



Neglected Tropical Diseases

July 2009

Neglected tropical diseases (NTDs) are a group of parasitic and bacterial tropical infections that primarily affect the most impoverished and vulnerable populations in the world, and as such have received scant attention until recently.^{1,2,3} Thirteen diseases represent the core group of the highest burden NTDs, grouped together due to their chronic, disfiguring, and stigmatizing impact, intricate association with poverty, and geographic overlap, and individuals are often infected with multiple NTDs simultaneously. Many NTDs, however, can be controlled and even eliminated with low-cost and effective interventions. The recommended approach is one of integrated control using preventive chemotherapy designed to target a group of NTDs simultaneously; a “rapid-impact package” combination of 4 drugs targeting the 7 most common NTDs is now available.

In recent years, growing awareness of the impact of NTDs, including their potential to threaten achievement of the UN Millennium Development Goals (MDGs), coupled with the availability of relatively low-cost control strategies, have led to important new global NTD initiatives. These include: the World Health Organization’s Neglected Tropical Diseases Program; the Global Network for Neglected Tropical Diseases; the U.S. government’s Neglected Tropical Diseases Initiative and new commitments by other G8 members; and efforts of foundations and the private sector. President Obama’s recently announced new global health initiative calls attention to and proposes increased funding for NTDs.⁴

- Of the thirteen highest burden NTDs, the seven most common are particularly controllable and the target of recent interventions, including the rapid-impact package:^{3,5}

Figure 2: Global Prevalence of the Seven Most Common Neglected Tropical Diseases

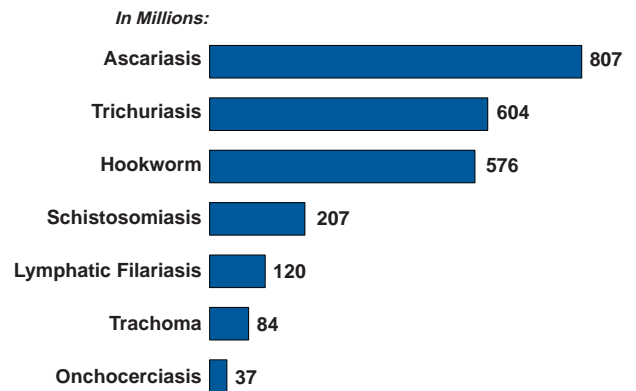


Figure 1: The 13 Neglected Tropical Diseases (NTDs) (*7 most common NTDs)

Ascariasis* (roundworm)
Buruli Ulcer
Dengue Hemorrhagic Fever
Dracunculiasis (guinea worm)
Hookworm*
Human African Trypanosomiasis (African sleeping sickness)
Lymphatic Filariasis* (elephantiasis)
Leishmaniasis
Leprosy
Onchocerciasis* (river blindness)
Schistosomiasis* (snail fever)
Trachoma*
Trichuriasis* (whipworm)

Current Global Snapshot

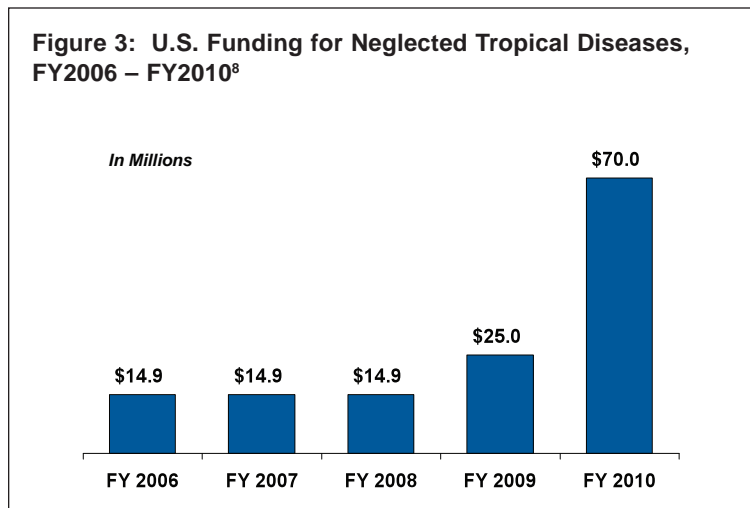
- An estimated 1.4 billion people – one sixth of the world’s population – are infected with one or more NTDs and another two billion people are at risk.² The majority of the NTD burden is concentrated in Africa, Asia, and Latin America.⁴
- NTDs have low mortality but high morbidity rates, and are the fourth most devastating group of communicable diseases behind lower respiratory infections, HIV, and diarrheal diseases, but ranking higher than either malaria or tuberculosis. NTDs often result in severe disability, disfigurement, blindness, and malnutrition.² Lack of access to clean water, health services, adequate housing, and good sanitation contribute to their prevalence and impact.

- **Ascariasis** (roundworm): the most common human worm infection, affecting more than 807 million people worldwide; an estimated 60,000 people die each year. It causes swelling of the abdomen, intestinal blockage, malnutrition, and anemia. Contracted by ingesting contaminated food, water, or soil, it is typically found in sub-Saharan Africa and Southeast Asia.
- **Trichuriasis** (whipworm): affects more than 604 million people, causing chronic and bloody diarrhea, anemia, malnutrition, and other more serious problems. It is transmitted by ingesting soil or unwashed vegetables contaminated with human feces, and cases are typically found in sub-Saharan Africa, Latin America, and East Asia, as well as in the southern United States.
- **Hookworm**: affects 576 million people and is the world’s leading cause of anemia and malnutrition. Pregnant women and children are most vulnerable to infection. Transmitted by contact with contaminated soil, hookworm is most prevalent in Africa, Latin America, Southeast Asia and China.
- **Schistosomiasis** (snail fever): ranks second only to malaria as the most common parasitic disease. An estimated 207 million people living in 74 countries worldwide are infected, with more than half of all infections in Africa. It is the most deadly NTD, causing an estimated 280,000 deaths each year, and severely disabling 20 million people. Women with urinary schistosomiasis (*S. haematobium*) develop lesions in their genital tract which significantly increases the risk of HIV infection.⁶ Schistosomiasis is transmitted via contaminated fresh water inhabited by snails carrying the parasite.
- **Lymphatic filariasis** (elephantiasis): affects more than 120 million people in over 80 countries worldwide. Symptoms include severe swelling of the extremities and genitals caused by the parasitic filariasis worms, which are transmitted by mosquitoes. Found worldwide, it is most prevalent in Africa, India and South Asia, the Pacific, and the Americas.

- **Trachoma:** affects an estimated 84 million people in more than 56 countries and is the world's leading cause of preventable blindness. An estimated 8 million people have lost their sight due to repeated exposure to the disease. Transmitted through contact with eye discharge from an infected person's hands or clothes, or on the feet of flies, trachoma is most common in Africa and Asia.
- **Onchocerciasis** (river blindness): affects more than 37 million people; 500,000 of which are severely visually impaired and another 270,000 are permanently blinded by the disease. It is caused by worms transmitted by black flies that breed near fast-moving rivers and streams in Africa, Yemen, and Latin America.

NTD Control

A number of strategies have been successful in controlling and even eliminating some NTDs (e.g. control of schistosomiasis in China and Egypt, and near elimination of onchocerciasis in 10 countries worldwide). Although many interventions are relatively inexpensive, challenges persist to effectively and efficiently deliver tools and services to the most at-risk populations. In addition, until recently, most efforts were relatively uncoordinated. Today, the recommended strategy is one of integrated control, targeting multiple NTDs simultaneously through mass drug administration at the community level. The rapid-impact package, initiated by members of the Global Network for NTDs, the WHO, and other leaders in the NTD field, is a combination of 4 drugs used to treat the 7 most common NTDs for as little as \$0.25–\$0.50 per person per year; three of these drugs are donated by the pharmaceutical industry and the fourth is available at low cost.^{3,7} In addition to integrated control with preventive chemotherapy, other measures, such as promoting clean water, sanitation, and hygiene, also play a critical role in addressing the underlying causes of NTDs.



The U.S. Government's Response²

Historically, the U.S. response to NTDs was relatively limited and focused largely on research and surveillance conducted by the National Institutes of Health and the Centers for Disease Control and Prevention. Attention to and funding for NTDs by the U.S., however, increased recently:

- In 2006, Congress appropriated funds specifically for NTD control and USAID created a Neglected Tropical Disease (NTD) Control Program, proposing \$100 million over 5 years to target the 7 most common NTDs, with the goal of delivering treatment to 40 million people.^{8,9}
- In 2008, building on the USAID program, President Bush launched the Neglected Tropical Diseases Initiative, a 5-year, \$350 million initiative to provide treatment to more than 300 million people in Africa, Asia, and Latin America, and increase the number of focus countries to 30 by 2013.² USAID initially targeted 5 focus countries in 2006 (Burkina Faso, Ghana, Mali, Niger, and Uganda), and has since expanded to include 7 more (Haiti, Sierra Leone, Southern Sudan, Nepal, Bangladesh, Tanzania, and the Democratic Republic of Congo).
- Despite these initiatives, funding for NTDs was only \$15 million per year from 2006–2008. It reached \$25 million in FY 2009, after the launch of the U.S. NTD Initiative. President Obama's new global

health initiative, announced in May 2009, proposes \$63 billion over 6 years to address a range of global health challenges including NTDs and requests increased funding of \$70 million in the FY 2010.⁴ See Figure 3.

The Global Response

While there were earlier global efforts to address NTDs – for example a 1974 World Health Assembly Resolution (WHA27.52) which called on the WHO to intensify research on major tropical parasitic diseases, and the creation of the Training and Research in Tropical Diseases (TDR) Program by WHO, UNICEF, UNDP, and the World Bank the following year – a broader, integrated approach did not begin until much more recently:

- In 2001, the World Health Assembly unanimously set a global target to reduce helminth (parasitic worm) infections through Resolution 54.19, which aimed to treat at least 75% of all school aged children at risk of morbidity from schistosomiasis and other soil-transmitted helminths by 2010.¹⁰ As a result, WHO launched the Partners for Parasite Control (PPC).
- The MDGs¹¹ led to several important initiatives and programs aimed at reducing the impact of NTDs, including: the Global Network for NTDs, an alliance of international organizations working to control and eliminate NTDs by 2020; the International Trachoma Initiative, founded by Pfizer and The Edna McConnell Clark Foundation; the Schistosomiasis Control Initiative, started by the Gates Foundation and Imperial College of London; Liverpool Associates in Tropical Health, which provides technical research on NTDs; the TDR Program; and WHO's Global Plan to Combat Neglected Tropical Diseases 2008–2015.^{2,12}
- In 2008, governments and international organizations significantly scaled-up efforts to address NTDs. For the first time, G8 leaders put NTDs on the global health agenda and called for sustained action over the next 3 to 5 years to address NTDs.¹³ In addition to new U.S. commitments, the UK announced a commitment of \$80 million over 5 years toward NTD control and elimination. Canada and Japan have also provided some funding for NTD control.¹⁴ The private sector has also made significant investments. The pharmaceutical industry provides deeply discounted and donated drugs (estimated \$1 billion since 2006)⁶ to countries to treat NTDs. The Gates Foundation has provided new resources to the field, including a 2009 grant of \$34 million to the Global Network for NTDs to establish regional strategies and funding mechanisms and leverage new investments to eliminate some NTDs and reduce disease burden by 2020.¹⁵

Looking Forward: Challenges & Opportunities

New attention to NTDs and availability of low-cost and effective interventions to control and even eliminate some NTDs, offer a unique opportunity to significantly reduce disease burden among the world's poor. Still, many challenges remain, including: funding shortages despite recent increases, raising concerns about the ability to sustain and augment successes, particularly in light of the global economic crisis which affects not only donor resources, but exacerbates the underlying conditions of poverty so conducive to NTD spread; ongoing and significant unmet need for interventions among hard hit populations; and outstanding research challenges to identifying interventions for NTDs not yet "tool-ready."

¹ WHO, *Report of the Global Partners Meeting on Neglected Tropical Diseases*, April 2007.

² U.S. Government's NTD Initiative: www.neglecteddiseases.gov.

³ Global Network for NTDs, <http://gnntdc.sabin.org>.

⁴ www.whitehouse.gov/the_press_office/Statement-by-the-President-on-Global-Health-Initiative/; May 5, 2009.

⁵ Hotez P et al. "Control of Neglected Tropical Diseases;" *NEJM*. Vol. 357(10); 2007.

⁶ Stoever K et al. "HIV/AIDS, schistosomiasis, and girls," *The Lancet*, 373(9680); 2009.

⁷ Schistosomiasis Control Initiative. Control of NTDs [webpage]; 2009.

⁸ USAID and RTI International. Control of Neglected Tropical Diseases Project Fact Sheet; 2009.

⁹ OMB. Personal Communication, May 2009.

¹⁰ WHO. Partners for Parasite Control [website]; 2009.

¹¹ United Nations. *The Millennium Development Goals Report 2008*; September 2008.

¹² WHO, "Global Plan to Combat Neglected Tropical Diseases 2008–2015," 2007.

¹³ Global Network. Leading the Fight Against Diseases of Poverty, Annual Review; 2008.

¹⁴ G8 Research Group 2008 Interim Compliance Report, Health: Neglected Tropical Diseases; November 2008.

¹⁵ Global Network. Global Network receives \$34 million Gates Foundation investment to scale up prevention and treatment efforts [press release]; January 30, 2009.