

What Are Neglected Tropical Diseases?



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This Colombian soldier shows sores on his arm and face from the disease leishmaniasis. He caught the disease while on patrol in the jungles of southern Colombia and received treatment at a base near Bogota.

Definitions and descriptions of poverty-causing diseases are compiled from U.S. and international agencies.

These diseases almost exclusively affect impoverished people living in rural areas or poor urban slums of low-income countries. They are caused by parasitic worms, bacteria, and protozoa. They can be fatal, but they primarily cause chronic lifelong disabilities, leading to disfigurement, impaired child development, poor pregnancy outcomes, and impaired worker productivity.

Victims of neglected tropical diseases also encounter serious stigma in their communities, adding social consequences to their health problems. As a result,

neglected tropical diseases affect the health of poor populations, and they mire infected individuals in poverty. On national and regional scales, their effects are so dire that these diseases are considered conditions that promote and perpetuate poverty.

HIV/AIDS, tuberculosis, and malaria are also considered by some to be “neglected.” Large-scale funding is now being invested in these “big three diseases,” however, while no broad initiatives are underway for the 13 major parasitic and bacterial infections comprising the neglected tropical diseases. Vaccine programs are in early research and development for all the neglected tropical diseases cited here.

HELMINTH/INTESTINAL WORM INFECTIONS

Hookworm is an intestinal parasitic worm of humans that usually causes intestinal blood loss leading to iron-deficiency anemia and malnutrition. As a result, heavy infection with hookworm can create serious health and educational problems for preschool and school-aged children, and for women of reproductive age, including pregnant women, and for persons with low iron reserves. An estimated 600 million people are infected. Recent economic estimates indicate that chronic hookworm infection in childhood reduces future wage-earning capacity by 40 percent.

Onchocerciasis is an infection caused by a parasitic worm, which is spread by the bite of an infected blackfly. It is also called river blindness because the transmission is most intense in remote African rural villages, located near streams. Persons with heavy infections will usually have dermatitis, eye lesions, and/or subcutaneous nodules. The global prevalence is approximately 18 million, of whom about 270,000 are blind and another 500,000 have visual impairment.

Schistosomiasis, also known as bilharzia, is a disease caused by parasitic worms found in water contaminated with human waste. *Schistosoma* parasites can penetrate the skin of persons who are wading, swimming, bathing, or washing in contaminated water. The first symptoms are rashes or skin irritations, followed later by fever, chills, cough, and muscle aches. People who are repeatedly infected for many years may experience damage to the liver, intestines, and bladder and kidneys. In Africa, schistosomiasis is a leading cause of chronic renal failure. Approximately 200 million people are infected worldwide, resulting in 280,000 deaths annually.

PROTOZOAN INFECTIONS

Amebiasis is a disease caused by a one-celled parasite that thrives in unsanitary conditions. The symptoms often are quite mild and can include loose stools, stomach pain, and stomach cramping. Amebic dysentery is a severe form of amebiasis associated with stomach pain, bloody stools, and fever. Some patients go on to develop an amebic liver abscess. Amebiasis is among the world's most prevalent parasitic illnesses, affecting an estimated 500 million people.

Chagas' disease is an infection caused by a parasite carried by blood-sucking triatomine bugs, which live in cracks and holes of substandard housing from the southern United States to southern Argentina. Worldwide, it is estimated that 16 to 18 million people are infected with Chagas' disease. Of those infected, 50,000 will die each year. For about one-third of the persons who get Chagas' disease, chronic symptoms and heart failure develop 10 to 20 years after infection. For those who develop chronic symptoms, the average life expectancy decreases by an average of nine years.



In Tegucigalpa, Honduras, a city employee fumigates a house during a campaign to kill mosquitoes carrying dengue fever.

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Leishmaniasis is a parasitic disease spread by the bite of infected sand flies. The disease may come in a cutaneous form, causing skin sores, or in a visceral form affecting the internal organs of the body. Skin sores caused



This banner displayed in Singapore is part of a multimillion dollar government effort to promote preventive measures against the breeding of mosquitoes that spread dengue fever.

by leishmaniasis may take months or years to heal if untreated. Organ damage resulting from the visceral form of the disease can lead to death. This parasite is now endemic in 88 countries on five continents—Africa, Asia, Europe, North America, and South America—with an estimated 12 million people affected worldwide .

BACTERIAL INFECTIONS

Buruli ulcer is a disease caused by infection with *Mycobacterium ulcerans*, which is transmitted to humans through an unknown mechanism. Infection causes formation of large ulcers usually on the legs or arms, leading to extensive destruction of skin and soft tissue. Patients who are not treated early often suffer long-term disfigurement and functional disability, such as restriction of joint movement. Buruli ulcer has been reported in more than 30 countries mainly with tropical and subtropical climates, but limited knowledge of the disease and its occurrence in poor rural communities make global estimates of case numbers difficult.

Chlamydia is the world's most common sexually transmitted disease (STD) and can cause long-term damage to a woman's reproductive organs. Though symptoms of chlamydia are usually mild or absent, serious complications that cause irreversible damage, including infertility, can occur unnoticed before a woman ever recognizes a problem. Chlamydia also can cause discharge from an infected man and pain and itching in urination. Complications among men are rare. Another important form of human chlamydia infection is known as trachoma, which is nonsexually transmitted and results in visual impairment or even blindness. It is the most common infectious cause of blindness in the world. Currently, 8 million people are visually impaired as a result of trachoma, and 84 million suffer from active infection.

Leprosy is a bacterial disease with an incubation period of about five years. Symptoms can take as long as 20 years to appear. It is transmitted through close contact with untreated cases via droplets from the nose and mouth. Leprosy mainly affects the skin and nerves. If untreated,

progressive and permanent damage to the skin, nerves, limbs, and eyes may result. Leprosy is a curable disease, and treatment provided in the early stages averts disability. The global occurrence has dropped dramatically from more than 5 million annual cases in 1985 to fewer than 300,000 in 2004.

Leptospirosis is a bacterial disease that affects both humans and animals. The early stages of the disease may include high fever, severe headache, muscle pain, chills, redness in the eyes, abdominal pain, jaundice, hemorrhages in skin and mucous membranes, vomiting, diarrhea, and a rash. Human infection occurs through direct contact with the urine of infected animals or by contact with a urine-contaminated environment, such as surface water, soil, and plants. Because the symptoms are similar to other diseases, leptospirosis is often not recognized, and a precise number of cases worldwide is not known.

Treponematoses encompass a group of diseases caused by one of several different strains of the spirochete bacterium. The group includes yaws, a disease of the skin, bones, and joints passed from one person to another through bacteria carried by eye gnats or entrance of the bacteria through a cut. Bejel, or endemic syphilis, is a chronic skin and tissue disease caused by a related strain of bacteria, producing lesions on the limbs and trunk and inflammation of the leg bones. Pinta is another condition in this family of diseases, and it also produces skin lesions. The several strains are distinct to different world regions, and they usually can be treated with antibiotics. Together the diseases affect about 25 million people.

VIRAL INFECTIONS

Dengue is a mosquito-borne infection found in tropical and subtropical regions around the world. Dengue fever is a severe, flu-like illness that affects infants, young children, and adults, but seldom causes death. Dengue hemorrhagic fever (DHF) is a potentially lethal complication, characterized by high fever, hemorrhagic phenomena—often with enlargement of the liver—and in severe cases, circulatory failure. WHO currently estimates there may be 50 million cases of dengue infection worldwide every year.

Japanese encephalitis is a disease caused by a virus transmitted to humans through a mosquito bite. Mosquitoes pick up the virus from feeding on domestic pigs and wild birds. Mild infections occur without apparent symptoms other than fever with headache. More severe infection is marked by quick onset, headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, occasional convulsions, and spastic paralysis. Japanese encephalitis is the leading cause of viral encephalitis in Asia with 30,000 to 50,000 cases reported annually. ■

Sources: International Leptospirosis Society; International Trachoma Initiative; U.S. Centers for Disease Control and Prevention; University of California, Berkeley; World Health Organization; the Global Network for Neglected Tropical Disease Control.