]	
		No.	(%)	No.	(%)	No.	(%)
United States	**7,177**	**6,939**	**(96.7)**	**639**	**(9.2)**	**97**	**(1.4)**
Alabama	92	91	(98.9)	3	(3.3)	0	(0)
Alaska	45	45	(100.0)	4	(8.9)	0	(0)
Arizona	156	156	(100.0)	21	(13.5)	5	(3.2)
Arkansas	65	64	(98.5)	2	(3.1)	0	(0)
California	1,679	1,633	(97.3)	176	(10.8)	29	(1.8)
Colorado	39	39	(100.0)	3	(7.7)	0	(0)
Connecticut	40	39	(97.5)	2	(5.1)	1	(2.6)
Delaware	15	15	(100.0)	0	(0)	0	(0)
District of Columbia	22	21	(95.5)	2	(9.5)	1	(4.8)
Florida	494	474	(96.0)	45	(9.5)	3	(0.6)
Georgia	219	209	(95.4)	19	(9.1)	3	(1.4)
Hawaii	91	89	(97.8)	10	(11.2)	1	(1.1)
Idaho	13	12	(92.3)	0	(0)	0	(0)
Illinois	256	249	(97.3)	29	(11.6)	3	(1.2)
Indiana	80	80	(100.0)	4	(5.0)	1	(1.3)
Iowa	34	29	(85.3)	4	(13.8)	2	(6.9)
Kansas	35	34	(97.1)	1	(2.9)	0	(0)
Kentucky	62	61	(98.4)	3	(4.9)	0	(0)
Louisiana	109	105	(96.3)	11	(10.5)	0	(0)
Maine	20	20	(100.0)	2	(10.0)	0	(0)
Maryland	164	161	(98.2)	15	(9.3)	2	(1.2)
Massachusetts	131	127	(96.9)	15	(11.8)	3	(2.4)
Michigan	69	69	(100.0)	2	(2.9)	0	(0)
Minnesota	138	136	(98.6)	19	(14.0)	8	(5.9)
Mississippi	49	48	(98.0)	4	(8.3)	2	(4.2)
Missouri	75	71	(94.7)	9	(12.7)	0	(0)
Montana	2	2	(100.0)	0	(0)	0	(0)
Nebraska	20	6	(30.0)	0	(0)	0	(0)
Nevada	41	39	(95.1)	7	(17.9)	0	(0)
New Hampshire	13	13	(100.0)	2	(15.4)	0	(0)
New Jersey	227	211	(93.0)	18	(8.5)	3	(1.4)
New Mexico	34	34	(100.0)	3	(8.8)	0	(0)
New York State[3]	150	147	(98.0)	11	(7.5)	0	(0)
New York City	452	434	(96.0)	43	(9.9)	10	(2.3)
North Carolina	181	180	(99.4)	10	(5.6)	0	(0)
North Dakota	17	0	(0)	0	—	0	—
Ohio	110	110	(100.0)	6	(5.5)	1	(0.9)
Oklahoma	56	55	(98.2)	2	(3.6)	0	(0)
Oregon	51	51	(100.0)	8	(15.7)	1	(2.0)
Pennsylvania	127	122	(96.1)	11	(9.0)	2	(1.6)
Rhode Island	9	9	(100.0)	1	(11.1)	0	(0)
South Carolina	78	76	(97.4)	4	(5.3)	1	(1.3)
South Dakota	11	11	(100.0)	1	(9.1)	0	(0)
Tennessee	80	77	(96.3)	3	(3.9)	1	(1.3)
Texas	934	914	(97.9)	71	(7.8)	10	(1.1)
Utah	17	17	(100.0)	2	(11.8)	1	(5.9)
Vermont	5	5	(100.0)	0	(0)	0	(0)
Virginia	169	167	(98.8)	12	(7.2)	1	(0.6)
Washington	156	144	(92.3)	15	(10.4)	2	(1.4)
West Virginia	10	8	(80.0)	2	(25.0)	0	(0)
Wisconsin	34	29	(85.3)	2	(6.9)	0	(0)
Wyoming	1	1	(100.0)	0	(0)	0	(0)
American Samoa[4]	1	0	(0)	0	—	0	—
Fed. States of Micronesia[4]	33	30	(90.9)	0	(0)	0	(0)
Guam[4]	43	34	(79.1)	7	(20.6)	2	(5.9)
Marshall Islands[4]	67	54	(80.6)	1	(1.9)	0	(0)
N. Mariana Islands[4]	12	8	(66.7)	1	(12.5)	0	(0)
Puerto Rico[4]	44	41	(93.2)	0	(0)	0	(0)
Republic of Palau[4]	15	14	(93.3)	0	(0)	0	(0)
U.S. Virgin Islands[4]	0	0	...	0	...	0	...

[1]Patients tested to at least isoniazid and rifampin.
[2]Isolates may be resistant to other drugs. Overall U.S. percentage based on 52 reporting areas (50 states, New York City, and the District of Columbia).
[3]Excludes New York City.
[4]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 50. Tuberculosis Cases and Percentages, by HIV Status[1]: Reporting Areas, 2016

Reporting area	Total cases	Cases with information on HIV status[2]		Cases in persons with HIV-positive results	
		No.	(%)	No.	(%)
United States	**9,063**	**8,150**	**(89.9)**	**454**	**(5.6)**
Alabama	109	106	(97.2)	3	(2.8)
Alaska	56	51	(91.1)	1	(2.0)
Arizona	185	174	(94.1)	8	(4.6)
Arkansas	84	83	(98.8)	2	(2.4)
California	2,023	1,775	(87.7)	73	(4.1)
Colorado	60	57	(95.0)	1	(1.8)
Connecticut	52	50	(96.2)	1	(2.0)
Delaware	16	16	(100.0)	2	(12.5)
District of Columbia	25	25	(100.0)	7	(28.0)
Florida	622	583	(93.7)	63	(10.8)
Georgia	292	276	(94.5)	30	(10.9)
Hawaii	117	113	(96.6)	0	(0)
Idaho	16	12	(75.0)	0	(0)
Illinois	330	303	(91.8)	10	(3.3)
Indiana	108	101	(93.5)	5	(5.0)
Iowa	47	45	(95.7)	3	(6.7)
Kansas	38	37	(97.4)	0	(0)
Kentucky	88	88	(100.0)	3	(3.4)
Louisiana	125	113	(90.4)	5	(4.4)
Maine	23	19	(82.6)	3	(15.8)
Maryland	220	209	(95.0)	14	(6.7)
Massachusetts	184	83	(45.1)	10	(12.0)
Michigan	133	118	(88.7)	2	(1.7)
Minnesota	168	160	(95.2)	11	(6.9)
Mississippi	59	58	(98.3)	4	(6.9)
Missouri	98	84	(85.7)	3	(3.6)
Montana	4	4	(100.0)	1	(25.0)
Nebraska	28	17	(60.7)	0	(0)
Nevada	55	49	(89.1)	6	(12.2)
New Hampshire	15	15	(100.0)	1	(6.7)
New Jersey	284	223	(78.5)	15	(6.7)
New Mexico	39	36	(92.3)	2	(5.6)
New York State[3]	200	178	(89.0)	9	(5.1)
New York City	553	475	(85.9)	23	(4.8)
North Carolina	212	207	(97.6)	11	(5.3)
North Dakota	22	22	(100.0)	1	(4.5)
Ohio	136	120	(88.2)	5	(4.2)
Oklahoma	71	66	(93.0)	0	(0)
Oregon	69	67	(97.1)	2	(3.0)
Pennsylvania	167	150	(89.8)	13	(8.7)
Rhode Island	12	11	(91.7)	1	(9.1)
South Carolina	98	87	(88.8)	1	(1.1)
South Dakota	11	11	(100.0)	0	(0)
Tennessee	100	96	(96.0)	11	(11.5)
Texas	1,230	1,138	(92.5)	69	(6.1)
Utah	20	20	(100.0)	0	(0)
Vermont	5	0	(0)	0	…
Virginia	201	199	(99.0)	8	(4.0)
Washington	200	173	(86.5)	5	(2.9)
West Virginia	13	12	(92.3)	0	(0)
Wisconsin	39	29	(74.4)	5	(17.2)
Wyoming	1	1	(100.0)	1	(100.0)
American Samoa[4]	1	1	(100.0)	0	(0)
Fed. States of Micronesia[4]	126	68	(54.0)	0	(0)
Guam[4]	74	71	(95.9)	0	(0)
Marshall Islands[4]	175	151	(86.3)	0	(0)
N. Mariana Islands[4]	27	22	(81.5)	0	(0)
Puerto Rico[4]	64	61	(95.3)	6	(9.8)
Republic of Palau[4]	21	20	(95.2)	0	(0)
U.S. Virgin Islands[4]	0	0	...	0	...

[1]Persons not dead at diagnosis.
[2]Includes only those cases in persons with negative, positive, or indeterminate HIV test results.
[3]Excludes New York City.
[4]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.
HIV, human immunodeficiency virus.
See Technical Notes.

This page intentionally left blank

Table 51. Tuberculosis Diagnostic Tests, by Type of Laboratory: Reporting Areas, 2016

Reporting area	Nucleic acid amplification test					Sputum culture					Culture of tissue or other fluids				
	Total[1]	Commercial lab	Public health lab	Other lab	Missing	Total[2]	Commercial lab	Public health lab	Other lab	Missing	Total[3]	Commercial lab	Public health lab	Other lab	Missing
	No.	(%)	(%)	(%)	(%)	No.	(%)	(%)	(%)	(%)	No.	(%)	(%)	(%)	(%)
United States	**5,770**	**(28.6)**	**(50.3)**	**(12.3)**	**(8.8)**	**7,599**	**(26.7)**	**(46.8)**	**(13.4)**	**(13.1)**	**4,432**	**(42.7)**	**(23.8)**	**(22.1)**	**(11.4)**
Alabama	69	(7.2)	(89.9)	(2.9)	(0)	104	(7.7)	(88.5)	(2.9)	(1.0)	37	(24.3)	(45.9)	(24.3)	(5.4)
Alaska	31	(3.2)	(80.6)	(16.1)	(0)	53	(1.9)	(96.2)	(1.9)	(0)	12	(25.0)	(75.0)	(0)	(0)
Arizona	87	(28.7)	(47.1)	(24.1)	(0)	167	(12.6)	(72.5)	(15.0)	(0)	80	(28.8)	(25.0)	(46.3)	(0)
Arkansas	74	(1.4)	(93.2)	(5.4)	(0)	82	(2.4)	(89.0)	(7.3)	(1.2)	42	(23.8)	(26.2)	(47.6)	(2.4)
California	1,319	(41.3)	(40.9)	(16.5)	(1.3)	1,754	(44.4)	(39.3)	(15.3)	(1.0)	891	(54.4)	(18.9)	(24.7)	(2.0)
Colorado	34	(29.4)	(35.3)	(11.8)	(23.5)	50	(18.0)	(28.0)	(6.0)	(48.0)	32	(31.3)	(6.3)	(21.9)	(40.6)
Connecticut	33	(45.5)	(54.5)	(0)	(0)	44	(25.0)	(75.0)	(0)	(0)	33	(48.5)	(51.5)	(0)	(0)
Delaware	11	(9.1)	(27.3)	(63.6)	(0)	12	(16.7)	(50.0)	(33.3)	(0)	10	(30.0)	(20.0)	(50.0)	(0)
District of Columbia	18	(0)	(0)	(100.0)	(0)	23	(0)	(0)	(100.0)	(0)	12	(0)	(0)	(100.0)	(0)
Florida	505	(15.2)	(82.0)	(2.8)	(0)	558	(17.0)	(80.8)	(2.2)	(0)	285	(45.6)	(46.3)	(8.1)	(0)
Georgia	187	(42.8)	(46.0)	(7.0)	(4.3)	250	(22.8)	(66.0)	(10.8)	(0.4)	138	(71.0)	(26.1)	(0)	(2.9)
Hawaii	100	(98.0)	(0)	(1.0)	(1.0)	110	(98.2)	(0)	(1.8)	(0)	45	(97.8)	(0)	(2.2)	(0)
Idaho	12	(16.7)	(83.3)	(0)	(0)	10	(0)	(100.0)	(0)	(0)	9	(11.1)	(66.7)	(22.2)	(0)
Illinois	152	(52.0)	(36.8)	(11.2)	(0)	253	(41.1)	(37.5)	(20.2)	(1.2)	176	(68.8)	(8.5)	(22.7)	(0)
Indiana	55	(20.0)	(56.4)	(23.6)	(0)	84	(11.9)	(65.5)	(22.6)	(0)	42	(40.5)	(14.3)	(45.2)	(0)
Iowa	40	(17.5)	(82.5)	(0)	(0)	37	(8.1)	(91.9)	(0)	(0)	23	(34.8)	(65.2)	(0)	(0)
Kansas	20	(45.0)	(55.0)	(0)	(0)	35	(25.7)	(74.3)	(0)	(0)	17	(64.7)	(35.3)	(0)	(0)
Kentucky	73	(16.4)	(67.1)	(15.1)	(1.4)	88	(9.1)	(80.7)	(10.2)	(0)	50	(22.0)	(40.0)	(38.0)	(0)
Louisiana	78	(41.0)	(50.0)	(5.1)	(3.8)	107	(46.7)	(43.0)	(8.4)	(1.9)	35	(94.3)	(2.9)	(2.9)	(0)
Maine	16	(0)	(93.8)	(6.3)	(0)	18	(0)	(94.4)	(5.6)	(0)	9	(0)	(100.0)	(0)	(0)
Maryland	149	(37.6)	(61.7)	(0.7)	(0)	206	(26.7)	(72.3)	(1.0)	(0)	114	(61.4)	(34.2)	(4.4)	(0)
Massachusetts	109	(14.7)	(45.0)	(0)	(40.4)	125	(27.2)	(33.6)	(0)	(39.2)	124	(35.5)	(37.9)	(0)	(26.6)
Michigan	58	(6.9)	(51.7)	(39.7)	(1.7)	86	(0)	(100.0)	(0)	(0)	55	(16.4)	(50.9)	(32.7)	(0)
Minnesota	91	(65.9)	(30.8)	(3.3)	(0)	119	(59.7)	(40.3)	(0)	(0)	97	(57.7)	(42.3)	(0)	(0)
Mississippi	49	(2.0)	(0)	(55.1)	(42.9)	53	(3.8)	(0)	(60.4)	(35.8)	37	(5.4)	(0)	(73.0)	(21.6)
Missouri	28	(14.3)	(71.4)	(0)	(14.3)	85	(16.5)	(77.6)	(0)	(5.9)	54	(50.0)	(37.0)	(0)	(13.0)
Montana	4	(25.0)	(75.0)	(0)	(0)	4	(25.0)	(75.0)	(0)	(0)	1	(100.0)	(0)	(0)	(0)
Nebraska	13	(23.1)	(46.2)	(23.1)	(7.7)	18	(11.1)	(38.9)	(38.9)	(11.1)	10	(10.0)	(30.0)	(30.0)	(30.0)
Nevada	33	(15.2)	(81.8)	(0)	(3.0)	46	(32.6)	(65.2)	(2.2)	(0)	25	(76.0)	(24.0)	(0)	(0)
New Hampshire	12	(0)	(83.3)	(8.3)	(8.3)	12	(16.7)	(83.3)	(0)	(0)	6	(50.0)	(16.7)	(16.7)	(16.7)
New Jersey	83	(48.2)	(7.2)	(44.6)	(0)	229	(31.0)	(34.5)	(34.1)	(0.4)	150	(43.3)	(1.3)	(55.3)	(0)
New Mexico	20	(40.0)	(60.0)	(0)	(0)	35	(48.6)	(48.6)	(0)	(2.9)	19	(57.9)	(42.1)	(0)	(0)

Table 51. (Con't) Tuberculosis Diagnostic Tests, by Type of Laboratory: Reporting Areas, 2016

Reporting area	Nucleic acid amplification test					Sputum culture					Culture of tissue or other fluids				
	Total[1]	Commercial lab	Public health lab	Other lab	Missing	Total[2]	Commercial lab	Public health lab	Other lab	Missing	Total[3]	Commercial lab	Public health lab	Other lab	Missing
	No.	(%)	(%)	(%)	(%)	No.	(%)	(%)	(%)	(%)	No.	(%)	(%)	(%)	(%)
New York State[4]	127	(17.3)	(37.8)	(10.2)	(34.6)	174	(23.6)	(21.8)	(15.5)	(39.1)	115	(23.5)	(25.2)	(20.9)	(30.4)
New York City	474	(6.3)	(63.7)	(23.8)	(6.1)	495	(12.7)	(7.9)	(49.5)	(29.9)	281	(6.8)	(3.9)	(56.9)	(32.4)
North Carolina	120	(40.0)	(60.0)	(0)	(0)	185	(20.5)	(55.1)	(24.3)	(0)	124	(40.3)	(12.1)	(46.8)	(0.8)
North Dakota	9	(66.7)	(33.3)	(0)	(0)	19	(63.2)	(36.8)	(0)	(0)	12	(58.3)	(33.3)	(0)	(8.3)
Ohio	76	(78.9)	(21.1)	(0)	(0)	109	(78.9)	(21.1)	(0)	(0)	93	(89.2)	(10.8)	(0)	(0)
Oklahoma	53	(7.5)	(84.9)	(7.5)	(0)	55	(3.6)	(94.5)	(1.8)	(0)	27	(11.1)	(77.8)	(11.1)	(0)
Oregon	49	(8.2)	(42.9)	(40.8)	(8.2)	55	(9.1)	(45.5)	(29.1)	(16.4)	33	(9.1)	(30.3)	(48.5)	(12.1)
Pennsylvania	72	(15.3)	(62.5)	(9.7)	(12.5)	127	(26.8)	(59.1)	(9.4)	(4.7)	109	(50.5)	(20.2)	(25.7)	(3.7)
Rhode Island	10	(40.0)	(60.0)	(0)	(0)	9	(0)	(100.0)	(0)	(0)	8	(25.0)	(75.0)	(0)	(0)
South Carolina	60	(13.3)	(71.7)	(15.0)	(0)	71	(15.5)	(76.1)	(8.5)	(0)	48	(41.7)	(25.0)	(33.3)	(0)
South Dakota	11	(0)	(90.9)	(9.1)	(0)	11	(0)	(100.0)	(0)	(0)	4	(0)	(100.0)	(0)	(0)
Tennessee	63	(47.6)	(50.8)	(1.6)	(0)	93	(20.4)	(66.7)	(12.9)	(0)	50	(52.0)	(32.0)	(16.0)	(0)
Texas	823	(13.2)	(41.4)	(8.7)	(36.6)	946	(5.4)	(23.7)	(5.1)	(65.9)	619	(17.6)	(25.5)	(14.1)	(42.8)
Utah	10	(70.0)	(30.0)	(0)	(0)	17	(52.9)	(47.1)	(0)	(0)	8	(100.0)	(0)	(0)	(0)
Vermont	4	(50.0)	(50.0)	(0)	(0)	4	(50.0)	(25.0)	(25.0)	(0)	2	(50.0)	(0)	(50.0)	(0)
Virginia	71	(31.0)	(49.3)	(19.7)	(0)	185	(15.1)	(74.1)	(9.2)	(1.6)	102	(37.3)	(38.2)	(22.5)	(2.0)
Washington	137	(50.4)	(39.4)	(3.6)	(6.6)	149	(42.3)	(47.7)	(4.0)	(6.0)	98	(91.8)	(2.0)	(1.0)	(5.1)
West Virginia	7	(42.9)	(57.1)	(0)	(0)	10	(0)	(100.0)	(0)	(0)	5	(80.0)	(0)	(20.0)	(0)
Wisconsin	30	(13.3)	(83.3)	(0)	(3.3)	27	(22.2)	(70.4)	(0)	(7.4)	24	(29.2)	(41.7)	(0)	(29.2)
Wyoming	1	(0)	(100.0)	(0)	(0)	1	(0)	(0)	(100.0)	(0)	0	...	...	...	...
American Samoa[5]	0	...	...	...	...	1	(0)	(100.0)	(0)	(0)	0	...	...	...	...
Fed. States of Micronesia[5]	26	(92.3)	(3.8)	(3.8)	(0)	87	(96.6)	(2.3)	(0)	(1.1)	12	(100.0)	(0)	(0)	(0)
Guam[5]	54	(33.3)	(55.6)	(1.9)	(9.3)	53	(77.4)	(13.2)	(1.9)	(7.5)	5	(20.0)	(20.0)	(20.0)	(40.0)
Marshall Islands[5]	112	(16.1)	(76.8)	(4.5)	(2.7)	120	(95.8)	(1.7)	(1.7)	(0.8)	3	(100.0)	(0)	(0)	(0)
N. Mariana Islands[5]	22	(0)	(100.0)	(0)	(0)	20	(95.0)	(0)	(5.0)	(0)	0	...	...	...	...
Puerto Rico[5]	27	(0)	(100.0)	(0)	(0)	59	(5.1)	(94.9)	(0)	(0)	16	(12.5)	(87.5)	(0)	(0)
Republic of Palau[5]	19	(5.3)	(94.7)	(0)	(0)	17	(100.0)	(0)	(0)	(0)	0	...	...	...	...
U.S. Virgin Islands[5]	0	...	...	...	...	0	...	...	...	...	0	...	...	...	...

[1]Nunber of patients with positive or negative NAA test results.
[2]Number of patients with positive or negative sputum culture test results.
[3]Number of patients with positive or negative culture of tissue and other body fluid test results.
[4]Excludes New York City.
[5]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 52. Tuberculosis Genotyping Surveillance Coverage[1]: Reporting Areas, 2016

Reporting area	Total cases	Culture positive cases	Genotyped cases	Genotype surveillance coverage[2]
		No.	No.	(%)
United States	**9,272**	**7,162**	**6,903**	**(96.4)**
Alabama	112	92	91	(98.9)
Alaska	57	45	45	(100.0)
Arizona	188	155	154	(99.4)
Arkansas	91	65	65	(100.0)
California	2,062	1,679	1,618	(96.4)
Colorado	64	39	39	(100.0)
Connecticut	52	40	39	(97.5)
District of Columbia	25	22	21	(95.5)
Delaware	16	15	15	(100.0)
Florida	639	494	491	(99.4)
Georgia	302	215	213	(99.1)
Hawaii	119	91	90	(98.9)
Idaho	18	13	13	(100.0)
Illinois	342	256	244	(95.3)
Indiana	109	80	80	(100.0)
Iowa	48	34	34	(100.0)
Kansas	39	35	35	(100.0)
Kentucky	91	62	60	(96.8)
Louisiana	127	109	77	(70.6)
Maine	23	20	20	(100.0)
Maryland	220	164	160	(97.6)
Massachusetts	190	130	127	(97.7)
Michigan	133	69	69	(100.0)
Minnesota	168	138	138	(100.0)
Mississippi	61	49	49	(100.0)
Missouri	101	70	66	(94.3)
Montana	4	2	2	(100.0)
Nebraska	28	20	15	(75.0)
Nevada	56	41	39	(95.1)
New Hampshire	15	13	12	(92.3)
New Jersey	294	227	218	(96.0)
New Mexico	39	34	34	(100.0)
New York[3]	768	602	545	(90.5)
North Carolina	219	181	180	(99.4)
North Dakota	22	16	16	(100.0)
Ohio	140	110	106	(96.4)
Oklahoma	78	56	55	(98.2)
Oregon	70	51	50	(98.0)
Pennsylvania	173	127	123	(96.9)
Rhode Island	12	9	9	(100.0)
South Carolina	102	78	75	(96.2)
South Dakota	12	11	11	(100.0)
Tennessee	103	80	75	(93.8)
Texas	1,250	932	906	(97.2)
Utah	20	17	17	(100.0)
Vermont	5	5	5	(100.0)
Virginia	205	169	164	(97.0)
Washington	205	155	153	(98.7)
West Virginia	14	10	10	(100.0)
Wisconsin	40	34	29	(85.3)
Wyoming	1	1	1	(100.0)
American Samoa[4]	1	1	0	(0)
Fed State of Micronesia[4]	126	33	31	(93.9)
Guam[4]	75	43	39	(90.7)
Marshall Islands[4]	179	67	61	(91.0)
N. Mariana Islands[4]	27	12	10	(83.3)
Puerto Rico[4]	69	44	41	(93.2)
Republic of Palau[4]	21	15	14	(93.3)
U.S. Virgin Islands[4]	0	0	0	...

[1]Genotype surveillance coverage is defined as the percentage of all culture positive tuberculosis (TB) cases for which there was a genotyped isolate.
[2]National TB Performance Indicator goal for national TB genotyping surveillance coverage is 94.0%.
[3]Includes New York City.
[4]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.
See Technical Notes.

Morbidity Tables
Reporting Areas, 2014

Table 53. Tuberculosis Cases and Percentages, by Type of Health Care Provider: Reporting Areas, 2014[1]

Reporting area	Total cases	Cases in persons alive at diagnosis	Cases with information on type of health care provider		Percentage of cases by type of health care provider[2]		
			No.	(%)	Health department	Private/other	Both health department and private/other
United States	**9,398**	**9,203**	**9,042**	**(98.3)**	**(65.4)**	**(23.9)**	**(10.7)**
Alabama	133	128	128	(100.0)	(64.1)	(25.0)	(10.9)
Alaska	62	61	61	(100.0)	(14.8)	(6.6)	(78.7)
Arizona	193	190	189	(99.5)	(62.4)	(37.6)	(0)
Arkansas	93	91	89	(97.8)	(89.9)	(4.5)	(5.6)
California	2,130	2,090	2,072	(99.1)	(55.1)	(36.3)	(8.6)
Colorado	64	64	64	(100.0)	(93.8)	(6.3)	(0)
Connecticut	60	60	60	(100.0)	(16.7)	(21.7)	(61.7)
Delaware	21	21	18	(85.7)	(88.9)	(5.6)	(5.6)
District of Columbia	32	30	30	(100.0)	(90.0)	(6.7)	(3.3)
Florida	595	580	559	(96.4)	(62.6)	(25.4)	(12.0)
Georgia	334	326	319	(97.9)	(81.8)	(7.2)	(11.0)
Hawaii	136	134	134	(100.0)	(86.6)	(9.0)	(4.5)
Idaho	11	10	7	(70.0)	(71.4)	(28.6)	(0)
Illinois	319	311	309	(99.4)	(39.2)	(21.7)	(39.2)
Indiana	108	106	106	(100.0)	(62.3)	(22.6)	(15.1)
Iowa	54	53	53	(100.0)	(0)	(98.1)	(1.9)
Kansas	40	39	39	(100.0)	(94.9)	(2.6)	(2.6)
Kentucky	80	77	76	(98.7)	(86.8)	(9.2)	(3.9)
Louisiana	121	118	117	(99.2)	(74.4)	(9.4)	(16.2)
Maine	14	14	14	(100.0)	(7.1)	(0)	(92.9)
Maryland	198	194	189	(97.4)	(93.7)	(3.7)	(2.6)
Massachusetts	199	196	182	(92.9)	(78.0)	(18.7)	(3.3)
Michigan	105	104	101	(97.1)	(82.2)	(17.8)	(0)
Minnesota	147	147	147	(100.0)	(47.6)	(48.3)	(4.1)
Mississippi	74	72	69	(95.8)	(92.8)	(5.8)	(1.4)
Missouri	79	78	62	(79.5)	(83.9)	(16.1)	(0)
Montana	6	6	6	(100.0)	(16.7)	(66.7)	(16.7)
Nebraska	38	38	29	(76.3)	(10.3)	(31.0)	(58.6)
Nevada	74	74	68	(91.9)	(92.6)	(5.9)	(1.5)
New Hampshire	11	11	11	(100.0)	(18.2)	(54.5)	(27.3)
New Jersey	307	299	299	(100.0)	(69.6)	(18.7)	(11.7)
New Mexico	50	45	40	(88.9)	(65.0)	(32.5)	(2.5)
New York State[3]	202	198	191	(96.5)	(69.1)	(22.0)	(8.9)
New York City	582	570	570	(100.0)	(48.1)	(41.8)	(10.2)
North Carolina	195	192	192	(100.0)	(76.0)	(7.8)	(16.1)
North Dakota	15	15	15	(100.0)	(13.3)	(86.7)	(0)
Ohio	156	149	149	(100.0)	(79.2)	(20.8)	(0)
Oklahoma	59	59	59	(100.0)	(71.2)	(3.4)	(25.4)
Oregon	77	75	75	(100.0)	(41.3)	(40.0)	(18.7)
Pennsylvania	208	203	203	(100.0)	(78.8)	(15.3)	(5.9)
Rhode Island	21	21	19	(90.5)	(84.2)	(5.3)	(10.5)
South Carolina	79	78	77	(98.7)	(85.7)	(13.0)	(1.3)
South Dakota	8	7	7	(100.0)	(42.9)	(57.1)	(0)
Tennessee	151	149	148	(99.3)	(93.9)	(4.1)	(2.0)
Texas	1,269	1,243	1,240	(99.8)	(78.1)	(17.3)	(4.6)
Utah	31	29	29	(100.0)	(93.1)	(6.9)	(0)
Vermont	2	2	2	(100.0)	(0)	(0)	(100.0)
Virginia	198	193	186	(96.4)	(72.6)	(7.5)	(19.9)
Washington	194	190	182	(95.8)	(58.8)	(23.6)	(17.6)
West Virginia	13	13	2	(15.4)	(100.0)	(0)	(0)
Wisconsin	48	48	48	(100.0)	(0)	(0)	(100.0)
Wyoming	2	2	1	(50.0)	(0)	(100.0)	(0)
American Samoa[4]	1	1	0	(0)	...	...	...
Fed. States of Micronesia[4]	170	167	164	(98.2)	(100.0)	(0)	(0)
Guam[4]	56	56	55	(98.2)	(96.4)	(3.6)	(0)
Marshall Islands[4]	152	149	146	(98.0)	(99.3)	(0.7)	(0)
N. Mariana Islands[4]	25	25	10	(40.0)	(100.0)	(0)	(0)
Puerto Rico[4]	44	44	44	(100.0)	(72.7)	(20.5)	(6.8)
Republic of Palau[4]	14	14	13	(92.9)	(92.3)	(7.7)	(0)
U.S. Virgin Islands[4]	0	0	0	...	...	...	...

[1]Most recent year for which data are available.

[2]Health department: all outpatient care provided by the state or local health department; private/other: all care (except contact investigation and dispensing of medication) provided by non-health department providers; both health department and private/other: both sectors involved in the care of the patient. Percentage for U.S. based on 52 reporting areas (50 states, New York City, and the District of Columbia).

[3]Excludes New York City.

[4]Not included in U.S. totals.

Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 54. Tuberculosis Cases and Percentages, by Directly Observed Therapy (DOT): Reporting Areas, 2014[1]

Reporting area	Total cases	Cases with initial drug regimen prescribed[2]	Cases with information on directly observed therapy		Percentage of Cases by directly observed therapy[3]	
			No.	(%)	DOT Only	Both DOT and self-sdministered
United States	**9,398**	**9,163**	**9,064**	**(98.9)**	**(63.9)**	**(29.0)**
Alabama	133	128	128	(100.0)	(53.1)	(43.0)
Alaska	62	61	61	(100.0)	(98.4)	(1.6)
Arizona	193	190	188	(98.9)	(81.9)	(16.0)
Arkansas	93	90	86	(95.6)	(22.1)	(70.9)
California	2,130	2,076	2,058	(99.1)	(50.4)	(41.0)
Colorado	64	64	64	(100.0)	(75.0)	(20.3)
Connecticut	60	60	60	(100.0)	(23.3)	(60.0)
Delaware	21	21	20	(95.2)	(60.0)	(40.0)
District of Columbia	32	30	30	(100.0)	(80.0)	(13.3)
Florida	595	576	562	(97.6)	(17.8)	(80.4)
Georgia	334	324	318	(98.1)	(88.4)	(10.4)
Hawaii	136	134	134	(100.0)	(91.8)	(3.7)
Idaho	11	10	9	(90.0)	(44.4)	(33.3)
Illinois	319	309	305	(98.7)	(50.5)	(32.5)
Indiana	108	106	106	(100.0)	(95.3)	(3.8)
Iowa	54	53	52	(98.1)	(69.2)	(23.1)
Kansas	40	39	39	(100.0)	(97.4)	(2.6)
Kentucky	80	77	77	(100.0)	(96.1)	(3.9)
Louisiana	121	118	115	(97.5)	(59.1)	(21.7)
Maine	14	14	14	(100.0)	(64.3)	(21.4)
Maryland	198	194	191	(98.5)	(71.2)	(28.8)
Massachusetts	199	196	194	(99.0)	(58.8)	(26.8)
Michigan	105	103	102	(99.0)	(59.8)	(40.2)
Minnesota	147	146	146	(100.0)	(72.6)	(25.3)
Mississippi	74	72	70	(97.2)	(71.4)	(28.6)
Missouri	79	75	72	(96.0)	(29.2)	(68.1)
Montana	6	6	6	(100.0)	(83.3)	(16.7)
Nebraska	38	38	34	(89.5)	(55.9)	(41.2)
Nevada	74	74	74	(100.0)	(91.9)	(8.1)
New Hampshire	11	11	11	(100.0)	(54.5)	(45.5)
New Jersey	307	297	289	(97.3)	(51.6)	(26.3)
New Mexico	50	45	45	(100.0)	(88.9)	(6.7)
New York State[4]	202	198	197	(99.5)	(17.3)	(78.7)
New York City	582	569	555	(97.5)	(55.9)	(17.8)
North Carolina	195	192	192	(100.0)	(98.4)	(1.6)
North Dakota	15	15	14	(93.3)	(21.4)	(71.4)
Ohio	156	149	149	(100.0)	(63.1)	(25.5)
Oklahoma	59	59	59	(100.0)	(10.2)	(89.8)
Oregon	77	75	75	(100.0)	(88.0)	(10.7)
Pennsylvania	208	203	203	(100.0)	(70.9)	(24.1)
Rhode Island	21	20	20	(100.0)	(5.0)	(95.0)
South Carolina	79	78	77	(98.7)	(83.1)	(11.7)
South Dakota	8	7	7	(100.0)	(57.1)	(42.9)
Tennessee	151	149	149	(100.0)	(97.3)	(2.7)
Texas	1,269	1,236	1,235	(99.9)	(93.5)	(5.3)
Utah	31	29	29	(100.0)	(100.0)	(0)
Vermont	2	2	2	(100.0)	(0)	(100.0)
Virginia	198	193	190	(98.4)	(87.9)	(10.0)
Washington	194	189	188	(99.5)	(68.6)	(16.5)
West Virginia	13	13	13	(100.0)	(100.0)	(0)
Wisconsin	48	48	48	(100.0)	(87.5)	(12.5)
Wyoming	2	2	2	(100.0)	(50.0)	(50.0)
American Samoa[5]	1	1	1	(100.0)	(100.0)	(0)
Fed. States of Micronesia[5]	170	166	165	(99.4)	(95.8)	(4.2)
Guam[5]	56	56	55	(98.2)	(98.2)	(1.8)
Marshall Islands[5]	152	149	149	(100.0)	(84.6)	(14.8)
N. Mariana Islands[5]	25	17	8	(47.1)	(100.0)	(0)
Puerto Rico[5]	44	44	43	(97.7)	(62.8)	(2.3)
Republic of Palau[5]	14	14	13	(92.9)	(53.8)	(38.5)
U.S. Virgin Islands[5]	0	0	0	...	...	...

[1]Most recent year for which data are available.
[2]Includes persons alive at diagnosis with an initial drug regimen of one or more drugs prescribed.
[3]Percentage for U.S. based on 52 reporting areas (50 states, New York City, and the District of Columbia).
[4]Excludes New York City.
[5]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

This page intentionally left blank

Table 55. Tuberculosis Cases and Percentages, by Reason Therapy Was Stopped: Reporting Areas, 2014[1]

Reporting area	Cases with initial drug regimen prescribed[2]	Completed therapy		Did not complete therapy									
				Adverse event		Lost		Refused		Died[3]		Unknown[4]	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
United States	**9,163**	**8,119**	**(88.6)**	**18**	**(0.2)**	**83**	**(0.9)**	**83**	**(0.9)**	**568**	**(6.2)**	**292**	**(3.2)**
Alabama	128	117	(91.4)	0	(0)	2	(1.6)	0	(0)	9	(7.0)	0	(0)
Alaska	61	56	(91.8)	0	(0)	0	(0)	0	(0)	4	(6.6)	1	(1.6)
Arizona	190	154	(81.1)	0	(0)	1	(0.5)	1	(0.5)	16	(8.4)	18	(9.5)
Arkansas	90	77	(85.6)	0	(0)	0	(0)	6	(6.7)	5	(5.6)	2	(2.2)
California	2,076	1,825	(87.9)	7	(0.3)	15	(0.7)	19	(0.9)	150	(7.2)	60	(2.9)
Colorado	64	59	(92.2)	0	(0)	0	(0)	0	(0)	4	(6.3)	1	(1.6)
Connecticut	60	58	(96.7)	0	(0)	0	(0)	0	(0)	2	(3.3)	0	(0)
Delaware	21	19	(90.5)	0	(0)	0	(0)	0	(0)	1	(4.8)	1	(4.8)
District of Columbia	30	28	(93.3)	0	(0)	0	(0)	0	(0)	1	(3.3)	1	(3.3)
Florida	576	522	(90.6)	0	(0)	3	(0.5)	0	(0)	23	(4.0)	28	(4.9)
Georgia	324	285	(88.0)	1	(0.3)	8	(2.5)	2	(0.6)	24	(7.4)	4	(1.2)
Hawaii	134	127	(94.8)	0	(0)	1	(0.7)	0	(0)	3	(2.2)	3	(2.2)
Idaho	10	8	(80.0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(20.0)
Illinois	309	281	(90.9)	2	(0.6)	2	(0.6)	4	(1.3)	17	(5.5)	3	(1.0)
Indiana	106	98	(92.5)	0	(0)	0	(0)	1	(0.9)	7	(6.6)	0	(0)
Iowa	53	50	(94.3)	0	(0)	0	(0)	1	(1.9)	1	(1.9)	1	(1.9)
Kansas	39	36	(92.3)	0	(0)	0	(0)	0	(0)	3	(7.7)	0	(0)
Kentucky	77	67	(87.0)	0	(0)	0	(0)	1	(1.3)	8	(10.4)	1	(1.3)
Louisiana	118	100	(84.7)	0	(0)	4	(3.4)	4	(3.4)	6	(5.1)	4	(3.4)
Maine	14	12	(85.7)	0	(0)	1	(7.1)	1	(7.1)	0	(0)	0	(0)
Maryland	194	173	(89.2)	1	(0.5)	2	(1.0)	0	(0)	14	(7.2)	4	(2.1)
Massachusetts	196	185	(94.4)	0	(0)	0	(0)	0	(0)	4	(2.0)	7	(3.6)
Michigan	103	90	(87.4)	0	(0)	1	(1.0)	2	(1.9)	10	(9.7)	0	(0)
Minnesota	146	134	(91.8)	0	(0)	0	(0)	3	(2.1)	6	(4.1)	3	(2.1)
Mississippi	72	56	(77.8)	0	(0)	0	(0)	0	(0)	10	(13.9)	6	(8.3)
Missouri	75	57	(76.0)	0	(0)	3	(4.0)	2	(2.7)	5	(6.7)	8	(10.7)
Montana	6	3	(50.0)	0	(0)	0	(0)	0	(0)	3	(50.0)	0	(0)
Nebraska	38	25	(65.8)	0	(0)	2	(5.3)	4	(10.5)	1	(2.6)	6	(15.8)
Nevada	74	67	(90.5)	1	(1.4)	1	(1.4)	0	(0)	5	(6.8)	0	(0)
New Hampshire	11	11	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
New Jersey	297	262	(88.2)	0	(0)	2	(0.7)	4	(1.3)	13	(4.4)	16	(5.4)
New Mexico	45	38	(84.4)	1	(2.2)	0	(0)	0	(0)	5	(11.1)	1	(2.2)

Table 55. (Con't) Tuberculosis Cases and Percentages, by Reason Therapy Was Stopped: Reporting Areas, 2014[1]

Reporting area	Cases with initial drug regimen prescribed[2]	Completed therapy		Did not complete therapy									
				Adverse event		Lost		Refused		Died[3]		Unknown[4]	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
New York State[5]	198	174	(87.9)	0	(0)	2	(1.0)	3	(1.5)	13	(6.6)	6	(3.0)
New York City	569	508	(89.3)	0	(0)	4	(0.7)	5	(0.9)	39	(6.9)	13	(2.3)
North Carolina	192	178	(92.7)	0	(0)	1	(0.5)	0	(0)	13	(6.8)	0	(0)
North Dakota	15	13	(86.7)	0	(0)	0	(0)	0	(0)	0	(0)	2	(13.3)
Ohio	149	128	(85.9)	2	(1.3)	1	(0.7)	2	(1.3)	11	(7.4)	5	(3.4)
Oklahoma	59	55	(93.2)	0	(0)	2	(3.4)	0	(0)	2	(3.4)	0	(0)
Oregon	75	64	(85.3)	0	(0)	1	(1.3)	0	(0)	6	(8.0)	4	(5.3)
Pennsylvania	203	170	(83.7)	1	(0.5)	1	(0.5)	2	(1.0)	22	(10.8)	7	(3.4)
Rhode Island	20	18	(90.0)	1	(5.0)	0	(0)	1	(5.0)	0	(0)	0	(0)
South Carolina	78	70	(89.7)	0	(0)	1	(1.3)	0	(0)	6	(7.7)	1	(1.3)
South Dakota	7	6	(85.7)	0	(0)	0	(0)	0	(0)	1	(14.3)	0	(0)
Tennessee	149	134	(89.9)	1	(0.7)	0	(0)	0	(0)	12	(8.1)	2	(1.3)
Texas	1,236	1,082	(87.5)	0	(0)	19	(1.5)	15	(1.2)	65	(5.3)	55	(4.4)
Utah	29	26	(89.7)	0	(0)	0	(0)	0	(0)	2	(6.9)	1	(3.4)
Vermont	2	2	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Virginia	193	183	(94.8)	0	(0)	0	(0)	0	(0)	5	(2.6)	5	(2.6)
Washington	189	171	(90.5)	0	(0)	3	(1.6)	0	(0)	6	(3.2)	9	(4.8)
West Virginia	13	13	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Wisconsin	48	42	(87.5)	0	(0)	0	(0)	0	(0)	5	(10.4)	1	(2.1)
Wyoming	2	2	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
American Samoa[6]	1	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Fed. States of Micronesia[6]	166	152	(91.6)	1	(0.6)	0	(0)	2	(1.2)	3	(1.8)	8	(4.8)
Guam[6]	56	50	(89.3)	1	(1.8)	0	(0)	0	(0)	2	(3.6)	3	(5.4)
Marshall Islands[6]	149	131	(87.9)	0	(0)	7	(4.7)	0	(0)	10	(6.7)	1	(0.7)
N. Mariana Islands[6]	17	11	(64.7)	0	(0)	3	(17.6)	0	(0)	2	(11.8)	1	(5.9)
Puerto Rico[6]	44	31	(70.5)	0	(0)	0	(0)	2	(4.5)	10	(22.7)	1	(2.3)
Republic of Palau[6]	14	8	(57.1)	0	(0)	2	(14.3)	0	(0)	2	(14.3)	2	(14.3)
U.S. Virgin Islands[6]	0	0	...	0	...	0	...	0	...	0	...	0	...

[1]Most recent year for which data are available.
[2]Number of cases in persons alive at diagnosis, with an initial regimen of one or more drugs prescribed. Percentage for U.S. based on 52 reporting areas (50 states, New York City, and the District of Columbia).
[3]Died = died of any cause.
[4]Includes cases reported as other, missing, and unknown.
[5]Excludes New York City.
[6]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 56. Reason Therapy Was Extended Beyond 12 Months: Reporting Areas, 2014[1]

Reporting area	Total cases with therapy extended[2,3]	Reasons therapy was extended											
		Rifampin resistant		Adverse event		Nonadherence		Treatment failure		Clinically indicated		Other	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
United States	**825**	**70**	**(8.5)**	**153**	**(18.5)**	**86**	**(10.4)**	**11**	**(1.3)**	**341**	**(41.3)**	**291**	**(35.3)**
Alabama	8	1	(12.5)	0	(0)	0	(0)	1	(12.5)	4	(50.0)	2	(25.0)
Alaska	4	1	(25.0)	0	(0)	2	(50.0)	1	(25.0)	1	(25.0)	2	(50.0)
Arizona	26	4	(15.4)	2	(7.7)	5	(19.2)	0	(0)	16	(61.5)	3	(11.5)
Arkansas	13	0	(0)	2	(15.4)	4	(30.8)	2	(15.4)	3	(23.1)	2	(15.4)
California	233	16	(6.9)	51	(21.9)	21	(9.0)	0	(0)	112	(48.1)	73	(31.3)
Colorado	4	1	(25.0)	0	(0)	1	(25.0)	0	(0)	2	(50.0)	0	(0)
Connecticut	5	0	(0)	1	(20.0)	0	(0)	0	(0)	3	(60.0)	5	(100.0)
Delaware	2	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(100.0)
District of Columbia	3	0	(0)	1	(33.3)	0	(0)	0	(0)	2	(66.7)	0	(0)
Florida	40	8	(20.0)	4	(10.0)	4	(10.0)	0	(0)	24	(60.0)	2	(5.0)
Georgia	26	1	(3.8)	5	(19.2)	1	(3.8)	0	(0)	10	(38.5)	13	(50.0)
Hawaii	2	1	(50.0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(100.0)
Idaho	1	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Illinois	30	1	(3.3)	4	(13.3)	3	(10.0)	0	(0)	14	(46.7)	12	(40.0)
Indiana	11	2	(18.2)	0	(0)	1	(9.1)	0	(0)	7	(63.6)	2	(18.2)
Iowa	3	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	3	(100.0)
Kansas	3	1	(33.3)	1	(33.3)	0	(0)	0	(0)	1	(33.3)	1	(33.3)
Kentucky	5	2	(40.0)	2	(40.0)	1	(20.0)	0	(0)	3	(60.0)	1	(20.0)
Louisiana	17	0	(0)	4	(23.5)	1	(5.9)	2	(11.8)	1	(5.9)	11	(64.7)
Maine	1	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)	1	(100.0)
Maryland	21	1	(4.8)	5	(23.8)	5	(23.8)	0	(0)	4	(19.0)	9	(42.9)
Massachusetts	30	2	(6.7)	3	(10.0)	0	(0)	0	(0)	10	(33.3)	15	(50.0)
Michigan	2	0	(0)	1	(50.0)	0	(0)	0	(0)	1	(50.0)	1	(50.0)
Minnesota	11	1	(9.1)	6	(54.5)	0	(0)	0	(0)	8	(72.7)	0	(0)
Mississippi	7	0	(0)	0	(0)	0	(0)	1	(14.3)	0	(0)	6	(85.7)
Missouri	3	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	3	(100.0)
Montana	0	0	…	0	…	0	…	0	…	0	…	0	…
Nebraska	1	0	(0)	1	(100.0)	1	(100.0)	0	(0)	0	(0)	0	(0)
Nevada	4	0	(0)	4	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)
New Hampshire	0	0	…	0	…	0	…	0	…	0	…	0	…
New Jersey	28	4	(14.3)	7	(25.0)	2	(7.1)	0	(0)	10	(35.7)	13	(46.4)
New Mexico	2	0	(0)	0	(0)	0	(0)	0	(0)	1	(50.0)	1	(50.0)

Table 56. (Con't) Reason Therapy Was Extended Beyond 12 Months: Reporting Areas, 2014[1]

Reporting area	Total cases with therapy extended[2,3]	Reasons therapy was extended											
		Rifampin resistant		Adverse event		Nonadherence		Treatment failure		Clinically indicated		Other	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
New York State[4]	14	0	(0)	2	(14.3)	1	(7.1)	0	(0)	0	(0)	11	(78.6)
New York City	28	3	(10.7)	7	(25.0)	5	(17.9)	2	(7.1)	3	(10.7)	8	(28.6)
North Carolina	9	1	(11.1)	3	(33.3)	0	(0)	0	(0)	4	(44.4)	4	(44.4)
North Dakota	4	1	(25.0)	0	(0)	0	(0)	0	(0)	3	(75.0)	1	(25.0)
Ohio	14	1	(7.1)	5	(35.7)	3	(21.4)	0	(0)	5	(35.7)	0	(0)
Oklahoma	4	0	(0)	1	(25.0)	0	(0)	0	(0)	2	(50.0)	1	(25.0)
Oregon	3	1	(33.3)	2	(66.7)	0	(0)	0	(0)	0	(0)	0	(0)
Pennsylvania	33	2	(6.1)	21	(63.6)	4	(12.1)	2	(6.1)	18	(54.5)	9	(27.3)
Rhode Island	2	2	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
South Carolina	2	0	(0)	0	(0)	0	(0)	0	(0)	1	(50.0)	1	(50.0)
South Dakota	1	0	(0)	1	(100.0)	0	(0)	0	(0)	0	(0)	0	(0)
Tennessee	8	1	(12.5)	1	(12.5)	2	(25.0)	0	(0)	3	(37.5)	1	(12.5)
Texas	122	5	(4.1)	0	(0)	13	(10.7)	0	(0)	54	(44.3)	55	(45.1)
Utah	1	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)
Vermont	0	0	…	0	…	0	…	0	…	0	…	0	…
Virginia	15	3	(20.0)	3	(20.0)	3	(20.0)	0	(0)	5	(33.3)	5	(33.3)
Washington	12	1	(8.3)	0	(0)	3	(25.0)	0	(0)	1	(8.3)	7	(58.3)
West Virginia	1	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)	0	(0)
Wisconsin	6	1	(16.7)	2	(33.3)	0	(0)	0	(0)	3	(50.0)	3	(50.0)
Wyoming	0	0	…	0	…	0	…	0	…	0	…	0	…
American Samoa[5]	0	0	…	0	…	0	…	0	…	0	…	0	…
Fed. States of Micronesia[5]	1	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)
Guam[5]	1	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)
Marshall Islands[5]	3	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	3	(100.0)
N. Mariana Islands[5]	0	0	…	0	…	0	…	0	…	0	…	0	…
Puerto Rico[5]	2	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	2	(100.0)
Republic of Palau[5]	1	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	1	(100.0)
U.S. Virgin Islands[5]	0	0	…	0	…	0	…	0	…	0	…	0	…

[1]Most recent year for which data are available.
[2]Among patients who were alive at diagnosis, started on treatment and had a duration of treatment >365 days.
[3]Patient may have more than one reason therapy was extended beyond 12 months (total reasons therapy extended may be greater than total patients with therapy extended).
[4]Excludes New York City.
[5]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 57. Completion of Tuberculosis Therapy (COT) Cases and Percentages, by Hispanic Ethnicity and Non-Hispanic Race: Reporting Areas, 2014[1]

Reporting area	Total cases[2]	Hispanic[3]		Non-Hispanic													
				American Indian/ Alaska Native		Asian		Black/African American		Native Hawaiian/ Other Pacific Islander		White		Multiple race[4]		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
United States	**7,720**	**2231**	**(90.3)**	**93**	**(91.4)**	**2562**	**(91.3)**	**1661**	**(89.0)**	**81**	**(87.7)**	**1003**	**(88.6)**	**67**	**(91.0)**	**22**	**(68.2)**
Alabama	112	10	(100.0)	0	...	11	(100.0)	59	(89.8)	1	(100.0)	31	(96.8)	0	...	0	...
Alaska	54	0	...	43	(93.0)	9	(100.0)	0	...	1	(100.0)	1	(100.0)	0	...	0	...
Arizona	130	69	(82.6)	9	(77.8)	23	(95.7)	16	(100.0)	0	...	13	(84.6)	0	...	0	...
Arkansas	80	9	(88.9)	1	(100.0)	8	(75.0)	18	(72.2)	22	(72.7)	22	(77.3)	0	...	0	...
California	1,745	632	(89.1)	2	(100.0)	874	(88.4)	100	(85.0)	10	(100.0)	122	(85.2)	4	(75.0)	1	(100.0)
Colorado	52	8	(87.5)	0	...	21	(95.2)	15	(100.0)	1	(100.0)	7	(100.0)	0	...	0	...
Connecticut	51	14	(100.0)	0	...	15	(93.3)	13	(100.0)	0	...	9	(100.0)	0	...	0	...
Delaware	20	3	(100.0)	0	...	6	(100.0)	6	(83.3)	0	...	5	(60.0)	0	...	0	...
District of Columbia	27	3	(100.0)	0	...	1	(100.0)	22	(90.9)	0	...	1	(100.0)	0	...	0	...
Florida	507	165	(95.2)	0	...	69	(95.7)	177	(89.8)	0	...	96	(92.7)	0	...	0	...
Georgia	282	51	(96.1)	0	...	66	(90.9)	127	(87.4)	0	...	36	(83.3)	1	(100.0)	1	(100.0)
Hawaii	121	3	(100.0)	0	...	99	(98.0)	0	...	17	(100.0)	1	(100.0)	1	(100.0)	0	...
Idaho	8	2	(100.0)	0	...	3	(100.0)	0	...	0	...	1	(100.0)	0	...	2	(0)
Illinois	262	78	(89.7)	0	...	76	(92.1)	66	(86.4)	0	...	42	(90.5)	0	...	0	...
Indiana	91	13	(84.6)	0	...	27	(92.6)	20	(95.0)	1	(100.0)	29	(93.1)	1	(100.0)	0	...
Iowa	43	7	(85.7)	0	...	13	(92.3)	3	(66.7)	3	(100.0)	14	(92.9)	3	(100.0)	0	...
Kansas	35	10	(100.0)	0	...	12	(91.7)	5	(80.0)	1	(100.0)	7	(100.0)	0	...	0	...
Kentucky	62	11	(100.0)	0	...	11	(100.0)	13	(92.3)	1	(100.0)	25	(92.0)	1	(100.0)	0	...
Louisiana	103	15	(66.7)	0	...	15	(86.7)	50	(84.0)	0	...	22	(72.7)	1	(100.0)	0	...
Maine	14	1	(100.0)	0	...	4	(75.0)	7	(85.7)	0	...	2	(50.0)	0	...	0	...
Maryland	163	32	(81.3)	0	...	55	(90.9)	64	(92.2)	0	...	12	(91.7)	0	...	0	...
Massachusetts	163	27	(88.9)	0	...	68	(86.8)	42	(90.5)	0	...	24	(91.7)	2	(100.0)	0	...
Michigan	87	12	(100.0)	0	...	37	(100.0)	26	(92.3)	0	...	11	(81.8)	1	(100.0)	0	...
Minnesota	122	12	(100.0)	3	(100.0)	37	(83.8)	52	(96.2)	0	...	17	(94.1)	1	(100.0)	0	...
Mississippi	60	8	(87.5)	0	...	4	(100.0)	35	(80.0)	0	...	13	(76.9)	0	...	0	...
Missouri	65	5	(40.0)	0	...	20	(65.0)	28	(78.6)	1	(100.0)	11	(63.6)	0	...	0	...
Montana	3	0	...	1	(100.0)	0	...	0	...	0	...	2	(100.0)	0	...	0	...
Nebraska	35	12	(58.3)	0	...	6	(83.3)	10	(70.0)	0	...	4	(100.0)	3	(33.3)	0	...
Nevada	66	15	(80.0)	0	...	33	(97.0)	9	(100.0)	0	...	6	(100.0)	3	(100.0)	0	...
New Hampshire	10	0	...	0	...	6	(100.0)	1	(100.0)	0	...	3	(100.0)	0	...	0	...
New Jersey	244	81	(96.3)	0	...	114	(92.1)	31	(87.1)	0	...	18	(88.9)	0	...	0	...

Table 57. (Cont'd) Completion of Tuberculosis Therapy (COT) Cases and Percentages, by Hispanic Ethnicity and Non-Hispanic Race: Reporting Areas, 2014[1]

Reporting area	Total cases[2]	Hispanic[3]		Non-Hispanic											
				American Indian/ Alaska Native		Asian		Black/African American		Native Hawaiian/ Other Pacific Islander		White		Multiple race[4]		Unknown/ missing	
		No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)	No.	(%)
New Mexico	35	17	(88.2)	8	(100.0)	5	(100.0)	0	...	1	(100.0)	4	(100.0)	0	...	0	...
New York State[5]	167	44	(100.0)	0	...	75	(93.3)	20	(85.0)	0	...	25	(80.0)	1	(100.0)	2	(100.0)
New York City	476	123	(95.9)	0	...	200	(95.0)	95	(96.8)	0	...	30	(93.3)	22	(95.5)	6	(83.3)
North Carolina	159	31	(96.8)	5	(100.0)	20	(100.0)	68	(97.1)	0	...	32	(96.9)	3	(100.0)	0	...
North Dakota	12	0	...	1	(0)	0	...	0	...	0	...	1	(100.0)	0	...	10	(60.0)
Ohio	121	10	(90.0)	0	...	31	(93.5)	41	(92.7)	0	...	39	(87.2)	0	...	0	...
Oklahoma	53	8	(87.5)	8	(87.5)	16	(100.0)	3	(66.7)	2	(100.0)	11	(100.0)	5	(100.0)	0	...
Oregon	58	8	(100.0)	0	...	23	(100.0)	10	(90.0)	1	(100.0)	15	(86.7)	1	(100.0)	0	...
Pennsylvania	166	19	(73.7)	0	...	71	(84.5)	39	(74.4)	0	...	30	(76.7)	7	(100.0)	0	...
Rhode Island	17	9	(88.9)	0	...	1	(100.0)	5	(100.0)	0	...	2	(50.0)	0	...	0	...
South Carolina	65	10	(100.0)	0	...	5	(100.0)	40	(92.5)	0	...	10	(100.0)	0	...	0	...
South Dakota	5	1	(100.0)	2	(100.0)	0	...	2	(50.0)	0	...	0	...	0	...	0	...
Tennessee	128	21	(100.0)	0	...	18	(88.9)	58	(94.8)	0	...	31	(96.8)	0	...	0	...
Texas	1,025	554	(87.9)	3	(100.0)	188	(91.5)	182	(85.7)	1	(100.0)	92	(83.7)	5	(60.0)	0	...
Utah	23	9	(100.0)	1	(100.0)	7	(100.0)	4	(100.0)	0	...	2	(100.0)	0	...	0	...
Vermont	2	0	...	0	...	0	...	2	(100.0)	0	...	0	...	0	...	0	...
Virginia	170	28	(100.0)	0	...	68	(94.1)	42	(92.9)	0	...	32	(100.0)	0	...	0	...
Washington	169	24	(95.8)	4	(75.0)	76	(94.7)	27	(88.9)	16	(75.0)	21	(90.5)	1	(100.0)	0	...
West Virginia	12	0	...	0	...	0	...	1	(100.0)	1	(100.0)	10	(90.0)	0	...	0	...
Wisconsin	38	7	(100.0)	1	(100.0)	15	(86.7)	7	(71.4)	0	...	8	(100.0)	0	...	0	...
Wyoming	2	0	...	1	(100.0)	0	...	0	...	0	...	1	(100.0)	0	...	0	...
American Samoa[6]	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Fed. States of Micronesia[6]	160	0	...	0	...	0	...	0	...	160	(92.5)	0	...	0	...	0	...
Guam[6]	51	1	(100.0)	0	...	25	(92.0)	0	...	22	(95.5)	0	...	0	...	3	(100.0)
Marshall Islands[6]	137	1	(100.0)	0	...	3	(100.0)	0	...	131	(92.4)	0	...	0	...	2	(50.0)
N. Mariana Islands[6]	10	0	...	0	...	4	(100.0)	0	...	6	(100.0)	0	...	0	...	0	...
Puerto Rico[6]	32	32	(90.6)	0	...	0	...	0	...	0	...	0	...	0	...	0	...
Republic of Palau[6]	7	0	...	0	...	2	(100.0)	0	...	3	(100.0)	0	...	0	...	2	(100.0)
U.S. Virgin Islands[6]	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

[1]Most recent year for which data are available.
[2]Therapy ≤1 year indicated in persons alive at diagnosis with an initial regimen of one or more drugs prescribed, who did not die within one year of initiating therapy. Excludes persons with initial isolate rifampin resistant, or patient with bone and joint disease, meningeal disease or disease of the central nervous system, or pediatric patient (age <15) with miliary disease or positive blood culture or a positive nucleic acid amplification test on a blood specimen, and those who moved out of the country within one year of initiating treatment.
[3]Persons of Hispanic origin may be of any race.
[4]Indicates two or more races reported for a person and does not include persons of Hispanic ethnicity.
[5]Excludes New York City.
[6]Not included in U.S. totals.
Note: Case counts and percentage for race categories do not include persons of Hispanic ethnicity. See Technical Notes for description of completion of therapy calculation.
Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.

Table 58. Tuberculosis Cases and Percentages, by Completion of Tuberculosis Therapy (COT): Reporting Areas, 2014[1]

Reporting area	Total cases	Therapy ≤1 year indicated[2,3,4]			Therapy >1 year indicated[3,5]	
		No.	COT ≤1 year(%)	COT(%)	No.	COT(%)
United States	**9,398**	**7720**	**(90.1)**	**(96.6)**	**526**	**(94.1)**
Alabama	133	112	(93.8)	(99.1)	6	(100.0)
Alaska	62	54	(94.4)	(100.0)	3	(66.7)
Arizona	193	130	(86.9)	(96.2)	11	(100.0)
Arkansas	93	80	(76.3)	(91.3)	4	(100.0)
California	2,130	1745	(88.3)	(96.6)	126	(94.4)
Colorado	64	52	(96.2)	(100.0)	4	(100.0)
Connecticut	60	51	(98.0)	(100.0)	6	(100.0)
Delaware	21	20	(85.0)	(95.0)	0	...
District of Columbia	32	27	(92.6)	(100.0)	1	(100.0)
Florida	595	507	(92.9)	(97.0)	21	(95.2)
Georgia	334	282	(89.4)	(96.1)	11	(100.0)
Hawaii	136	121	(98.3)	(99.2)	6	(83.3)
Idaho	11	8	(75.0)	(87.5)	1	(100.0)
Illinois	319	262	(89.7)	(97.7)	22	(95.5)
Indiana	108	91	(92.3)	(97.8)	9	(100.0)
Iowa	54	43	(90.7)	(95.3)	4	(100.0)
Kansas	40	35	(94.3)	(100.0)	1	(100.0)
Kentucky	80	62	(95.2)	(98.4)	5	(100.0)
Louisiana	121	103	(79.6)	(93.2)	3	(100.0)
Maine	14	14	(78.6)	(85.7)	0	...
Maryland	198	163	(89.6)	(98.2)	11	(90.9)
Massachusetts	199	163	(89.0)	(96.9)	22	(100.0)
Michigan	105	87	(95.4)	(96.6)	5	(100.0)
Minnesota	147	122	(92.6)	(98.4)	15	(93.3)
Mississippi	74	60	(81.7)	(91.7)	1	(100.0)
Missouri	79	65	(69.2)	(80.0)	5	(100.0)
Montana	6	3	(100.0)	(100.0)	0	...
Nebraska	38	35	(68.6)	(68.6)	0	...
Nevada	74	66	(93.9)	(97.0)	2	(100.0)
New Hampshire	11	10	(100.0)	(100.0)	1	(100.0)
New Jersey	307	244	(92.6)	(97.5)	23	(82.6)
New Mexico	50	35	(94.3)	(97.1)	1	(100.0)
New York State[6]	202	167	(92.2)	(97.0)	8	(100.0)
New York City	582	476	(95.4)	(98.3)	39	(92.3)
North Carolina	195	159	(97.5)	(100.0)	15	(100.0)
North Dakota	15	12	(58.3)	(83.3)	3	(100.0)
Ohio	156	121	(90.9)	(96.7)	12	(83.3)
Oklahoma	59	53	(94.3)	(98.1)	2	(100.0)
Oregon	77	58	(94.8)	(98.3)	2	(100.0)
Pennsylvania	208	166	(80.1)	(94.6)	13	(92.3)
Rhode Island	21	17	(88.2)	(88.2)	3	(100.0)
South Carolina	79	65	(95.4)	(98.5)	6	(83.3)
South Dakota	8	5	(80.0)	(100.0)	1	(100.0)
Tennessee	151	128	(95.3)	(100.0)	7	(85.7)
Texas	1,269	1025	(87.7)	(95.0)	60	(93.3)
Utah	31	23	(100.0)	(100.0)	4	(75.0)
Vermont	2	2	(100.0)	(100.0)	0	...
Virginia	198	170	(95.9)	(100.0)	10	(100.0)
Washington	194	169	(91.1)	(95.9)	7	(100.0)
West Virginia	13	12	(91.7)	(100.0)	1	(100.0)
Wisconsin	48	38	(89.5)	(100.0)	3	(66.7)
Wyoming	2	2	(100.0)	(100.0)	0	...
American Samoa[7]	1	0	...	...	1	(100.0)
Fed. States of Micronesia[7]	170	160	(92.5)	(93.1)	2	(100.0)
Guam[7]	56	51	(94.1)	(96.1)	2	(50.0)
Marshall Islands[7]	152	137	(92.0)	(94.2)	2	(100.0)
N. Mariana Islands[7]	25	10	(100.0)	(100.0)	1	(100.0)
Puerto Rico[7]	44	32	(90.6)	(93.8)	1	(100.0)
Republic of Palau[7]	14	7	(100.0)	(100.0)	2	(50.0)
U.S. Virgin Islands[7]	0	—	—	—	—	...

[1]Most recent year for which data are available.
[2]Initial isolate susceptible to rifampin (n = 5,746) or susceptibility unknown (n = 90); culture negative (n = 1,622); culture status unknown (n = 272).
[3]Number of cases in persons alive at diagnosis, with an initial regimen of one or more drugs prescribed. Percentage for U.S. based on 52 reporting areas (50 states, New York City, and the District of Columbia).
[4]Therapy ≤1 year indicated in persons alive at diagnosis with an initial regimen of one or more drugs prescribed, who did not die within one year of initiating therapy. Excludes persons with initial isolate rifampin resistant, or patient with bone and joint disease, meningeal disease or disease of the central nervous system, or pediatric patient (age <15) with miliary disease or positive blood culture or a positive nucleic acid amplification test on a blood specimen, and those who moved out of the country within one year of initiating treatment.
[5]Initial isolate rifampin resistant, or patient with meningeal disease or bone and joint disease, or disease of the central nervous system, or pediatric patient (age <15) with miliary disease or positive blood culture or a positive nucleic acid amplification test on a blood specimen, and those who did not move out of the country or die during treatment.
[6]Excludes New York City.
[7]Not included in U.S. totals.
Note: Ellipses (...) indicate that the percentage cannot be calculated, and the denominator is 0.
See Technical Notes for description of completion of therapy calculation.

Table 59. Tuberculosis Cases and Percentages Among Persons Completing Therapy for Whom Therapy Was Indicated for ≤1 Year: Reporting Areas, 2010–2014[1]

Reporting area	Year									
	2010		2011		2012		2013		2014	
	No.[2]	(%)[3]	No.[2]	(%)[3]	No.[2]	(%)[3]	No.[2]	(%)[3]	No.[2]	(%)[3]
United States	**9,120**	**(89.7)**	**8,491**	**(89.7)**	**8,110**	**(90.1)**	**7,780**	**(89.8)**	**7,720**	**(90.1)**
Alabama	117	(91.5)	138	(93.5)	119	(90.8)	94	(95.7)	112	(93.8)
Alaska	49	(93.9)	54	(88.9)	60	(93.3)	67	(92.5)	54	(94.4)
Arizona	217	(86.2)	166	(87.3)	139	(94.2)	131	(86.3)	130	(86.9)
Arkansas	69	(87.0)	67	(83.6)	58	(89.7)	61	(72.1)	80	(76.3)
California	1,896	(88.0)	1,875	(87.6)	1,768	(89.0)	1,755	(88.6)	1,745	(88.3)
Colorado	53	(92.5)	59	(96.6)	47	(95.7)	58	(94.8)	52	(96.2)
Connecticut	67	(92.5)	68	(94.1)	60	(95.0)	49	(85.7)	51	(98.0)
Delaware	13	(100.0)	17	(94.1)	21	(81.0)	17	(70.6)	20	(85.0)
District of Columbia	31	(87.1)	49	(79.6)	27	(96.3)	27	(85.2)	27	(92.6)
Florida	706	(94.9)	607	(92.9)	562	(91.5)	547	(93.6)	507	(92.9)
Georgia	330	(90.0)	277	(89.5)	292	(91.1)	290	(88.6)	282	(89.4)
Hawaii	104	(95.2)	110	(90.0)	91	(92.3)	102	(90.2)	121	(98.3)
Idaho	14	(85.7)	11	(81.8)	13	(84.6)	9	(88.9)	8	(75.0)
Illinois	301	(87.4)	278	(92.1)	289	(91.7)	267	(89.9)	262	(89.7)
Indiana	80	(93.8)	87	(89.7)	85	(92.9)	77	(96.1)	91	(92.3)
Iowa	39	(94.9)	32	(87.5)	36	(80.6)	40	(87.5)	43	(90.7)
Kansas	36	(100.0)	27	(88.9)	31	(93.5)	30	(100.0)	35	(94.3)
Kentucky	72	(88.9)	56	(82.1)	68	(94.1)	47	(91.5)	62	(95.2)
Louisiana	171	(80.7)	140	(84.3)	119	(81.5)	120	(78.3)	103	(79.6)
Maine	6	(100.0)	8	(75.0)	17	(64.7)	12	(91.7)	14	(78.6)
Maryland	179	(91.6)	194	(94.8)	192	(90.1)	149	(91.3)	163	(89.6)
Massachusetts	187	(84.0)	155	(83.9)	172	(84.9)	149	(91.9)	163	(89.0)
Michigan	145	(89.7)	137	(91.2)	115	(87.8)	107	(95.3)	87	(95.4)
Minnesota	116	(90.5)	101	(95.0)	133	(95.5)	125	(94.4)	122	(92.6)
Mississippi	101	(93.1)	73	(91.8)	67	(89.6)	42	(90.5)	60	(81.7)
Missouri	95	(86.3)	81	(91.4)	71	(81.7)	84	(75.0)	65	(69.2)
Montana	6	(100.0)	7	(100.0)	5	(80.0)	4	(100.0)	3	(100.0)
Nebraska	24	(91.7)	20	(85.0)	17	(82.4)	20	(95.0)	35	(68.6)
Nevada	100	(94.0)	82	(95.1)	71	(90.1)	78	(96.2)	66	(93.9)
New Hampshire	8	(87.5)	10	(100.0)	7	(100.0)	12	(83.3)	10	(100.0)
New Jersey	325	(92.9)	252	(90.1)	232	(93.5)	252	(92.1)	244	(92.6)
New Mexico	29	(93.1)	38	(92.1)	27	(96.3)	34	(94.1)	35	(94.3)
New York State[4]	204	(91.7)	187	(94.1)	169	(94.1)	172	(89.5)	167	(92.2)
New York City	599	(92.8)	565	(92.2)	540	(93.7)	545	(95.2)	476	(95.4)
North Carolina	248	(96.0)	200	(95.5)	187	(97.9)	178	(97.8)	159	(97.5)
North Dakota	8	(75.0)	5	(60.0)	23	(56.5)	10	(80.0)	12	(58.3)
Ohio	150	(89.3)	118	(88.1)	129	(86.0)	118	(83.9)	121	(90.9)
Oklahoma	69	(94.2)	72	(91.7)	72	(87.5)	58	(93.1)	53	(94.3)
Oregon	71	(98.6)	64	(89.1)	53	(96.2)	61	(86.9)	58	(94.8)
Pennsylvania	181	(86.7)	202	(85.1)	181	(81.8)	176	(76.1)	166	(80.1)
Rhode Island	22	(68.2)	25	(80.0)	19	(89.5)	23	(95.7)	17	(88.2)
South Carolina	125	(93.6)	113	(95.6)	105	(90.5)	92	(84.8)	65	(95.4)
South Dakota	13	(84.6)	12	(83.3)	14	(92.9)	6	(83.3)	5	(80.0)
Tennessee	146	(93.2)	130	(94.6)	142	(95.8)	118	(96.6)	128	(95.3)
Texas	1,092	(85.2)	1,071	(87.9)	1,025	(90.0)	958	(88.1)	1,025	(87.7)
Utah	13	(100.0)	25	(100.0)	29	(96.6)	28	(100.0)	23	(100.0)
Vermont	5	(100.0)	6	(83.3)	4	(100.0)	4	(100.0)	2	(100.0)
Virginia	235	(88.9)	189	(89.4)	191	(84.8)	148	(94.6)	170	(95.9)
Washington	194	(88.7)	155	(85.2)	148	(85.1)	178	(84.8)	169	(91.1)
West Virginia	12	(100.0)	10	(90.0)	7	(100.0)	9	(100.0)	12	(91.7)
Wisconsin	41	(90.2)	62	(90.3)	58	(91.4)	42	(90.5)	38	(89.5)
Wyoming	6	(50.0)	4	(50.0)	3	—	0	—	2	(100.0)
American Samoa[5]	3	(33.3)	3	(0)	1	(100.0)	2	(100.0)	0	—
Fed. States of Micronesia[5]	160	(91.9)	130	(90.0)	161	(88.2)	117	(93.2)	160	(92.5)
Guam[5]	86	(95.3)	72	(94.4)	60	(86.7)	44	(95.5)	51	(94.1)
Marshall Islands[5]	188	(48.9)	138	(76.8)	129	(92.2)	137	(90.5)	137	(92.0)
N. Mariana Islands[5]	25	(96.0)	29	(75.9)	19	(84.2)	25	(88.0)	10	(100.0)
Puerto Rico[5]	70	(90.0)	34	(94.1)	49	(91.8)	37	(91.9)	32	(90.6)
Republic of Palau[5]	16	(100.0)	6	(83.3)	4	(100.0)	7	(100.0)	7	(100.0)
U.S. Virgin Islands[5]	0	—	0	—	3	—	1	—	0	—

[1]Most recent year for which data are available.
[2]Total cases for which therapy ≤1 year indicated in persons alive at diagnosis with an initial regimen of one or more drugs prescribed who did not die within one year of initiating therapy. Excludes persons with initial isolate rifampin resistant, or patient with bone and joint disease, meningeal disease or disease of the central nervous system, or pediatric patient (age <15) with miliary disease or positive blood culture or a positive nucleic acid amplification test on a blood specimen, and those who moved out of the country within one year of initiating treatment.
[3]Percentage of total cases in persons who completed therapy within one year for whom therapy less than one year was indicated.
[4]Excludes New York City.
[5]Not included in U.S. totals.

Note: See Technical Notes for description of completion of therapy calculation.

Morbidity Tables

Metropolitan Statistical Areas, 2016

This page intentionally left blank

Table 60. Tuberculosis Cases and Case Rates per 100,000 Population: Metropolitan Statistical Areas with ≥500,000 Population, 2016 and 2015

Metropolitan statistical area	Cases		Case rates		Population estimates 2016
	2016	2015	2016	2015	
Akron, OH	16	12	2.3	1.7	702,221
Albany-Schenectady-Troy, NY	7	6	0.8	0.7	881,839
Albuquerque, NM	14	14	1.5	1.5	909,906
Allentown-Bethlehem-Easton, PA-NJ	5	6	0.6	0.7	835,652
Atlanta-Sandy Springs-Roswell, GA	202	215	3.5	3.8	5,789,700
Augusta-Richmond County, GA-SC	13	15	2.2	2.5	594,919
Austin-Round Rock, TX	65	77	3.2	3.9	2,056,405
Bakersfield, CA	20	29	2.3	3.3	884,788
Baltimore-Columbia-Towson, MD	73	64	2.6	2.3	2,798,886
Baton Rouge, LA	13	23	1.6	2.8	835,175
Birmingham-Hoover, AL	18	30	1.6	2.6	1,147,417
Boise City, ID	10	8	1.4	1.2	691,423
Boston-Cambridge-Newton, MA-NH	148	149	3.1	3.1	4,794,447
Bridgeport-Stamford-Norwalk, CT	21	24	2.2	2.5	944,177
Buffalo-Cheektowaga-Niagara Falls, NY	15	17	1.3	1.5	1,132,804
Cape Coral-Fort Myers, FL	19	17	2.6	2.4	722,336
Charleston-North Charleston, SC	12	19	1.6	2.6	761,155
Charlotte-Concord-Gastonia, NC-SC	50	41	2.0	1.7	2,474,314
Chattanooga, TN-GA	11	10	2.0	1.8	551,632
Chicago-Naperville-Elgin, IL-IN-WI	312	304	3.3	3.2	9,512,999
Cincinnati, OH-KY-IN	28	21	1.3	1.0	2,165,139
Cleveland-Elyria, OH	23	39	1.1	1.9	2,055,612
Colorado Springs, CO	---	---	---	---	712,327
Columbia, SC	21	10	2.6	1.2	817,488
Columbus, OH	50	41	2.4	2.0	2,041,520
Dallas-Fort Worth-Arlington, TX	319	311	4.4	4.4	7,233,323
Dayton, OH	7	9	0.9	1.1	800,683
Deltona-Daytona Beach-Ormond Beach, FL	11	6	1.7	1.0	637,674
Denver-Aurora-Lakewood, CO	48	50	1.7	1.8	2,853,077
Des Moines-West Des Moines, IA	17	8	2.7	1.3	634,725
Detroit-Warren-Dearborn, MI	82	75	1.9	1.7	4,297,617
Durham-Chapel Hill, NC	13	9	2.3	1.6	559,535
El Paso, TX	43	38	5.1	4.5	841,971
Fayetteville-Springdale-Rogers, AR-MO	27	30	5.1	5.8	525,032
Fresno, CA	60	42	6.1	4.3	979,915
Grand Rapids-Wyoming, MI	16	20	1.5	1.9	1,047,099
Greensboro-High Point, NC	20	27	2.6	3.6	756,139
Greenville-Anderson-Maudlin, SC	10	11	1.1	1.3	884,975
Harrisburg-Carlisle, PA	6	11	1.1	1.9	568,033
Hartford-West Hartford-East Hartford, CT	16	25	1.3	2.1	1,206,836
Houston-The Woodlands-Sugar Land, TX	350	383	5.2	5.8	6,772,470
Indianapolis-Carmel-Anderson, IN	52	63	2.6	3.2	2,004,230
Jackson, MS	18	25	3.1	4.3	579,229
Jacksonville, FL	55	58	3.7	4.0	1,478,212
Kansas City, MO-KS	34	30	1.6	1.4	2,104,509
Knoxville, TN	7	8	0.8	0.9	868,546
Lakeland-Winter Haven, FL	12	26	1.8	4.0	666,149
Lancaster, PA	6	7	1.1	1.3	538,500
Las Vegas-Henderson-Paradise, NV	47	70	2.2	3.3	2,155,664
Lexington-Fayette, KY	11	17	2.2	3.4	506,751
Little Rock-North Little Rock-Conway, AR	23	21	3.1	2.9	734,622
Los Angeles-Long Beach-Anaheim, CA	756	804	5.7	6.1	13,310,447
Louisville-Jefferson County, KY-IN	39	31	3.0	2.4	1,283,430
Madison, WI	8	8	1.2	1.2	648,929
McAllen-Edinburg-Mission, TX	84	72	9.9	8.6	849,843
Memphis, TN-MS-AR	39	56	2.9	4.2	1,342,842
Miami-Fort Lauderdale-West Palm Beach, FL	234	250	3.9	4.2	6,066,387

Table 60. (Cont'd) Tuberculosis Cases and Case Rates per 100,000 Population: Metropolitan Statistical Areas with ≥500,000 Population, 2016 and 2015

Metropolitan statistical area	Cases		Case rates		Population estimates 2016
	2016	2015	2016	2015	
Milwaukee-Waukesha-West Allis, WI	17	31	1.1	2.0	1,572,482
Minneapolis-St. Paul-Bloomington, MN-WI	132	114	3.7	3.2	3,551,036
Modesto, CA	9	18	1.7	3.4	541,560
Nashville-Davidson-Murfreesboro-Franklin, TN	35	46	1.9	2.5	1,865,298
New Haven-Milford, CT	10	18	1.2	2.1	856,875
New Orleans-Metairie, LA	51	35	4.0	2.8	1,268,883
New York-Newark-Jersey City, NY-NJ-PA	917	941	4.6	4.7	20,153,634
Northport-Sarasota-Bradenton, FL	25	16	3.2	2.1	788,457
Ogden-Clearfield, UT	---	---	---	---	654,417
Oklahoma City, OK	26	24	1.9	1.8	1,373,211
Omaha-Council Bluffs, NE-IA	14	18	1.5	2.0	924,129
Orlando-Kissimmee-Sanford, FL	80	68	3.3	2.9	2,441,257
Oxnard-Thousand Oaks-Ventura, CA	32	24	3.8	2.8	849,738
Palm Bay-Melbourne-Titusville, FL	18	12	3.1	2.1	579,130
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	144	163	2.4	2.7	6,070,500
Phoenix-Mesa-Scottsdale, AZ	131	127	2.8	2.8	4,661,537
Pittsburgh, PA	15	15	0.6	0.6	2,342,299
Portland-South Portland, ME	10	9	1.9	1.7	529,657
Portland-Vancouver-Hillsboro, OR-WA	55	57	2.3	2.4	2,424,955
Providence-Warwick, RI-MA	24	36	1.5	2.2	1,614,750
Provo-Orem, UT	---	---	---	---	603,309
Raleigh, NC	40	30	3.1	2.4	1,302,946
Richmond, VA	22	14	1.7	1.1	1,281,708
Riverside-San Bernardino-Ontario, CA	116	121	2.6	2.7	4,527,837
Rochester, NY	26	19	2.4	1.8	1,078,879
Sacramento-Roseville-Arden-Arcade, CA	85	90	3.7	4.0	2,296,418
St. Louis, MO-IL	40	40	1.4	1.4	2,807,002
Salt Lake City, UT	14	31	1.2	2.7	1,186,187
San Antonio-New Braunfels, TX	71	89	2.9	3.7	2,429,609
San Diego-Carlsbad, CA	258	234	7.8	7.1	3,317,749
San Francisco-Oakland-Hayward, CA	337	353	7.2	7.6	4,679,166
San Jose-Sunnyvale-Santa Clara, CA	161	198	8.1	10.1	1,978,816
Santa Rosa, CA	12	9	2.4	1.8	503,070
Scranton-Wilkes-Barre-Hazleton, PA	---	---	---	---	555,225
Seattle-Tacoma-Bellevue, WA	159	144	4.2	3.9	3,798,902
Spokane-Spokane Valley, WA	---	---	---	---	556,634
Springfield, MA	10	8	1.6	1.3	630,283
Stockton-Lodi, CA	42	58	5.7	8.0	733,709
Syracuse, NY	18	10	2.7	1.5	656,510
Tampa-St. Petersburg-Clearwater, FL	80	63	2.6	2.1	3,032,171
Toledo, OH	6	9	1.0	1.5	605,221
Tucson, AZ	25	36	2.5	3.6	1,016,206
Tulsa, OK	17	17	1.7	1.7	987,201
Urban Honolulu, HI	88	98	8.9	9.9	992,605
Virginia Beach-Norfolk-Newport News, VA-NC	28	34	1.6	2.0	1,726,907
Washington-Arlington-Alexandria, DC-VA-MD-WV	291	271	4.7	4.5	6,131,977
Wichita, KS	11	14	1.7	2.2	644,672
Winston-Salem, NC	9	10	1.4	1.5	662,079
Worcester, MA-CT	19	28	2.0	3.0	935,781
Youngstown-Warren-Boardman, OH-PA	---	---	---	---	544,746
Total - 107 areas	**7,382**	**7,610**	**3.4**	**3.5**	**219,819,005**
San Juan-Caguas-Guaynabo, PR	53	35	2.5	1.6	2,157,729

Note: 2016 and 2015 population case counts and rates updated using County Totals Dataset: Population, Population Change and Estimated Components of Population Change: April 1, 2010 to July 1, 2016 (https://www.census.gov/data/datasets/2016/demo/popest/counties-total.html); accessed July 19, 2017.

Dashes (---) indicate that the data is suppressed for geographic areas below the state level that reported <5 cases in 2016.

See Technical Notes for definition of metropolitan statistical area.

Table 61. Tuberculosis Cases, by Age Group: Metropolitan Statistical Areas with ≥500,000 Population, 2016

Metropolitan statistical area	Total cases	Under 5	5–14	15–24	25–44	45–64	≥65	Unknown/ missing
Akron, OH	16	0	0	2	4	4	6	0
Albany-Schenectady-Troy, NY	7	0	0	3	2	2	0	0
Albuquerque, NM	14	1	1	1	2	6	3	0
Allentown-Bethlehem-Easton, PA-NJ	5	0	1	0	0	2	2	0
Atlanta-Sandy Springs-Roswell, GA	202	7	6	17	67	70	35	0
Augusta-Richmond County, GA-SC	13	0	1	1	4	4	3	0
Austin-Round Rock, TX	65	2	1	6	24	20	12	0
Bakersfield, CA	20	0	0	3	7	8	2	0
Baltimore-Columbia-Towson, MD	73	2	0	6	28	23	14	0
Baton Rouge, LA	13	0	0	1	4	6	2	0
Birmingham-Hoover, AL	18	1	0	1	6	9	1	0
Boise City, ID	10	4	0	1	1	2	2	0
Boston-Cambridge-Newton, MA-NH	148	1	5	18	52	33	39	0
Bridgeport-Stamford-Norwalk, CT	21	0	0	4	9	5	3	0
Buffalo-Cheektowaga-Niagara Falls, NY	15	0	1	2	4	6	2	0
Cape Coral-Fort Myers, FL	19	0	0	1	7	7	4	0
Charleston-North Charleston, SC	12	1	4	1	2	1	3	0
Charlotte-Concord-Gastonia, NC-SC	50	0	3	4	13	22	8	0
Chattanooga, TN-GA	11	0	0	0	4	3	4	0
Chicago-Naperville-Elgin, IL-IN-WI	312	9	3	29	89	86	93	3
Cincinnati, OH-KY-IN	28	0	1	3	9	6	9	0
Cleveland-Elyria, OH	23	0	0	0	4	11	8	0
Colorado Springs, CO	---	---	---	---	---	---	---	---
Columbia, SC	21	1	2	3	6	6	3	0
Columbus, OH	50	0	4	4	24	11	7	0
Dallas-Fort Worth-Arlington, TX	319	6	9	27	113	102	62	0
Dayton, OH	7	0	0	2	1	3	1	0
Deltona-Daytona Beach-Ormond Beach, FL	11	0	0	0	2	5	4	0
Denver-Aurora-Lakewood, CO	48	2	0	4	10	20	12	0
Des Moines-West Des Moines, IA	17	0	0	2	5	9	1	0
Detroit-Warren-Dearborn, MI	82	3	1	5	21	27	25	0
Durham-Chapel Hill, NC	13	1	0	0	9	2	1	0
El Paso, TX	43	4	2	5	4	17	11	0
Fayetteville-Springdale-Rogers, AR-MO	27	3	0	5	9	6	4	0
Fresno, CA	60	3	3	5	9	22	18	0
Grand Rapids-Wyoming, MI	16	0	1	2	7	4	2	0
Greensboro-High Point, NC	20	1	0	3	7	6	3	0
Greenville-Anderson-Maudlin, SC	10	0	1	1	5	3	0	0
Harrisburg-Carlisle, PA	6	0	0	1	1	2	2	0
Hartford-West Hartford-East Hartford, CT	16	1	0	1	5	2	7	0
Houston-The Woodlands-Sugar Land, TX	350	13	7	45	113	129	43	0
Indianapolis-Carmel-Anderson, IN	52	2	1	4	26	14	5	0
Jackson, MS	18	1	0	3	5	6	3	0
Jacksonville, FL	55	0	1	4	21	20	9	0
Kansas City, MO-KS	34	0	0	9	15	4	6	0
Knoxville, TN	7	0	0	0	3	2	2	0
Lakeland-Winter Haven, FL	12	1	0	0	4	4	3	0
Lancaster, PA	6	0	0	1	3	1	1	0
Las Vegas-Henderson-Paradise, NV	47	3	0	6	19	9	10	0
Lexington-Fayette, KY	11	0	0	3	0	3	5	0
Little Rock-North Little Rock-Conway, AR	23	0	1	2	13	6	1	0
Los Angeles-Long Beach-Anaheim, CA	756	11	2	56	185	238	264	0
Louisville-Jefferson County, KY-IN	39	0	1	2	16	15	5	0
Madison, WI	8	0	0	1	6	1	0	0
McAllen-Edinburg-Mission, TX	84	6	2	13	23	24	16	0
Memphis, TN-MS-AR	39	2	1	3	12	17	4	0

Table 61. (Cont'd) Tuberculosis Cases, by Age Group: Metropolitan Statistical Areas with ≥500,000 Population, 2016

Metropolitan statistical area	Total cases	Under 5	5–14	15–24	25–44	45–64	≥65	Unknown/ missing
Miami-Fort Lauderdale-West Palm Beach, FL	234	4	5	15	77	77	56	0
Milwaukee-Waukesha-West Allis, WI	17	0	1	1	5	8	1	1
Minneapolis-St. Paul-Bloomington, MN-WI	132	4	7	17	57	27	20	0
Modesto, CA	9	0	0	0	0	1	8	0
Nashville-Davidson-Murfreesboro-Franklin, TN	35	2	0	4	11	7	11	0
New Haven-Milford, CT	10	0	0	1	3	4	2	0
New Orleans-Metairie, LA	51	0	1	4	21	21	4	0
New York-Newark-Jersey City, NY-NJ-PA	917	16	10	101	304	276	209	1
Northport-Sarasota-Bradenton, FL	25	2	1	3	4	7	8	0
Ogden-Clearfield, UT	---	---	---	---	---	---	---	---
Oklahoma City, OK	26	0	1	3	7	8	7	0
Omaha-Council Bluffs, NE-IA	14	0	1	1	4	5	3	0
Orlando-Kissimmee-Sanford, FL	80	2	0	10	18	27	23	0
Oxnard-Thousand Oaks-Ventura, CA	32	0	0	4	9	12	7	0
Palm Bay-Melbourne-Titusville, FL	18	0	0	0	4	3	11	0
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	144	6	1	9	48	38	42	0
Phoenix-Mesa-Scottsdale, AZ	131	0	2	21	48	37	23	0
Pittsburgh, PA	15	1	0	2	2	3	7	0
Portland-South Portland, ME	10	0	0	2	4	2	2	0
Portland-Vancouver-Hillsboro, OR-WA	55	4	0	6	17	16	12	0
Providence-Warwick, RI-MA	24	2	1	3	7	5	6	0
Provo-Orem, UT	---	---	---	---	---	---	---	---
Raleigh, NC	40	2	1	0	14	15	8	0
Richmond, VA	22	0	0	5	11	4	2	0
Riverside-San Bernardino-Ontario, CA	116	2	1	11	21	43	38	0
Rochester, NY	26	3	0	3	9	8	3	0
Sacramento-Roseville-Arden-Arcade, CA	85	3	0	9	20	21	32	0
St. Louis, MO-IL	40	1	0	2	15	12	10	0
Salt Lake City, UT	14	1	1	2	3	3	4	0
San Antonio-New Braunfels, TX	71	0	1	13	14	27	16	0
San Diego-Carlsbad, CA	258	5	6	26	78	69	74	0
San Francisco-Oakland-Hayward, CA	337	3	2	26	84	102	120	0
San Jose-Sunnyvale-Santa Clara, CA	161	2	1	13	43	49	53	0
Santa Rosa, CA	12	0	0	2	1	6	3	0
Scranton-Wilkes-Barre-Hazleton, PA	---	---	---	---	---	---	---	---
Seattle-Tacoma-Bellevue, WA	159	6	0	23	51	44	35	0
Spokane-Spokane Valley, WA	---	---	---	---	---	---	---	---
Springfield, MA	10	0	0	1	3	2	4	0
Stockton-Lodi, CA	42	0	0	2	9	20	11	0
Syracuse, NY	18	0	0	2	6	6	4	0
Tampa-St. Petersburg-Clearwater, FL	80	0	1	4	19	36	20	0
Toledo, OH	6	0	0	1	2	1	2	0
Tucson, AZ	25	0	0	0	10	1	14	0
Tulsa, OK	17	0	4	4	5	2	2	0
Urban Honolulu, HI	88	1	2	6	16	25	38	0
Virginia Beach-Norfolk-Newport News, VA-NC	28	0	1	1	7	14	5	0
Washington-Arlington-Alexandria, DC-VA-MD-WV	291	3	7	30	113	83	55	0
Wichita, KS	11	0	0	1	4	3	3	0
Winston-Salem, NC	9	0	0	1	3	2	3	0
Worcester, MA-CT	19	0	0	4	9	3	3	0
Youngstown-Warren-Boardman, OH-PA	---	---	---	---	---	---	---	---
Total - 107 areas	**7,382**	**167**	**125**	**726**	**2,266**	**2,267**	**1,826**	**5**
San Juan-Caguas-Guaynabo, PR	53	0	1	1	16	23	12	0

Note: See Technical Notes for definition of metropolitan statistical area.
Dashes (---) indicate that the data is suppressed for geographic areas below the state level that reported <5 cases in 2016.

Table 62. Tuberculosis Cases, by Hispanic Ethnicity and Non-Hispanic Race: Metropolitan Statistical Areas with ≥500,000 Population, 2016

Metropolitan statistical area	Total cases	Hispanic/ Latino[1]	American Indian/ Alaska Native	Asian	Black/ African American	Native Hawaiian/ Other Pacific Islander	White	Multiple race[2]	Unknown/ missing
Akron, OH	16	0	0	7	3	0	6	0	0
Albany-Schenectady-Troy, NY	7	0	0	3	1	0	1	0	2
Albuquerque, NM	14	6	0	5	1	0	2	0	0
Allentown-Bethlehem-Easton, PA-NJ	5	2	0	1	0	0	1	1	0
Atlanta-Sandy Springs-Roswell, GA	202	35	0	58	90	0	19	0	0
Augusta-Richmond County, GA-SC	13	0	0	3	10	0	0	0	0
Austin-Round Rock, TX	65	29	1	17	11	0	7	0	0
Bakersfield, CA	20	17	0	2	0	0	1	0	0
Baltimore-Columbia-Towson, MD	73	8	0	34	25	0	3	1	2
Baton Rouge, LA	13	2	0	4	3	0	2	2	0
Birmingham-Hoover, AL	18	6	0	0	7	0	5	0	0
Boise City, ID	10	7	0	1	1	0	0	0	1
Boston-Cambridge-Newton, MA-NH	148	26	0	48	41	0	30	1	2
Bridgeport-Stamford-Norwalk, CT	21	10	0	7	2	0	2	0	0
Buffalo-Cheektowaga-Niagara Falls, NY	15	0	1	5	3	0	6	0	0
Cape Coral-Fort Myers, FL	19	7	0	0	6	0	5	1	0
Charleston-North Charleston, SC	12	0	0	1	8	1	2	0	0
Charlotte-Concord-Gastonia, NC-SC	50	13	0	9	22	0	5	1	0
Chattanooga, TN-GA	11	1	0	6	3	0	1	0	0
Chicago-Naperville-Elgin, IL-IN-WI	312	88	0	126	65	0	32	0	1
Cincinnati, OH-KY-IN	28	3	0	3	10	0	12	0	0
Cleveland-Elyria, OH	23	0	0	9	8	0	6	0	0
Colorado Springs, CO	---	---	---	---	---	---	---	---	---
Columbia, SC	21	3	0	9	7	0	2	0	0
Columbus, OH	50	1	0	17	29	0	3	0	0
Dallas-Fort Worth-Arlington, TX	319	109	0	81	88	0	39	2	0
Dayton, OH	7	1	0	3	1	0	2	0	0
Deltona-Daytona Beach-Ormond Beach, FL	11	2	0	3	2	0	4	0	0
Denver-Aurora-Lakewood, CO	48	15	0	13	14	0	6	0	0
Des Moines-West Des Moines, IA	17	1	0	9	2	0	4	1	0
Detroit-Warren-Dearborn, MI	82	4	0	29	26	0	23	0	0
Durham-Chapel Hill, NC	13	5	0	5	1	0	1	1	0
El Paso, TX	43	41	0	1	0	0	1	0	0
Fayetteville-Springdale-Rogers, AR-MO	27	1	0	2	1	14	9	0	0
Fresno, CA	60	28	0	24	4	0	4	0	0
Grand Rapids-Wyoming, MI	16	1	0	9	5	0	1	0	0
Greensboro-High Point, NC	20	4	0	4	10	0	2	0	0
Greenville-Anderson-Maudlin, SC	10	0	0	3	6	0	1	0	0
Harrisburg-Carlisle, PA	6	0	0	3	0	0	3	0	0
Hartford-West Hartford-East Hartford, CT	16	4	0	9	1	0	2	0	0
Houston-The Woodlands-Sugar Land, TX	350	158	0	94	71	1	26	0	0
Indianapolis-Carmel-Anderson, IN	52	11	0	22	13	0	6	0	0
Jackson, MS	18	0	0	4	10	0	4	0	0
Jacksonville, FL	55	3	0	14	20	1	17	0	0
Kansas City, MO-KS	34	6	0	8	13	0	7	0	0
Knoxville, TN	7	1	0	1	0	0	5	0	0
Lakeland-Winter Haven, FL	12	1	0	6	3	0	2	0	0
Lancaster, PA	6	0	0	3	1	0	1	1	0
Las Vegas-Henderson-Paradise, NV	47	12	1	15	13	0	4	1	1
Lexington-Fayette, KY	11	0	0	3	4	0	4	0	0
Little Rock-North Little Rock-Conway, AR	23	8	0	8	4	0	3	0	0
Los Angeles-Long Beach-Anaheim, CA	756	288	1	374	40	4	48	1	0
Louisville-Jefferson County, KY-IN	39	7	0	8	9	0	14	1	0
Madison, WI	8	2	0	3	1	0	1	0	1
McAllen-Edinburg-Mission, TX	84	83	0	0	1	0	0	0	0
Memphis, TN-MS-AR	39	4	0	0	29	0	6	0	0
Miami-Fort Lauderdale-West Palm Beach, FL	234	85	0	24	100	0	23	2	0

Table 62. (Cont'd) Tuberculosis Cases, by Hispanic Ethnicity and Non-Hispanic Race: Metropolitan Statistical Areas with ≥500,000 Population, 2016

Metropolitan statistical area	Total cases	Hispanic/ Latino[1]	American Indian/ Alaska Native	Asian	Black/ African American	Native Hawaiian/ Other Pacific Islander	White	Multiple race[2]	Unknown/ missing
Milwaukee-Waukesha-West Allis, WI	17	5	0	3	4	0	5	0	0
Minneapolis-St. Paul-Bloomington, MN-WI	132	8	1	48	67	0	8	0	0
Modesto, CA	9	2	0	4	1	0	2	0	0
Nashville-Davidson-Murfreesboro-Franklin, TN	35	5	0	10	12	0	8	0	0
New Haven-Milford, CT	10	0	0	6	4	0	0	0	0
New Orleans-Metairie, LA	51	15	0	2	14	0	17	3	0
New York-Newark-Jersey City, NY-NJ-PA	917	255	0	392	158	1	89	13	9
Northport-Sarasota-Bradenton, FL	25	5	0	6	3	0	10	1	0
Ogden-Clearfield, UT	---	---	---	---	---	---	---	---	---
Oklahoma City, OK	26	10	1	5	2	0	5	1	2
Omaha-Council Bluffs, NE-IA	14	3	0	7	2	0	2	0	0
Orlando-Kissimmee-Sanford, FL	80	17	0	14	34	0	15	0	0
Oxnard-Thousand Oaks-Ventura, CA	32	17	0	10	0	0	3	2	0
Palm Bay-Melbourne-Titusville, FL	18	5	0	4	1	0	8	0	0
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	144	17	1	64	46	0	16	0	0
Phoenix-Mesa-Scottsdale, AZ	131	67	5	29	13	4	13	0	0
Pittsburgh, PA	15	0	0	9	1	0	5	0	0
Portland-South Portland, ME	10	1	0	4	3	0	2	0	0
Portland-Vancouver-Hillsboro, OR-WA	55	12	1	23	6	4	8	1	0
Providence-Warwick, RI-MA	24	9	0	7	5	0	2	0	1
Provo-Orem, UT	---	---	---	---	---	---	---	---	---
Raleigh, NC	40	15	0	12	12	0	1	0	0
Richmond, VA	22	3	0	12	4	0	3	0	0
Riverside-San Bernardino-Ontario, CA	116	51	1	36	8	1	17	0	2
Rochester, NY	26	2	0	11	10	0	2	0	1
Sacramento-Roseville-Arden-Arcade, CA	85	10	0	61	3	2	9	0	0
St. Louis, MO-IL	40	3	0	12	15	0	10	0	0
Salt Lake City, UT	14	4	1	3	1	3	2	0	0
San Antonio-New Braunfels, TX	71	48	0	9	9	0	4	1	0
San Diego-Carlsbad, CA	258	114	0	103	20	3	17	1	0
San Francisco-Oakland-Hayward, CA	337	49	0	242	17	4	23	2	0
San Jose-Sunnyvale-Santa Clara, CA	161	21	0	129	5	0	5	1	0
Santa Rosa, CA	12	2	0	7	1	0	2	0	0
Scranton-Wilkes-Barre-Hazleton, PA	---	---	---	---	---	---	---	---	---
Seattle-Tacoma-Bellevue, WA	159	16	2	85	26	3	22	0	5
Spokane-Spokane Valley, WA	---	---	---	---	---	---	---	---	---
Springfield, MA	10	2	0	6	1	0	1	0	0
Stockton-Lodi, CA	42	8	0	26	2	0	6	0	0
Syracuse, NY	18	0	0	8	5	0	4	0	1
Tampa-St. Petersburg-Clearwater, FL	80	21	0	17	18	0	24	0	0
Toledo, OH	6	1	0	3	0	0	2	0	0
Tucson, AZ	25	10	2	4	5	0	4	0	0
Tulsa, OK	17	2	2	6	6	0	1	0	0
Urban Honolulu, HI	88	0	0	74	1	10	2	1	0
Virginia Beach-Norfolk-Newport News, VA-NC	28	2	0	13	9	0	4	0	0
Washington-Arlington-Alexandria, DC-VA-MD-WV	291	58	0	112	99	0	16	4	2
Wichita, KS	11	1	0	6	2	0	2	0	0
Winston-Salem, NC	9	1	0	3	3	0	2	0	0
Worcester, MA-CT	19	6	0	4	5	0	3	1	0
Youngstown-Warren-Boardman, OH-PA	---	---	---	---	---	---	---	---	---
Total - 107 areas	**7,382**	**2,058**	**21**	**2,815**	**1,514**	**57**	**835**	**49**	**33**
San Juan-Caguas-Guaynabo, PR	53	49	0	3	0	0	1	0	0

[1]Persons of Hispanic/Latino origin may be of any or multiple race.
[2]Indicates two or more races reported for a person and does not include persons of Hispanic/Latino origin.
Note: Case counts for race categories (American Indian/Alaska Native, Asian, black/African American, Native Hawaiian/Other Pacific Islander, and white) are mutually exclusive and do not include persons of Hispanic ethnicity or multiple race.
See Technical Notes for definition of metropolitan statistical area and Hispanic ethnicity and non-Hispanic race.
Dashes (---) indicate that the data is suppressed for geographic areas below the state level that reported <5 cases in 2016.

Table 63. Tuberculosis Cases and Percentages, U.S.-Born Persons and Non-U.S.–Born Persons[1]: Metropolitan Statistical Areas with ≥500,000 Population, 2016

Metropolitan statistical area	Total cases	U.S.-born persons		Non-U.S.–born persons		Unknown	
		No.	(%)	No.	(%)	No.	(%)
Akron, OH	16	8	(50.0)	8	(50.0)	0	(0)
Albany-Schenectady-Troy, NY	7	2	(28.6)	5	(71.4)	0	(0)
Albuquerque, NM	14	4	(28.6)	10	(71.4)	0	(0)
Allentown-Bethlehem-Easton, PA-NJ	5	1	(20.0)	4	(80.0)	0	(0)
Atlanta-Sandy Springs-Roswell, GA	202	83	(41.1)	118	(58.4)	1	(0.5)
Augusta-Richmond County, GA-SC	13	9	(69.2)	4	(30.8)	0	(0)
Austin-Round Rock, TX	65	20	(30.8)	45	(69.2)	0	(0)
Bakersfield, CA	20	4	(20.0)	16	(80.0)	0	(0)
Baltimore-Columbia-Towson, MD	73	18	(24.7)	55	(75.3)	0	(0)
Baton Rouge, LA	13	6	(46.2)	7	(53.8)	0	(0)
Birmingham-Hoover, AL	18	13	(72.2)	5	(27.8)	0	(0)
Boise City, ID	10	5	(50.0)	5	(50.0)	0	(0)
Boston-Cambridge-Newton, MA-NH	148	18	(12.2)	129	(87.2)	1	(0.7)
Bridgeport-Stamford-Norwalk, CT	21	3	(14.3)	18	(85.7)	0	(0)
Buffalo-Cheektowaga-Niagara Falls, NY	15	7	(46.7)	8	(53.3)	0	(0)
Cape Coral-Fort Myers, FL	19	5	(26.3)	14	(73.7)	0	(0)
Charleston-North Charleston, SC	12	10	(83.3)	2	(16.7)	0	(0)
Charlotte-Concord-Gastonia, NC-SC	50	24	(48.0)	26	(52.0)	0	(0)
Chattanooga, TN-GA	11	4	(36.4)	7	(63.6)	0	(0)
Chicago-Naperville-Elgin, IL-IN-WI	312	78	(25.0)	234	(75.0)	0	(0)
Cincinnati, OH-KY-IN	28	12	(42.9)	16	(57.1)	0	(0)
Cleveland-Elyria, OH	23	13	(56.5)	10	(43.5)	0	(0)
Colorado Springs, CO	---	---	---	---	---	---	---
Columbia, SC	21	11	(52.4)	10	(47.6)	0	(0)
Columbus, OH	50	9	(18.0)	41	(82.0)	0	(0)
Dallas-Fort Worth-Arlington, TX	319	140	(43.9)	179	(56.1)	0	(0)
Dayton, OH	7	2	(28.6)	5	(71.4)	0	(0)
Deltona-Daytona Beach-Ormond Beach, FL	11	5	(45.5)	6	(54.5)	0	(0)
Denver-Aurora-Lakewood, CO	48	10	(20.8)	38	(79.2)	0	(0)
Des Moines-West Des Moines, IA	17	3	(17.6)	14	(82.4)	0	(0)
Detroit-Warren-Dearborn, MI	82	34	(41.5)	48	(58.5)	0	(0)
Durham-Chapel Hill, NC	13	1	(7.7)	12	(92.3)	0	(0)
El Paso, TX	43	13	(30.2)	30	(69.8)	0	(0)
Fayetteville-Springdale-Rogers, AR-MO	27	13	(48.1)	14	(51.9)	0	(0)
Fresno, CA	60	16	(26.7)	44	(73.3)	0	(0)
Grand Rapids-Wyoming, MI	16	4	(25.0)	12	(75.0)	0	(0)
Greensboro-High Point, NC	20	9	(45.0)	11	(55.0)	0	(0)
Greenville-Anderson-Maudlin, SC	10	7	(70.0)	3	(30.0)	0	(0)
Harrisburg-Carlisle, PA	6	3	(50.0)	3	(50.0)	0	(0)
Hartford-West Hartford-East Hartford, CT	16	2	(12.5)	14	(87.5)	0	(0)
Houston-The Woodlands-Sugar Land, TX	350	121	(34.6)	229	(65.4)	0	(0)
Indianapolis-Carmel-Anderson, IN	52	10	(19.2)	42	(80.8)	0	(0)
Jackson, MS	18	13	(72.2)	5	(27.8)	0	(0)
Jacksonville, FL	55	35	(63.6)	20	(36.4)	0	(0)
Kansas City, MO-KS	34	8	(23.5)	26	(76.5)	0	(0)
Knoxville, TN	7	4	(57.1)	3	(42.9)	0	(0)
Lakeland-Winter Haven, FL	12	4	(33.3)	8	(66.7)	0	(0)
Lancaster, PA	6	2	(33.3)	4	(66.7)	0	(0)
Las Vegas-Henderson-Paradise, NV	47	12	(25.5)	35	(74.5)	0	(0)
Lexington-Fayette, KY	11	5	(45.5)	6	(54.5)	0	(0)
Little Rock-North Little Rock-Conway, AR	23	7	(30.4)	16	(69.6)	0	(0)
Los Angeles-Long Beach-Anaheim, CA	756	123	(16.3)	628	(83.1)	5	(0.7)
Louisville-Jefferson County, KY-IN	39	15	(38.5)	24	(61.5)	0	(0)
Madison, WI	8	1	(12.5)	7	(87.5)	0	(0)
McAllen-Edinburg-Mission, TX	84	36	(42.9)	48	(57.1)	0	(0)
Memphis, TN-MS-AR	39	32	(82.1)	7	(17.9)	0	(0)
Miami-Fort Lauderdale-West Palm Beach, FL	234	54	(23.1)	180	(76.9)	0	(0)

Table 63. (Cont'd) Tuberculosis Cases and Percentages, U.S.-Born Persons and Non-U.S.–Born Persons[1]: Metropolitan Statistical Areas with ≥500,000 Population, 2016

Metropolitan statistical area	Total cases	U.S.-born persons		Non-U.S.–born persons		Unknown	
		No.	(%)	No.	(%)	No.	(%)
Milwaukee-Waukesha-West Allis, WI	17	12	(70.6)	5	(29.4)	0	(0)
Minneapolis-St. Paul-Bloomington, MN-WI	132	15	(11.4)	117	(88.6)	0	(0)
Modesto, CA	9	2	(22.2)	6	(66.7)	1	(11.1)
Nashville-Davidson-Murfreesboro-Franklin, TN	35	14	(40.0)	21	(60.0)	0	(0)
New Haven-Milford, CT	10	2	(20.0)	8	(80.0)	0	(0)
New Orleans-Metairie, LA	51	33	(64.7)	18	(35.3)	0	(0)
New York-Newark-Jersey City, NY-NJ-PA	917	145	(15.8)	772	(84.2)	0	(0)
Northport-Sarasota-Bradenton, FL	25	11	(44.0)	14	(56.0)	0	(0)
Ogden-Clearfield, UT	---	---	---	---	---	---	---
Oklahoma City, OK	26	10	(38.5)	16	(61.5)	0	(0)
Omaha-Council Bluffs, NE-IA	14	2	(14.3)	12	(85.7)	0	(0)
Orlando-Kissimmee-Sanford, FL	80	28	(35.0)	52	(65.0)	0	(0)
Oxnard-Thousand Oaks-Ventura, CA	32	4	(12.5)	28	(87.5)	0	(0)
Palm Bay-Melbourne-Titusville, FL	18	12	(66.7)	6	(33.3)	0	(0)
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	144	43	(29.9)	101	(70.1)	0	(0)
Phoenix-Mesa-Scottsdale, AZ	131	32	(24.4)	99	(75.6)	0	(0)
Pittsburgh, PA	15	6	(40.0)	9	(60.0)	0	(0)
Portland-South Portland, ME	10	0	(0)	10	(100.0)	0	(0)
Portland-Vancouver-Hillsboro, OR-WA	55	12	(21.8)	42	(76.4)	1	(1.8)
Providence-Warwick, RI-MA	24	6	(25.0)	18	(75.0)	0	(0)
Provo-Orem, UT	---	---	---	---	---	---	---
Raleigh, NC	40	10	(25.0)	30	(75.0)	0	(0)
Richmond, VA	22	4	(18.2)	18	(81.8)	0	(0)
Riverside-San Bernardino-Ontario, CA	116	32	(27.6)	79	(68.1)	5	(4.3)
Rochester, NY	26	12	(46.2)	14	(53.8)	0	(0)
Sacramento-Roseville-Arden-Arcade, CA	85	17	(20.0)	68	(80.0)	0	(0)
St. Louis, MO-IL	40	18	(45.0)	22	(55.0)	0	(0)
Salt Lake City, UT	14	4	(28.6)	10	(71.4)	0	(0)
San Antonio-New Braunfels, TX	71	38	(53.5)	33	(46.5)	0	(0)
San Diego-Carlsbad, CA	258	69	(26.7)	188	(72.9)	1	(0.4)
San Francisco-Oakland-Hayward, CA	337	37	(11.0)	298	(88.4)	2	(0.6)
San Jose-Sunnyvale-Santa Clara, CA	161	15	(9.3)	145	(90.1)	1	(0.6)
Santa Rosa, CA	12	3	(25.0)	9	(75.0)	0	(0)
Scranton--Wilkes-Barre-Hazleton, PA	---	---	---	---	---	---	---
Seattle-Tacoma-Bellevue, WA	159	32	(20.1)	127	(79.9)	0	(0)
Spokane-Spokane Valley, WA	---	---	---	---	---	---	---
Springfield, MA	10	2	(20.0)	8	(80.0)	0	(0)
Stockton-Lodi, CA	42	12	(28.6)	30	(71.4)	0	(0)
Syracuse, NY	18	1	(5.6)	17	(94.4)	0	(0)
Tampa-St. Petersburg-Clearwater, FL	80	40	(50.0)	40	(50.0)	0	(0)
Toledo, OH	6	3	(50.0)	3	(50.0)	0	(0)
Tucson, AZ	25	9	(36.0)	16	(64.0)	0	(0)
Tulsa, OK	17	7	(41.2)	10	(58.8)	0	(0)
Urban Honolulu, HI	88	15	(17.0)	73	(83.0)	0	(0)
Virginia Beach-Norfolk-Newport News, VA-NC	28	12	(42.9)	16	(57.1)	0	(0)
Washington-Arlington-Alexandria, DC-VA-MD-WV	291	32	(11.0)	259	(89.0)	0	(0)
Wichita, KS	11	2	(18.2)	9	(81.8)	0	(0)
Winston-Salem, NC	9	5	(55.6)	4	(44.4)	0	(0)
Worcester, MA-CT	19	2	(10.5)	17	(89.5)	0	(0)
Youngstown-Warren-Boardman, OH-PA	---	---	---	---	---	---	---
Total - 107 areas	**7,382**	**1,937**	**(26.2)**	**5,427**	**(73.5)**	**18**	**(0.2)**
San Juan-Caguas-Guaynabo, PR	53	45	(84.9)	8	(15.1)	0	(0)

[1]Includes persons born outside of the United States (including the U.S. territories), except persons born to at least one U.S. citizen parent.

Note: See Technical Notes for definition of metropolitan statistical area.

Dashes (---) indicate that the data is suppressed for geographic areas below the state level that reported <5 cases in 2016.

Table 64. Tuberculosis Cases and Percentages, by Homeless Status,[1] Ages ≥15 Years: Metropolitan Statistical Areas with ≥500,000 Population, 2016

Metropolitan statistical area	Total cases	Cases with information on homeless status		Cases reported as being homeless[2]	
		No.	(%)	No.	(%)
Akron, OH	16	16	(100.0)	2	(12.5)
Albany-Schenectady-Troy, NY	7	7	(100.0)	0	(0)
Albuquerque, NM	12	12	(100.0)	1	(8.3)
Allentown-Bethlehem-Easton, PA-NJ	4	4	(100.0)	0	(0)
Atlanta-Sandy Springs-Roswell, GA	189	189	(100.0)	16	(8.5)
Augusta-Richmond County, GA-SC	12	12	(100.0)	1	(8.3)
Austin-Round Rock, TX	62	62	(100.0)	4	(6.5)
Bakersfield, CA	20	20	(100.0)	2	(10.0)
Baltimore-Columbia-Towson, MD	71	71	(100.0)	0	(0)
Baton Rouge, LA	13	13	(100.0)	1	(7.7)
Birmingham-Hoover, AL	17	17	(100.0)	3	(17.6)
Boise City, ID	6	6	(100.0)	0	(0)
Boston-Cambridge-Newton, MA-NH	142	141	(99.3)	4	(2.8)
Bridgeport-Stamford-Norwalk, CT	21	21	(100.0)	0	(0)
Buffalo-Cheektowaga-Niagara Falls, NY	14	14	(100.0)	0	(0)
Cape Coral-Fort Myers, FL	19	18	(94.7)	0	(0)
Charleston-North Charleston, SC	7	7	(100.0)	0	(0)
Charlotte-Concord-Gastonia, NC-SC	47	47	(100.0)	5	(10.6)
Chattanooga, TN-GA	11	11	(100.0)	0	(0)
Chicago-Naperville-Elgin, IL-IN-WI	297	296	(99.7)	17	(5.7)
Cincinnati, OH-KY-IN	27	27	(100.0)	2	(7.4)
Cleveland-Elyria, OH	23	23	(100.0)	2	(8.7)
Colorado Springs, CO	---	---	---	---	---
Columbia, SC	18	18	(100.0)	1	(5.6)
Columbus, OH	46	46	(100.0)	3	(6.5)
Dallas-Fort Worth-Arlington, TX	304	304	(100.0)	26	(8.6)
Dayton, OH	7	7	(100.0)	0	(0)
Deltona-Daytona Beach-Ormond Beach, FL	11	10	(90.9)	1	(10.0)
Denver-Aurora-Lakewood, CO	46	46	(100.0)	4	(8.7)
Des Moines-West Des Moines, IA	17	16	(94.1)	0	(0)
Detroit-Warren-Dearborn, MI	78	78	(100.0)	4	(5.1)
Durham-Chapel Hill, NC	12	12	(100.0)	1	(8.3)
El Paso, TX	37	37	(100.0)	3	(8.1)
Fayetteville-Springdale-Rogers, AR-MO	24	24	(100.0)	1	(4.2)
Fresno, CA	54	54	(100.0)	3	(5.6)
Grand Rapids-Wyoming, MI	15	15	(100.0)	0	(0)
Greensboro-High Point, NC	19	19	(100.0)	1	(5.3)
Greenville-Anderson-Maudlin, SC	9	9	(100.0)	0	(0)
Harrisburg-Carlisle, PA	6	6	(100.0)	0	(0)
Hartford-West Hartford-East Hartford, CT	15	15	(100.0)	0	(0)
Houston-The Woodlands-Sugar Land, TX	330	329	(99.7)	13	(4.0)
Indianapolis-Carmel-Anderson, IN	49	49	(100.0)	0	(0)
Jackson, MS	17	17	(100.0)	3	(17.6)
Jacksonville, FL	54	50	(92.6)	4	(8.0)
Kansas City, MO-KS	34	34	(100.0)	4	(11.8)
Knoxville, TN	7	7	(100.0)	0	(0)
Lakeland-Winter Haven, FL	11	11	(100.0)	0	(0)
Lancaster, PA	6	6	(100.0)	0	(0)
Las Vegas-Henderson-Paradise, NV	44	44	(100.0)	1	(2.3)
Lexington-Fayette, KY	11	11	(100.0)	2	(18.2)
Little Rock-North Little Rock-Conway, AR	22	22	(100.0)	2	(9.1)
Los Angeles-Long Beach-Anaheim, CA	743	743	(100.0)	52	(7.0)
Louisville-Jefferson County, KY-IN	38	38	(100.0)	1	(2.6)
Madison, WI	8	8	(100.0)	0	(0)
McAllen-Edinburg-Mission, TX	76	76	(100.0)	0	(0)
Memphis, TN-MS-AR	36	36	(100.0)	3	(8.3)
Miami-Fort Lauderdale-West Palm Beach, FL	225	217	(96.4)	6	(2.8)

Table 64. (Cont'd) Tuberculosis Cases and Percentages, by Homeless Status,[1] Ages ≥15 Years: Metropolitan Statistical Areas with ≥500,000 Population, 2016

Metropolitan statistical area	Total cases	Cases with information on homeless status		Cases reported as being homeless[2]	
		No.	(%)	No.	(%)
Milwaukee-Waukesha-West Allis, WI	15	15	(100.0)	1	(6.7)
Minneapolis-St. Paul-Bloomington, MN-WI	121	121	(100.0)	6	(5.0)
Modesto, CA	9	8	(88.9)	0	(0)
Nashville-Davidson-Murfreesboro-Franklin, TN	33	33	(100.0)	0	(0)
New Haven-Milford, CT	10	10	(100.0)	0	(0)
New Orleans-Metairie, LA	50	49	(98.0)	4	(8.2)
New York-Newark-Jersey City, NY-NJ-PA	890	886	(99.6)	17	(1.9)
Northport-Sarasota-Bradenton, FL	22	21	(95.5)	3	(14.3)
Ogden-Clearfield, UT	---	---	---	---	---
Oklahoma City, OK	25	24	(96.0)	1	(4.2)
Omaha-Council Bluffs, NE-IA	13	12	(92.3)	0	(0)
Orlando-Kissimmee-Sanford, FL	78	78	(100.0)	3	(3.8)
Oxnard-Thousand Oaks-Ventura, CA	32	32	(100.0)	2	(6.3)
Palm Bay-Melbourne-Titusville, FL	18	18	(100.0)	0	(0)
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	137	137	(100.0)	4	(2.9)
Phoenix-Mesa-Scottsdale, AZ	129	126	(97.7)	7	(5.6)
Pittsburgh, PA	14	14	(100.0)	0	(0)
Portland-South Portland, ME	10	10	(100.0)	1	(10.0)
Portland-Vancouver-Hillsboro, OR-WA	51	50	(98.0)	6	(12.0)
Providence-Warwick, RI-MA	21	21	(100.0)	1	(4.8)
Provo-Orem, UT	---	---	---	---	---
Raleigh, NC	37	37	(100.0)	1	(2.7)
Richmond, VA	22	22	(100.0)	1	(4.5)
Riverside-San Bernardino-Ontario, CA	113	113	(100.0)	7	(6.2)
Rochester, NY	23	23	(100.0)	1	(4.3)
Sacramento-Roseville-Arden-Arcade, CA	82	80	(97.6)	3	(3.8)
St. Louis, MO-IL	39	39	(100.0)	4	(10.3)
Salt Lake City, UT	12	12	(100.0)	1	(8.3)
San Antonio-New Braunfels, TX	70	70	(100.0)	12	(17.1)
San Diego-Carlsbad, CA	247	247	(100.0)	21	(8.5)
San Francisco-Oakland-Hayward, CA	332	330	(99.4)	12	(3.6)
San Jose-Sunnyvale-Santa Clara, CA	158	157	(99.4)	6	(3.8)
Santa Rosa, CA	12	11	(91.7)	0	(0)
Scranton-Wilkes-Barre-Hazleton, PA	---	---	---	---	---
Seattle-Tacoma-Bellevue, WA	153	150	(98.0)	2	(1.3)
Spokane-Spokane Valley, WA	---	---	---	---	---
Springfield, MA	10	10	(100.0)	0	(0)
Stockton-Lodi, CA	42	42	(100.0)	2	(4.8)
Syracuse, NY	18	18	(100.0)	0	(0)
Tampa-St. Petersburg-Clearwater, FL	79	77	(97.5)	8	(10.4)
Toledo, OH	6	6	(100.0)	0	(0)
Tucson, AZ	25	23	(92.0)	1	(4.3)
Tulsa, OK	13	13	(100.0)	2	(15.4)
Urban Honolulu, HI	85	85	(100.0)	6	(7.1)
Virginia Beach-Norfolk-Newport News, VA-NC	27	27	(100.0)	2	(7.4)
Washington-Arlington-Alexandria, DC-VA-MD-WV	281	281	(100.0)	6	(2.1)
Wichita, KS	11	11	(100.0)	1	(9.1)
Winston-Salem, NC	9	9	(100.0)	0	(0)
Worcester, MA-CT	19	19	(100.0)	2	(10.5)
Youngstown-Warren-Boardman, OH-PA	---	---	---	---	---
Total - 107 areas	**7,085**	**7,041**	**(99.4)**	**356**	**(5.1)**
San Juan-Caguas-Guaynabo, PR	52	52	(100.0)	3	(5.8)

[1]Homeless within past 12 months of TB diagnosis.
[2]Percent of those with known status.
Note: See Technical Notes for definition of metropolitan statistical area.
Dashes (---) indicate that the data is suppressed for geographic areas below the state level that reported <5 cases in 2016.

Estimates of Recent Transmission, 2015–2016

OVERVIEW

Eliminating TB in the United States requires interrupting the TB transmission that is still occurring in some communities. Improved analytic methods can provide estimates of the numbers of TB cases attributed to recent transmission by distinguishing them from cases likely due to reactivation of longstanding, untreated latent TB infection. Distinguishing these cases is an important consideration for state and local TB programs that are designing effective public health interventions.

In this new section of the annual report, CDC is including data from these improved methods[1] for estimating recent TB transmission, which replace the estimates of county-based genotype clustering in previous editions of the annual report that could have overestimated the proportion of cases attributed to recent transmission. These estimates can be used by state and local TB programs to:

- monitor trends in recent transmission,
- use limited public health resources to plan and prioritize TB control activities,
- enhance service delivery by applying sufficient resources,
- identify geographic, demographic, and social disparities in the proportion of cases attributed to recent transmission,
- develop specific prevention strategies and interventions to interrupt transmission, and
- facilitate connections among jurisdictions to share TB control strategies.

Recent transmission is a concerning public health issue regardless of the overall TB incidence in a particular state; even states with a low incidence of TB overall may have counties where transmission is occurring.[2] Because not only TB incidence but also demographics and molecular epidemiology vary considerably among states and counties, these data should not be compared across jurisdictions.

TERMINOLOGY

Overall recent transmission: Using national surveillance data, a TB case is designated as attributed to recent transmission if a plausible source case[1] can be identified who:

1. has the same *M. tuberculosis* genotype,
2. has an infectious form of TB disease,
3. resides within 10 miles of the TB case,
4. is 10 years of age or older, and
5. was diagnosed within 2 years before the TB case.

Overall recent transmission estimates are mapped as counts to describe the relative numbers of cases attributed to recent TB transmission (Figure 1).

Extensive recent transmission: A TB case is designated as attributed to extensive recent transmission when the criteria above for overall recent transmission are met, and the case belongs to a plausible transmission chain of six or more cases (i.e., the plausible source case and four or more other cases identified within 3 years before the TB case). Extensive recent transmission estimates are presented as a percentage of all genotyped cases to identify areas and populations disproportionately affected by extensive recent transmission among counties with 10 or more genotyped cases (Figure 2).

RECENT TRANSMISSION IN THE UNITED STATES

Nationally, 13.7% of genotyped cases reported during 2015-2016 are attributed to overall recent transmission (Table 65) and 5.0% of genotyped cases are attributed to extensive recent transmission.

Geography

Forty-eight counties (or county equivalents) had >5% of cases attributed to extensive recent transmission (Table 66). In these counties, the median number of genotyped cases was 41, although the number of cases ranged from 10 cases to 986 cases. The median percentage of genotyped cases

occurring in U.S.-born patients (48.4%) was significantly higher in these 48 counties compared with the national proportion of TB cases among U.S.-born persons (31.5%).

Demographic and social characteristics
Cases among U.S.-born persons were more frequently attributed to both overall recent transmission (26.2%) and extensive recent transmission (11.6%) than cases among non-U.S.–born persons (8.1% and 2.1%, respectively) (Table 67). Racial disparities in the proportions of cases attributed to overall and extensive recent transmission were identified among American Indians/Alaska Natives (36.8% and 19.2%, respectively), Native Hawaiian/Other Pacific Islander (25.6% and 12.0%), and non-Hispanic Blacks/African Americans (21.2% and 9.8%).

Greater proportions of cases attributed to overall recent transmission and extensive recent transmission were identified among persons reporting injecting drug use (35.0% and 12.7%, respectively), non-injecting drug use (33.0% and 14.2%), or excess alcohol use (28.8% and 13.2%) within the past year compared with national averages for 2015–2016. Cases also were more frequently attributed to overall and extensive recent transmission among people experiencing homelessness within the past year (36.7% and 21.5%, respectively) and residents of a correctional facility at the time of diagnosis (21.8% and 12.5%).

LIMITATIONS

An important limitation of these methods for estimating recent transmission is that they can only be applied to 13,777 culture-confirmed, genotyped cases in 2015 and 2016. Clinically diagnosed TB cases are excluded from these methods, so pediatric cases are likely underrepresented in the estimates. This limitation is especially relevant for TB cases in young children, which are most likely to be due to recent transmission because of young age.

The proportions of cases attributed to recent transmission are generally higher in areas with fewer *M. tuberculosis* genotypes. Recent transmission may be overestimated in relatively closed populations and remote areas, such as parts of Alaska, where prevalent genotypes have been predominant for many years. These characteristics make it difficult to distinguish cases attributed to recent transmission from cases due to reactivation of longstanding, untreated latent TB infection.

In general, estimates of recent transmission are limited by the molecular resolution of genotyping. As evidenced by whole-genome sequencing results, genomic diversity may be greater that what is apparent using current genotyping methods among cases reported by areas bordering Mexico. Recent transmission also may be overestimated in some counties with relatively large numbers of common genotypes (Table 24) because plausible source cases and transmission chains are more likely present for these genotypes. Conversely, single locus variants in genotyping results, which are assigned distinct genotypes, would not meet the method's criteria so recent transmission could be underestimated in some cases.

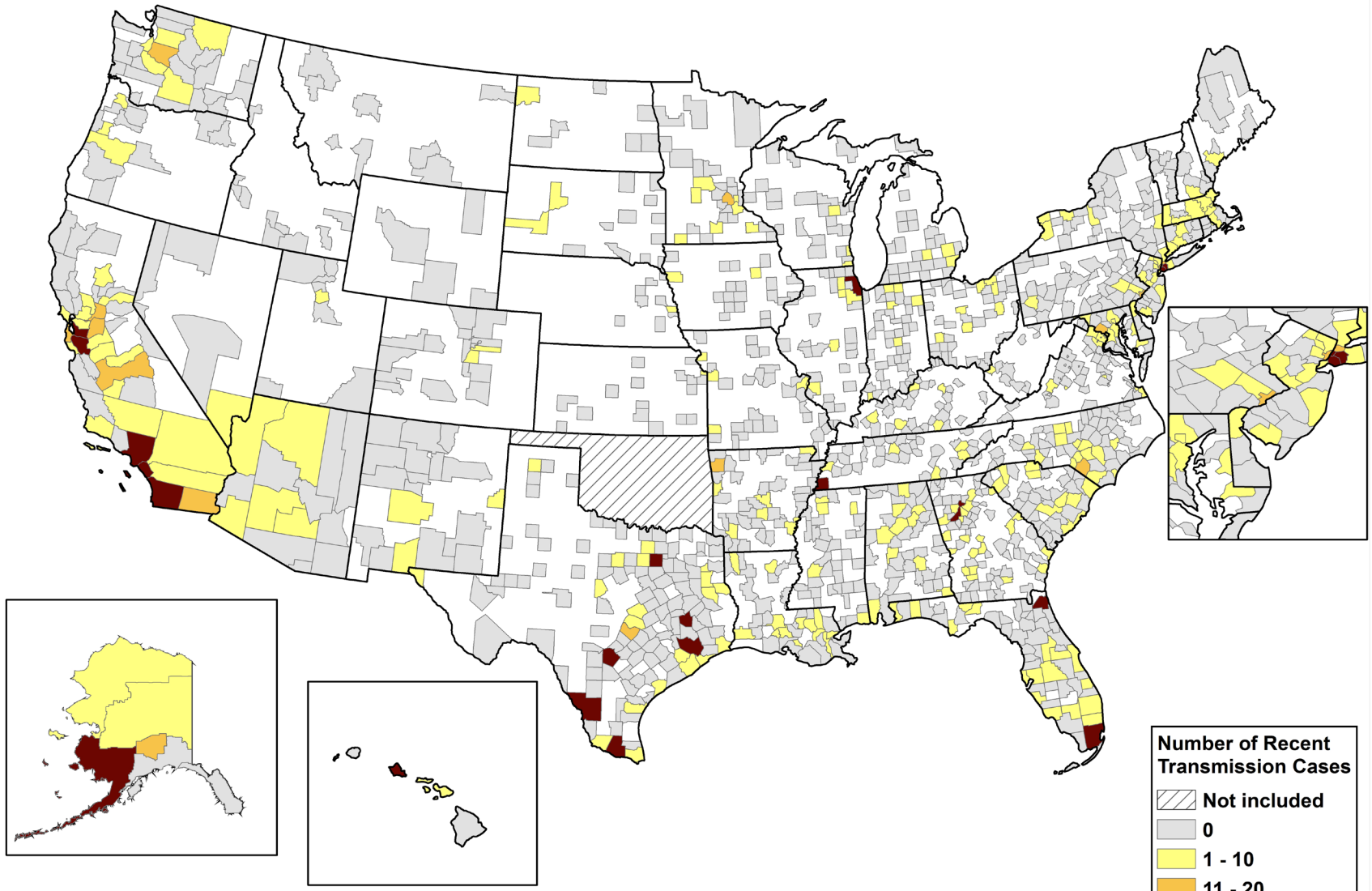
FUTURE APPLICATIONS

The estimates provided here present a description of the U.S. landscape of recent transmission. The estimates should be considered as one type of data to describe TB epidemiology in a particular jurisdiction. Although national surveillance data can only provide aggregated estimates, these methods offer state and local TB control programs new opportunities to track trends in recent transmission and prioritize public health activities and interventions.

REFERENCES

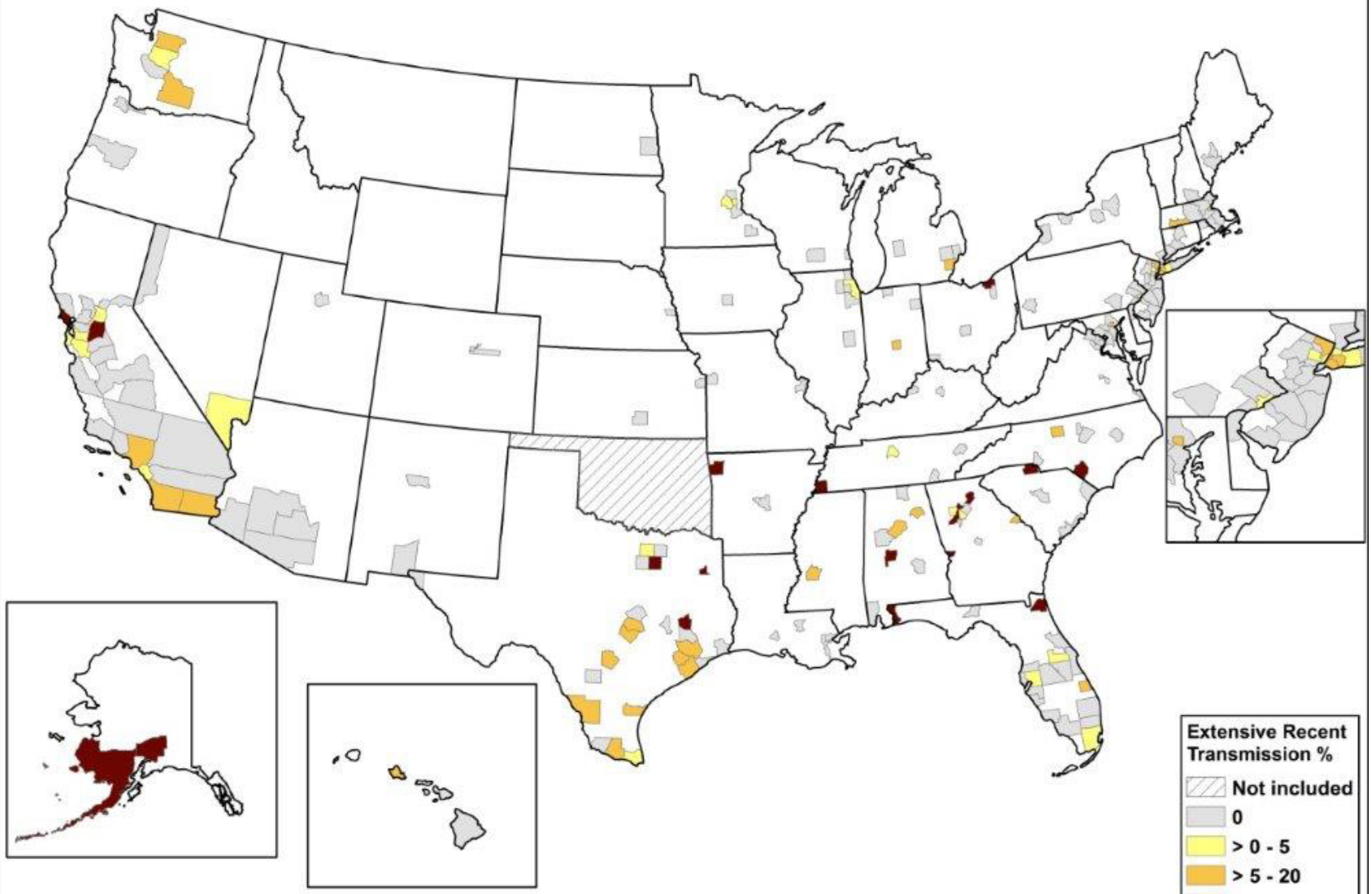
1. France AM, Grant J, Kammerer JS, Navin TR. A field-validated approach using surveillance and genotyping data to estimate tuberculosis attributable to recent transmission in the United States. Am J Epidemiol 2015; 182: 799-807.
2. Yuen CM, Kammerer JS, Marks K, Navin TR, France AM. Recent Transmission of Tuberculosis - United States, 2011-2014. PLoS One 2016; 11: e0153728.

Figure 1. Estimated Cases Attributed to Recent Transmission of Tuberculosis, United States, 2015–2016*



*Counties shaded white had no genotyped cases that could be evaluated for recent transmission during 2015-2016.

Figure 2. Estimated Percentage of Extensive Recent Transmission of Tuberculosis in Counties with 10 or More Genotyped Cases, United States, 2015–2016*



*Counties shaded white had <10 genotyped cases that could be evaluated for recent transmission during 2015-2016.

Table 65. Counts and Percentages of Tuberculosis Cases Estimated to be Attributed to Overall and Extensive Recent Transmission: Reporting Areas, 2015–2016

Reporting area[1]	Total genotyped cases[2]	Cases not attributed to overall recent transmission		Cases attributed to overall recent transmission[3]		Cases attributed to extensive recent transmission[4]	
		No.	(%)	No.	%	No.	%
United States	**13,777**	**11,883**	**(86.3)**	**1,894**	**(13.7)**	**690**	**(5.0)**
Alabama	180	132	(73.3)	48	(26.7)	18	(10.0)
Alaska	102	57	(55.9)	45	(44.1)	27	(26.5)
Arizona	292	266	(91.1)	26	(8.9)	0	(0)
Arkansas	123	101	(82.1)	22	(17.9)	9	(7.3)
California	3,246	2,798	(86.2)	448	(13.8)	164	(5.1)
Colorado	86	83	(96.5)	3	(3.5)	0	(0)
Connecticut	92	88	(95.7)	4	(4.3)	0	(0)
District of Columbia	46	37	(80.4)	9	(19.6)	3	(6.5)
Delaware	31	30	(96.8)	1	(3.2)	0	(0)
Florida	945	826	(87.4)	119	(12.6)	45	(4.8)
Georgia	437	353	(80.8)	84	(19.2)	45	(10.3)
Hawaii	183	154	(84.2)	29	(15.8)	9	(4.9)
Idaho	21	21	(100.0)	0	(0)	0	(0)
Illinois	469	414	(88.3)	55	(11.7)	10	(2.1)
Indiana	164	147	(89.6)	17	(10.4)	4	(2.4)
Iowa	56	54	(96.4)	2	(3.6)	0	(0)
Kansas	70	69	(98.6)	1	(1.4)	0	(0)
Kentucky	100	85	(85.0)	15	(15.)	0	(0)
Louisiana	149	119	(79.9)	30	(20.1)	1	(0.7)
Maine	32	31	(96.9)	1	(3.1)	0	(0)
Maryland	289	257	(88.9)	32	(11.1)	5	(1.7)
Massachusetts	265	243	(91.7)	22	(8.3)	4	(1.5)
Michigan	161	154	(95.7)	7	(4.3)	4	(2.5)
Minnesota	252	227	(90.1)	25	(9.9)	3	(1.2)
Mississippi	91	78	(85.7)	13	(14.3)	5	(5.5)
Missouri	136	121	(89.0)	15	(11.0)	0	(0)
Montana	9	9	(100.0)	0	(0)	0	(0)
Nebraska	33	32	(97.0)	1	(3.0)	0	(0)
Nevada	99	89	(89.9)	10	(10.1)	2	(2.0)
New Hampshire	18	17	(94.4)	1	(5.6)	0	(0)
New Jersey	471	438	(93.0)	33	(7.0)	8	(1.7)
New Mexico	67	64	(95.5)	3	(4.5)	0	(0)
New York[5]	288	269	(93.4)	19	(6.6)	3	(1.0)
New York City	818	662	(80.9)	156	(19.1)	61	(7.5)
North Carolina	350	290	(82.9)	60	(17.1)	25	(7.1)
North Dakota	22	20	(90.9)	2	(9.1)	0	(0)
Ohio	197	178	(90.4)	19	(9.6)	11	(5.6)
Oregon	104	95	(91.3)	9	(8.7)	0	(0)
Pennsylvania	263	240	(91.3)	23	(8.7)	3	(1.1)
Rhode Island	27	26	(96.3)	1	(3.7)	0	(0)
South Carolina	155	133	(85.8)	22	(14.2)	3	(1.9)
South Dakota	24	21	(87.5)	3	(12.5)	0	(0)
Tennessee	160	126	(78.8)	34	(21.3)	19	(11.9)
Texas	1,841	1,469	(79.8)	372	(20.2)	191	(10.4)
Utah	40	39	(97.5)	1	(2.5)	0	(0)
Vermont	12	12	(100.0)	0	(0)	0	(0)
Virginia	326	307	(94.2)	19	(5.8)	0	(0)
Washington	326	301	(92.3)	25	(7.7)	8	(2.5)
West Virginia	18	17	(94.4)	1	(5.6)	0	(0)
Wisconsin	86	79	(91.9)	7	(8.1)	0	(0)
Wyoming	5	5	(100.0)	0	(0)	0	(0)

[1]Oklahoma cases were excluded because they lacked sufficient geographic data to apply the plausible source-case method.
[2]Total number of *M. tuberculosis* genotyped cases that are eligible to be evaluated for recent transmission (i.e., complete data for the plausible-source case method's algorithm).
[3] Number of cases attributed to overall recent transmission includes any given case with a plausible source case regardless of cluster size.
[4]Number of cases attributed to extensive recent transmission includes only cases in a plausible chain of transmission of six or more cases (five secondary and one source case).
[5]Excludes New York City.

Table 66. Counts and Percentages of Tuberculosis Cases Estimated to be Attributed to Overall and Extensive Recent Transmission: Counties with >5 Percent Estimated Extensive Recent Transmission, 2015-2016

Counties and county equivalents[1]	Total genotyped cases[2]	Percentage of genotyped cases that are U.S.-born	Number of unique GENTypes[3]	Cases attributed to overall recent transmission[4]	Cases attributed to extensive recent transmission[5]	Percentage of cases attributed to extensive recent transmission[6]
Anchorage/Mat-Su (Region), AK[7]	31	(54.8)	23	11	8	(25.8)
Baltimore (City), MD	30	(60.0)	26	6	5	(16.7)
Bergen, NJ	58	(15.5)	56	4	3	(5.2)
Bexar, TX	112	(53.6)	88	26	6	(5.4)
Brazoria, TX	15	(53.3)	14	3	1	(6.7)
Cuyahoga, OH	28	(60.7)	22	7	7	(25.0)
Dallas, TX	273	(47.6)	200	81	67	(24.5)
District of Columbia	46	(34.8)	42	9	3	(6.5)
Duval, FL	84	(70.2)	49	37	30	(35.7)
Escambia, FL	17	(70.6)	11	7	6	(35.3)
Etowah, AL	14	(100.0)	7	8	2	(14.3)
Fort Bend, TX	40	(37.5)	38	4	3	(7.5)
Fulton, GA	72	(75.0)	47	29	24	(33.3)
Gregg, TX	13	(84.6)	6	7	5	(38.5)
Guilford, NC	31	(19.4)	24	8	3	(9.7)
Hall, GA	10	(60.0)	5	7	5	(50.0)
Hampden, MA	13	(38.5)	12	2	2	(15.4)
Harris, TX	417	(36.0)	306	104	54	(12.9)
Hidalgo, TX	120	(36.7)	91	35	11	(9.2)
Hinds, MS	23	(78.3)	18	6	4	(17.4)
Honolulu, HI	138	(15.9)	112	27	9	(6.5)
Imperial, CA	56	(41.1)	39	17	7	(12.5)
Jefferson, AL	26	(76.9)	21	9	3	(11.5)
Kings, NY	240	(18.3)	209	56	23	(9.6)
Los Angeles, CA	986	(16.7)	775	175	79	(8.0)
Marin, CA	10	(10.0)	5	6	3	(30.0)
Marion, IN	63	(28.6)	59	7	4	(6.3)
Muscogee, GA	16	(87.5)	9	8	7	(43.8)
New York, NY	119	(24.4)	109	28	8	(6.7)
Nueces, TX	18	(72.2)	15	5	2	(11.1)
Perry, AL	12	(100.0)	4	9	9	(75.0)
Queens, NY	329	(6.1)	299	52	25	(7.6)
Richmond, GA	10	(90.0)	9	2	2	(20.0)
Robeson, NC	33	(87.9)	11	18	13	(39.4)
San Diego, CA	386	(22.5)	314	66	25	(6.5)
San Joaquin, CA	72	(30.6)	57	19	16	(22.2)
Shelby, TN	48	(72.9)	27	24	18	(37.5)
Snohomish, WA	47	(17.0)	45	3	3	(6.4)
Southwest (Region), AK[7]	49	(100.0)	17	27	15	(30.6)
St. Lucie, FL	16	(37.5)	13	5	1	(6.3)
Travis, TX	85	(23.5)	73	13	9	(10.6)
Walker, TX	51	(92.2)	23	28	21	(41.2)
Washington, AR	26	(50.0)	17	11	9	(34.6)
Wayne, MI	42	(47.6)	38	5	4	(9.5)
Webb, TX	61	(49.2)	43	22	9	(14.8)
Williamson, TX	18	(38.9)	18	1	1	(5.6)
Yakima, WA	16	(43.8)	12	3	1	(6.3)
York, SC	12	(83.3)	7	6	3	(25.0)

[1]Counties (and county equivalents) that had >5% of cases attributed to extensive recent transmission are included in table 66.
[2]Total number of *M. tuberculosis* genotyped cases that are eligible to be evaluated for recent transmission (i.e., complete data for the plausible-source case method's algorithm).
[3]Total number of unique GENTypes identified in the county among all genotyped cases that are eligible to be evaluated for recent transmission.
[4]Number of cases attributed to overall recent transmission includes any given case with a plausible source case regardless of cluster size.
[5]Number of cases attributed to extensive recent transmission includes only cases in a plausible chain of transmission of six or more cases (five secondary and one source case).
[6]Proportion of cases attributed to extensive recent transmission calculated for counties with 10 or more genotyped cases.
[7]Recent transmission estimates for Alaska are aggregated to region level (http://live.laborstats.alaska.gov/pop/estimates/pub/popover.pdf).

This page intentionally left blank

Table 67. Characteristics of Tuberculosis Cases Estimated to be Attributed to Overall and Extensive Recent Transmission: United States[1], 2015–2016

Case characteristics	Total genotyped cases[2]	Cases not attributed to overall recent transmission		Cases attributed to overall recent transmission[3]		Cases attributed to extensive recent transmission[4]	
		No.	(%)	No.	(%)	No.	(%)
Total	**13,777**	**11,883**	**(86.3)**	**1,894**	**(13.7)**	**690**	**(5.0)**
Origin of birth							
U.S-born	4,272	3,154	(73.8)	1,118	(26.2)	494	(11.6)
Non-U.S.–born	9,484	8,712	(91.9)	772	(8.1)	194	(2.1)
Unknown or missing	21	17	(81.0)	4	(19.0)	2	(9.5)
Race and ethnicity							
Hispanic/Latino	3,714	3,154	(84.9)	560	(15.1)	160	(4.3)
American Indian/Alaska Native	193	122	(63.2)	71	(36.8)	37	(19.2)
Asian	5,009	4,623	(92.3)	386	(7.7)	113	(2.3)
Black/African American	2,821	2,223	(78.8)	598	(21.2)	276	(9.8)
Native Hawaiian/Other Pacific Islander	125	93	(74.4)	32	(25.6)	15	(12.0)
White	1,784	1,553	(87.1)	231	(12.9)	85	(4.8)
Multiple race	87	72	(82.8)	15	(17.2)	4	(4.6)
Unknown or missing	44	43	(97.7)	1	(2.3)	0	(0)
Age group (years)							
0–4	120	63	(52.5)	57	(47.5)	12	(10.0)
5–14	106	77	(72.6)	29	(27.4)	9	(8.5)
15–24	1,380	1,168	(84.6)	212	(15.4)	65	(4.7)
25–44	4,202	3,576	(85.1)	626	(14.9)	211	(5.0)
45–64	4,386	3,670	(83.7)	716	(16.3)	315	(7.2)
≥65	3,577	3,323	(92.9)	254	(7.1)	78	(2.2)
Unknown	6	6	(100.0)	0	(0)	0	(0)
Disease site							
Pulmonary only	10,108	8,607	(85.2)	1,501	(14.8)	564	(5.6)
Extrapulmonary	2,115	1,907	(90.2)	208	(9.8)	60	(2.8)
Both	1,546	1,361	(88.0)	185	(12.0)	66	(4.3)
Unknown	8	8	(100.0)	0	(0)	0	(0)
Sputum smear							
Positive	6,547	5,567	(85.0)	980	(15.0)	367	(5.6)
Negative	5,543	4,821	(87.0)	722	(13.0)	265	(4.8)
Not done	1,669	1,447	(86.7)	192	(11.5)	58	(3.5)
Unknown or missing	18	18	(100.0)	0	(0)	1	(5.6)
Cavitary disease[5]							
Yes	141	119	(84.4)	22	(15.6)	11	(7.8)
No	1,104	968	(87.7)	136	(12.3)	50	(4.5)
Unknown or missing	2	2	(100.0)	0	(0)	0	(0)
Homeless within past year							
Yes	753	477	(63.4)	276	(36.7)	162	(21.5)
No	12,957	11,344	(87.6)	1,613	(12.4)	527	(4.1)
Unknown or missing	67	62	(92.5)	5	(7.5)	1	(1.5)

Table 67. (Con't) Characteristics of Tuberculosis Cases Estimated to be Attributed to Overall and Extensive Recent Transmission: United States[1], 2015–2016

Case characteristics	Total genotyped cases[2]	Cases not attributed to overall recent transmission		Cases attributed to overall recent transmission[3]		Cases attributed to extensive recent transmission[4]	
		No.	(%)	No.	(%)	No.	(%)
Excess alcohol use within the past year							
Yes	1,517	1,080	(71.2)	437	(28.8)	200	(13.2)
No	12,088	10,651	(88.1)	1,437	(11.9)	488	(4.0)
Unknown or missing	172	152	(88.4)	20	(11.6)	2	(1.2)
Injecting illicit drug use within past year							
Yes	197	128	(65.0)	69	(35.0)	25	(12.7)
No	13,422	11,629	(86.6)	1,793	(13.4)	658	(4.9)
Unknown or missing	158	126	(79.7)	32	(20.3)	7	(4.4)
Noninjecting illicit drug use within past year							
Yes	1,011	677	(67.0)	334	(33.0)	144	(14.2)
No	12,612	11,085	(87.9)	1,527	(12.1)	536	(4.3)
Unknown or missing	154	121	(78.6)	33	(21.4)	10	(6.5)
Resident of a correctional facility at the time of diagnosis							
Yes	449	351	(78.2)	98	(21.8)	56	(12.5)
No	12,582	10,928	(86.9)	1,654	(13.1)	571	(4.5)
Unknown or missing	746	604	(81.0)	142	(19.0)	63	(8.5)
HIV status							
Positive	705	585	(83.0)	120	(17.0)	57	(8.1)
Negative	11,632	10,010	(86.1)	1,622	(13.9)	594	(5.1)
Refused testing	321	281	(87.5)	40	(12.5)	14	(4.4)
Testing not offered	760	684	(90.0)	76	(10.0)	18	(2.4)
Unknown, missing or indeterminate	359	323	(90.0)	36	(10.0)	7	(2.0)
Multidrug-resistant TB							
Yes	182	162	(89.0)	20	(11.0)	4	(2.2)
No	13,295	11,458	(86.2)	1,837	(13.8)	675	(5.1)
Unknown or missing	300	263	(87.7)	37	(12.3)	11	(3.7)

[1]Oklahoma cases were excluded because they lacked sufficient geographic data to apply the plausible source-case method.
[2]Total number of *M. tuberculosis* genotyped cases that are eligible to be evaluated for recent transmission (i.e., complete data for the plausible-source case method's algorithm).
[3]Number of cases attributed to overall recent transmission includes any given case with a plausible source case regardless of cluster size.
[4]Number of cases attributed to extensive recent transmission includes only cases in a plausible chain of transmission of six or more cases (five secondary and one source case).
[5]Cavitary disease only assessed for persons with pulmonary TB and an abnormal x-ray.

Surveillance Slide Set 2016

Surveillance Slide #1

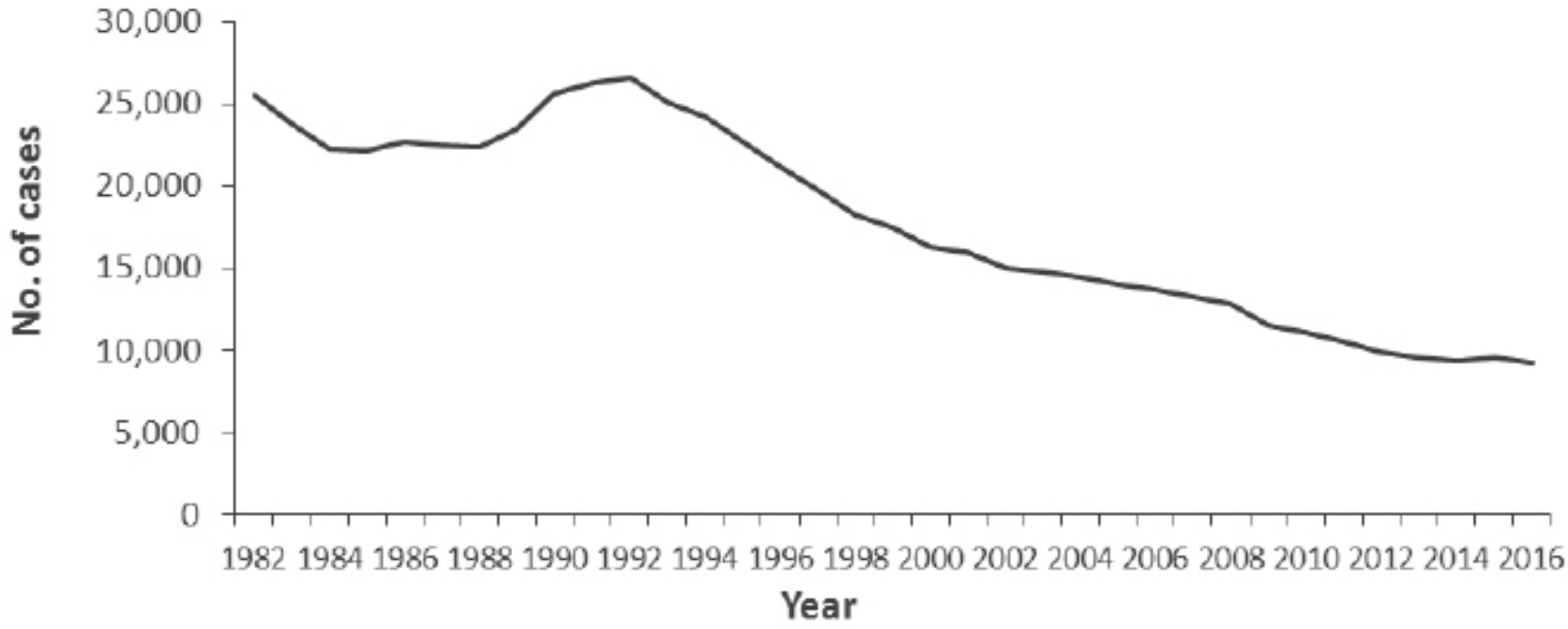
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
Division of Tuberculosis Elimination

Tuberculosis in the United States

National Tuberculosis Surveillance System
Highlights from 2016

Surveillance Slide #2

Reported Tuberculosis (TB) Cases United States, 1982–2016*



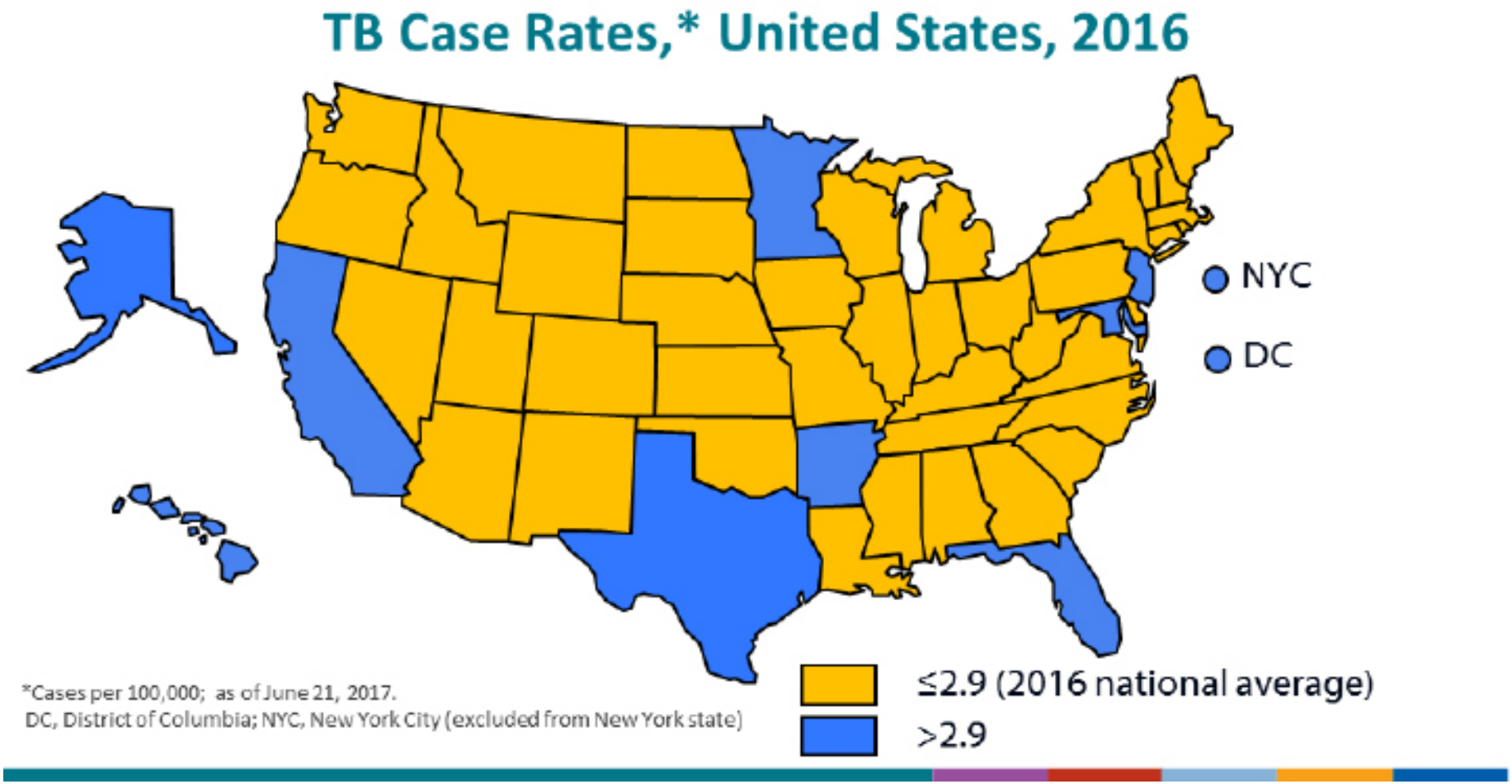
*As of June 21, 2017.

TB Morbidity United States, 2011–2016

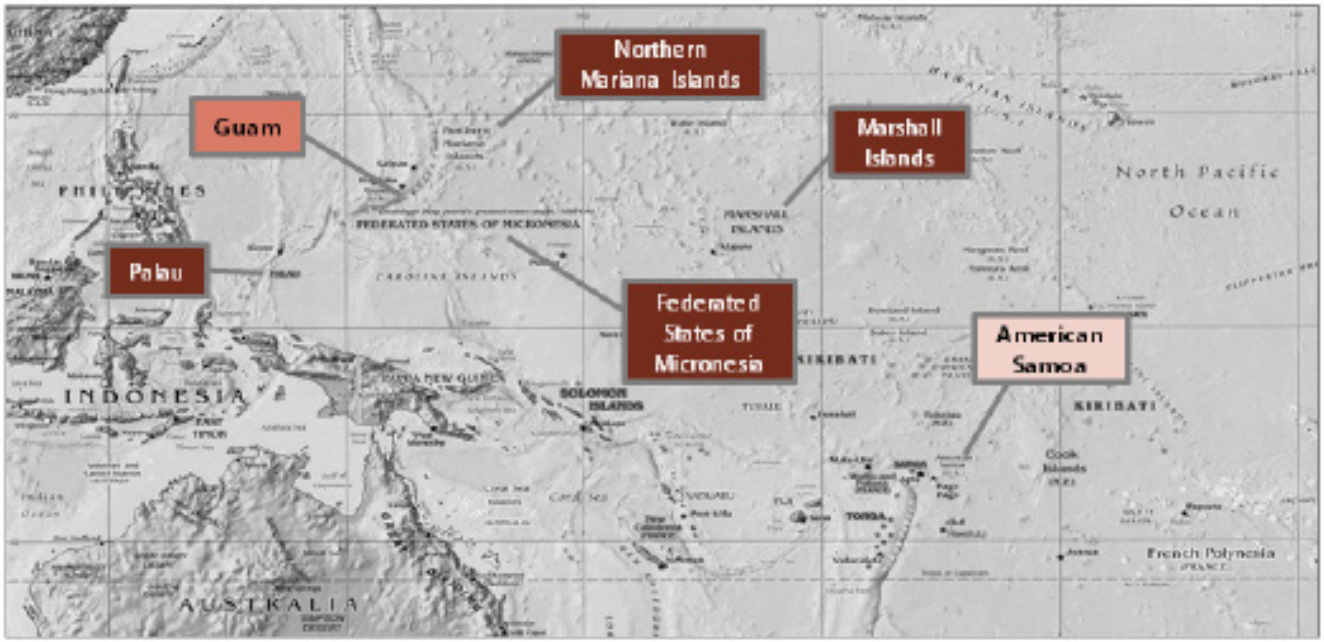
Year	No.	Rate*
2011	10,509	3.4
2012	9,940	3.2
2013	9,561	3.0
2014	9,398	3.0
2015	9,547	3.0
2016	9,272	2.9

* Cases per 100,000 population; as of June 21, 2017.

Surveillance Slide #4



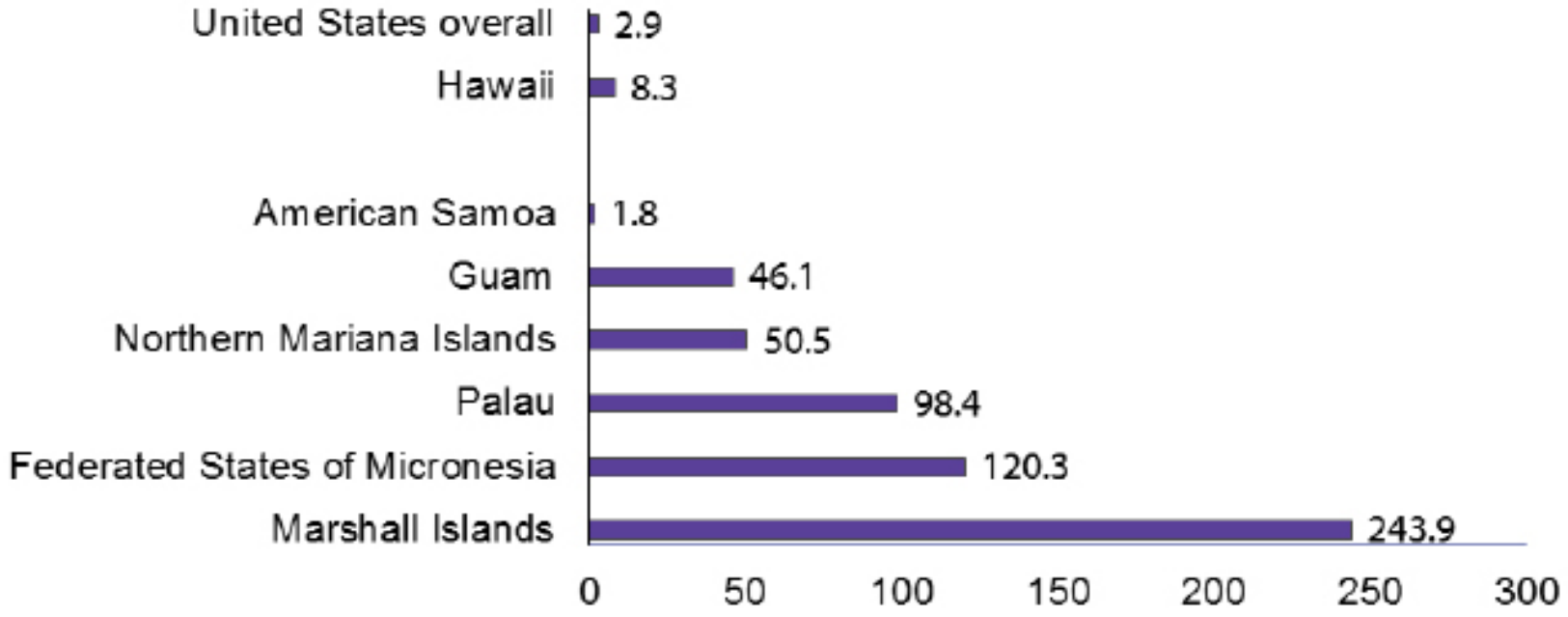
Map of U.S.-Affiliated Pacific Islands, by TB Case Rates,* 2016



*Cases per 100,000 population; as of June 21, 2017.

Surveillance Slide #6

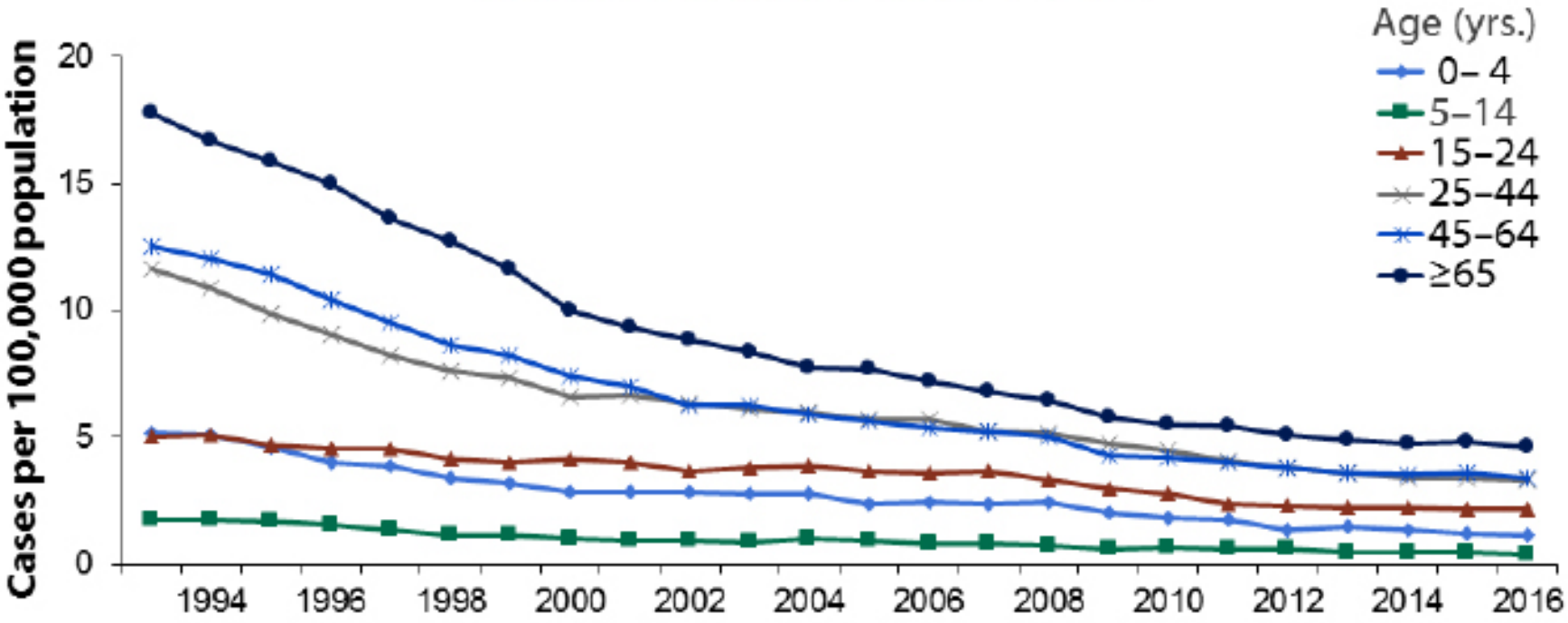
TB Case Rates,* U.S.-Affiliated Pacific Islands, 2016



*Cases per 100,000 population; as of June 21, 2017.

Surveillance Slide #7

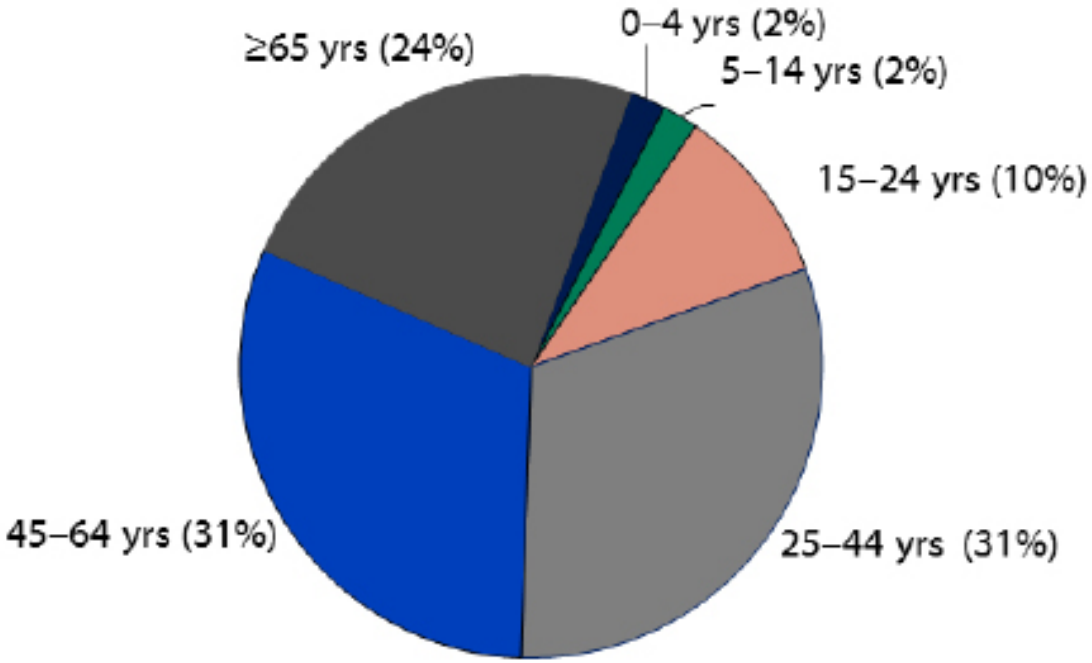
TB Case Rates* by Age Group, United States, 1993–2016



*Cases per 100,000 population; as of June 21, 2017.

Surveillance Slide #8

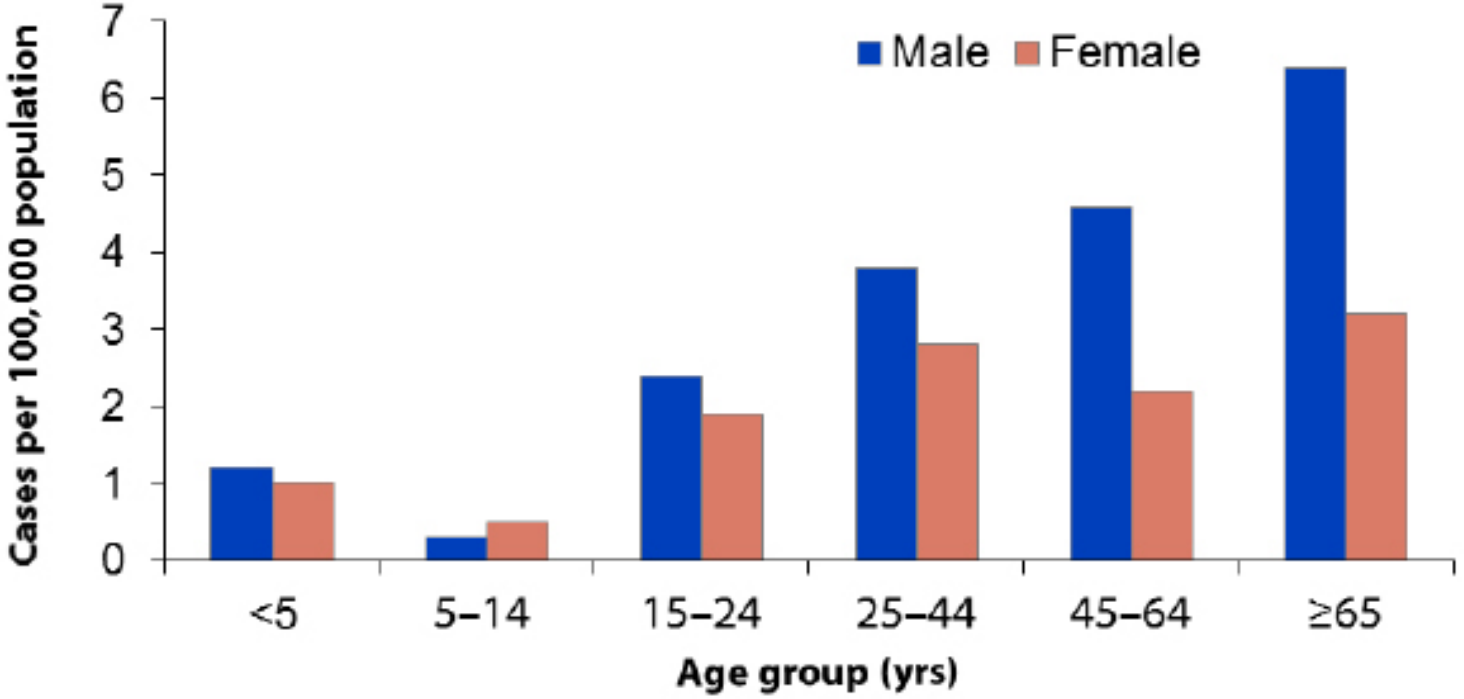
Reported TB Cases by Age Group, United States, 2016*



*Cases per 100,000 population; as of June 21, 2017.

Surveillance Slide #9

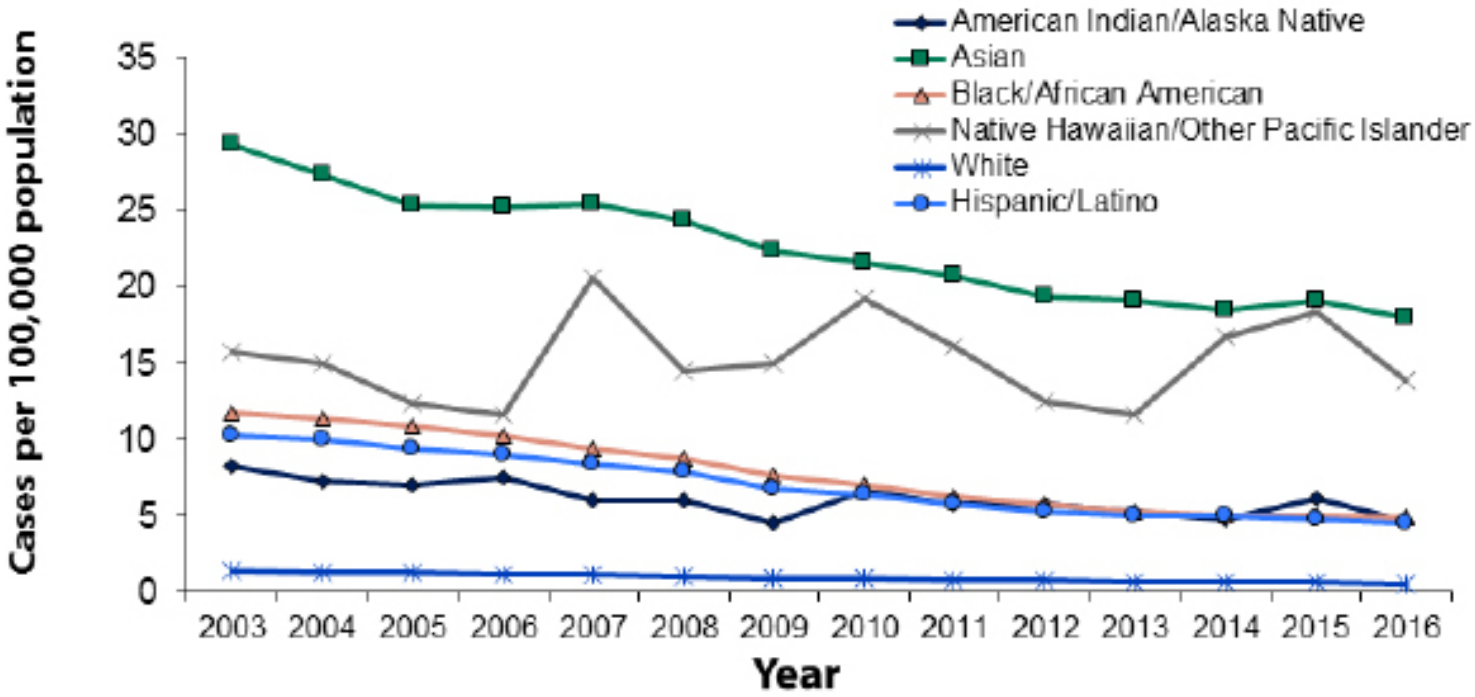
TB Case Rates by Age Group and Sex, United States, 2016*



*Cases per 100,000 population; as of June 21, 2017.

Surveillance Slide #10

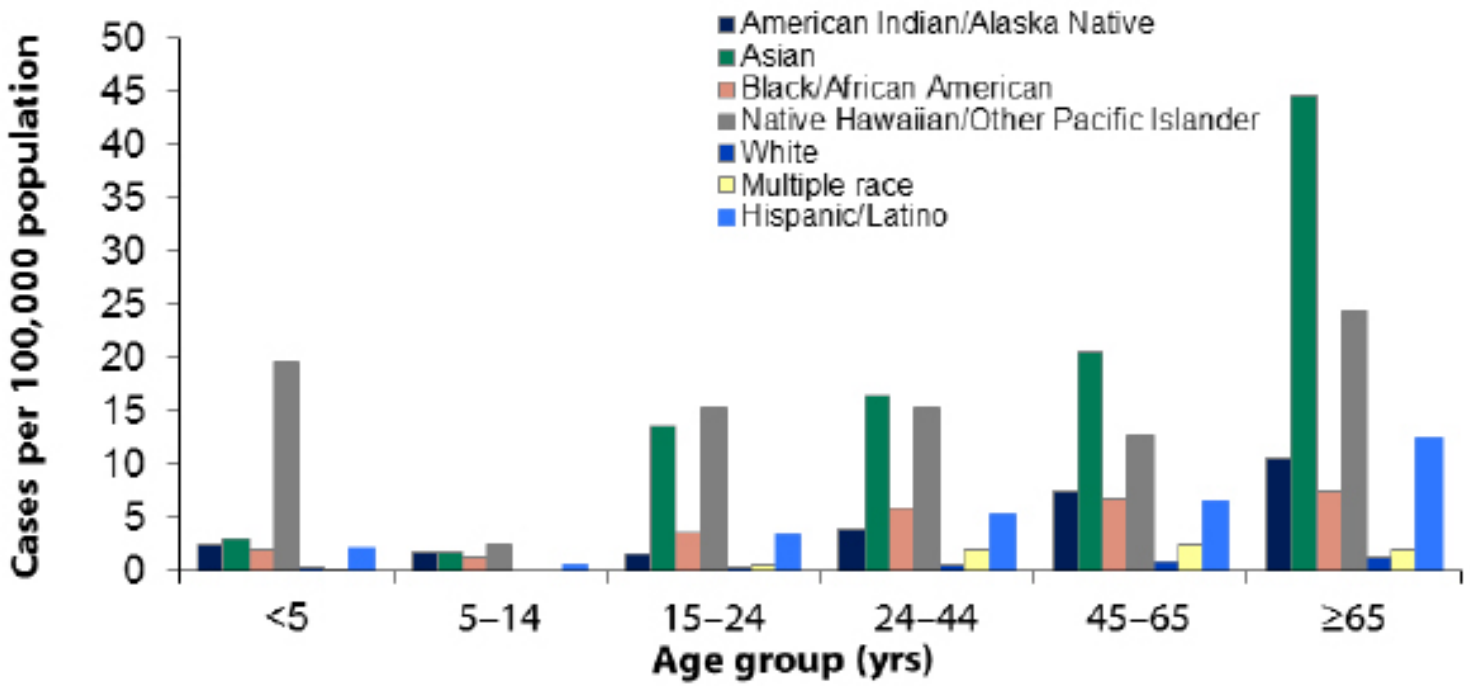
TB Case Rates by Race/Ethnicity,* United States, 2003–2016†



* All races are non-Hispanic; multiple race indicates two or more races reported for a person, but does not include persons of Hispanic/Latino origin.

† As of June 21, 2017.

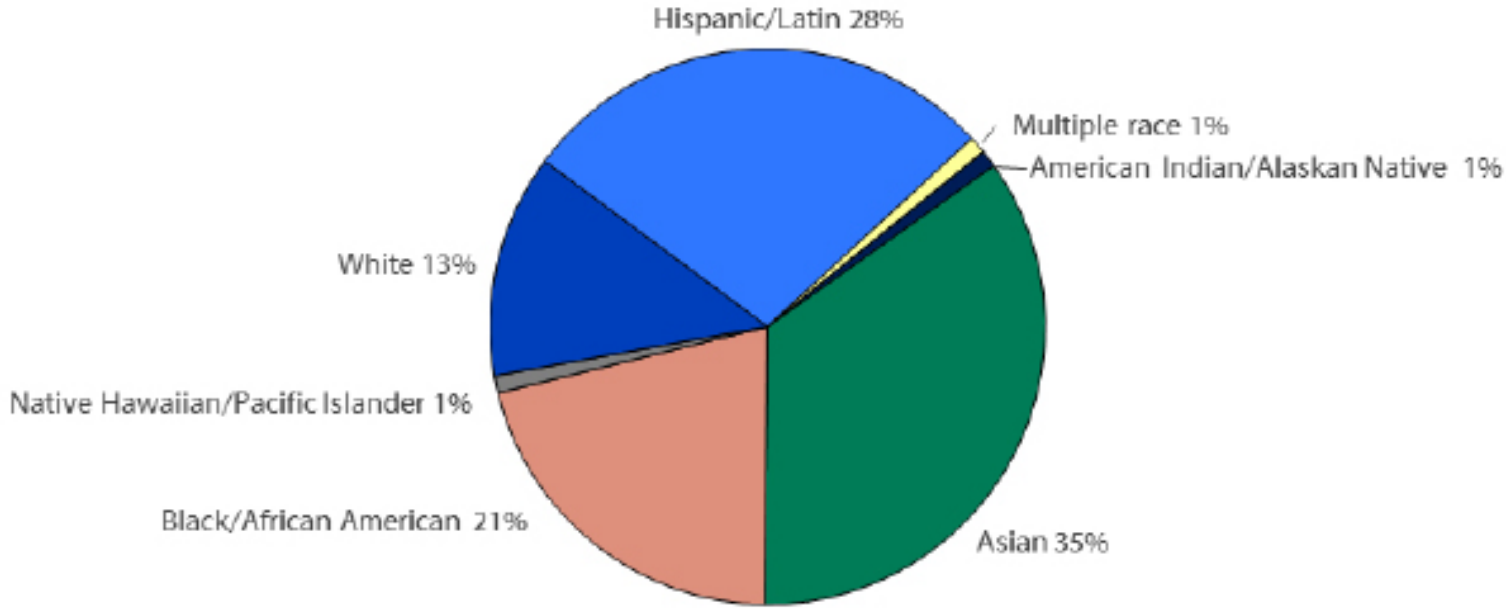
TB Case Rates by Age Group and Race/Ethnicity,* United States, 2016†



* All races are non-Hispanic; multiple race indicates two or more races reported for a person, but does not include persons of Hispanic/Latino origin.
† As of June 21, 2017.

Surveillance Slide #12

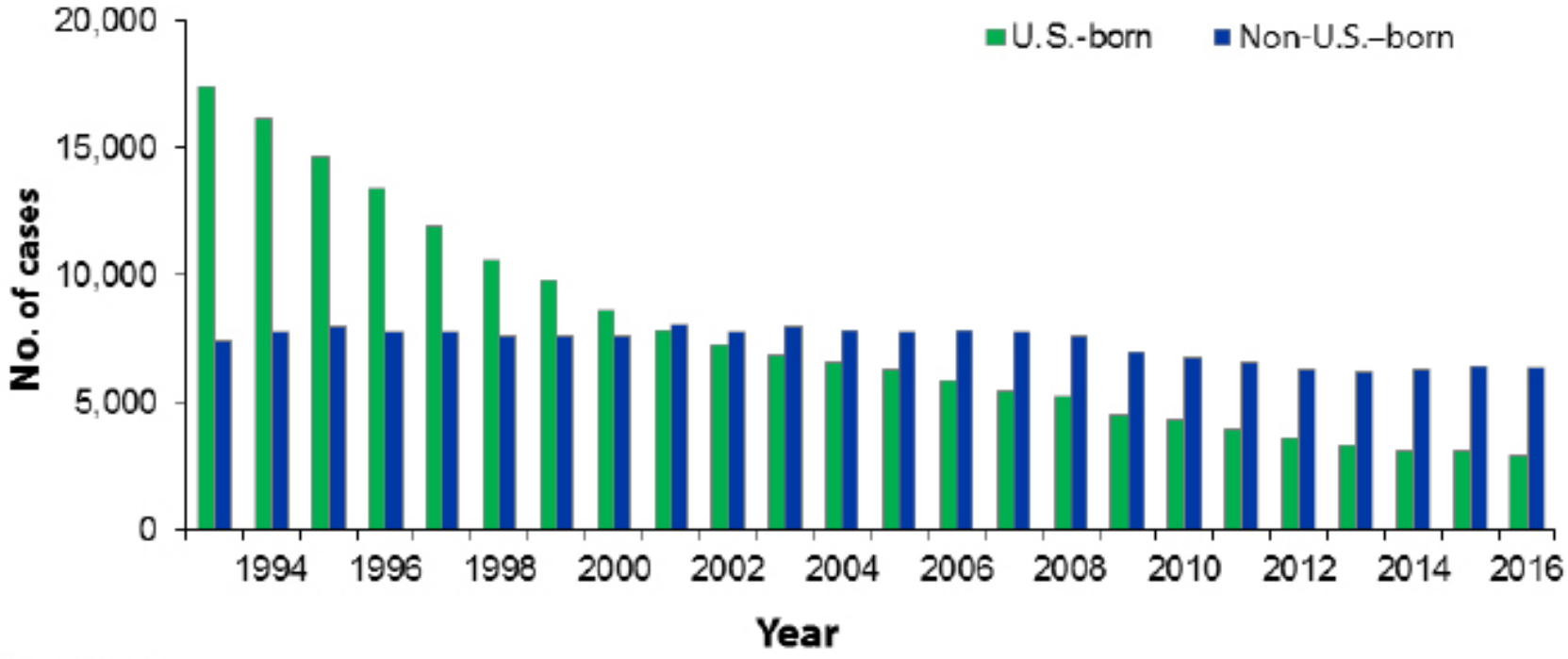
Reported TB Cases by Race/Ethnicity,* United States, 2016†



* All races are non-Hispanic; multiple race indicates two or more races reported for a person, but does not include persons of Hispanic/Latino origin.
† Percentages are rounded; as of June 21, 2017.

Surveillance Slide #13

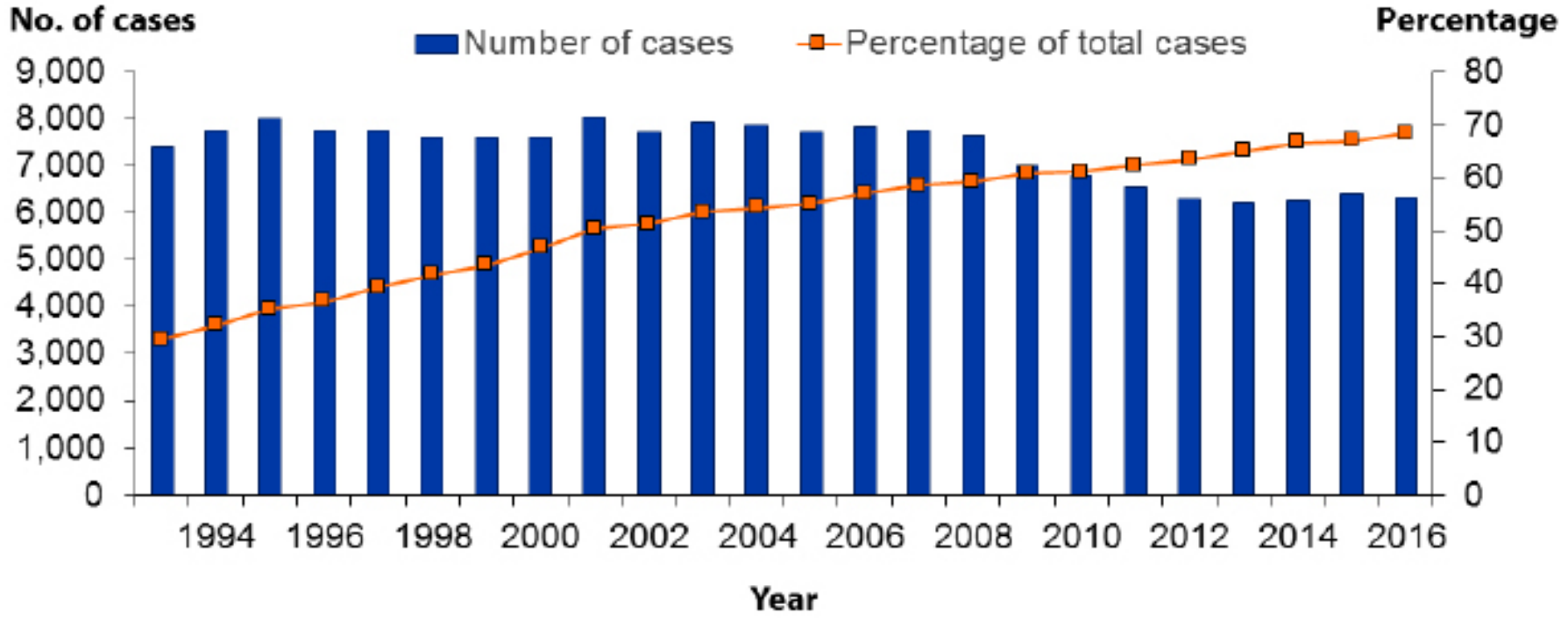
Number of TB Cases Among U.S.-Born versus Non-U.S.–Born Persons, United States, 1993–2016*



*As of June 21, 2017.

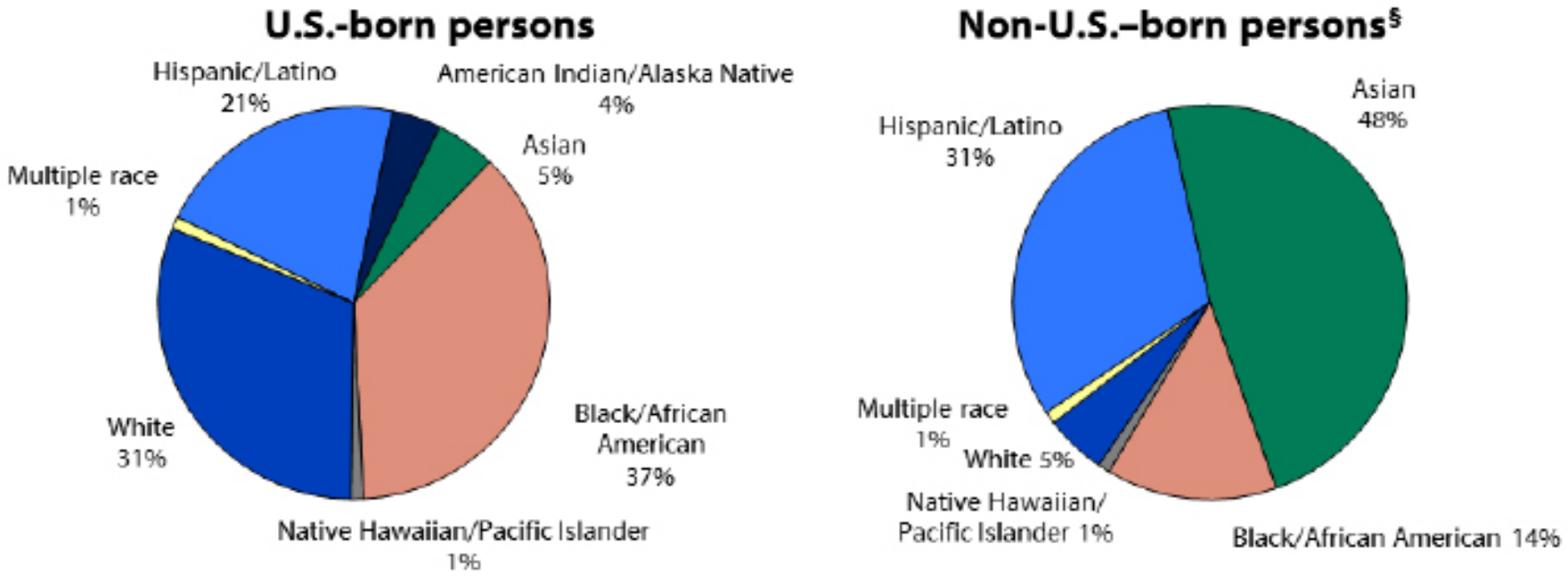
Surveillance Slide #14

Trends in TB Cases Among Non-U.S.–Born Persons, United States, 1993–2016*



*As of June 21, 2017.

Reported TB Cases by Origin and Race/Ethnicity*, United States, 2016†



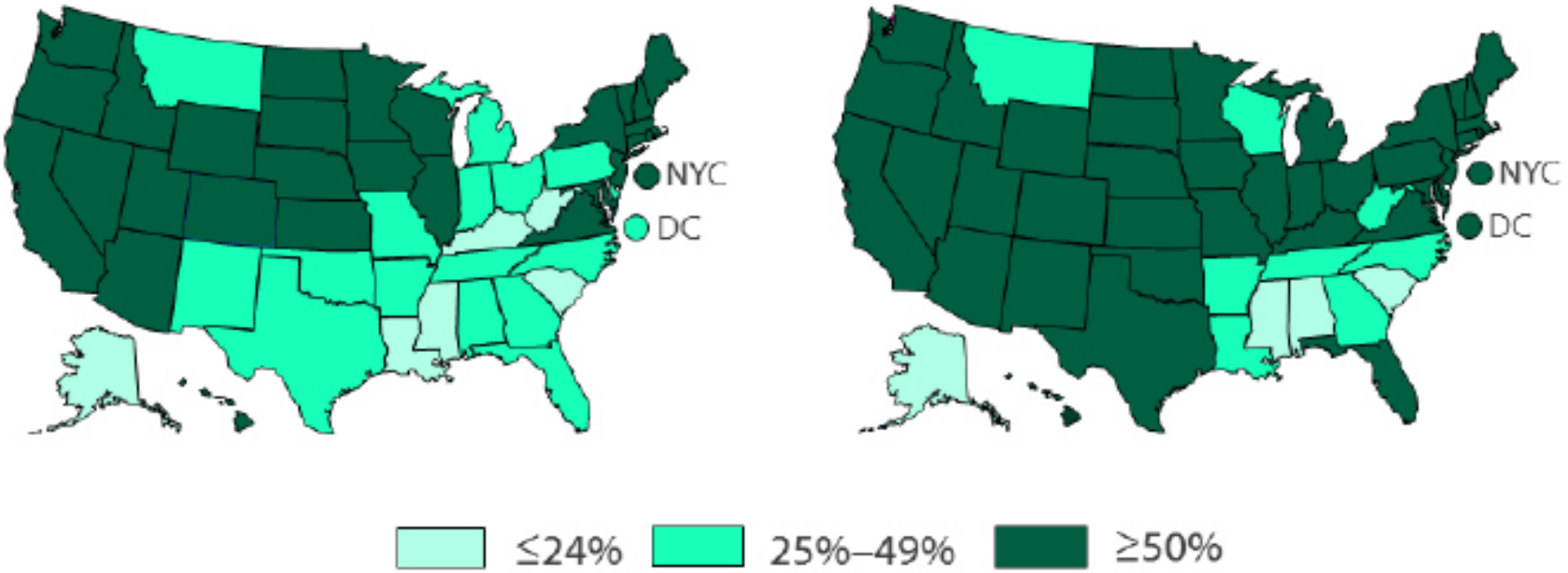
* All races are non-Hispanic; multiple race indicates two or more races reported for a person, but does not include persons of Hispanic/Latino origin.

† Percentages are rounded; as of June 21, 2017.

§ American Indian/Alaska Native accounted for <1% of cases among non-U.S.–born persons and are not shown.

Surveillance Slide #16

Percentage of Non-U.S.–Born Persons Among TB Cases, United States,* 2006 and 2016

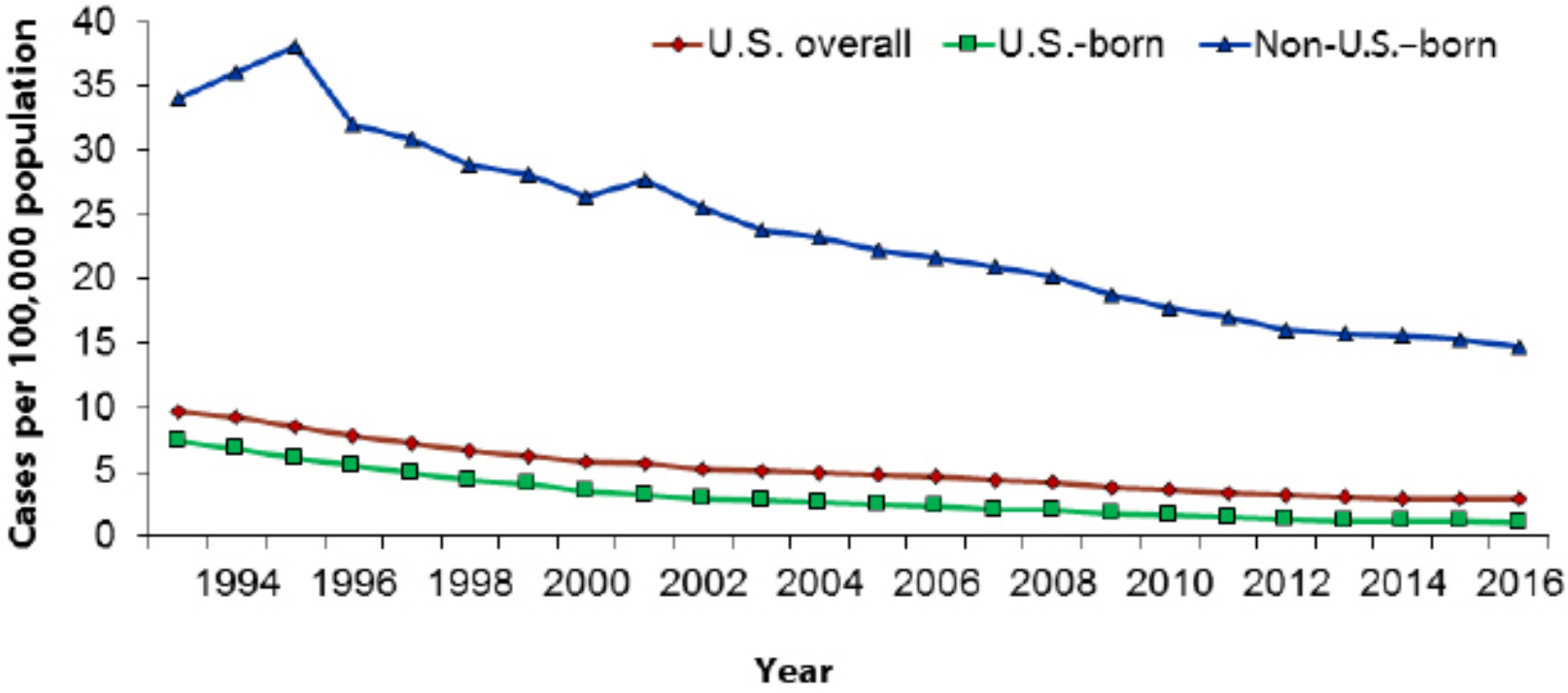


*As of June 21, 2017.

DC, District of Columbia; NYC, New York City (excluded from New York state)

Surveillance Slide #17

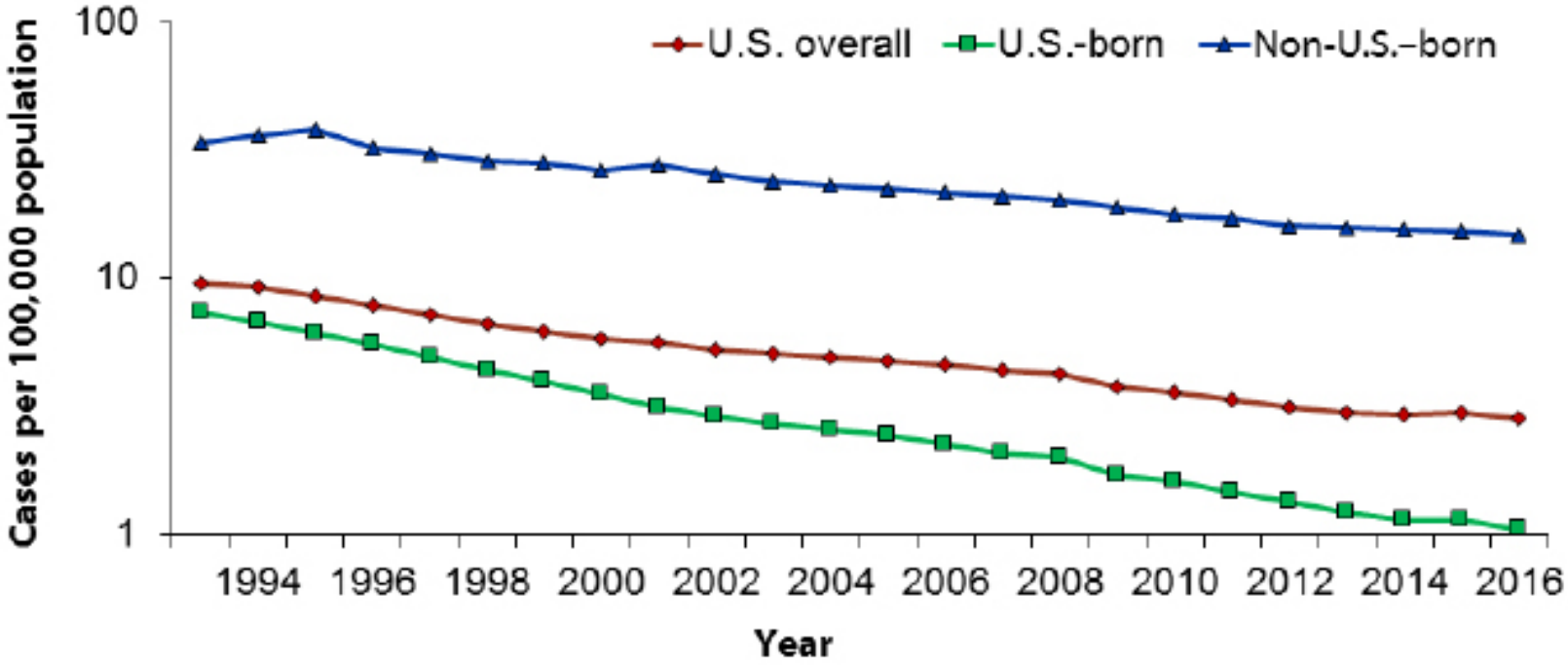
TB Case Rates Among U.S.-Born versus Non-U.S.–Born Persons, United States, 1993–2016*



*As of June 21, 2017.

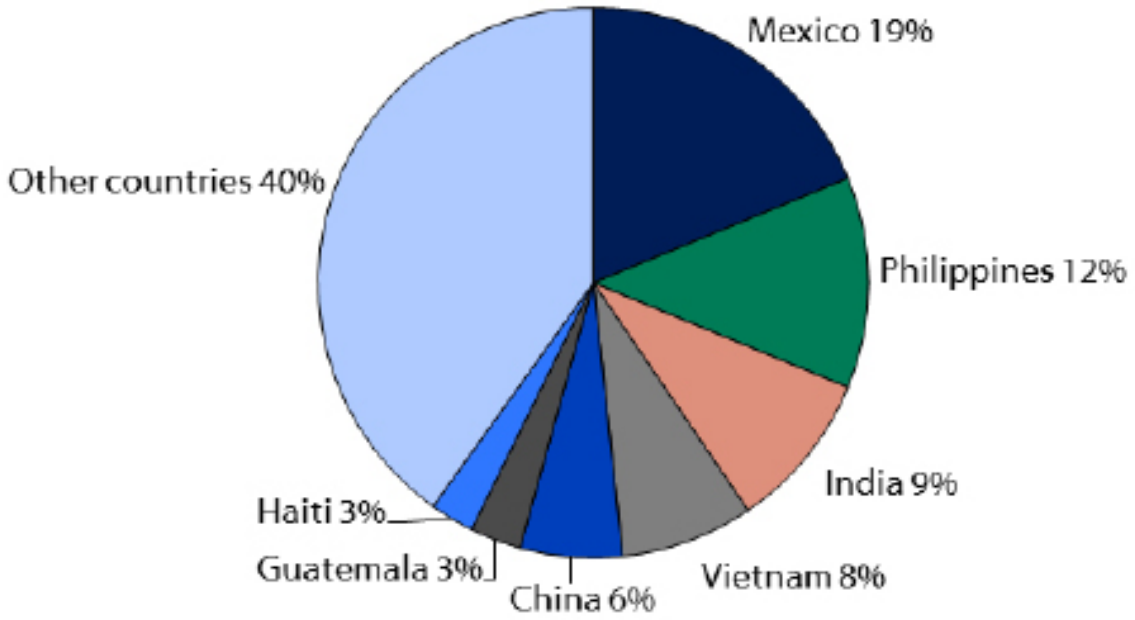
Surveillance Slide #18

TB Case Rates Among U.S.-Born versus Non-U.S.–Born Persons, United States*, 1993–2016†



* Includes the same data as previous slide, but rates are presented on a logarithmic scale.
† As of June 21, 2017.

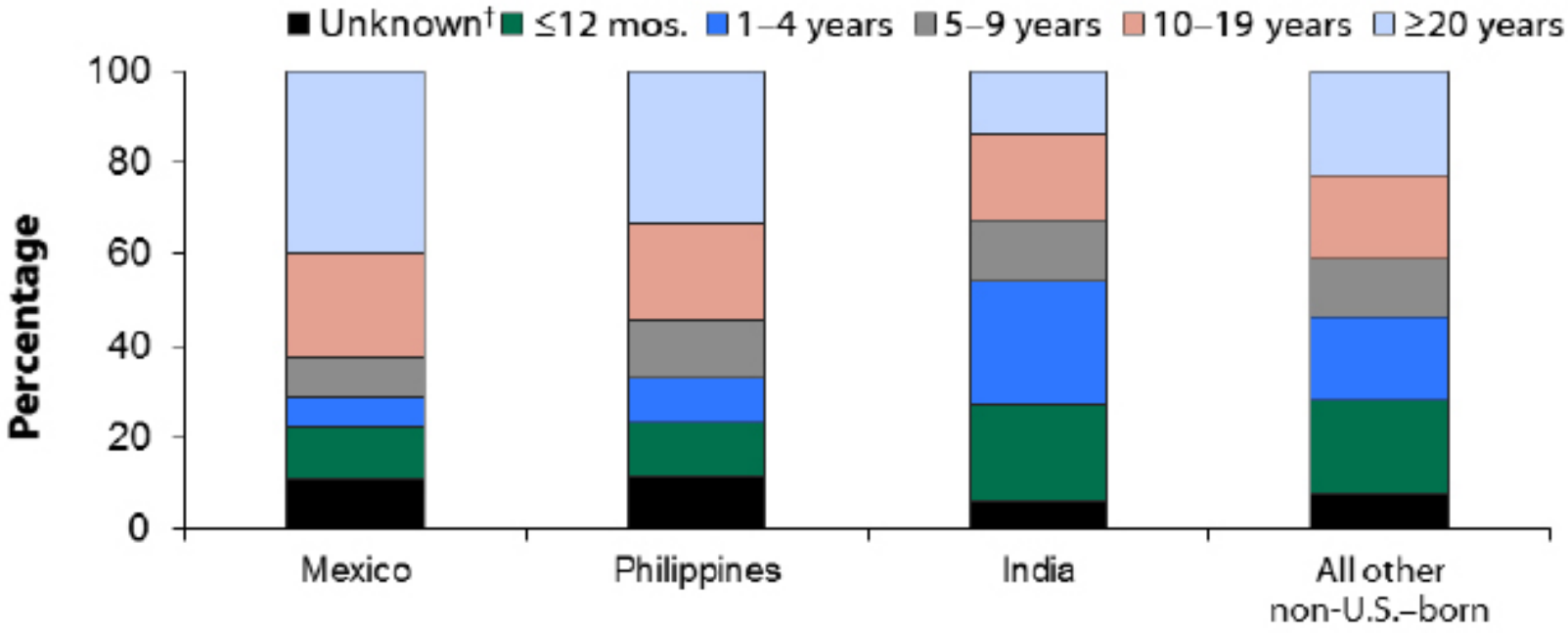
Countries of Birth Among Non-U.S.–Born Persons Reported with TB, United States, 2016



*Percentages are rounded; as of June 21, 2017.

Surveillance Slide #20

Percentage of Non-U.S.–Born Persons with TB, by Time of Residence in U.S. Before Diagnosis, 2016*

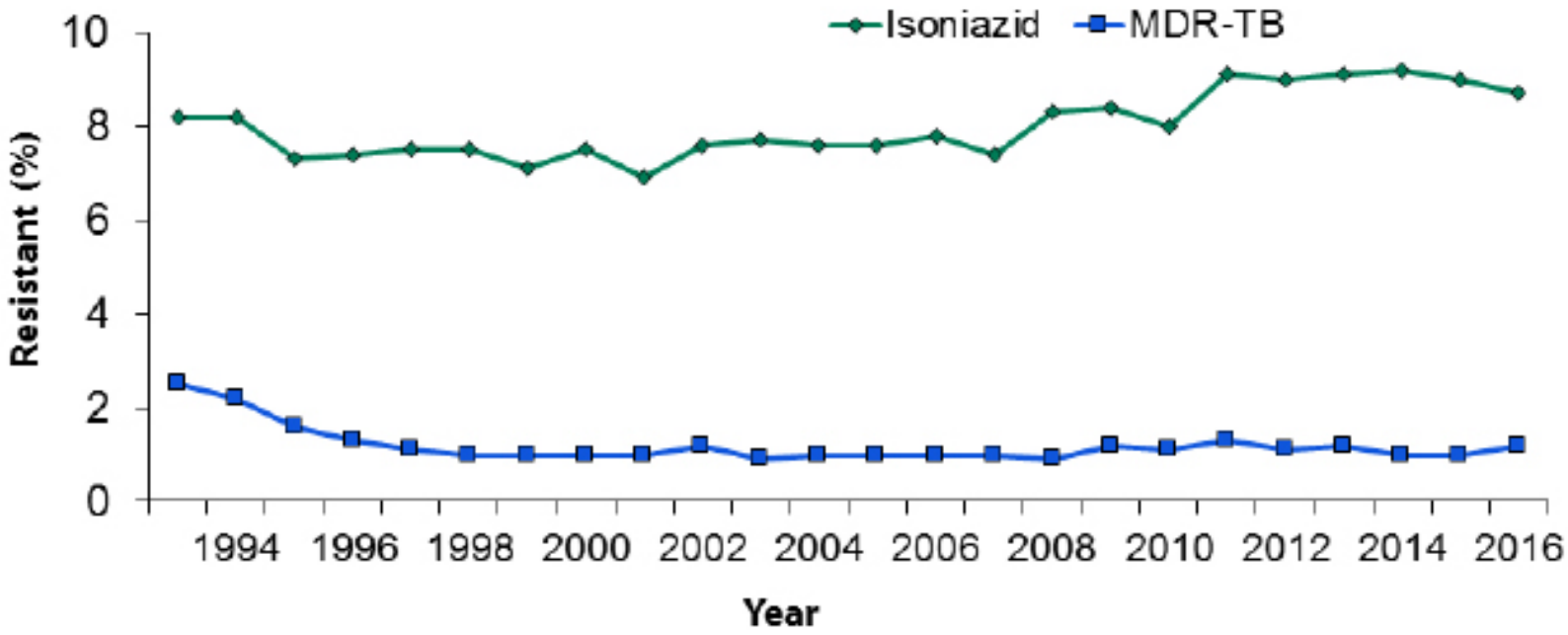


* As of June 21, 2017.

† Non-U.S.–born persons for whom information on length of residence in the United States before diagnosis is unknown or missing.

Surveillance Slide #21

Primary Anti-TB Drug Resistance, United States, 1993–2016*

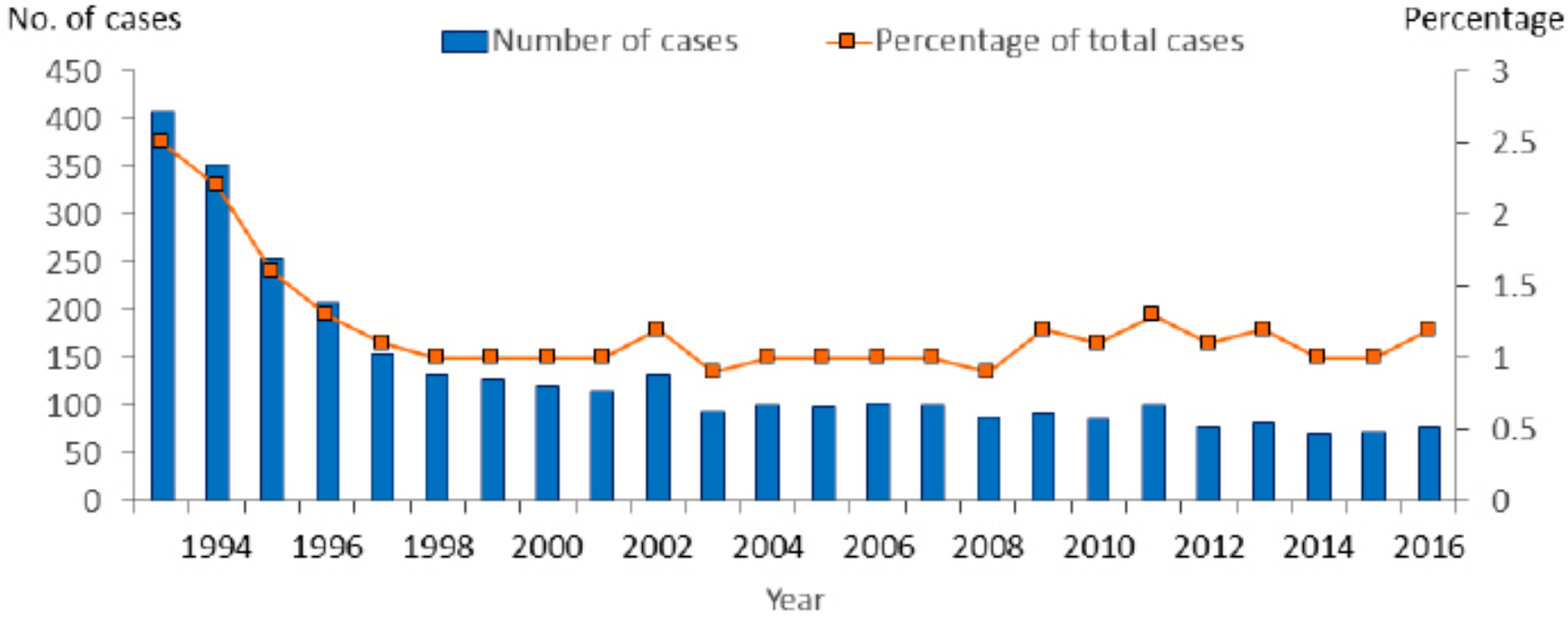


* As of June 21, 2017.

Note: Based on initial isolates from persons with no prior history of TB; multidrug-resistant TB (MDR-TB) is defined as resistance to at least isoniazid and rifampin.

Surveillance Slide #22

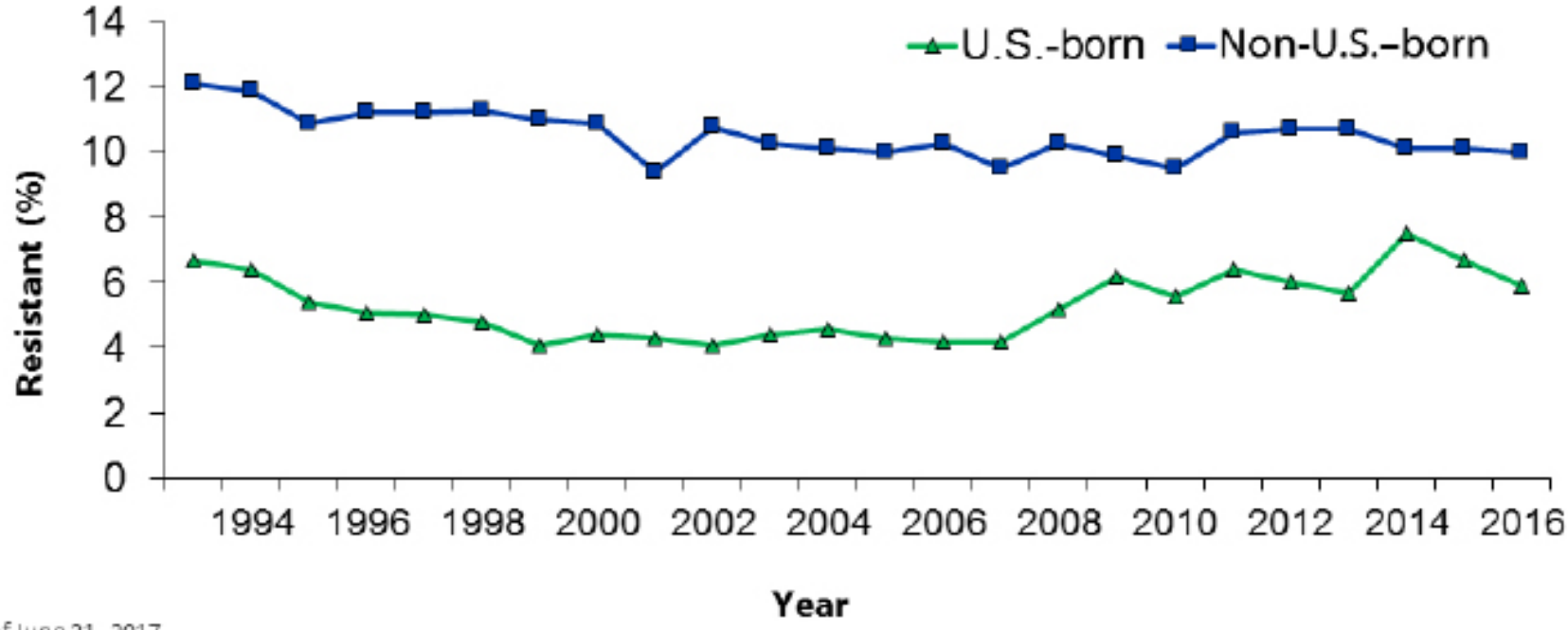
Primary MDR-TB, United States, 1993–2016*



* As of June 21, 2017.

Note: Based on initial isolates from persons with no prior history of TB; multidrug-resistant TB (MDR-TB) is defined as resistance to at least isoniazid and rifampin.

Primary Isoniazid Resistance Among U.S.-Born versus Non-U.S.–Born Persons, United States, 1993–2016*

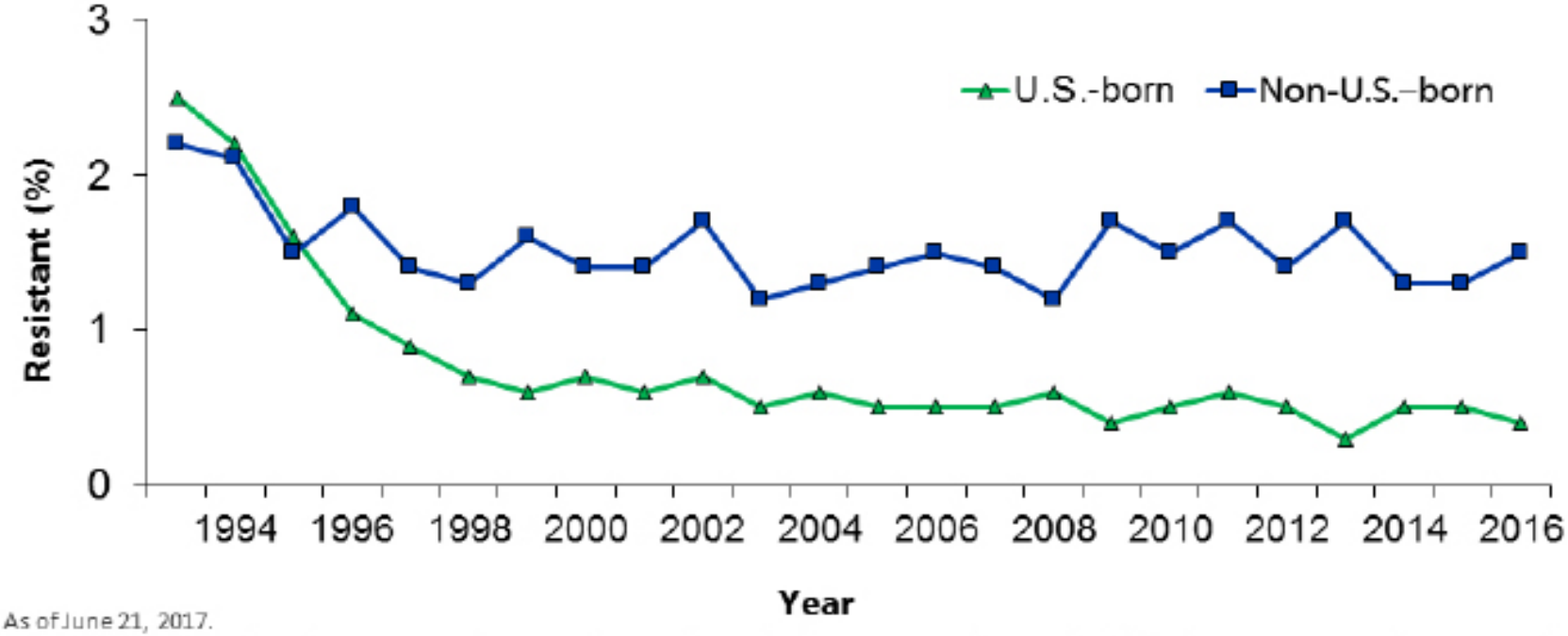


* As of June 21, 2017.

Note: Based on initial isolates from persons with no prior history of TB.

Surveillance Slide #24

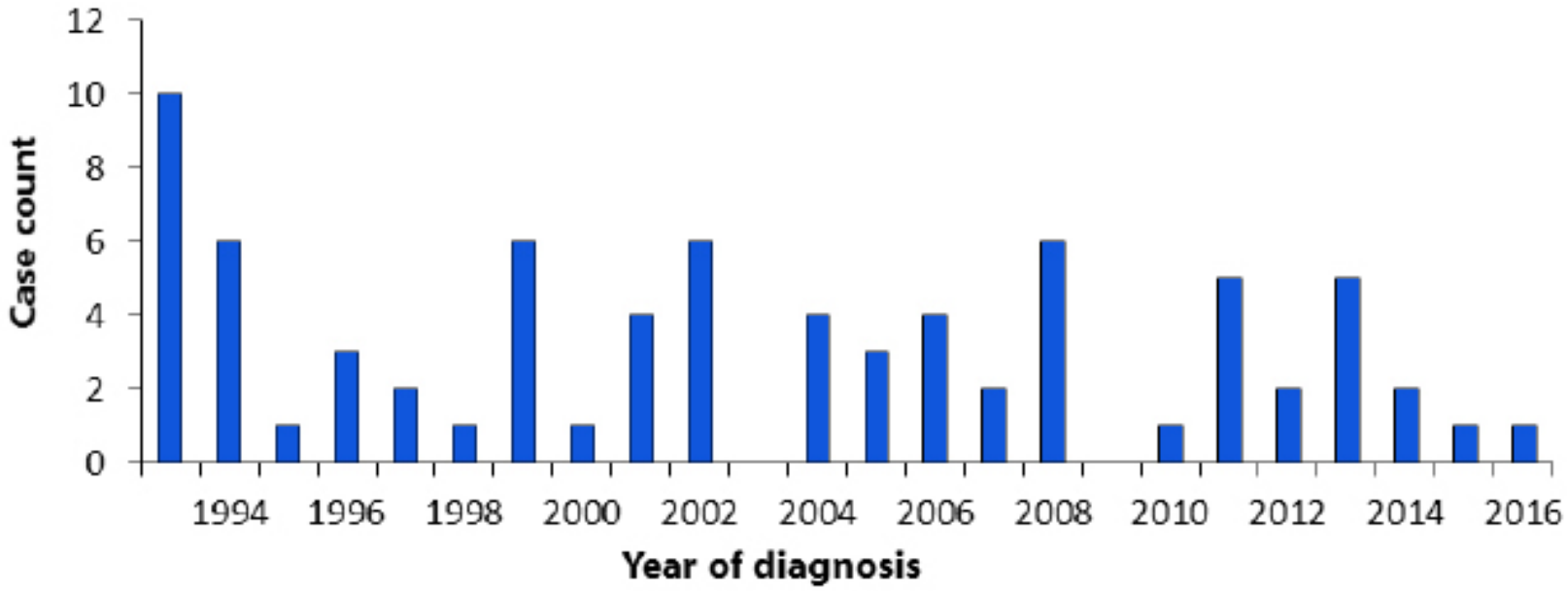
Primary MDR-TB Among U.S.-Born versus Non-U.S.–Born Persons, United States, 1993–2016*



* As of June 21, 2017.

Note: Based on initial isolates from persons with no prior history of TB; multidrug-resistant TB (MDR-TB) is defined as resistance to at least isoniazid and rifampin.

XDR-TB* Case Count, Defined on Initial DST,† by Year, 1993–2016§



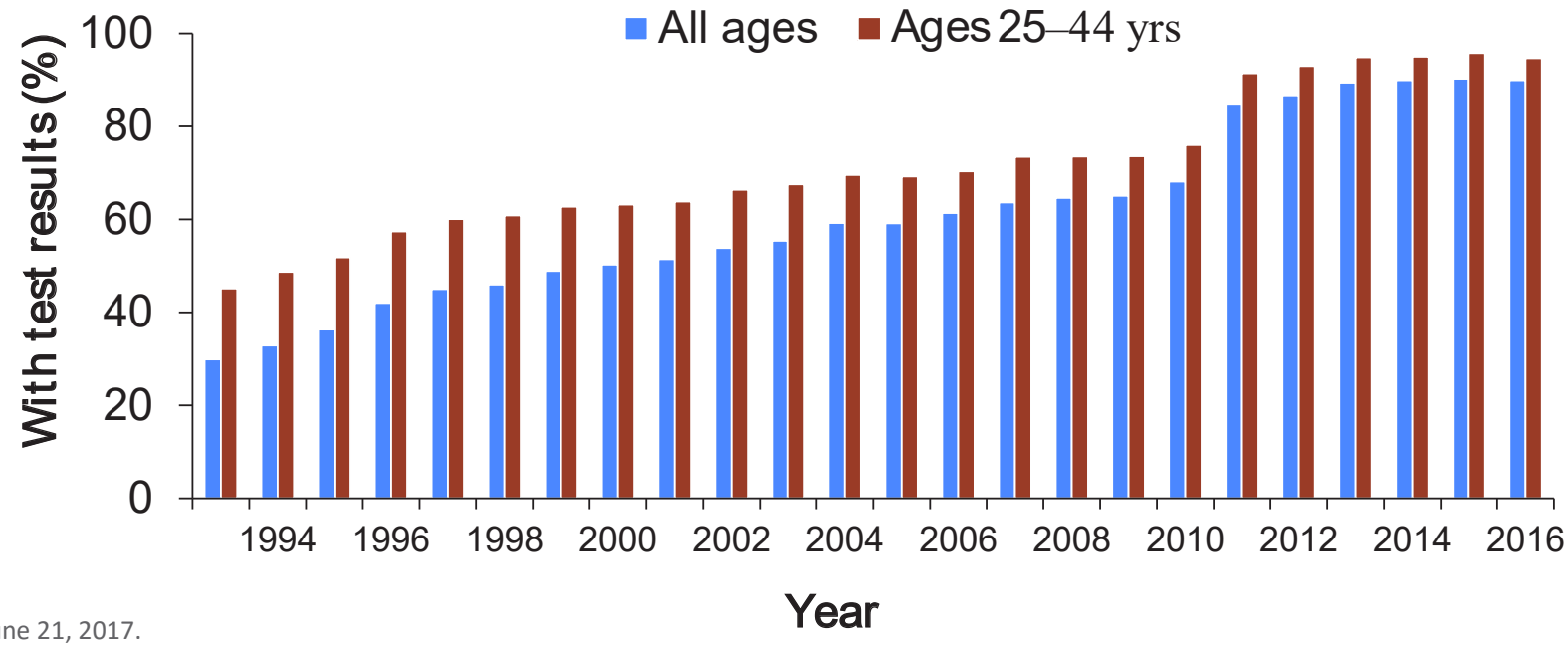
* XDR-TB , extensively drug-resistant TB.

† DST, drug susceptibility test.

§ As of June 21, 2017.

Note: 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.

Reporting of HIV Test Results Among Persons with TB, by Age Group, United States, 1993–2016*

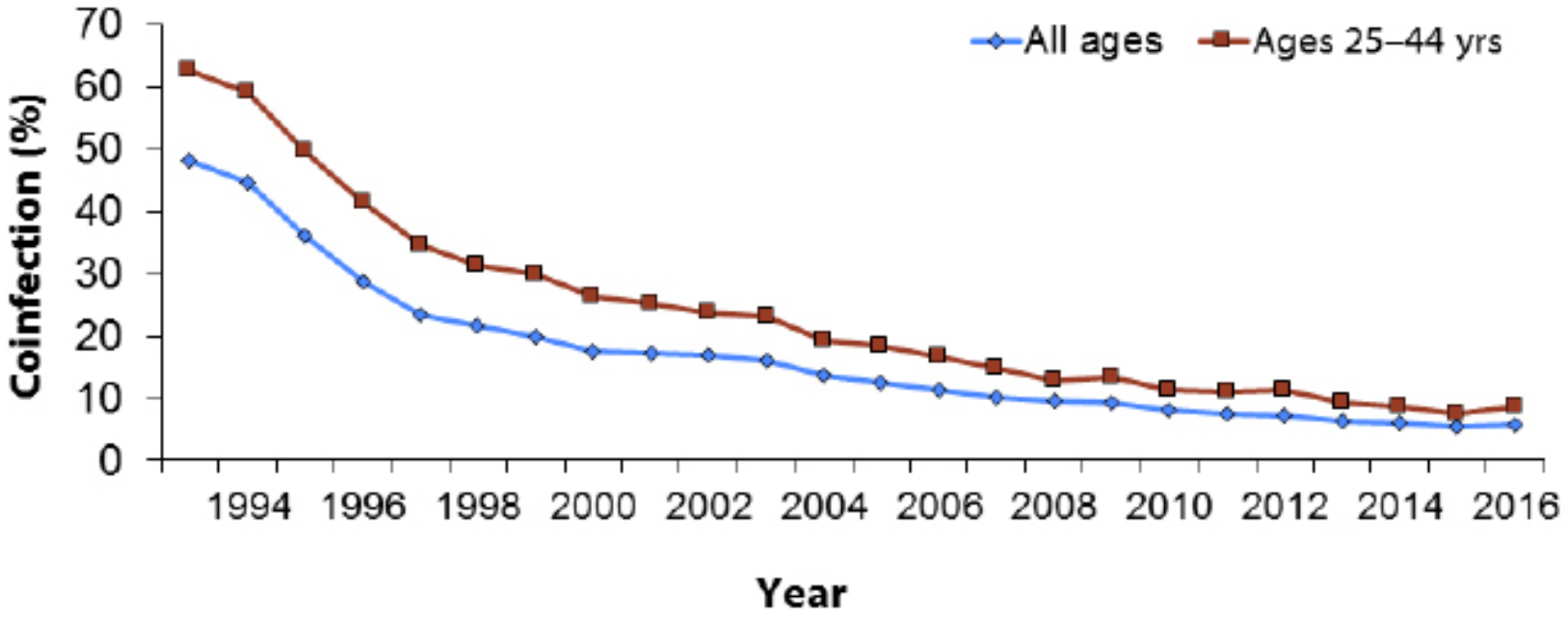


* As of June 21, 2017.

Note: Includes persons with positive, negative, or indeterminate human immunodeficiency virus (HIV) test results and persons from California with co-diagnosis of TB and acquired immunodeficiency syndrome (AIDS). Rhode Island did not report HIV test results for years 1993–1997. HIV test results for Vermont are not included for years 2007–2013. HIV test results for California are not included for years 2005–2010.

Surveillance Slide #27

Estimated HIV Coinfection Among Persons Reported with TB, United States, 1993–2016*

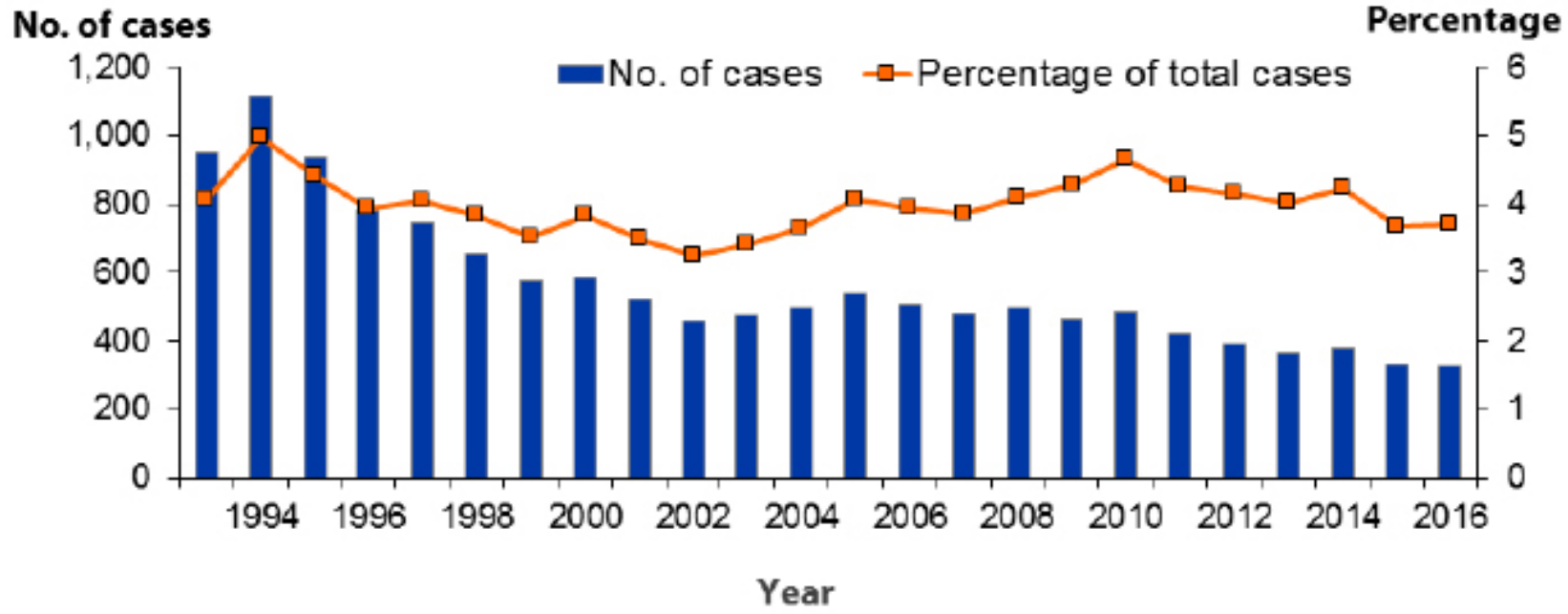


* As of June 21, 2017.

Note: Minimum estimates are based on reported HIV-positive status among all TB patients in the age group.

Surveillance Slide #28

TB Cases Among Persons Aged ≥15 Years Residing in Correctional Facilities, United States, 1993–2016*

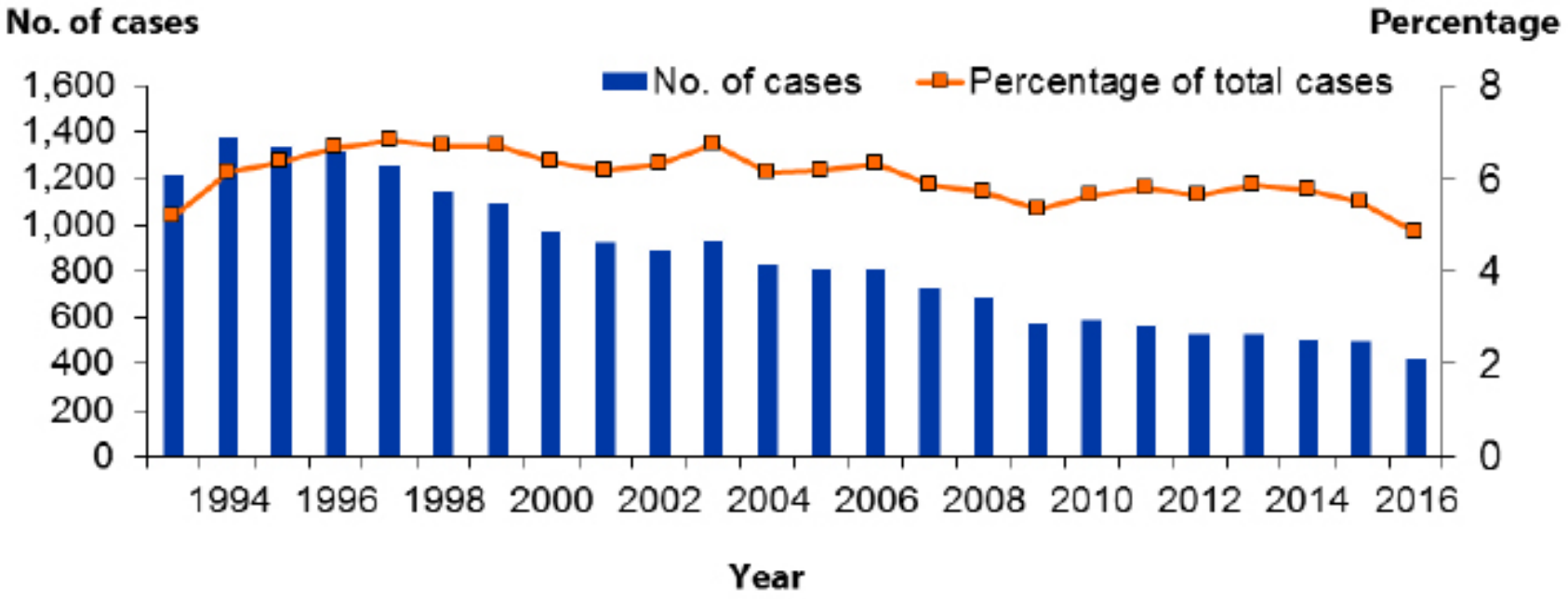


* As of June 21, 2017.

Note: Resident of correctional facility at time of TB diagnosis.

Surveillance Slide #29

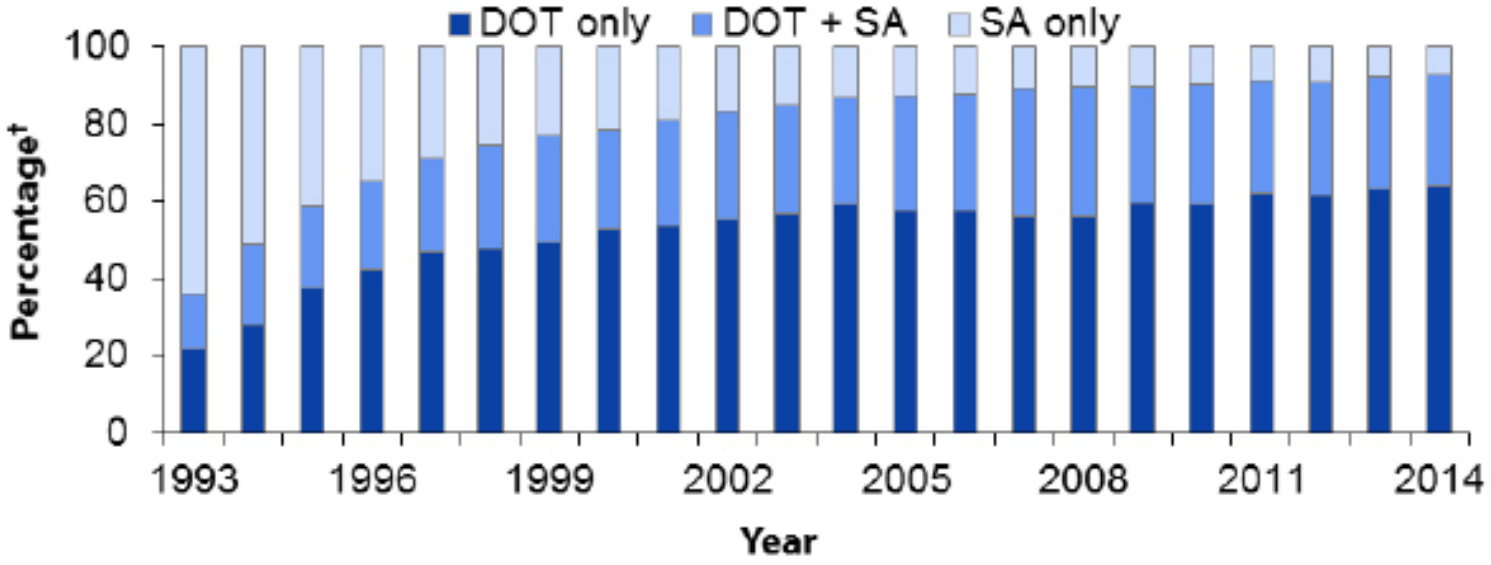
TB Cases Reported Among Homeless Persons During the 12 Months Before Diagnosis, Ages ≥15 Years, United States, 1993–2016*



* As of June 21, 2017.
Note: Homeless during the 12 months before TB diagnosis.

Surveillance Slide #30

Mode of Treatment Administration Among Persons Reported with TB, United States, 1993–2014*

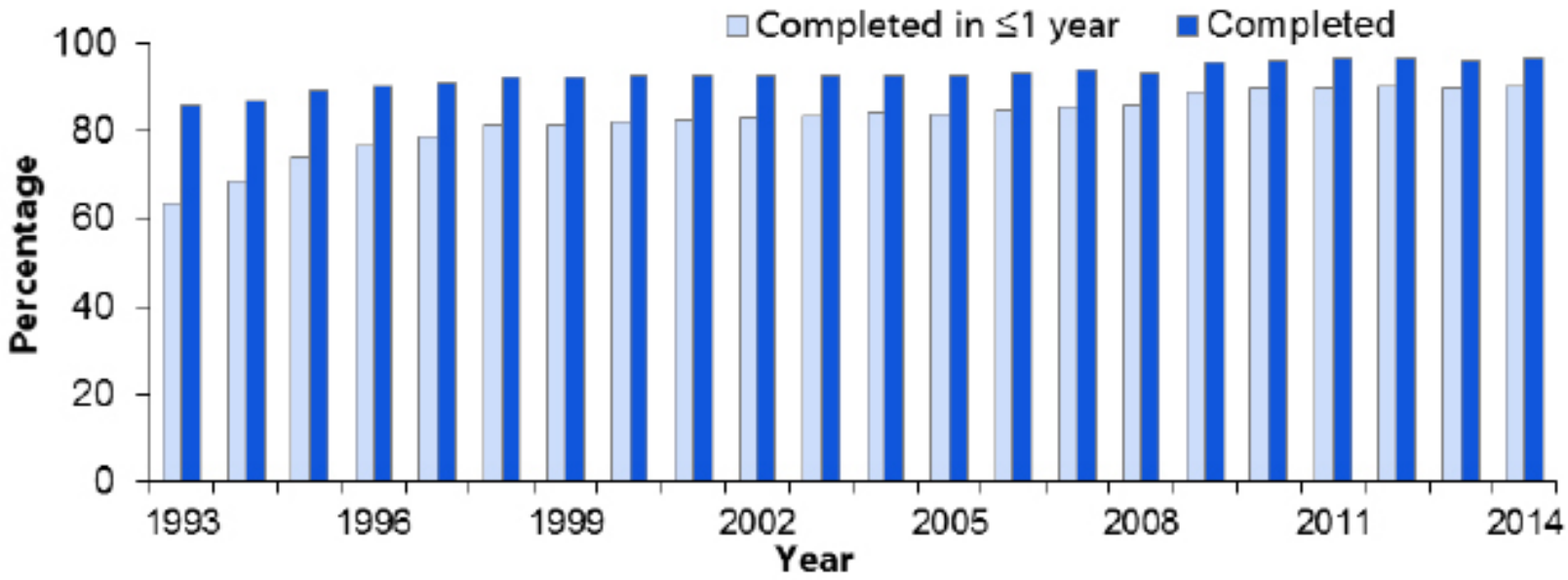


DOT, directly observed therapy; SA, self-administered therapy.

* As of June 21, 2017; data available through 2014 only.

† Percentage of total cases among persons alive at diagnosis, with an initial regimen of one or more drugs prescribed and excluding cases with unknown mode of treatment administration.

Completion of TB Treatment Therapy, United States, 1993–2014*

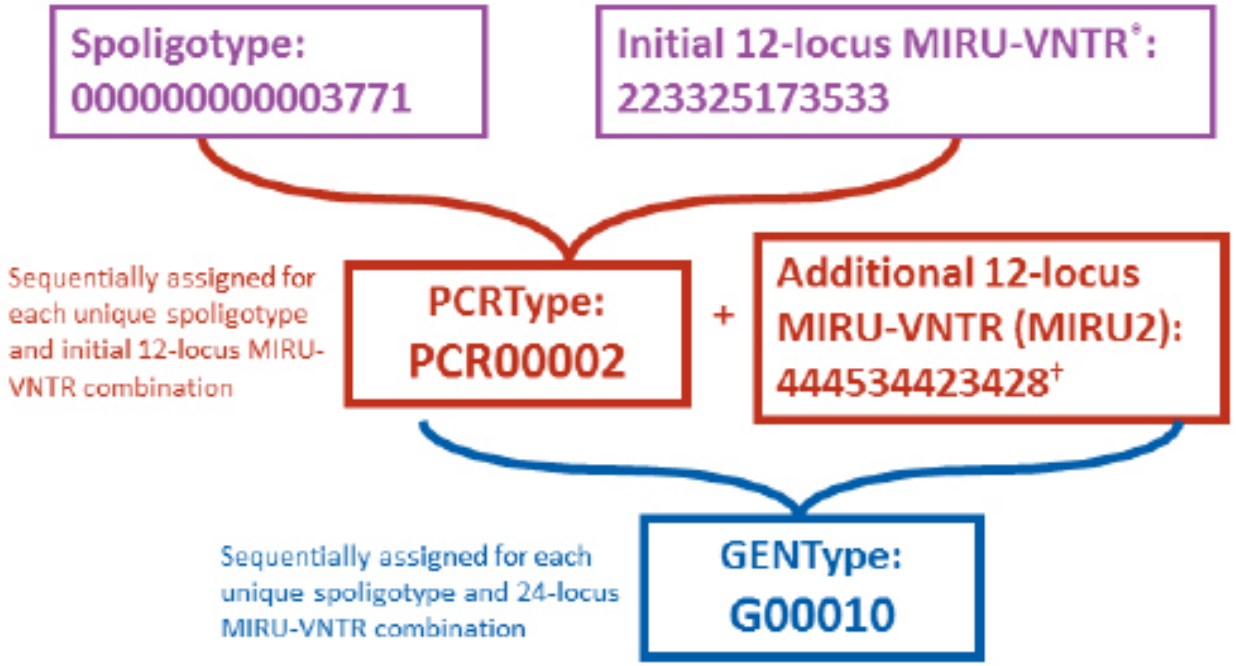


* As of June 21, 2017; data available through 2014 only.

Note: Includes persons alive at diagnosis, with initial drug regimen of one or more drugs prescribed, who did not die within one year of initiating treatment; excludes persons with initial rifampin-resistant isolate, patients with bone and joint disease, meningeal disease, or disease of the central nervous system, or pediatric patients (ages 0–14 years) with miliary disease or positive blood culture or a positive nucleic acid amplification test on a blood specimen, and those who moved out of the country within one year of initiating treatment.

Surveillance Slide #32

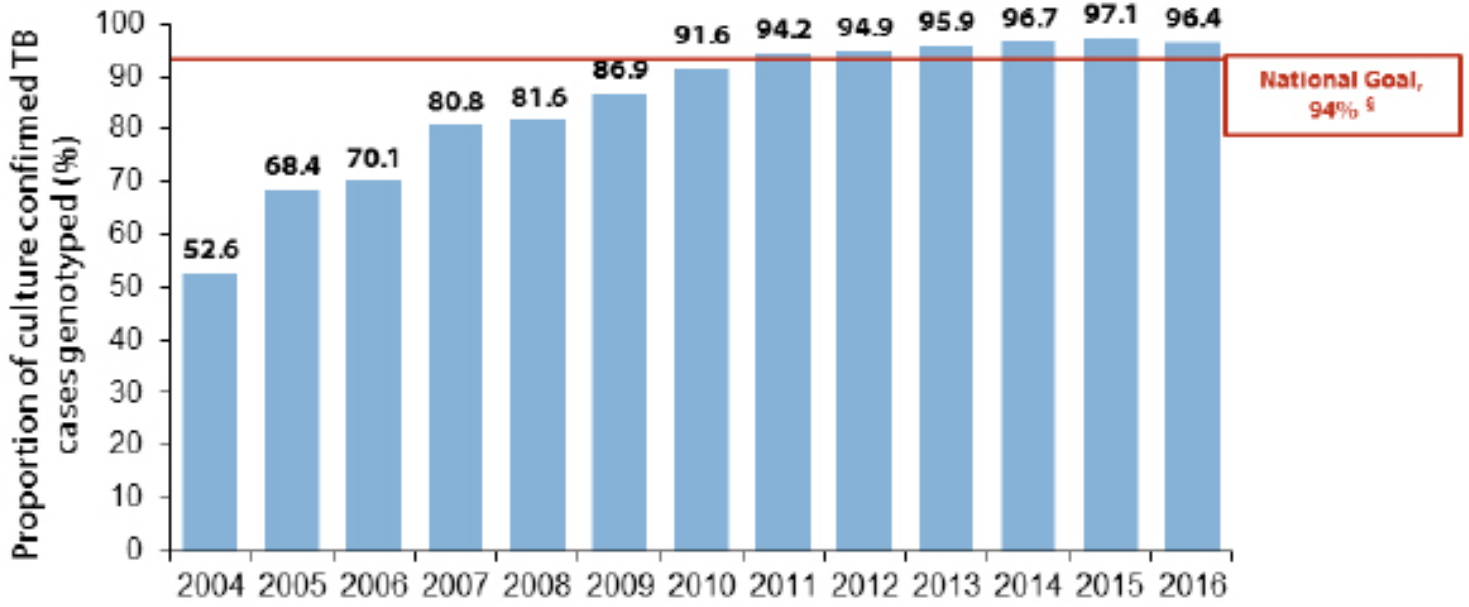
Definition for Tuberculosis Genotyping in the United States



* Mycobacterial interspersed repetitive unit–variable number tandem repeat.

† The complete set of 24 loci is referred to as 24-locus MIRU-VNTR and is used for GENType designation for genotype in the United States.

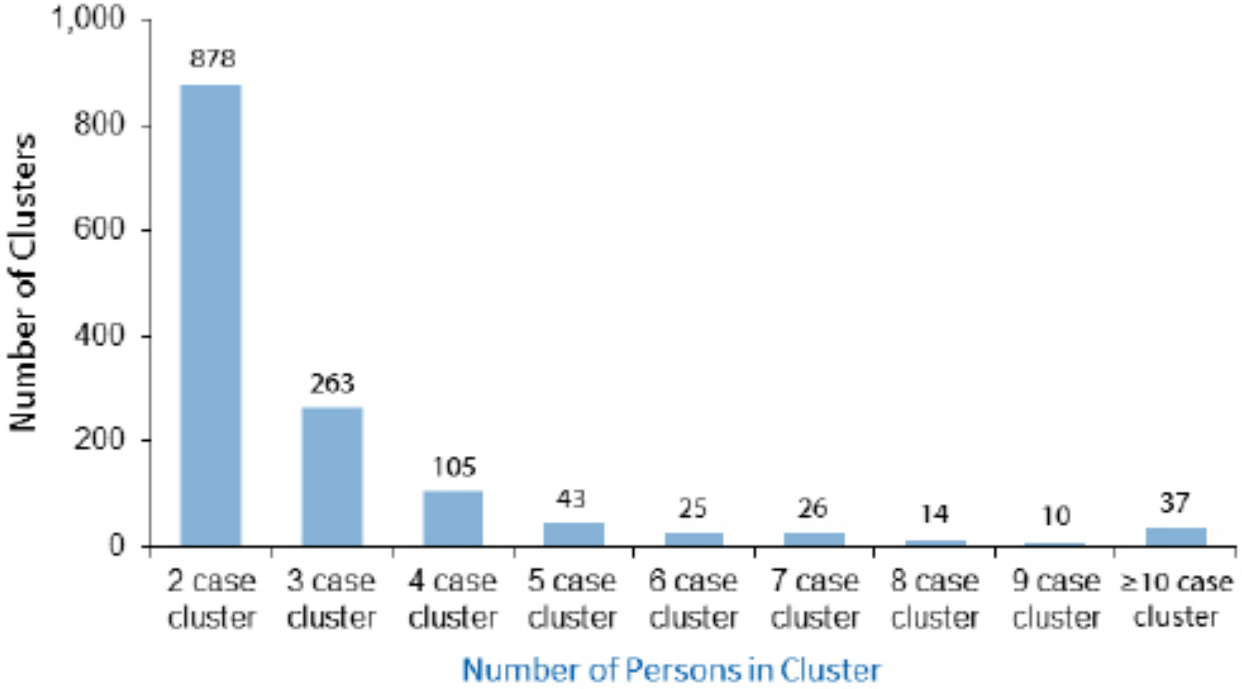
National Tuberculosis Genotyping Surveillance Coverage* by Year: United States†, 2004–2016



* The proportion of positive cultures with at least one genotyped isolate.
† Includes 50 states and the District of Columbia.
§ For the year 2020, the national goal for TB genotyping surveillance coverage will change to 100%.

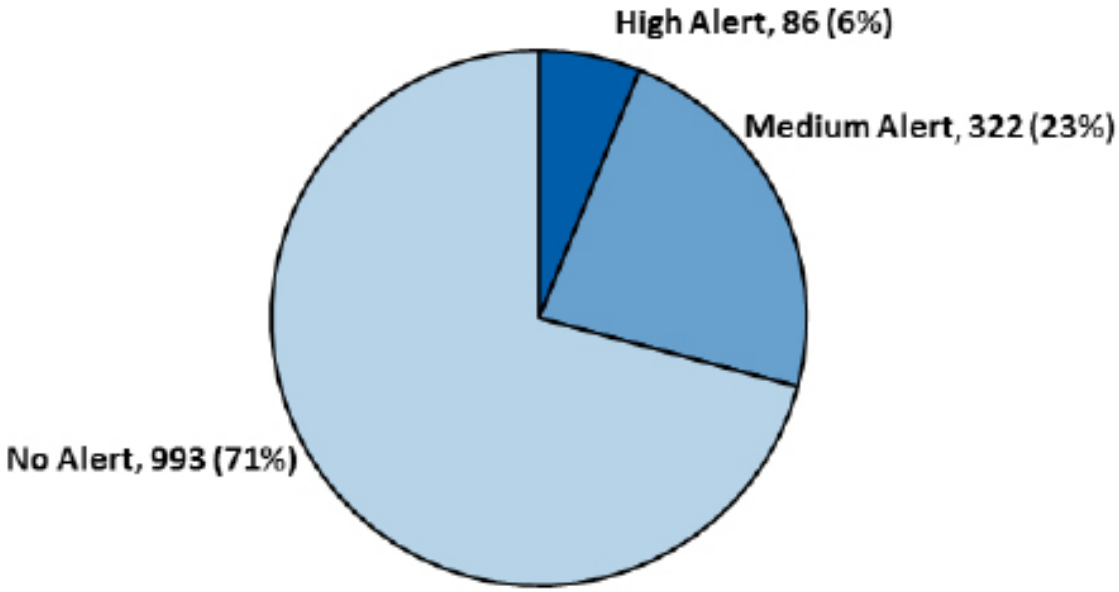
Surveillance Slide #34

Number of County-Based Tuberculosis Genotype Clusters* by Cluster Size, United States, 2014–2016



* Genotype cluster is defined as two or more cases with matching spoligotype and 24-locus MIRU-VNTR (GENType) within a county during the specified 3-year time period.

Tuberculosis Genotype Clusters by TB GIMS* Alert Levels†, United States, 2014-2016



* Tuberculosis Genotyping Information Management System.

† Alert level is determined by the log likelihood ratio statistic (LLR) for a given cluster, identifying higher than expected geospatial concentrations for a TB genotype cluster in a specific county, compared to the national distribution of that genotype; TB GIMS generates alert level notifications based on this statistic: "No alert" is indicated if LLR is between 0 – <5, "medium" is for LLR of 5 – <10 and "high" alert is for clusters with LLR ≥ 10.

Surveillance Slide #36

Division of Tuberculosis Elimination
National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
Centers for Disease Control and Prevention
1600 Clifton Road NE
MS E-10
Atlanta, GA 30329
Phone: 404-639-8120
Internet Address: http://www.cdc.gov/tb/

Tuberculosis in the United States

National Tuberculosis Surveillance System Highlights from 2016

Slide 1 (title slide). Tuberculosis in the United States—National Tuberculosis Surveillance System, Highlights from 2016. This slide set was prepared by the Division of Tuberculosis Elimination, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP), Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services (HHS). It provides trends for the recent past and highlights data collected through the National Tuberculosis Surveillance System for 2016. Since 1953, through the cooperation of state and local health departments, CDC has collected information on newly reported cases of tuberculosis (TB) disease in the United States. The data presented here were collected by the revised TB case report introduced in 2009. Each individual TB case report (Report of Verified Case of Tuberculosis, or RVCT) is submitted electronically to CDC. The data for this slide set are based on updates received by CDC as of June 21, 2017. All case counts and rates for years 1993–2016 have been updated.

Slide 2. Reported Tuberculosis (TB) Cases, United States, 1982–2016. The resurgence of TB in the mid-1980s was marked by years of increasing case counts until its peak in 1992. Case counts decreased from 1993 and 2014, and again in 2016. However, in 2015, a slight increase occurred in the total number of TB cases reported in the United States. From 1992 until 2008, the total number of TB cases decreased 2%–7% annually. An unprecedented decrease occurred in 2009, when the total number of TB cases decreased by more than 10% from 2008 to 2009. In 2016, a total of 9,272 cases were reported from the 50 states and the District of Columbia (DC). This represents a decrease of 2.9% from 2015, and a 65.2% decrease from 1992.

Slide 3. TB Morbidity, United States, 2011–2016. This slide provides the total number of reported U.S. TB cases and the associated rates for each of the past 6 years. Rate is defined as the number of cases per 100,000 population. The number of TB cases decreased from 10,509 in 2011 to 9,272 in 2016, and the TB rate decreased from 3.4 in 2011 to 2.9 in 2016.

Slide 4. TB Case Rates, United States, 2016. Forty-one states reported a rate ≤2.9 cases/100,000 population, the 2016 national average. Nine states, the District of Columbia (DC) and New York City (NYC) reported a rate >2.9 cases/100,000 population; these accounted for 63% of the national total in 2016.

Slide 5. Map of the U.S.-Affiliated Pacific Islands, by TB Case Rates, 2016. The Federated States of Micronesia, Republic of the Marshall Islands, Northern Mariana Islands and Palau had case rates at or above 50/100,000 population. The lowest case rates were in Guam and American Samoa.

Slide 6. TB Case Rates, U.S.-Affiliated Pacific Islands, 2016. Case rates range from 1.8/100,000 population in American Samoa to 243.9/100,000 in the Republic of the Marshall Islands, compared with the substantially lower overall U.S. case rate (2.9/100,000).

Slide 7. TB Case Rates by Age Group, United States, 1993–2016. During 2016, case rates in all age groups declined by >50% from their 1993 values: persons aged ≥65 years, from 17.7 cases/100,000 population in 1993 to 4.6 in 2016; adults aged 45–64 years, from 12.5 to 3.4; adults aged 25–44 years, from 11.6 to 3.3; persons aged 15–24 years, from 5.0 to 2.2; children aged 5 to 14 years, from 1.7 to 0.4; and children aged ≤4 years, from 5.2 to 1.1.

Slide 8. Reported TB Cases by Age Group, United States, 2016. Two percent of TB cases were among children aged 0–4 years; 2% were among those aged 5–14 years; 10% were among persons aged 15–24 years; 31% were among adults aged 25–44 years; 31% were among adults aged 45–64 years; and 24% were among adults aged ≥65 years.

Slide 9. TB Case Rates by Age Group and Sex, United States, 2016. Case rates tended to increase with age, ranging from <1 case/100,000 children aged 5–14 years to a high of 6.4 cases/100,000 men aged ≥65 years.

As age increased, the case rate among men increased faster than women; the rates among men aged ≥45 years were approximately twice those among women of the same age.

Slide 10. TB Case Rates by Race/Ethnicity, United States, 2003–2016. By race/ethnicity, the rates indicate a declining trend in TB since 2003. Asians consistently had the highest yearly TB rates, but their rates declined from 29.3 cases/100,000 population in 2003 to 18.0 in 2016, a 38.6% decrease. Rates also declined among the following racial/ethnic groups: non-Hispanic blacks/African Americans, from 11.7 in 2003 to 4.9 in 2016 (–58.2%); Hispanics, from 10.2 to 4.5 (–55.8%); non-Hispanic whites, from 1.4 to 0.6 (–57.1%); American Indians and Alaska Natives, from 8.3 to 4.7 (–43.6%); and Native Hawaiian/Other Pacific Islanders, from 15.7 to 13.9 (–11.2%). Because of the low TB case counts and population estimates for Native Hawaiians/Other Pacific Islanders in the United States, case rates for this group might appear high. (Percentage change are based off of unrounded numbers.)

Certain key factors likely contribute to the disproportionate burden of TB among minority groups. For persons who were born in countries where TB is common, TB disease can result from infection acquired in their country of origin. Unequal distribution of TB risk factors (e.g., human immunodeficiency virus [HIV] infection) also might contribute to increased exposure to TB or to an increased risk for experiencing TB after becoming infected with Mycobacterium tuberculosis.

Slide 11. TB Case Rates by Age Group and Race/Ethnicity, United States, 2016. After infancy (ages 0–4 years), risk typically increased with age across all racial/ethnic groups, except among Native Hawaiians/Other Pacific Islanders, which did not indicate a trend. Rates were consistently higher among minority racial/ethnic groups than among non-Hispanic whites. Rates were the highest among Asians and Native Hawaiians/Other Pacific Islanders. Because of the low TB case counts and population estimates for Native Hawaiians/Other Pacific Islanders in the United States, case rates for this group might appear high.

Slide 12. Reported TB Cases by Race/Ethnicity, United States, 2016. During 2016, approximately 86% of all reported TB cases occurred among racial/ethnic minorities: Asians, 35%; Hispanics, 28%; non-Hispanic blacks/African Americans, 21%; American Indians/Alaska Natives, 1%; and Native Hawaiians/Other Pacific Islanders, 1%. In contrast, 13% of cases occurred among non-Hispanic whites. Persons reporting two or more races, not including persons of Hispanic or Latino ethnicity, accounted for 1% of all cases. Unknown or missing data on race accounted for <0.5% of all cases.

Slide 13. Number of TB Cases Among U.S.-Born versus Non-U.S.–Born Persons, United States 1993–2016. The graph illustrates the increase in the percentage of cases occurring among non-U.S.–born persons during the study period, from 30% in 1993 to 69% in 2016. Overall, the number of cases among non-U.S.–born remained stable before 2009, with approximately 7,400–8,000 cases/year. During 2009, the number decreased to 6,999, and that trend continued through 2013, with the number of cases among non-U.S.–born persons decreasing to 6,222. However, in 2014 and 2015 the number of cases among non-U.S.–born persons increased to a high of 6,406 in 2015. In 2016, the number of cases decreased from 2015 to 6,351 cases. Among U.S.-born persons the number of cases decreased from >17,000 in 1993 to 2,901 in 2016.

Slide 14. Trends in TB Cases Among Non-U.S.–Born Persons, United States, 1993–2016. The percentage of TB cases accounted for among non-U.S.–born persons increased from 30% in 1993 to 69% in 2016.

Slide 15. Reported TB Cases by Origin and Race/Ethnicity, United States, 2016. Among U.S.-born persons with TB in 2016, 37% were non-Hispanic black/African American; 31% were non-Hispanic white, 21% were Hispanic/Latino; 5% were Asian; 4% were American Indian/Alaska Native; and 1% were Native Hawaiian/Other Pacific Islander. Persons reporting two or more races totaled <1% of cases among U.S.-born persons. Among non-U.S.–born persons with TB, 48% were Asian; 31% were Hispanic/Latino; 14% were non-Hispanic black/African American; 5% were non-Hispanic white; 1% were Native Hawaiian/Pacific Islander; and 1% were persons reporting two or more races, not including persons of Hispanic/Latino origin.

Cases among American Indians/Alaska Natives constituted 0.3% of the cases among non-U.S.–born persons and are not included on the charts.

Slide 16. Percentage of Non-U.S.–Born Persons Among TB Cases, United States, 2006 and 2016. The number of states with <25% of their TB cases occurring among non-U.S.–born persons decreased from 6 states in 2006 to 4 states in 2016. The number of states with ≥25%–49% of cases among non-U.S.–born persons decreased from 16 states and DC in 2006 to 8 states in 2016. However, the number of states that had ≥50% of their cases among non-U.S.–born persons increased from 28 states in 2006 to 38 states and DC in 2016.

Slide 17. TB Case Rates Among U.S.-Born versus Non-U.S.–Born Persons, United States, 1993–2016. TB rates among non-U.S.–born remain higher than those among the U.S.-born population. During 1993–2016, the rate among U.S.-born persons decreased from 7.4 cases/100,000 population to 1.1, whereas the rates among non-U.S.–born persons decreased from 34.0 cases/100,000 population to 14.7.

Slide 18. TB Case Rates Among U.S.-Born versus Non-U.S.–Born Persons, United States, 1993–2016. The chart presents the same data as on Slide 17, but uses a logarithmic scale to better illustrate the trends. The trend lines indicate a greater rate of decrease among U.S.-born, compared with non-U.S.–born, persons during the study period.

Slide 19. Countries of Birth Among Non-U.S.–Born Persons Reported with TB, United States, 2016. The top seven countries are displayed in the chart; those countries have remained relatively constant since 1986, when information regarding country of birth was first reported by all areas submitting reports to CDC. During 2016, the top seven countries accounted for 60% of all cases among non-U.S.–born persons, with Mexico accounting for 19%; the Philippines, 12%; India, 9%; Vietnam, 8%; China, 6%; Guatemala, 3%; and Haiti, 3%. Persons from 135 other countries each accounted for ≤2% of the total, but altogether, accounted for 40% of non-U.S.–born persons reported with TB.

Slide 20. Percentage of Non-U.S.–Born Persons with TB, by Time of Residence in U.S. Before Diagnosis, 2016. The chart indicates that the distribution for the top three countries of birth is Mexico, the Philippines, and India. Among persons born in Mexico, 11.2% had been in the United States for <1 year; 6.5%, 1–4 years; 8.4%, 5–9 years; 22.9%, 10–19 years; and 39.8% for ≥20 years. Among persons born in the Philippines, 11.6% had been in the United States for <1 year; 9.9%, 1–4 years; 12.4%, 5–9 years; 21.4%, 10–19 years; and 33.2%, ≥20 years. Among persons born in India, 21.1% had been in the United States for <1 year; 26.8%, 1–4 years; 13.2%, 5–9 years; 18.8%, 10–19 years; and 13.8%, ≥20 years. Values for unknown length of residence in the United States for these top three countries ranged from 6.3 to 11.5% for 2016. For all other non-U.S.–born persons, 20.4% had been in the United States for <1 year; 17.9%, 1–4 years; 12.9%, 5–9 years; 18.1%, 10–19 years; 22.8%, ≥20 years; and 7.9%, unknown length of residence. Overall, 17.6% had been in the United States for <1 year; 15.6%, 1–4 years; 12.0%, 5–9 years; 19.5%, 10–19 years; 26.5%, ≥20 years; and 8.8%, unknown length of residence.

Slide 21. Primary Anti-TB Drug Resistance, United States, 1993–2016. The graph starts in 1993, the year in which the individual TB case reports submitted to the national surveillance system began collecting information regarding initial susceptibility test results for patients with culture-positive TB. Data were available for >86.9% of culture-positive cases for each year. Primary resistance was calculated by using data from persons with no reported prior TB episode. Resistance to at least isoniazid was 8.2% in 1993; however, by 2016, this had increased to 8.7%. Resistance to at least isoniazid and rifampin, known as multidrug-resistant TB (MDR TB), was 2.5% in 1993. The percent of primary MDR TB has remained approximately stable since it decreased to 1.0% in 1998. In 2016 the percent of primary MDR TB was 1.2%.

Slide 22. Primary MDR-TB, United States, 1993–2016. This graph focuses on trends in primary multidrug-resistant TB (MDR-TB), which is based on initial isolates from persons with no prior history of TB. The number of primary MDR-TB cases, represented by the bars, decreased steadily from 407 in 1993 to 115 in

2001, with a slight increase to 132 in 2002. Since then, the total number of primary MDR-TB cases has fluctuated from 70 to 103 cases, with 78 cases reported for 2016. Primary MDR-TB, indicated by the trend line, decreased from 2.5% in 1993 to approximately 1.0% in 1998, and has fluctuated approximately 1.0% since then. During 2016, the percentage was 1.2%.

Slide 23. Primary Isoniazid Resistance Among U.S.-Born versus Non-U.S.–Born Persons, United States, 1993–2016. On the basis of initial isolates from persons with no prior history of TB, the percentage of isoniazid resistance has remained higher among non-U.S.–born persons than among U.S.-born persons for all years measured. Among non-U.S.–born persons, the percentage declined from 12.1% in 1993 to 10.0% in 2016. In U.S.-born persons, the percentage decreased from 6.7% in 1993 to a low of 4.2% in 2007. From 2008 to 2016 the percentage of cases ranged from 5.2% in 2008 to a high of 7.5% in 2014. During 2016, the percentage of primary isoniazid resistance among U.S.-born cases was 5.9%.

Slide 24. Primary MDR-TB in U.S.-born vs. Non-U.S.–born Persons, United States, 1993–2016. This graph highlights primary MDR-TB in U.S.-born versus non-U.S.–born persons. The percentage with primary MDR-TB has declined among both groups since 1993, although the decline in the U.S.-born has been greater. As a result, the proportion of primary MDR-TB cases in the US that are attributed to non-U.S.–born persons increased from approximately 25% in 1993 to 90% in 2016 (not shown on slide). Among the U.S.-born, the percentage with primary MDR-TB has been less than 1% since 1997 and was 0.4% in 2016. The percentage among non-U.S.–born persons has fluctuated year by year, although it has remained between 1.2 and 1.8% since 1995. In 2016 the percentage of primary MDR-TB among non-U.S.–born persons was 1.5%.

Slide 25. XDR-TB Case Count, Defined on Initial DST, United States, 1993–2016. Extensively drug-resistant TB (XDR-TB) at first drug susceptibility test (DST) 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. One case of XDR-TB was reported in 2016, and the most reported in a single year was 10 in 1993. No cases were reported in 2003 and 2009, and no apparent trend exists in the number of cases over time.

Slide 26. Reporting of HIV Test Results in Persons with TB by Age Group, United States, 1993–2016. This slide shows the completeness of reporting of HIV test results in persons with TB by age group from 1993 through 2016. The percentage of TB patients for whom test results were reported increased from 30% among all ages in 1993 to 90% in 2016. Among adults 25–44 years of age, the percentage increased from 45% in 1993 to 95% in 2016. California began reporting HIV test results to CDC in 2011; this accounts for the substantial percentage increase for that year.

Slide 27. Estimated HIV Coinfection in Persons Reported with TB, United States, 1993–2016. This slide provides minimum estimates of HIV coinfection among persons reported with TB from 1993 through 2016. Since the addition of the request for HIV status to the individual TB case report in 1993, incomplete reporting has provided a challenge to calculating reliable estimates, although reporting improved substantially beginning in 2011 (see previous Slide 26). Results from the cross-matching of TB and AIDS registries have been used to supplement reported HIV test results. For all ages, the estimated percentage of HIV coinfection in persons who reported HIV testing (positive, negative, or indeterminate test results) with TB decreased from 48% to 6% overall from 1993–2016, and from 63% to 9% among persons 25 to 44 years of age during this period.

Slide 28. TB Cases by Residence in Correctional Facilities, Age ≥15, United States, 1993-2016. This graph highlights the number of cases that were a resident of any type of correctional facility at the time of TB diagnosis. Cases must have been 15 years of age or greater. The number of cases residing in a correctional facility has decreased from a high of 1,117 cases in 1994 to 328 cases in 2016. Between the years 2000 and 2010, the number of cases residing in a correctional facility ranged between the mid to high-400s and high-500s; 2011 was the first year to drop below this range to 423 cases. Of total cases, the percentage of cases residing in a correctional facility has ranged from 5.0% in 1994 to 3.3% in 2002. The 1990s saw a decreasing trend in percentage until 2002. Since 2002, there has been an increasing trend in percentage. In 2016 percent-age of total cases was 3.7%.

Slide 29. TB Cases by Homeless Status, Age ≥15, United States, 1993–2016. This graph highlights the status of cases that were homeless within twelve months prior of TB diagnosis from 1993 through 2016. Cases must have been 15 years of age or greater. The number of homeless cases has decreased from a high of 1,379 cases in 1994 to 430 in 2016. This category has seen an overall decrease in cases since 1994, with the exception of the slight increases observed in years 2003, 2006, and 2010. Of total cases, the percentages of homeless have had an overall decline from 7.5% in 1993 to 4.9% in 2016.

Slide 30. Mode of Treatment Administration in Persons Reported with TB, United States, 1993–2014. In 1993, the reporting areas began providing information about mode of treatment administration on the individual TB case report form. Treatment administered as only directly observed therapy (DOT) increased from 21.7% in 1993 to 63.9% in 2014, the latest year with available data. The proportion of patients who received at least some portion of their treatment as DOT (based on combining the percentage of patients who received only DOT and the percentage for whom some portion was self-administered) was 29.0% in 2014.

Slide 31. Completion of TB Therapy, United States, 1993–2014. The reporting areas began providing information on completion of therapy in 1993 through the individual TB case report form. The calculations exclude persons with initial isolate rifampin resistant, or patient with bone and joint disease, meningeal disease or disease of the central nervous system, or pediatric patient (age <15) with miliary disease or positive blood culture or a positive nucleic acid amplification test on a blood specimen, and those who moved out of the country within one year of initiating treatment. Overall completion of therapy had remained at approximately 92-93% from 1998 through 2008, but increased to 95-97% from 2009 to 2014. In 2014, the latest year with available data, completion of therapy was 97%. Completion in 1 year or less increased from 63% in 1993 to 90% in 2014. The current DHHS Healthy People 2020 objective is completion of therapy in 1 year or less in 93% of patients. CDC is working with state and local health departments to determine and evaluate reasons for apparently delayed completion of therapy, which may vary by jurisdiction.

Slide 32. Definition for Tuberculosis Genotyping in the United States. This slide shows the schematic for sequential assignment of unique spoligotypes and initial 12-locus MIRU-VNTR combination or 24-locus MIRU-VNTR combination.

Slide 33. National Tuberculosis Genotyping Surveillance Coverage by Year, United States, 2004–2016. This slide shows the increase in genotyping surveillance coverage from 2004 to 2016. In 2004 the proportion of positive cultures with at least one genotyped isolate was 52.6%; in 2016 it was 96.4%. The national goal for genotyping surveillance coverage is 94.0%.

Slide 34. Number of County-based Tuberculosis Genotype Clusters by Cluster Size, United States, 2014–2016. This slide shows the number of county-based TB genotype clusters by the size of the clusters; genotype cluster is defined as two or more cases with matching spoligotype and 24-locus MIRU-VNTR (GENType) within a county during the specified three year time period. In the 2014–2016 three year time period, there were 878 two-case clusters, 263 three-case clusters, 105 four-case clusters, 43 five-case clusters, 25 six-case clusters, 26 seven-case clusters, 14 eight-case clusters, 10 nine-case clusters, and 37 case clusters that were greater or equal to 10 in size.

Slide 35. Tuberculosis Genotype Clusters by TB GIMS Alert Levels, United States, 2014–2016. This slide shows a chart with percentage of genotype clusters by alert level. Alert level is determined by the log likelihood ratio statistic (LLR) for a given cluster, identifying higher than expected geospatial concentrations for a TB genotype cluster in a specific county, compared to the national distribution of that genotype; TB GIMS generates alert level notifications based on this statistic: “No alert” is indicated if LLR is between 0–<5, “medium” is for LLR of 5–<10 and “high” alert is for clusters with LLR ≥10. In the 2014–2016 three year time period, high alerts made up 6% of the total, medium alerts were 23%, and no alert were 71%.

Slide 36. (final slide). For more information, please contact Division of Tuberculosis Elimination at http://www.cdc.gov/tb/.

Appendixes

Appendix A

Tuberculosis Case Definition for Public Health Surveillance
(Revised May 13, 2009)

Clinical Description
A chronic bacterial infection caused by *Mycobacterium tuberculosis*, usually characterized pathologically by the formation of granulomas. The most common site of infection is the lung, but other organs can be involved.

Clinical Case Definition
A case that meets ***all*** of the following criteria:

- A positive tuberculin skin test result or positive interferon gamma release assay for *M. tuberculosis.*
- Other signs and symptoms compatible with tuberculosis (TB) (e.g., abnormal chest radiograph, abnormal chest computerized tomography scan or other chest imaging study, or clinical evidence of current disease).
- Treatment with two or more anti-TB medications.
- A completed diagnostic evaluation.

Laboratory Criteria for Diagnosis

- Isolation of *M. tuberculosis* complex from a clinical specimen,*
  or
- Demonstration of *M. tuberculosis* complex from a clinical specimen by nucleic acid amplification test,†
  or
- Demonstration of acid-fast bacilli in a clinical specimen when a culture has not been or cannot be obtained or is falsely negative or contaminated.

Case Classification
Confirmed: A case that meets the clinical case definition or is laboratory-confirmed.

Comment**:** A case should not be counted twice within any consecutive 12-month period. However, a case occurring in a patient who had previously had verified TB disease should be reported and counted again if >12 months have elapsed since the patient completed therapy. A case should also be reported and counted again if the patient was lost to supervision for >12 months and TB disease can be verified again. Mycobacterial diseases other than those caused by *M. tuberculosis* complex should not be counted in tuberculosis morbidity statistics unless concurrent tuberculosis occurs.

* Use of rapid identification techniques for *M. tuberculosis* (e.g., DNA probes and mycolic acid high-pressure liquid chromatography performed on a culture from a clinical specimen) are acceptable under this criterion.

† Nucleic acid amplification (NAA) tests must be accompanied by culture for mycobacteria species for clinical purposes. A culture isolate of *M. tuberculosis* complex is required for complete drug susceptibility testing and also genotyping. However, for surveillance purposes, CDC will accept results obtained from NAA tests approved by the Food and Drug Administration (FDA) and used according to the approved product labeling on the package insert, or a test produced and validated in accordance with applicable FDA and Clinical Laboratory Improvement Amendments (CLIA) regulations.

Appendix B

Recommendations for Reporting and Counting Tuberculosis Cases
(Revised May 13, 2009)

Since publication of the "Recommendations for Counting Reported Tuberculosis Cases"[1] in July 1997, substantial changes have occurred, and questions have been raised within the field of tuberculosis (TB) surveillance. This appendix updates and supersedes previous versions.

A distinction should be made between ***reporting*** TB cases to a health department and ***counting*** TB cases for determining disease incidence. Throughout each year, TB cases and suspected cases are reported to public health authorities by such sources as clinics, hospitals, laboratories, and health care providers. From these reports, the state or local TB control officer must determine which cases meet the surveillance definition for TB disease and whether the case is countable. These countable TB cases are then reported to the Centers for Disease Control and Prevention (CDC).

Beginning in 2009, state and local TB control officers may also report to CDC those TB cases that are verified but not countable for morbidity statistics, as a measure of programmatic and case management burden. The noncountable report can include persons with TB disease recurring within a consecutive 12-month period after the patient completed TB therapy.

I. Reporting TB Cases. CDC recommends that health care providers and laboratories be required to report all TB cases or suspected cases to state and local health departments on the basis of "Tuberculosis Case Definition for Public Health Surveillance" (Appendix A). This notification is essential for TB programs to

- ensure case supervision,
- ensure completion of recommended therapy,
- ensure completion of contact investigations,
- evaluate program effectiveness, and
- assess trends and characteristics of TB morbidity.

II. TB Surveillance. For purposes of surveillance, a case of TB is defined on the basis of laboratory or clinical evidence of active disease caused by *M. tuberculosis* complex.*

* Because the majority of laboratories use tests that do not routinely distinguish *Mycobacterium tuberculosis* from closely related species, these laboratories report culture results as being positive or negative for "*Mycobacterium tuberculosis* complex." Although in almost all cases of human disease, isolates in the *M. tuberculosis* complex are, in fact, *M. tuberculosis*, other species are possible. Other species in the *M. tuberculosis* complex include *M. bovis*, *M. africanum*, *M. microti*, *M. canetii*, *M. caprae*, *M. pinnipedii*, and *M. mungi*; the inclusion of these species in *M. tuberculosis* complex should not affect public health laboratories or programs because only a few laboratories identify to the species level. These seven species are approximately identical in DNA homology studies. In terms of their ability to cause clinical disease or be transmissible from person to person, *M. bovis*, *M. africanum*, *M. microti*, *M. canetii*, *M. pinnipedii*, and *M. mungi* behave like *M. tuberculosis*; therefore, disease caused by any of the organisms should be reported as TB, using the Report of Verified Case of Tuberculosis (RVCT). The only exception is the bacillus Calmette-Guérin (BCC) strain of *M. bovis*, which can be isolated from persons who have received the vaccine for protection against TB or as cancer immunotherapy; disease caused by the BCG strain of *M. bovis* should not be reported as TB.

A. Laboratory Case Definition

Isolation of* M. tuberculosis *complex from a clinical specimen. The use of rapid identification techniques for *M. tuberculosis* performed on a culture from a clinical specimen (e.g., DNA probes or high-pressure liquid chromatography) is acceptable under this criterion.

or

Demonstration of* M. tuberculosis *from a clinical specimen by nucleic acid amplification test. Nucleic acid amplification (NAA) tests must be accompanied by cultures of mycobacterial species. However, for surveillance purposes, CDC will accept results obtained from NAA tests approved by the Food and Drug Administration (FDA) and used according to the approved product labeling on the package insert, or a test produced and validated in accordance with applicable FDA and Clinical Laboratory Improvement Amendments regulations.

or

Demonstration of acid-fast bacilli (AFB) in a clinical specimen when a culture has not been or cannot be obtained or is falsely negative or contaminated. Historically, this criterion has been most commonly used in diagnosing TB in the postmortem setting.

B. Clinical Case Definition. In the absence of laboratory confirmation of *M. tuberculosis* complex after a diagnostic process has been completed, persons must have ***all*** of the following criteria for a clinical TB diagnosis:

1. Evidence of TB infection based on a positive tuberculin skin test result or positive interferon gamma release assay for *M. tuberculosis*, and
2. current treatment with two or more anti-TB medications.

and

One of the following:

1. Signs and symptoms compatible with current TB disease (e.g., an abnormal chest radiograph or abnormal chest computerized tomography scan or other chest imaging study,

or

2. Clinical evidence of current disease (e.g., fever, night sweats, cough, weight loss, hemoptysis).

NOTE: The software for TB surveillance developed by CDC includes a calculated variable called "Vercrit," for which one of the values is Provider Diagnosis. Provider Diagnosis is selected when the user chooses to override a Suspect default value in the case verification screen as Verified by Provider Diagnosis. Thus, Provider Diagnosis is not a component of the case definition for TB in the "Tuberculosis Case Definition for Public Health Surveillance" (Appendix A). CDC's national morbidity reports have traditionally included all TB cases that are

considered verified by the reporting areas, without a requirement that cases meet the published case definition.

III. Counting TB Cases. Cases that meet the CDC surveillance case definition for verified TB are counted by 52 reporting areas with count authority (50 states, the District of Columbia [DC], and New York City) to determine annual incidence for the United States. The remaining 8 reporting areas (American Samoa, Federated States of Micronesia, Guam, Marshall Islands, Northern Mariana Islands, Puerto Rico, Republic of Palau, and U.S. Virgin Islands) report cases to CDC but are not included in the annual incidence for the United States. The laboratory and clinical case definitions are the two diagnostic categories used in the CDC "Tuberculosis Case Definition for Public Health Surveillance" (Appendix A).

The majority of verified TB cases are accepted for counting on the basis of laboratory confirmation of *M. tuberculosis* complex from a clinical specimen.

A person might have more than one discrete (separate and distinct) episode of TB. If disease recurs ***within*** any 12-month consecutive period after the patient completed therapy, count only one episode as a case. However, if TB disease recurs in a person, ***and*** if >12 months have elapsed since the person completed TB therapy or the person was lost to supervision, the TB case is considered a separate episode and should be counted as a new case.

Mycobacterial diseases other than those caused by *M. tuberculosis* complex should not be counted in TB morbidity statistics unless concurrent TB occurs.

A. Verified TB Cases

COUNT
Count only verified TB cases that meet the laboratory or clinical case definitions (see Section II). TB diagnosis must be verified by the TB control officer or designee. The CDC surveillance case definition for TB (Appendix A) describes and defines the criteria to be used in the case definition for TB disease.

DO NOT COUNT
If diagnostic procedures have not been completed, do not count; wait for confirmation of disease. Do not count as a case of illness in a patient for whom two or more anti-TB medications have been prescribed for preventive therapy for exposure to multidrug-resistant TB or while the diagnosis is still pending.

B. Nontuberculous Mycobacterial Disease

COUNT
An episode of TB disease diagnosed concurrently with another nontuberculous mycobacterial disease (NTM) should be counted as a TB case.

DO NOT COUNT
Disease attributed to or caused by NTM alone should not be counted as a TB case.

C. TB Cases Reported at Death

COUNT
TB cases first reported to the health department at the time of a person's death are counted as incident cases, provided the person had current disease at the time of death. The TB control officer should verify the TB diagnosis.

DO NOT COUNT
Do not count as a case of TB if no evidence exists of current disease at the time of death or at autopsy.

D. Immigrants, Refugees, Permanent Resident Aliens, Border Crossers,† and Foreign Visitors[2]

COUNT
Immigrants and refugees who are examined after arriving in the United States and who receive a diagnosis of clinically active TB requiring anti-TB medications should be reported and counted by the locality of their residence at the time of diagnosis, regardless of citizenship status.

Border crossers† who receive a TB diagnosis and who plan to receive anti-TB therapy from a locality in the United States for ≥90 days should be reported and counted by the locality where they receive anti-TB therapy.

Foreign visitors (e.g., students, commercial representatives, and diplomatic personnel) who receive a diagnosis of TB, are receiving anti-TB therapy, ***and*** have been or plan to remain in the United States for ≥90 days should be reported and counted by the locality of current residence.

DO NOT COUNT
Any person who received a TB diagnosis and who started anti-TB drugs in another country should not be counted as a new case but should be reported as a person with a verified noncountable TB case.

Border crossers† and foreign visitors who receive a TB diagnosis and who receive anti-TB therapy from a locality in the United States for ≤89 days but who plan to return to their native country to continue therapy should not be reported or counted by the locality where they receive anti-TB therapy.

† *Border crosser* is defined by the U.S. Citizenship and Immigration Services[3] as "an alien resident of the United States reentering the country after an absence of less than six months in Canada or Mexico, or a nonresident alien entering the United States across the Canadian border for stays of no more than six months, or across the Mexican border for stays of no more than 72 hours." Border crossers might go back and forth across the border frequently in a short period.

E. Out-of-State or Out-of-Area Residents

COUNT
A person's TB case should be counted by the locality in which he or she resides at the time of diagnosis. TB in a person who has no address should be counted by the locality where TB is diagnosed and treated. The TB control officer should notify the out-of-state or out-of-area TB control officer of the person's home locality to (1) determine whether the case has been counted already to avoid double counting, and (2) agree on which TB control office should count the case if it has not yet been counted.

DO NOT COUNT
Do not count a case in a patient with newly diagnosed TB who is an out-of-area resident and whose TB has already been counted by the out-of-area TB control office.

F. Migrants and Other Transients

COUNT
Persons without any fixed U.S. residence are considered to be the public health responsibility of their present locality, and their TB case should be reported and counted where diagnosed.

DO NOT COUNT
Cases among transient TB patients should not be counted when evidence exists that they have already been counted by another locality.

G. Cases Occurring in Federal Facilities (e.g., Military and Veterans Administration Facilities)

COUNT
Cases among military personnel, their dependents, or veterans should be reported and counted by the locality where the persons are residing in the United States at the time of diagnosis and initiation of treatment.

However, if military personnel or dependents are discovered to have TB at a military base outside the United States but are referred elsewhere for treatment (e.g., a military base located within the United States), the TB case should be reported and counted where treated and not where the diagnosis was made.

DO NOT COUNT
Do not count if the case was already counted by another locality in the United States.

H. Cases Associated with the Indian Health Service

COUNT
TB should be reported to the local health authority (e.g., state or county) and counted where diagnosed and treatment is initiated. However, for specific groups (e.g., the Navajo Nation) located in multiple states, health departments should discuss each case

and determine which locality should count the case.

DO NOT COUNT
Do not count if the case was already counted by another locality.

I. Cases Occurring in Correctional Facilities (e.g., Local, State, Federal, and Military)

COUNT
Frequently, persons who reside in local, state, federal, or military correctional facilities are transferred or relocated within or between different correctional facilities. TB among these persons should be reported to the local health authority and counted by the locality where the diagnosis was made and treatment plans were initiated.

DO NOT COUNT
Do not count correctional facility residents' TB cases that were counted elsewhere by another locality or correctional facility, even if treatment continues at another locale or correctional facility.

J. Peace Corps, Missionaries, and Other Citizens Residing Outside the United States

DO NOT COUNT
TB among persons who received their diagnosis outside the United States should not be counted. TB among these persons should be counted by the country in which they are residing, regardless of their plans to return to the United States for further evaluation or treatment.

IV. Recommended Administrative Practices

To promote uniformity in TB case counting, the following administrative procedures are recommended:

A. All TB cases verified by the 52 reporting areas with count authority (50 states, DC, and New York City) during the calendar year (by December 31) will be included in the annual U.S. incidence count for that year. All TB cases verified during the calendar year by a reporting area with count authority from one of the remaining eight reporting areas (American Samoa, Federated States of Micronesia, Guam, Marshall Islands, Northern Mariana Islands, Puerto Rico, Republic of Palau, and U.S. Virgin Islands) are also counted but are not included in the annual incidence for the United States. Cases for which bacteriologic results are pending or for which confirmation of disease is questionable for any other reason should not be counted until their status is clearly determined; they should be counted at the time they meet the criteria for counting. This means that a case reported in 1 calendar year might be included in the morbidity count for the following year. All reporting areas should ensure that agreement exists between final local and state TB figures reported to CDC. Reporting areas might not use this recommended protocol. They may wait until the beginning of the following year when they have received and processed all of the TB cases for inclusion in the annual case count for the previous year. If reporting areas decide to revise their protocols, they should be aware that their TB trends might change.

B. Occasionally, TB is reported to health departments by telephone, by letter or fax, or on forms other than the RVCT. Such information should be accepted as an official morbidity report if sufficient details are provided; otherwise, the notification should be used as an indicator of a possible TB case (suspect) that should be investigated promptly for confirmation.

V. TB Surveillance Definitions

Case: An episode of TB disease in a person meeting the laboratory or clinical criteria for TB as defined in "Tuberculosis Case Definition for Public Health Surveillance" (see Section II for criteria).

Suspect: A case for which a high index of suspicion exists for active TB (e.g., in a known contact of a person with active TB or in a person with signs or symptoms consistent with TB) and that is currently under evaluation.

Verification of a TB case: The process whereby a TB case, after the diagnostic evaluation is complete, is reviewed at the local level (e.g., state or county) by a TB control official who is familiar with TB surveillance definitions; if all the criteria for a TB case are met, the TB case is then verified and eligible for counting.

> **Counting of a TB case:** The process whereby a reporting area with count authority evaluates verified TB cases against count criteria (e.g., assesses for case duplication). These cases are then counted for morbidity in that locality (e.g., state or county) and reported to CDC for national morbidity counting. Noncountable, verified cases may also be sent to CDC.

***M. tuberculosis* complex:** Because the majority of laboratories use tests that do not routinely distinguish *M. tuberculosis* from closely related species, those laboratories report culture results as being positive or negative for *M. tuberculosis* complex. Although in approximately all cases of human disease, isolates in the *M. tuberculosis* complex are, in fact, *M. tuberculosis*, other species are possible. For example, one study in San Diego reported that 6% of human tuberculosis was caused by *M. bovis*; cultures from these cases would be reported by the majority of laboratories as being positive for *M. tuberculosis* complex[4]. Other species in the *M. tuberculosis* complex include *M. africanum*, *M. microti*, *M. canetii*, *M. caprae*, and *M. pinnipedii*. Although *M. microti*, *M. canetii*, *M. caprae*, and *M. pinnipedii* are newly described species, their inclusion in *M. tuberculosis* complex should not affect public health laboratories or programs because only a few laboratories identify to the species level. These seven species are almost identical in DNA homology studies. In terms of their ability to cause clinical disease or be transmissible from person to person, *M. bovis*, *M. africanum*, *M. microti*, *M. canetti*, *M. caprae*, and *M. pinnipedii* behave similar to *M. tuberculosis*; therefore, disease caused by any of the organisms should be reported as TB by using the RVCT form. The only exception is the BCG strain of *M. bovis*, which might be isolated from persons who have received the vaccine for protection against TB or as cancer immunotherapy; disease caused by the BCG strain of *M. bovis* should not be reported as TB.

Nontuberculous mycobacteria: Mycobacteria other than *M. tuberculosis* complex that can cause human infection or disease. Common nontuberculous mycobacteria (NTM) include *M. avium* complex (also known as "MAC") (*M. avium*, *M. intracellulare*), *M. kansasii*, *M. marinum*, *M. scrofulaceum*, *M. chelonae*, *M. fortuitum*, and *M. simiae*. Other terms have been used to represent NTM, including "MOTT" (mycobacteria other than TB) and "atypical" mycobacteria.

Reporting area: Areas responsible for counting and reporting verified TB cases to CDC. A total of 60 areas report cases to CDC: the 50 states, DC, New York City, American Samoa, Federated States of Micronesia, Guam, Marshall Islands, Northern Mariana Islands, Puerto Rico, Republic of Palau, and U.S. Virgin Islands. The annual incidence of tuberculosis for the United States is based on 52 of these reporting areas (the 50 states, DC, and New York City).

Alien: Defined by USCIS[3] as "any person not a citizen or national of the United States." The term *alien* is further defined as follows:

Border crosser: Defined by USCIS[3] as "an alien resident of the United States reentering the country after an absence of less than six months in Canada or Mexico, or a nonresident alien entering the United States across the Canadian border for stays of no more than six months, or across the Mexican border for stays of no more than 72 hours." Border crossers may go back and forth across the border frequently in a short period.

Class A TB with waiver[2]: All applicants who have tuberculosis disease and have been granted a waiver.

Class B1 TB, Pulmonary[2]:

No Treatment

Applicants who have medical history, physical exam, HIV, or chest radiographic findings indicative of pulmonary TB but have negative AFB sputum smears and cultures and have not received a diagnosis of TB or who can wait to have TB treatment started after immigration.

Completed Treatment

Applicants who received a diagnosis of pulmonary TB and successfully completed directly observed therapy before immigration. The report cover sheet should indicate if the initial sputum smears and cultures were positive and if drug susceptibility testing results are available.

Class B1 TB, Extrapulmonary[2]:

Applicants with evidence of extrapulmonary TB. Document the anatomic site of infection.

Class B2 TB, Latent TB Infection (LTBI) Evaluation[2]:

Applicants who have a tuberculin skin test (TST) of ≥10-mm induration but oth-

erwise have a negative evaluation for TB. The size of the TST reaction, the applicant's status with respect to latent TB infection treatment, and the medications used should be documented. For applicants who have had >1 TST, if the applicant's TST reaction converted, that should be documented (i.e., initial TST was ≤9-mm induration but subsequent TST was ≥10-mm induration).

Class B3 TB, Contact Evaluation[2]:
Applicants who are a recent contact of a known TB patient. The size of the applicant's TST reaction should be documented. Information about the source patient, including name, alien number, relationship to contact, and type of TB should also be documented.

Immigrant: Defined by the USCIS[3] as "an alien admitted to the United States as a lawful permanent resident. Immigrants are those persons lawfully accorded the privilege of residing permanently in the United States. They may be issued immigrant visas by the [U.S.] Department of State overseas or adjusted to permanent resident status by the USCIS of the United States."

Permanent Resident Alien: See *Immigrant*.

Waivers[2]: A provision allows applicants undergoing pulmonary or laryngeal TB treatment to petition for a Class A TB with waiver. Waivers should be pursued for any immigrant or refugee who has a complicated clinical course and would benefit from receiving TB treatment in the United States. Applicants with diagnosed TB disease who are both smear- and culture-negative and will be traveling to the United States before start of treatment do not need to complete the waiver process.

References

1. CDC. Recommendations for counting reported tuberculosis cases. In: *Reported Tuberculosis in the United States, 1996*. Atlanta, GA: US Department of Health and Human Services, CDC; 1997:61–8.
2. CDC. *2007 Technical Instructions for Tuberculosis Screening and Treatment for Panel Physicians.* Atlanta, GA: US Department of Health and Human Services, CDC; 2013. Available at: http://www.cdc.gov/immigrantrefugeehealth/exams/ti/panel/tuberculosis-panel-technical-instructions.html.
3. US Department of Homeland Security (DHS). U.S. Citizenship and Immigration Services [Homepage]. Washington, DC: DHS; 2016. Available at: http://uscis.gov.
4. TC Rodwell, M Moore, KS Moser, SK Brodine, SA Strathdee. Tuberculosis from *Mycobacterium bovis* in Binational Communities, United States. Emerg Infect Dis. 2008 Jun; 14(6): 909–916.

Appendix C

National Surveillance for Severe Adverse Events Associated with Treatment for Latent Tuberculosis Infection — Reporting Information

This information is included to alert our public health partners to the importance of reporting severe (i.e., hospitalization or death) adverse events associated with treatment for latent TB infection (LTBI). Data regarding severe adverse events (SAEs) among persons receiving treatment for LTBI are needed to serve as a basis for periodic evaluation of LTBI treatment guidelines.

In April 2000, after the publication of updated *Guidelines for Targeted Tuberculin Testing and Treatment of Latent Tuberculosis Infection*,[1] CDC's Division of Tuberculosis Elimination (DTBE) began receiving reports of SAEs related to use of a 2-month course of rifampin and pyrazinamide for LTBI treatment. In response, DTBE requested and received reports and conducted on-site investigations of liver injury among persons on LTBI treatment, and treatment guidelines were revised to recommend against the general use of rifampin and pyrazinamide for treating LTBI.[2,3] In January 2004, DTBE implemented the National Surveillance System for Severe Adverse Events Associated with Treatment for LTBI, which collects reports about SAEs associated with any LTBI treatment regimen, to quantify the frequency of SAEs and to characterize the clinical features of affected patients.[4]

Local medical providers should report possible LTBI treatment-associated SAEs to their respective local or state health departments. State health departments should report SAEs that occurred on or after January 1, 2004, to DTBE (e-mail: LTBIdrugevents@cdc.gov). Any SAEs should also be reported to the U.S. Food and Drug Administration's MedWatch program, using the Online Voluntary Reporting Form available at: https://www.accessdata.fda.gov/scripts/medwatch/index.cfm?action=reporting.home.

References

1. American Thoracic Society/CDC. Targeted tuberculin testing and treatment of latent tuberculosis infection. Am J Respir Crit Care Med 2000;161:S221–47. Available at: http://www.atsjournals.org/doi/abs/10.1164/ajrccm.161.supplement_3.ats600#.V9wOcWrylPY.
2. American Thoracic Society/CDC. Update: Adverse event data and revised American Thoracic Society/CDC recommendations against the use of rifampin and pyrazinamide for treatment of latent tuberculosis infection—United States, 2003. *MMWR* 2003;52:735–9. Available at: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5231a4.htm.
3. American Thoracic Society. An official ATS statement: hepatoxicity of antituberculosis therapy. Am J Respir Crit Care Med 2006;174:935–52. Available at: https://www.thoracic.org/statements/resources/mtpi/hepatotoxicity-of-antituberculosis-therapy.pdf.
4. CDC. Severe isoniazid-associated liver injuries among persons being treated for latent tuberculosis infection—United States, 2004–2008. MMWR Morb Mortal Wkly Rep 2010;59:224–9. Available at: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5908a3.htm.

Appendix D

Genotyping Background Information and Glossary

Tuberculosis (TB) genotyping is a laboratory-based analysis of the genetic material of the bacteria that cause TB disease, *Mycobacterium tuberculosis* complex. The total genetic content is referred to as the genome. Specific sections of the genome contain distinct genetic patterns that help distinguish different strains of *M. tuberculosis*. TB genotyping examines the location, number, and presence of different types of spacer or repetitive DNA patterns. The areas of the genome examined in TB genotyping are different from those related to drug resistance.

Applications of Genotyping

Persons with TB disease who are related by transmission should have matching genotype results. Conversely, persons with matching TB genotyping results are probably related by transmission in some way, although the connection might not be recent or direct.

Genotyping results, when combined with epidemiologic data, can help identify persons with TB disease involved in the same chain of transmission. This information adds value to conventional TB control activities in different ways. These applications are summarized as follows:

Patient-Level Applications of Genotyping

Complete Contact Investigations

- Confirm or refute patient connections (epidemiologic linkages) identified that might or might not be identified through routine contact investigations.

Cluster Investigations

- Find patient connections that were not identified through routine contact investigations.
- Detect, refute, or confirm potential false-positive culture results.
- Distinguish relapse TB disease from new TB infection among TB patients with recurrent TB disease.

Population-Level Applications of Genotyping

- Detect potential outbreaks by using geospatial or other analyses of genotype clusters.
- Refute outbreaks when cases believed to be part of the same outbreak have nonmatching genotype results.
- Define the scope of potential outbreaks by identifying all cases in an area with a matching genotype.
- Monitor known outbreaks over time by watching for new cases with the outbreak genotype that become added to existing clusters (outbreak surveillance).

History of TB Genotyping Surveillance in the United States

In 1996, CDC started the National Tuberculosis Genotyping Surveillance Network (NTGSN), a 5-year initiative that established the utility of genotyping in TB control efforts.[1] In 2004, based on the knowledge gained from NTGSN and associated studies,[2] CDC established the National TB Genotyping Service (NTGS) and funded a national genotyping laboratory, located in Michigan, to genotype at least one *M. tuberculosis* isolate from each culture-positive TB case reported in the United States.[3] All TB control programs can use NTGS at no cost to the patients, health

care providers, or health departments. NTGS participation is voluntary, with individual programs determining how genotyping data will be used for their TB control activities. Since 2004, approximately 120,000 *M. tuberculosis* isolates have been successfully genotyped through NTGS and its partnerships among CDC programs, national genotyping laboratories, and 58 states and jurisdictions.

In 2010, CDC launched the TB Genotyping Information Management System (TB GIMS), a secure Internet-based database available to all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and the U.S.-affiliated Pacific Islands. TB GIMS makes genotyping data easily available to users and links genotyping data to patient surveillance records. Key features include tools to link genotype results of isolate records from NTGS to patient surveillance records from the National TB Surveillance System (NTSS). Additional features include database queries regarding genotypes and clusters, data quality checks, aggregate reports, maps, and outbreak detection tools. TB GIMS has >500 users among local, state, federal, and territorial partners.

Genotyping-Based Outbreak Detection

CDC identifies genotype clusters that are most likely to represent TB outbreaks. Genotyping-based outbreak detection involves using geospatial analysis to identify unusual groupings of TB cases with matching genotypes that might represent outbreaks. TB control programs can use outbreak detection information to help allocate and prioritize resources for investigation and intervention on specific TB genotype clusters.

CDC's primary outbreak detection method is based on identifying higher than expected geospatial concentrations of a TB genotype in a specific county, compared with the national distribution of that genotype. This method calculates a log-likelihood ratio (LLR) statistic; clusters with higher LLRs are more likely to represent greater geospatial concentrations than clusters with lower LLRs; higher LLRs might indicate recent transmission of TB. LLRs are then classified into alert levels within TB GIMS on the basis of established cut points. Clusters are classified as *no alert* (LLRs 0–<5), *medium alert* (LLRs 5–<10), or *high alert* (≥10). The alert level and changes in alert levels (e.g., from no to medium or high) can help TB programs identify outbreaks and prioritize TB genotype clusters for further investigation or intervention.

Genotyping Terminology

In NTGS, a genotype is defined as a unique combination of spacer oligonucleotide typing results (spoligotype) and 24-locus mycobacterial interspersed repetitive unit–variable number tandem repeat typing (MIRU–VNTR) results. Each unique combination of results is assigned a GENType designated as *G* followed by 5 digits, which are assigned sequentially to every genotype identified in the United States (e.g., G00162). This nomenclature is designed for convenience and ease of communication, but the specific numbers assigned have no additional importance outside NTGS. Genotyping data from NTGS should not be used for clinical decision making.

National TB Genotyping Surveillance Coverage in the United States

National TB genotyping surveillance coverage refers to the proportion of culture-positive TB cases with a genotyped *M. tuberculosis* isolate. High levels of coverage in the United States can provide a better understanding of the epidemiology of TB transmission within a specific geographic area, as well as nationally. Additionally, because outbreak detection algorithms are based on identifying unusual geospatial concentrations of genotypes, high coverage levels help

decrease the likelihood of false-negative alerts. The National Tuberculosis Indicator Project national genotyping surveillance coverage objective is 94%.[4]

GLOSSARY

Alert level: A mechanism used by TB GIMS to notify users of genotype clusters, possibly representing TB outbreaks, in a specific county. The alert level is determined by the LLR for a given cluster. This is calculated by TB GIMS and is updated whenever a new case is added to a genotype cluster. E-mail notifications are generated whenever an alert level changes from a no alert LLR (0–<5.0) to medium LLR (5.0–<10.0) or high LLR (≥10.0), or from a medium LLR to a high LLR.

Cluster investigation: A cluster investigation identifies epidemiologic links between TB patients whose isolates have matching genotypes. It might consist of reviewing information from public health and medical records and interviewing case managers and outreach workers. It can also involve re-interviewing TB patients.

Epidemiologic link (epi link): An epidemiologic link is a relationship that two TB patients share that explains where, when, and how *M. tuberculosis* might have been transmitted between them. Patients who name each other as contacts have an epidemiologic link. However, an epidemiologic link can be a location where the two persons spent time together or an activity occurred that brought them together.

Genotype: The designation that represents one or more of the three genotyping techniques used for *M. tuberculosis*: spoligotyping, MIRU-VNTR analysis, and IS*6110*-based restriction fragment length polymorphism (RFLP). These designations were developed to facilitate communication of genotyping information within and between TB programs. In the United States, we use GENType or PCRType to define a genotype.

Genotype surveillance coverage: Genotyping surveillance coverage is defined as the proportion of culture-positive TB cases with a genotype result.

GENType: A designation for each unique combination of spoligotype and 24-locus MIRU–VNTR results. GENType is designated as *G* followed by five digits, which are assigned sequentially to every genotype identified in the United States (e.g., G00017).

Genotyping cluster: A genotyping cluster consists of two or more cases in a jurisdiction during a specified period with *M. tuberculosis* isolates that share matching genotypes. In the United States, all cases with matching GENType or PCRType are considered to be in a genotype cluster. The jurisdiction and period used vary on the basis of the specific application of the term *cluster*. Within TB GIMS, a single county and a 3-year period are used to define a cluster.

Geospatial concentration: Geospatial concentration is a measure of how concentrated a genotype is in time and space. It indicates that recent transmission has occurred because patients with infections with the same genotype in the same location are more likely to have come in contact with each other. TB GIMS uses the LLR to generate a numeric measure of geospatial concentration of a given TB genotype.

Linking: In TB GIMS, *linking* refers to the process of connecting genotyping results with a reported TB case from the National TB Surveillance System (NTSS). This step is essential for ensuring that demographic, risk factor, and geographic data can be viewed in TB GIMS for genotype clusters.

LLR (log-likelihood ratio): A measure of the geographic concentration of a specific genotype in a county, compared with the national distribution of that same genotype, throughout a 3-year period. The higher the LLR, the greater the evidence that the local genotype cluster within the county represents a greater geospatial concentration than the national average, which might indicate recent transmission of *M. tuberculosis.*

MDR: Multidrug-resistant (MDR) tuberculosis strains are resistant to at least isoniazid and rifampin.

MIRU-VNTR: Mycobacterial interspersed repetitive unit–variable number tandem repeat typing analysis. MIRU-VTNR is a polymerase chain reaction (PCR)-based genotyping assay. The CDC genotyping program performs 24-locus MIRU-VNTR analysis on every isolate submitted for genotyping. Before 2009, only 12-locus MIRU-VNTR was performed.

***Mycobacterium bovis*:** A member of the *M. tuberculosis* complex that is commonly associated with cattle, particularly in countries with a low socioeconomic status. In the United States, human cases of *M. bovis* TB typically have a foodborne origin (e.g., consumption of unpasteurized dairy products). *M. bovis* is typically resistant to pyrazinamide. Identification of TB isolates that are *M. bovis* can be performed through genotyping; however, this information should not be relied on for clinical decision making.

***Mycobacterium tuberculosis* complex:** Often abbreviated *MTC*, a group of closely related mycobacterial species that can cause latent TB infection (LTBI) and TB disease (i.e., *M. tuberculosis*, *M. bovis*, *M. bovis* bacillus Calmette-Guérin, *M. africanum*, *M. canetti*, *M. microti*, *M. pinnipedii*, and *M. mungi*). Among humans, the majority of TB cases are caused by *M. tuberculosis*.

NTGS: The National TB Genotyping Service has provided TB genotyping services to local and state TB control programs since 2004. National genotyping laboratories are contracted by CDC to provide genotyping services at no cost to patients, health care providers, or health departments.

NTSS: National TB Surveillance System administered by CDC. NTSS collects surveillance data through an electronic reporting registry. Data collected include sociodemographic, clinical, and risk factor variables that are reported to CDC by states and local health departments.

PCRType: A designation for each unique combination of spoligotype and 12-locus MIRU–VNTR results. PCRType is designated as *PCR* followed by five digits, which are assigned sequentially to every genotype identified in the United States (e.g., PCR01974).

Polymerase chain reaction (PCR): A laboratory method that can rapidly amplify limited quantities of DNA, thereby enabling certain types of laboratory testing. The national genotyping laboratories routinely use two PCR-based techniques, spoligotyping and MIRU-VNTR analysis.

Relapse versus reinfection: A case of relapsed TB represents a worsening of signs and symptoms of disease after a period of improvement, caused by the same strain of *M. tuberculosis*. TB that represents a new infection (or reinfection) is disease caused by a second infection (often with a strain different from the strain that caused the initial infection). Genotyping the initial and the subsequent *M. tuberculosis* isolate might distinguish these two possibilities.

Report of a Verified Case of TB (RVCT): National surveillance data on patients with tuberculosis is recorded on this form and subsequently reported to CDC's National TB Surveillance System.

Restriction fragment length polymorphism (RFLP): Also called IS*6110*-based, RFLP analysis was the first widely used method for genotyping *M. tuberculosis* isolates. A genotyping technique based on measuring the number and length of specific DNA fragments that are cut by using specific restriction enzymes.

Spoligotyping: Spacer oligonucleotide genotyping. A genotyping technique based on spacer sequences located in the direct repeat region in the chromosomes (genetic makeup) of the *M. tuberculosis* complex. The spoligotype is reported as a 15-digit number.

References

1. Cowan LS, Crawford JT. Genotype analysis of *Mycobacterium tuberculosis* isolates from a sentinel surveillance population. Emerg Infect Dis 2002;8:1294–302.
2. Haddad MB, Diem MA, Cowan LS, et al. Tuberculosis genotyping in six low-incidence states, 2000–2003. Am J Prev Med 2007;32:239–43.
3. Ghosh S, Moonan PK, Cowan L, Grant J, Kammerer S, Navin TR. Tuberculosis Genotyping Information Management System: enhancing tuberculosis surveillance in the United States. Infect Genet Evol 2012;12:782–8.
4. Centers for Disease Control and Prevention (CDC). (2010, March 19). Monitoring Tuberculosis Programs---National Tuberculosis Indicator Project, United States, 2002–2008. MMWR. Morbidity and Mortality Weekly Reports. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5910a3.htm.

Boyd Sanatorium, Organ Mountains-Desert Peaks National Monument, New Mexico (Wayne Suggs, 2017)