U.S. Response to the Global Threat of Tuberculosis: Basic Facts

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Summary

Tuberculosis (TB) is one of the most widespread infectious diseases in the world, infecting an average of 9 million people annually. Although TB is curable, more than 1 million TB-related deaths occur each year. Due in part to a growing global response to TB, progress has been made in combating the disease. Globally, new TB infection rates have begun to slowly decline and TB mortality rates have decreased significantly since 1990. At the same time, absolute numbers of people infected with TB, particularly in Asia and Africa, continue to rise. Congress has recognized TB as an important humanitarian issue and increasingly as a potential threat to global security. In its second session, the 112th Congress will likely debate the appropriate funding levels and optimum strategy for addressing the continued challenge of global TB.

Congress has enacted several key pieces of legislation related to the prevention, treatment, and care of people with TB around the world. These include the Global AIDS and Tuberculosis Relief Act of 2000 (P.L. 106-264); the U.S. Leadership Against HIV/AIDS, Tuberculosis, and Malaria Act of 2003 (P.L. 108-25); and the Tom Lantos and Henry J. Hyde United States Global Leadership Against HIV/AIDS, Tuberculosis, and Malaria Reauthorization Act of 2008 (P.L. 110-293). These acts have authorized funds to be used in the fight against global TB and have recommended priority areas for the use of these funds.

From FY2004 to FY2007, U.S. spending for global TB remained at around $90 million per fiscal year. TB received new attention as a critical issue in May 2007, when a man known to be carrying a drug-resistant form of the disease was able to cross several international borders, putting dozens of others at risk of infection. In response to this event and to growing recognition of the global threat posed by TB, congressional funding for global TB began to increase significantly in FY2008, when Congress provided $163.1 million to USAID for its TB programs and directed the State Department to spend at least $150 million of funds for the President's Emergency Plan for AIDS Relief (PEPFAR) on joint HIV/TB programs. Funding for global TB saw steady increases from FY2008 to FY2010 and has seen small fluctuations since.

The United States Agency for International Development (USAID) is the lead U.S. agency in global TB control and oversees bilateral programs in over 40 countries. The United States works closely with a range of multilateral partners in responding to global TB, including the World Health Organization (WHO) and the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund), the largest external donor for TB. National governments play a critical role in responding to TB, and domestic government expenditures account for the majority of global TB funding.

Several key issues threaten global control of TB. First, HIV/TB co-infection, particularly in Africa, is a growing challenge. TB is the leading cause of death for people with HIV, and TB control is significantly impeded in areas with high HIV prevalence. Second, drug-resistant forms of TB, including multidrug-resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB), are more difficult and expensive to treat, leading to greater TB-related mortality. Finally, the methods currently used for both TB diagnosis and treatment are antiquated and have varying degrees of success, particularly in the face of HIV/TB co-infection and drug-resistant TB. This report outlines basic facts related to global TB, including characteristics of the epidemic and U.S. legislation, programs, funding, and partnerships related to the global response to TB. The report will be updated as events warrant.

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Introduction

The United States has increasingly recognized tuberculosis (TB) as a critical global health issue. In FY2008, Congress significantly increased its funding for global TB, providing $163.1 million to USAID for its TB programs and directing the Office of the Global AIDS Coordinator (OGAC) at the State Department to spend at least $150 million on joint HIV/TB programs. Fighting TB is a key goal of President Barack Obama's Global Health Initiative (GHI) and global TB programs saw funding increases in FY2009, FY2010, and FY2012, with a slight decrease in FY2011, reflecting deficit reduction measures that affected most discretionary spending amounts. This report provides information on key components of the global TB epidemic and U.S. global TB efforts as the 112th Congress considers how the United States should continue to respond to the challenge of TB around the world.

Description of Tuberculosis

TB is an infectious disease spread through the air. TB most often affects the lungs, but it can also affect the brain, kidneys, or spine. The disease is passed when an infected person coughs, sneezes, talks, or spits and another person inhales the infected air. Individuals infected with TB can have latent TB infection or active TB disease. Those with latent TB infection do not exhibit symptoms and cannot spread the infection to others, whereas those with active TB disease exhibit a range of symptoms and are contagious. Without treatment, individuals with active TB will infect an average of 10-15 people each year and can ultimately die from the disease. TB most often becomes active when one's immune system is weakened, for example by HIV/AIDS.

Global Tuberculosis Statistics[1]

Prevalence: Prevalence measures the number of people living with a disease. The World Health Organization (WHO) estimates that about one-third of all people in the world are currently carriers of TB. An estimated 12 million people were living with active TB in 2010.

Incidence: Incidence measures the number of people who contract a disease within a given time period (usually one year). It is estimated that each year an average of 9 million people are infected with active TB disease. In 2010, there were an estimated 8.8 million new cases of TB worldwide, including roughly 1.1 million new TB patients who were also infected with HIV. Global TB incidence rates fell from 1990 to 1997, increased again from 1997 to 2002, due in part to the HIV epidemic, and have slowly declined since.

Mortality: In 2010, there were 1.4 million TB-related deaths, including 0.35 million TB-related deaths among HIV-positive individuals. Global TB mortality has fallen by more than one-third since 1990 levels.

Multidrug-Resistant TB (MDR-TB) is resistant to the two most powerful first-line TB drugs. MDR-TB significantly challenges TB control efforts, as it is more difficult to cure and may lead

[1] All data in this section is from World Health Organization (WHO), *Global Tuberculosis Control*, 2011, http://www.who.int/tb/publications/global_report/2011/gtbr11_full.pdf.

to high TB-related death rates. TB drug resistance is due to poor treatment adherence or incorrect drug usage. In 2010, there were an estimated 650,000 cases of MDR-TB among the world's 12 million prevalent cases of TB. Twenty-seven countries, known as high MDR-TB burden countries, account for the vast majority of all MDR-TB cases.

Extensively Drug-Resistant TB (XDR-TB) is resistant to any fluoroquinolone—antibiotics commonly used in treating TB—and at least one of the three injectable second-line drugs. XDR-TB is more difficult to diagnosis and treat than either drug-susceptible TB or MDR-TB. In low-resource settings, XDR-TB is often fatal. As of July 2010, 58 countries and territories had reported at least one case of XDR-TB. XDR strains of TB are likely under-diagnosed due to weak laboratory capacity to test for second-line drug resistance.

Regional Distribution of Tuberculosis[2]

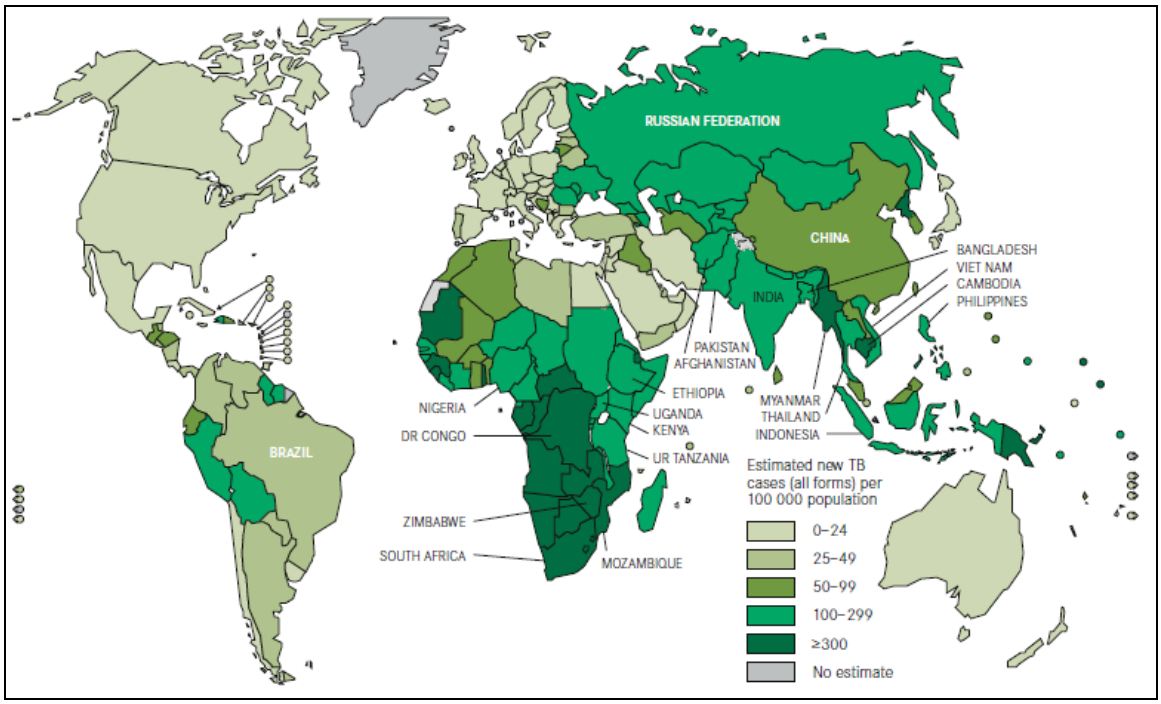
Although TB occurs all over the world, there are a number of regions, as categorized by WHO,[3] that are home to the highest TB prevalence and incidence rates.

- In 2010, 59% of all TB cases occurred in Asia, 26% in Africa, 7% in the Eastern Mediterranean Region, 5% in Europe, and 3% in the Americas. **Figure 1** shows the global distribution of new TB cases in 2010.
- Twenty-two high-burden countries (HBCs) are home to the highest absolute number of TB cases and account for 81% of all TB around the world. In 2010, the five countries with the largest number of new TB cases were India, China, South Africa, Indonesia, and Pakistan.
- Estimates suggest that levels of MDR-TB among newly infected TB patients are stable in the Americas, decreasing in the Eastern Mediterranean, South-East Asia, and Western Pacific regions, and increasing in the African and European regions.

[2] All data in this section is from WHO, *Global Tuberculosis Control*, 2011, http://www.who.int/tb/publications/global_report/2011/gtbr11_full.pdf.

[3] For an explanation of the countries included in each WHO Region, see "WHO Regional Offices," http://www.who.int/about/regions/en/index.html.

Figure 1. Estimated TB Incidence Rates, by Country, 2010



Source: WHO, Global *Tuberculosis Control*, 2011, p. 14.

Note: Incidence rates are per 100,000 population.

Tuberculosis Prevention and Treatment

Treatment: TB is curable through short-term chemotherapy. Active TB is treated with a combination of drugs, taken over the course of 6-12 months.

In 1993, WHO developed an internationally recommended strategy for detection and treatment of TB called "Directly Observed Treatment, Short-course" (DOTS). DOTS is widely recognized as the standard treatment protocol by national governments and external donors. DOTS recommends that once patients are diagnosed with TB using microscopy, health workers and volunteers observe and record patients each time they take medication throughout their anti-TB regimen. DOTS has five key components:

- sustained political and financial commitment;
- diagnosis by quality-ensured sputum-smear microscopy;
- standardized short-course anti-TB treatment given under direct and supportive observation;
- a regular, uninterrupted supply of high-quality anti-TB drugs; and
- standardized recording and reporting.

In areas with moderate to high levels of MDR-TB, WHO recommends implementation of DOTS-Plus, a strategy that includes guidance on the appropriate use of second-line TB drugs.

In 2000, WHO and its partners released its "Global Plan to Stop TB," which included global targets for TB control from 2001 to 2005. WHO released updated plans in 2006 and 2010.[4] Underpinning the most recent Global Plan to Stop TB is WHO's 2006 "Stop TB Strategy: 2006-2015,"[5] which outlines actions that national TB control programs and their partners should take to reach the global TB control targets. The central component of the Stop TB Strategy is the use of DOTS to diagnose and treat TB. The Stop TB Strategy has six focus areas:

- pursue high-quality DOTS expansion and enhancement;
- address TB/HIV, MDR-TB, and the needs of poor and vulnerable populations;
- contribute to health system strengthening based on primary health care;
- engage all care providers;
- empower people with TB, and communities through partnerships; and
- enable and promote research.

WHO's strategy has been widely adopted by national TB control programs and their partners. By 2007, 99% of all cases of TB reported to WHO were being treated in DOTS programs. In 2009, DOTS had a treatment success rate of 87%.[6]

Prevention: Preventative therapy is available for individuals at high risk of developing TB—such as HIV-positive patients—and those diagnosed with latent TB.

There is a TB vaccine called Bacille Calmette Guerin (BCG), but it has been found to have inconsistent success in protecting individuals from infection. When successful, protection is thought to last around 15 years. The vaccine has also been shown to cause potentially fatal infection when given to HIV-positive adults or to children with weak immune systems.

Key U.S. Legislation on Global Tuberculosis

- On August 19, 2000, President Bill Clinton signed into law the Global AIDS and Tuberculosis Relief Act of 2000 (P.L. 106-264). The act authorized $60 million to be spent on global TB programs in FY2001 and FY2002. The act recommended that the United States Agency for International Development (USAID), the primary U.S. agency responsible for global TB programs, coordinate with WHO, the Centers for Disease Control and Prevention (CDC), and the National Institutes of Health (NIH) toward the goal of controlling TB, and put forth the following targets for countries with USAID TB programs, to be met by December 31, 2010:
  - detect at least 70% of infectious TB cases, and
  - cure at least 85% of detected cases.

[4] Stop TB Partnership, *The Global Plan to Stop TB: 2011-2015*, World Health Organization, 2010, http://www.stoptb.org/assets/documents/global/plan/TB_GlobalPlanToStopTB2011-2015.pdf.

[5] Stop TB Partnership, *Stop TB Strategy: 2006-2015*, World Health Organization, 2006, http://whqlibdoc.who.int/hq/2006/WHO_HTM_STB_2006.368_eng.pdf.

[6] WHO, *Global Tuberculosis Control*, 2011, p. 40.

- On May 27, 2003, President George W. Bush signed into law the United States Leadership Against HIV/AIDS, Tuberculosis, and Malaria Act of 2003 (Leadership Act, P.L. 108-25). The act authorized $15 billion to be spent on global HIV/AIDS, TB, and malaria programs over five years, though it did not authorize a specific funding amount for bilateral TB programs. The act outlined congressional priorities for tackling TB from FY2004 through FY2008 and put forth the following goals:
  - detect at least 70% of infectious TB cases in high-burden countries (HBCs) by December 31, 2005, and in all countries with USAID TB programs by December 31, 2010; and
  - cure at least 85% of detected cases in HBCs by December 31, 2005, and in all countries with USAID TB programs by December 31, 2010.

  The act mandated that U.S. global TB assistance prioritize DOTS coverage and spend at least 75% of global TB funding on TB medicines, supplies, direct patient services, and training in diagnosis and treatment for DOTS coverage and treatment of MDR-TB using DOTS-Plus, including funding for the Global Tuberculosis Drug Facility (see "Key Partners in the Response to Global Tuberculosis").

  The act also prohibited U.S. contributions to the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund, see "Key Partners in the Response to Global Tuberculosis") (**Table 2**) from exceeding 33% of the total amount of funds contributed from all sources.
- On July 24, 2008, President Bush signed into law the Tom Lantos and Henry J. Hyde U.S. Global Leadership Against HIV/AIDS, Tuberculosis, and Malaria Reauthorization Act of 2008 (Lantos-Hyde Act, P.L. 110-293). The act increased the budget for global HIV/AIDS, TB, and malaria efforts to $48 billion from FY2008 through FY2013, authorizing $4 billion for TB programs over the course of five years. The act also outlined the following goals for U.S. global TB programs:
  - halve the TB death and disease burden from the 1990 baseline;
  - detect at least 70% of infectious TB cases and treat at least 85% of detected cases in countries with USAID TB programs;
  - treat 4,500,000 new infectious TB cases under DOTS by 2013;
  - diagnose and treat 90,000 new MDR-TB cases by 2013; and
  - develop a five-year U.S. Global Tuberculosis Strategy to expand and improve U.S. TB efforts in support of the Global Plan to Stop TB.

This legislation will be up for reauthorization in FY2013.

U.S. Global Tuberculosis Programs

USAID began its TB program in 1998. Since then, Congress has increased funding for global TB and the U.S. response has expanded to include more ambitious goals for USAID and involve

several other U.S. agencies. The United States currently provides bilateral TB assistance to 40 countries (**Figure 2**).

Figure 2. USAID Bilateral Tuberculosis Programs

Source: USAID, Infectious Diseases, "Tuberculosis: Countries," http://www.usaid.gov/our_work/global_health/id/tuberculosis/countries/index.html.

President Obama has indicated that TB is a key global health priority. On May 5, 2009, the President announced the Global Health Initiative (GHI), a new effort to develop a comprehensive U.S. global health strategy over the course of six years. TB is one of the GHI's six focus areas, reflecting the Administration's goal of prioritizing those areas with the greatest disease burden, as well as the intention to maximize health impact per dollar spent. The GHI also calls for a more integrated U.S. response to global health issues and for a shift in U.S. global health strategy from one focused on specific diseases to a more comprehensive approach to health, including a focus on health system strengthening.

In March 2010, in response to congressional reporting requirements to develop a coordinated approach to global TB, USAID, the Department of Health and Human Services (HHS) (including CDC and NIH), the Department of State, and the Department of Defense (DOD) released a joint "Lantos-Hyde United States Government Tuberculosis Strategy" (the Strategy).[7] The Strategy explains how U.S. TB programs will advance the goals of the GHI and outlines key targets for the U.S. TB response from 2009 to 2014, including several of the goals set out in the Lantos-Hyde Act. Two of the targets in the Strategy differ from those in the Lantos-Hyde Act. While the Lantos-Hyde Act aims to treat 4.5 million new infectious TB cases and diagnose and treat 90,000 new MDR-TB cases by 2013, the Strategy includes the following goals:

- treat 2.6 million new infectious TB cases using DOTS by 2014, and

[7] USAID, CDC, Office of the Global AIDS Coordinator (OGAC), HHS, NIH, and DOD, *Lantos-Hyde United States Government Tuberculosis Strategy*, March 24, 2010, http://www.usaid.gov/press/releases/2010/USG_TB_Strategy_3-24-10.pdf.

- diagnose and treat at least 57,200 new MDR-TB cases by 2014.

In order to reach the goals outlined in the Strategy, U.S. TB programs focus on providing assistance for four key activities:

- accelerated detection and treatment of TB in up to 25 countries,[8] selected on the basis of TB, MDR-TB, and HIV/TB co-infection prevalence and incidence rates; case detection and treatment success rates; and other factors, including political commitment, financial need, and managerial feasibility;
- scaled-up prevention and treatment of MDR-TB;
- expanded coverage of interventions for TB-HIV co-infection in coordination with USG HIV efforts under PEPFAR; and
- improved health systems.

Implementing U.S. Agencies and Departments

A number of U.S. agencies and departments implement a range of programs aimed at treating and containing the global spread of TB. Key agencies include the following:

- **United States Agency for International Development:** USAID is the lead agency in international TB control. USAID supports implementation and scale-up of all components of the Stop TB Strategy through bilateral programs in over 40 countries, and in partnership with national TB programs. USAID also supports operations research and late-stage clinical trials related to TB.
- **Office of the Global AIDS Coordinator (OGAC), Department of State:** As the coordinator of the President's Emergency Plan for AIDS Relief (PEPFAR), OGAC is the lead for the U.S. response to HIV/TB co-infection. OGAC's HIV/TB programs include HIV testing for TB patients, TB screening and testing of persons with HIV/AIDS, surveillance, and laboratory strengthening.
- **Centers for Disease Control and Prevention:** CDC provides technical support to international partners on epidemiology and surveillance, laboratory strengthening, and clinical/operational research for diagnostic and treatment strategies and the new approaches to TB care. CDC also funds the TB Clinical Trials Consortium and the TB Epidemiologic Studies Consortium to address gaps in TB diagnostics, treatment regimens, case detection, and monitoring.
- **National Institutes of Health:** NIH supports international biomedical research including basic research, studies of pathology, epidemiology, and transmission of TB; studies on drug resistance; HIV/TB co-infection; identification, pre-clinical development and clinical evaluation of new drugs, diagnostics, and vaccines; and research training, infrastructure, and capacity building in partner countries.

[8] In FY2009, India, Indonesia, and South Africa were chosen as the first three TB countries to receive additional resources to support accelerated detection and treatment of TB. In FY2010, six more countries were chosen to receive funding increases, including the Democratic Republic of the Congo, Ethiopia, Nigeria, Bangladesh, Russia, and the Philippines.

U.S. Global Tuberculosis Assistance Funds

Congress designates funds for global TB interventions only to USAID, through annual State-Foreign Operations appropriations, whereas other agencies and departments support global TB efforts using non-designated funds. Funding for global TB efforts increased slowly from FY2004 through FY2007. Appropriation levels for global TB rose significantly in FY2008, partly in response to a global public health scare in May 2007 when a man known to be carrying a drug-resistant form of the disease was able to cross a number of international borders, putting dozens of individuals at risk of infection. Appropriation amounts increased each fiscal year from FY2008 to FY2010 and have fluctuated since (**Table 1** and **Figure 3**).

Table 1. U.S. Bilateral Funding For Global Tuberculosis: FY2004-FY2013

($ millions, current)

Agency	FY2004 Actual	FY2005 Actual	FY2006 Actual	FY2007 Actual	FY2008 Actual	FY2009 Actual	FY2010 Actual	FY2011 Actual	FY2012 Estimate	FY2013 Request
USAID GHP[a]	74.7	79.4	81.8	80.8	148.0	162.5	225.0	224.6	236.0	224.0
USAID Other[b]	10.4	12.6	12.3	14.1	15.2	14.1	18.2	13.8	13.8	8.0
TOTAL TB Bilateral	85.1	92.0	91.5	94.9	163.2	176.6	243.2	238.4	254.4	236.0

Source: Compiled by CRS from Congressional Budget Justifications and appropriations legislation.

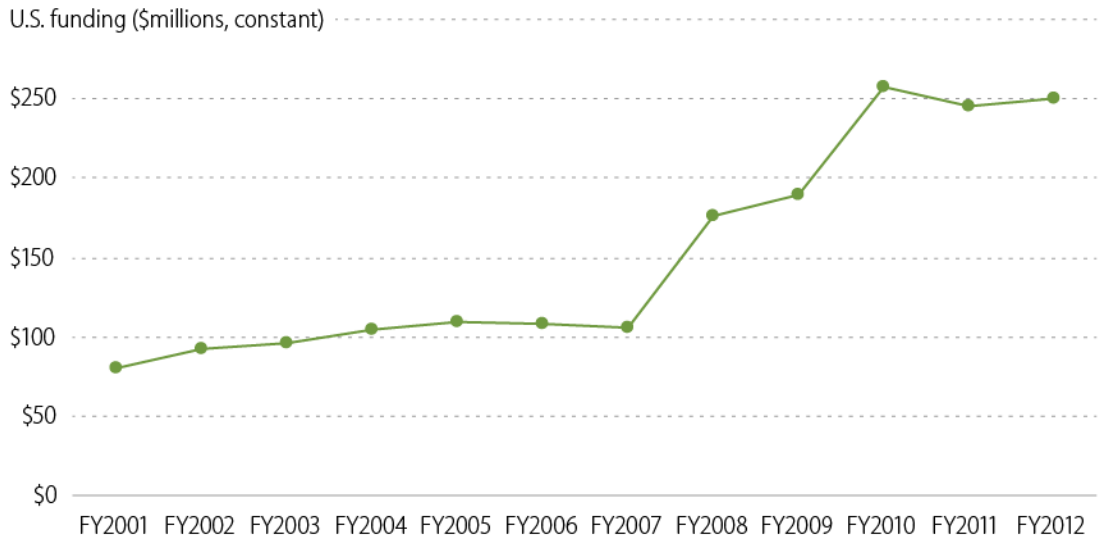
Notes: While not noted in the table, CDC spends a portion of its general TB budget on global TB activities and PEPFAR spends on joint HIV/TB programs.

a. Global Health Programs (GHP) Account.

b. This includes funding from the Development Assistance Account (DA), the Economic Support Fund Account (ESF), and the Assistance for Europe, Eurasia, and Central Asia Account (AEECA).

Figure 3. USAID Funding for Bilateral Global Tuberculosis Programs in Constant Dollars: FY2001-FY2012

($ millions, constant)



Source: Compiled by CRS from Congressional Budget Justifications and appropriations legislation.

The United States also supports global TB efforts through contributions to the Global Fund, an international financing mechanism for the response to HIV/AIDS, TB, and malaria. U.S. contributions to the Global Fund support grants for HIV/AIDS, TB, and malaria. The United States is the largest single contributor to the Global Fund. **Table 2** details U.S. contributions to the Global Fund from FY2004 to FY2013.

Table 2. U.S. Appropriations for the Global Fund: FY2004-FY2013

($ millions, current)

Program/Agency	FY2004 Actual	FY2005 Actual	FY2006 Actual	FY2007 Actual	FY2008 Actual	FY2009 Actual	FY2010 Actual	FY2011 Actual	FY2012 Estimate	FY2012 Request
USAID	397.6	248.0	247.5	247.5	0.0	100.0	0.0	0.0	0.0	0.0
State	0.0	0.0	198.0	377.5	545.5	600.0	750.0	748.5	1,300.0	1,650.0
HHS	149.1	99.2	99.0	99.0	294.8	300.0	300.0	297.3	0.0	0.0
Total	**546.6**	**347.2**	**544.5**	**724.0**	**840.3**	**1,000.0**	**1,050.0**	**1,045.8**	**1,300.0**	**1,650.0**

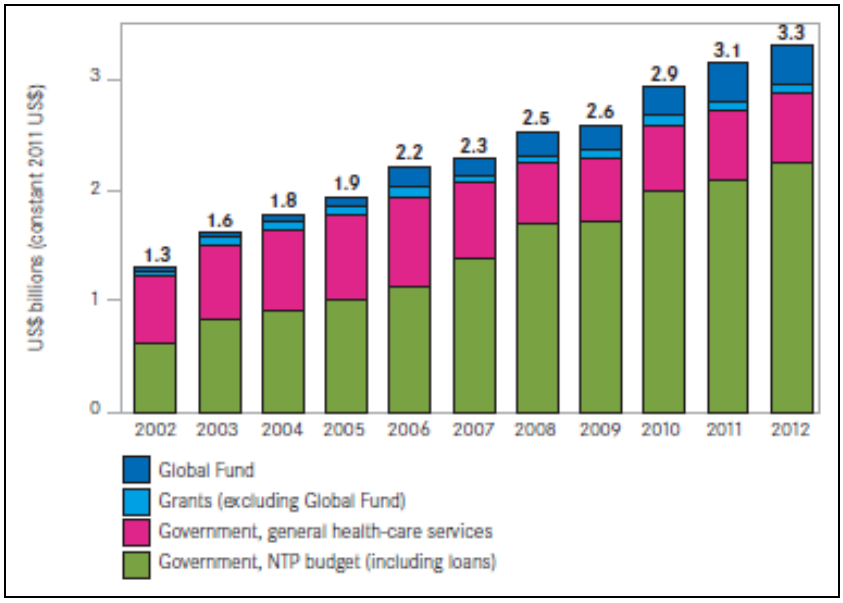
Source: Compiled by CRS from Congressional Budget Justifications and appropriations legislation.

International funding for TB makes up a relatively small proportion of all global TB spending. The Global Fund is the largest source of donor funding for global TB; the Fund provided an estimated 84% of all international TB funding in 2011.[9] The majority of funding for global TB comes from domestic governments, although there is much variation within the HBCs with regard

[9] Global Fund to Fight AIDS, Tuberculosis, and Malaria, *Making a Difference – Global Fund Results Report 2011*, 2011, p. 40.

to level of internal versus external funding. Domestic government spending is expected to account for 87% of all financing for global TB in 2012 (**Figure 4**).

Figure 4. International Funding for TB Control in High-Burden Countries, 2002-2012



Source: WHO, *Global Tuberculosis Control: Who Report 2011*, p. 43.

Notes: According to WHO, both categories labeled "government" refer to internal government sources of funding within high-burden countries. NTP stands for National Tuberculosis Program. "General health-services" refers to the utilization of non-TB specific services, such as hospitalization and outpatient visits, during TB treatment.

Key Partners in the Response to Global Tuberculosis

The United States works with a range of partners to combat TB, including other national governments, multilateral organizations, non-governmental organizations (NGOs), and the private sector. Congress has authorized coordination with and contributions to multilateral organizations to address global TB, including several WHO groups and the Global Fund. Key partners include the following:

- **World Health Organization:** WHO is the authority for global health within the United Nations system. It is responsible for shaping the global health research agenda, setting norms and standards, articulating evidence-based policy options, providing technical support to countries, and monitoring global health trends. Examples of WHO activities related to TB include the following:
  - **The Stop TB Partnership:** The Stop TB Partnership (originally the Stop TB Initiative) was established in 1998 and comprises a network of international organizations, donor governments, and private sector and non-governmental organizations working to eliminate TB. The Stop TB Partnership is

responsible for developing the "Global Plan to Stop TB." The United States is a member of the Stop TB Partnership.

- **Global Drug Facility (GDF):** GDF, housed in WHO and managed by a small team in the Stop TB Partnership Secretariat, is a financing mechanism that provides technical assistance in the management and surveillance of TB drug use, as well as procurement of high-quality anti-TB drugs at a relatively low price. Countries can purchase TB treatments directly from GDF at prices below market value or apply for grants to purchase first-line treatments. GDF also works with grantees to estimate drug needs for the next year of GDF support.
- **Green Light Committee (GLC):** GLC was set up by WHO in 2000 to support countries in the fight against MDR-TB. GLC is composed of the CDC, International Union Against Tuberculosis and Lung Diseases, Medical Research Council of South Africa, National Tuberculosis Programs of Estonia and Latvia, Partners in Health, and WHO. The committee reviews requests for second-line TB treatments through DOTS-Plus projects and determines whether it can provide the medication in compliance with international standards of care. Programs that receive GLC approval are eligible to purchase these drugs through a GLC-pooled procurement mechanism at discounted prices.

- **The Global Fund:** The Global Fund was established in 2002 as a public-private partnership to provide significant financial support for global responses to HIV/AIDS, TB, and malaria. The United States contributes more to the Global Fund than any other donor. The Global Fund has committed over $22.6 billion in grants in 150 countries since it was established. In 2009, the Global Fund provided 65% of all international funding for TB efforts in high-burden countries, and in 2011 it is expected to provide 84% of all international funding.[10] In November 2011, the Global Fund announced that due to limited resources available, it would postpone its 11th round of funding.[11]

Key Issues in Global Tuberculosis

The 112th Congress will likely be faced with a number of issues regarding the U.S. response to global TB, including how much assistance to provide and how to best apportion global TB funds. As Congress debates the role of the U.S. in global TB control, it may consider the following issues:

- **TB/HIV Co-infection:** TB/HIV co-infection poses a challenge to effective TB and HIV control. TB is the leading cause of death for people with HIV, and TB control is significantly impeded in areas with high HIV prevalence. Nonetheless, rates of TB testing among HIV patients and provision of antiretroviral therapy

[10] Ibid., p. 42.

[11] The Global Fund to Fight AIDS, Tuberculosis, and Malaria, "The Global Fund is Alive and Well, but Global Health Progress is in Peril," December 2011, http://www.theglobalfund.org/en/mediacenter/announcements/2011-12-01_The_Global_Fund_is_alive_and_well_But_Global_Health_Progress_is_in_Peril_by_Simon_Bland_the_Chair_of_the_Board_of_the_Global_Fund/.

(ART) to co-infected individuals remain low. Some advocates call for increased U.S. support for TB/HIV services through PEPFAR and for the establishment of specific targets related to TB/HIV co-infection.

- **Multidrug-Resistant TB (MDR-TB) and Extensively Drug-Resistant TB (XDR-TB):** Drug resistant forms of TB are threatening progress in TB control. Limited laboratory and trained health personnel, along with an insufficient supply of second-line anti-TB drugs, make it difficult to properly diagnose and treat MDR/XDR-TB patients. Treatment for drug resistant-TB is more time intensive, toxic, and expensive, and is less easily available and effective than treatment for non-resistant TB, especially for those with HIV. Global health experts have debated how to best address the issue of drug resistant TB, including whether more funds should be used to specifically address MDR-TB, particularly in countries with limited resources.
- **Research and Development:** Many of the tools used for TB prevention, diagnosis, and treatment are antiquated and have limited success rates. While there is a vaccine for TB, it provides unreliable protection for adults and has had little impact on the epidemic. The tool used to diagnose TB is over a century old and is often ineffective, especially for people with HIV. TB treatments for drug-resistant TB are costly, time intensive, and can be toxic. Many advocates call for increased support for the development of new TB vaccines, diagnostics, and drugs to be used in resource-poor countries. Some also argue that funding for TB research and development should prioritize new tools to diagnose and treat MDR-TB, XDR-TB, and TB/HIV co-infection.

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