

MALARIA

Malaria is a major cause of sickness and death worldwide, resulting in 250 million infections and almost 1 million deaths in 2006. Approximately half of the world's population lives in areas where they are at risk of contracting malaria. Malaria is endemic (where a constant, measurable number of new cases and natural transmission occurs over time) in more than 100 countries around the world. Caused by parasites called *Plasmodium* that are transmitted to humans via mosquito bites, malaria can render an individual extremely ill and, in some cases, may prove to be fatal. Symptoms of infection may include fever, chills, headache, muscle pain, fatigue, nausea and vomiting and usually appear between 10 to 15 days after a person is bitten by an infected mosquito.

Although the disease occurs in many parts of the world, including Asia, Latin America, the Middle East, and parts of Europe, it poses the greatest problem in sub-Saharan Africa, where just over 85% of malarial cases and about 90% of malarial deaths occurred in 2006, mostly in children under five years of age. This region of the world is particularly hard-hit by malaria due to several factors: sub-Saharan Africa is home to a species of mosquito that can transmit the malaria parasite very efficiently; most of the region's cases are caused by the *Plasmodium falciparum* parasite, which causes the most severe and life-threatening form of malaria; poverty and limited health infrastructure make the mounting of effective prevention and treatment efforts difficult; and drug-resistant strains of the parasite have also emerged in the region, acting as another barrier to malaria control.

In sub-Saharan Africa, the situation is also worsened by the presence of other diseases, especially HIV/AIDS. Both HIV/AIDS and malaria affect similar geographic areas and risk groups, causing dual public health crises. Increasing knowledge regarding the interactions between HIV/AIDS and malaria suggests that HIV-positive individuals may be more susceptible to malaria illness because of their weakened immune systems and may be less likely to respond to standard treatments for malaria. There is also evidence to suggest that severe malarial episodes can temporarily lead to an upsurge in HIV viral load, thereby leading to increased morbidity in individuals co-infected with HIV and malaria.

Certain populations are more vulnerable to malaria, particularly pregnant women and children. Women's immune systems are weaker during pregnancy, placing them at increased risk for contracting disease. Malaria during pregnancy is very serious and can lead to severe anemia, malarial infection of the placenta, and, in some cases, maternal death. Children born to women co-infected with malaria and HIV are much more likely to face complications such as having low birth-weight and often die during infancy. Children under five years of age are also at high risk of suffering from malaria-related illness and death because they have not had a chance to build up sufficient immunity to the disease. Approximately 85% of all malarial deaths in 2006 occurred in children under the age of five. According to the World Health Organization (WHO), a child dies of malaria every 30 seconds. Those who recover from the disease may still suffer from serious conditions as a result of the infection, such as anemia, recurrent fever, blindness and brain damage.

Although causing much morbidity and mortality around the world, illness and death from malaria are largely preventable. Control of mosquitoes is the main way in which malaria transmission can be prevented. Regional efforts to eradicate the mosquitoes that carry malaria began in the 1940s, followed with a WHO-led global effort in the 1950s and 1960s. DDT (dichlorodiphenyltrichloroethane) was the main insecticide used during this time. Through these efforts, malaria was successfully eradicated from North America, Europe and parts of Asia. Eventually, outdoor use of DDT for malaria control was discouraged by the WHO because of the insecticide's harmful effects on the environment. Currently, the WHO recommends use of DDT for malaria control through indoor spraying. The WHO also recommends the use of insecticide-treated bed nets. These nets have been shown to significantly reduce death and illness from malaria in endemic regions and are a very important malaria control strategy. Additionally, long-lasting insecticidal nets have been developed which can retain their insecticidal activity of the net for several years without needing to be re-treated.

Medications for prevention and treatment of malaria are also available. A number of anti-malarial drugs exist and are currently in use, including chloroquine, sulfadoxine-pyrimethamine (SP) and amodiaquine. They are known as monotherapies because each medication is generally used alone. Unfortunately, malaria parasites are developing resistance to many of the available monotherapies. This is true in many parts of Asia and South America, and is a growing problem in Africa as well. Due to concerns over drug-resistance, the WHO now recommends that countries make available combination therapies, which combine two or more medications and are harder for parasites to develop resistance. As a result, since 2001, many countries have changed their treatment policy and have endorsed combination treatment in place of monotherapies. However, combination therapy is still not available in many countries where existing drugs are ineffective. The WHO, together with other international organizations is working to support initiatives to expand access to effective combination therapies. In 2004, the WHO revised its malaria treatment recommendation to include artemisinin-based combination therapy (ACT). The compound, found naturally in a Chinese herb, has been used to treat malaria since the 1980s and is currently the most effective measure against the disease. However, early evidence now suggests that drug resistance to ACTs may already be occurring in Asia.

In 1998, the Roll Back Malaria (RBM) Partnership was created by the WHO, United Nations Children's Fund, United Nations Development Programme and the World Bank. The Partnership aims to coordinate international malaria-control activities by bringing together over 500 public and private organizations, international agencies, malaria-endemic countries and research and academic institutions. The goal of the Partnership is to reduce the global burden of malaria by helping malaria-endemic countries to expand and sustain malaria-control interventions overtime. RBM has successfully raised awareness of the disease, mobilized social, political and financial support and coordinated international efforts to combat malaria.

The Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), an independent grant-making organization, which pools funding from countries to provide grants to low- and middle- income countries to combat malaria (as well as HIV and TB), is a significant source of funding for malaria-control interventions. Since its establishment in 2002, the Global Fund has become the largest financier of insecticide-treated bed nets and has committed to delivering and expanding access to hundreds of millions of ACT dosages to help reduce the impact of drug-resistant malaria. To date, more than 70 countries worldwide have received support from the Global Fund to combat malaria.

In 2005, U.S. President George W. Bush announced the creation of a new President's Malaria Initiative (PMI) and pledged to increase funding for malaria prevention and treatment by more than US\$1.2 billion over five years (FY2006-FY2010) and reduce deaths due to malaria by 50% in 15 countries. The reauthorization of PEPFAR, the President's Emergency Plan for AIDS Relief, in 2008 authorized up to \$5 billion for malaria efforts by the U.S. government between FY 2009 and FY 2013. Most recently, President Barack Obama announced a new U.S. Global Health Initiative which includes increased funding for malaria. The private sector, particularly the Bill & Melinda Gates Foundation, a private, philanthropic organization, is also an important source of support. The Gates Foundation has established major global malaria initiatives, supporting the development of safe, effective, and affordable malaria vaccines, malaria control efforts, the search for new malaria treatments, and expanded access to existing malaria control tools and to new drugs and vaccines.

ADDITIONAL RESOURCES

Bill & Melinda Gates Foundation. Malaria, <http://www.gatesfoundation.org/topics/Pages/malaria.aspx>

Global Fund to Fight AIDS, Tuberculosis and Malaria. Fighting Malaria, <http://www.theglobalfund.org/en/malaria/>

Kaiser Family Foundation, U.S. Global Health Policy. *Global Health: Malaria Overview*, <http://globalhealth.kff.org/Diseases/malaria.aspx>

Kaiser Family Foundation, U.S. Global Health Policy. *Global Health: Malaria Overview*, <http://globalhealth.kff.org/Diseases/Malaria/Malaria-FAQs.aspx>

Kaiser Family Foundation. *The Global Malaria Epidemic: Fact Sheet*, <http://www.kff.org/globalhealth/7882.cfm>

Kaiser Family Foundation. *The President's Malaria Initiative: Fact Sheet*, <http://www.kff.org/globalhealth/7922.cfm>

Kaiser Family Foundation. *The U.S. Strategy for Combating Malaria Around the World: Looking Forward* [video], <http://globalhealth.kff.org/Multimedia/2009/June/17/gh061709video.aspx?CFID=1744493&CFTOKEN=88812156&jsessionid=60304406f185d364afe0561f4855f8872a16>

Malaria No More: <http://www.malarianomore.org/>

Malaria Elimination Group: <http://www.malariaeliminationgroup.org/>

PATH: <http://www.path.org/malaria.php>

President's Malaria Initiative (PMI). <http://www.fightingmalaria.gov/>

Roll Back Malaria. Fact Sheet: *Counting Malaria Out* (April 2009), <http://www.rollbackmalaria.org/multimedia/rbminfosheets.html>

Roll Back Malaria. The Global Malaria Action Plan (2008), <http://www.rollbackmalaria.org/gmap/0-5.pdf>

United Nations Children's Fund, Roll Back Malaria, and The Global Fund to Fight AIDS, Tuberculosis and Malaria. *Malaria & Children: Progress in Intervention Coverage (2009)*, <http://www.rollbackmalaria.org/multimedia/partnershippublications.html>

U.S. Centers for Disease Control and Prevention. *The History of Malaria, an Ancient Disease*, <http://www.cdc.gov/malaria/history/index.htm>

U.S. Centers for Disease Control and Prevention. Malaria During Pregnancy, <http://www.cdc.gov/malaria/pregnancy.htm>

World Health Organization. *Fact Sheet on Malaria*, <http://www.who.int/mediacentre/factsheets/fs094/en/index.html>

World Health Organization. *Malaria*, <http://www.who.int/topics/malaria/en/>

World Health Organization. *World Malaria Report 2008*, <http://apps.who.int/malaria/wmr2008/>