



The American Society of Tropical Medicine and Hygiene

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Tropical Disease and Military Preparedness Issue Brief 2nd Session, 111th Congress (2010)

The American Society of Tropical Medicine and Hygiene (ASTMH) – the nation’s leading professional organization for tropical medicine – represents nearly 3,700 researchers and clinicians engaged in the battle against infectious and tropical disease in the United States and internationally. ASTMH promotes world health through research and education to prevent and control tropical diseases.

As part of our efforts, we advocate implementation and funding of federal programs that address the prevention and control of infectious diseases that are leading causes of death and disability in the developing world, and which pose threat to U.S. citizens. Priority diseases include malaria, tuberculosis, and cholera.

For the 2nd Session of the 111th Congress (2010), our public policy efforts are focused principally on issues related to malaria control. ASTMH supports and encourages Congress and the Administration to expand funding for and commitments to domestic, military, and international malaria control initiatives.

Tropical Disease Control and Prevention: **A Key Component to Military Preparedness**

Malaria remains the most dominant parasitic disease in the world, with 247 million malaria cases and nearly one million deaths from malaria in 2008. Servicemen and women deployed from the U.S. military are among a number of healthy adults traveling each year to malarial regions on behalf of the U.S. government. The impact of malaria on military operations cannot be overstated and history has proven time and again that the failure to protect troops against infectious disease and malaria in particular can impact the outcomes of conflicts.

“Malaria has affected almost all military deployments since the American Civil War and remains a severe and ongoing threat.”

***From *Battling Malaria: Strengthening the U.S. Military Malaria Vaccine Program*
Institute of Medicine Report, 2006***

The impact of malaria is not theoretical: service members continue to be infected. A 2007 study by Army researchers found that during the period from 2000 to 2006, at least 423 U.S. service members contracted malaria while deployed overseas, with the

vast majority of these cases the result of deployments to South Korea (where malaria has recently reemerged along the demilitarized zone with North Korea) and Afghanistan. A total of 83 cases – with two thirds from Afghanistan – occurred in 2008. These areas have relatively low risk transmission areas and do not represent the devastating effects malaria could have on deployments to Sub-Saharan Africa and Southeast Asia, where malaria is much more prevalent and deadly.

U.S. experience during a peacekeeping mission in Liberia in 2003 clearly demonstrates this point. Of 157 Marines who spent at least one night ashore during this operation, 80 contracted malaria, and one-half of those troops had to be evacuated by air to Germany where many required intensive care. There are a multitude of reasons why prevention of malaria is difficult, but central to this issue is the paucity of effective prophylactic medications without side-effects, and the lack of an effective vaccine.

Because of the historic and continuing impact of malaria on overseas operations, the U.S. military has a storied tradition of being a leader in the development of anti-malarial drugs. The most effective and widely used anti-malarials were developed by U.S. military researchers. Drugs that have saved countless lives throughout the world were originally developed by the U.S. military to protect troops serving in tropical regions during WWII, the Korean War, and the Vietnam War. During these conflicts, the quinine-based anti-malaria drug chloroquine was the chemoprophylaxis and therapeutic agent of choice for the U.S. military. The malaria parasite developed widespread resistance against chloroquine over time, making the drug less effective at protecting deployed troops from malaria. In response, military researchers at the Walter Reed Army Institute of Research (WRAIR) performed the scientific breakthroughs that led to the development of mefloquine, which quickly replaced chloroquine as the military's front-line drug against malaria.

Unfortunately, the malaria parasite has consistently demonstrated a frustrating ability to become quickly resistant to new drugs. The latest generation of medicines is no exception. Malaria parasites in Southeast Asia have already developed significant resistance to mefloquine, and resistant strains of the parasite have been identified in West Africa and South America. Consequently, the military no longer considers mefloquine to be a first-line treatment, and at this time the military does not have an ideal malaria prophylactic. Indeed, the most deadly variant of malaria – *Plasmodium falciparum* – is believed by the World Health Organization to have become resistant to “nearly all anti-malarials in current use.” This resistance is not yet universal among the global *Plasmodium falciparum* population, with parasites in a given geographic area having developed resistance to some drugs and not others. But the sheer speed with which the parasite has developed resistance to mefloquine – a drug that came into use in the 1980s – reminds us that military malaria researchers cannot afford to rest on their laurels. Most anti-malarial agents are estimated to have a “lifespan” of 7 to 10 years. A failure of drug development to keep pace with resistance would lead to devastating outcomes for deployed military personnel and any traveler to high risk areas. The development of new anti-malarials is an extraordinary challenge, and one that requires significant resources.

In addition to protection from malaria, the treatment of malaria is a key area of concern for the U.S. military and for U.S. civilians who travel to endemic areas. The U.S. military has led in this area of research and development as well. In 2007, in a partnership with the Centers for Disease Control and Prevention (CDC), intravenous artesunate became available for the treatment of severe malaria under an Investigational New Drug Application (IND). Previously, intravenous quinidine - with its well-described cardiac side-effects - was the only other medication available for the treatment of severe malaria. While this advance is exciting, artesunate resistance has already been documented in South East Asia, a troubling development which underscores the need for continual research and development.

Ultimately, a combination of effective anti-malarials and an effective vaccine would be necessary to control the disease in endemic regions and protect deploying service members and travelers. To this end, the military has been working on a malaria vaccine for over 50 years. The process of developing an effective vaccine has been extremely challenging and requires a great deal of resources. Until the recent interest and funding by large charitable organizations such as the Bill & Melinda Gates Foundation, the majority of this research was done by DoD or other government organizations.

The DoD, in concert with multiple organizations including the CDC and vaccine manufacturers, has developed several exciting vaccine candidates, including one that recently began the first ever large-scale Phase 3 trial for a malaria vaccine, (RTS,S). In earlier trials, the vaccine has been shown to decrease clinical episodes of malaria by over 50% in children in Africa. Despite these advances, the vaccine will likely be unsuitable for deploying personnel and travelers, because of its efficacy level. As a result, there is still a significant need for continued funding for ongoing research.

The international community is working in concert in many areas to reduce the impact of malaria in the developing world, particularly by reducing childhood malaria mortality, and the U.S. military is playing an important role in this broad partnership. The U.S. military makes significant contributions to the global effort to develop a malaria vaccine. Unfortunately, military malaria researchers work practically alone in the area most directly related to U.S. national security: drugs designed to protect or treat healthy adults with no developed resistance to malaria who travel to regions endemic to the disease. These drugs benefit everyone living or traveling in the tropics, but are particularly essential to the U.S. for the protection of forces from disease during deployment.

Despite the importance of this research, funding has actually been flat-to-decreasing in recent years.

Congress provides funding each year to support DoD programs focused on the development of vaccines and drugs for priority infectious disease. The funding is essential to ensure that as many American soldiers as possible are protected from tropical and other diseases. The Walter Reed Army Institute of Research and the Naval Medical Research Center coordinate one of the world's premier tropical disease research programs. These entities contributed to the development of the

gold standard for experimental malaria immunization of humans, and the most advanced and successful vaccine and drugs currently being used globally.

There is an ongoing need to develop new and improved malaria prophylaxis and treatment for U.S. service members. A large deployment to a country or region where malaria is endemic, especially in sub-Saharan Africa, could prove disastrous both medically and strategically if we as a nation are not prepared for such an event. A small increase in support would go a long way in terms of maintaining the levels of research and development investment required to produce the drugs that will safeguard U.S. troops from malaria. In terms of the overall DoD budget, the malaria research program's funding is small – approximately \$23.1 million in FY 2008, the most recent year for which figures are available – but very important. Cutting funding for this program would deal a major blow to the military's work to reduce the impact of malaria on soldiers and civilians alike, thereby undercutting both the safety of troops deployed to tropical climates, and the health of civilians in those regions.

FY 2011 DoD Appropriations

ASTMH calls upon Congress and the Administration to dedicate \$30 million in the FY 2011 Defense appropriations and authorization measures to support efforts to develop a vaccine against malaria and for development of new anti-malarial drugs. Further, ASTMH urges Congress and the Department of the Defense to ensure that the next five year budget cycle (FY2010-FY2015) sustains investment in DoD malaria research programs by providing additional funds over the next five years resulting in \$76.6 million in funding by FY2015.

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