



A Global Health Initiative **FACT-SHEET**

April 2007

Investing in Global Health Research: Malaria

Malaria is the number-one killer of children under age five in Africa, accounting for one in five of all childhood deaths. It is also a major cause of death in Asia and Latin America.¹ Worldwide, there are more than 300 million cases of malaria each year, resulting in 1 million deaths.²

The global malaria problem is not going away. More than half of the world's population is at risk of contracting malaria, and this number is increasing each year for a host of reasons: malaria parasites are becoming resistant to common treatments; the mosquitoes that carry the disease are building up resistance to insecticides; habitats for malarial mosquitoes are expanding due to climate change; travel has increased the number of people exposed to malaria; and conflict and natural disasters have driven people from their homes, exposing them to mosquitoes and infection.

How Does Malaria Affect the U.S.?

- **Cases of Malaria Occur among Americans**

Malaria was once a significant health threat in the United States. During the Civil War, in the Union Army alone, there were 1.3 million cases of malaria, which resulted in 10,000 deaths.³ In 1946, an agency of seven medical officers was set up to control the spread of malaria in the United States. This agency grew into what are now the Centers for Disease Control and Prevention (CDC). The CDC's first mission, to declare the U.S. free of malaria, was accomplished in 1949.

Although today most of the U.S. is malaria-free, the disease is still a concern for U.S. health officials because of infections that are contracted during international travel. Every year, 1,300 cases of malaria are reported in the U.S. Most of these infections occur in Americans who have traveled to malaria-endemic regions.⁴ Malaria is also the most significant infectious disease threat to U.S. troops worldwide. It has caused large numbers of casualties in U.S. forces operating in malaria-prone regions of Africa, Iraq, Afghanistan, and Korea. For example, in a recent deployment of 225 troops to Liberia, 80 cases of malaria were reported.⁵

"In every U.S. military campaign this century, we lost more casualties to malaria than bullets."

- Dr. (Capt.) Stephen L. Hoffman, Naval Medical Research Institute, 1996

Although malaria is not endemic in the U.S., the threat of malaria remains very real because of increasing tourism and changes in migration patterns.⁶ International tourism is expected to increase over the next 15 years, and American troops continue to be deployed to malaria-prone regions of the world.

- **Malaria Is Spreading**

Areas where malaria is not endemic today are not guaranteed to remain malaria-free. Sporadic malaria outbreaks in the U.S. have led the CDC to caution local health departments that the risk of malaria is very real because malaria-spreading mosquitoes are present in this country, particularly in the South.

Needless to say, mosquitoes don't need to go through border controls. Diseases that are spread by mosquitoes and other insects (vector-borne diseases) move in ways that can be very difficult to control. West Nile virus, which is spread by mosquitoes and infected migratory birds, was first isolated in Uganda in 1937. The virus was not found in the Western Hemisphere until 1999, when it appeared in New York City, and it is now present in mosquitoes and birds in every state in the continental U.S.⁷

Recent research has shown that climate change aggravates vector-borne diseases, putting millions more people at risk for diseases such as malaria and West Nile virus. The mosquitoes that carry malaria require a warm environment in order to survive and multiply, and thus, cooler temperatures have kept malaria epidemics at bay in some parts of the world. As the climate warms, malaria and other insect-borne diseases are being introduced to new regions of the world (see map). Insect-borne infections are spreading in Canada, Mexico, Colombia, and mountainous regions of east and central Africa.^{8,9}

The spread of malaria is affecting countries worldwide. Europe, which was once considered free of malaria, is seeing new outbreaks of the disease. The number of imported malaria cases in the European Union has increased 10-fold in the last 30 years.¹⁰ The disease is also spreading across Asia: Today, Southeast Asia has the highest incidence of drug-resistant malaria.¹¹

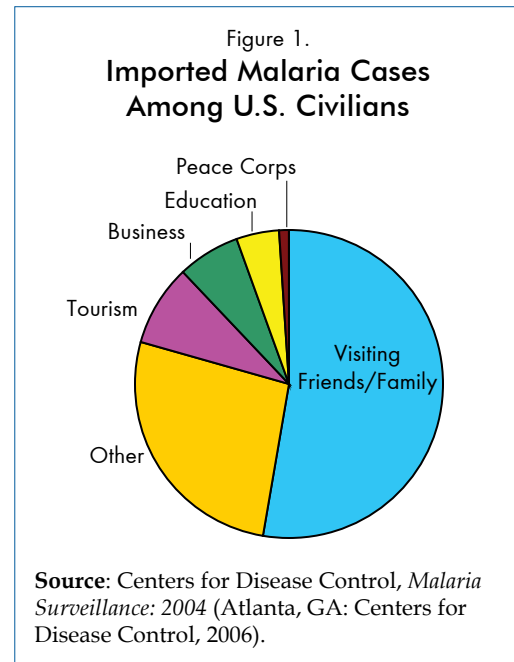
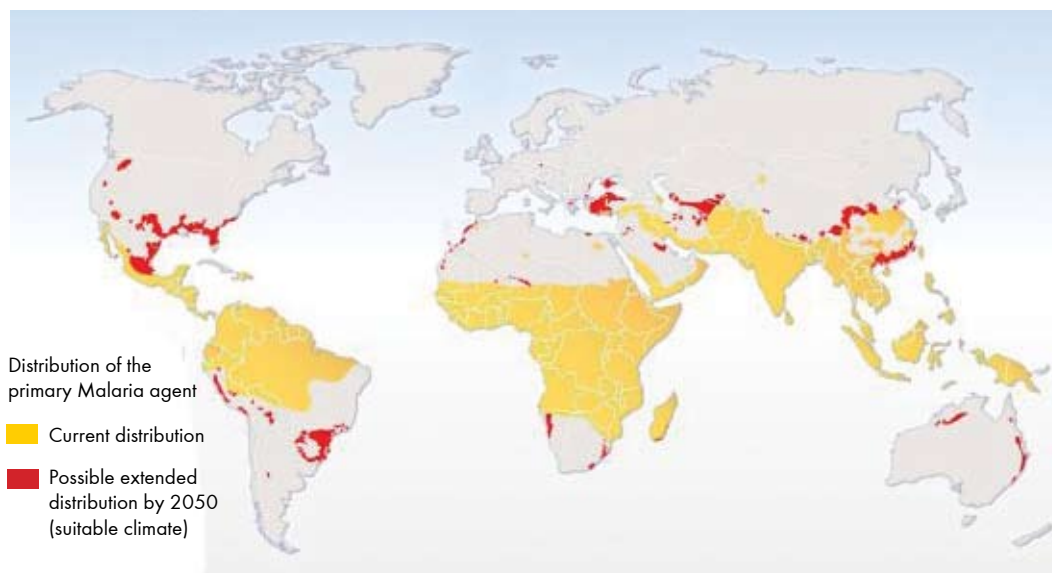


Figure 2. Climate Change and Malaria: Scenario for 2050



Source: David J. Rogers and Sarah E. Randolph, "The Global Spread of Malaria in a Future, Warmer World," *Science* 289, no. 5485 (September 2000): 1763 - 1766.

Malaria, Poverty, and Economic Growth

Malaria Causes Poverty at Both the Household and National Levels

- Malaria is found in 107 countries around the world, putting 3.2 billion people at risk for infection.¹²
- About 75 percent of malaria deaths occur among children. Malaria is also responsible for low birth weight and reduced cognitive development.¹³
- Without malaria, the gross domestic product (GDP) of some African countries would be about 30 percent greater than it is today. Malaria reduces the overall GDP of Africa by \$12 billion a year.¹⁴ The disease not only affects the workforce, but it also deters investments and holds back tourism because travelers and multinational firms avoid malaria-prone regions.
- Malaria accounts for 10 percent of Africa's disease burden and as much as 40 percent of public health expenditures in cities where it is endemic.¹⁵
- Poor families in Africa can spend up to 25 percent of their household income on malaria prevention and treatment.¹⁶

- **The Business Case for Malaria Investment**

It makes economic sense for the U.S. to invest in reducing the world's burden of malaria. The U.S. has economic and strategic interests in the progress and stability of developing countries because, in an increasingly interconnected world, an economic drain on one country has a global impact. Malaria has been a particular drain on African countries. The U.S. has a long-term interest in development and stability in Africa – an interest that has been accentuated by growing reliance on the continent's oil reserves. By 2015, it is projected that 25 percent of North American oil imports will come from Africa, compared to about 15 percent today.¹⁷

Studies have confirmed that in countries where malaria is significantly widespread, economic growth can be stunted by as much as 30 percent over 30 years.¹⁸ Reducing the burden of malaria in Brazil, China, and Malaysia, for example, would not only benefit these countries, but it would also yield economic benefits for the U.S. – together, these three countries account for 15 percent of U.S. international commodities trade.¹⁹

Private companies operating internationally have realized that malaria not only affects health, but it also adversely affects economic prospects by increasing operating costs and lowering productivity. In a survey of international business executives, 22 percent reported that malaria had an impact on their business.²⁰

One Fortune 500 Company Realizes the Return on Its Malaria Investment

Marathon Oil, a leading company in the U.S. oil industry, has learned that it pays to invest in efforts to improve health in Africa. In 2002, the Texas-based oil company set up operations on an island of Equatorial Guinea in West Africa. The company soon realized that the poor health of the population would affect the productivity of its employees and, ultimately, its bottom line. Marathon Oil developed a \$12 million effort to combat malaria by spraying homes throughout the island with long-lasting insecticides. In two years, there has been a 95 percent reduction in the number of mosquitoes carrying malaria. The success of this project can be attributed largely to the company's partnerships with research institutions funded by the United States, the local government, and private corporations.²¹

Isn't Malaria Treatable?

Malaria is indeed treatable, but the battle is not yet won. The increase in malaria mortality has occurred partly because malaria parasites are becoming resistant to standard treatments. Research has recently yielded new drugs, known as artemisinin-based combination therapies (ACTs), which have proven to be effective. However, ACTs have complicated regimens, and experience has shown that drug resistance is always a threat. The biomedical research community needs to become prepared with the next generation of treatments in the event that malaria parasites become resistant to the new drugs. What's more, a malaria vaccine has not yet been developed, and a vaccine is a critical tool for effectively eradicating the disease. Research – and research dollars – must increase to meet the growing challenge.

How Can the United States Meet the Challenge?

Commit to Research and Innovation for a Long-Term Solution

The United States has played a leading role in fighting malaria, and its continued leadership is essential in order to make strides against this disease. The President's Malaria Initiative (PMI), a five-year, \$1.2 billion initiative to cut malaria deaths by 50 percent, and programs coordinated by the United States Agency for International Development (USAID) have contributed to prevention efforts, including the widespread use of bed nets and insecticides. However, research and development of new treatments and vaccines are crucial in order to eliminate the disease. While attention to malaria has increased, spending on malaria research has not increased to match the need.

The National Institutes of Health (NIH), the leading biomedical research agency in the U.S., has made significant contributions to the progress in malaria treatment. However, in 2006, NIH spent only \$98 million on malaria research.²² This represents less than one-half of one percent (0.3 percent) of NIH's total investment in health research, which is quite minimal considering the global disease burden that malaria poses.²³

Due to insufficient funding, promising vaccine and drug candidates are unable to progress from the early, initial stages of research to expensive clinical trials with human subjects. The critically low, unacceptable level of funding for malaria research is standing in the way of saving millions of lives.²⁴

In order to make significant strides toward effective treatments and a new vaccine – and eventually end the widespread suffering caused by malaria – approximately \$1 billion is needed for research and development.²⁵ Compared to the \$12 billion that malaria costs the world annually, this is a small price to pay.

Endnotes

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- ¹⁸ J. Gallup and J. Sachs, op. cit.
- ¹⁹ U.S. Census Bureau, *Foreign Trade Statistics: Top Trading Partners* (Washington: U.S. Census Bureau, 2007), available online at <http://www.census.gov/foreign-trade/statistics/highlights/index.html>, accessed on April 12, 2007.
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- ²⁵ Malaria R&D Alliance, op. cit.