Executive Commentary

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Highlights of 2008 Report

Since 1953, in cooperation with state and local health departments, the Centers for Disease Control and Prevention (CDC) have collected information on each newly reported case of tuberculosis (TB) disease in the United States. Currently, each individual TB case report (Report of Verified Case of Tuberculosis, or RVCT) is submitted electronically to CDC's Division of Tuberculosis Elimination. The following are the highlights of the 2008 report:

1. Updated case counts for each year from 1993 through 2007.

2. Case counts: 12,904 TB cases were reported to CDC from the 50 states and the District of Columbia (DC) for 2008, representing a 2.9% decrease from 2007 (Table1).
   - Eighteen states reported increased case counts from 2007 (Table 28).
   - California, Texas, New York, and Florida accounted for 49% of the national case total (Table 28).
   - For the fifth consecutive year, Hispanics (29%) exceeded all other racial or ethnic groups with the largest percentage of total cases (Table 2).
   - Asians (26%) surpassed non-Hispanic blacks or African-Americans[1] (25%) as the second largest racial or ethnic group.
   - Blacks or African-Americans born in the United States represented 42% of TB cases in U.S.-born persons and accounted for approximately 17% of the national case total (Tables 17, 18).
   - Asians born outside the United States represented 43% of TB cases in foreign-born persons and accounted for approximately 25% of the national case total (Tables 17, 18).

3. Case rates: In 2008, the TB case rate declined from 4.4 to 4.2 per 100,000 persons, representing a 3.8% decrease from 2007.
   - Eleven states and DC reported rates above the national average (Table 20).
   - Thirty states met the definition for low incidence, or ≤3.5 cases per 100,000 population (Table 20).
   - The TB case rate was 2.0 per 100,000 for U.S.-born persons and 20.3 for foreign-born persons (Table 5).
   - Asians continued to have the highest case rate (25.6 per 100,000 persons) among all racial or ethnic groups (Table 2).

4. Burden among the foreign-born: The percentage of cases occurring in foreign-born persons continued to increase and was 59% of the national case total.
   - Foreign-born Hispanics and Asians together represented 80% of TB cases in foreign-born persons, and accounted for 47% of the national case total (Tables 17, 18).
   - In 29 states and the District of Columbia, ≥ 50% of TB cases occurred among foreign-born persons (Table 23).
   - In 14 states, ≥70% of TB cases occurred among foreign-born persons (Table 23).
   - The top five countries of origin of foreign-born persons with TB were Mexico, Philippines, Vietnam, India and China (Table 6).

5. Drug resistance: 1.0% of reported cases, compared to 1.1% in 2007, had primary multidrug resistance, which is defined as no previous history of TB disease and resistance to at least isoniazid and rifampin (Table 10).

[1]Hispanic and non-Hispanic are ethnicities. All races are non-Hispanic. The category "non-Hispanic blacks or African-Americans" includes U.S. - born and foreign-born persons unless otherwise specified.

Tuberculosis in the United States

In 2008, the number of TB cases reported (12,904) and case rate (4.2 cases per 100,000) both decreased; this represented declines of 2.9% and 3.8%, respectively, compared to 2007. Since the 1992 TB resurgence peak in the United States, the number of TB cases reported annually has decreased by approximately 50%. However, the trend of the declining annual case rate has slowed, from an annual average decline of 5.6% for 1993 through 2002 to an annual average decline of 2.6% for 2003 through 2008 (Table 1).

The proportion of total cases occurring in foreign-born persons has been increasing since 1993. In 2008, 59% of TB cases occurred in foreign-born persons. Foreign-born persons have accounted for the majority of TB cases in the United States every year since 2001. Moreover, the case rate among foreign-born persons in 2008 was approximately 10 times higher than among U.S.-born persons (Table 5).

Tuberculosis deaths decreased by 0.6%, from 648 deaths in 2005 to 644 deaths in 2006, the most recent years for which data are available (Table 1).

Age

Since 1993, TB case rates have declined annually for all age groups. TB case rates vary by well-known factors such as age, race and ethnicity, and country of origin. In 2008, TB case rates declined or remained constant for all age groups. The highest burden of disease continues to be among older adults. In 2008, adults aged 65 years and older had a case rate of 6.4 cases per 100,000, while children aged <14 years had the lowest rate at 1.3 cases per 100,000 (Table 4).

Race and Ethnicity

In 2003, the race and ethnicity category, "non-Hispanic, Asian or Pacific Islander," was split into "non-Hispanic Asian" and "non-Hispanic Native Hawaiian or Other Pacific Islander." In 2008, Asians had the highest TB case rate at 25.6 cases per 100,000, which was a slight decrease from 26.7 in 2007. In 2008, Native Hawaiians or Other Pacific Islanders had the second-highest TB case rate at 15.9 cases per 100,000, which is a marked decrease compared to 22.3 cases per 100,000 reported in 2007. Due to low case numbers among Native Hawaiians or Other Pacific Islanders, case rates fluctuate and must be interpreted with caution (Table 2).

Since 1993, TB case rates have declined between 59% and 69% in the following racial and ethnic groups: among Hispanic or Latinos from 19.9 to 8.1 cases per 100,000; among blacks or African-Americans from 28.5 to 8.8 cases per 100,000; and among non-Hispanic whites from 3.6 to 1.1 cases per 100,000. In 2008, the TB case rate for Asians was approximately three times higher than that for Hispanics or blacks or African-Americans (Table 2).

Origin of Birth

Since 1993, the TB case rate among U.S.-born persons has declined annually. In 2008, the TB case rate for U.S.-born persons was 2.0 cases per 100,000 representing a 73% decrease from 7.4 cases per 100,000 in 1993. The TB case rate among foreign-born persons also declined during the same interval, but was less substantial. In 2008, the TB case rate among foreign-born persons was 20.3 cases per 100,000 representing a 40% decrease from 34.0 cases per 100,000 in 1993 (Table 5).

The proportion of TB cases among persons born in the United States also has declined annually since 1993. In 2008, 41% of TB cases were among U.S-born persons compared to 69% in 1993 (Table 5). In 29 states and the District of Columbia, ≥50% of TB cases occurred among foreign-born persons. In 14 states (California, Colorado, Connecticut, Delaware, Maryland, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, Oregon, Rhode Island, Virginia and Washington), ≥70% of TB cases occurred among foreign-born persons (Table 23).

Country of Origin and World Region
From 2004 through 2008, the top five countries of origin of foreign-born persons with TB were Mexico, Philippines, Vietnam, India and China (Table 6). However, the changes in the distribution of TB cases by world region of origin reflect the changing immigration patterns among persons settling in the United States[2]. Of the 7,563 TB cases reported among foreign-born persons in 2008, 43% occurred among persons born in the Americas region, and 30% occurred among persons born in the Western Pacific region (Table 19). From 1993 to 2008, the proportion of cases increased among persons born in the Eastern Mediterranean region (3% in 1993 to 4.5% in 2008), the Southeast Asia region (6% in 1993 to 13% in 2008), and the African region (2% in 1993 and 8% in 2008) (Table 19).

Multidrug-Resistant Tuberculosis
Since 1993, when the RVCT was expanded to include drug-susceptibility results, the proportion of patients with primary multidrug-resistant TB (MDR TB), which is defined as no previous history of TB disease and resistance to at least isoniazid and rifampin, has decreased from 2.5% to 1.0% in 2008. Since 1998, the percentage of U.S.-born patients with MDR TB has remained $\leq 0.7\%$. However, of the total number of reported primary MDR TB cases, the proportion occurring in foreign-born persons increased from 25.3% (103 of 407) in 1993 to 76.7% (66 of 86) in 2008 (Table 10).

Extensively Drug-Resistant Tuberculosis
CDC has included an updated case count of extensively drug-resistant TB (XDR TB) cases from 1993 to 2008 in the slide set that accompanies this report. XDR TB is defined as resistance to isoniazid and rifampin plus resistance to any fluoroquinolone and at least one of three injectable second-line anti-TB drugs (i.e., amikacin, kanamycin, or capreomycin)[3,4]. Four cases of XDR TB were reported during 2008, compared to two cases in 2007.

Tuberculosis Therapy
The proportion of TB patients prescribed an initial treatment regimen of three or more anti-TB drugs increased from 72% in 1993 to 87% in 2008. The proportion of patients who completed therapy within 1 year increased from 64% in 1993 to 84% in 2006 (the latest year for which complete outcome data are available). The proportion of persons receiving directly observed therapy at least for a portion of the treatment duration also increased from 36% in 1993 to 88% in 2006, the latest year for which complete outcome data are available (Table 12).

Summary
Essential elements for controlling TB in the United States include sufficient resources, interventions targeted to populations at high risk for TB, and collaborative efforts with the international community to reduce the burden of TB globally.

During 1993 through 2008, TB case rates in the United States decreased for U.S.-born and foreign-born persons; however, the decrease among foreign-born persons continues to be less substantial. Despite the decreasing case rate among foreign-born persons, well over half of the TB cases in the United States in 2008 occurred in this population, and the case rate was approximately 10 times higher than among U.S.-born persons. To address the high TB case rates among foreign-born persons, CDC is collaborating with other national and international public health organizations to 1) improve overseas screening of immigrants and refugees by systematically monitoring and evaluating the screening process; 2) strengthen the current notification system that alerts local health departments about

[2]World Health Organization (WHO). Global Tuberculosis Control 2009: Epidemiology, Strategy, Financing. Geneva, Switzerland: World Health Organization, 2009 (WHO/HTM/TB/2009.411).

[3]Centers for Disease Control and Prevention (CDC). Notice to readers: revised definition of XDR-TB. *Morbid Mortal Weekly Report* 2006; 55:1176.

[4]WHO. Extensively drug-resistant tuberculosis (XDR-TB): recommendations for prevention and control. *Weekly Epidemiol Record* 2006; 81: 430–432.

the arrival of immigrants or refugees who have suspected TB to enhance the evaluation and treatment of such persons; 3) improve coordination of TB control activities between the United States and Mexico to ensure completion of treatment among TB patients who cross the border; 4) test recent arrivals from high-incidence countries for latent TB infection and monitor treatment completion; and 5) survey foreign-born TB patients in the United States to determine opportunities for improving prevention and control interventions. In addition, CDC continues to strengthen collaborations with international partners, including the World Health Organization's Stop TB Partnership, to improve TB control in high-incidence countries.

Accelerating progress in national TB elimination activities will require broader prevention efforts among high-risk population groups such as black or African-American and Asian communities, persons who are incarcerated, persons with excess alcohol and drug use, persons with human immunodeficiency virus infection, and persons living in poverty with limited access to medical care and stable housing.

In addition, low-incidence areas in the United States require continued support to maintain the capacity and expertise needed to respond to future TB cases[5] especially in light of changing immigration patterns. CDC has updated the comprehensive national action plan to reflect the alignment of CDC priorities with the 2000 Institute of Medicine report on TB and to ensure that priority prevention activities are undertaken with optimal collaboration and coordination among national and international public health partners[6,7].

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[5]CDC. Progressing toward tuberculosis elimination in low-incidence areas of the United States: Recommendations of the Advisory Council for the Elimination of Tuberculosis. *Morbid Mortal Weekly Report* 2002; 51 (No. RR-5): 1–20.
[6]Institute of Medicine. *Ending Neglect: The Elimination of Tuberculosis in the United States.* Washington, DC: National Academy Press, 2000.
[7]CDC. *CDC's Response to Ending Neglect: The Elimination of Tuberculosis from the United States.* Atlanta, GA: U.S. Department of Health and Human Services, CDC, 2000.