



The Global Malaria Epidemic

March 2011

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

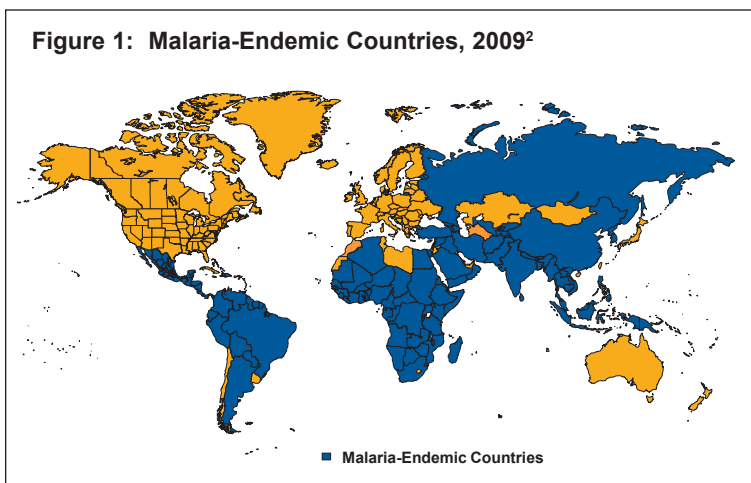
- Half the world's population is at risk for malaria, which is endemic (where a constant, measurable number of new cases and natural transmission occurs over time) in more than 100 countries.<sup>2</sup> Children are at particular risk, accounting for most malaria deaths globally.<sup>2</sup>
- Although 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.<sup>3</sup>
- Widespread regional and international efforts to address malaria began in the 1940s and 1950s, and strategies have evolved over time.<sup>3,4</sup> From the early 1950s until 1978, malaria was eliminated in parts of the Americas, Europe, and Asia.<sup>3,4</sup> But such efforts did not reach or were unsuccessful in many of the hardest hit areas, particularly sub-Saharan Africa.<sup>3,4</sup> 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.<sup>2,5,6</sup>
- 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.<sup>2,3,4,5,7</sup>

- Malaria is a leading cause of death for children, who represent 85% of all malaria deaths.<sup>2</sup> Children are at risk because they lack developed immune systems to protect against the disease.<sup>5</sup>
- About 50 million women living in endemic regions become pregnant each year.<sup>5</sup> 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.<sup>5,8</sup>
- Other high-risk groups include travelers, refugees, displaced persons, and migrant workers entering endemic areas.<sup>5</sup>
- Scale-up of malaria control programs has helped to greatly reduce malaria cases and deaths.<sup>2,6</sup> Since 2000, 11 African countries have experienced at least a 50% reduction in reported malaria cases and deaths; 31 countries outside of Africa have experienced at least a 50% reduction in reported malaria cases.<sup>2</sup>

Figure 2: Estimated Malaria Incidence and Deaths by Region, 2009<sup>2,9,10</sup>

WHO Region (# of Endemic Countries)	Estimated No. (%) of Malaria Cases, 2009	Estimated No. (%) of Deaths, 2009
<b>Global Total (106)</b>	<b>225 million (100%)</b>	<b>781,000 (100%)</b>
Africa (43)	176 million (78%)	709,000 (91%)
South-East Asia (10)	34 million (15%)	49,000 (6%)
Eastern Mediterranean (12)	12 million (5%)	16,000 (2%)
Western Pacific (10)	2 million (1%)	5,300 (1%)
Americas (23)	1 million (<1%)	1,300 (<1%)
Europe (8)	1 million (<1%)	0 (0%)

Figure 1: Malaria-Endemic Countries, 2009<sup>2</sup>



Current Global Snapshot

The *Anopheles* mosquito, which transmits malaria parasites to humans, thrives in warm, tropical, and subtropical climates.<sup>3</sup> 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 2009:<sup>2,3</sup>

- There were **106** malaria-endemic countries and approximately **half** the world's population is at risk for infection, worldwide.
- There were **225 million** cases of malaria and **781,000** deaths, mostly among children, under the age of five.

- **Africa.**<sup>2,10</sup> With 43 malaria-endemic countries, Africa accounts for the majority of estimated malaria cases (78%) and deaths (91%), but only 12–13% of the world's population.<sup>11</sup> Recent data, however, indicate that effective programs have helped reduce reported cases and deaths by at least 50% in 11 countries (including heavily burdened countries such as Eritrea, Madagascar, Rwanda, Sao Tome and Principe, and Zambia) and a portion of Tanzania (Zanzibar).
- **South-East Asia.**<sup>2,10</sup> There are 10 malaria-endemic countries in South-East Asia which accounts for 15% (34 million) of estimated cases worldwide, the second highest number after Africa. India, Indonesia, and Myanmar comprise most of the region's reported cases (94%). Bhutan, Democratic Republic of Korea, Nepal, Sri Lanka, and Thailand have made notable achievements in programmatic activities targeting malaria which have led to at least a 50% reduction in reported cases since 2000.
- **Eastern Mediterranean.**<sup>2,10</sup> There are 12 malaria-endemic countries in the Eastern Mediterranean. Together, Afghanistan, Pakistan, Sudan, and Yemen made up 98% of the region's reported cases in 2009.
- **Western Pacific.**<sup>2,10</sup> Representing 1% of estimated global cases, there are 10 malaria-endemic countries in the region. Cambodia, Papua New Guinea, and Solomon Islands represented 71% of the region's reported cases in 2009.
- **Americas.**<sup>2,10</sup> There are 23 malaria-endemic countries in the region, which includes the Caribbean and North, Central, and South America.

Brazil, Columbia, Haiti, and Peru account for 90% of the region's reported cases.

- **Europe.**<sup>2,10</sup> While there are 8 malaria-endemic countries in Europe, in 2009, the region accounted for less than 1% of the estimated cases and deaths worldwide.

### 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.<sup>2,5,6</sup>

**Prevention** efforts include mosquito-control activities and antimalarial drugs to prevent infection, comprised of:

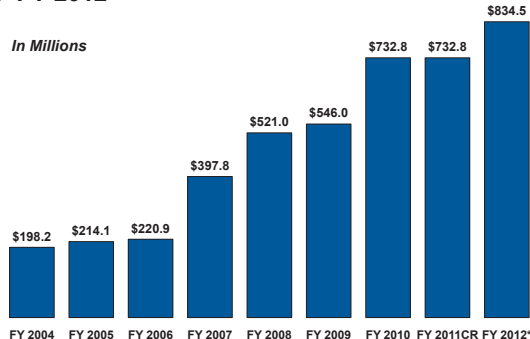
- Insecticide-treated bed nets (ITN). The Alliance for Malaria Prevention reports that the number of ITNs delivered to sub-Saharan Africa increased from 5.4 million in 2004 to 88.5 million in 2009.<sup>2</sup> However, while ITN ownership and use is growing, access remains limited—42% of African households owned at least one ITN and 35% of children used an ITN in 2010.<sup>2</sup>
- Indoor residual spraying (IRS). IRS is commonly used in the Americas, South-East Asia, and Europe, and to a lesser extent in Africa, the Eastern Mediterranean, and the Western Pacific.<sup>2</sup> In 2009, 63 countries were implementing IRS, and the number of people in Africa protected by IRS increased from less than 13 million in 2005 to 75 million in 2009.<sup>2</sup> Resistance to insecticides has emerged as a problem in Latin America, South-East Asia, and the Western Pacific.<sup>5</sup>
- Intermittent Preventive Treatment in Pregnancy (IPTp). IPTp coverage for pregnant women is still limited.<sup>2,5</sup> In Africa, data suggest that 55% of women attending antenatal clinics received the second dose IPTp in 2009.<sup>2</sup>
- A malaria vaccine is not yet available, although clinical trials are underway.<sup>12</sup>

**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.<sup>2,5,13</sup>

- National malaria programs report that ACT distribution increased from 2 million in 2004 to 73 million in 2008.<sup>14</sup> Still, less than 15% of children in Africa received ACT in 2008 and access to other types of antimalarial treatment is also limited.<sup>13,14</sup>
- Multidrug-resistant malaria is now prevalent in Africa, South America, the Western Pacific, and South-East Asia.<sup>15</sup> While ACTs have been introduced to treat resistant strains, early evidence suggests ACT resistance is occurring in parts of Asia.<sup>2,16</sup>

**Figure 3: Total U.S. Bilateral Funding for Malaria, FY 2004–FY 2012\*<sup>23</sup>**

In Millions



\* FY 2012 figure is President's budget request only.

### 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)<sup>17</sup> 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),<sup>18</sup> a five-year, \$1.2 billion effort originally targeting 15 focus countries in Africa (two more countries were added in 2010), with a goal of reducing malaria-related deaths in these countries by 50%. In addition to the 17 PMI focus countries, USAID and CDC also conduct malaria control efforts in three other African countries, India, and two regions (one in South America and one in Asia).<sup>19,20</sup>
- In 2009, the Obama Administration launched the Global Health Initiative (GHI), a new six-year (FY 2009 – 2014) effort to develop a comprehensive U.S. government strategy for global health. The GHI integrates the PMI into a larger global health portfolio and includes specific targets for malaria.<sup>21</sup> The 2010 release of a six-year U.S. strategy for combating malaria globally "proposes an expanded approach to USG-supported malaria control efforts" as part of the GHI and is directed at reaching these targets.<sup>22</sup>
- U.S. bilateral funding commitments for malaria, which include PMI and other malaria efforts, totaled \$2.8 billion between FY 2004 and 2010, and is approximately \$733 million in FY 2011 (FY 2011 is currently funded at FY 2010 enacted amounts under a Continuing Resolution (CR)).<sup>23</sup> Most funding is provided to PMI focus countries. The Administration's FY 2012 budget request seeks \$835 million for malaria, a 14% increase over the FY 2011 level (see Figure 3).<sup>23</sup> U.S. bilateral support also includes significant amounts for malaria research.<sup>24</sup>

### 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.<sup>4</sup> 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 committed over \$5 billion to more than 70 countries for malaria-related initiatives).<sup>25</sup>
- Other significant international efforts include the World Bank's Booster Program for Malaria Control in Africa, which has committed more than \$1 billion,<sup>26</sup> and private sector support, particularly from the Bill & Melinda Gates Foundation, which has committed over \$1.9 billion to malaria to date and additional funding to the Global Fund.<sup>27</sup>
- As a result of increased efforts, global commitments for malaria rose from \$200 million in 2004 to \$1.8 billion in 2010, and in 2008, through the Global Malaria Action Plan, donors pledged over \$3 billion with the intent to reduce malaria deaths to zero by 2015.<sup>2,28</sup> Increases in funding have led to dramatic scale-up of malaria control efforts. Still, annual need is projected at \$5 billion, leaving a significant gap.<sup>2</sup>

<sup>1</sup> For more information on malaria, see: <http://globalhealth.kff.org/>.

<sup>2</sup> WHO, *World Malaria Report 2010*; December 2010.

<sup>3</sup> CDC, *Malaria*: [www.cdc.gov/malaria/](http://www.cdc.gov/malaria/).

<sup>4</sup> Tanner M et al. "Malaria Eradication Back on the Table?" *Bulletin of WHO*. Vol. 86, No. 2; 2008.

<sup>5</sup> Roll Back Malaria, *The Global Malaria Action Plan*; 2008.

<sup>6</sup> United Nations, *The Millennium Development Goals Report 2010*; 2010.

<sup>7</sup> Senior K. "Climate Change and Infectious Disease: A Dangerous Liaison?" *The Lancet*. Vol. 8, No. 2; 2008.

<sup>8</sup> WHO, *Malaria in Pregnancy*: [http://www.who.int/malaria/high\\_risk\\_groups/pregnancy/en/index.html](http://www.who.int/malaria/high_risk_groups/pregnancy/en/index.html).

<sup>9</sup> WHO regions: [www.who.int/whr/2004/annex/topic/en/annex\\_member\\_en.pdf](http://www.who.int/whr/2004/annex/topic/en/annex_member_en.pdf).

<sup>10</sup> Estimated data are available for global and regional totals. Country level data includes reported cases.

<sup>11</sup> PRB, 2009 World Population Data Sheet; 2009.

<sup>12</sup> PATH, *Phase 3 Malaria Vaccine Trial Begins—Final Testing of RTS,S*; May 27, 2009.

<sup>13</sup> WHO, *Guidelines for the treatment of malaria, second edition*; 2010.

<sup>14</sup> WHO, *World Malaria Report 2009*; December 2009.

<sup>15</sup> WHO, *Drug Resistance in Malaria*; 2001.

<sup>16</sup> WHO, *Global Malaria Control and Elimination: Report of a Meeting on Containment of Artemisinin Tolerance*; 2008.

<sup>17</sup> U.S. Congress, Public Law No. 108-25; May 27, 2003.

<sup>18</sup> PMI, *Malaria Operational Plans for Fiscal Year 2011*: <http://www.fightingmalaria.gov/countries/mops/fy11/index.html>. For more information on the PMI, see KFF's "The President's Malaria Initiative" Fact Sheet: <http://www.kff.org/globalhealth/7922.cfm>.

<sup>19</sup> CDC, *CDC's Global Malaria Activities*: [http://www.cdc.gov/malaria/malaria\\_worldwide/cdc\\_activities/index.html](http://www.cdc.gov/malaria/malaria_worldwide/cdc_activities/index.html).

<sup>20</sup> Kaiser Family Foundation analysis of data from the State Department, Foreign Assistance Dashboard [website], available at: [www.foreignassistance.gov](http://www.foreignassistance.gov).

<sup>21</sup> GHI, *Implementation of the Global Health Initiative: Consultation Document*; February 2010: <http://www.pepfar.gov/ghi/index.htm>.

<sup>22</sup> USAID, *Lantos-Hyde United States Government Malaria Strategy*; April 2010.

<sup>23</sup> KFF Analysis, of data from: FY 2012 Budget of the United States; Federal Agency Budget and Congressional Justification documents; ForeignAssistance.gov; Office of Management and Budget, personal communication.

<sup>24</sup> Families USA Foundation, *The World Can't Wait: More Funding Needed for Research on Neglected Infectious Diseases*; December 2008. See also: Moran M et al. "Neglected Disease Research and Development: How Much Are We Really Spending?" *The George Institute for International Health*; February 2009.

<sup>25</sup> The Global Fund: <http://www.theglobalfund.org/programs/search/?lang=en>.

<sup>26</sup> The World Bank: <http://go.worldbank.org/87UGJUEGPL0>.

<sup>27</sup> Bill & Melinda Gates Foundation: <http://www.gatesfoundation.org/grants/Pages/search.aspx>.

<sup>28</sup> RBM, *2008 MDG Malaria Summit*: [www.rollbackmalaria.org/gmap/mediacoverage.html](http://www.rollbackmalaria.org/gmap/mediacoverage.html).