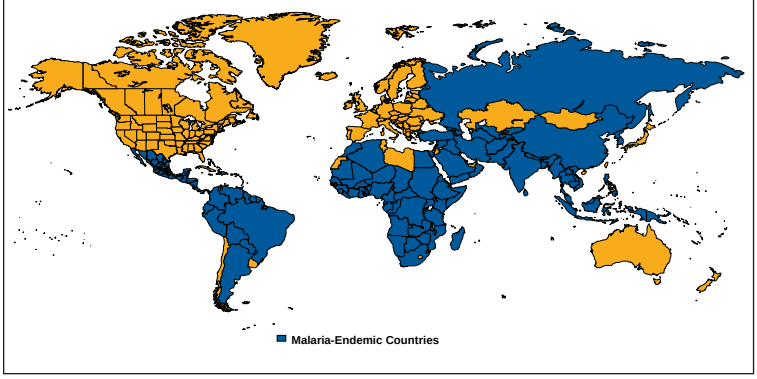
The Global Malaria Epidemic

June 2009

Malaria, caused by parasites transmitted to humans by mosquitoes, is one of the world's most common and serious tropical diseases:[1]

- Half the world's population is at risk for malaria, which is endemic (where a constant, measurable number of new cases and natural transmission occurs over time) in more than 100 countries. Children are at particular risk, accounting for most malaria deaths globally.[2]
- Although preventable and treatable, malaria causes significant morbidity and mortality, particularly in resource-poor regions. Sub-Saharan Africa is the hardest hit region in the world, and parts of Asia and Latin America also face significant malaria epidemics.[3]
- Widespread regional and international efforts to address malaria began in the 1940s and 1950s, and strategies have evolved over time.[3,4] From the early 1950s until 1978, malaria was eliminated in parts of the Americas, Europe, and Asia.[3,4] But such efforts did not reach or were unsuccessful in many of the hardest hit areas, particularly sub-Saharan Africa.[3,4] More recent attention to these regions by the United States, other donor governments, multilateral institutions, and affected countries, has helped to increase access to prevention and treatment and reduce cases and deaths.[2,5,6]
- Still, while access to interventions has increased, gaps remain and many challenges continue to complicate malaria-control efforts in hard hit areas, including poverty, poor sanitation, weak health systems, limited disease surveillance capabilities, drug and insecticide resistance, natural disasters, armed conflict, migration, and climate change.[2,3,4,5,7,8]

Figure 1: Malaria-Endemic Countries, 2006[2]



Current Global Snapshot

The *Anopheles* mosquito, which transmits malaria parasites to humans, thrives in warm, tropical, and subtropical climates.[3] While anyone living in or visiting an endemic country may be at risk, certain groups, particularly children and pregnant women, are more vulnerable. The World Health Organization (WHO) estimates that in 2006:[2,5]

- There were **109** malaria-endemic countries and approximately **3.3 billion** people at risk for infection, worldwide.
- There were **247 million** cases of malaria and **881,000** deaths, mostly among children, under the age of five.
- Malaria is a leading cause of death for children, who represent 85% of all malaria deaths.[2] Children are at risk because they lack developed immune systems to protect against the disease.[5]
- About 50 million women living in endemic regions become pregnant each year.[5] They are at risk because pregnancy reduces immunity to malaria, increasing the risk of infection, severe illness, and death; adverse outcomes include low birth weight and spontaneous abortions.[5,9]
- Other high-risk groups include travelers, refugees, displaced persons, and migrant workers entering endemic areas.[5]
- Scale-up of malaria control programs has helped to greatly reduce malaria cases and deaths.[6] Since 2000, 7 African countries have experienced at least a 50% reduction in malaria cases and deaths; 22 countries outside of Africa have experienced at least a 50% reduction in malaria cases.[2]
- 92 formerly endemic countries or territories are now considered malaria-free by WHO.[5]

Figure 2: Malaria Risk, Incidence and Deaths by Region, 2006[2,10]

WHO Region (# of Endemic Countries)	Estimated No. (%) of People at Risk for Malaria, 2006	Estimated No. (%) of Malaria Cases, 2006	Estimated No. (%) of Deaths, 2006
Global Total (109)	**3.3 billion (100%)**	**247 million (100%)**	**881,000 (100%)**
Africa (44)	647 million (20%)	212 million (86%)	801,000 (91%)
South-East Asia (10)	1.3 billion (39%)	21 million (9%)	36,000 (4%)
E. Mediterranean (13)	295 million (9%)	8.1 million (3%)	38,000 (4%)
Americas (22)	137 million (4%)	2.7 million (1%)	3,000 (<1%)
Western Pacific (10)	888 million (27%)	2.2 million (<1%)	4,000 (<1%)
Europe (9)	22 million (<1%)	4,000 (<1%)	0 (0%)

- **Africa.**[2,5] With 44 malaria-endemic countries, Africa accounts for the majority of malaria cases (86%) and deaths (91%), but only 11-12% of the world's population. Recent data, however, indicate that effective programs have helped reduce cases and deaths by at least 50% in 7 countries, including Eritrea, Rwanda, and Tanzania.
- **South-East Asia.**[2,5,11] There are 10 malaria-endemic countries in South-East Asia which accounts for 9%, or 21 million, of estimated cases worldwide, the second highest number after Africa. India, Bangladesh, Indonesia, and Myanmar comprise most of the region's cases and deaths. Shifts in weather patterns within the region contribute to malaria outbreaks each year. Sri Lanka, Thailand, and India have made notable achievements in malaria control.
- **Eastern Mediterranean.**[2,5] There are 13 malaria-endemic countries in the Eastern Mediterranean, including Egypt, Iraq, Morocco, Oman, Saudi Arabia, and the Syrian Arab Republic. The region is home to the endemic country most recently declared malaria-free—the United Arab Emirates.
- **Americas.**[2,4,5,12] There are 22 malaria-endemic countries in the region, which includes the Caribbean and North, Central, and South America. Within the region, Brazil accounts for half of all cases. Although malaria was eliminated in parts of the region between 1950 and 1970,

THE HENRY J. KAISER FAMILY FOUNDATION

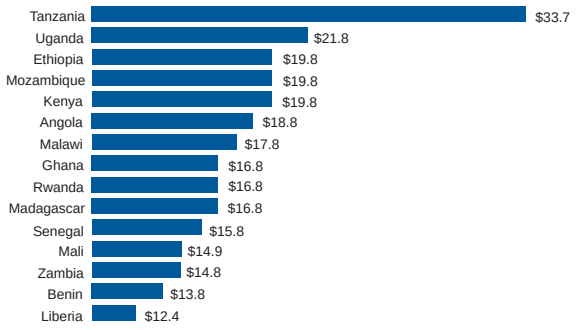
The Henry J. Kaiser Family Foundation
Headquarters: 2400 Sand Hill Road Menlo Park, CA 94025 650.854.9400 Fax: 650.854.4800
Washington Offices and Barbara Jordan Conference Center: 1330 G Street, NW Washington, DC 20005 202.347.5270 Fax: 202.347.5274 **www.kff.org**

The Kaiser Family Foundation is a non-profit private operating foundation, based in Menlo Park, California, dedicated to producing and communicating the best possible information, research and analysis on health issues.

progress has not been uniform. While the region as a whole has had a 32% and 39% decrease in reported malaria cases and deaths, respectively, since 2000, some countries, including Venezuela and Haiti, have experienced increases. Seasonal shifts in weather patterns contribute to malaria transmission in parts of the region.

- **Western Pacific.**[2,5] Representing less than 1% of global cases, there are 10 malaria-endemic countries in the region. Seasonal shifts in weather patterns, common to the region, cause regular malaria outbreaks and are of particular concern in highly populated countries, like Viet Nam and the Philippines.
- **Europe.**[2,5] There are 9 malaria-endemic countries in Europe, which accounts for <1% of cases worldwide and had no malaria deaths in 2006. Together, Tajikistan and Turkey made up 82% of the region's cases in 2006.

Figure 3: U.S. President's Malaria Initiative (PMI) Focus Country Funding, FY 2008 (in millions)[17]



Total PMI Focus Country Funding, FY 2008=$274 million

Prevention and Treatment

Malaria control efforts involve a combination of prevention and treatment strategies and tools. While access to both prevention and treatment services has grown over time, gaps remain.[2,5,6]

Prevention efforts include mosquito-control activities and antimalarial drugs to prevent infection (a malaria vaccine is not yet available, although clinical trials are underway[13]):

- Insecticide-treated bed nets (ITN). ITN production increased from 30 million in 2004 to 95 million in 2007.[5] However, access remains limited—the number of ITNs produced in 2006 was sufficient to protect just 26% of the population at risk in Africa.[2]
- Indoor residual spraying (IRS). IRS is commonly used in India and Europe, but less so in Africa and the Western Pacific.[2] In 2006, more than 100 million homes received IRS, including 70 million in India and 22 million across Africa.[2] Resistance to insecticides has emerged as a problem in Latin America, South-East Asia, and the Western Pacific.[5]
- Intermittent Preventive Treatment in Pregnancy (IPTp). IPTp coverage for pregnant women is still limited.[2,5] In Africa, just 18% of pregnant women received IPTp in 2006.[2]

Treatment for malaria includes chloroquine, primaquine, and highly effective artemisinin-based combination therapy (ACT). ACT is recommended for areas with drug resistance or more deadly malaria strains.[2,5]

- Antimalarial drug distribution rose from 6 million in 2005 to 49 million in 2006.[2,5] Still, just 3% of children in Africa received ACT in 2006 and access to other types of antimalarial treatment is also limited.[2]
- Multidrug-resistant malaria is now prevalent in Africa, South America, Western Pacific, and South-East Asia.[14] While ACTs have been introduced to treat resistant strains, early evidence suggests ACT resistance may be occurring in parts of Asia.[2,15]

The U.S. Government Response

- The U.S. government's international response to malaria began in the 1950s through activities at the U.S. Centers for Disease Control and Prevention (CDC) and what is now the U.S. Agency for International Development (USAID). Early efforts focused on technical assistance but also included some direct financial support. Over time, U.S. efforts expanded and the 2003 passage of the President's Emergency Plan for AIDS Relief (PEPFAR)[16] explicitly included malaria in its mandate, authorizing bilateral funding for malaria (although no specific amounts were specified) and multilateral support to the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), an independent, international financing institution which in turn provides grants to countries to address malaria (as well as HIV and TB).
- U.S. attention to malaria was elevated in 2005 with the launching of the President's Malaria Initiative (PMI),[17] a five-year, $1.2 billion effort targeting 15 focus countries in Africa, with a goal of reducing malaria-related deaths in these countries by 50%. In addition to the 15 PMI focus countries, USAID and CDC also conduct malaria control efforts in 5 other African countries, in India, and in two regions (one in South America and one in South-East Asia).[18,19]
- The 2008 reauthorization of PEPFAR[20] included specific authorization levels for malaria ($5 billion over 5 years) and created a PMI Coordinator at USAID, with oversight over all U.S. government malaria programs. U.S. bilateral funding commitments for malaria totaled $2.1 billion between FY 2004 and 2009, and were approximately $561 million in FY 2009.[21] Most funding is provided to PMI focus countries. U.S. bilateral support also includes significant amounts for malaria research.[21,22]

The Global Response

- While regional malaria elimination campaigns first started in the 1940s, it was not until 1955 that the WHO announced a Global Malaria Eradication Program. By the 1970s, the goal of eradication had given way to one of control, although discussion of eradication has once again emerged.[4] Still, global efforts to combat malaria intensified only in the last decade. In 1998, the WHO established the Roll Back Malaria Program; in 2000, all nations agreed to international malaria targets as part of the United Nations (UN) Millennium Development Goals; and in 2001, the newly created Global Fund included malaria as one of its three target diseases (to date, it has disbursed nearly $2 billion to more than 70 countries for malaria-related initiatives[23]). In addition to PEPFAR and the PMI by the U.S., other significant international efforts include the World Bank's Booster Program for Malaria Control in Africa, which has committed $470 million,[24] and private sector support, particularly from the Bill & Melinda Gates Foundation, which has committed $1.4 billion to malaria to date and additional funding to the Global Fund.[25]
- As a result of increased efforts, global funding for malaria rose from $51 million in 2003 to $1.5 billion in 2007 and donors recently pledged over $3 billion with the intent to reduce malaria deaths to zero by 2015.[5,26] Still, future need is projected to be $5.3 billion in 2009 and $6.2 billion in 2010, leaving a significant gap.[5]

---

[1] For more information on malaria, see: http://globalhealth.kff.org/.
[2] WHO, *World Malaria Report 2008;* September 2008.
[3] CDC, *Malaria:* www.cdc.gov/malaria/.
[4] Tanner M et al. "Malaria Eradication Back on the Table?" *Bulletin of WHO*. Vol. 86, No. 2; 2008.
[5] Roll Back Malaria, *The Global Malaria Action Plan;* 2008.
[6] United Nations, *The Millennium Development Goals Report 2008;* September 2008.
[7] Senior K. "Climate Change and Infectious Disease: A Dangerous Liaison?" *The Lancet*. Vol. 8, No. 2; 2008.
[8] Githeko AK et al. "Climate Change and Vector-Borne Disease: A Regional Analysis." *Bulletin of WHO*. Vol. 78, No. 9; 2000.
[9] WHO, *Malaria in Pregnancy:* www.who.int/malaria/malariainpregnancy.html.
[10] WHO regions: www.who.int/whr/2004/annex/topic/en/annex_member_en.pdf. Mayotte is one of the 109 malaria-endemic countries but is not included in the *List of Member States*.
[11] Narain JP. "Malaria in South-East Asia Region: Myth and Reality." *IJMR*. Vol. 128; 2008.
[12] PAHO. Malaria Day in the *Americas: Status Report;* November 6, 2008 Forum.
[13] Collins WE et al. "A Hopeful Beginning for Malaria Vaccines." *NEJM*. Vol. 359, No. 24; 2008.
[14] WHO, *Drug Resistance in Malaria;* 2001.
[15] WHO, *Global Malaria Control and Elimination: Report of a Meeting on Containment of Artemisinin Tolerance;* 2008.
[16] U.S. Congress. Public Law No: 108-25; May 27, 2003.
[17] See: www.fightingmalaria.gov and USAID, *The President's Malaria Initiative: Working to Save Lives in Africa, Third Annual Report;* March 2009.
[18] CDC, *CDC Activities:* http://www.cdc.gov/malaria/cdcactivities/intl_activities.htm.
[19] USAID, *Malaria Countries:* http://www.usaid.gov/our_work/global_health/id/malaria/countries/index.html.
[20] U.S. Congress. Public Law No: 110-293; July 30, 2008.
[21] White House, Office of Management and Budget and KFF analysis of data provided by OMB, May 2009.
[22] Families USA Foundation, *The World Can't Wait: More Funding Needed for Research on Neglected Infectious Diseases;* December 2008.
[23] The Global Fund: http://www.theglobalfund.org/programs/search/?lang=en.
[24] The World Bank: http://go.worldbank.org/6WZ5JH2CM0.
[25] Personal communication, Bill & Melinda Gates Foundation, February 2009.
[26] RBM, *2008 MDG Malaria Summit:* www.rollbackmalaria.org/gmap/mediacoverage.html.

This publication (#7882) is available on the Kaiser Family Foundation's website at www.kff.org.