

Tuberculosis Threat to the US: Tuberculosis (TB) is the second leading global cause of death from a curable infectious disease, claiming 1.3 million lives annually.¹ The United States has made great progress in reducing the cases of TB by investing in prevention and treatment. The number of TB cases reported in the United States continues to decline each year, and TB rates in the United States are at their lowest since nationwide surveillance of TB disease began in 1953.

However, about one-third of the world's population is infected with TB, and with increased migration, the threat of TB in the United States is real. There are 8-10 million people in the United States with latent TB infection, which affects every state of the nation. TB can impart a significant economic cost: in 2013 Wisconsin had to spend \$5.6 million to control a TB outbreak in one county.¹

State Public Health Role in Addressing Tuberculosis

Although there have been substantial and consistent declines in TB disease cases in the United States over the past two decades, the public health system must continue to support community programs and services to achieve the goal of TB elimination because the disease is highly contagious and there are an increasing number of drug-resistant TB strains. Estimates suggest that TB prevention and control efforts in the United States have helped prevent more than 200,000 cases since 1993.³ To maintain declines and eventually eliminate TB, state TB programs need continued support to carry out their prevention and control activities.

Prevention is the most cost-effective approach to TB. Treatment for one drug-susceptible case of TB averages \$17,000, and drug-resistant cases can cost up to 25 times as much.⁴ State health agencies conduct a wide array of TB prevention and control activities, such as contact investigations, to limit the spread of disease, and directly observed therapy (DOT) to reduce drug resistance (see page 4). Due to these complex activities, public health has traditionally been the primary provider of detection and treatment of TB.

During this time of health transformation, and as more people become eligible for insurance, state TB services are still essential. Certain populations are not eligible for insurance, while others may be eligible but have challenges maintaining coverage. Additionally, most private sector healthcare providers are not trained or equipped to address TB, and may not conduct all the activities needed for TB control, such as contact investigations. For every case of TB disease that is reported, about 10 contacts need to be assessed for TB.

It is important that gaps in access to care do not lead to a resurgence of TB cases. To prevent the disease's spread, appropriate treatment needs to be part of a comprehensive and effective public-private healthcare system.

Federally-Funded State Tuberculosis Programs

CDC provides direct funding to state tuberculosis programs in all 50 states, D.C., nine cities, and eight territories through cooperative agreements. This funding is used to support the necessary core activities of TB prevention and control programs: finding all cases of active TB and ensuring completion of

therapy, contact investigations, TB surveillance, and TB public health laboratory activities. These activities fall outside the scope of the private healthcare system, but are essential population-based services that state health agencies conduct. State funding and other resources are often used to supplement these activities, such as purchasing and providing medication and treatment.

State TB programs' ultimate goal is to eliminate TB in the United States, with the following 2015 targets: less than 0.7 cases per 100,000 among the U.S.-born population and 14 cases per 100,000 among foreign-born populations.⁵ In 2013, the TB rate was 1.3 cases per 100,000 among the U.S.-born population and 15.6 cases per 100,000 among foreign-born populations.³



CDC. "Tuberculosis in the United States: National Tuberculosis Surveillance System Highlights from 2013." Available at <http://www.cdc.gov/tb/statistics/surv/surv2013/default.htm>. Accessed 3-23-15.

While TB rates are declining, the rate of decline is slowing. The annual percentage rate change of TB incidence decreased from 7.3 percent in 2000 to 3.8 percent in 2008.⁶ In the past, declining rates of TB have led to decreased funding and attention as "[p]rograms to control tuberculosis became victims of their own success."⁷ For example, in 1960, New York City had a comprehensive system to treat tuberculosis, but with declining rates of disease, the staff was reduced and the number of clinics declined. These diminished public health efforts to control TB, combined with other societal factors, led to a resurgence of the disease in the 1980s.⁷ To avoid another resurgence, including new cases and harder to treat drug-resistant cases, efforts must be expended to find and treat existing cases of TB disease, as well as new cases introduced through international travel or activation of latent TB.

Public health TB prevention efforts have proved successful in the past. Through activities such as DOT, infection control measures, and changes in treatment regimens, cases in New York City substantially decreased following the 1980s TB resurgence.⁷

To achieve the goal of elimination, continued commitment to public health efforts at the federal, state, and local levels is critical. Shrinking federal dollars may make elimination less likely. After a funding peak of \$96,882,867 in FY03, federal program funding eroded. The FY13 total funding level from CDC for the state TB programs was \$82,409,227 (see table on page 5).^{8,1}

¹ Note that funding for TB was significantly reduced in FY13 due to the federal budget sequester.

CDC's Division of Tuberculosis Elimination (DTBE) funds state and local TB programs through cooperative agreements using formulas designed to reflect TB incidence, patient characteristics, case complexity, workload in the public health laboratory, timely completion of therapy, and drug susceptibility testing.

CDC developed the formulas with input from representatives of the National Tuberculosis Controllers Association and the Association of Public Health Laboratories, and the formulas reflect perspectives from TB programs with high, medium, and low-incidence of TB cases. The formulas were phased in over the past decade to help programs adjust to changes in funding levels. In the past, TB programs received funding at established base amounts, or "legacy" funding, that had been allocated in response to the nation's TB resurgence in the late 1980s and early 1990s. In FY15, with the transition completed, 100 percent of all TB cooperative agreement awards will be distributed according to the new formulas.

Challenges in Addressing Tuberculosis

A disproportionate burden of disease persists among foreign-born populations and racial and ethnic minorities. Other populations are also at increased risk for TB, such as homeless, incarcerated or persons living with HIV.³ As TB becomes more concentrated in high-risk populations, public health staff must expend more effort identifying and reaching those who need treatment, and performing contact investigations to prevent further spread of disease. There are many potential barriers to treatment including the following categories: knowledge, attitudes, and perceptions; cultural beliefs; socioeconomic status; language; patient satisfaction; inconvenience/infringement on autonomy/length of treatment; and medication side effects. Improved TB control and prevention activities among disproportionately affected populations are essential for eliminating TB.

Unfortunately, shortages of drugs to treat TB have been a chronic issue in the United States affecting disease control.² The limited number of FDA-approved manufacturers, combined with the fact that several drugs have only a single supplier, enables even small manufacturing issues to lead to disruptions in supply. Drug shortages can entail temporary interruptions in supply or permanent withdrawal of a drug from the U.S. market. Historically the problem has been with second-line drugs (i.e., drugs used when the disease is resistant to first-line therapy). However, in 2013 there was a shortage of a first-line drug (isoniazid) and a testing product (Tubersol). Treatment interruptions caused by drug shortages can result in longer periods of infectiousness, which increases the risk of spreading disease. Suboptimal treatment regimens can also lead to more toxicity. To mitigate the effect of drug shortages, some groups have proposed creating a reserve supply of drugs or providing incentives to manufacturers.²

In addition, it is important to appropriately treat TB to avoid the development of drug resistance. Inappropriate or incomplete treatment can lead to the development of multi-drug resistant (MDR) or extensively-drug resistant (XDR) TB. The United States had 15 cases of XDR-TB between 2008 and 2012.¹ It is more complicated and costly to treat drug-resistant TB, as well as to manage those contacts who have been exposed and may need preventive treatment.

A recent CDC study highlights the economic and human costs for treatment of drug-resistant TB.⁴ The average direct cost of treatment for drug-susceptible TB is \$17,000 (this includes drugs, diagnostics, case management, hospitalization, etc). In contrast, the average direct cost to treat per MDR-TB case is

\$134,000. When including the productivity losses faced by patients while undergoing treatment, the cost increases to \$260,000 per case. The average cost for treating a case of XDR-TB is even higher, at \$430,000 per case (\$554,000 when productivity losses are included). Globally, less than 25 percent of people with MDR-TB are being treated.¹

Funding to state health agencies can support DOT to ensure proper treatment regimens are followed. However, DOT is time-consuming and labor-intensive, and requires adequate staff capacity. At each encounter a healthcare provider or designee must meet the patient, check for potential side effects, verify medication, watch the patient take pills, and document the visit. Often times, DOT programs also perform case management functions, such as providing education and social services. These activities ensure proper treatment completion and minimize the development of drug-resistant TB.

The number of TB cases has reached a historic low in the United States. To maintain that success, state TB programs need continued support to carry out their prevention and control activities. State health agencies need the resources and capacity for disease surveillance, case management, treatment, contact investigation, and other necessary services to ensure there is not a resurgence of TB in the United States and advance our collective efforts toward eliminating TB.

For more information, visit www.cdc.gov/tb.

1. American Thoracic Society. "Tuberculosis Fact Sheet." 2014.
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8. HHS. "State Table: TB Prevention and Control." In: "CDC Fiscal Year 2015 Justification of Estimates for Appropriation Committees." Available at http://www.cdc.gov/fmo/topic/Budget%20Information/appropriations_budget_form_pdf/FY2015_CJ_CDC_FINAL.pdf. Accessed on 5-1-2014.

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Cases, Case Rate, and FY13 CDC Funding for TB Programs by State

State	Cases [†]	Case Rate [†]	CDC Award FY 13 [^]
Alabama	134	2.8	\$ 1,045,496
Alaska	66	9	\$ 392,758
Arizona	211	3.2	\$ 1,273,872
Arkansas	70	2.4	\$ 520,387
California*	2,191	5.8	\$ 15,522,310
Colorado	64	1.2	\$ 528,943
Connecticut	74	2.1	\$ 593,957
Delaware	28	3.1	\$ 267,660
D.C.	37	5.9	\$ 424,603
Florida	679	3.5	\$ 6,504,276
Georgia	357	3.6	\$ 2,530,314
Guam	68	42.5	\$ 413,376
Hawaii	117	8.4	\$ 729,596
Idaho	15	0.9	\$ 196,635
Illinois*	347	2.7	\$ 2,629,041
Indiana	102	1.6	\$ 686,559
Iowa	46	1.5	\$ 413,717
Kansas	42	1.5	\$ 403,739
Kentucky	80	1.8	\$ 608,598
Louisiana	149	3.2	\$ 1,227,208
Maine	17	1.3	\$ 181,256
Marshall Islands	145	211.7	\$ 258,605
Maryland*	224	3.8	\$ 1,561,528
Massachusetts	215	3.2	\$ 1,496,082
Michigan*	149	1.5	\$ 1,165,647
Micronesia	173	162.5	\$ 413,353
Minnesota	162	3	\$ 2,085,290
Mississippi	81	2.7	\$ 831,847
Missouri	89	1.5	\$ 593,743
Montana	5	0.5	\$ 181,984
Nebraska	22	1.2	\$ 284,762
Nevada	82	3	\$ 638,482
New Hampshire	9	0.7	\$ 231,564
New Jersey	302	3.4	\$ 3,508,346
New Mexico	40	1.9	\$ 356,790
New York*	866	4.4	\$ 7,676,538
North Carolina	211	2.2	\$ 1,765,538
North Dakota	26	3.7	\$ 163,397
North Marianas	21	40.9	\$ 235,983
Ohio	149	1.3	\$ 1,089,677
Oklahoma	88	2.3	\$ 636,376
Oregon	61	1.6	\$ 551,110
Palau	2	9.5	\$ 114,072
Pennsylvania*	234	1.8	\$ 1,618,672
Puerto Rico	71	1.9	\$ 669,209
Rhode Island	23	2.2	\$ 329,868
Samoa	1	1.8	\$ 113,825
South Carolina	122	2.6	\$ 1,152,291
South Dakota	19	2.3	\$ 275,358
Tennessee	164	2.5	\$ 1,381,945
Texas*	1,233	4.7	\$ 9,452,734
Utah	37	1.3	\$ 330,476

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Vermont	4	0.6	\$ 155,826
Virginia	235	2.9	\$ 1,550,712
Virgin Islands	4	3.8	\$ 118,431
Washington	185	2.7	\$ 1,401,295
West Virginia	8	0.4	\$ 297,054
Wisconsin	71	1.2	\$ 460,208
Wyoming	3	0.5	\$ 166,255
TOTAL	9,945	3.2	\$ \$82,409,277

†2012 case and case rate (per 100,000) data from the CDC; totals are for states only.

*Includes funding for directly funded cities and counties. California includes Los Angeles, San Diego, and San Francisco; Illinois includes Chicago; Maryland includes Baltimore; Michigan includes Detroit; New York includes New York City; Pennsylvania includes Philadelphia; and Texas includes Houston.

^Amounts reflect new assistance and include HIV/TB co-infection funds. Amounts do not include direct assistance. California, Florida, Minnesota, New Jersey, and Texas receive additional funds to support regional training and medical consultation centers.

Source: <http://www.cdc.gov/tb/statistics/reports/2012/pdf/report2012.pdf>;

http://www.cdc.gov/fmo/topic/Budget%20Information/appropriations_budget_form_pdf/FY2015_CJ_CDC_FINAL.pdf.