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Malaria Progress & Challenges
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Introduction

Chairman Smith, Ranking Member Bass, Members of the Committee, thank you for having me here today. Before I begin with my testimony, I would like to take a moment to express my appreciation for Congress' ongoing and steadfast support for malaria control. Thank you. The global malaria fight is succeeding. Deaths have decreased by a third over the past decade, from a million per year to an estimated 660,000 per year. With bipartisan support in Congress, for both bilateral and multilateral efforts, through the President's Malaria Initiative (PMI) and the Global Fund to Fight AIDS, Tuberculosis, & Malaria, malaria is being rolled back. It's a triumph of partnership — all of us working together – the U.S. Government and our partners; partner countries, the private sector, nonprofit organizations, faith groups, and the communities we are trying to serve.

PMI, at its very core, is also an example of the success and real impact that the U.S. Government can achieve through a solid interagency partnership. Through PMI, the strengths and talents of both USAID and the Centers for Disease Control and Prevention, are being brought to bear on malaria and we are working in synergy and with determination to tackle this devastating disease. The United States malaria program through the President's Malaria Initiative (PMI) continues to be a "game changer" in the global fight against malaria. In the seventh year of the initiative, the financial and technical contributions made by the U.S. Government are a major catalyst in the remarkable progress that has been achieved in many countries to reduce the devastating burden of malaria on child mortality. At the same time, with the U.S. Government's support, countries are also strengthening their own capacity to fight the disease.

Investments in malaria prevention and control are making a significant impact on the lives of millions of children, pregnant women and families in Africa. It is a tremendous success story, yet it is still incomplete.

Toll of Malaria

The World Health Organization (WHO) estimates that malaria caused 219 million cases of disease in 2010 and 660,000 deaths. But in the almost 10-year accelerated campaign against malaria, it is estimated that 1.1 million lives have been saved. In spite of this, malaria remains one of the major public health problems on the African continent, with about 80 percent of worldwide malaria deaths occurring in African children under five years of age.

Malaria also places a heavy burden on individual families and national health systems. In many African countries, at least 30 percent or more of outpatient visits and hospital admissions in children under five are reported to be caused by malaria. Because most malaria transmission occurs in rural areas, the greatest burden of the disease usually falls on families who have lower incomes and whose access to health care is most limited.

On a sun-drenched morning in Ghana's Ashanti region, I joined village chiefs and their wives for the launch of an insecticide-treated mosquito net distribution and hang-up campaign. As I watched volunteers perform a drama about sleeping under mosquito nets, I was reminded of my childhood in Vietnam, where I was fortunate to have slept under the protection of a mosquito net. And I was grateful that I had access to an effective antimalarial medicine when I fell ill with malaria.

Malaria no longer threatens boys and girls in the United States, but across Africa, it remains a reality for many children. The lives of potential future presidents, scientists and nurses are lost prematurely, and their hope for making an impact on the world is greatly diminished.

History of the Program

By 1990, much of the world had successfully controlled or eliminated malaria as a public health threat. But in Africa, and certain other areas, it persisted. Malaria – largely preventable, treatable and curable – was an insidious disease of poverty and a cause of poverty, killing more than 1 million people each year on the continent.

In June 2005, before the Gleneagles summit in Scotland of the Group of Eight major industrialized nations, President Bush created the President's Malaria Initiative, and committed $1.2 billion for malaria control. The initiative started with Tanzania, Uganda, and Angola, and, since then, 16 additional African countries have been added. PMI is an interagency program led by USAID and implemented together with the Centers for Disease Control and Prevention. Its goals were ambitious: cutting in half the death toll of a disease that ravaged Africans, hitting children and pregnant women the hardest.

This bold initiative was buoyed by new tools to prevent and treat the disease including new diagnostic tools and antimalarial medicines as well as insecticide-treated nets to hang over sleeping spaces. For the first time, the tools, the political will, and the funding were in place at sufficient levels to really have an impact on malaria in Africa.

With the passage of the 2008 Lantos-Hyde United States Leadership against HIV/AIDS, Tuberculosis, and Malaria Act and the launch of the GHI, PMI's goal has expanded to achieve Africa-wide impact by halving the burden of malaria in 70 percent of at-risk populations in sub-Saharan Africa, i.e., approximately 450 million residents.

In the last seven years, substantial reductions in mortality among children under five have been recorded together with improvements in coverage with malaria interventions. Of the twelve PMI focus countries (Angola, Ethiopia, Ghana, Kenya, Madagascar, Malawi, Mozambique, Rwanda, Senegal, Tanzania, Uganda and Zambia), where baseline and follow up health surveys with data on childhood mortality have been conducted, all-cause mortality rates among children under five have dropped by 16 percent (in Malawi) to 50 percent (in Rwanda). Although multiple factors may be influencing the decline in under-five mortality rates, strong and growing evidence suggests that malaria prevention and treatment are playing a major role in these unprecedented reductions in mortality. PMI is participating in in-depth impact evaluations to ascertain the contribution of malaria control efforts to these reductions in mortality, with Tanzania being the first country to complete this impact evaluation. Conducted in collaboration with the Government of Tanzania, the Roll Back Malaria Partnership, WHO, and the Ifakara Health Institute, the impact evaluation concluded that malaria mortality in children under five in Tanzania has fallen and that nearly 63,000 lives have been saved in that country over the 10-year period between 2000 and 2010 due to the scale up of malaria interventions.

In fiscal year 2012 alone, PMI protected over 50 million people with prevention measures, such as insecticide-treated mosquito nets to hang over sleeping spaces and/or indoor residual spraying of homes with insecticides. PMI also procured more than 72 million treatments of life-saving antimalarial medicines for distribution to targeted populations.

External Evaluation

Across Africa, PMI advisors from USAID and CDC, in-country USAID health teams, national malaria control programs, and partners, are working together to roll back malaria. In 2011, PMI commissioned an external Evaluation Team to review its performance. The External Evaluation Report affirmed that PMI's planning, implementation, partnerships, and funding have been key to global efforts to combat malaria.

A rigorous external evaluation not only concluded that PMI is "by-and-large a very successful, well-led component of the U.S. Government Global Health Initiative," but challenged us to re-

examine critically what we have been doing and how we could improve programming in the face of falling malaria transmission in most PMI countries.

The Evaluation Team made five policy and five technical overarching recommendations that will guide programmatic improvements in the coming years. PMI views these recommendations as relevant and useful for program improvement. In fact, several of the recommendations are directly in line with management and technical improvements that are already underway. PMI leadership and technical teams have carefully reviewed all comments in the report and, with input from PMI's Interagency Advisory Group, have developed a detailed management response including a plan and timeline for implementation of each recommendation.

Bold Vision

Malaria prevention and control are major national security and foreign assistance objectives of the U.S. Government. In 2010, President Barack Obama launched his vision for how the United States would approach global development, which sees development assistance as a pillar of foreign policy and crucial to America's national security and economic interests. In his 2013 State of the Union Address, the President stated that "… the United States will join with our allies to eradicate such extreme poverty in the next two decades … by saving the world's children from preventable deaths …" Malaria is a major cause of childhood mortality in Africa. Consequently, preventing and controlling malaria are a key focus of U.S. Government foreign assistance. PMI is playing a lead role in implementing the President's vision.

PMI's efforts to reduce malaria mortality also directly contribute to the goal to end preventable child deaths as articulated by the USAID 2012 Call to Action and reaffirmed by A Promise Renewed, a joint global effort led by UNICEF and endorsed by the U.S. Government. Reducing the level of malaria transmission has the dual effect of preventing mild cases of malaria from progressing to severe disease and death while unburdening the health system, so health workers can focus their time and energy on other important childhood illnesses, such as pneumonia, diarrhea and malnutrition.

The human and economic toll of malaria in Africa has been reduced but remains devastating. The mortality and health impact that malaria has in sub-Saharan Africa, predominantly on pregnant women and children under the age of five, is well known. Our support to national malaria programs in Africa are focused on reaching these two most vulnerable groups and we focus on delivering equitable care by targeting rural areas where the greatest burden of the disease usually falls on families who have lower incomes and whose access to health care is most limited.

In addition to its human toll, malaria imposes a high cost on macroeconomic growth, household income (through absenteeism and expenditures on treatments); and negatively impacts

childhood cognitive development. These factors pose serious impediments to poverty alleviation and overall development in Sub-Saharan Africa.

- **Malaria hurts macroeconomic growth in Africa**: Economists estimate countries with high burden of malaria grew 1.3 percent less (gross domestic product) due to malaria. This is further estimated to equal up to $12 billion in lost productivity due to malaria in Africa annually.
- **Malaria is impoverishing to families in Africa, 50% live on less than $1.25 a day**: Economic studies have shown that the total cost (direct and indirect) imposed by malaria can cost families from 9-18% of household income in Kenya and up to 32% of household income in Malawi.
- **Malaria negatively impacts childhood cognitive development, which can lead to reduced educational attainment and earning potential in adulthood**. A recent study among children in Uganda concluded that an episode of cerebral malaria was associated with a 3.7 fold risk of cognitive impairment compared to children in the control group not exposed to cerebral malaria. Cognitive impairment has been associated with poor reading and arithmetic achievement in children. Lower grades in school among children exposed to non severe malaria infections have been demonstrated in studies in Brazil and Sri Lanka.

Global Fund and PMI Collaboration

The Global Fund is a multilateral public-private partnership created in 2002 to provide financial support through grants for large-scale prevention and treatment services for HIV/AIDS, tuberculosis and malaria.

The Global Fund and PMI are committed to coordinating their efforts in-country in an effort to maximize their impact on the global malaria burden. Each program has its own unique strengths, lending to the complementarity of the partnership and significant success on the ground. Currently, all 19 PMI focus countries in Africa, and one regional program in the Greater Mekong Subregion of Southeast Asia, receive substantial funding from the Global Fund, which, alongside PMI, is the leading donor for malaria. And because the Global Fund does not have in-country technical staff, it often relies on PMI Resident Advisors to help coordinate malaria activities and share information about potential bottlenecks with the Global Fund.

PMI also sits on the U.S. delegation of the Global Fund Board; therefore, it helps shape policy issues at the highest level of Global Fund governance. Moreover, PMI staff have also participated on the Technical Review Panel, which is responsible for reviewing the Global Fund's grant applications prior to Board consideration, and on the Global Fund's Country

Coordinating Mechanisms, which are country-level multi-stakeholder partnerships that develop and submit grant proposals. Country examples of collaboration include:

- Liberia: Almost half of the population in Liberia seeks medical treatment from the private sector; therefore, PMI and the Global Fund supply subsidized first-line anti-malaria drugs to the private sector, thereby expanding access to affordable malaria treatment to Liberians.
- Nigeria: PMI has helped to distribute over 15 million insecticide-treated nets procured by the Global Fund (among other donors) across Nigeria, and managed logistics and donor coordination.
- Democratic Republic of the Congo (DRC): PMI helped the DRC government develop its Round 10 grant proposal to the Global Fund, and together, PMI and the Global Fund are helping to ensure that all of the country's health zones receive a minimum package of antimalarial interventions.

Leveraging Partnerships

Partnership is a hallmark of how PMI does business. We coordinate our activities with a broad set of partners ranging from national malaria control programs of PMI focus countries to multilateral and bilateral institutions, such as WHO, the United Nations Children's Fund (UNICEF), the World Bank, The Global Fund, DFID, and AusAID as well as private foundations, such as the Bill & Melinda Gates Foundation, William J. Clinton Foundation and UN Foundation; and numerous nonprofit and faith-based organizations. Examples of these partnerships include:

- PMI supported the Roll Back Malaria Harmonization Working Group to help six African countries (Benin, Burkina Faso, Chad, Ethiopia, Niger and Zambia) prepare their malaria proposals for the Global Fund's Transitional Funding Mechanism – all of which were successfully funded.

- In Zambia, DFID has channeled funds through PMI for the procurement of commodities. And, in four additional PMI focus countries (Kenya, Malawi, Rwanda and Uganda), PMI and DFID have initiated discussions to develop partnerships.

- In the 2012 fiscal year, Peace Corps volunteers in 14 PMI focus countries assisted with malaria control activities.

- To date, PMI has supported malaria activities through more than 200 nonprofit organizations, approximately one-third of which are faith based. These groups often have strong and highly effective bases of operations in underserved rural areas, where

the burden of malaria is greatest. And, recently, I witnessed how the voice of the faith community can help raise awareness around malaria. For example, the United Methodist Church recently helped rally interest around malaria during the screening of the HBO film, "Mary and Martha" – which tells the story of two mothers who are joined together by the loss of their children to malaria.

PMI also works with private sector partners to help leverage their capabilities and resources and ensure that their efforts are well coordinated with government strategies and plans. For example, PMI has partnered with mining and sugar cane companies to implement IRS activities in Ghana, Liberia, Malawi and Zambia. In FY 2012, the ExxonMobil Foundation provided $500,000 to PMI to support PMI objectives in Angola, bringing its total contributions to PMI to $4.5 million since 2006. The foundation's support is for the scale-up of ACTs and IPTp through subgrants to nongovernmental and faith-based organizations in eight provinces where government health infrastructure is weak.

Budget

Thanks to strong bipartisan support we are on track to provide continued life-saving health assistance to more people than ever before although the needs remain great. The FY 2014 Global Health request supports our goals of creating an AIDS-free generation, ending preventable child and maternal deaths.

Because of continued bipartisan support, PMI was able to expand its efforts in Africa by:

- ✓ Designing PMI programs and beginning implementation of malaria control activities in two new PMI focus countries – Guinea and Zimbabwe; and
- ✓ Expanding PMI programs in Nigeria to eight of 36 states (total population of 27 million) and the Democratic Republic of the Congo to four of 11 provinces (total population of 19 million).

PMI now includes 19 focus countries in Africa and one regional program in the Greater Mekong Subregion of Southeast Asia. PMI's efforts in the Greater Mekong are primarily focused on combating antimalarial drug resistance and finding new methods to reduce outdoor transmission among migrant populations and forest workers. In addition, USAID malaria funding also supports control efforts in three other African countries as well as one regional program in Latin America: the Amazon Malaria Initiative.

The United States continues to provide global leadership in the fight against malaria and in global health. We continue to challenge endemic countries to increase their domestic contribution to malaria control and use their malaria funding wisely and strategically.

The announcement of a substantial increase in malaria support from the British Government through DFID will help meet some of the global need for malaria funding, but malaria control is a long-term challenge, and sustained external donor support will be critical to the continued progress of national malaria control programs in focus countries. The fact that DFID is choosing to channel its own funding through USAID's in-country bilateral programs and mechanisms is a vote of confidence in the efficiency of our systems. We are pleased to see that we have a strong and trusted partner in DFID that has shown this level of commitment to malaria control.

Challenges

Tremendous progress has been made over the past decade, including a 25% reduction in estimated malaria deaths at the global level and a 33% reduction in Africa alone.

The risk of malaria is declining and more children are surviving, but the gains are fragile and could be reversed without continued support. We recognize and appreciate the continued commitment of Congress and the American people to fighting malaria through PMI and Global Fund in this time of budget austerity.

Despite the significant gains the Global Fund, PMI, national governments, and others have made in the fight against malaria, the disease remains a serious global public health problem. The goal moving forward is to maintain and build on previous efforts and ensure the successes to date are not rolled back, even as the dual threats of artemisinin drug resistance and insecticide resistance grow.

A strain of the malaria parasite has appeared in parts of Southeast Asia with resistance to what have been the most effective medicines to fight the parasite. And some fear that the parasite may ultimately become resistant to all drugs we currently have to treat malaria. Migration of this resistant parasite to Africa would be devastating.

We must also be diligent in identifying and monitoring mosquito resistance to insecticides so that our most effective prevention measures, insecticide-treated mosquito nets and indoor residual spraying, aren't undermined. This is especially important because both insecticide-treated mosquito nets and indoor residual spraying rely on the use of insecticides. If mosquitoes become resistant to those insecticides, the efficacy of these interventions will be compromised. We must also find new ways to interrupt outdoor transmission, where LLINs and IRS are less effective. In some areas of the Greater Mekong Subregion, estimates are that more than 50 percent of transmission takes place outside of homes. Insecticide-treated clothing and spatial or area repellents or insecticides are promising interventions we are evaluating.

We recognize that tackling these new strategic challenges is a priority and we are working with the private sector to develop new antimalarial drugs as well as new insecticide-based tools. At

the same time, we need to continue to expand our tool box to combat malaria by developing a highly effective, but inexpensive, vaccine that could result in hundreds of thousands of lives saved.

Leveraging Innovation and Technology

Research to support malaria control efforts and reduce the burden of malaria has been a high priority of the U.S. Government for many years. USAID investments in science and global health research and development cut across a broad range of topics, including the development of malaria vaccines, antimalarial drugs, and diagnostic tools for malaria; implementation research to improve programs; and behavioral/social science research to improve service utilization and health-seeking behavior.

The U.S. Government malaria research effort involves the U.S. Centers for Disease Control and Prevention and the National Institutes of Health of the Department of Health and Human Services, the Naval Medical Research Center and the Walter Reed Army Institute of Research of the U.S. Department of Defense and the U.S. Agency for International Development. Each of these agencies has its own direct funding for malaria research. PMI funds operational research in addition to these other research efforts.

USAID support of drug development through product development partnerships such as the Malaria Medicines Venture has led to the approval and use of new treatments for malaria.

PMI support of malaria operational research focuses on topics, such as mosquito net durability; the effectiveness of combining interventions such as IRS and ITNs; and looking forward, the impact of insecticide resistance on mosquito net effectiveness, the use of spatial repellents to interrupt outdoor biting, better use of diagnostics to guide malaria treatment and new vector surveillance and control technologies. PMI uses study results to help guide its program investments, make policy recommendations to national malaria control programs and target interventions to increase their cost-effectiveness. Some examples of PMI-funded operational research studies include:

- Eight PMI focus countries (Angola, Benin, Kenya, Malawi, Mozambique, Rwanda, Senegal and Zambia) are conducting studies on the physical and insecticidal longevity of ITNs. Overall study results have shown that many mosquito nets do not last the expected three years due to loss of physical integrity. Thus, ITNs may need to be replaced more frequently than anticipated in order to maintain high coverage. These findings are being used to inform research on ITN care and repair behaviors, as well as to aid design changes to ITNs to improve physical durability.

- In Nigeria, preliminary results from a study looking at mosquito net care and repair behaviors indicate that few residents repair their mosquito nets when they are damaged. Encouraging mosquito net repair could help prolong the useful lifetime of a mosquito net and thus reduce the cost of mosquito net procurements over time.
- In Kenya, where mosquitoes have developed resistance to pyrethroid insecticides used in IRS campaigns, PMI supported a study to assess the effect of nine different insecticides or insecticide formulations on mosquito populations. Results were presented to the national vector control technical working group, which then made recommendations to the NMCP to use a carbamate insecticide in future IRS campaigns.

And we are also looking at ways to apply new technology to solve malaria problems. In Zanzibar, PMI created a mobile application that builds on an early epidemic detection system for malaria. This innovative mHealth system allows health facilities to report new malaria cases using a cell phone, which ensures that outbreaks of malaria are identified within two weeks of their onset. These mHealth applications are helping Zanzibar to sustain the remarkable gains it has made against this dangerous and debilitating disease. Opportunities exist to expand on the lessons learned from these technology-based activities in malaria programs and introduce them as solutions to other global health projects that are facing similar challenges.

The goal over the next 5 to 10 years will be to sustain and build on these efforts in the face of such challenges as antimalarial drug resistance, insecticide resistance, and uncertainties around donor and national funding for malaria control.

Research and development are critical components of the fight against malaria, and we will need to continue to expand our tool box to combat malaria. The sustained bipartisan support for global health in the U.S. Congress over two administrations is a testament to the fact that we have been able to demonstrate an incredible return on investment for every dollar spent on saving lives and improving opportunity. The health of a nation is the foundation upon which economies are able to grow and new markets for U.S. products are established.

In closing, I would like to thank the U.S. Congress for its continued support and reiterate that, together with our partners, we remain deeply committed to the global fight against malaria.