Tuberculosis in the United States

National Tuberculosis Surveillance System Highlights from 2013

Slide 1 (title slide). Tuberculosis in the United States—National Tuberculosis Surveillance System, Highlights from 2013. This slide set was prepared by the Division of Tuberculosis Elimination, Centers for Disease Control and Prevention (CDC), Department of Health and Human Services (DHHS). It provides trends for the recent past and highlights data collected through the National Tuberculosis Surveillance System for 2013. 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 via the revised TB case report introduced in 2009. Currently, 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 11, 2014. All case counts and rates for years 1993–2013 have been updated.

Slide 2. Reported TB Cases, United States, 1982–2013. The resurgence of TB in the mid-1980s was marked by several years of increasing case counts until its peak in 1992. Case counts began decreasing again in 1993, and 2013 marked the twenty-first year of decline in the total number of TB cases reported in the United States since the peak of the resurgence. From 1992 until 2002, the total number of TB cases decreased 5%–7% annually. From 2002 to 2003, however, the total number of TB cases decreased by only 1.4%. An unprecedented decrease occurred in 2009, when the total number of TB cases decreased by more than 10% from 2008 to 2009. In 2013, a total of 9,582 cases were reported from the 50 states and the District of Columbia (DC). This represents a decline of 3.6% from 2012 and 64.1% from 1992.

Slide 3. TB Morbidity, United States, 2008-2013. 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 cases per 100,000 population. The number of TB cases decreased from 12,893 in 2008 to 9,582 in 2013, and the TB rate decreased from 4.2 in 2008 to 3.0 in 2013.

Slide 4. TB Case Rates, United States, 2013. This map shows TB rates for 2013. Forty-one states reported a rate less than 3.0 TB cases per 100,000, the 2013 national average. Nine states and DC reported a rate above 3.0 TB cases per 100,000; these accounted for 62% of the national total in 2013.

Slide 5. Map of U.S.-Affiliated Pacific Islands by TB Case Rates, 2013. This map of the Pacific region shows the case rates by jurisdiction.

Slide 6. TB Case Rates, U.S.-Affiliated Pacific Islands, 2013. This bar chart shows TB rates for the U.S. Pacific Islands for reported cases in 2013. These case rates range from 3.7 per 100,000 in American Samoa to 219.4 per 100,000 in the Republic of the Marshall Islands. The overall case rate for the United States (3.0 per 100,000) and for Hawaii (8.2 per 100,000) are also shown.

Slide 7. TB Case Rates by Age Group, United States, 1993–2013. This slide shows the last 21 years' declining trend in TB rates by age group. In 2013, case rates in all age groups declined by more than 50% from 1993 values: persons 65 years and older (from 17.7 per 100,000 in 1993 to 4.9 in 2013); adults aged 45 to 64 years (from 12.4 to 3.6); adults aged 25 to 44 years (from 11.5 to 3.6); those 15 to 24 years of age (from 5.0 to 2.2); and in children under 15 years of age (from 2.9 to 0.8)

Slide 8. Reported TB Cases by Age Group, United States, 2013. This pie chart shows the age distribution of persons reported with TB in 2013. Five percent were children under 15 years of age, 10% were age 15 to 24, 31% were age 25 to 44, 31% were age 45 to 64, and 23% were at least 65 years old.

Slide 9. TB Case Rates by Age Group and Sex, United States, 2013. This slide graphs the TB rates in 2013 by age group and sex. It shows that rates tended to increase with age, ranging from a low of less than 1 per 100,000 in children aged 5 - 14 to a high of 6.9 per 100,000 in men 65 years and older. As age increased, the case rate in men increased faster than women; the rates in men 45 years and older were approximately more than twice those in same-age women.

Slide 10. TB Case Rates by Race/Ethnicity, United States, 2003–2013. This slide shows the declining trend in TB rates by race/ethnicity during the last 12 years. Asians had the highest TB rates, which declined from 29.9 per 100,000 in 2003 to 18.7 in 2013, and had a percent decline over the time period of 37%. Rates also declined in the following racial/ethnic groups: among non-Hispanic blacks or African-Americans, from 11.7 in 2003 to 5.4 in 2013 (-54%); among Hispanics, from 10.3 to 5.0 (-51%); among American Indians and Alaska Natives, from 8.2 to 5.4 (-34%); among non-Hispanic whites, from 1.4 to 0.7 (-50%); and among Native Hawaiian or Other Pacific Islanders, from 16.2 to 11.3 (-30%).

Several important factors likely contribute to the disproportionate burden of TB in minorities. In persons who were born in countries where TB is common, TB disease may result from infection acquired in the country of origin. Unequal distribution of TB risk factors, such as HIV infection, may also contribute to increased exposure to TB or to an increased risk of developing TB once infected with M. tuberculosis.

Slide 11. TB Case Rates by Age Group and Race/Ethnicity, United States, 2013. This slide presents TB rates in 2013 by age group and race/ethnicity. After infancy (age under 5), risk typically increased with age across all racial and ethnic groups. Rates were consistently higher in minority racial and ethnic groups than in non-Hispanic whites. Rates were the highest in Asians and Native Hawaiians and Other Pacific Islanders, particularly in adult age groups.

Slide 12. Reported TB Cases by Race/Ethnicity, United States, 2013. In 2013, 83% of all reported TB cases occurred in racial and ethnic minorities (32% in Asians , 29% in Hispanics, 22% in non-Hispanic blacks or African-Americans, 1% in American Indians or Alaska Natives, and 1% in Native Hawaiians or Other Pacific Islanders), whereas 15% of cases occurred in non-Hispanic whites. Persons reporting two or more races accounted for 2% of all cases.

Slide 13. Number of TB Cases in U.S.-born vs. Foreign-born Persons, United States, 1993–2013. This graph plots the number of U.S.-born vs. foreign-born persons reported with TB each year, from 1993 through 2013. It illustrates the increase in the percentage of cases occurring in foreign-born persons during this period, from 29% in 1993 to 65% in 2013. Overall, the number of cases in foreign-born persons remained virtually level, with approximately 7,600–8,000 cases each year before 2009, until 2009 when the number dropped to 6,956. That decreasing trend continued in 2013 with the number of foreign-born cases dropping to 6,193. The number in U.S.-born persons decreased from more than 17,000 in 1993 to 3,375 in 2013.

Slide 14. Trends in TB Cases in Foreign-born Persons, United States, 1993–2013. This slide shows trends in the past 21 years of TB cases in foreign-born persons in the United States from 1993 through 2013. The percentage of TB cases accounted for by foreign-born persons increased from 29% in 1992 to 65% in 2013.

Slide 15. Reported TB Cases by Origin and Race/Ethnicity, United States, 2013. Among U.S.-born persons with TB in 2013, 37% were non-Hispanic black or African-American, 33% were non-Hispanic white, 20% were Hispanic or Latino, 5% were Asian, 4% were American Indian or Alaska Native, and 1% were Native Hawaiian or Other Pacific Islander. Among the foreign-born, 46% were Asian, 33% were Hispanic or Latino, 14% were non-Hispanic black or African-American, and 5% were non-Hispanic white. Cases among American Indians or Alaska Natives and among Native Hawaiians or Other Pacific Islanders constituted less than 1%, respectively, of the cases among the foreign-born and are not shown. Persons reporting two or more races totaled less than 1% of all cases.

Slide 16. Percentage of TB Cases Among Foreign-born Persons, United States, 2003 and 2013. The percentage range of the total number of TB cases that occurred in foreign-born persons in each state is highlighted for 2003 and 2013 in these side-by-side maps. The number of states with less than 25% of their TB cases among the foreign-born decreased from 10 states in 2003 to 7 states in 2013. The number of states with at least 25-49% of cases among the foreign-born decreased from 16 states in 2003 to 9 states in 2013. However, the number of states that had 50% or more of their cases among the foreign-born increased from 27 states in 2003 to 36 states in 2013.

Slide 17. TB Case Rates in U.S.-born vs. Foreign-born Persons, United States, 1993–2013. TB rates in foreign-born persons remain higher than those in the U.S.-born population. From 1993 through 2013, the rates in U.S.-born persons decreased from 7.4 per 100,000 to 1.2, whereas the rates in foreign-born persons decreased from 34.0 per 100,000 to 15.6.

Slide 18. TB Case Rates in U.S.-born vs. Foreign-born Persons, United States, 1993–2013. This is the same as Slide 15, but the rates are presented on a logarithmic scale to better illustrate the trend in TB rates among the U.S.-born and foreign-born. The lines show a greater rate of decline among the U.S.-born compared with the foreign-born during this period.

Slide 19. Countries of Birth of Foreign-born Persons Reported with TB, United States, 2013. This slide shows the overall distribution of the countries of birth of foreign-born persons reported with TB in 2013, with the top seven highlighted. The list of countries has remained relatively constant since 1986, when information on country of birth was first reported by all areas submitting reports to CDC. In 2013 the seven top countries accounted for 60% of all foreign-born cases, with Mexico accounting for 20%; the Philippines, 13%; India, 8%; Vietnam, 7%; China, 6%; Guatemala, 3%; and Haiti, 3%. Persons from more than 135 other countries each accounted for 2% or less of the total, but altogether accounted for 40% of foreign-born persons reported with TB.

Slide 20. Percent of Foreign-born with TB by Time of Residence in U.S. Prior to Diagnosis, 2013. The length of U.S. residence among foreign-born persons prior to their TB diagnosis in 2013 is shown in these stacked bars. Overall, 15% had been in the United States for less than 1 year, 16% between 1 and 4 years, and 60% for at least 5 years. The distribution is also shown for the top three countries of birth: Mexico, the Philippines, and India. Among persons born in Mexico, 8% had been in the United States for less than 1 year, 8% between 1 and 4 years, and 74% for at least 5 years. Among persons born in the Philippines, 11% had been in the United States for less than 1 year, 13% between 1 and 4 years, and 68% for at least 5 years. Among persons born in India, 20% had been in the United States for less than 1 year, 21% between 1 and 4 years, and 49% for at least 5 years. Values for unknown length of residence in U.S. for these top three countries ranged between 9 – 10% for 2013.

Slide 21. Primary Anti-TB Drug Resistance, United States, 1993–2013. Primary drug resistance is shown for the past 21 years. The graph starts in 1993, the year in which the individual TB case reports submitted to the national surveillance system began collecting information on initial susceptibility test results for patients with culture-positive TB. Data were available for more than 85% 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 2013, this had increased to 8.8%. 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 2013 the percent of primary MDR TB was 1.2%.

Slide 22. Primary MDR TB, United States, 1993–2013. This graph focuses on trends in primary MDR TB (based on initial isolates from persons with no prior history of TB) in the United States from 1993 through 2013. The number of primary MDR TB cases, represented by bars, steadily declined from 407 in 1993 to 132 in 2002. Since then, the total number of primary MDR TB cases has fluctuated between 87 to 103 cases, with 82 cases reported for 2013. Primary MDR TB, shown by the line, decreased from 2.5% in 1993 to approximately 1.0% in 1998, and has fluctuated around 1.0% since then. In 2013, the percentage was 1.2%.

Slide 23. Primary Isoniazid Resistance in U.S.-born vs. Foreign-born Persons, United States, 1993–2013. This graph shows primary isoniazid resistance in U.S.-born vs. foreign-born persons. Based on initial isolates from persons with no prior history of TB, the percentage of isoniazid resistance is more than twice as high among foreign-born persons than among U.S.-born persons. In foreign-born persons, the percentage declined from 12.1% in 1993 to 10.5% in 2013. In U.S.-born persons, the percentage decreased from 6.7% in 1993 to 4.2% in 2007, but has increased since then to 5.6% in 2013.

Slide 24. Primary MDR TB in U.S.-born vs. Foreign-born Persons, United States, 1993–2013. This graph highlights primary MDR TB in U.S.-born versus foreign-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 foreign-born persons increased from approximately 25% in 1993 to 92% in 2013 (not shown on slide). Among the U.S.-born, the percentage with primary MDR TB has been less than 1% since 1997 and was 0.3% in 2013. The percentage among foreign-born persons has fluctuated year by year, although it has remained between 1.2 and 1.8% since 1995. In 2013, the percentage of primary MDR TB among foreign-born persons was 1.7%

Slide 25. Extensively Drug Resistant (XDR) TB, as Defined on Initial Drug Susceptibility Testing (DST), United States, 1993–2013. This graph shows the annual number of counted XDR TB cases as defined on initial DST from 1993-2013. 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. Four cases of XDR TB were reported in 2013. The most reported in a single year was 10 in 1993, while there were no cases reported in 2003 and 2009. There is no apparent trend in the number of cases over time.

Slide 26. Reporting of HIV Test Results in Persons with TB by Age Group, United States, 1993–2013. This slide shows the completeness of reporting of HIV test results in persons with TB by age group from 1993 through 2013. The percentage of TB patients for whom test results were reported increased from 30% among all ages in 1993 to 88% in 2013. Among adults aged 25–44 years, the percentage increased from 45% in 1993 to 94% in 2013. 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, 1993–2013. This slide provides minimum estimates of HIV coinfection among persons reported with TB from 1993 through 2013. 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 7% overall from 1993 – 2013, and from 63% to 9% among persons aged 25 to 44 years during this period.

Slide 28. TB Cases by Residence in Correctional Facilities, Age ≥15, United States, 1993-2013. 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 359 cases in 2013. Between the years 2000 and 2010, the number of cases residing in a correctional facility ranged between the high-400s and high-500s; 2011 was the first year to drop below this range to 422 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 2013 the percentage of total cases was 4.0%.

Slide 29. TB Cases by Homeless Status, Age ≥15, United States, 1993-2013. This graph highlights the status of cases that were homeless within twelve months prior of TB diagnosis from 1993 through 2013. 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 514 in 2013. This category has seen an overall decrease in cases since 1994; increases were observed in the years 2003 (6.7%), 2006 (6.3%), and 2010 (5.6%); these have been exceptions with a small increase in cases. Of total cases, 6.1% were homeless in 1994 and percentages have ranged between 6.8% in 1997 and a low of 5.3% in 2009. It has since increased to 5.7% in 2013.

Slide 30. Mode of Treatment Administration in Persons Reported with TB, United States, 1993–2011. 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 62% in 2011, 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% in 2011.

Slide 31. Completion of TB Therapy, United States, 1993–2011. 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 meningeal disease, or pediatric patient (aged <15) with miliary disease or positive blood culture. Overall completion of therapy had remained at approximately 92-93% from 1998 through 2008, but increased to 96% in 2011, the latest year with available data. Completion in 1 year or less increased from 63% in 1993 to 89% in 2011. 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, 2004–2013. This slide shows the increase in genotyping surveillance coverage from 2004 to 2013. In 2004 the proportion of positive cultures with at least one genotyped isolate was 52.6%; in 2013 it was 94.6%. The national indicator for genotyping surveillance coverage is 94%.

Slide 34. Number and Percent of Unique and County-GENType Clustered Cases, United States, 2011–2013. This slide shows a chart with the percentage of unique and clustered cases. Unique cases are those with a spoligotype and 24-locus MIRU-VNTR (GENType) that does not match any other case in that county during the specified three year time period. Clustered cases are two or more cases with matching spoligotype and 24-locus locus MIRU-VNTR (GENType) within a county during the specified three year time period. In the 2011 – 2013 three year time period, there were 79% unique cases, and 21% clustered cases.

Slide 35. Number of County-based Tuberculosis Genotype Clusters by Cluster Size, United States, 2011–2013. 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 2011 – 2013 three year time period, there were 1,015 two-case clusters, 250 three-case clusters, 111 four-case clusters, 59 five-case clusters, 23 six-case clusters, 17 seven-case clusters, 12 eight-case clusters, 7 nine-case clusters, and 38 case clusters that were greater or equal to 10 in size.

Slide 36. Tuberculosis Genotype Clusters by TB GIMS Alert Levels, United States, 2011-2013. 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 5.1–10 and “high” alert is for clusters with LLR >10. In the 2011-2013 three year time period, high alerts made up 7% of the total, medium alerts were 22%, and no alert were 71%.