



THE LIVING PROOF PROJECT

U.S. investments in global health are working.

Significant progress towards the elimination and eradication of neglected tropical diseases has been made in the last decade. Development of public-private partnerships, drug donations from major pharmaceutical companies, increased country and international agency commitment, and effective intervention strategies have led to dramatic declines in rates of infection from these debilitating diseases.

Over the last five years, neglected tropical diseases (NTDs)—a group of debilitating infectious diseases that contribute to extreme poverty—have been the focus of increased attention. Countries, supported by a variety of global initiatives, have made remarkable headway in combating NTDs—including diseases such as leprosy, lymphatic filariasis (elephantiasis), onchocerciasis (river blindness), schistosomiasis (snail fever), and trachoma—and guinea worm may be the next disease eradicated from the planet.

Global Progress

The prospects for reducing the enormous burden caused by NTDs have changed dramatically in just the past few years, in part due to the growing recognition of the linkages between the fight against these debilitating diseases and progress towards the United Nations Millennium Development Goals (MDGs).

The remarkable efforts of public-private partnerships under the leadership of the World Health Organization (WHO)—which include the pharmaceutical industry, academic and research institutions, donors, nongovernmental organizations, and local communities—have revolutionized the treatment and control of many diseases. For example, when the Mectizan Donation Program was launched by Merck & Co. Inc. in 1987, collaboration between the public and private sectors in addressing global health challenges was uncommon. The program was initially established to oversee the donation of their drug Mectizan® (also known as ivermectin) “for as long as needed” to treat onchocerciasis, and was expanded to include lymphatic filariasis in 1998. Programs such as this one make it financially possible to provide the annual or biannual drug doses required for treatment of these diseases to the millions of people at risk.

Since then, pharmaceutical companies have donated billions of doses of drugs to programs such as the **African Program for Onchocerciasis Control** and the **Onchocerciasis**

Elimination Program for the Americas (Merck & Co.), **Global Programme to Eliminate Lymphatic Filariasis** (GlaxoSmithKline, Merck & Co.), **International Trachoma Initiative** (Pfizer), **Children Without Worms** (Johnson & Johnson), and the **WHO Program to Eliminate Sleeping Sickness** (Bayer, sanofi-aventis) to provide treatment for those NTDs. For schistosomiasis control, praziquantel has been provided via WHO by Merck KGaA and by MedPharm to the **Schistosomiasis Control Initiative**. Drugs for leprosy control are provided free by Novartis.

This collection of programs and alliances has been successful in bringing together partners to address NTDs, but there are others who also provide support to national programs fighting these diseases.

The **Carter Center** spearheads efforts with the **Centers for Disease Control (CDC)**, **WHO**, and **UNICEF** to eradicate guinea worm disease. This disease has been eliminated in all but six countries, and cases have been reduced by more than 99 percent. The final battle to find and contain the last cases in the hardest-to-reach parts of the world is under way.

Bilateral development agencies also contribute, including the **U.S. Agency for International Development (USAID) Neglected Tropical Disease Control Program**, which was established in 2006 to reduce the burden of NTDs. USAID expanded efforts in 2008, launching the **Neglected Tropical Diseases Initiative** which committed \$350 million (2009–2013) to deliver integrated NTD treatment to 300 million people in Africa, Asia, and Latin America.¹

An improved understanding of the relationship between NTDs and extreme poverty has prompted other new initiatives. In addition to the MDGs, there are many international and regional goals which help spur action to improve health. For example, in 2001, **WHO** adopted a resolution to reduce parasitic worm infections by deworming 75 percent of all at-risk school-age children by 2010—the largest public health program ever attempted. WHO’s Global Plan to Combat

NTDs has as its goal the prevention, control, elimination, or eradication of NTDs, particularly the elimination or eradication of a targeted group of diseases by 2015.²

Promoting even greater awareness and coordination is the **Global Network for Neglected Tropical Diseases**, an alliance of international organizations working to control and eliminate NTDs by 2020, which launched in 2006.

Innovation and Scientific Advances

Development of innovative strategies for the delivery of existing drugs and methods to encourage behavior change have allowed for continued progress in controlling NTDs globally.

Significant efforts have been made to prevent trachoma using the **SAFE Strategy**, which was introduced by WHO in 1996. The strategy uses *surgery* to correct eyelid defects that lead to blindness, *antibiotics* to treat active infections, *face washing*, and *environmental improvement* (by providing clean water and sanitation) to prevent transmission of the bacteria that cause trachoma.⁴

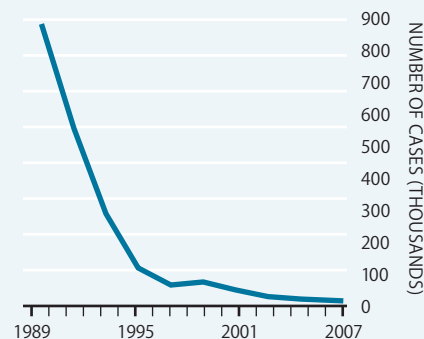
New strategies for distributing drugs to infected populations have increased

access to medications and created the possibility of controlling some diseases to the point of elimination:

- Distribution of drugs to an entire population, known as **mass drug administration (MDA)**, has allowed countries to significantly control onchocerciasis, lymphatic filariasis, schistosomiasis, trachoma, and soil-transmitted worms.⁵ An integrated approach using a combination of four drugs can treat multiple diseases at once.⁶
- **Community-directed treatment** is a sustainable and cost-effective method of MDA, which was developed by African researchers for the distribution of ivermectin to treat onchocerciasis (river blindness). This strategy empowers communities to take responsibility for drug distribution and has delivered hundreds of millions of drug doses, as well as other health interventions, often to populations with little access to health services.⁷
- To assist in implementing interventions, researchers have developed **rapid mapping** techniques which allow for targeting of drug distribution programs and facilitate planning for more integrated approaches. This enhances efficiency and reduces

GUINEA WORM ERADICATION PROGRESS

Declines in total number of cases since 1989



Source: World Health Organization

costs, particularly by identifying where the diseases overlap.

National research programs, WHO and other international agencies, and foundations are supporting research and development for “tool-deficient” diseases, where existing drugs are inappropriate or diagnostic and surveillance tools inadequate. Innovative nonprofit product development partnerships have also emerged to fill the gaps.

WHAT ARE NEGLECTED TROPICAL DISEASES?

More than 1 billion people—one-sixth of the world’s population—suffer from one or more NTDs, which can cause disfigurement, disability, and even death.

NTDs are called *neglected* because they have been largely wiped out in the developed world and persist only in the poorest, most marginalized communities and conflict zones. They thrive in places with unsafe water, poor sanitation, and limited access to basic health care.

The primary listing of NTDs includes 13 parasitic and bacterial tropical infections. Each disease manifests differently but frequently impacts the same populations, hindering economic development, causing chronic disability, and impairing childhood development. As a result, NTDs cause billions of dollars in lost wages, keeping those at risk of infection trapped in a cycle of poverty.

The following diseases are responsible for 90 percent of the global NTD burden.³

- **Lymphatic filariasis** (elephantiasis) is a mosquito-borne parasitic infection. People with the disease can suffer from disfigurement and permanent disabilities where limbs or other parts of the body are grotesquely swollen or enlarged.
- **Onchocerciasis** (river blindness) is a parasitic worm disease spread by the bite of infected black flies that causes blindness and skin lesions.
- **Schistosomiasis** (snail fever) is a parasitic worm disease transmitted by freshwater snails. It causes the highest mortality among the NTDs, but can be treated by drug therapy, which reduces the severity of lesions that result in chronic and life-threatening disease.

- **Soil-transmitted helminth infections:** **Hookworm**, **Ascariasis** (roundworm) and **Trichuriasis** (whipworm) are parasites that are ingested in contaminated food or water, or in the case of hookworm, exposure of the skin (often the feet) to larvae in contaminated soil. Infection can cause anemia and malnutrition, as well as other more serious and/or fatal problems.
- **Trachoma** is a bacterial eye infection, which, if left untreated, leads to irreversible and painful visual impairment and blindness. It is the world’s leading cause of infectious blindness.

The other NTDs which complete the list of 13 are guinea worm disease, leishmaniasis, Chagas disease, human African trypanosomiasis (sleeping sickness), Buruli ulcer, and leprosy.

Results

Programs to treat and control NTDs are some of the most cost-effective in public health, with remarkable rates of return from annual treatments with donated products or other interventions.⁸ As a result of dedicated partnerships and increased global efforts, millions of lives have been saved or improved by preventing disability and disfigurement.

Guinea worm disease is on the verge of being the second disease in human history (after smallpox) to be eradicated. One of the most remarkable global health success stories, it will be eradicated without the use of vaccines or drugs.⁹ In 1986, there were an estimated 3.5 million cases in 20 countries. Since then, **cases have declined by 99.7 percent**. Less than 5,000 cases of guinea worm have been reported in the last year, with cases confined to six African countries.^{10, 11}

The number of new **leprosy** cases per year has also fallen dramatically, and the disease remains a public health problem in only seven of the more than 100 countries where it used to be endemic. Since 1985, 14.5 million people have been cured.

Lymphatic filariasis (elephantiasis) has been successfully controlled or eliminated in China, Costa Rica, Egypt,

South Korea, Solomon Islands, Sri Lanka, Suriname, Thailand, and Trinidad and Tobago.^{12, 13} Since 2000, the Global Program to Eliminate Lymphatic Filariasis has helped to deliver 1.9 billion treatments to individuals living in 48 of the 83 filariasis-endemic countries. In 2007 alone, over 546 million people were treated.

Onchocerciasis (river blindness) has been eliminated in Colombia, and studies at sites in Senegal and Mali have demonstrated that elimination using ivermectin alone is feasible in Africa as well.^{14, 15} A program launched in 1974 that used insecticides to kill infected black flies eliminated the disease as a public health problem in 10 West African countries, benefiting 60 million people. In other regions of Africa, drug treatment is used instead to control blindness and skin disease. Community-directed distribution of ivermectin reached more than 54 million people in 16 countries in 2007. It is estimated that by 2010, the sight of 800,000 people will have been saved.¹⁶

Prevalence and intensity of infection of **schistosomiasis (snail fever)** have been significantly reduced in Uganda, Burkina Faso, Mali, Niger, Tanzania, and Cambodia. Prevalence in Egypt has been reduced from around 20 percent to less than 1 to 2 percent over the

past two decades. China has also made substantial progress, reducing cases from 11 million in 1950 to less than 1 million in early 2000.

Trachoma has been reduced from 149 million cases in 1997 to 60 million cases in 2008 thanks to the implementation of the SAFE strategy; Oman, Morocco, and Mexico have eliminated blinding trachoma using this strategy. Another 15 countries are making strides towards elimination.

Moving Forward

While the prospects for reducing the burden caused by these diseases have changed dramatically, challenges still remain. With a comparatively modest, time-limited financial push, many of these diseases can be controlled or even eliminated.

Integrate control and elimination efforts with other programs

Traditionally, partnerships and programs have been devoted to the control or elimination of a single neglected disease; however, people can be infected with more than one NTD simultaneously. Since the donated drugs are effective against several of these infections, major health gains as well as administrative efficiencies are

COUNTRY SPOTLIGHT: ELIMINATION OF LYMPHATIC FILARIASIS IN EGYPT

Lymphatic filariasis (LF) has been affecting people in Egypt for hundreds of years. The country experienced a resurgence of the disease in the 1970s, when prevalence rose to 40 percent in certain areas.^{21, 22} Since then, Egypt has made substantial progress in dramatically decreasing the prevalence of the parasite which causes the disease, becoming one of the first filariasis-endemic countries in the world to eliminate LF as a public health problem.

Egypt's success stemmed from the novel approach of treating the entire infected population at the onset, rather than the traditional method of gradually scaling up over a number of years.

The large-scale intervention included identifying infections, treating the whole population annually using MDA, and monitoring infection rates.

After identifying the filariasis-endemic areas, teams comprised of physicians, nurses, and other health workers were tasked with informing the population about drug safety, possible adverse reactions, and the importance of eliminating LF. Beginning in 2000, these teams visited every household and administered albendazole and diethylcarbamazine (DEC) tablets to 2.5 million people in 181 Egyptian localities, over a two-week period every year for

five years.²³ Egypt was able to achieve high compliance in MDA primarily due to its effective outreach services and innovative social mobilization methods, which included announcements in mosques, television clips, and comic books for children.

The implementation of this intervention has led to a significant decline in parasite prevalence rates and an absence of transmission. The study intervention demonstrated that five rounds of MDA with high coverage rates may be able to eliminate lymphatic filariasis.²⁴ To confirm that LF has been eliminated, and to detect any early signs of resurgence of



infection, Egypt has been conducting a post-surveillance intervention and expects to announce results in 2010. Egypt's story exemplifies that committed national efforts, public-private international cooperation, and community involvement can lead to elimination of a disfiguring disease.

achieved by coordinating efforts to address several diseases at once. One study estimated that, if programs were combined, drugs could be delivered at a cost savings of 26 to 47 percent.¹⁷

Further benefits could be gained by including NTD control efforts in malaria and HIV/AIDS programs. Investing in NTD control also promotes and improves the efficiency and coverage of immunizations, vitamin A and bed net distribution, and maternal child health programs.^{18, 19}

Invest in research and development for drugs, diagnostics, and surveillance tools

Although there have been advances in drug development, essential medicines to treat many NTDs are too expensive, highly toxic, or becoming less effective.

Investments are needed in many areas, including:

- Diagnostics and treatment for several NTDs, including human African trypanosomiasis (sleeping sickness), visceral leishmaniasis, Chagas disease, and Buruli ulcer need to be improved.
- In some worm diseases, a drug which kills adult worms would pave the way to more rapid elimination and could lead to eradication.
- Tools to quickly and inexpensively identify whether a disease has reentered a population need to be developed for programs in the elimination phase.
- Monitoring drug efficacy is essential because of the potential development of drug resistance—especially given the huge scale of mass-treatment

programs. New antihelminthic (anti-worm) drugs are needed to keep ahead of potential resistance and shorten the duration of interventions.⁶

Increase global financing to control and eliminate NTDs

An estimated \$2–3 billion will be needed over the next five years to control and eliminate NTDs.²⁰ The funding gap for drugs alone is an estimated \$222 million (from 2008 to 2012).³ Additional funds are needed to cover drug delivery costs, social mobilization, training, and monitoring and evaluation. U.S. funding is expected to increase, and the United Kingdom has committed £50 million over the next five years to fight NTDs.¹ Overall, however, the funds committed represent only a fraction of what is needed for global control of the seven major diseases.³

Endnotes

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The Living Proof Project is a multimedia initiative intended to highlight successes of U.S.-funded global health initiatives. Millions of lives have already been transformed and saved with effective, affordable solutions. We have the knowledge, innovative technologies and proven tools to do much more. The content for this progress sheet was developed by the Global Health Group at the University of California, San Francisco and SEEK Development in Berlin. It is also available online at www.livingproofproject.org.