Tuberculosis

About a third of the world’s population is infected with the bacterium that causes active, infectious tuberculosis disease. While 90 percent of infected people will not progress to disease, people with compromised immune systems, including from HIV, face much greater risks of illness. This is just one of the reasons tuberculosis, with growing incidence of strains that do not respond to the most effective and least toxic treatments, resurfaced at the end of the last century. In the last year, new cases of disease in the United States rose for the first time in two decades. Globally, tuberculosis now ranks with HIV as one of the two leading infectious disease killers worldwide and took more than 1.5 million lives in 2014. That year also saw 9.6 million new active cases of tuberculosis disease, including about a third of all cases that went undiagnosed, and about a million among children. Multidrug-resistant tuberculosis now accounts for more than 3 percent of new tuberculosis cases.

BACKGROUND Tuberculosis had a long head start on science and medicine, with more than two millennia elapsing between Hippocrates’ writing about the wasting effects of the disease and physician scientist Robert Koch’s identification in 1882 of the bacterium that causes it. Science began to overtake the illness during the century that followed, with research and development producing a vaccine that prevented disease in infants, public health policies that controlled the spread of bacteria, diagnostic technologies that detected active infection, and antibiotic drugs that cured it. Together these advances curtailed the impact of tuberculosis in developed countries for the first time in history. After that, funding for tuberculosis research and development declined.

The advances, though, represented partial solutions. The vaccine only prevents disease in young children. The cure requires a lengthy regimen of multiple medicines with debilitating side effects, and drug-resistant strains require longer treatments with side effects that can include permanent hearing loss. Infection control and diagnosis demand resources that are absent or insufficient in countries where tuberculosis has spread easily. Underfunded and poorly managed programs around the world have led to increasing numbers of people not completing treatment and developing strains of TB that do not respond to most drugs. While people with healthy immune systems who are infected with tuberculosis face an estimated 10 percent lifetime risk of developing active disease, the risk for infected people living with HIV of developing active disease is approximately 10 percent per year. In the 1980s HIV and rapid urbanization fueled the spread of tuberculosis, once again, globally. TB became the leading killer of people with HIV. While tuberculosis incidence rose steeply in developing countries, developed countries also saw disease incidence rise for the first time in three decades.

From 1985 to 1992, cases of tuberculosis in the United States consistently increased. In 1992, rising incidence of tuberculosis, with outbreaks of multidrug-resistant strains of disease in Miami and New York led the U.S. Centers for Disease Control and Prevention to issue a National Action Plan to Combat Multidrug-Resistant Tuberculosis. While the 1992 plan was not backed by sufficient funding to carry out all of its components, strengthened surveillance systems, improved infection control, and updated laboratory services under the plan led to declining U.S. tuberculosis cases.

In 1993, the World Health Organization declared tuberculosis a global health emergency, and in 1998 USAID began its global TB control program, building skills across countries with the highest burdens of the disease to diagnose, treat and prevent disease according to international standards. In 2001, the creation of the Global Fund to Fight AIDS, Tuberculosis and Malaria opened new avenues for supporting national TB control programs in heavily affected countries. From 2013, funding for tuberculosis programs declined, however, and then flattened. After two decades of a continued downturn in numbers of TB cases in the U.S., tuberculosis incidence in the U.S. plateaued in 2013, with 3 cases per 100,000 persons during 2013–2015.

At the end of 2015, the White House released a National Action Plan for Combating Multidrug-Resistant Tuberculosis, setting specific treatment and disease impact targets in the U.S. and abroad as well as goals to build collaborative international responses and capacities to fight multidrug-resistant tuberculosis.

In February, however, the President’s budget for fiscal year 2017 proposed just $191 million for global tuberculosis efforts, a $45 million cut from last year’s funding.
Now This year, the U.S. Centers for Disease Control and Prevention reported the first increase in the number of tuberculosis cases nationwide in more than two decades. That increase, of 157 cases from 2014 to 2015, means 9,573 people got tuberculosis in the U.S. last year. Nearly 6 percent of U.S. TB patients in 2015 were also living with HIV. TB incidence among foreign-born persons in the United States at 15.1 cases per 100,000 people is about 13 times the incidence among U.S.-born persons, which is about 1.2 cases per 100,000. The CDC report releasing the data noted the increase of tuberculosis cases in the U.S. reflects failures to adequately address the disease on a global scale.

With funding for tuberculosis inadequate to the growing challenges of drug-resistant disease, the data also reflect a false economy. The cost of treating each patient in the U.S. who could be treated with first-line drugs was about $17,000. For each patient whose disease was resistant to first-line drugs the cost was $150,000 each. For patients with extensively drug resistant, or XDR-TB, the cost was close to half a million dollars each. Globally, only about a quarter of people with multidrug-resistant tuberculosis are identified and treated. Untreated individuals, remaining ill and infectious, transmit drug-resistant strains of disease.

The need In its global tuberculosis strategy for 2015-2019, the United States Agency for International Development set goals to work with affected countries and other partners to reduce TB incidence by 25 percent from 2015 levels, successfully treat at least 13 million TB patients, initiate appropriate treatment for at least 360,000 patients with drug-resistant TB, cure more than 90 percent of tuberculosis patients whose disease responds to first-line medicines, and provide antiretroviral treatment for all people living with HIV and coinfected with TB.

The United States Agency for International Development leads U.S.-funded tuberculosis responses on the global front, informing priorities for research, and providing technical support that brings advances to the field in 23 high burden countries. The National Institutes of Health leads basic science research efforts and early clinical trials that lead to the development of new medicines and technologies. The CDC supports advanced clinical trials and operational research, policy guideline development, and technical support for programming. Through PEPFAR, the Department of State supports tuberculosis programming in the context of HIV programming, while the Department of Defense provides operational research and evaluation.

Developing a new drug, vaccine or diagnostic tool can cost approximately a billion dollars, with clinical trials alone costing $50 million or more. The NIH is the largest funder of tuberculosis research globally, and had $279 million for tuberculosis efforts in fiscal year 2015, while USAID had a research budget of about $20 million. The CDC’s TB Trials Consortium had less than $8.5 million for 2015, and the CDC’s Epidemiologic Studies Consortium had $6.2 million.

The CDC Division of Tuberculosis Elimination will need at least $243 million to respond to tuberculosis domestically and to conduct clinical trials for more effective prevention and treatment tools. Additionally, at least $400 million through USAID is needed to accomplish sustainable progress against tuberculosis globally.

Dedicated funding for science and responsive public policy have led to significant advances against tuberculosis over the last century and a half, but sustained progress is necessary. Renewed headway against the disease will require intensification of efforts both in the United States and globally, including support for community-based responses, continued work toward diagnostic tools that can be used in technology-limited settings to detect infection and drug resistance, a vaccine that is effective for all age groups, and treatments with shorter, more easily tolerated regimens. A U.S. commitment to fighting tuberculosis with adequate resources everywhere is fundamental to ending the global health threat of the disease.

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