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THE PRESIDENT'S MALARIA INITIATIVE

PROGRESS THROUGH PARTNERSHIPS: SAVING LIVES IN AFRICA

SECOND ANNUAL REPORT
MARCH 2008

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

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THE WHITE HOUSE

April 9, 2008

In 2005 President Bush launched the President's Malaria Initiative: a five-year program to combat malaria in the hardest-hit nations on the continent of Africa. We are partnering with countries throughout Africa to fight a disease that knows no national boundaries, spares no race or religion, and takes a devastating toll especially on women and children. A largely treatable and preventable disease, malaria claims the life of a child in Africa every 30 seconds and more than a million lives each year.

This historic partnership is saving lives across the continent of Africa. The United States has distributed life-saving medicines, insecticide sprays, and mosquito nets to more than 25 million people during the two years of PMI's implementation. I have seen firsthand the remarkable progress being made in the fight against malaria during my trips to Africa. I have met children whose lives have been saved by anti-malarial medicines, observed homes being sprayed with insecticide, and given pregnant mothers bed nets to protect both them and their unborn children from the dangers of malaria.

With continued support from the United States, other developed nations, foundations, businesses, religious groups, and private citizens, the people in Africa can have a bright and healthy future free of malaria.

With best wishes,

Laura Bush

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Abbreviations and Acronyms

ACT	Artemisinin-based combination therapy
ADDO	Accredited drug dispensing outlet
ANC	Antenatal care
BCC	Behavior change communication
CDC	U.S. Centers for Disease Control and Prevention
CHW	Community health worker
DHS	Demographic and Health Survey
DSS	Demographic Surveillance System
FANC	Focused antenatal care
FBO	Faith-based organization
FY	Fiscal year
GBC	Global Business Coalition on HIV/AIDS, Tuberculosis, and Malaria
HHS	U.S. Department of Health and Human Services
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
IDP	Internally displaced persons
IEC	Information education communication
IPTp	Intermittent preventive treatment for pregnant women
IRCMM	Inter-Religious Campaign Against Malaria in Mozambique
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
MCP	Malaria Communities Program
MOH	Ministry of Health
NGO	Nongovernmental organization
NMCP	National Malaria Control Program
OFDA	Office of U.S. Foreign Disaster Assistance
OGAC	Office of the U.S. Global AIDS Coordinator
PEPFAR	U.S. President's Emergency Plan for AIDS Relief
PLWHA	People living with HIV/AIDS
PMI	President's Malaria Initiative

PMTCT	Prevention of mother-to-child transmission
RDT	Rapid diagnostic test
SP	Sulfadoxine-pyrimethamine
TAM	Together Against Malaria Project
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

THE PRESIDENT'S MALARIA INITIATIVE

"Americans are a compassionate people who care deeply about the plight of others and the future of our world, and we can all be proud of the work our nation is doing to fight disease and despair. By standing with the people of Africa in the fight against malaria, we can help lift a burden of unnecessary suffering, provide hope and health, and forge lasting friendships." – President George W. Bush in a Malaria Awareness Day Proclamation on April 24, 2007

BONNIE GILLESPIE/VOICES FOR A MALARIA-FREE FUTURE

Mothers and their children wait for antenatal care services in a PMI-supported clinic in Tanzania. Women and children under five are most at risk for malaria and PMI's support is focused on these vulnerable groups.

Executive Summary

PMI Goal and Targets

The President's Malaria Initiative (PMI) represents an historic five-year expansion of U.S. Government resources to fight malaria in the region most affected by the disease. The President committed an additional $1.2 billion in malaria funding to this Initiative with the goal of reducing malaria-related deaths by 50 percent in 15 focus countries. This will be achieved by expanding coverage of highly effective malaria prevention and treatment measures to 85 percent of the most vulnerable populations – children under five years of age and pregnant women. This package of high-impact interventions includes insecticide-treated mosquito nets (ITNs), indoor residual spraying (IRS) with insecticides, intermittent preventive treatment for pregnant women (IPTp), and artemisinin-based combination therapy (ACT).

Achieving Results

The rapid scale-up of PMI-supported malaria prevention and treatment measures continued into the second year of the Initiative and already signs of impact on malaria transmission are emerging. For example:

PMI RESULTS AT A GLANCE[1]

	Year 1	Year 2	Cumulative Results
Number of people protected by IRS	2,097,056	17,776,105	17,776,105[2]
Number of ITNs procured	1,047,393	5,149,038	6,196,431, (of which 4,306,410 have been distributed)
Number of mosquito nets re-treated	505,573	677,108	1,182,681
Number of ACT treatments procured	1,229,550	11,536,443	12,766,983, (of which 7,471,965 have been distributed[3])
Number of health workers trained in use of ACTs	8,344	20,864	29,208[4]
Number of rapid diagnostic tests procured	1,004,875	2,082,600	3,087,475, (of which 1,300,015 have been distributed[3])
Number of IPTp treatments procured[5]	0	1,350,000	1,350,000, (of which 583,333 have been distributed[3])
Number of health workers trained in IPTp	1,994	3,153	5,147[4]

[1] Results reported in this table are up-to-date as of January 1, 2008, and include all 15 PMI focus countries. Year 2 IRS data from Mozambique and Malawi include spray results through February 2008.

[2] IRS operations typically involve successive rounds of spraying in the same geographical area. Thus, only one spray round was counted to avoid counting the same household residents twice.

[3] Distributed to health facilities.

[4] Numbers reported here do not account for possible double-counting of health workers trained in Year 1 and Year 2 or health workers who were trained in both ACT use and IPTp.

[5] A treatment of IPTp consists of three tablets of sulfadoxine-pyrimethamine.

FIGURE 1
Percentage of Blood Slides Positive for Malaria, Muleba District Hospital, Tanzania, 1997-2007

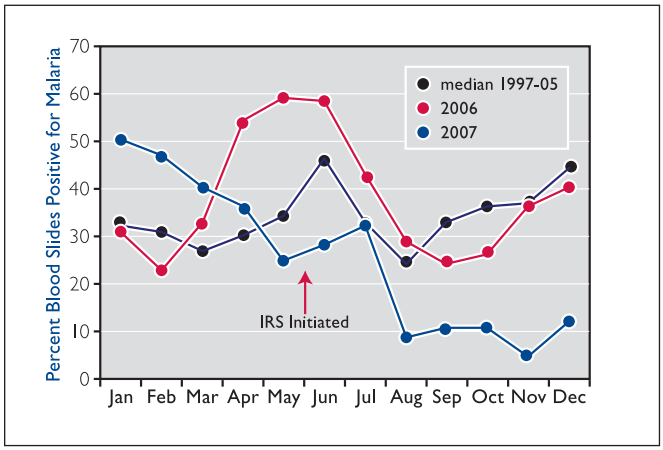


FIGURE 2
Percentage of Blood Slides Positive for Malaria in Children Under Age 2, Zanzibar, 2005-2007

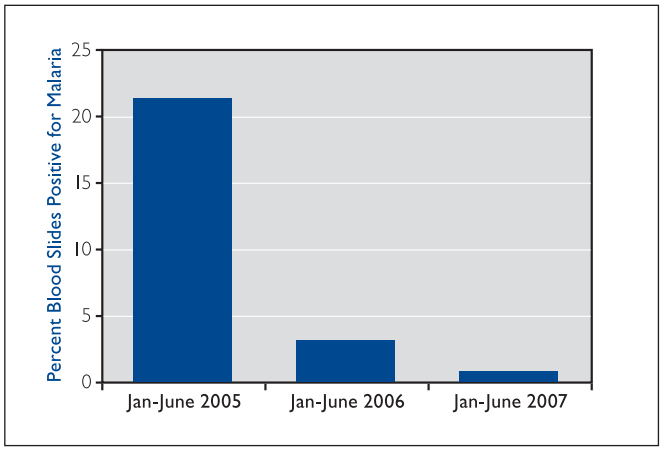
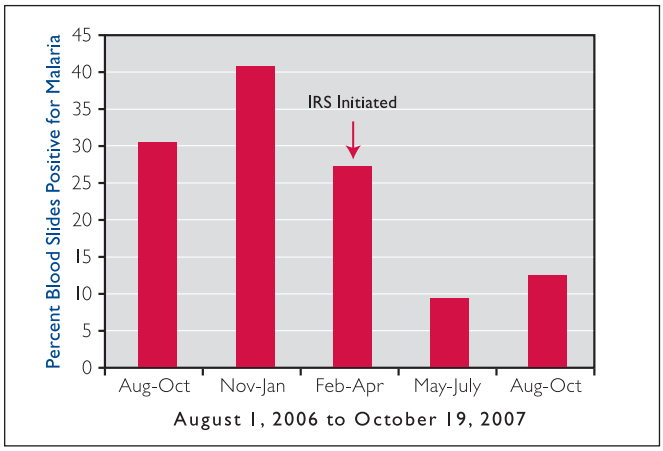


FIGURE 3
Percentage of Blood Slides Positive for Malaria, Kihihi Health Center, Uganda, 2006-2007



- In 2007, PMI worked with the National Malaria Control Program (NMCP) to launch IRS in Muleba District in northwest Tanzania, an area with highly seasonal malaria transmission. Information collected from the district hospital shows a 37 percent reduction in the proportion of blood smears from patients of all ages that were positive for malaria during the peak transmission season of June and July when compared with previous years. Data from this hospital also show a 70 percent reduction in severe anemia, to which malaria is a major contributor (see Figure 1).

- During the past two years, the NMCP, PMI, the Global Fund, and other partners supported a rapid scale-up of ITNs, IRS, and ACTs on the island of Zanzibar. As of May 2007, a population-based survey showed that 74 percent of children under five and 73 percent of pregnant women had slept under an ITN the previous night. In July-August 2007, a survey of 10 health facilities showed a greater than 90 percent decline in the proportion of blood smears positive for malaria in children under two years of age from 22 percent in 2005 to just 0.7 percent in 2007 (see Figure 2).

- Malaria infections are one of the major contributing causes of severe anemia in young children in Africa. In Malawi, ITN coverage has increased considerably during the past three years through the efforts of the NMCP, Global Fund, PMI, and other donors. A 2007 household survey in six of Malawi's 27 districts showed a 43 percent relative reduction in severe anemia in children aged 6 to 30 months compared with children of the same age in a 2005 survey. These surveys also demonstrated that, in this age group, children sleeping under an ITN had significantly reduced risks of malaria infection and anemia.

- PMI and the NMCP supported an IRS campaign in Kanungu District, Uganda, during February and March 2007. Data collected from the Kihihi Health Center in that district showed a 58 percent relative reduction in the proportion of blood smears positive for malaria, from 30.3 percent in August-October 2006 to 12.7 percent during the same time period in 2007 (see Figure 3).

Partnerships

NGOs and FBOs: Partnerships are at the heart of PMI's strategy and during the past year, PMI greatly expanded its collaboration with the private sector, nongovernmental organizations (NGOs), and faith-based organizations

(FBOs). In December 2006, the First Lady announced the launch of the Malaria Communities Program to support small NGOs and FBOs that are involved in malaria-related activities in PMI focus countries. Five grants were awarded to NGOs and local organizations in 2007, and more grants will be awarded in future years. To date, PMI has supported more than 70 nonprofit organizations, of which more than 20 are faith-based.

Private sector: PMI continues to leverage private sector support. In partnership with Malaria No More and others, PMI distributed free long-lasting ITNs through national campaigns in Uganda, Madagascar, and Mali. In Zambia, PMI and the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) joined with the Global Business Coalition to distribute more than 500,000 long-lasting ITNs through home-based care programs serving people affected by HIV/AIDS. In total, more than 6.5 million nets have been distributed through public-private partnerships such as these.

The Roll Back Malaria Partnership and the Global Fund: Only 32 percent of countries which submitted Round 6 Global Fund malaria proposals were successful, including only two of the 15 PMI focus countries. To improve the approval rate of these proposals, the Harmonization Working Group of the Roll Back Malaria Partnership provided technical assistance to a selected group of 20 countries on how to prepare malaria proposals. This effort was supported by a coalition of donors, including the PMI, ExxonMobil, Malaria No More, and others. As a result of this effort, 15 (75 percent) of the 20 countries had successful proposals, including nine PMI focus countries. Based on this successful experience, the Harmonization Working Group is now planning to assist countries to ensure early signing and release of

PMI PUBLIC-PRIVATE PARTNERSHIPS: MASS INSECTICIDE-TREATED NET DISTRIBUTION CAMPAIGNS

Country	Long-Lasting ITNs Distributed (All Partners)	PMI Partners	PMI Contribution
Madagascar	1,500,000	NMCP Global Fund Malaria No More UNICEF Red Cross	$1 million to support campaign logistics, social mobilization, and follow-up to the campaign
Mali	2,262,404	NMCP Global Fund Malaria No More Nothing But Nets UNICEF WHO Red Cross Mission Bilateral Partners Groupe Pivot Santé	169,800 long-lasting ITNs; Technical support for campaign planning; financial and technical support for community mobilization and campaign follow-up
Uganda	2,300,000	NMCP Global Fund Malaria No More	590,621 long-lasting ITNs; educational materials and support for monitoring and evaluation
Zambia	500,000	NMCP PEPFAR Global Business Coalition RAPIDS	77,669 long-lasting ITNs

PMI BACKGROUND

PMI Structure: The PMI is an interagency initiative led by the U.S. Agency for International Development (USAID) and implemented together with the U.S. Centers for Disease Control and Prevention (CDC) of the U.S. Department of Health and Human Services (HHS). It is overseen by a PMI Coordinator and an Interagency Steering Group made up of representatives of USAID, CDC/HHS, Department of State, Department of Defense, National Security Council, and Office of Management and Budget.

PMI Country Selection: The 15 focus countries were selected and approved by the Coordinator and the Interagency Steering Group using the following criteria:

- High malaria disease burden;
- National malaria control policies consistent with the internationally accepted standards of the World Health Organization (WHO);
- Capacity to implement such policies;
- Willingness to partner with the United States to fight malaria; and
- Involvement of other international donors and partners in national malaria control efforts.

PMI Approach: The PMI is organized around four operational principles based on lessons learned from more than 50 years of U.S. Government efforts in fighting malaria, together with experience gained from implementation of PEPFAR, which began in 2003. The PMI approach involves:

- Use of a comprehensive, integrated package of proven prevention and treatment interventions;
- Strengthening of health systems and integrated maternal and child health services;
- Commitment to strengthen national malaria control programs and to build capacity for country ownership of malaria control efforts; and
- Close coordination with international and in-country partners.

The PMI works within the overall strategy and plan of the host country's NMCP and planning and implementation of PMI activities are coordinated closely with each Ministry of Health.

PMI FUNDING SUMMARY

Fiscal Year (FY)	Budget	Focus Countries
2006	$30 million[1]	Angola, Tanzania, Uganda
2007	$135 million[2]	Malawi, Mozambique, Rwanda, Senegal *(in addition to Year 1 countries)*
2008	$300 million[3]	Benin, Ethiopia (Oromiya region), Ghana, Kenya, Liberia, Madagascar, Mali, and Zambia *(in addition to Year 1 and Year 2 countries)*
2009	$300 million	All 15 PMI focus countries
2010	$500 million	All 15 PMI focus countries
TOTAL: $1.265 billion		

[1] In addition, Angola, Tanzania, and Uganda also used $4,250,775 in FY05 funds for malaria activities.

[2] This total does not include $25 million of additional FY07 funding, of which $22 million was used for malaria activities in the 15 PMI focus countries. In addition, Malawi, Mozambique, Rwanda, and Senegal used $11,951,000 in FY06 funds for malaria activities as allocated by the PMI Malaria Coordinator.

[3] Benin, Ethiopia (Oromiya region), Ghana, Kenya, Liberia, Madagascar, Mali, and Zambia also used $23.59 million of FY06 and $42.82 million of FY07 funding (of which $2.8 million was included in the $25 million additional FY07 funding) as allocated by the PMI Malaria Coordinator.

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In Tanzania, two young children sleep under a long-lasting insecticide-treated net provided by the PMI.

funds from their Round 7 grants, and to assist other countries with their Round 8 proposals.

PMI is also working with the World Health Organization (WHO) and other technical partners to reach consensus on issues, such as how best to use microscopic diagnosis and rapid diagnostic tests (RDTs) in different epidemiologic and clinical settings and how to improve quality standards for antimalarial drugs, especially ACTs.

U.S. President's Emergency Plan for AIDS Relief: The past year has seen enhanced coordination of activities supported by PMI and PEPFAR. In Mozambique, the two programs are working together to ensure that pregnant women receive a full package of services when they attend antenatal visits, including IPTp, long-lasting ITNs, and services to prevent mother-to-child transmission of HIV/AIDS (PMTCT). In Rwanda, PMI and PEPFAR have cooperated in reinforcing the laboratory diagnostic capacity for malaria and HIV/AIDS. In Zambia, PMI joined with PEPFAR and the Global Business Coalition 154to distribute approximately 500,000 free long-lasting ITNs through home-based care networks serving families affected by HIV/AIDS. In Tanzania, as a result of PMI/PEPFAR joint collaboration, a nationwide survey including both HIV and malaria indicators was completed.

Strengthening Health Systems and Building Capacity

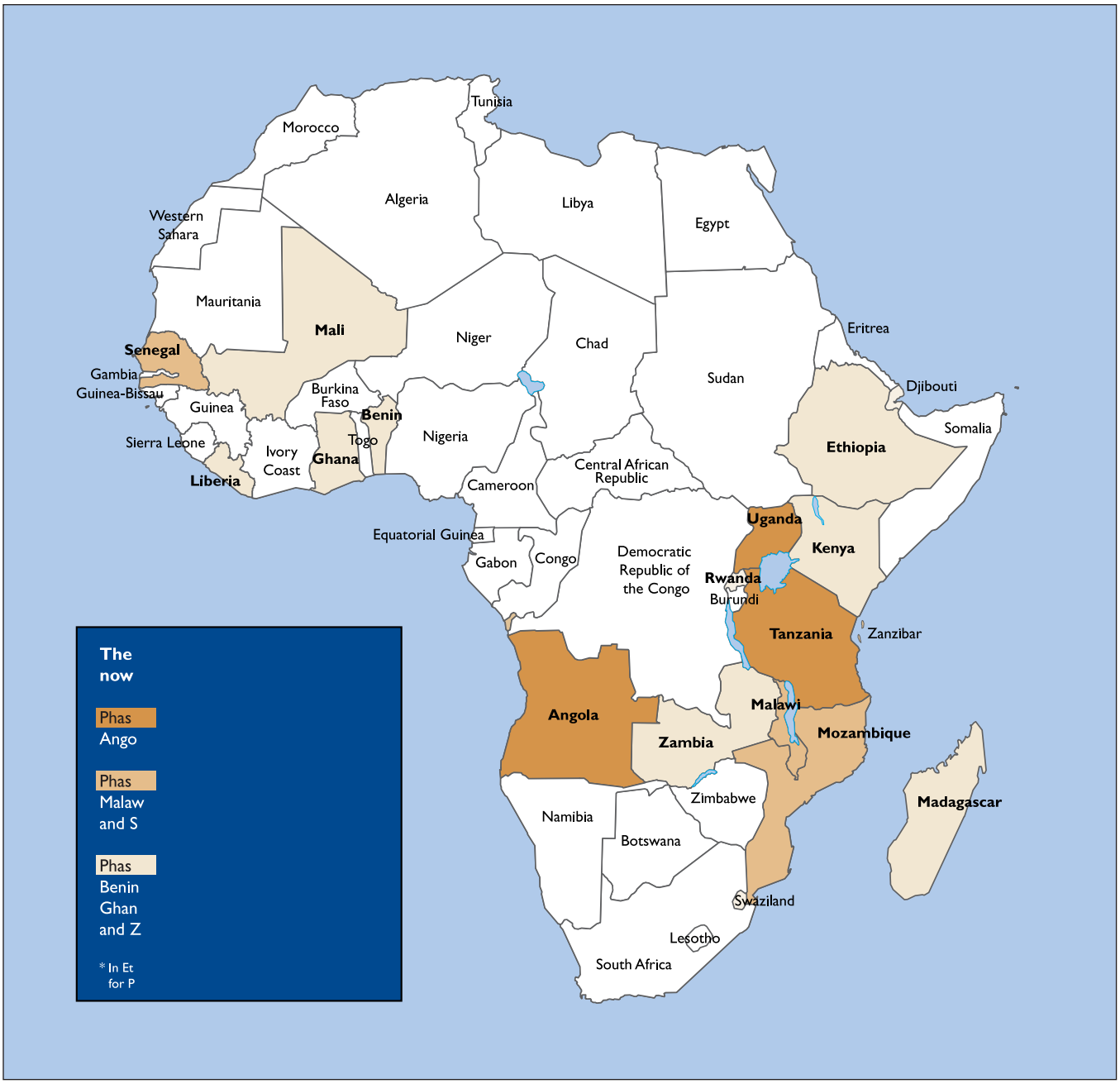
PMI resources are now being programmed in ways that will directly and indirectly build health systems and strengthen overall capacity in host government ministries of health and national malaria control programs. This includes:

- Work with ministries of health, national malaria control programs, and national essential drugs programs in all focus countries to improve the forecasting, procurement, storage, and distribution of antimalarial and other drugs, together with training and supervision of pharmacy and medical store staff and health workers to ensure the correct usage of these drugs;
- Support to national health management information systems and malaria surveillance programs to improve the quality and timeliness of data collection, analysis, and reporting, as well as to strengthen epidemic detection and response;
- Work with national malaria control programs and other partners, such as PEPFAR and WHO, to strengthen laboratory diagnosis of malaria and ensure that clinical workers make appropriate use of the laboratory test results when prescribing treatment. This work will also improve the quality of general laboratory services;

RICHARD NYBERG/USAID SENEGAL

In Senegal, spray operators stand ready to begin IRS activities with PMI's support in the village of Keur Moussa on May 29, 2007.

BOX 1
Map of Africa Showing Countries Supported by PMI in Years 1, 2, and 3



- Support to integrated maternal and child health programs to increase clinic attendance through improvements to the quality and quantity of malaria prevention and treatment services provided; and

- General support to increase the capacity of national malaria control programs through training and supervision, procurement of laboratory equipment, and technical assistance.

Looking Forward

PMI activities are already under way in the eight new fiscal year (FY)2008 focus countries. Continuing challenges during this third year of PMI implementation include:

- The need for a rapid scale-up of ACT distribution and appropriate use of these drugs in countries with historically weak national pharmaceutical management systems and the expanded distribution of ACTs at the community level;

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With PMI's support, children are receiving prompt treatment for malaria with effective artemisinin-based combination drugs.

- The need to strengthen monitoring and evaluation systems for malaria so that national malaria control programs and partners can monitor the progress of their activities, make adjustments, and report on their results; and

- The need to translate high ITN ownership into high net usage.

Progress in scaling-up malaria prevention and control interventions during the last 12 months has been dramatic. There is now growing optimism within national malaria control programs and among partners that malaria in sub-Saharan Africa can be controlled.

CHAPTER 1

"Now is the time for Africa and its development partners to raise our collective ambition higher than ever before. Over the next three to five years, we must ask ourselves whether or not we can free Africa from malaria's grip. Achieving rapid but sustained malaria control will take both a tremendous ability to lead and willingness by many different partners to collaborate and coordinate their efforts." – Professor Awa Marie Coll-Seck, Executive Director of the Roll Back Malaria Partnership, October 11, 2007

SOURCE: RICHARD NYBERG/USAID

Senegalese women hold up a poster to promote the launch of PMI-supported IRS activities in the village of Keur Moussa, Senegal, in May 2007.

The Global Challenge of Malaria Control

MALARIA AT A GLANCE

- Each year, an estimated 300 million to 500 million people become ill with malaria, and more than 1 million die.
- Every 30 seconds, an African child dies of malaria.
- More than 80 percent of the world's malaria deaths occur in sub-Saharan Africa.
- Malaria is a leading cause of death of young children in Africa.
- Malaria is a preventable and treatable disease.
- Malaria causes an annual loss of $12 billion, or 1.3 percent, of Africa's gross domestic product.
- Malaria accounts for approximately 40 percent of public health expenditures in Africa.

Malaria Transmission and Infection

Malaria is a blood-borne infection transmitted to human beings by the bite of female *Anopheles* mosquitoes. The initial symptoms of a malaria infection include fever, chills, and flu-like illness. Mild to moderate anemia is also common because the malaria parasite infects and destroys red blood cells. If left untreated, malaria can result in severe anemia, lung and kidney failure, coma, and death.

Malaria is typically found in tropical and subtropical regions of the world, particularly sub-Saharan Africa, where the mosquito and the malaria parasite thrive. Four species of malaria parasites infect humans, although two species, *Plasmodium falciparum* and *Plasmodium vivax*, account for about 90 percent of all human infections. In sub-Saharan Africa, the majority of infections are caused by *P. falciparum*, which causes the most severe form of the disease and almost all deaths worldwide.

Social and Economic Impact

Approximately 3.2 billion people worldwide live in areas at risk of malaria transmission. An estimated 300 million to 500 million of them become ill with malaria each year, and more than 1 million die. More than 80 percent of deaths occur in sub-Saharan Africa. Box 1 shows the distribution of malaria in Africa. While all persons living in areas where malaria is transmitted can be infected, three populations are particularly vulnerable children under five years of age, pregnant women, and people with HIV/AIDS. Malaria is a leading cause of death in African children, accounting for approximately 18 percent of deaths in children under five.

Although malaria eradication efforts during the 1950s and 1960s successfully eliminated or controlled the disease in some areas outside Africa, malaria remains a major killer in Africa due to a combination of biological, economic, and political factors. The sub-Saharan climate provides ideal conditions for malaria transmission, while poverty and political instability create obstacles to successful malaria control.

Malaria Control Interventions

Malaria is both preventable and treatable. Several proven and cost-effective prevention and treatment measures exist. These include insecticide-treated mosquito nets (ITNs), indoor residual spraying (IRS) of insecticides, intermittent preventive treatment for pregnant women (IPTp), and prompt use of artemisinin-based combination therapies (ACTs) for those who have malaria. The appropriate mix of prevention and treatment interventions varies according to:

- The pattern of malaria disease transmission;
- Mosquito resistance to insecticides and parasite resistance to antimalarial drugs;
- The age and pregnancy status of infected persons; and
- Operational feasibility and sustainability.

1. Insecticide-Treated Mosquito Nets

In Africa, malaria-carrying mosquitoes typically bite late at night or in the early morning hours. A net hung over the sleeping area prevents mosquitoes from biting. When that net is treated with insecticide, it provides much greater protection by repelling mosquitoes and killing those that land on it. The insecticides used to treat the nets have been approved for safety and efficacy by the World Health Organization (WHO). ITNs have been shown to reduce all-cause mortality in children less than 5 by about 20 percent and malarial illnesses among

children under five and pregnant women by up to 50 percent.

ITNs come in a variety of shapes, colors, and sizes, ranging in price from $4 to $7. Until recently, ITNs required re-treatment with insecticide about every six months to maintain their effectiveness. ITNs now have been developed that have insecticide bound to or incoporated in the netting material during production, which enables them to maintain their full protective effect through at least 20 washes, which is equivalent to three to four years of regular use.

PMI has focused on scaling-up ITN coverage in all 15 focus countries. While ITN activities are tailored to the local conditions and capacities of each country, PMI follows certain principles and best practices in all focus countries:

- Targeting the most vulnerable populations, children under five and pregnant women;
- Removing cost as a barrier to ITN ownership through provision of free ITNs to the poorest and most vulnerable groups, while allowing market segmentation to increase access to low-cost or highly subsidized nets for those who can afford them;
- Building upon existing mechanisms for delivery, including immunization or health campaigns, antenatal clinics, and the commercial sector;
- Preferentially procuring and distributing long-lasting ITNs, rather than conventional ITNs; and
- Educating populations at risk about the benefits of ITNs and their appropriate use.

2. Indoor Residual Spraying

IRS, a proven and highly effective malaria control measure, involves the coordinated, timely spraying of the interior walls of homes with insecticides. Mosquitoes are killed when they rest on walls. Sprayed houses are protected for about four to 10 months, depending on the insecticide used and the housing construction.

WHO has approved 12 insecticides it considers effective and safe for use in IRS, including DDT. The choice of insecticide depends on its registration status in the country, the housing construction (i.e., mud vs. brick vs. wood), the duration of the transmission season, and susceptibility

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Children under five, such as this Ugandan boy, are particularly vulnerable to malaria.

of local *Anopheles* mosquitoes to the insecticide. For IRS to be effective, at least 80 percent of the homes in the targeted area must be sprayed.

Prior to PMI, only a few countries in Africa were conducting large-scale IRS campaigns, most of these in southern and the Horn of Africa. PMI has now supported national malaria control programs to launch IRS activities in 10 countries, with the remaining five PMI focus countries scheduled to start IRS activities in the coming year. While IRS activities are tailored to the local conditions and capacities of each country, the following principles and best practices are applied in all countries:

- Completing environmental assessments and developing plans for the appropriate handling and safe use of insecticides prior to spraying;
- Recruiting and training local residents and government health staff to carry out and supervise IRS, building in-country capacity for future spraying activities; and

- Making house-to-house visits prior to spray campaigns to educate residents about IRS and foster cooperation with spray teams.

3. Intermittent Preventive Treatment in Pregnancy

Malaria infection during pregnancy poses serious health risks for both the mother and her unborn child. If a pregnant woman contracts malaria, she is at much greater risk of anemia, premature delivery, and death. In addition, her newborn child is at higher risk of low birthweight–a leading contributor to infant mortality in Africa. The prevention and treatment of malaria during pregnancy depends on a combination of malaria control measures, including the use of ITNs, prompt and effective treatment for clinical illness, and intermittent preventive treatment.

IPTp is a highly effective means of reducing the consequences of malaria in both the pregnant woman and her unborn child. Pregnant women in their second and third trimesters are administered at least two doses of the drug sulfadoxine-pyrimethamine (SP) at least one month apart. Because antenatal clinic attendance in most African countries is greater than 70 percent, IPTp usually is administered during routine antenatal clinic visits. Costing only 10 to 12 cents per treatment dose, IPTp reduces the frequency of maternal anemia, malaria infection of the placenta, and low birthweight babies and could prevent 75,000 to 200,000 infant deaths each year in Africa.

In all countries where IPTp is recommended, PMI is supporting the strengthening and expansion of preventive activities for malaria in pregnancy, which includes training health care workers in the use of IPTp and provision of ITNs, procuring and distributing SP and ITNs to antenatal clinics, and creating demand for antenatal care through health promotion and education activities.

4. Diagnosis and Treatment

Artemisinin drugs are the most rapidly acting and effective antimalarial drugs currently available. Combined with a second effective antimalarial, so-called artemisinin-based combination therapy has become the standard of treatment of malaria in almost all malaria-affected regions. The rationale for using combination therapy for malaria is that it greatly reduces the probability of the emergence of malaria parasites that are drug resistant, and thus prolongs the effective lifetimes of both drugs.

ACTs currently cost 10 to 20 times more than previous first-line malaria treatments, such as chloroquine, and have a shelf life of just 18 to 24 months. Therefore, good pharmaceutical management is critical to their effective use.

The high cost of ACTs increases the need for accurate diagnosis of malaria. Currently, most malaria cases are diagnosed solely on clinical grounds, without laboratory confirmation. Because the symptoms and signs of malaria are nonspecific, many people treated for malaria do not have the infection. The result is that costly drugs are wasted and other treatable conditions are missed. Microscopic examination of blood smears is considered the gold standard for diagnosis, but it requires considerable supervisory and logistical support to sustain high-quality performance. In recent years, the development and refinement of rapid diagnostic tests (RDTs) for malaria has offered a potentially simpler solution to laboratory diagnosis of malaria. RDTs, though simple to use, have their limitations. There have been problems with poor

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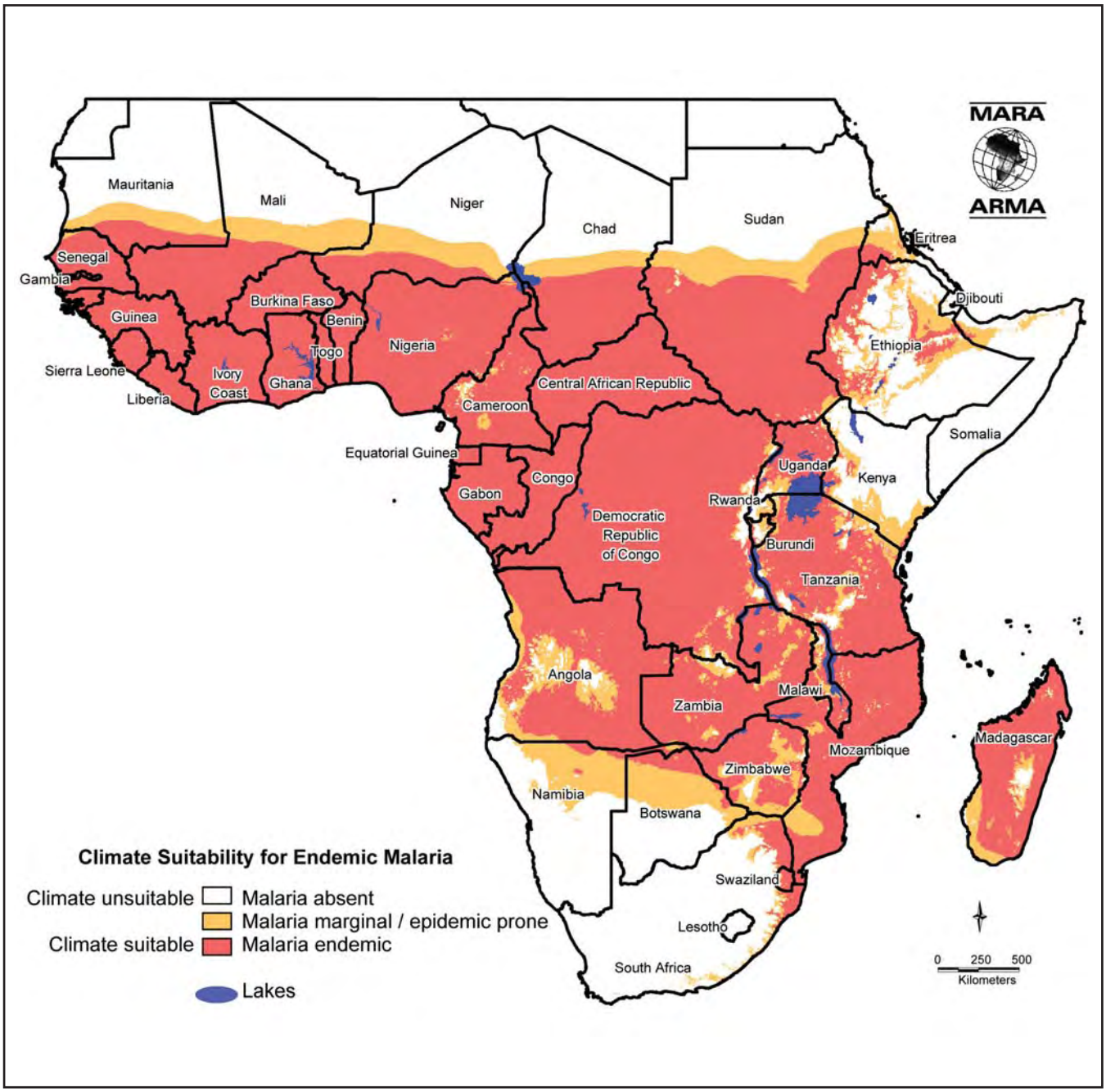
PMI's support is focused on pregnant women and children under five, the populations most at risk for malaria.

BOX 1
Distribution of Malaria in Africa



quality control during the manufacture of some test kits. All available RDTs also become unstable at high temperature and humidity. In addition, health care workers may not accept negative test results when those results do not agree with their clinical impression of the cause of a patient's illness.

PMI is supporting procurement and distribution of ACTs, the training of health workers in appropriate treatment guidelines, and the improvement of laboratory diagnosis of malaria.

President's Malaria Initiative: A Partner in Malaria Control

First Lady Laura Bush described the defeat of malaria as an "urgent calling," made even more pressing by the fact that we have the tools to prevent and treat the disease. International development experts agree that controlling

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A child with malaria receives artemisinin-based combination therapy in Tanzania.

malaria is critical to the continued development of this region. Malaria casts a shadow not only over health, but also educational attainment, worker productivity, and economic development in sub-Saharan Africa. Recognizing the grave threat presented by malaria in sub-Saharan Africa, President Bush created the President's Malaria Initiative, a five-year, $1.2 billion initiative to cut malaria mortality by 50 percent in 15 African countries with a high burden of malaria.

CHAPTER 2

"On behalf of the American people, the President has made unprecedented commitments to fight HIV/AIDS and other major health threats in Africa. The Emergency Plan for AIDS Relief and the President's Malaria Initiative have helped bring hope to millions of people in Africa over the last three years. I am excited to visit these important programs to see, first-hand, how these programs are working in communities to improve lives."
– Michael Leavitt, Secretary of the U.S. Department of Health and Human Services commenting prior to his visit to several PMI focus countries on August 15, 2007

BONNIE GILLESPIE/VOICES FOR A MALARIA-FREE FUTURE

At the Unyama Health Center in Uganda, a health worker explains to pregnant women how to hang and use the mosquito net that they will receive during their antenatal care visit.

Progress After Two Years of Implementation in Angola, Tanzania, and Uganda

In all three first-year PMI focus countries, Angola, Tanzania, and Uganda, considerable progress has been made in the fight against malaria. More children and pregnant women are sleeping under insecticide-treated mosquito nets; effective drugs are now available in health facilities and in communities to treat malaria patients; and homes are being sprayed with insecticides to reduce mosquito populations and protect residents from malaria. This chapter describes the achievements in these three countries during the last year.

ANGOLA

Malaria in Angola

Angola's health infrastructure was severely damaged during the civil war that ended in 2002, and it is estimated that only about 30 percent of the population has access to government health facilities. Malaria is a major health problem, accounting for an estimated 35 percent of the overall mortality in children under five, 25 percent of maternal mortality, and 60 percent of hospital admissions for children under five.

Insecticide-Treated Nets

Household ownership of one or more insecticide-treated nets (ITNs) has increased dramatically in the past year, especially in the seven provinces targeted during the 2006 measles immunization-ITN campaign, during which more than 800,000 ITNs were distributed free of charge. According to the nationwide Malaria Indicator Survey carried out between November 2006 and April 2007, 51 percent of households in those areas targeted by the campaign owned one or more ITNs compared to an estimated 11 percent prior to the campaign; in addition, 34 percent of children under five and 40 percent of pregnant women had slept under an ITN the previous night. During Year 2 of implementation, PMI:

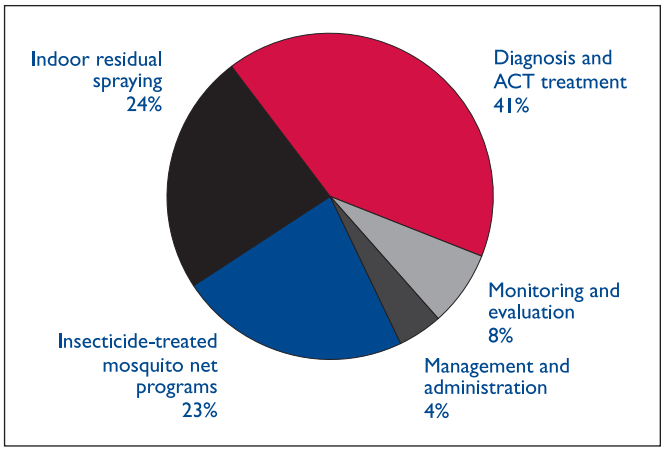
PMI RESULTS IN ANGOLA[1]

Intervention	Indicator	Year 1	Year 2	Cumulative Results
Insecticide-Treated Nets	ITNs procured (distributed)	540,949 (540,949)	294,200	835,149, of which 540,949 have been distributed
Indoor Residual Spraying	Spray personnel trained	350	582	–
	Houses targeted (% sprayed)	119,303 (90%)	130,218 (85%)	–
	People protected	590,398	612,776	–
Malaria in Pregnancy	Health workers trained in IPTp	1,450	290[2]	1,740
Diagnosis and Treatment	Health workers trained in ACT use	1,283	290[2]	1,573
	Health workers trained in malaria diagnostics	0	374[2]	374
	ACT treatments procured (distributed)	587,520	2,033,200 (1,101,801)	2,620,720, of which 1,101,801 have been distributed
	Rapid diagnostic tests procured (distributed)	129,875	375,000 (101,000)	504,875, of which 101,000 have been distributed
BUDGET	**$1.74 million (FY05), $7.5 million (FY06), $18.5 million (FY07)**			

[1] The PMI measured Year 1 and Year 2 results in terms of process indicators. Mid-point results for PMI in Angola will be obtained during 2008 through a nationwide household survey. Results reported in this table are up-to-date as of January 1, 2008.

[2] These health workers were trained in IPTp, case management/ACTs, and RDTs; an additional 84 laboratory workers were trained in malaria diagnosis only.

FIGURE 2.1
Allocation of $18.5 Million PMI Budget in Angola, FY07
(Proportion of budget spent on commodities: 62%)



- Procured 294,200 long-lasting ITNs, which have arrived in-country and will be distributed free-of-charge through antenatal and child health clinics; and

- Created demand and provided education related to ITNs through house-to-house visits, radio spots, and drama shows.

Mosquito net ownership and usage are expected to increase even more during the next 12 months, since more than 868,000 additional long-lasting nets procured with the Global Fund Round 3 grant have already been distributed in 2007.

Indoor Residual Spraying

Before PMI began work in Angola in 2005, no large-scale indoor residual spraying (IRS) had been conducted by the National Malaria Control Program (NMCP) for many years. During Year 1 of PMI, more than 107,000 houses were sprayed with a synthetic pyrethroid insecticide, lambdacyhalothrin, in the two southern provinces of Huila and Cunene with PMI support. In Year 2, PMI:

- Sprayed 110,826 houses in Huila, Cunene, and Namibe provinces. Eighty-five percent of the houses targeted for spraying were sprayed and a total of 612,776 residents were protected by the campaign;

- Trained 582 local personnel to conduct and oversee spraying activities; and

- Educated local residents about IRS to gain their acceptance and cooperation with the spray teams through house-to-house visits and the distribution of informational material.

Malaria in Pregnancy

Intermittent preventive treatment of pregnant women (IPTp) has now been scaled-up in 13 of Angola's 18 provinces. The training of health workers and provision of drugs for IPTp were carried out together with that for artemisinin-based combination therapy (ACTs) during 2006. IPTp is now being used in all 18 provinces. With PMI support, 290 health workers have been trained in IPTp, case management, and ITNs in Huambo Province. All sulfadoxine-pyrimethamine (SP) drug needs for IPTp are being met by the Ministry of Health (MOH) and the Global Fund. For the period of January to December 2007, support from all malaria partners in Angola resulted in more than 206,000 pregnant women receiving their first dose of SP and more than 182,000 receiving their second.

Diagnosis and Treatment

To address the slow implementation of artemisinin-based combination therapy, PMI supported strengthening of the national pharmaceutical logistics system, and a non-governmental organization (NGO), which is working with the NMCP to coordinate the rollout of ACTs in Huambo, one of the most highly malarious provinces. Since mid-2006, the rollout of ACTs has accelerated r apidly, and ACTs are now being used in all 18 provinces. Artemether-lumefantrine procured and distributed with PMI funds has contributed to the expansion of ACT rollout from 93 health facilities in nine provinces to 403 health facilities in 13 provinces. According to MOH reports, more than 110,000 treatments are being administered monthly. Based on the successful implementation of ACTs in Huambo province, PMI is supporting ACT rollout in four additional provinces through four new NGO partners. During Year 2, PMI:

- Procured 2,033,200 artemether-lumefantrine treatments, which have already arrived in-country, and distributed 1,101,801 treatments (some of which were procured in Year 1) to provinces;

- Developed provincial- and district-level training manuals on pharmaceutical management of ACTs in Portuguese;

- Trained trainers in pharmaceutical management of ACTs for 46 staff from all 18 provinces, and trained 46 pharmacy staff in Huambo province;

- Trained 290 health workers in Huambo in case management, ITNs, and IPTp;

- Trained a cadre of 12 senior laboratory workers in the microscopic diagnosis of malaria to ensure cascade training to lower levels of the health system in all 18 provinces and procured a teaching microscope for the central malaria diagnostic laboratory at the Institute of Public Health; and

- Procured 375,000 rapid diagnostic tests (RDTs) to improve diagnostic accuracy at the health center level and distributed 101,000 RDTs (procured in Year 1) to provinces.

Monitoring and Evaluation

Between December 2006 and April 2007, a nationwide Malaria Indicator Survey was conducted in 2,599 households, funded by PMI and the Global Fund. The survey was carried out by two Angolan NGOs with technical support from a U.S.-based organization that has extensive experience with Demographic and Health Surveys (DHS). This was the first nationwide health survey in Angola for many years and provided critical data on national coverage of the major malaria prevention and treatment interventions. It also will serve as the baseline for PMI in Angola.

Challenges and Future Directions

PMI is helping with two major challenges related to Angola's Global Fund support. Approval of the second phase of its Round 3 grant was in jeopardy due primarily to the slower than projected rollout of ACTs throughout the country. In addition, both Angola's Round 5 and Round 6 Global Fund grant applications had been rejected. Thanks to the accelerated scale-up of ACT implementation in Huambo and other provinces during the first six months of 2007, the Global Fund approved the $13 million Phase 2 of its Round 3 grant, which primarily provides funding to continue the scale-up of ITNs and ACTs.

JOAQUIM EVANGELISTA, PSI/ANGOLA

Domingas purchased a highly subsidized long-lasting insecticide-treated net during a routine visit to her physician.

PMI also worked with the Roll Back Malaria Harmonization Working Group and in-country partners to assist the NMCP in preparing its five-year, $78 million Round 7 proposal, which focuses on ITN and ACT procurement. In-country PMI advisors played a major role in developing a revised National Malaria Control Strategy on which the Global Fund proposal was based. In November 2007, the Global Fund Board announced that Angola had been successful in its grant application.

The past 12 months have also seen dramatic changes in the Roll Back Malaria Partnership in the country, with much improved coordination between partners under the growing leadership of the NMCP. This was most evident in the collaborative effort assisting the NMCP to prepare its Round 7 Global Fund proposal. Additionally, during the past year, the Government of Angola has demonstrated its growing commitment to malaria control through increased funding and support for the procurement of 600,000 ACT treatments and 54,000 ITNs.

TANZANIA

Malaria in Tanzania

Malaria is highly endemic in the United Republic of Tanzania, with 93 percent of the population (35.6 million) at risk on the mainland and 100 percent (1.1 million) at risk on Zanzibar. According to the MOH, malaria is responsible for more than half of the deaths among children under five years of age in health facilities and up to one-fifth of deaths among pregnant women.

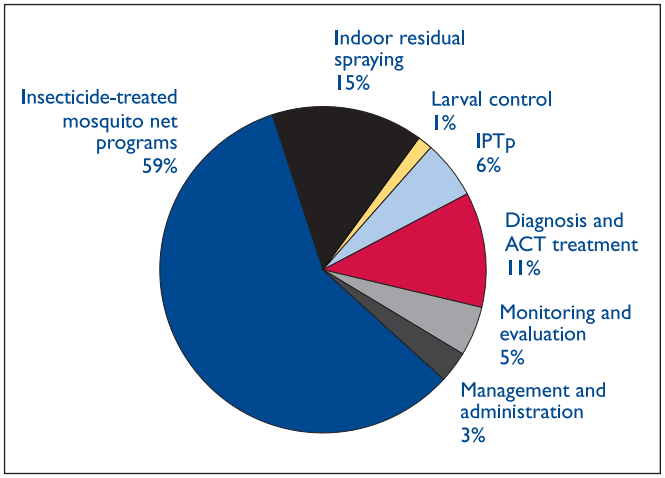
There has been noteworthy progress in the fight against malaria in Tanzania during the past year, particularly on Zanzibar, where laboratory-confirmed cases of malaria among children less than two years old have declined significantly (see Box 1). This follows the introduction and scale-up of key prevention and control measures by multiple partners, including the introduction of ACTs in late 2003, a mass ITN campaign in early 2006 funded by PMI and the Global Fund, and three rounds of IRS funded by PMI in 2006–07.

PMI RESULTS IN TANZANIA[1]				
Intervention	**Indicator**	**Year 1**	**Year 2**	**Cumulative Results**
Insecticide-Treated Nets	ITNs procured (distributed)	Zanzibar = 130,000 (130,000)	-	130,000, all of which have been distributed
	ITN vouchers distributed	Mainland = 382,900 infant vouchers	Mainland = 1,493,100 infant and pregnant women vouchers	1,876,000 distributed, of which 362,194 have been redeemed[2]
	Mosquito net insecticide re-treatment kits procured (distributed)	-	Mainland = 875,000 (875,000)	875,000, all of which have been distributed
Indoor Residual Spraying	Spray personnel trained	Zanzibar = 536	Mainland = 164 Zanzibar 1st round = 570 Zanzibar 2nd round = 570	-
	Houses targeted (% sprayed)	Zanzibar = 212,244 (96%)	Mainland = 40,197 (89%) Zanzibar 1st round = 217,737 (90%) Zanzibar 2nd round = 218,816 (97%)	-
	People protected	Zanzibar = 1,018,156	Mainland = 159,579 Zanzibar 1st round = 1,062,865 Zanzibar 2nd round = 1,120,381	-
Malaria in Pregnancy	Health workers trained in IPTp	Mainland = 376	Mainland = 1,158	1,534
Diagnosis and Treatment	Health workers trained in ACT use	Mainland = 4,217	Mainland = 1,011	5,228
	ACT treatments procured (distributed)	Mainland = 380,160 (380,160)	Mainland = 694,050 (694,050)	1,074,210, all of which have been distributed
	RDTs procured (distributed)	Mainland = 775,000 Zanzibar = 100,000 (100,000)	Mainland = 400,200 Zanzibar = 150,000 (1,025,200)	1,425,200, of which 1,125,200 have been distributed
BUDGET	**$2 million (FY05), $11.5 million (FY06), $31 million (FY07)**			

[1] The PMI measured Year 1 and Year 2 results in terms of process indicators. Mid-point results for PMI in Tanzania will be obtained during 2008 through a nationwide household survey. Results reported in this table are up-to-date as of January 1, 2008. In addition to results reported here, PMI supported larviciding activities in Year 1 and Year 2, which benefited more than 300,000 people.

[2] Confirmed voucher redemptions totaled 362,194 as of January 1, 2008. There is a lag time of several months between the distribution of vouchers and their redemption for a mosquito net.

FIGURE 2.2
Allocation of $31 Million PMI Budget in Tanzania, FY07
(Proportion of budget spent on commodities: 51%)



Insecticide-Treated Nets

On the mainland, Tanzania has primarily relied on the Tanzania National Voucher Scheme to distribute ITN vouchers to pregnant women and infants at health clinics. Vouchers are then redeemed for an ITN at the 6,200 shops or vendors nationwide. While the voucher scheme continues to serve as the primary mechanism for routine distribution of nets to infants and pregnant women, it will be complemented in 2008 with a nationwide, free distribution of long-lasting ITNs for children under five years of age. On Zanzibar, following the successful long-lasting ITN mass distribution in early 2006, the Zanzibar Malaria Control Program (ZMCP) introduced a voucher scheme as the routine distribution mechanism for long-lasting ITNs for pregnant women and infants. As of October 31, 2007, an initial batch of 58,000 vouchers had been distributed. During Year 2, PMI:

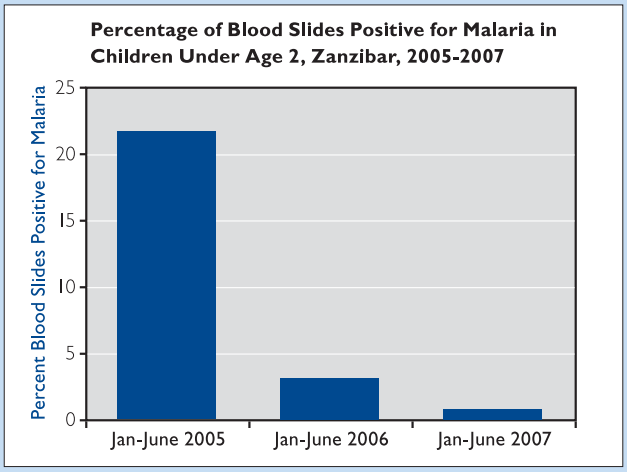
- Distributed an estimated 1.3 million infant vouchers to 3,426 health facilities nationwide, of which 362,194 have been redeemed as of January 1, 2008;
- Procured and distributed 875,000 insecticide treatment kits that were bundled with nets for the voucher scheme and for subsidized commercial sales; and
- Completed technology transfer to enable a Tanzanian net manufacturer to produce insecticide-treated polyethylene nets, with an annual production capacity of 1 million ITNs.

Indoor Residual Spraying

PMI has supported three rounds of IRS on the Zanzibar islands and one on the mainland since 2006. The second and third rounds of IRS on Zanzibar were conducted in February and September 2007, respectively. On the mainland, spraying was completed in Muleba District and will be expanded to Karagwe District in early 2008. During the second year of implementation, PMI:

- Sprayed approximately 200,000 houses and protected more than 1 million people in each of two rounds of spraying on Zanzibar. In both rounds, more than 90 percent of houses targeted for spraying were sprayed;

BOX 1
Reductions in Malaria Infections Among Children Attending Health Facilities on Zanzibar



During the past two years, the NMCP, PMI, the Global Fund, and other partners supported a rapid scale-up of ITNs, IRS, and ACTs on the island of Zanzibar. As of May 2007, a population-based survey showed that 74 percent of children under five and 73 percent of pregnant women had slept under an ITN the previous night. In July–August 2007, a survey of 10 health facilities showed a greater than 90 percent decline in the proportion of blood smears positive for malaria in children under two years of age, from 22 percent in 2005 to just 0.7 percent in 2007.

- Sprayed 35,691 houses, benefiting 159,579 residents in Muleba District in 2007; 89 percent of houses targeted for spraying were sprayed. Following spraying, a rapid reduction in the frequency of malaria infections and severe anemia was observed (see Box 2);

- Trained 570 local personnel on Zanzibar during each round and 164 personnel in Muleba District to implement spray operations; and

- Implemented a comprehensive behavior change and communication activity in Muleba District and on Zanzibar before and during the IRS campaigns, including sensitization meetings with local officials and religious organizations, radio spots, and dissemination of promotional materials to promote acceptance of the spraying.

Malaria in Pregnancy

PMI has supported the scale-up of IPTp through an integrated Focused Antenatal Care (FANC) approach recommended by the World Health Organization. In Tanzania, among 102 health facilities (reporting between October 2006 and June 2007) where USAID has supported FANC training with Maternal and Child Health and fiscal year (FY)2006 malaria funding, the proportion of women who received at least two doses of SP was 17 percent higher than the national average as measured in a 2007 national survey (2007 TNVS Evaluation, IHRDC/LSHTM). During Year 2, PMI:

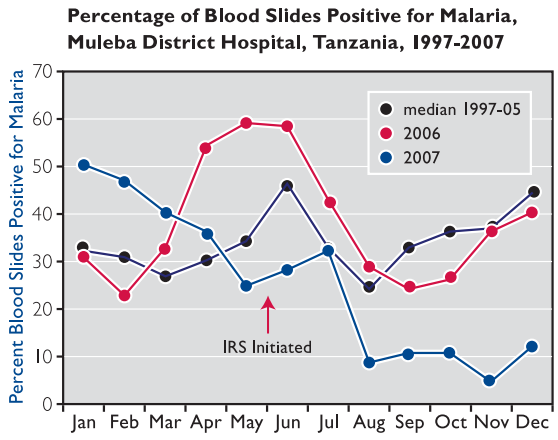
- Trained 1,158 health care workers in FANC and IPTp. Currently 1,295 health facilities (or 27 percent of all health facilities nationwide) have one or more workers trained in FANC/IPTp on the mainland; and

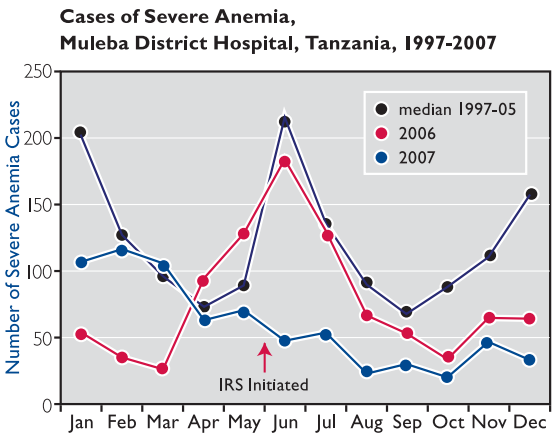
- Trained tutors and preceptors in FANC/IPTp from all 51 preservice nursing and midwifery schools in the country. Approximately 1,600 students graduate from these programs annually.

Diagnosis and Treatment

Artemisinin-based combination therapy was launched on Zanzibar and the mainland in 2003 and 2006, respectively, with support from the Global Fund. During Year 2, PMI has:

BOX 2
Reductions in Malaria Infections and Severe Anemia Following Indoor Residual Spraying in Muleba District, Tanzania





In 2007, PMI worked with the NMCP to launch IRS in Muleba District in northwest Tanzania, an area with highly seasonal malaria transmission. Information collected from the district hospital shows a 37 percent reduction in the proportion of blood smears from patients of all ages that were positive for malaria during the peak transmission season in June and July when compared with previous years. Data from this hospital also show a 70 percent reduction in severe anemia, to which malaria is a major contributor.

PMI/TANZANIA

On Zanzibar, a father and daughter smile outside their home after PMI-supported spray teams sprayed it with insecticides.

- Procured and distributed 694,050 ACT treatments to support malaria treatment in refugee camps and surrounding communities in western Tanzania (not covered by Global Fund ACTs) and through Accredited Drug Dispensing Outlets (ADDOs), which provide highly subsidized ACTs through private drug shops in rural Tanzania;
- Trained 1,011 pharmacy workers/shopkeepers participating in the ADDOs in the appropriate use of ACTs;
- Oriented more than 200 Regional and District Health Management Team members on the ADDO program and launched a system of supervision;
- Procured 150,000 RDTs for health facilities on Zanzibar and 400,200 RDTs for the mainland; and
- Strengthened the pharmaceutical management system to ensure continuous stocks of ACTs and SP for IPTp.

Larviciding

With PMI support, the City Council of Dar es Salaam has established a program in which community members deliver an environmentally safe insecticide to every collection of water in peri-urban areas that are home to more than 300,000 people. An assessment of this activity showed a reduction in the prevalence of malaria infection by 45 percent in the areas with larviciding when compared with the nonintervention areas, and a 50 percent reduction in the annual number of infectious mosquito bites at a cost of less than $1 per person per year.

Monitoring and Evaluation

PMI-Tanzania staff worked closely with the national malaria control programs of the mainland and Zanzibar and other partners to increase national monitoring and evaluation capacity. During Year 2, PMI:

- Assisted the National and Zanzibar Malaria Control Programs in drafting their first written, comprehensive monitoring and evaluation plans;
- Developed a strategy for using sentinel health facilities for intensified reporting of malaria indicators on the mainland and on Zanzibar; and
- Collaborated closely with ZMCP in developing a strategy for malaria epidemic detection and response.

Challenges and Future Directions

The major challenges for PMI in 2008 are:

- Sustaining the reductions in malaria incidence on Zanzibar by maintaining high net ownership and usage and instituting enhanced malaria surveillance at health facilities to detect and respond rapidly to increases in malaria transmission;
- Implementing the new policy changes to the Tanzanian National Voucher Scheme, including the transition to long-lasting ITNs and the reduced consumer co-payment fee;
- Increasing long-lasting ITN coverage levels for pregnant women and children under five;
- Planning and implementing the national, one-time long-lasting ITN catch-up campaign for children on the mainland; and
- Ensuring appropriate mechanisms are established so that ACT supplies are readily available at the district and peripheral level for prompt treatment of uncomplicated malaria.

UGANDA

Malaria in Uganda

Approximately 90 percent of Uganda's population of 29.4 million live in areas where malaria is transmitted. Malaria is the leading cause of morbidity and mortality, accounting for 30 to 50 percent of outpatient visits, 15 to 20 percent

of hospital admissions, and 9 to 14 percent of all hospital deaths. Nearly half of all in-patient deaths among children under five years of age are reported as clinical malaria.

Insecticide-Treated Nets

Uganda's NMCP promotes the distribution of long-lasting ITNs through a variety of channels, including free nets via health campaigns and antenatal (ANC) clinics, and subsidized and full cost nets through the private sector. PMI has supported all of these approaches in Uganda. During Year 2, PMI:

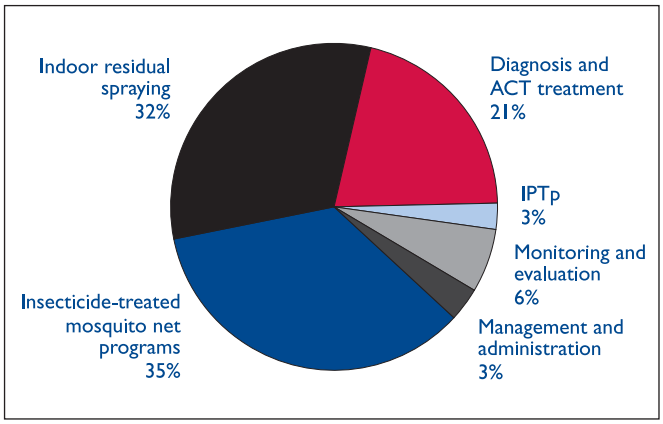
- Procured 1,012,138 long-lasting ITNs. In Year 2, a total of 1,053,677 nets were distributed (including some nets that were procured in Year 1 but were not distributed that year) for free as follows:
  - 590,621 were distributed free as part of a nationwide net distribution campaign in partnership with Malaria No More, the MOH, and the Global Fund, which distributed more than 2.3 million long-lasting ITNs in total;
  - 360,151 were distributed free to pregnant women and children under five through ANCs in northern Uganda; and
  - 102,905 were distributed free to pregnant women and children under five by 20 nongovernmental and community-based organizations and to people living with HIV/AIDS.
- Re-treated 71,086 mosquito nets with insecticide for free;

PMI RESULTS IN UGANDA[1]				
Intervention	**Indicator**	**Year 1**	**Year 2**	**Cumulative Results**
Insecticide-Treated Nets	ITNs procured (distributed)	376,444 (305,305)	1,012,138 (1,053,677)	1,388,582 procured, of which 1,358,982 have been distributed 1,518,317 sold with PMI marketing support
	ITNs re-treated with insecticides	505,573	71,086	576,659 nets re-treated with insecticides
Indoor Residual Spraying	Spray personnel trained	450	4,062	–
	Houses targeted (% sprayed)	107,634 (96%)	455,906 (98%)	–
	People protected	488,502	1,865,956	–
Malaria in Pregnancy	Health workers trained in IPTp	168	807	975
Diagnosis and Treatment	Health workers trained in ACT use	2,844	12,637	15,481
	ACT treatments procured (distributed)	261,870 (227,827)	0[2]	261,870 procured, of which 227,827 have been distributed; in addition, PMI distributed 8,709,140 treatments procured by the Global Fund
BUDGET	**$510,775 (FY05), $9.5 million (FY06), $21.5 million (FY07)**			

[1] The PMI measured Year 1 and Year 2 results in terms of process indicators. Mid-point results for PMI in Uganda will be obtained during 2008 through a nationwide household survey. Results reported in this table are up-to-date as of January 1, 2008.

[2] During Year 2, PMI did not procure any ACT treatments because sufficient quantities of ACTs were already being procured by other partners, such as the Global Fund.

FIGURE 2.3
Allocation of $21.5 Million PMI Budget in Uganda, FY07
(Proportion of budget spent on commodities: 45%)



- Sold 59,087 ITNs at a subsidized price via local net distributors and 872,946 ITNs at full market price through private retailers; and

- Created publications, television and radio shows, billboards, and road shows to promote the correct and consistent use of ITNs.

Indoor Residual Spraying

The Uganda NMCP aims to establish and sustain high quality IRS in epidemic and endemic malaria transmission areas. With the support of PMI, Uganda massively scaled up IRS from just one district in Year 1 to four districts in Year 2. In Year 2 of implementation, PMI:

- Trained 4,062 local spray personnel, including 2,938 supervisors/sprayers, 123 clinicians, and one environmentalist;

- Sprayed 446,117 houses with a pyrethroid insecticide in six districts. This represents 98 percent of all houses targeted for spraying. More than 1.8 million people were protected by spraying; and

- Sensitized residents about upcoming spray operations through community meetings, radio talk shows, radio spots, and film shows held in communities. Spray personnel were also given pocket reference cards to help them educate people about IRS.

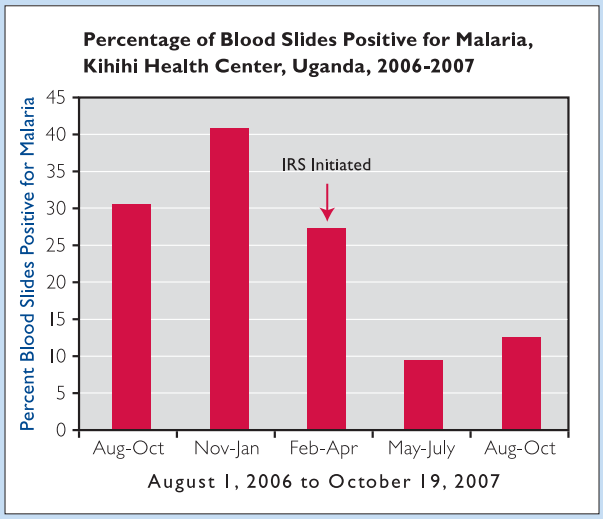
Malaria in Pregnancy

Although it is national policy that all pregnant women should receive two doses of SP during their routine ANC visits, according to the 2006 DHS survey, only 16 percent of pregnant women received two doses, while 37 percent received just one. Implementation of a USAID-supported malaria in pregnancy program in Kasese District between May 2006 and February 2007 resulted in increased coverage levels of one dose of SP, from 43 percent to 94 percent, and of two doses, from 27 percent to 76 percent, benefiting an additional 13,000 women. To increase the uptake of IPTp in Year 2, PMI:

- Developed, in collaboration with the MOH, health worker job aids for malaria in pregnancy, such as gestational wheels and malaria in pregnancy charts. A total of 3,000 gestational wheels and charts were distributed, covering 12 of the country's 96 districts; and

- Trained 807 health workers in IPTp. This was accompanied by an innovative information education communication (IEC) campaign that reached an estimated 2.5 million people and included drama troupes, radio talk shows, and community theater.

BOX 3
Impact of Indoor Residual Spraying on Laboratory-Confirmed Cases of Malaria in Uganda



PMI and the NMCP supported an IRS campaign in Kanungu District, Uganda, during February and March 2007. Data collected from the Kihihi Health Center in that district showed a 58 percent relative reduction in the proportion of blood smears positive for malaria, from 30.3 percent in August-October 2006 to 12.7 percent during the same time period in 2007.

PMI/TANZANIA

A team of spray operators prepares to deploy on Zanzibar, Tanzania.

Diagnosis and Treatment

With support from the Global Fund, Uganda introduced the ACT, artemether-lumefantrine, as its first-line treatment for uncomplicated malaria in 2006. PMI supported the rollout of ACTs by providing technical assistance in pharmaceutical management, supporting community-based treatment with ACTs, and building the capacity of the National Drug Authority. In Year 2, PMI:

- Supported the distribution of ACTs to health facilities (7,285,800 ACT treatments) and to community drug distributors (1,423,340 ACT treatments). These ACTs were procured by the Global Fund;
- Provided technical assistance to improve the availability of ACTs at health facilities;
- Implemented on-the-job training and supportive supervision for 9,988 health workers and training workshops for 2,649 private sector health care providers to ensure that ACTs are properly dispensed.
- Assisted the National Drug Authority in developing guidelines to phase out monotherapies for the treatment of malaria; and
- Conducted information, education, and communication activities to promote demand for and the correct use of ACTs through radio talk shows, radio spots, and community leaflets, reaching an estimated 4 million residents.

Monitoring and Evaluation

In 2006, PMI focused its support on strengthening Uganda's malaria monitoring and evaluation system and establishing a baseline for PMI, which included support for a verbal autopsy study to estimate the proportion of malaria deaths among children under five. During Year 2, emphasis has shifted to strengthening and expanding the existing network of sentinel sites for routine reporting on malaria morbidity and mortality. With support from PMI and the MOH, the number of sentinel sites has increased to 14 in eight districts, and these districts now have the capacity to monitor and collect high quality data on malaria morbidity and mortality. To obtain information on the availability and quality of malaria treatment, PMI supported a survey of 630 public, private, and not-for-profit health facilities throughout the country, and results are expected in early 2008.

Challenges and Future Directions

The major challenges in Year 3 in Uganda will be:

- Transitioning the IRS program from the use of pyrethroid insecticides to DDT;
- Ensuring effective implementation of the newly approved Round 7 Global Fund grant;
- Scaling up the use of ACTs at the community level through the existing community-drug distributor network; and
- Increasing the correct and consistent use of ITNs.

CURING MALARIA IN ANGOLAN CHILDREN WITH DRUGS THAT WORK

NATHAN MILLER/MENTOR INITIATIVE

Maria José Inés, Chief Nurse, Benfica Baixa Health Center, Huambo, Angola

Maria José Inés has seen many patients with malaria over the years. This year, she is seeing something different.

As Chief Nurse at the Benfica Baixa Health Center in the city of Huambo in Angola, Maria has treated malaria patients with a wide range of antimalarial drugs. This year, as part of the introduction of artemether-lumefantrine (AL or Coartem®) in Angola, she has begun using the new medication in place of the old standbys: chloroquine and amodiaquine. The differences between the old drugs and the new one are striking. As Maria explains, "Coartem is the best drug we have. With Coartem, 100 percent of patients with malaria are cured. With the other drugs, many people come back with malaria because of resistance."

The year 2007 marks the first widespread use of Coartem as first-line treatment for malaria in Angola. To date, 55 health facilities in Huambo Province (including hospitals, health centers, and one health post) have begun using the new drug. PMI has supported technical assistance to improve the drug logistics system, training of health workers, and Coartem procurement. The arrival of the new drug could not have been timelier, with malaria parasite resistance levels estimated at 50 percent for chloroquine. Thus far, resistance to Coartem has not been observed, meaning that many people who were once treated with partially effective or ineffective drugs are now being completely cured. Thus, fewer patients develop severe malaria and die as a result of malaria infection. In addition to improved effectiveness in clearing parasites, Maria adds that "we don't encounter many negative side effects," so patients are more likely to complete their treatments.

With the planned rollout of Coartem to all health facilities in the province, followed by expansion to other provinces, large numbers of Angolans will finally have an effective weapon against the country's number one killer. Patients are already beginning to ask for the drug when they go for consultations. Maria recounts that "people are starting to know Coartem. They come in and ask for 'that new drug for malaria with the pills in a card. That's the one that helped my baby.'"

CHAPTER 3

"The introduction of the new [malaria] drug plays a central role in the social and economic development of our country because only the healthy that are free from malaria and other diseases can contribute to meaningful economic development." – Dr. Marjorie Ngaunje, Health Minister of Malawi, December 5, 2007, commenting on the first shipment of artemisinin-combination drugs in Malawi that had been procured by PMI

PSI/MALAWI

Mrs. Mercy Matemba with her infant in Chilobwe township, Malawi – both grateful recipients of a long-lasting insecticide-treated net provided through PMI.

Malawi

Malaria in Malawi

Malaria is a major public health and economic problem in Malawi. The Malawi Ministry of Health (MOH) estimates that malaria accounts for 40 percent of all outpatient visits. Malaria is the leading cause of hospital admissions and death among children under five and is responsible for 39 percent of in-patient admissions. In addition, it is estimated that low-income families spend more than one quarter of their annual income to treat malaria. PMI's fiscal year (FY) 2007 budget for Malawi was $18.5 million in addition to $2 million in FY2006 funding, which was approved by the PMI Coordinator after Malawi was announced as a PMI focus country in June 2006 (Figure 3.1).

Insecticide-Treated Nets

The Government of Malawi has identified insecticide-treated nets (ITNs) as its primary malaria prevention strategy. Free long-lasting ITNs are distributed to

MALAWI AT A GLANCE

Indicator	Baseline Coverage	PMI Results[1]
Pregnant women who slept under an ITN the previous night	14.7%[2]	1,039,400 long-lasting ITNs procured, of which 211,995 have been distributed
Children under five who slept under an ITN the previous night	23%[3]	
Houses in geographic areas targeted for IRS, which were sprayed	No areas targeted at baseline[4]	26,950 houses sprayed and 126,126 people protected
Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy	46.5%[2]	Educational materials on IPTp distributed to health facilities
Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms	ACTs not yet implemented at baseline	4,694,013 ACT treatments procured and distributed to health facilities and regional stores
Government health facilities with ACTs available for treatment of uncomplicated malaria	ACTs not yet implemented at baseline	

YEAR 1 BUDGET: $2.045 million (FY06) and $18.5 million (FY07)

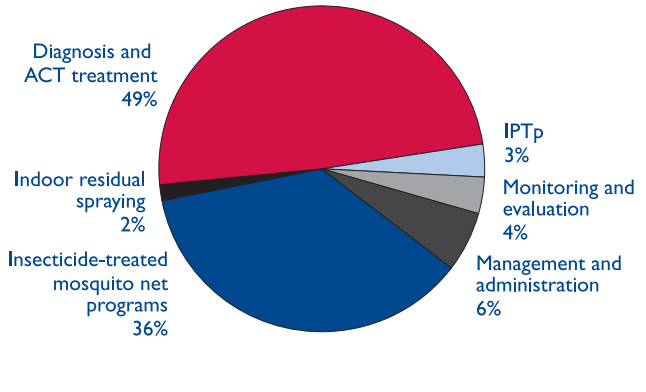
[1] The PMI measured Year 1 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2008. IRS results include spray activities through February 2008. Spraying will be completed in April 2008.

[2] 2004 Demographic and Health Survey

[3] 2006 Multiple Indicator Cluster Survey

[4] At baseline, no areas were targeted for spraying by the National Malaria Control Program.

FIGURE 3.1
Allocation of $18.5 Million PMI Budget in Malawi, FY07
(Proportion of budget spent on commodities: 69%)



Note: In addition to FY07 funding, $2,045,000 of FY06 funds were also used: $1,195,250 for ITNs; $205,000 for malaria in pregnancy activities; and $644,750 for other malaria activities.

pregnant women at antenatal clinics, to newborns at immunization clinics, and to the poorest of the poor through regular campaigns. There is evidence in Malawi that use of ITNs is making an impact on malaria (see Box 1). During Year 1, PMI:

- Procured 1,039,400 long-lasting ITNs for free distribution to pregnant women and newborns. All of these nets have arrived in-country as of February 2008, and 211,995 have already been distributed; and
- Supported a small grants program to community-based organizations to foster correct and consistent use of ITNs.

Indoor Residual Spraying

When PMI began work in Malawi, the only indoor residual spraying (IRS) being carried out in the country was a small spraying program on privately managed sugar estates; no MOH-supported IRS was being conducted. With the support of PMI, Malawi has expanded its IRS program through a successful public-private partnership with the Dwangwa Sugar Estates in Nkhotakota District. During the first year of implementation, PMI:

- Sprayed approximately 23,500 houses with insecticides, in addition to 3,450 houses sprayed by the sugar estate, which protected a total of 126,126 residents as of February 2008. Spray operations are continuing and will be completed in April 2008;
- Trained 300 local personnel to conduct and oversee spraying activities; and
- Provided information to local residents through house-to-house visits and radio messages, to educate them about the risks of malaria and the value of spraying.

Malaria in Pregnancy

Malawi was the first country in Africa to adopt intermittent preventive treatment for pregnant women (IPTp). According to the 2004 Malawi Demographic and Health Survey, the percentage of pregnant women receiving one dose of sulfadoxine-pyrimethamine (SP) was 79 percent, but only 46 percent had received two or more doses of SP in spite of high antenatal clinic attendance rates. All SP needs are being covered by the MOH. In Year 1, PMI distributed information education communication (IEC) materials for staff and patients to encourage early antenatal clinic attendance and increase coverage of IPTp.

ABBEY GONTER, USAID/DELIVER

Boxes containing artemisinin-based combination drugs procured by PMI are loaded onto trucks for distribution to health facilities nationwide in Malawi.

OLIVER HAZEMBA, MSH

Boxes of artemisinin-based combination drugs line the shelves of this district hospital pharmacy in Salima District.

Diagnosis and Treatment

In November 2007, Malawi introduced artemether-lumefantrine, an artemisinin-based combination therapy (ACT), as its new first-line malaria treatment. Implementation of this change in policy was made possible by PMI's support for the procurement of ACTs. PMI and the MOH have collaborated closely to implement the malaria treatment policy change. The MOH supplied the majority of the IEC materials and supported the training of health care workers on ACTs, while PMI procured 4,694,013 treatments and distributed these nationwide to regional stores and all health facilities. In addition to drug procurement, PMI provided technical assistance to the MOH's Central Medical Stores and the National Malaria Control Program (NMCP) in the areas of forecasting drug needs, distribution planning, improving storage capacity, health worker training, and supportive supervision. As a result of this support, all Malawians are now able to access free ACTs for the treatment of malaria. ACTs are now available in all of Malawi's health facilities, both those run by the government and those operated by the Christian Health Association of Malawi.

Monitoring and Evaluation

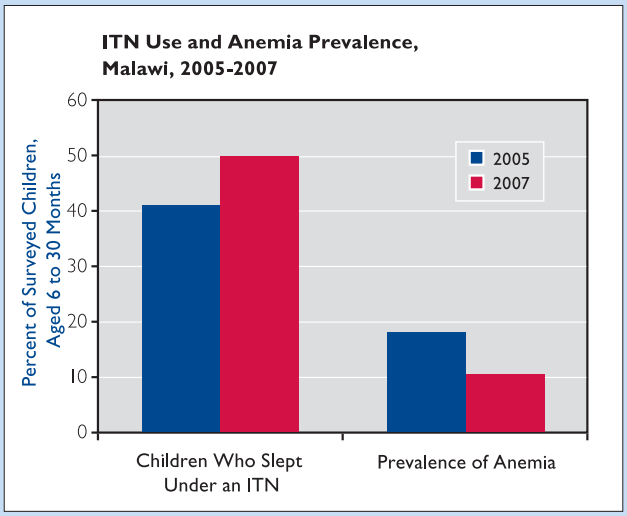
In 2007, PMI supported a variety of activities to strengthen the monitoring and evaluation capacity of the NMCP. For example, PMI conducted an anemia-parasitemia household survey among 12,000 households in six districts to provide early estimates of changes in ITN use and malaria infection for the NMCP and the PMI (see Box 1).

Challenges and Future Directions

Malawi has made major strides in the last year with support from PMI and other partners, primarily in terms of increasing long-lasting ITN ownership and assisting with implementation of ACTs as the new first-line antimalarial. Despite these successes, challenges exist for the coming year, including:

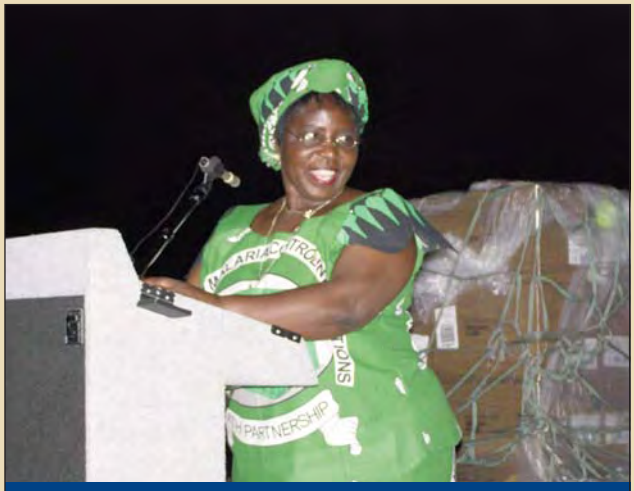
- Scaling up the use of ACTs at the community-level through the existing community drug distributor network;

BOX 1
Impact of ITN Distribution on Anemia in Young Malawian Children



Malaria infections are one of the major contributing causes of severe anemia in young children in Africa. In Malawi, ITN coverage has increased considerably during the past three years through the efforts of the NMCP, Global Fund, PMI, and other donors. A 2007 household survey in six of Malawi's 27 districts showed a 43 percent relative reduction in severe anemia in children aged 6 to 30 months compared with children of the same age in a 2005 survey. These surveys also demonstrated that, in this age group, children sleeping under an ITN had significantly reduced risks of malaria infection and anemia.

LIFE-SAVING DRUGS MAKE THEIR WAY TO MALAWI'S MALARIA PATIENTS



The Honorable Marjorie Ngaunje, Minister of Health, delivers a speech as she stands in front of PMI-procured ACTs on the tarmac of Kamuzu International Airport in Malawi.

Monday, September 24, 2007, represented an important milestone in Malawi's fight against malaria. At 6:30 in the evening, a DC-10 landed at Kamuzu International Airport, bringing 2.6 million doses of a malaria drug that will save many lives in Malawi. It comes as no surprise that the plane's arrival was greeted with a warm welcome from staff of the National Malaria Control Program, Malawi's Minister of Health Marjorie Ngaunje, U.S. Ambassador Alan Eastham, the USAID Mission Director, and other development partners.

The plane's cargo holds promise for the millions of Malawians who fall ill with malaria and the several thousand who die of the disease each year. As the Minister of Health pointed out, "It is estimated that there are about 6 million cases of malaria per year in our country and that the problem is worse in pregnant women and children under five." This consignment is the first of several artemisinin-based combination therapy (ACT) drug shipments funded by PMI, which will meet all of the country's malaria drug needs for the next 18 months.

In November 2007, the Ministry of Health officially changed its policy of first-line treatment for malaria from sulfadoxine-pyrimethamine (SP) to ACTs. "When we started using SP," said Ms. Ngaunje, "my ministry was conducting studies every two years to check whether SP was still effective in curing malaria. Just like with any other drug, we started seeing an increase in the resistance of malaria parasites to SP so that by the year 2004, the resistance levels were as high as 25 to 31 percent." PMI's funding for the new drugs means that malaria patients will be able to find life-saving ACT drugs at all public health facilities, including the estimated 40 percent of facilities run by the Christian Health Association of Malawi.

Working with the Central Medical Stores, PMI supported the distribution of the drugs to more than 550 facilities along 33 different delivery routes, ranging from urban hospitals to isolated rural health centers. To make sure that the drugs were properly prescribed, PMI also supported training on the revised standard treatment guidelines for ACTs for the health workers at these facilities. Resources from both PMI and the U.S. President's Emergency Plan for AIDS Relief are being leveraged to support Central Medical Stores to improve overall supply chain management, as well as more rational pharmaceutical management to ensure the correct and consistent utilization of all drugs in Malawi.

- Developing a diagnostic policy to complement the new ACT policy;
- Translating increased ITN ownership into increased correct and consistent use of ITNs; and
- Scaling up the use of IRS in line with national policy.

CHAPTER 4

"The President's Malaria Initiative is a terrific example of how governments can work together to address poverty and pandemic disease. Nongovernmental organizations, religious institutions, volunteer groups, and individual citizens can also play a role in this historic effort." – First Lady Laura Bush, Maputo Seminary, Maputo, Mozambique, June 27, 2007, in remarks addressed to the Inter-Religious Campaign against Malaria in Mozambique, which will receive a multi-year grant from PMI

BITA RODRIGUES/USAID

A large and very cheerful crowd gathered to listen to Mozambique's Minister of Health, Dr. Ivo Garrido; USAID Mission Director Jay Knott; and Bishop Dinis Sengulane, Chairman of the Roll Back Malaria Program, speak at the PMI launch ceremony.

Mozambique

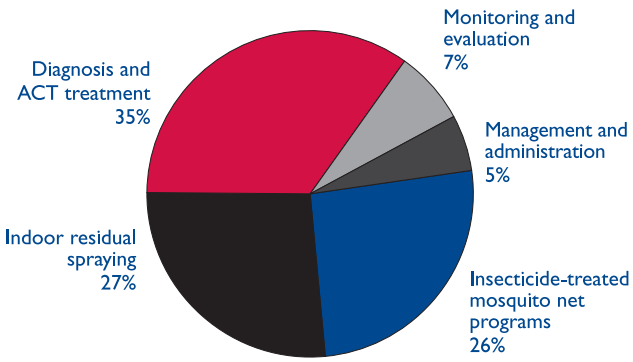
Malaria in Mozambique

Mozambique has a population of approximately 20.1 million, almost all of whom live in areas where malaria is transmitted. Malaria accounts for 40 percent of all outpatient consultations and 60 percent of all pediatric hospital admissions in Mozambique. It is also reported to be the leading cause of death among children admitted for pediatric services. PMI fiscal year (FY) 2007 funding for Mozambique in Year 1 was $18 million, in addition to $6.259 million in FY2006 funding, which was approved by the PMI Coordinator after Mozambique was announced as a PMI focus country in June 2006 (Figure 4.1). Activities were developed in close consultation with the National Malaria Control Program (NMCP) and fit in well with the Ministry of Health's (MOH) Strategic Plan for Malaria Control, while building on investments made by USAID to improve and expand malaria-related services over the past several years.

MOZAMBIQUE AT A GLANCE		
Indicator	**Baseline Coverage**	**PMI Results[1]**
Pregnant women who slept under an ITN the previous night	7%[2]	786,000 long-lasting ITNs procured and in-country, of which 565,000 have been distributed 454,986 nets re-treated with insecticide
Children under five who slept under an ITN the previous night	7%[2]	
Houses in geographic areas targeted for IRS, which were sprayed	Not available[3]	416,873 houses sprayed and 1,742,345 people protected
Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy	16%[2]	Training of health workers on IPTp to begin in early 2008
Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms	4.5%[2]	1,440,000 ACT treatments procured and 220,230 distributed to health facilities 391 health workers trained in malaria diagnostic techniques 174 health workers trained on ACTs
Government health facilities with ACTs available for treatment of uncomplicated malaria	Data not yet available	
YEAR 1 BUDGET: $6.259 million (FY06) and $18 million (FY07)		

[1] The PMI measured Year 1 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2008. IRS results include spray activities through February 2008. Spraying will be completed in March 2008.
[2] 2007 Malaria Indicator Survey, Preliminary Report
[3] Two large-scale IRS programs were underway in 2006 supported by the Ministry of Health and the Lubombo Spatial Development Initiative.

FIGURE 4.1
Allocation of $18 Million PMI Budget in Mozambique, FY07
(Proportion of budget spent on commodities: 49%)



Note: In addition to FY07 funding, $6,259,000 of FY06 funds were also used: $4,300,000 for IRS, $1,041,000 for ITNs; $209,000 for malaria in pregnancy activities; $529,000 for treatment; and $180,000 for other malaria activities.

Insecticide-Treated Nets

Mozambique promotes a policy of providing insecticide-treated nets (ITNs) free of charge through campaigns targeting children under five and through antenatal clinics (ANCs) to pregnant women. During Year 1, PMI:

- Procured 786,000 long-lasting ITNs, which have arrived in-country and of which 565,000 have been distributed for free to pregnant women and children under five. Of the 565,000 nets distributed, 437,000 were distributed via a sub-national campaign in partnership with UNICEF, Population Services International, and the Malaria Consortium; 78,000 were distributed through antenatal and child health clinics; and 50,000 were distributed in response to flooding in north-central Mozambique;
- Re-treated 454,986 nets free of charge through a campaign in five provinces in December 2006; and
- Provided technical assistance to the NMCP to draft a new national ITN policy, which focuses on universal access and provision of long-lasting ITNs.

Indoor Residual Spraying

Indoor residual spraying (IRS) in Mozambique began during the malaria eradication era in the 1960s. Although Mozambique's national IRS program has been under-funded, the MOH has been supporting IRS in peri-urban and urban areas for several years. Under the Lubombo Spatial Development Initiative, a three-country malaria control initiative, involving South Africa, Swaziland, and Southern Mozambique, large-scale IRS activities have been supported in Maputo Province since 2000. Based on the success of this program, the MOH targeted eight districts in Zambézia Province, with a population of 2.26 million, for IRS. During Year 1, the NMCP requested PMI assistance to spray six of these districts. In Year 1, PMI:

- Procured and delivered 60 tons of lambdacyhalothrin insecticide and 1,275 spray pumps;
- Trained 1,190 local personnel to conduct spraying and supervise operations;
- Sprayed 416,873 houses with lambdacyhalothrin and DDT (already procured by the Government of Mozambique) in six districts of Zambézia Province, which protected a total of 1,742,345 people as of February 2008. Spraying will be completed in March 2008; and
- Conducted community education campaigns in all areas targeted for IRS, including radio spots in three local languages, pamphlets, and house-to-house visits by 514 community mobilizers and their supervisors to gain community acceptance and cooperation with spray teams.

SHEALAH CRAIGHEAD/WHITE HOUSE

Mrs. Laura Bush hands out insecticide-treated mosquito nets during a visit to a malaria spraying site in Mozal, Mozambique.

BITA RODRIGUES/USAID

Chairman of the Roll Back Malaria Program, Bishop Dinis Sengulane; Mozambique Minister of Health, Dr. Ivo Garrido; and USAID Mozambique Mission Director Jay Knott (from left to right), presided over the net re-treatment ceremony, which marked the launch of PMI in Mozambique.

Malaria in Pregnancy

In May 2006, the MOH adopted intermittent preventive treatment of pregnant women (IPTp) with sulfadoxine-pyrimethamine (SP) for all pregnant women. Although ANC attendance in Mozambique is relatively high, with 81 percent of pregnant women making two or more visits during their pregnancy, the rollout of IPTp has been slow. In Year 1, PMI supported free long-lasting ITN distribution through ANCs. The first series of PMI-funded trainings for health workers on IPTp will begin in February 2008. Staff from PMI and the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) are working closely in Mozambique to ensure that pregnant women receive a full package of services when they attend their antenatal visits, including IPTp, long-lasting ITNs and services to prevent mother-to-child transmission of HIV.

Diagnosis and Treatment

In late 2004, Mozambique's first-line malaria treatment policy was changed to sulfadoxine-pyrimethmine/artesunate, with artemether-lumefantrine (which is also an ACT) as the second-line therapy. In 2007, artemether-lumefantrine was chosen as the first-line treatment for malaria in Mozambique and full rollout of this new policy is expected to begin in October 2008. The NMCP introduced rapid diagnostic tests (RDTs) in public health facilities in 2007 and plans to strengthen microscopic diagnosis where it already exists. In Year 1, PMI country staff assisted the NMCP in developing a written strategy for malaria diagnosis, including the use of microscopy and RDTs. As part of the NMCP plan to improve malaria diagnosis countrywide, PMI will purchase approximately 80 microscopes and microscopy supplies and will support the refurbishing and re-equipping of the national malaria reference laboratory. With PMI support, a detailed quantification of antimalarial drug requirements for each province for the full implementation of the new drug policy has been carried out. Training materials for the new drug policy have been developed and will be piloted in the coming months. In the first year of implementation, PMI:

- Procured 1,440,000 artemether-lumefantrine treatments, of which 220,230 have been distributed. The MOH reports that all government health facilities in Mozambique now have ACTs available;
- Trained 174 health workers in ACT use. As a result of support from all partners (including WHO, Malaria Consortium, Lubombo Spatial Development Initiative, and other PMI partners), the MOH estimates that 90 percent of all districts in the country have health workers trained in the use of ACTs; and
- Trained 391 health workers on malaria laboratory diagnostic techniques.

Communications and Behavior Change

In June 2007, First Lady Laura Bush announced the funding of the "Together Against Malaria" project of a newly-formed consortium of the 12 major religious groups in Mozambique called the Inter-Religious Campaign Against Malaria in Mozambique (IRCMM). The objective of this project is to help reduce malaria morbidity and mortality in Zambézia Province by providing correct and up-to-date information on malaria control and prevention.

Monitoring and Evaluation

To obtain information on coverage of malaria interventions and provide a baseline for PMI in Mozambique, PMI supported a nationally-representative Malaria Indicator Survey in June–July 2007. Almost 6,000 households were surveyed, and the final report is expected in early 2008. In late 2007, Mozambique began a nationwide mortality survey, which will provide specific estimates of malaria mortality among children under five. Funding is being provided by PEPFAR with technical assistance from the U.S. Bureau of Census and the other partners. PMI is also supporting technical assistance to strengthen the NMCPs monitoring and evaluation capacity.

FREE MOSQUITO NETS DRAW WOMEN TO HEALTH FACILITIES

Isabelle Fernando lost her first two children. "My daughter died at six months. She had a problem with her backbone, so I took her to the traditional healer," she says in Macua, the local language. "My son died of diarrhea when he was five months old." Isabelle has never been to school, does not know how to read or write, and does not know her age. But she now knows how to protect herself and her unborn child from malaria.

Isabelle is five months pregnant, and it is her second visit to her local health unit, a 20-kilometer walk from her remote village, located in the rural district of Monapo. "I left home before the sun came up to get here for my consultation." She concedes she might not have made the effort for that first trip, if she hadn't heard of the free distribution of mosquito nets for pregnant women. "I had heard about the nets," she says. "I hoped to receive one." Asked whether she would have asked if she was not given one, Isabelle smiles coyly, "No, I wouldn't be able to ask."

BITA RODRIGUES/USAID

Pregnant women and children under five in Mozambique are most vulnerable to malaria.

She was given a mosquito net during that first visit, and she says she is using it. She explains clearly in Macua why insecticide-treated mosquito nets prevent malaria and the dangers of malaria especially to pregnant women and infants.

With the support of PMI and partners such as the Malaria Consortium, the National Malaria Control Program has used a variety of methods to raise awareness about the free mosquito net distribution for pregnant women at antenatal clinics. Due to high illiteracy levels, messages are most effectively transmitted through word of mouth, radio, or visual tools, such as flip charts, which are used by nurses who have been specially trained on malaria control at the antenatal clinics. Ansha Lurdes, the nurse at the health center that Isabelle attends, says that the pregnant women who come to the center, "all know about the nets and most of them will ask for them."

The challenge is to access even more women living in remote areas, like Isabelle. A team from the health center goes out in a mobile unit three times a week to reach communities that are up to 90 kilometers away from the center. It is not an easy journey. Of the 21 districts in Nampula, only three are accessible by tarred roads, points out Armando Matos, the assistant program officer in Nampula for the Malaria Consortium. "Most of the roads are very bad dirt roads."

The mosquito nets are a proven tool in the fight against malaria control and could drastically reduce the high mortality rates in women and children in Mozambique. Each year, more than 400 out of every 100,000 pregnant women die due to complications during childbirth. More children die of malaria in Mozambique than of any other disease, accounting for 60 percent of the child pediatric hospital admissions and 35 percent of hospital deaths.

Isabelle heard about the mosquito net distribution during a talk given by a health worker in her remote community. She is convinced of the importance of the net. Although she and her husband are subsistence farmers and have little income to spend, she now values her mosquito net and says, "I don't want to be without a net now."

Challenges and Future Directions

In Year 1, a strong foundation was established in Mozambique to support a rapid scale-up of malaria prevention and treatment interventions during the coming year. The major challenges during Year 2 will be:

- A change in national malaria treatment policy from SP plus artesunate to artemether-lumefantrine that will require re-training of all public sector health workers and strengthening of the drug management system;

- Implementation of the new policy on diagnostic testing for management of persons with fever, with re-training of existing laboratory technicians in malaria microscopy; and

- Distribution of 1 million ITNs through a series of sub-national campaigns and through antenatal clinics.

CHAPTER 5

"The U.S. Government is pleased to be a partner with the Government of Rwanda in tackling this largely preventable disease. Working together, we have the opportunity to improve the living conditions of ordinary Rwandans and to prevent thousands of unnecessary illnesses and deaths." – Michael Arietti, U.S. Ambassador to Rwanda, speaking during the launch of the PMI-supported indoor residual spraying campaign, August 10, 2007

USAID/RWANDA

Kyankazi with one of her children at their home in Kicukiro District, Rwanda, which was sprayed, with PMI support, in September 2007. There are now fewer mosquitoes in the house," explained Kyankazi "Since the house was sprayed, no one has been sick."

Rwanda

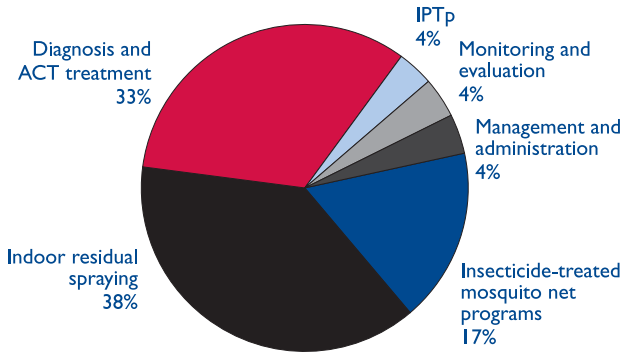
Malaria in Rwanda

With a population of approximately 9.1 million, Rwanda is one of the most densely populated countries in Africa. Malaria is the leading cause of death among Rwandan children under five, accounting for 34 percent of health facility deaths in this age group. In 2004, 54 percent of hospital cases and 53 percent of the deaths due to malaria occurred among children under five. Since the start of the PMI in Rwanda, the Initiative has supported National Malaria Control Program (NMCP) strategies and collaborated with national and international partners to complement Rwanda's malaria control efforts. The PMI fiscal year (FY) 2007 budget in Rwanda was $20 million in addition to $1.479 million in FY2006 funding, which was approved by the PMI Coordinator after Rwanda was announced as a PMI country in June 2006 (Figure 5.1).

RWANDA AT A GLANCE		
Indicator	**Baseline Coverage**	**PMI Results[1]**
Pregnant women who slept under an ITN the previous night	Pending[2]	Planned procurement and distribution of approximately 550,000 long-lasting ITNs in early 2008
Children under five who slept under an ITN the previous night	Pending[2]	
Houses in geographic areas targeted for IRS, which were sprayed	No areas targeted at baseline[4]	159,063 houses sprayed and 720,764 people protected
Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy	Pending[2]	250 health workers trained in IPTp 1.75 million SP tablets procured and distributed
Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms	Pending[2]	715,000 ACT treatments procured and in-country 5,127 community health workers trained on ACTs
Government health facilities with ACTs available for treatment of uncomplicated malaria	ACT implementation began in 2006[3]	
YEAR 1 BUDGET: $1.479 million (FY06) and $20 million (FY07)		

[1] The PMI measured Year 1 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2008.
[2] Baseline coverage data will be provided by the 2007 Malaria Indicator Survey, which is currently being finalized.
[3] As of October 2006, all government facilities are reported to have transitioned to ACTs and received new ACT stocks.
[4] At baseline, no areas were targeted for spraying by the National Malaria Control Program.

FIGURE 5.1
Allocation of $20 Million PMI Budget in Rwanda, FY07
(Proportion of budget spent on commodities: 42%)



Note: In addition to FY07 funds, $1,479,000 of FY06 funds were also used: $67,500 for IRS; $117,500 for ITNs; $430,490 for malaria in pregnancy activities; $616,510 for treatment; and $247,000 for other malaria activities.

Insecticide-Treated Nets

In Rwanda, long-lasting insecticide-treated nets (ITNs) are distributed through national integrated campaigns and routine antenatal care (ANC) and immunization clinics to pregnant women and children under five and are available through private sector social marketing programs to urban populations. Long-lasting ITNs have also been distributed to people living with HIV/AIDS (PLWHA) and poorest of the poor households through associations of community health workers and PLWHAs at the district level. During Year 1, PMI:

- Provided resources for the NMCP to supervise and follow up on a nationwide integrated campaign that distributed 1.35 million long-lasting ITNs (procured by the Global Fund) to children under five; and
- Procurement of approximately 550,000 long-lasting ITNs is planned in early 2008. Free distribution of these nets is planned for the poorest of the poor through health facilities and community health worker associations, together with follow-up activities to ensure correct use.

Indoor Residual Spraying

During Year 1 in Rwanda, PMI worked with the NMCP from August to October 2007 to introduce indoor residual spraying (IRS) in three districts. Further rounds of spraying in these same three districts are scheduled for 2008 with anticipated expansion into rural districts. Since IRS had not been part of Rwanda's malaria control strategy before PMI, the development of in-country technical capacity to oversee IRS activities was a high priority for the first year. During Year 1, PMI:

- Completed an environmental assessment to ensure safe use of the synthetic pyrethroid insecticide for IRS;
- Sprayed 159,063 houses in Gasabo, Kicukiro, and Nyarugenge Districts during the first round, protecting 720,764 people. Ninety-six percent of the houses targeted for spraying were successfully sprayed;
- Hired and trained 655 local residents to conduct and supervise IRS and local health personnel to identify and treat any potential side effects to the insecticide used; and
- Provided technical support to the NMCP to increase entomological capacity for mosquito vector monitoring, parasitological evaluations, and resistance monitoring for the districts targeted for IRS.

Malaria in Pregnancy

The PMI supported improvement of integrated focused antenatal care (FANC) services at health facilities through training and capacity building efforts at the national and district levels. To achieve these goals, PMI has supported the following activities during Year 1:

- Trained approximately 250 providers in FANC, including IPTp, in 12 of the country's 30 districts;

U.S. Secretary of Health and Human Services, Michael O. Leavitt, discusses home-based management of fever with community health workers in Kigali, Rwanda, in August 2007.

US EMBASSY/RWANDA

- Procured and distributed a full year's supply of iron-folate and 1.75 million SP tablets for intermittent preventive treatment in pregnant women (IPTp);

- Supported a staff position within the NMCP to assist with improving FANC training, provide input on updating ANC supervision tools, and conduct site visits with the NMCP; and

- Produced training materials, job aids, and other tools for ANC settings.

Diagnosis and Treatment

The PMI supports the NMCP's strategy to increase laboratory confirmation of malaria through upgrading laboratory equipment and support to the National Reference Laboratory's quality control program. Rwanda transitioned to artemether-lumefantrine as the first-line treatment for uncomplicated malaria in October 2006. With the combined support from the Global Fund, the PMI, and the Belgian Technical Cooperation, the NMCP has quickly expanded implementation of home-based management of fever with artemisinin-based combination therapy (ACT). In Rwanda, a highly successful community-based malaria treatment program reported that of all children treated for malaria, more than 80 percent had received their treatments within 24 hours of the onset of fever. During Year 1, PMI:

USAID/RWANDA

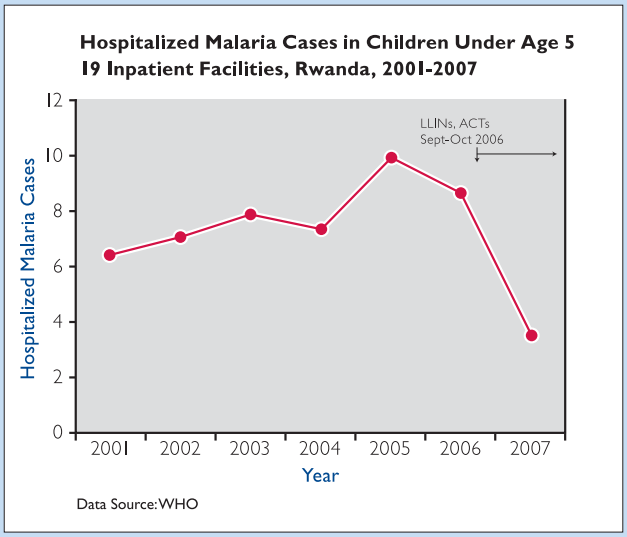
Three members of Masharika, a Rwandan drama and communications group, performing at the launch of PMI supported indoor residual spraying activities in August 2007 in the Gasabo District of Rwanda.

- Procured a one-year national supply of 147,250 ampoules of injectable artemether for the treatment of severe malaria;

- Procured 715,000 artemether-lumefantrine treatments that are being distributed by community health workers for home-based management of malaria and through the private sector;

- Expanded home-based management of fever in 10 districts by training 5,127 voluntary community health workers in ACT use, providing supervision

BOX 1
Impact of Long-Lasting ITNs and ACTs on Hospitalized Malaria Cases in Rwanda



In Rwanda, a Global Fund-World Health Organization (WHO) survey of 19 health facilities in November-December 2007 showed a 64 percent reduction in hospitalized malaria cases in children under five years of age shortly after the introduction and rapid scale-up of long-lasting ITNs, ACTs, and other malaria interventions throughout the country, beginning in late 2006. USAID has contributed to malaria prevention and control efforts in Rwanda through its health and community programming for many years, including support for the NMCP's home-based management of fever program that treats children under five with antimalarial drugs, procuring injectable artemether for treatment of severe malaria, and contributing to ITN distribution and follow-up activities as part of a nationwide integrated measles/ITN campaign.

SAVING LIVES BEGINS IN THE COMMUNITY

Mukamusoni is a mother of four children living in Kirehe District in Eastern Rwanda, an area prone to malaria outbreaks. When her children develop symptoms of malaria, she depends on community health workers for treatment. "I'm so glad for the community volunteer. When your child gets sick, day or night, you can get health care quickly and help your children."

In Rwanda, as in many parts of sub-Saharan Africa, malaria is the leading cause of death for children under five years of age. It is critical for young children to be diagnosed with malaria and receive treatment within 24 hours of the onset of fever. But, in rural Rwanda, families often live miles away from the nearest health facility and do not seek immediate care for malaria.

The Twubakane Project, supported by the PMI, is working to save children's lives by ensuring that they receive prompt treatment through home-based management of fever. Twubakane trains voluntary community health workers to diagnose the disease, provide life-saving ACT drugs, and refer severe cases to the closest health facilities for immediate care.

USAID/RWANDA

Mukamusoni with two of her children in Kirehe District, Eastern Province, Rwanda

"Before our neighbor began giving medicine to our children in the home, I always had trouble finding the money I needed for consultation fees to bring [them] to the health center. I was forced to [take a ride] to the hospital, where I had to pay so much that I was forced to sell my goats," explained Verena M., a 30-year-old mother with four children, living in Kicukiro District, a malaria-endemic district in central Rwanda. After home-based management of fever was introduced in her community, two of her young children were treated by a community health worker, and "they have been cured."

Community health workers not only provide medical care for young children, but also encourage pregnant women to use ITNs and go to the nearest health facility to receive intermittent preventive treatment for malaria. This treatment reduces the likelihood that mothers will become sick and have a negative impact on the health of her unborn child.

Home-based management of fever has eased the patient burden on health facilities in Rwanda. Sister Scholastic, a nurse in charge of childhood illnesses at the Masaka Health Center in Kicukiro District, said that the staff are "no longer overwhelmed by sick patients coming to the health center. The cases of fever are treated at the community level."

and logistics for procurement, repackaging, and distribution of AL. All training of workers at health facilities on ACTs is being covered by the Global Fund;

- Helped introduce ACTs to private sector pharmacies and retail outlets through training for private sector staff on how to appropriately treat malaria in children under five;
- Provided job aids and patient education materials on ACTs and strengthened the NMCP's capacity to supervise the transition to ACTs;
- Trained laboratory technicians and health workers in malaria microscopy and parasitological diagnosis in coordination with the U.S. President's Emergency Plan for AIDS Relief; and

- Provided technical support to assess and strengthen malaria diagnostics capacity.

Monitoring and Evaluation

The NMCP conducted a National Malaria Indicator Survey during June and early July 2007 to collect up-to-date information on coverage of malaria interventions, such as the use of ITNs, IPTp, and prompt, effective treatment of malaria. With PMI support, a national health facility survey was conducted to evaluate the quality of services at all 406 public health facilities; analysis of these data is underway. PMI is also supporting the development and pilot testing of a community-based disease surveillance system, which will provide data collected by community-level workers.

Challenges and Future Directions

During Year 1, PMI provided support for the implementation of key malaria prevention and control interventions in Rwanda with the intention of further supporting their expansion over the next three years. The major challenges in Year 2 will be to:

- Strengthen district level capacity to carry out IRS and community-based treatment of fever with ACTs in children under five. PMI will focus on improving district health capacity to carry out IRS, strengthening health facility services to improve supervision and ensure strong linkages with community health workers, and expanding information, education, communication strategies through nongovernmental organization networks; and

- Strengthen the Ministry of Health's and NMCP's capabilities in supply chain management for malaria commodities, the national laboratory diagnostics quality control program, and pharmacovigilance and drug quality monitoring.

CHAPTER 6

"What we seek in local partnerships in the fight against malaria is close collaboration among all actors for the effective implementation of our national strategic plan. I must say that from this perspective, PMI plays its part perfectly." – Dr. Pape Moussa Thior, Coordinator, National Malaria Control Program, Senegal, December 2007

RICHARD NYBERG/USAID SENEGAL

A young Senegalese girl on the island of Bassoul dances during a mosquito net distribution ceremony. Long-lasting ITNs from the PMI and corporate sponsors will cover the beds of all pregnant women and children under five on this remote island nestled in the mangroves of Senegal's Sine Saloum Delta.

Senegal

Malaria in Senegal

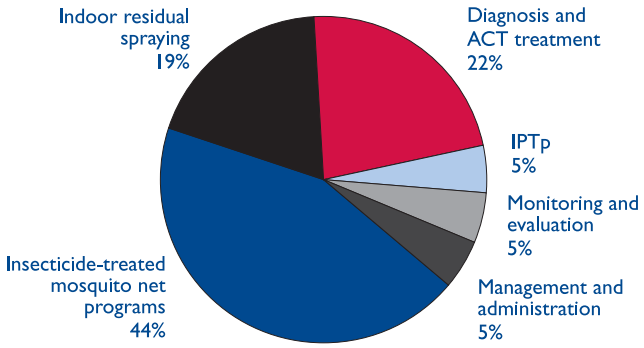
Malaria is endemic throughout Senegal, and all 11.3 million Senegalese people are at risk of contracting the disease. Malaria is responsible for about one third of outpatient consultations and a quarter of deaths among children under five in health facilities. Almost 60 percent of residents in rural areas live below the poverty line. Although substantial improvements have been achieved since the 1960s, Senegal's indicators of human development remain very low, and Senegal is ranked 156 out of 177 countries worldwide in terms of the human development index.

Planning for PMI Senegal Year 1 activities was completed in close consultation with the National Malaria Control Program (NMCP) and with the participation of nearly all national and international partners involved with malaria prevention and control in the country. The

SENEGAL AT A GLANCE		
Indicator	**Baseline Coverage**	**PMI Results[1]**
Pregnant women who slept under an ITN the previous night	17%[2]	200,000 long-lasting ITNs procured and in-country, of which 196,872 have been distributed Additionally, 134,413 ITN vouchers redeemed 158,060 ITNs sold with PMI marketing support 125,632 nets re-treated
Children under five who slept under an ITN the previous night	16%[2]	
Houses in geographic areas targeted for IRS which were sprayed	Not available[3]	76,279 houses sprayed and 678,971 people protected
Women who completed a pregnancy in the last 2 years and who received two or more doses of IPTp during that pregnancy	51%[2]	43 health workers trained on IPTp
Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms	3%[2]	1,020 community health workers trained in ACT use 127 health workers trained on ACT stock management procedures
Government health facilities with ACTs available for treatment of uncomplicated malaria	ACT implementation began in 2006[4]	
YEAR 1 BUDGET: $2.168 million (FY06) and $16.7 million (FY07)		

[1] The PMI measured Year 1 results in terms of process indicators, rather than outcome indicators. Results reported in this chapter are up-to-date as of January 1, 2008.
[2] 2006 Malaria Indicator Survey
[3] The 2006 Malaria Indicator Survey showed that 2.2% of households nationwide had been sprayed.
[4] Although the policy to replace chloroquine with artemisinin-based combination therapy drugs (ACTs) was approved at the end of 2003, ACTs only became available in January 2006.

FIGURE 6.1
Allocation of $16.7 Million PMI Budget in Senegal, FY07
(Proportion of budget spent on commodities: 43%)



Note: In addition to FY07 funding, $2,167,769 of FY06 funds were also used: $1,461,769 for ITNs, $285,900 for malaria in pregnancy activities, and $420,100 for treatment.

PMI's fiscal year (FY) 2007 budget for Senegal was $16.7 million in addition to $2.1 million in FY2006 funding, which was approved by the PMI Coordinator after Senegal was announced as a PMI focus country in June 2006 (Figure 6.1).

Insecticide-Treated Nets

The NMCP promotes insecticide-treated nets (ITN) distribution through a variety of approaches, including sales targeted to pregnant women and children under five, as well as sales to the general public at subsidized prices, sales through the private sector, and beginning in 2007, free distribution during periodic mass campaigns. During Year 1, PMI:

- Procured 200,000 long-lasting ITNs, of which 196,872 were distributed as follows:
  - 193,851 free long-lasting ITNs were distributed to children aged 6 to 59 months in the four peri-urban districts of Dakar region through the Government of Senegal's (GOS) National Micronutrient Days campaign.
  - 2,121 free long-lasting ITNs were distributed to people living with HIV/AIDS (PLWHA) through regional PLWHA networks.
  - 900 free long-lasting ITNs were distributed to pregnant women and children under five on an island in the Fatick region; combined with nets from other partners the distribution included enough nets to raise coverage on the island to 100 percent of these vulnerable groups.
- Distributed 134,413 subsidized long-lasting ITNs to pregnant women and children under five at health centers and health posts in five regions through a pre-existing voucher program. The value of the voucher was increased to about $6 in order to increase access to more effective but more expensive long-lasting ITNs;
- Provided marketing support to commercial vendors, resulting in the sale of 158,060 full cost ITNs to the general public between June 2006 and December 2007; and
- Re-treated 125,632 mosquito nets for free (more than 20 percent of these through matching funds from partners) through a community-based campaign targeting five of Senegal's eleven regions. In close collaboration with the NMCP and other malaria control partners, PMI worked through women's and community groups to implement the campaign.

To promote constant usage of ITNs, PMI also supported information, education, and communication (IEC) and behavior change communication (BCC) activities at the health facility and community level to ensure that residents understand the value of ITNs, especially long-lasting ITNs, and their correct care and use.

Indoor Residual Spraying

In partnership with the NMCP and the GOS Hygiene Service, PMI supported one round of spraying during May to August 2007 that protected more than 675,000

RICHARD NYBERG/USAID SENEGAL

PMI-supported spray operators launch their activities in the village of Keur Moussa, Senegal, under a banner that reads Together against malaria."

RICHARD NYBERG/USAID SENEGAL

Bator Diop and her three-month-old baby, Awa Sow, attend the launch of a mosquito net re-treatment campaign in Thiès, Senegal, on September 22, 2006. Hundreds of residents heard Senegalese and U.S. officials explain the importance of net re-treatment to fight malaria.

people. This was the first large-scale indoor residual spraying (IRS) program in Senegal in many years. In Year 1, PMI:

- Trained 275 local residents to conduct IRS and supervise operations;
- Implemented a highly successful round of spraying in three pilot districts (Velingara, Nioro, and Richard Toll), during which 76,279 houses were sprayed. This figure represents 98 percent of all houses targeted by the spraying program;
- Held focus groups in each district prior to spraying to develop a culturally appropriate public information campaign to support the spraying program. The campaign included posters, brochures, radio spots, community meetings, and house-to-house visits; and
- Collaborated with entomologists at the Université Cheikh Anta Diop and the Institut Pasteur to develop and implement an IRS monitoring and evaluation plan, including both epidemiological and entomological variables.

Malaria in Pregnancy

In 2003, the NMCP adopted intermittent preventive treatment in pregnant women (IPTp) with two doses of sulfadoxine-pyrimethamine (SP) as a standard part of antenatal care services. The 2006 Malaria Indicator Survey showed that 51 percent of women received two or more doses of SP during their last pregnancy, a significant increase from 13 percent in the 2005 Demographic and Health Survey. All Ministry of Health (MOH) antenatal clinics (ANCs) provide IPTp and the GOS provides SP at no cost to pregnant women. During the first year of implementation, PMI:

- Trained 43 health care workers on IPTp in two regions, including accurate record keeping and the diagnosis and treatment of malaria in pregnancy and provided supportive supervision to an additional 39 nurses and midwives across 11 regions;
- Developed and disseminated IEC/BCC messages designed to improve community awareness of the risks of malaria during pregnancy, promote the use of IPTp beginning early in the second trimester of pregnancy, and stress the importance of completing the recommended two doses of SP for IPTp; and
- Revised the antenatal care register to allow recording of IPTp doses.

Diagnosis and Treatment

Since January 2006, artesunate-amodiaquine combination therapy (AS/AQ) has been the treatment of choice for uncomplicated malaria in Senegal. The Global Fund Round 4 grant is covering all public sector artemisinin-based combination therapy (ACT) needs through 2009. Consequently, PMI has focused its efforts on strengthening the pharmaceutical management system and developing a system to ensure drug quality. PMI also supported refresher training of health personnel in case management and supportive supervision at all levels of the health system.

Fewer than 13 percent of malaria cases in Senegal are laboratory confirmed, and the quality of these diagnoses is unknown. During Year 1, PMI worked closely with

the NMCP and other partners to assess existing laboratory capacity, equipment, and needs for regional and district-level health facility-based laboratory services. Based on this assessment, PMI purchased laboratory equipment and supplies and worked with the NMCP to develop a plan for training and supervising laboratory workers. With Global Fund support, the NMCP has purchased rapid diagnostic tests (RDTs) and distributed them to all health districts following training and adoption of a testing algorithm. All suspected cases of malaria should now be confirmed with a laboratory test before antimalarial treatment is given. During Year 1, PMI:

- Developed a training curriculum for community health workers to implement case management of malaria with ACTs, with training for 1,020 community health workers at 656 community health huts in nine regions. An additional 2,705 community health educators from 117 health huts were trained to disseminate messages on malaria prevention and prompt care-seeking;

- Developed and disseminated IEC/BCC messages designed to encourage early care seeking for children with fever; and

- By March 2008, 80 laboratories in all districts and some regional level facilities will have been furnished with new microscopes and laboratory consumables, and 60 laboratory workers from every district and the central reference laboratory in Senegal will have received refresher training.

Monitoring and Evaluation

Between November and December 2006, PMI supported a nationwide Malaria Indicator Survey to provide data on coverage levels of major malaria prevention and treatment interventions for the NMCP and as a baseline for PMI. The survey was carried out by the Dakar-based Center for Research for Human Development with technical assistance from Macro International. A total of 3,063 houses were visited and 6,655 women interviewed. The PMI also supported two Demographic Surveillance Sites to obtain facility level malaria-specific mortality data for children under five. Improving data quality and data management are priorities of the NMCP. The PMI is providing technical assistance to improve the quality of data at the district level and also to strengthen data management at the central level.

RICHARD NYBERG/USAID SENEGAL

Monique Ndione of Thiès encourages other pregnant women to have their mosquito nets re-treated with insecticide.

Challenges and Future Directions

During Year 1, PMI established a strong foundation upon which to scale up interventions over the next three years. The major challenges during Year 2 will be to:

- Ensure that health workers at all levels adhere to new diagnostic and treatment guidelines based on the use of RDTs and ACTs;

- Improve communication and coordination among all malaria control partners in Senegal by re-activating the National Malaria Steering Committee;

- Work with the NMCP to implement a large-scale distribution of long-lasting ITNs, integrated with other child health activities, with PMI contributing more than 700,000 long-lasting ITNs; and

- Improve the quality, management, and analysis of data being reported through the routine NMCP system to more accurately reflect the impact of malaria control interventions.

SUPPORTING A VARIETY OF APPROACHES TO DISTRIBUTE MOSQUITO NETS IN SENEGAL

RICHARD NYBERG, USAID/SENEGAL

Rougiatou Diallo settles down for a nap with her two children, Serigne Fallou (3 years) and Mame Cor (1 year) in the district of Guédiawaye near Dakar.

As in any other country, Senegal has a diverse population: poorer and wealthier; schooled and unschooled; relaxed rural folks and hurried urbanites; toddlers, pregnant women, and elderly couples; mainlanders and islanders. And, a variety of people means a variety of tastes and ways to deliver products that people will use. Whether in the dusty streets of Kolda or the colorful alleys of Saint-Louis, you might hear locals invoke the proverb: "Bëgg-bëgg yee wuute, moo-tax njaay may jar ca jaba," which translates "people's preferences are different, which is why everything sold in the market finds a buyer."

That's the reason that PMI in Senegal is using several different methods to make insecticide-treated mosquito nets available to everyone at risk of malaria. First and foremost, PMI targets people most vulnerable to malaria: pregnant women, young children, and people living with HIV/AIDS. To date, PMI in Senegal has procured and delivered (through a vitamin A campaign, a visit from First Lady Laura Bush, and AIDS patient networks) 196,872 long-lasting ITNs into the hands of Senegalese in these three groups, at no charge to them.

Pregnant women and young children took home another 134,413 nets after they chipped in a small co-payment for a net in one of the 24 districts where a voucher system has begun operating with PMI's support. PMI also teamed up with community organizations to help families re-treat 125,632 older mosquito nets with insecticide, renewing their protective value.

And for those Senegalese who prefer to shop around for their choice of an insecticide-treated mosquito net, or the convenience of popping into a pharmacy at any hour and picking up a net at market price, PMI partners have helped introduce and market new net brands to retail outlets, with a resulting 158,060 nets sold retail.

One beneficiary is 38-year-old Rougiatou Diallo, who lives in the Guédiawaye District near Dakar. She received a mosquito net when she took her children to participate in a combined micronutrient-mosquito net campaign in May 2007. She was so pleased about the free net that "came from the Americans" that her family went out to buy a second at the nearby health center. The two nets protect Rougiatou and six children from malaria. Seven months after receiving the net, she reports that no one in the family has fallen ill with malaria, and mosquitoes do not venture into their bedrooms anymore. And if they do, she says, they are found dead on the floor the next morning.

CHAPTER 7

"After only two years of implementation, PMI-supported activities have benefited over 25 million people in Africa. Made possible by the American people and through the collective efforts of the private sector, nonprofits, and our international partners, lives are being saved every day. PMI more than doubled to 15 focus countries this year, and we continued to move quickly to launch high-impact activities on a national scale to protect people from this preventable and treatable disease." – Rear Admiral R.T. Ziemer USN (ret), Coordinator, President s Malaria Initiative, January 23, 2008

A woman stands near a long-lasting insecticide-treated mosquito net she received for free through a net distribution campaign in Zambia, which was supported by many partners, including PMI.

Activities in New PMI Focus Countries

In December 2006, the President and First Lady announced the final eight PMI focus countries: Benin, Ethiopia (Oromiya region), Ghana, Kenya, Liberia, Madagascar, Mali, and Zambia. Beginning in December 2006, the PMI Coordinator approved additional funding to accelerate malaria activities in these countries. Highlights of early activities in new PMI focus countries, implemented using fiscal year (FY) 2006 and FY2007 funding, include:

- In **Benin**, PMI contributed 150,000 long-lasting insecticide-treated nets (ITNs) and logistic support for the country's first national integrated campaign, during which more than 1.7 million mosquito nets were distributed to children under five. In addition, 391,680 artemisinin-based combination therapy (ACT) treatments were procured, of which 153,884 have been distributed. A total of 178,400 rapid diagnostic tests (RDTs) were procured, of which 73,815 have been distributed.

- In **Ethiopia**, PMI supported indoor residual spray operations that resulted in 778,000 houses being sprayed, protecting approximately 3,890,000 residents. In addition, 102,145 ITNs were procured and distributed to vulnerable populations.

RESULTS IN NEW PMI FOCUS COUNTRIES[1]	
Benin	221,000 long-lasting ITNs procured, of which 215,627 distributed 391,680 ACT treatments procured, of which 153,884 distributed 178,400 RDTs procured, of which 73,815 distributed 605 health workers trained in ACT use and IPTp 2.3 million SP tablets and 1,073,490 ACT treatments procured (in-country February 2008)
Ethiopia	778,000 houses sprayed with insecticides, benefiting approximately 3.89 million residents 102,145 ITNs procured and distributed to vulnerable populations
Ghana	Approximately 83,602 women received IPTp in USAID-supported health facilities 60,023 ITNs procured and distributed 612,000 ITNs distributed through the private sector, with USAID technical assistance 151,036 nets re-treated with insecticide 200,000 nets currently being re-treated through a campaign (begun in December 2007)
Kenya	4,697 local residents trained in spray operations and 1,171,073 houses sprayed with insecticides in three provinces, benefiting 3,459,207 residents 60,000 ITNs procured and 5,000 distributed
Liberia	196,000 ITNs and 496,000 ACT treatments procured and in-country
Madagascar	Logistics and social mobilization support for a national long-lasting ITN campaign Preparations complete for IRS campaign targeting 250,000 houses (February 2008)
Mali	369,800 long-lasting ITNs procured and distributed through integrated campaigns Support for community mobilization and campaign follow-up activities
Zambia	Two rounds of IRS completed: – Round 1: 1,100 spray personnel trained and 592,346 houses sprayed, benefiting 3.1 million residents – Round 2: 1,300 spray personnel trained and approximately 665,000 houses sprayed, benefiting approximately 3.4 million residents 808,332 long-lasting ITNs procured, of which 550,017 distributed 979,000 RDTs procured and in-country (arrived in January 2008)

[1] Results reported in this table include key malaria activities implemented between December 2006 and January 1, 2008 using $23.59 million of FY06 and $42.82 million of FY07 funding.

RICHARD KAHN/CDC

A woman and her young daughter receive a free mosquito net during the launch of the PMI in Ghana.

- In **Ghana**, an estimated 83,602 women have received IPTp in PMI-supported health facilities. In addition, PMI has procured and distributed 60,023 ITNs and provided technical assistance to the commercial sector to support social marketing and distribution of an estimated additional 612,000 ITNs. Since December 2006, 151,036 nets have been re-treated with PMI support.

- In **Kenya**, PMI supported indoor residual spraying (IRS) activities in three provinces, benefiting 3,459,207 residents. A total of 4,697 spray operators were trained, and 1,171,073 houses were sprayed.

- In **Liberia**, PMI procured 196,000 ITNs and 496,000 ACT treatments, which have arrived in-country and are being distributed. With support from the Office of Foreign Disaster Assistance (OFDA), 25,333 SP tablets, 64,200 ACT treatments, and 140,000 RDTs were procured and are being distributed.

- In **Madagascar**, PMI provided $1 million to support logistics and social mobilization for a national integrated measles/malaria campaign that distributed more than 1.5 million long-lasting ITNs. According to Ministry of Health preliminary administrative coverage data, the campaign achieved greater than 90 percent coverage of children under five. PMI has also made preparations for an IRS campaign that will target 250,000 houses beginning in February 2008.

- Since **Mali** was announced as a PMI focus country in December 2006, a total of 369,800 long-lasting ITNs were procured and distributed free of charge through one regional and one national integrated child health campaign. The national campaign, held in December 2007, was supported by PMI, the United Nations Foundation, Malaria No More-Nothing but Nets, and the Canadian Red Cross.

- In **Zambia**, since December 2006, two rounds of IRS have been conducted in 15 districts. During each round, more than 1,000 local personnel were trained, approximately 600,000 houses were sprayed and more than 3 million residents benefited. A total of 808,332 long-lasting ITNs were procured, of which 550,017 have already been distributed. To contribute to improving case management of malaria, 979,000 RDTs were procured and arrived in-country in January 2008.

With continued support from Congress, PMI expects to reach additional beneficiaries with lifesaving malaria prevention and treatment measures during 2008 across the 15 PMI focus countries, while building in-country capacity and promoting sustainability.

CHAPTER 8

"Now is the time for Africa and its development partners to raise our collective ambition higher than ever before. Over the next three to five years, we must ask ourselves whether or not we can free Africa from malaria's grip. Achieving rapid but sustained malaria control will take both a tremendous ability to lead and willingness by many different partners to collaborate and coordinate their efforts." – Professor Awa Marie Coll-Seck, Executive Director of the Roll Back Malaria Partnership, October 11, 2007

CHRIS THOMAS/USAID

A Zambian child holds up a long-lasting insecticide-treated net delivered by the public-private partnership between the members of the Global Business Coalition, the Office of the U.S. Global AIDS Coordinator, the President's Malaria Initiative, Vestergaard-Frandsen, and a coalition of NGOs.

Success Through Partnerships

Partnerships and PMI

Reducing malaria deaths by half across 15 PMI focus countries and achieving 85 percent coverage levels by the end of 2010 are ambitious targets. PMI recognizes that this can only be achieved through a coordinated and unified approach with many partners, both at country and international levels. Partnerships are the heart of the PMI's strategy. The PMI closely coordinates its activities

PMI PARTNERSHIPS: MASS INSECTICIDE-TREATED NET DISTRIBUTION CAMPAIGNS

Country	Long-lasting ITNs Distributed (All partners)	PMI Partners	PMI Contribution
Benin	1,700,000	NMCP World Bank UNICEF WHO Soroptimist International	150,000 long-lasting ITNs and support for campaign logistics
Madagascar	1,500,000	NMCP Global Fund Malaria No More UNICEF Red Cross	$1 million to support campaign logistics, social mobilization, and follow-up to the campaign
Mali	2,262,404	NMCP Global Fund Malaria No More Nothing But Nets UNICEF WHO Red Cross Mission Bilateral Partners Groupe Pivot Santé	169,800 long-lasting ITNs; technical support for campaign planning; financial and technical support for community mobilization and campaign follow-up
Mozambique	698,000	NMCP UNICEF Population Services International Malaria Consortium	437,000 long-lasting ITNs
Rwanda	1,350,000	NMCP Global Fund UNICEF WHO French Cooperation Rwandan Red Cross Population Services International IntraHealth	Support for supervision and campaign follow-up
Uganda	2,300,000	NMCP Global Fund Malaria No More	590,621 long-lasting ITNs educational materials and support for monitoring and evaluation
Zambia	500,000	NMCP PEPFAR Global Business Coalition RAPIDS	77,669 long-lasting ITNs

CHRIS THOMAS/USAID

Rear Admiral Ziemer, the PMI Coordinator, hands two long-lasting ITNs to a woman in Zambia as part of the RAPIDS (Reaching HIV-Affected People with Integrated Development and Support) campaign. "It's an unprecedented partnership between governments, businesses, and religious groups to reduce the suffering caused by malaria," said Mrs. Bush (not pictured).

with host country governments; other U.S. Government agencies; international organizations; other bilateral, multilateral, and private donors; and nongovernmental organizations (NGOs) and faith-based organizations. Over the past two years, PMI has forged broad partnerships in all PMI focus countries.

Host Country Governments

The PMI works within the overall strategy and plan of the host country's national malaria control program. PMI activities are planned and implemented in close collaboration with each host country's Ministry of Health. The PMI's long-term goal is to strengthen in-country capacity so that gains achieved with U.S. Government and other donor support can be sustained. Some examples include supporting refresher training for laboratory workers; quality control of malaria diagnosis; training provincial and district level staff to plan and conduct indoor residual spraying; and improving pharmaceutical supply and management systems for the proper distribution and use of artemisinin-based combination therapy (ACT) and intermittent preventive treatment for pregnant women (IPTp). For example, in Malawi, sulfadoxine-pyrimethamine for IPTp was purchased by the Government of Malawi, while PMI focused its resources on improving health care worker performance in adhering to the recommended policies for prevention of malaria during pregnancy and encouraging women to complete all recommended antenatal care visits on time.

Private Sector and Foundations

When PMI was launched in June 2005, President Bush urged other donors, including the private sector, to join in a broad campaign to reduce malaria mortality by 50 percent in Africa. The President reiterated this challenge in his remarks at a White House event on Malaria Awareness Day, April 25, 2007. In Year 2 of the PMI, partnerships with the private sector have expanded and leveraged malaria interventions to reach a greater number of beneficiaries.

Several donors in the private sector are already making major contributions to the fight against malaria, including the Bill and Melinda Gates Foundation, one of the largest funders of health activities in the world today, and Marathon Oil Corporation with Noble Energy, Inc., which are supporting a highly successful malaria control project in Equatorial Guinea.

In fiscal year (FY) 2007, the ExxonMobil Foundation made a second $1 million dollar donation to USAID/Angola to support PMI objectives in the country. In Zambia PMI, PEPFAR, and member companies of the Global Business Coalition on HIV/AIDS, Tuberculosis and Malaria (GBC) created a public private partnership that financed the distribution of 500,000 ITNs throughout the country. GBC is an alliance of over 220 international companies working to leverage the private sector's unique skills in the fight against HIV/AIDS, TB, and malaria. With the support of PMI, Malawi expanded its IRS program through a successful public-private partnership with the Dwangwa Sugar Estates in Nkhotakota District. The PMI also worked with private sector partners to implement many of the integrated ITN campaigns that took place this past year in several PMI focus countries (see table on previous page).

Nongovernmental and Faith-Based Organizations

The PMI's target of reaching 85 percent of children under five and pregnant women with life-saving interventions can only be achieved through close partnerships with civil society organizations, including NGOs, community-based organizations, and faith-based groups. These organizations are active partners in all PMI focus countries and in all four PMI intervention areas: ITNs, IPTp, ACTs, and community mobilization for IRS. NGOs have significantly contributed to PMI's successes to date. The participation of nongovernmental, faith-based, and community-based organizations are crucial to the success of PMI. These groups are well placed to

deliver services to people in remote areas where the formal health system is weak. They also have access to community networks and benefit from a high degree of credibility at the community level. To date, PMI has supported more than 70 nonprofit organizations, of which more than 20 are faith-based.

Nongovernmental and faith-based organizations have contributed in major ways to PMI's successes during Year 2. For example:

- In Madagascar, PMI supported both UNICEF and the American Red Cross along with the Ministry of Health to conduct a successful integrated measles-malaria campaign. American Red Cross worked with the local Red Cross chapter to provide post-campaign house-to-house follow-up to ensure that the long-lasting ITNs were hung and used.

- In Uganda, 59,800 ITNs procured by PMI were distributed free to pregnant women and children under five by 20 nongovernmental and community-based organizations.

- In June 2007, First Lady Laura Bush announced the funding of the "Together Against Malaria" (TAM) project of a newly-formed consortium of the 12 major religious groups in Mozambique called the Inter-Religious Coalition Against Malaria in Mozambique (IRCMM). The objective of the TAM project is to reduce malaria morbidity and mortality in Zambézia; reaching more than 1.6 million people with information on malaria control and prevention.

The Malaria Communities Program

On December 14, 2006, First Lady Laura Bush announced the Malaria Communities Program (MCP) at the White House Summit on Malaria. The MCP is a $30 million program under the umbrella of the PMI with the goal of identifying and supporting organizations new to partnering with the U.S. Government, both U.S.-based and indigenous, who are uniquely positioned to carry out sustainable malaria prevention and control activities at the community level in PMI focus countries. MCP grantees work in collaboration with other PMI malaria partners active in their target communities and contribute to achievement of PMI targets by increasing local ownership and capacity to undertake malaria prevention and treatment activities. In its first year, the MCP competitively awarded five cooperative agreements to new partner organizations to expand and promote proper use of ITNs; to support prevention and treatment of malaria in pregnant women; and to promote improved malaria case management, including community-based treatment efforts using innovative education and communication strategies. The five organizations receiving the MCP grants are Christian Reformed World Relief Committee, Lutheran World Relief, Episcopal Relief and Development, Minnesota International Health Volunteers, and Christian Social Services Commission. These organizations will receive a total of nearly $7 million, and approximately eight more grants are expected to be awarded in FY2008 through the MCP.

The U.S. President's Emergency Plan for AIDS Relief

PEPFAR and PMI already have seven focus countries in common (Ethiopia, Kenya, Mozambique, Rwanda, Tanzania, Uganda, and Zambia), and since both programs target pregnant women, there are programmatic reasons to combine IPTp and the distribution of ITNs with

CHRIS THOMAS/USAID

A Malian woman balances two long-lasting insecticide-treated mosquito nets that she received as part of a free distribution campaign that received support from many partners, including PMI.

services to prevent PMTCT of HIV/AIDS. Examples of PMI-PEPFAR collaboration include:

- In Mozambique, staff from the two programs are working together to ensure that pregnant women receive a full package of services when they attend antenatal visits, including IPTp, PMTCT services, and long-lasting ITNs. In addition, both programs are providing support to strengthen the supply chain for malaria and HIV/AIDS commodities.

- In Rwanda, PMI and PEPFAR have cooperated in reinforcing laboratory diagnostic capacity for malaria and HIV/AIDS. In FY2007, the collaboration emphasized training to improve the technicians' skills and supervision. Both programs have also jointly coordinated and supported large, national surveys to collect data relevant to both PMI and PEPFAR.

- In Zambia, PMI joined with PEPFAR and the Global Business Coalition to distribute approximately 500,000 long-lasting ITNs through home-based care networks serving families affected by HIV/AIDS.

- In Tanzania, as a result of PMI/PEPFAR joint collaboration, a nationwide survey including both HIV and malaria indicators has just been completed.

The Peace Corps

In the 15 PMI focus countries, there are excellent opportunities for Peace Corps volunteers to become involved in malaria activities in the schools and communities where they work. PMI and the Peace Corps jointly recognize that linking the creativity and commitment of Peace Corps volunteers to PMI activities benefits both programs. In Zambia, for example, a dedicated Peace Corps volunteer, who distributed more than 1,000 ITNs in her community, is now serving as a Malaria Technical Advisor within one of the NGOs that is implementing PMI activities.

Multilateral Organizations

The PMI seeks to identify and fill gaps in funding from other global partners engaged in the fight against malaria. In each PMI country, the Initiative coordinated its efforts with existing grants of The Global Fund to Fight AIDS, Tuberculosis and Malaria. For example:

- In Senegal, a Round 4 Global Fund grant is funding all ACT treatments through 2009, while PMI is focusing on training health care workers to use ACTs, developing IEC/BCC messages to encourage prompt treatment of fevers, and strengthening the laboratory diagnosis of malaria.

- In Rwanda, PMI provided resources for the NMCP to supervise and follow up on a nationwide integrated campaign that distributed 1.35 million long-lasting ITNs (which were procured by the Global Fund) to children under five.

- In Uganda, the Global Fund procured more than 8.7 million ACT treatments while PMI supported the distribution of the treatments to health facilities and to community drug distributors.

The PMI also coordinates its activities with The World Bank's Malaria Booster Program in countries where both programs are working. For example, in Benin, the Booster Program provided funding for the majority of the 1.7 million long-lasting ITNs that were distributed through a national campaign in October 2007, while PMI contributed 150,000 nets to fill the gap as well as logistic support for the campaign.

At the global level, PMI partners with both the WHO and UNICEF to ensure a steady world supply of high-quality ACTs, ITNs, and RDTs at reduced prices. PMI is also working with WHO and other technical partners to reach consensus on issues, such as how best to use microscopic diagnosis and RDTs in different epidemiologic and clinical settings and how to improve quality standards for antimalarial drugs, especially ACTs. The PMI and WHO are working together to support increased use of indoor residual spraying with insecticides (including DDT) in Africa. In several countries PMI has collaborated with both UNICEF and WHO to implement nationwide integrated ITN campaigns (e.g., Benin, Madagascar, Mali).

Only 32 percent of countries that submitted a Round 6 Global Fund malaria proposal were successful, including only two of the 15 PMI focus countries. PMI, working with other partners in the Roll Back Malaria Harmonization Working Group, provided technical assistance to 20 countries to improve the quality of their Round 7 Global Fund malaria proposals. As a result of this support, 15 (75 percent) of the 20 malaria proposals submitted by these countries were successful. Nine of the approved malaria proposals were from PMI focus countries.

CHAPTER 9

"We now have the tools to dramatically reduce malaria illness and mortality in Africa and are seeing excellent progress, but controlling malaria will involve more than procuring drugs and insecticide-treated nets. Malaria-endemic countries have severe shortages of trained health staff, weak logistics and management systems, and a lack of effective monitoring and evaluation systems, all of which may slow efforts to scale up malaria prevention and control measures. The PMI is actively working with other partners to address these constraints and sustain progress made to date." – Rear Admiral R.T. Ziemer USN (ret), Coordinator, President s Malaria Initiative, February 12, 2008

BONNIE GILLESPIE/VOICES FOR A MALARIA-FREE FUTURE

In Tanzania, PMI provides support to the Focused Antenatal Care program which deals with all the needs of pregnant women during their antenatal visits, rather than focusing on disease-specific issues.

Strengthening Health Systems and Building Capacity

PMI resources are now being programmed in ways that will directly and indirectly build health systems and strengthen overall capacity in host government ministries of health and national malaria control programs. The PMI works within the overall strategy and plan of the host country's national malaria control program, and PMI activities are planned and implemented in close collaboration with each host country's Ministry of Health. The PMI's long-term goal is to strengthen in-country capacity so that gains achieved with U.S. Government and other donor support can be sustained.

Strengthening Pharmaceutical Management

The PMI is working with ministries of health, national malaria control programs (NMCPs), and national essential drugs programs in all countries to improve the forecasting, procurement, storage, and distribution of artemisinin-based combination therapy (ACT) and other drugs, together with training and supervision of pharmacy and medical store staff and health workers to ensure the correct usage of these drugs. PMI is also supporting technical assistance to improve national capabilities in monitoring the quality of ACTs and other drugs. This support will not only improve the management of malaria commodities but all essential drugs.

Health Management Information Systems

Improving malaria surveillance and reporting is a high priority in all PMI countries. The PMI is working with NMCPs and other partners to develop comprehensive national malaria monitoring and evaluation plans that will form part of an integrated health management and information system. The PMI is also helping host countries in several other ways related to health management information:

- To provide timely information on malaria trends, PMI supports strengthening of sentinel sites or national malaria reporting systems in all 15 countries to collect routine data on malaria illnesses and deaths.

- The PMI provides support to national health management information systems, including efforts to improve data collection, management, and reporting.

- In those countries with epidemic-prone areas, PMI provides technical assistance to develop cost-effective epidemic detection and response capabilities that could be used for other diseases.

Integrated Maternal and Child Health Services

Since pregnant women and their newborns are most vulnerable to the severe effects of malaria infections, PMI has worked to improve service delivery through antenatal clinics and child health services. For example:

- In Tanzania and Rwanda, PMI provides support to the Focused Antenatal Care (FANC) program, which deals broadly with all of the needs of pregnant women during their antenatal clinic visits, rather than focusing on disease-specific interventions.

- In Mozambique, staff from PMI and the U.S. President's Emergency Plan for HIV/AIDS Relief (PEPFAR) are working together to ensure that pregnant women receive a full package of services when they attend antenatal visits, including intermittent preventive treatment for pregnant women, services to prevent

BONNIE GILLESPIE/VOICES FOR A MALARIA-FREE FUTURE

PMI is supporting National Malaria Control Programs to collect routine data on malaria illnesses and deaths, such as in this health facility in Uganda.

mother-to-child transmission of HIV/AIDS, and long-lasting insecticide-treated nets (ITNs). In addition, both programs are providing support to strengthen the supply chain for malaria and HIV/AIDS commodities.

- In Angola, PMI is procuring long-lasting ITNs, which will be distributed through antenatal and child health clinics for free.

Quality of Laboratory Services

With the introduction of more expensive combination therapies as first-line treatments of malaria in most African countries and the need to prevent the emergence of drug-resistant parasites, improving the quality of malaria laboratory diagnosis has become even more critical in good case management. At the same time, efforts need to be made to ensure that health workers have confidence in the laboratory results and prescribe treatment based on those results.

- In Mozambique, PMI is working with PEPFAR to strengthen malaria laboratory diagnosis as a part of an effort to improve the overall quality of laboratory services.

- In Uganda, PMI is supporting an innovative program to improve laboratory diagnosis together with training of physicians and nurses to increase their confidence in and use of laboratory testing.

- In most PMI countries, the Initiative is procuring microscopes to improve the quality of laboratory diagnosis in peripheral health facilities.

Overall Capacity Building of NMCPs

The PMI has supported general capacity building activities in national malaria control programs in all countries, including training and supervision, provision of equipment, and technical assistance. To further enhance these contributions, PMI is working with other donors to develop a standardized approach for assessing the managerial and fiscal oversight capacity of NMCPs. A pilot of this assessment was recently carried out in Malawi, and with minor modifications, similar assessments are planned for other PMI countries. The findings of the assessment will be used to plan additional capacity building activities.

Sustainability

Sustainability is a high priority for PMI. Toward this end, we are working to promote:

BONNIE GILLESPIE/VOICES FOR A MALARIA-FREE FUTURE

PMI is supporting training for laboratory workers to ensure accurate diagnosis of malaria and targeted use of life-saving artemisinin-combination drugs.

- Increased funding by host governments of their national malaria programs;

- Increased diversification and long-term funding by donors and partners;

- Improved quality of malaria services;

- Achievement of high and sustained national coverage rates for malaria prevention and treatment interventions;

- Active involvement of community-based, nongovernmental, and private sector organizations in malaria control at all levels;

- Long-term changes in behavior (e.g., culture of using ITNs, care seeking behavior) among vulnerable populations; and

- Improved health management and information systems.

Appendix 1

BASELINE COVERAGE OF MALARIA INTERVENTIONS IN ANGOLA, UGANDA, AND TANZANIA

Indicator	ANGOLA	UGANDA	TANZANIA	
			Mainland	Zanzibar
Pregnant women who slept under an ITN the previous night	22%[1]	10%[1]	16%[1]	20%[1]
Children under five who slept under an ITN the previous night	18%[1]	10%[1]	16%[1]	22%[1]
Houses in geographic areas targeted for IRS, which were sprayed	No areas targeted at baseline[2]			
Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy	3%[1]	18%[1]	22%[1]	14%[1]
Children under five with suspected malaria who received treatment with ACTs within 24 hours of onset of their symptoms	1.5%[1]	1%[1]	2%[1]	36%[1]
Government health facilities with ACTs available for treatment of uncomplicated malaria	< 5%[3]	0%[3]	<1%[3]	86%[4]

ANGOLA:
[1] Source: 2006-2007 Angola Malaria Indicator Survey.
[2] At baseline, no areas were targeted for spraying by the National Malaria Control Program.
[3] Best estimate based on available information. At baseline, ACTs were only being used in a small number of health facilities supported by nongovernmental organizations.

UGANDA:
[1] Source: Uganda 2006 Demographic and Health Survey.
[2] At baseline, no areas were targeted for spraying by the National Malaria Control Program.
[3] Best estimate based on available information. ACTs were not implemented in MOH facilities until March 2006.

TANZANIA:
[1] Source: 2004-2005 Tanzania Demographic and Health Survey.
[2] At baseline, no areas were targeted for spraying by the National Malaria Control Program.
[3] Best estimate based on available information.
[4] Source: Roll Back Malaria Coverage Survey (2004).

Appendix 2

PMI COUNTRY LEVEL TARGETS

PMI has a single set of country-level targets for the four major control measures. These targets are the same for each focus country, and they apply to the populations most vulnerable to malaria: children under age 5 and pregnant women:

- More than 90 percent of households with a pregnant woman and/or children under five will own at least one ITN.
- 85 percent of children under five will have slept under an ITN the previous night.
- 85 percent of pregnant women will have slept under an ITN the previous night.
- 85 percent of houses in geographic areas targeted for IRS will have been sprayed.
- 85 percent of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been protected by IRS.
- 85 percent of women who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy.
- 85 percent of governmental health facilities will have ACTs available for treatment of uncomplicated malaria.
- 85 percent of children under five with suspected malaria will have received treatment with artemisinin-based combination therapy within 24 hours of onset of their symptoms.

Appendix 3

Summary of Results by Intervention

INSECTICIDE-TREATED NETS (ITNs) PROCURED AND DISTRIBUTED BY PMI IN YEARS 1 AND 2						
Country	ITNs Procured			ITNs Distributed		
	Year 1	Year 2	Cumulative	Year 1	Year 2	Cumulative
Angola	540,949	294,200	835,149	540,949	0	540,949
Tanzania	130,000	0	130,000	130,000	0	130,000
Uganda	376,444	1,012,138	1,388,582	305,305	1,053,677	1,358,982
Malawi	0	1,039,400	1,039,400	0	211,995	211,995
Mozambique	0	786,000	786,000	0	565,000	565,000
Rwanda	0	0	0	0	0	0
Senegal	0	200,000	200,000	0	196,872	196,872
Benin	0	221,000	221,000	0	215,627	215,627
Ethiopia	0	102,145	102,145	0	102,145	102,145
Ghana	0	60,023	60,023	0	60,023	60,023
Kenya	0	60,000	60,000	0	5,000	5,000
Liberia	0	196,000	196,000	0	0	0
Madagascar	0	0	0	0	0	0
Mali	0	369,800	369,800	0	369,800	369,800
Zambia	0	808,332	808,332	0	550,017	550,017
TOTAL	**1,047,393**	**5,149,038**	**6,196,431**	**976,254**	**3,330,156**	**4,306,410**

ARTEMISININ-BASED COMBINATION TREATMENTS PROCURED AND DISTRIBUTED BY PMI IN YEARS 1 AND 2						
Country	ACTs Procured			ACTs Distributed		
	Year 1	Year 2	Cumulative	Year 1	Year 2	Cumulative
Angola	587,520	2,033,200	2,620,720	0	1,101,801	1,101,801
Tanzania	380,160	694,050	1,074,210	380,160	694,050	1,074,210
Uganda	261,870	0	261,870	227,827	0	227,827
Malawi	0	4,694,013	4,694,013	0	4,694,013	4,694,013
Mozambique	0	1,440,000	1,440,000	0	220,230	220,230
Rwanda	0	715,000	715,000	0	0	0
Senegal	0	0	0	0	0	0
Benin	0	1,465,170	1,465,170	0	153,884	153,884
Ethiopia	0	0	0	0	0	0
Ghana	0	0	0	0	0	0
Kenya	0	0	0	0	0	0
Liberia	0	496,000	496,000	0	0	0
Madagascar	0	0	0	0	0	0
Mali	0	0	0	0	0	0
Zambia	0	0	0	0	0	0
TOTAL	**1,229,550**	**11,537,433**	**12,766,983**	**607,987**	**6,863,978**	**7,471,965**

RESIDENTS PROTECTED BY PMI-SUPPORTED INDOOR RESIDUAL SPRAYING (IRS) IN YEARS 1 AND 2			
Country	**People Protected**		
	Year 1	**Year 2**	**Cumulative[1]**
Angola	590,398	612,776	612,776
Tanzania (Zanzibar)	1,018,156	1,120,381	1,120,381
Tanzania (Mainland)	0	159,579	159,579
Uganda	488,502	1,865,956	1,865,956
Malawi	0	126,126[2]	126,126
Mozambique	0	1,742,345[3]	1,742,345
Rwanda	0	720,764	720,764
Senegal	0	678,971	678,971
Benin	0	0	0
Ethiopia	0	3,890,000	3,890,000
Ghana	0	0	0
Kenya	0	3,459,207	3,459,207
Liberia	0	0	0
Madagascar	0	0	0
Mali	0	0	0
Zambia	0	3,400,000	3,400,000
TOTAL	**2,097,056**	**17,776,105**	**17,776,105**

[1] Indoor residual spray operations typically involve successive rounds of spraying in the same geographical area. Thus, only one spray round was counted to avoid counting the same household residents twice.

[2] Malawi IRS results include spray activities through February 2008. Spraying will be completed in April 2008.

[3] Mozambique IRS results include spray activities through February 2008. Spraying will be completed in March 2008.

HEALTH WORKERS TRAINED WITH PMI SUPPORT IN ACT AND IPTp USE IN YEARS 1 AND 2				
Country	**ACT Use**		**IPTp Use**	
	Year 1	**Year 2**	**Year 1**	**Year 2**
Angola	1,283	290	1,450	290
Tanzania	4,217	1,011	376	1,158
Uganda	2,844	12,637	168	807
Malawi	0	0	0	0
Mozambique	0	174	0	0
Rwanda	0	5,127	0	250
Senegal	0	1,020	0	43
Benin	0	605	0	605
Ethiopia	0	0	0	0
Ghana	0	0	0	0
Kenya	0	0	0	0
Liberia	0	0	0	0
Madagascar	0	0	0	0
Mali	0	0	0	0
Zambia	0	0	0	0
TOTAL	**8,344**	**20,864**	**1,994**	**3,153**

Acknowledgments

The Second Annual Report of the President's Malaria Initiative is dedicated to the staff of host governments, international and local partners, and all U.S. Government staff who have contributed to the achievements described in these pages.

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