

## **Tuberculosis in the United States**

### **National Surveillance System Highlights from 2003**

**Slide 1 (title slide): Tuberculosis in the United States: National Surveillance System, Highlights from 2003.** 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 past decade and highlights from data collected through the national TB surveillance system for 2003. Since 1953, through the cooperation of state and local health departments, CDC has collected information on the numbers of newly reported cases of TB disease in the United States. The data presented here were primarily collected via the expanded TB case report introduced in 1993. Currently, each individual TB case report (Report of Verified Case of Tuberculosis, or RVCT) is submitted electronically via the Tuberculosis Information Management System (TIMS).

**Slide 2: Reported TB Cases, United States, 1982-2003.** The resurgence of TB in the mid-1980s was marked by several years of increasing case counts followed by a steeper rise for several years. The total number of TB cases peaked in 1992. From 1992 until 2002, the total number of TB cases decreased 5%-7% annually, and 2003 marked the eleventh year of decline in the total number of TB cases reported in the United States since the peak of the resurgence. However, from 2002 to 2003 the total number of TB cases decreased by only 1.3%, the smallest annual decrease during the past decade. In 2003, a total of 14,874 TB cases were reported from the 50 states and the District of Columbia. This represents a 44% decline from 1992. (*Note: A provisional total of 14,871 was reported in the MMWR in March 2004.*)

**Slide 3: TB Morbidity, United States, 1999-2003.** This slide provides the total number of reported U.S. TB cases and the associated TB rates for each of the past 5 years. Rate is defined as cases per 100,000 population. The number of TB cases decreased from 17,531 in 1999 to 14,874 in 2003, and the TB rate also decreased, from 6.4 in 1999 to 5.1 in 2003.

**Slide 4: TB Case Rates, United States, 2003.** This map shows TB rates for 2003. Twenty-four states had a rate of less than or equal to 3.5 TB cases per 100,000, the interim goal for the year 2000 established by the Advisory Council for the Elimination of Tuberculosis. This group of states has

remained fairly constant over the last decade; five states (CT, MI, NM, OR, and PA) joined the group in 2000, one state (MO) joined the group in 2001 (also in 1998 for one year only), one state (KY) joined the group in 2003. States with a rate above the 2003 national average of 5.1 cases per 100,000 include the seven states that reported at least 400 cases in 2003: CA, FL, GA, IL, NJ, NY, and TX. These seven states accounted for 61% of the national total and have experienced substantial overall decreases in cases and rates from 1992-2002. In 2003, however, CA, TX, and NY reported more cases than in 2002.

**Slide 5: TB Case Rates by Age Group, United States, 1993-2003.** This slide shows the last 11 years' declining trend in TB rates by age group. The largest declines occurred in persons 65 years and older (from 17.8 per 100,000 in 1993 to 8.4 in 2003), in adults aged 45 to 64 years (from 12.5 to 6.3), in adults aged 25 to 44 years (from 11.6 to 6.0), and in children under 15 years of age (from 3.0 to 1.5), each group having decreased approximately 50%. The rate declined by approximately 25% in those 15 to 24 years of age (from 5.1 to 3.8).

**Slide 6: Reported TB Cases by Age Group, United States, 2003.** This pie chart shows the age distribution of persons reported with TB in 2003. Six percent were children under 15 years of age and 11% were 15- to 24-year-olds, while 34% were 25 to 44 years of age, 29% were 45- to 64-year-olds, and 20% were at least 65 years old.

**Slide 7: TB Case Rates by Age Group and Sex, United States, 2003.** This slide graphs the TB rates in 2003 by age group and sex. It shows that rates increase with age, ranging from a low of less than 2 per 100,000 in children to a high of approximately 12 per 100,000 in men over 65 years old. The rates in men over 44 years old are approximately twice those in women over 44 years old.

**Slide 8: TB Case Rates by Race/Ethnicity, United States, 1993-2003.** This slide shows the declining trend in TB rates by race/ethnicity during the last 11 years. Asians and Pacific Islanders had the highest TB rates, which declined from 44.5 per 100,000 in 1993 to 28.3 in 2003, and had the least percentage decline over the time period (36%). Rates declined by approximately 50% or more over the time period in the other racial/ethnic groups: among non-Hispanic black or African Americans from 29.1 in 1993 to 11.6 in 2003, among Hispanics from 20.6 to 10.3, among American Indians and Alaska Natives from 14.6 to 8.1, and among non-Hispanic whites from 3.6 to 1.4. In 2003, the Asian

and Pacific Islander race category includes persons who reported race as Asian only and/or Native Hawaiian or other Pacific Islander only. Although these categories were reported separately beginning in 2003, they were merged for this slide to allow for continuity in reporting trends.

Several important factors likely contribute to the disproportionate burden of TB in minorities. In foreign-born persons from countries where TB is common, TB disease may result from infection acquired in the country of origin. In racial and ethnic minorities, 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*. However, much of the increased risk of TB in minorities has been linked to lower socioeconomic status and the effects of crowding, particularly among U.S.-born persons.

**Slide 9: Reported TB Cases by Race/Ethnicity, United States, 2003.** In 2003, 82% of all reported TB cases occurred in racial and ethnic minorities (28% in non-Hispanic black or African Americans, 28% in Hispanics, 23% in Asians, 1% in Native Hawaiian or Other Pacific Islanders, and 1% in American Indian or Alaska Natives), whereas 19% of cases occurred in non-Hispanic whites. Persons reporting two or more races totaled less than 1% of all cases. This is the first time blacks have not comprised the single largest percentage of TB cases among all racial/ethnic groups.

**Slide 10: TB Case Rates by Age Group and Race/Ethnicity, United States, 2003.** This slide presents TB rates in 2003 by age group and race/ethnicity. Risk increased with age across racial and ethnic groups, and 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. The impact of non-U.S. birth is a consideration in interpreting rate variations by race/ethnicity. For example, 95% of cases in the Asian group occurred in foreign-born persons, compared with 75% of cases in Hispanics and 25% of cases in non-Hispanic black or African Americans. Persons reporting two or more races totaled less than 1% of all cases.

**Slide 11: Number of TB Cases in U.S.-born vs. Foreign-born Persons, United States, 1993-2003.** This graph plots the number of U.S.-born vs. foreign-born persons reported with TB each year, from 1993 through 2003. This graph illustrates the increase in the percentage of cases occurring in foreign-born persons during this period, from 30% in 1993 to 53% in 2003. Overall, the number of cases in

foreign-born persons remained at approximately 7,000-8,000 each year, whereas the number in U.S.-born persons decreased from more than 17,000 in 1993 to less than 7,000 in 2003.

**Slide 12: Trends in TB Cases in Foreign-born Persons, United States, 1986-2003.** This slide shows trends in TB cases in foreign-born persons in the United States from 1986, when information on country of birth was first reported by all areas submitting reports to CDC, through 2003. The number of TB cases in foreign-born persons has increased from nearly 5,000 in 1986 to 7,000-8,000 each year since 1991. The percentage of TB cases accounted for by foreign-born persons increased from 22% in 1986 to 53% in 2003.

**Slide 13: Reported TB Cases by Origin and Race/Ethnicity, United States, 2003.** Among TB cases in the U.S.-born in 2003, 3% were American Indian or Alaska Native, 2% were Asian, 45% were black or African American, 15% were Hispanic or Latino, 1% were Native Hawaiian or Other Pacific Islander, and 34% were white. Among the foreign-born, 42% were Asian, 13% were black or African American, 39% were Hispanic or Latino, and 5% were white. Cases among American Indian or Alaska Natives or Native Hawaiian or Other Pacific Islanders comprised 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 14: Percentage of TB Cases Among Foreign-born Persons, United States, 1993 and 2003.** The percentage of the total number of TB cases that occurred in foreign-born persons in each state is highlighted for 1993 and 2003 in these side-by-side maps. The number of states with at least 50% of cases in the foreign-born increased from five in 1993 to 25 in 2003, and the number of states with at least 70% of cases in the foreign-born increased from one (HI) in 1993 to 11 (CA, CT, HI, IA, MA, MN, NE, NH, NJ, UT, VT) in 2003.

**Slide 15: TB Case Rates in U.S.-born vs. Foreign-born Persons, United States, 1993-2003.**

TB rates in foreign-born persons remain higher than those in the U.S.-born population. From 1993 through 2003, the rates in U.S.-born persons decreased from 7.4 per 100,000 to 2.7, whereas the rates in foreign-born persons decreased from 33.6 per 100,000 to 23.6.

**Slide 16: TB Case Rates in U.S.-born vs. Foreign-born Persons, United States, 1993-2003.** This is the same as Slide 15 but the rates are presented on a logarithmic scale to provide a better comparison of 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 decline for the foreign-born during the past decade.

**Slide 17: Countries of Birth for Foreign-born Persons Reported with TB, United States, 2003.**

This slide shows the overall distribution of the countries of birth for foreign-born persons reported with TB in 2003. The countries have remained relatively constant since 1986, when information on country of birth was first reported by all areas submitting reports to CDC. Seven countries accounted for more than 60% of the total, with Mexico accounting for 26%; the Philippines, 12%; Viet Nam, 8%; India, 8%; China, 5%; Haiti, 4%; and South Korea, 2%. Persons from more than 140 other countries each accounted for 2% or less of the total but altogether accounted for 36% of foreign-born persons reported with TB.

**Slide 18: Length of U.S. Residence Prior to TB Diagnosis, United States, 2003.** The length of U.S. residence among foreign-born persons prior to their TB diagnosis in 2003 is shown in these stacked bars. Overall, approximately 21% had been in the United States for less than 1 year, 28% between 1 and 4 years, and 51% for at least 5 years. The distribution is also shown for the top three countries of birth: Mexico, the Philippines, and Viet Nam. Among persons born in Mexico, 21% had been in the United States for less than 1 year, 27% between 1 and 4 years, and 52% for at least 5 years. Among persons born in the Philippines, 29% had been in the United States for less than 1 year, 18% between 1 and 4 years, and 54% for at least 5 years. Among persons born in Viet Nam, 16% had been in the United States for less than 1 year, 15% between 1 and 4 years, and 68% for at least 5 years.

**Slide 19: Primary Anti-TB Drug Resistance, United States, 1993-2003.** Primary drug resistance is shown for the previous 11 years. The graph starts in 1993 because this is the year in which the individual TB case reports submitted to the national surveillance system began collecting information on initial susceptibility test results (for isolates) from 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 remained between 7% and 8%. However, resistance to at least isoniazid and rifampin, known as multidrug-resistant TB (MDR TB), decreased from 2.5% in 1993 to approximately 1.0% each year

during 1996-2003.

**Slide 20: Primary MDR TB, United States, 1993-2003.** 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 2003. The number of MDR TB cases, represented by bars, steadily declined from 410 in 1993 to 113 in 2001, then increased to 124 in 2002, and then decreased to 90 cases in 2003. Primary MDR TB, shown by the line, decreased from 2.5% in 1993 to 1.0% each year during 1998-2001, increased to 1.2% in 2002, and decreased to 0.9% in 2003.

**Slide 21: Primary Isoniazid Resistance in U.S.-born vs. Foreign-born Persons, United States, 1993-2003.** This graph shows primary isoniazid resistance in U.S.-born vs. foreign-born persons. Among foreign-born persons, the percentage of isoniazid resistance (based on initial isolates from persons with no prior history of TB) was approximately two times higher than among U.S.-born persons. Among foreign-born persons, the percentage declined from 12.4% in 1993 to 10.6% in 2003, including a drop below 10% in 2001. Among U.S.-born persons, the percentage decreased from 6.8% in 1993 to 4.1% in 2002, and then increased to 4.6% in 2003.

**Slide 22: Primary MDR TB in U.S.-born vs. Foreign-born Persons, United States, 1993-2003.** 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, although the decline in the U.S.-born has been greater. As a result, the proportion of primary MDR TB cases reported in foreign-born persons increased from approximately 26% in 1993 to 70% each year during 1999-2003. Among the U.S.-born, the percentage with MDR TB has remained between 0.6% and 0.7% since 1998. The foreign-born percentage has fluctuated year by year, while averaging approximately 1.4% from 1998 to 2003.

**Slide 23: Completeness of HIV Test Results in Persons with TB by Age Group, United States, 1993-2002.** This slide shows the completeness of reporting of HIV test results in persons with TB by age group from 1993 through 2002. The percentage of those with test results increased from 30% among all ages in 1993 to 52% in 2002. Among adults aged 25-44 years, the percentage increased from 46% to 65% in 2002. The numerator includes cases with positive, negative, or indeterminate HIV test results and cases from California in persons reported with AIDS (HIV test results are not reported to CDC from California).

**Slide 24: Estimated HIV Coinfection in Persons Reported with TB, United States, 1993-2002.**

This slide provides minimum estimates of HIV coinfection among persons reported with TB from 1993 through 2002. Since the addition of HIV status to the individual TB case report in 1993, incomplete reporting has provided a challenge to calculating reliable estimates. 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 reported with TB decreased from 15% to 9% overall and from 29% to 16% in persons aged 25 to 44 during this period.

**Slide 25: Mode of Treatment Administration in Persons Reported with TB, United States, 1993-2001.**

In 1993, the reporting areas began collecting information about mode of treatment administration on the individual TB case report form. This slide is based on data received at CDC by April 2004. Treatment administered as only directly observed therapy (DOT) increased from approximately 22% in 1993 to 54% in 2001, 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), also increased. In 2001, the proportion of patients who received at least some portion of their treatment as DOT was 77%.

**Slide 26: Completion of TB Therapy, United States, 1993-2001.** The reporting areas began collecting information on completion of therapy in 1993 through the individual TB case report form. This slide is based on data received at CDC by April 2004. Patients with an initial isolate resistant to rifampin and children with meningeal, bone or joint, or miliary disease were excluded from the calculations. Overall completion remained at approximately 90%; however, completion of therapy in 1 year or less increased from <65% in 1993 to approximately 80% in 1998-2001. The current DHHS Healthy People 2010 objective is completion of therapy in 1 year or less in 90% of patients. CDC is working with state and local health departments to evaluate reasons for apparently delayed completion of therapy, which may vary by jurisdiction.