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THE PRESIDENT'S MALARIA INITIATIVE

WORKING WITH COMMUNITIES TO SAVE LIVES IN AFRICA

THIRD ANNUAL REPORT
MARCH 2009



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Cover photo

The President's Malaria Initiative strives to reduce the burden of malaria across Africa by targeting the two most vulnerable groups — pregnant women and children under five, such as these children at a health clinic in Kenya.

Credit

Bonnie Gillespie/Voices for a Malaria-Free Future

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ABBREVIATIONS AND ACRONYMS

| | |
|--------------------|--|
| ACT | Artemisinin-based combination therapy |
| AL | Artemether-lumefantrine |
| ANC | Antenatal clinic |
| BCC | Behavior change communication |
| CBO | Community-based organization |
| CDC | Centers for Disease Control and Prevention |
| CHW | Community health worker |
| DHS | Demographic and Health Survey |
| EPI | Expanded Program on Immunization |
| FANC | Focused antenatal care |
| FBO | Faith-based organization |
| FY | Fiscal year |
| Global Fund | The Global Fund to Fight AIDS, Tuberculosis and Malaria |
| HIV/AIDS | Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome |
| IEC | Information, education, and communication |
| IPTp | Intermittent preventive treatment for pregnant women |
| IRS | Indoor residual spraying |
| ITN | Insecticide-treated net |
| MOH | Ministry of Health |
| NGO | Nongovernmental organization |
| NMCP | National Malaria Control Program |
| PEPFAR | U.S. President's Emergency Plan for AIDS Relief |
| RDT | Rapid diagnostic test |
| SP | Sulfadoxine-pyrimethamine |
| UNICEF | United Nations Children's Fund |
| USAID | U.S. Agency for International Development |
| WHO | World Health Organization |

THE PRESIDENT'S MALARIA INITIATIVE

“Experience shows that when partners work together, and when malaria control strategies – such as nets, effective medicines, indoor spraying – are employed comprehensively and on a mass scale, extraordinary success can be realized.” – Professor Awa-Marie Coll-Seck, Executive Director of the Roll Back Malaria Partnership, February 8, 2008



A community health worker reviews malaria education materials with a young mother in Uganda. PMI works with National Malaria Control Programs to increase attendance at antenatal and child health clinics through health promotion and education activities.

BONNIE GILLESPIE
VOICES FOR A MALARIA-FREE FUTURE

EXECUTIVE SUMMARY

Malaria is a preventable and treatable disease. It remains one of the major causes of illness and death among children in Africa, and is estimated to account for 300 million to 500 million illnesses and nearly 1 million deaths each year, with 90 percent of those deaths in children under five years of age. Malaria also places a tremendous burden on national health systems and individual families. Economists estimate that malaria accounts for approximately 40 percent of public health expenditures in Africa and causes an annual loss of \$12 billion, or 1.3 percent of the continent's gross domestic product. Malaria and poverty are closely linked; the

greatest burden of malaria usually falls on residents of rural areas, where access to health care is limited by cost or distance. As a result, the control of malaria is a major objective of the U.S. foreign assistance program.

The President's Malaria Initiative (PMI) is a historic \$1.2 billion, five-year expansion of U.S. Government (USG) resources to reduce the intolerable burden of malaria and help relieve poverty on the African continent. The goal of PMI is to reduce malaria-related deaths by 50 percent in 15 countries with a high burden of malaria by expanding coverage of four highly effective

| PMI RESULTS AT A GLANCE ¹ | | | | |
|--|----------------------|----------------------|----------------------|--|
| | PMI Year 1 (2006) | PMI Year 2 (2007) | PMI Year 3 (2008) | Cumulative Results |
| Number of people protected by indoor residual spraying | 2,097,056 | 18,827,709 | 24,787,363 | PMI is supporting IRS in 14 countries ² |
| Number of ITNs procured | 1,047,393 | 5,210,432 | 6,481,827 | 12,739,652 (8,978,369 distributed) |
| Number of ITNs procured by other partners and distributed with PMI support | 0 | 369,900 | 1,287,624 | 1,657,524 |
| Number of mosquito nets re-treated | 505,573 | 802,740 | 581,319 | 1,889,632 |
| Number of ACT treatments procured | 1,229,550 | 11,537,433 | 15,627,869 | 28,394,852 (18,139,983 distributed ³) |
| Number of ACT treatments procured by other partners and distributed with PMI support | 0 | 8,709,140 | 112,330 | 8,821,470 |
| Number of health workers trained in use of ACTs | 8,344 | 20,864 | 35,397 | N/A ⁴ |
| Number of rapid diagnostic tests procured | 1,004,875 | 2,082,600 | 2,050,000 | 5,137,475 (3,459,475 distributed ³) |
| Number of IPTp treatments procured ⁵ | 0 | 1,349,999 | 1,018,333 | 2,368,332 (585,889 distributed ³) |
| Number of health workers trained in IPTp | 1,994 | 3,153 | 14,194 | N/A ⁴ |

¹ Results reported in this table are up-to-date as of January 1, 2009, and include all 15 PMI focus countries.
² A cumulative total of people protected by indoor residual spraying cannot be calculated without double counting.
³ Distributed to health facilities.
⁴ A cumulative total of health workers trained cannot be calculated without double counting.
⁵ A treatment of IPTp consists of three tablets of sulfadoxine-pyrimethamine.

malaria prevention and treatment measures to 85 percent of the most vulnerable populations – pregnant women and children under five years of age.

Progress under PMI in scaling up malaria prevention and control interventions during the last 36 months has been dramatic. The belief that malaria in sub-Saharan Africa really can be controlled is already being substantiated with clear evidence of reductions in malaria burden in many of the PMI focus countries.

PMI Operating Principles

Malaria is a health emergency in Africa, and PMI, together with its partners, is moving quickly and effectively to scale up interventions, build local capacities, and strengthen maternal and child health systems to facilitate expansion of programs nationwide. PMI's management plan stresses:

- Minimizing lead times for procurement of critical commodities and services;
- Flexibility in working with other donors to fill gaps in core malaria commodities and services, such as PMI funding the distribution of insecticide-treated nets (ITNs) procured by other partners; and
- Maintaining a PMI Central Emergency Procurement Fund to help ensure that no PMI focus country experiences a stockout of essential commodities (Page 7).

Achieving Results

In the third year of the Initiative, PMI-supported malaria prevention and treatment measures were expanded across all 15 focus countries. PMI procured more than 6.4 million long-lasting ITNs, most of which have been or will be distributed free of charge to pregnant women and young children. Indoor residual spraying (IRS) activities were also expanded, and a total of 6 million houses were sprayed with synthetic pyrethroids, carbamates, or DDT, helping to protect more than 24.7 million people at risk of malaria. During 2008, 15.6 million artemisinin-based combination therapies (ACTs) were procured in nine focus countries for the treatment of acute malarial illnesses. PMI also supported the expansion of intermittent preventive treatment for pregnant women (IPTp) as part of broader efforts to improve and expand antenatal care services. To build capacity and promote sustainability, PMI also helped strengthen pharmaceutical management, quality assurance of drugs, and health management information systems and trained tens of



GILBERT AWEROFUA/COURTESY OF PHOTOSHARE

Children in the Adit Internally Displaced Persons Camp in northern Uganda lie under a mosquito net in preparation for bedtime. PMI works with its partners to provide free nets to camp residents to protect them from malaria, one of the leading killers of young children in these camps.

thousands of health workers and community volunteers. Finally, PMI promoted increased understanding and demand for malaria prevention and treatment interventions by funding a wide range of behavior change communication and education activities across the 15 focus countries.

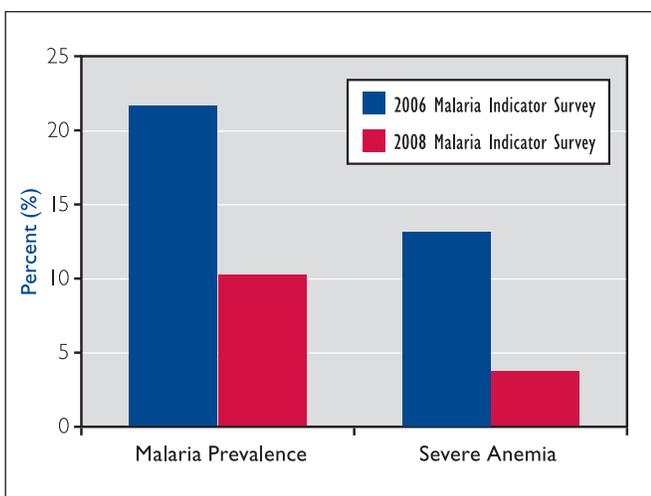
Working with national governments and other donors, PMI has helped to rapidly scale up malaria prevention and treatment measures. As a result, an impact on malaria transmission is already being seen:

- In Zambia, 2006 and 2008 nationwide Malaria Indicator Surveys show that malaria control efforts led by a strong National Malaria Control Program (NMCP) and supported by PMI, the Global Fund, the Bill and Melinda Gates Foundation, the World Bank, and other partners are having a dramatic impact on the prevalence (frequency) of malaria and anemia. Over this three-year period, the prevalence of malaria fell by 53 percent, and the prevalence of severe anemia in children under five years of age, which is closely associated with malaria, fell by 68 percent (Figure 1). In addition, a 2007 nationwide survey showed a 29 percent reduction in all-cause mortality in children under five, to which malaria is a major contributor (Box 1). The USG has been supporting the Zambian national malaria program since 2002, including \$7.6 million in FY 2006 and \$9 million in PMI jump start funding in FY 2007.

- In Rwanda, support by PMI, the Global Fund, and other donors for a strong malaria control effort, led by the NMCP, is producing striking reductions in the malaria burden. Preliminary results of a 2008 interim nationwide Demographic and Health Survey (DHS) show about a fourfold increase in ownership of one or more ITNs, from 13 to 57 percent, and in the proportion of children under five sleeping under an ITN, from 15 to 58 percent between 2005 and 2008. This

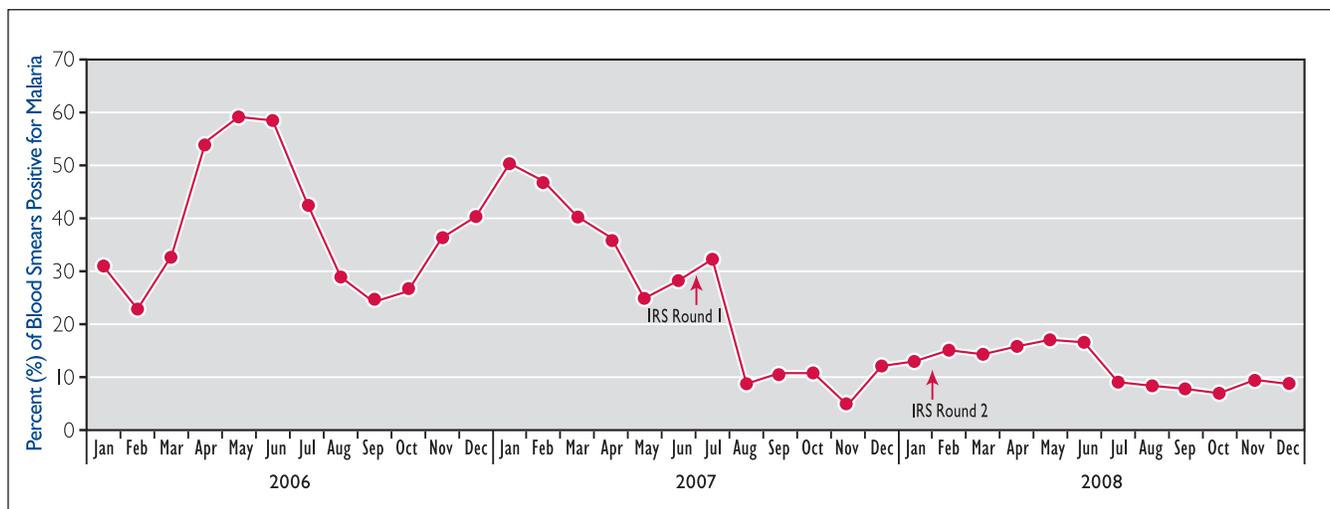
increased ITN ownership and use, together with targeted IRS and the rollout of ACTs at both the community and health facility levels, was associated with a fall in the prevalence of malaria to less than 3 percent and an overall reduction in under five childhood mortality of 32 percent between 2005 and 2008 (from 152 to 103 deaths per 1,000 live births) (Box 1). The USG has been supporting malaria control efforts in Rwanda since 2002, including \$1.5 million in PMI jump start funding in FY 2006 and \$20 million in FY 2007.

FIGURE 1
Decline in Malaria Prevalence and Severe Anemia in Children Under Five Years of Age, Zambia, 2006–2008



- In Zanzibar, following a rapid scale-up of ITNs, IRS, and ACTs between 2005 and 2007 (supported by PMI, the Global Fund, and other partners), the proportion of blood smears positive for malaria in children under two years of age attending health clinics fell from 22 percent to less than 1 percent. This low level of blood smear positivity was sustained during 2008. Focus has now turned to strengthening malaria case surveillance to allow rapid detection and response to any potential resurgence of malaria cases.
- In Tanzania, during 2008, PMI continued to support IRS in Muleba District, consolidating the gains in malaria control seen during the previous year. A further drop of 55 percent in blood smears positive for malaria in patients of all ages was observed during 2008. In total, between 2006 and 2008, the prevalence of malaria during the peak transmission period of June–July fell by 73 percent (Figure 2).

FIGURE 2
Decline in Proportion of Blood Smears Positive for Malaria, Muleba District Hospital, Tanzania, 2006–2008



- In Malawi, household surveys conducted in 2007 and 2008 in Nkhosokota District demonstrate a relative reduction of 28 percent in severe anemia in children 6 months to 30 months of age. A closer look at areas within the district where PMI supported IRS in October–November 2007 shows an even greater reduction of 44 percent in severe anemia. In light of these positive results, the Malawi Ministry of Health (MOH) plans to scale up IRS in six additional high-risk districts.
- In Mozambique, in 2007, at the request of the NMCP, PMI helped expand and strengthen the government's IRS program in Zambézia Province. With PMI support, a total of 586,568 houses were sprayed, and more than 2.5 million people were protected. Between September and November 2008, PMI supported a second round of IRS, during which 412,923 houses were sprayed and more than 1.4 million people were protected. Fewer houses were sprayed in the second round because houses that were harder to reach were

targeted for long-lasting ITN distribution. An independent survey (funded by the Bill and Melinda Gates Foundation through the Innovative Vector Control Consortium) was conducted in November 2008 in the same six districts. Results showed a 38 percent decline in malaria prevalence when compared to a similar 2007 survey.

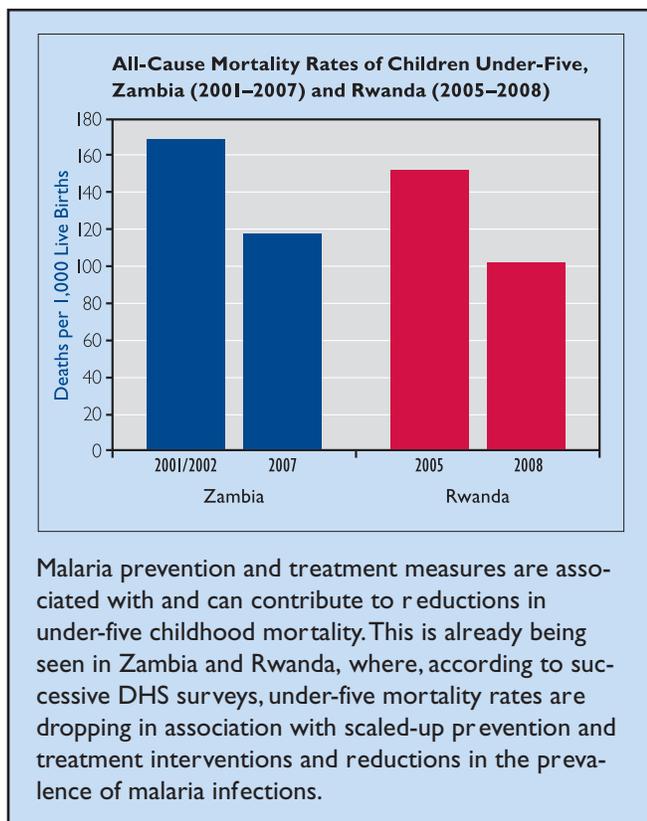
PMI – A Partner in Malaria Control

Partnerships at both the international and national levels are key to PMI's strategy and success. PMI coordinates its activities with major multilateral and bilateral institutions and donors, such as the World Health Organization (WHO), UNICEF, the World Bank, the Global Fund, the U.K. Department for International Development, and the Bill and Melinda Gates Foundation. During the past year, PMI expanded collaboration with the private sector, nongovernmental organizations (NGOs), and faith-based organizations (FBOs). These groups often have strong bases of operation in underserved rural areas, where the burden of malaria is greatest. The Malaria Communities Program, launched in December 2006, catalyzes partnerships with small national and international NGOs and FBOs. In Year 3, through the Malaria Communities Program alone, PMI provided more than \$11 million in grants to eight NGOs and FBOs working at the community level in PMI focus countries. In total, PMI has supported more than 150 nonprofit organizations, more than 40 of which are faith based.

In 2007 and 2008, PMI, the ExxonMobil Foundation, Malaria No More, and many others contributed funding to the Harmonization Working Group of the Roll Back Malaria Partnership to improve the success rate of African countries applying for Global Fund malaria grants. This support has had a major impact. In the most recent round (Round 8), 78 percent of the 18 African countries that received technical support from the Harmonization Working Group were successful in their grant applications. The increased funds will greatly contribute to the rapid scale-up of malaria prevention and treatment interventions in PMI focus countries and other high-burden African countries.

PMI continues to work with WHO and other technical partners to reach consensus on issues, such as how best to use microscopic diagnosis and rapid diagnostic tests in different epidemiological and clinical settings; how to improve quality standards for antimalarial drugs, especially ACTs; and how to roll out community-based treatment of malaria with ACTs.

BOX 1 Scale-Up of Malaria Prevention and Treatment Measures Associated With Reduction in Under-Five Mortality



PMI BACKGROUND

PMI Structure: PMI is an interagency initiative led by the U.S. Agency for International Development (USAID) and implemented together with the Centers for Disease Control and Prevention (CDC) of the Department of Health and Human Services (HHS). It is overseen by the U.S. Global Malaria Coordinator, advised by 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 Malaria 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 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: PMI is organized around four operational principles based on lessons learned from more than 50 years of USG 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 NMCPs and to build capacity for country ownership of malaria control efforts; and
- Close coordination with international and in-country partners.

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 MOH.

PMI FUNDING SUMMARY

| Fiscal Year (FY) | Budget | Focus Countries |
|-------------------------------|----------------------------|---|
| 2006 | \$30 million ¹ | Angola, Tanzania, and Uganda |
| 2007 | \$135 million ² | Malawi, Mozambique, Rwanda, and Senegal (in addition to Round 1 countries) |
| 2008 | \$300 million ³ | Benin, Ethiopia (Oromia Region), Ghana, Kenya, Liberia, Madagascar, Mali, and Zambia (in addition to Round 1 and Round 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 \$4.2 million 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 \$11.9 million in FY06 funds for malaria activities as allocated by the Malaria Coordinator.

³ Benin, Ethiopia (Oromia Region), Ghana, Kenya, Liberia, Madagascar, Mali, and Zambia also used \$23.6 million of FY06 funding and \$42.8 million of FY07 funding (of which \$2.8 million was included in the \$25 million additional FY07 funding) as allocated by the Malaria Coordinator.

PMI Drug and Commodity Security: Central Emergency Procurement Fund

For malaria case management and prevention, maintaining adequate drug and commodity supplies can be a matter of life and death. Stockouts of critical malaria treatments, such as ACTs, can result in increases in morbidity and mortality. Similarly, stockouts of mosquito nets and indoor insecticide spray have been associated with increases in malaria cases, particularly in children and infants. PMI works with partner countries to prevent such shortages by ensuring adequate stocks of malaria drugs and other commodities. This effort culminated in the creation of the PMI Central Emergency Procurement Fund. If a country needs drugs or commodities but lacks funds to make the purchase, the Central Fund buys and ships the necessary goods. In 2008, use of the Central Fund averted what could have been disastrous stockouts in Liberia and Malawi. In both countries, funding from other donors arrived later than expected, leaving the countries without sufficient funds to purchase ACTs. In Kenya, a stockout had already occurred and was mitigated by the Central Fund's rapid procurement of ACTs. The Central Fund purchased and delivered more than 2.4 million treatments to these three countries during 2008, saving countless lives.



Dr. Bernice Dahn, Deputy Minister and Chief Medical Officer at the Ministry of Health and Social Welfare in Liberia, accepts PMI's emergency shipment of 496,000 ACT treatments procured through the Central Fund.

Building Capacity in National Health Systems

Both directly and indirectly, PMI resources help build health systems and strengthen overall capacity in host government's MOHs and NMCPs. By reducing the burden of malaria in highly endemic countries, where MOH statistics indicate that the disease often accounts for 30–40 percent of outpatient visits and hospital admissions, PMI allows critical resources and over-stretched health workers to concentrate on controlling other childhood illnesses, such as diarrhea and pneumonia. In 2008, PMI efforts to strengthen health systems included:

- Funding for training: more than 35,000 health workers on case management with ACTs, more than 1,600 health workers in malaria laboratory diagnostics, and more than 14,000 health workers in IPTp;
- Providing \$8.4 million in FY 2008 funding to help MOHs, NMCPs, and national essential drugs programs to improve the forecasting; procurement; quality control; storage; and distribution of antimalarial and other drugs, and to train and supervise pharmacy, medical store staff, and health workers to ensure the correct usage of these drugs;

- Supporting 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; and
- Collaborating with NMCPs and other partners, such as the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and WHO, to strengthen laboratory diagnosis of malaria. These efforts to upgrade laboratory services help improve the overall quality of primary health care, diagnosis, and treatment.

Looking Ahead

In spite of this progress, we cannot afford to be complacent. Inefficient national supply chain management systems, the intensification of antimalarial drug and insecticide resistance, and weak health information systems all hamper malaria and other disease control efforts. Together with our partners, PMI is tackling these challenges. With the increased funding for malaria in the Tom Lantos and Henry J. Hyde United States Global Leadership Against HIV/AIDS, Tuberculosis, and Malaria Reauthorization Act of 2008, the USG has the opportunity to expand malaria prevention and treatment efforts across the continent.

BOX 2 PMI Focus Countries



As malaria prevention and treatment activities expand in all 15 focus countries, and malaria declines, some adjustments in approach will be necessary. These include:

- Emphasizing laboratory diagnosis of malaria over traditional clinical diagnosis based on the patient's symptoms in order to differentiate malaria from other multiple causes of fever;

- Improving malaria surveillance and response as the prevalence of malaria falls, immunity to malaria wanes, and the risk of outbreaks increases; and

- Tailoring approaches to prevention and treatment of malaria to the changing malaria situation.

CHAPTER 1

“Malaria is not only a disease of poverty; it’s a cause of poverty.” – Robert B. Zoellick, President of the World Bank Group, commenting during the United Nations 2008 Millennium Development Goals Malaria Summit, September 26, 2008



KIM WYLLIE/USAID

A sprayer practices his technique on a wall in Zanzibar, where indoor residual spraying, in combination with other malaria control efforts, has contributed to a dramatic reduction in the number of confirmed cases of malaria in young children. PMI works with focus countries to train local residents on the proper handling and safe use of insecticides during spraying campaigns.

THE CHALLENGE OF MALARIA CONTROL

MALARIA AT A GLANCE

- Each year, an estimated 300 million to 500 million people become ill with malaria, and nearly 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 caused by parasites and transmitted among human beings by the bite of female *Anopheles* mosquitoes. Malaria usually begins as a flu-like illness with fever and chills. Mild to moderate anemia is also common because the malaria parasite infects and destroys red blood cells. Untreated, malaria can result in severe anemia, lung and kidney failure, coma, and death.

Malaria typically occurs in tropical and subtropical regions of the world, particularly in sub-Saharan Africa, where the mosquito and the malaria parasite thrive. Four species of malaria parasites infect humans, although two species, *Plasmodium falciparum* and *P. 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 where they are at risk of malaria transmission. An estimated 300 million to 500 million people become ill with malaria each year, and nearly 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 people living in areas where malaria is transmitted can be infected, children under five years of age, pregnant

women, and people with HIV/AIDS are the most vulnerable groups. 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 efforts.

Malaria Control Interventions

Malaria is both preventable and treatable. Several proven and cost-effective prevention and treatment measures exist. These include insecticide-treated nets (ITNs), indoor residual spraying (IRS) with 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 and intensity of malaria disease transmission;
- Mosquito resistance to insecticides and parasite resistance to antimalarial drugs;



The *Anopheles funestus* (above) and *A. gambiae* mosquitoes are the two most important malaria vectors in Africa, where more than 80 percent of the world's malarial disease and deaths occur.

JAMES GATHANY/CDC



At a hospital in Tanzania, a mother tends to her young child, who is being treated for malaria. PMI focuses on the most vulnerable populations: children under five and pregnant women.

- The age and pregnancy status of infected persons; and
- Operational feasibility and sustainability.

Insecticide-Treated 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 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 under five 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, and range in price from \$4 to \$7. Until a few years ago, ITNs required re-treatment with insecticide about every six months to maintain their effectiveness. Newer, long-

lasting ITNs have the insecticide bound to the netting material during production, which enables them to maintain their full protective effect through at least 20 washes, which is equivalent to approximately three years of regular use.

PMI has focused on scaling up ITN coverage in all 15 focus countries. Although 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 – while working to expand to universal coverage for all residents when that is in agreement with national strategy, and adequate resources exist;
- 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 and child health clinics, and the commercial sector;
- Preferentially procuring and distributing long-lasting ITNs rather than conventional ITNs; and
- Educating at-risk populations about the benefits of ITNs and their appropriate use.

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 those walls. Sprayed houses are protected for about four to ten 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-country, the housing construction (e.g., mud, brick, or wood), the duration of the malaria transmission season, and susceptibility of local *Anopheles* mosquitoes to the insecticide. For IRS to be effective, at least 80 percent of 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 them in southern Africa and the Horn of Africa. PMI has now supported National Malaria Control Programs (NMCPs) to launch IRS activities in all 15 focus countries. 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.

Malaria in Pregnancy

Malaria infection during pregnancy poses serious health risks for both the mother and her unborn child. The prevention and treatment of malaria during pregnancy depend on a combination of malaria control measures, including the use of ITNs, prompt and effective treatment for malaria, 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 is greater than 70 percent in most African countries, IPTp usually is administered during routine antenatal clinic visits. Costing only \$0.10 to \$0.12 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 supports strengthening and expanding preventive activities for malaria in pregnancy as part of a partnership between malaria and reproductive health programs. This partnership includes (1) training health care workers about malaria in pregnancy and the use of IPTp and ITNs in the context of high-quality antenatal services, (2) procurement and distribution of SP and ITNs to antenatal

clinics, and (3) creating demand for antenatal care through health promotion and education activities.

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.

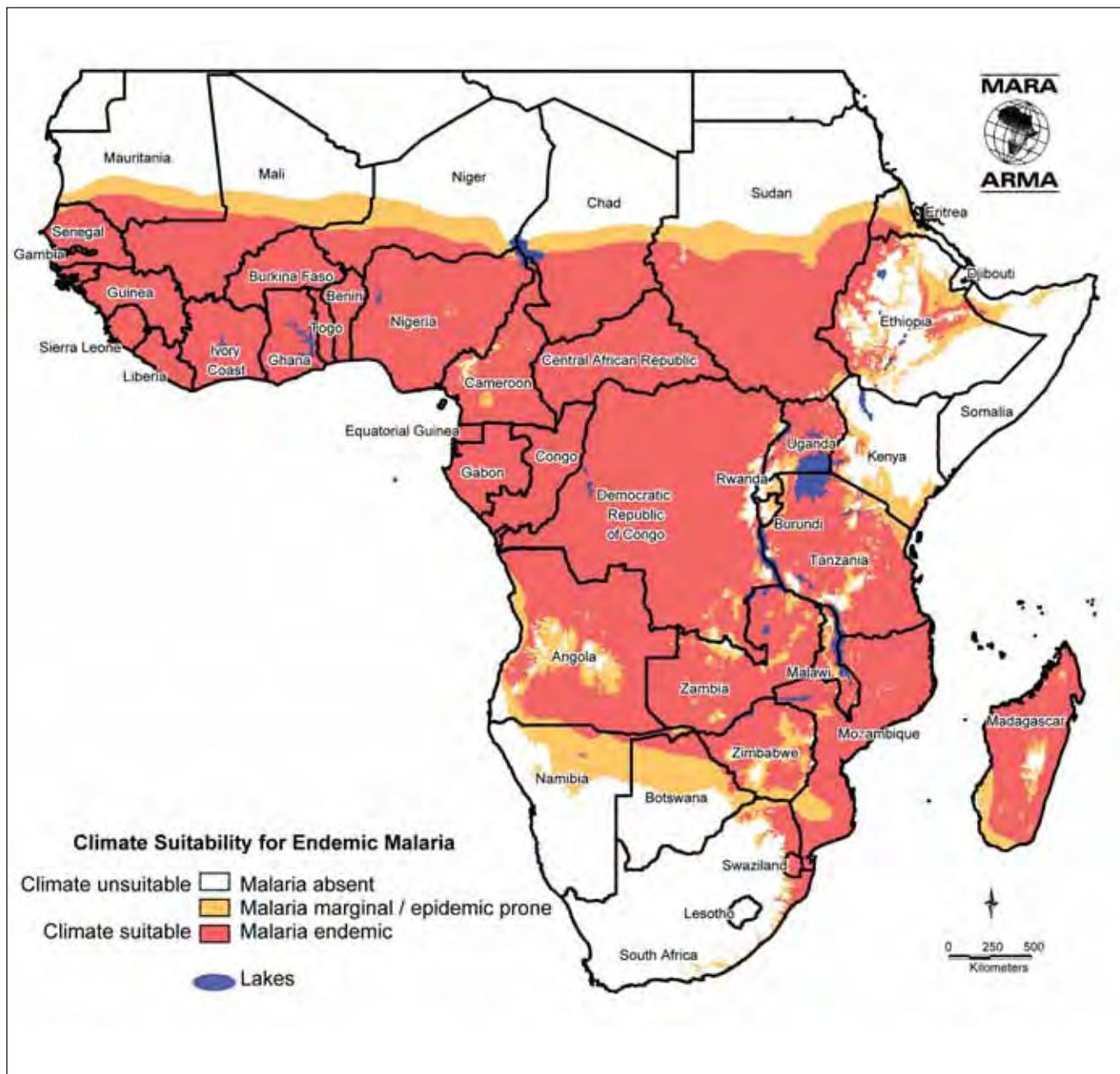
The high cost of ACTs increases the need for accurate diagnosis of malaria. Currently, most malaria cases are diagnosed solely on clinical grounds, without laboratory confirmation. Because the symptoms and signs of malaria are nonspecific, many people treated for malaria do not have the infection. The 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 logistics support to sustain high-quality performance. In recent years, the development and



Community members wear protective gear in preparation for a round of spraying in Keur Moussa, Senegal. Residents are educated about IRS and encouraged to participate during house-to-house visits prior to spray campaigns.

RICHARD NYBERG/USAID SENEGAL

BOX 1
Distribution of Malaria in Africa



refinement of rapid diagnostic tests (RDTs) for malaria offer a potentially simpler solution to laboratory diagnosis of malaria, but these tests have their limitations. There have been problems with poor quality control during manufacture, and all available RDTs become unstable at high temperatures 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 and supervision of health workers in appropriate malaria treatment, and the improvement of laboratory diagnosis of malaria, including utilization of test results. PMI also works with NMCPs to ensure that appropriate policies are in place and antimalarial drugs are procured for the management of severe malaria. In addition, because many people in Africa cannot access facility-based treatment services in a timely manner, PMI is working with host governments to expand communi-

ty-based malaria treatment and improve the diagnosis and treatment of malaria in the private sector.

President's Malaria Initiative: A Partner in Malaria Control

Former President George W. Bush described the defeat of malaria as an “urgent calling,” and, in 2005, created the President's Malaria Initiative, a five-year, \$1.2 billion initiative to reduce malaria mortality by 50 percent in 15 African countries with a high burden of malaria. International development experts agree that controlling malaria in Africa is critical to the continued development of this region, as malaria casts a shadow over not only health, but also educational attainment, worker productivity, and economic development. This call has been taken up by the U.S. Congress, most recently with the passage in July 2008 of the Tom Lantos and Henry J. Hyde United States Global Leadership Against HIV/AIDS, Tuberculosis, and Malaria Reauthorization Act of 2008. This Act authorizes an increase in funding to a total of \$5 billion over five years for the fight against malaria.



PMI uses community mobilization activities, such as this one in Ghana, to reach mothers of children between 18 months and five years. Children in this vulnerable age group no longer visit clinics for routine vaccinations and often miss out on free distribution of ITNs.

USAID GHANA

CHAPTER 2

“With the assistance of the President’s Malaria Initiative, we are on the verge of conquering malaria [in Zanzibar].... Think what it would mean to the people of my country to eliminate all these deaths and sufferings, and what it would mean to our economy, based on tourism and agriculture, to not have this strain on our productivity and reputation.” – Mohamed Saleh Jiddawi, M.D., Zanzibar Principal Secretary, Ministry of Health and Social Welfare, White House Summit on Malaria, Washington, D.C., December 14, 2006



Residents of Gumbiro Village, Tanzania, participate in a villagewide malaria education and mobilization event. Angola, Tanzania, and Uganda were selected in June 2005 to be the first three countries to participate in PMI.

JULIE WALLACE/USAID

PROGRESS TO DATE IN PMI ROUND 1 COUNTRIES: ANGOLA, TANZANIA, AND UGANDA

Angola, Tanzania, and Uganda were the first three countries selected for PMI activities, and work supported by PMI began in these countries in 2006. Now, after nearly three years of scaling up malaria prevention and treatment measures, impact is being seen on malaria-related illnesses and childhood mortality in several areas. For example, following indoor residual spraying (IRS) campaigns in Muleba District, Tanzania, and Kihhihi District, Uganda, significant reductions in laboratory-confirmed cases of malaria were reported. On the island of Zanzibar, increased coverage with insecticide-treated nets (ITNs) together with IRS campaigns, were associated with a dramatic fall in the proportion of blood smears

positive for malaria in children under two years of age attending health clinics, from 22 to less than 1 percent. This chapter provides details of the progress in these three countries.

ANGOLA

Malaria in Angola

Malaria remains a major health problem in Angola, estimated by the Ministry of Health (MOH) to account for about 60 percent of hospital admissions and 35 percent of the overall mortality in children under five years of age. As a result of severe damage to the country's health

| PMI RESULTS IN ANGOLA ¹ | | | | | |
|------------------------------------|--|-------------------|-----------------------|---|------------------------------------|
| Intervention | Indicator | Year 1 (2006) | Year 2 (2007) | Year 3 (2008) | Cumulative Results |
| Insecticide-Treated Nets | ITNs procured (distributed) | 540,949 (540,949) | 294,200 (0) | 734,198 (339,440) | 1,569,347 (880,389) |
| | ITNs procured by other partners and distributed with PMI support | 0 | 0 | 109,624 | 109,624 |
| Indoor Residual Spraying | Spray personnel trained | 350 | 582 | Late 2007/Early 2008: 2,104 Late 2008: 565 | – |
| | Houses targeted (% sprayed) | 119,303 (90%) | 130,218 (85%) | Late 2007/Early 2008: 154,662 (90%) Late 2008: 140,000 (97%) | – |
| | People protected | 590,398 | 612,776 | Late 2007/Early 2008: 745,061 Late 2008: 678,030 | – |
| Malaria in Pregnancy | Health workers trained in IPTp | 1,450 | 290 | 1,481 | – |
| Diagnosis and Treatment | Health workers trained in ACT use | 1,283 | 290 | 1,357 | – |
| | Health workers trained in malaria diagnostics | 0 | 374 ² | 1,356 ³ | – |
| | ACT treatments procured (distributed) | 587,520 (0) | 2,033,200 (1,101,801) | 3,035,520 (2,985,958) | 5,656,240 ⁴ (4,087,759) |
| | RDTs procured (distributed) | 129,875 (0) | 375,000 (101,000) | 375,000 (380,875) | 879,875 ⁵ (481,875) |
| BUDGET | \$1.7 million (FY05 jump start funds), \$7.5 million (FY06), \$18.5 million (FY07), \$18.8 million (FY08) | | | | |

¹ PMI measured Year 1, 2, and 3 results in terms of process indicators. Interim results for PMI in Angola will be obtained from the 2008 nationwide Multiple Indicator Cluster Survey, conducted in early 2009. Results reported in this table are up-to-date as of January 1, 2009.

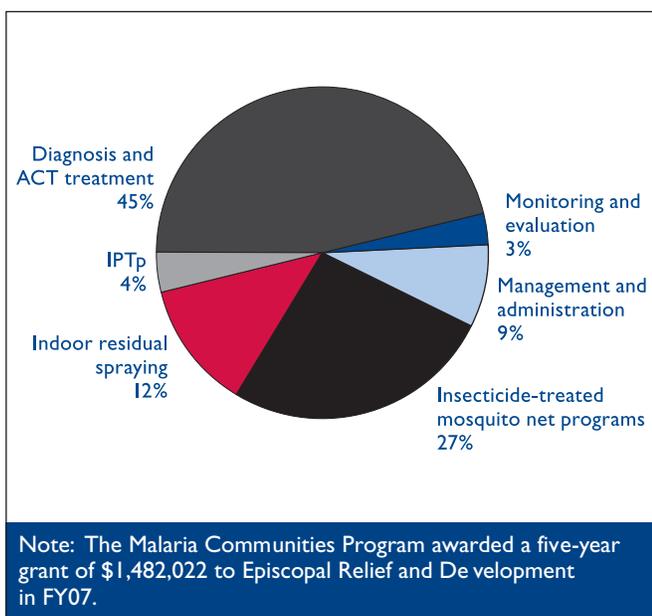
² These health workers were trained in IPTp, case management/ACTs, and malaria diagnosis. Of these, 84 health workers were trained in malaria laboratory diagnosis only.

³ These health workers were trained in IPTp, case management/ACTs, and malaria diagnosis. Of these, 136 health workers were trained in malaria laboratory diagnosis only.

⁴ A total of 404,134 artemether-lumefantrine treatments procured in 2007 and 2008 were stolen from the central warehouse and two local airports in Angola.

⁵ Approximately 23,000 RDTs were damaged by rain during port clearance and had to be discarded.

FIGURE 2.1
Allocation of \$18.8 Million
PMI Budget in Angola, FY08
 (Proportion of budget spent on commodities: 52%)



infrastructure due to the prolonged civil war, only an estimated 30 percent of the population has access to government health facilities.

Insecticide-Treated Nets

The National Malaria Control Program (NMCP) has a multipronged approach to ITN distribution, including free distribution through large-scale health campaigns, free distribution through antenatal and child health clinics, and commercial sales of full-cost or subsidized nets. According to UNICEF, more than 3 million ITNs have been distributed since the July 2006 large-scale integrated measles-ITN campaign. Thus, it is expected that the nationwide Multiple Indicator Cluster Survey, conducted in early 2009, will show a dramatic increase in ITN ownership and use when compared with results from the 2006 Malaria Indicator Survey. During Year 3 of implementation, PMI:

- Procured 734,198 long-lasting ITNs, most of which arrived in country in 2008 for free distribution through antenatal and child health clinics;
- Distributed 339,440 long-lasting ITNs (procured by PMI) free of charge through antenatal and child health clinics and outreach programs;

- Distributed 109,624 long-lasting ITNs (procured by other partners) through the private sector in urban areas; and
- Created demand for and promoted correct hanging and use of ITNs through house-to-house visits, radio spots, and drama shows.

PMI is also supporting national and international non-governmental organizations (NGOs) in several provinces to assist with the distribution and promotion of ITNs in hard-to-reach areas. An example of this is the Episcopal Relief and Development (ERD) project in Mucaba District of Uige Province (population 92,000), one of the Malaria Communities Program recipients in Angola. ERD has focused its efforts on establishing community-based malaria prevention programs. As a result, ITN distribution in the area has increased significantly in the past year. According to a recent survey carried out by ERD, the proportion of households in Mucaba District with one or more ITNs increased from 8 percent to 86 percent in less than one year. Currently, 80 percent of pregnant women and 72 percent of children under five are reported to be sleeping under an ITN in this area, coverage figures that are close to reaching the 85 percent PMI target.

Indoor Residual Spraying

Before PMI began work in Angola in 2005, no large-scale IRS had been conducted by the NMCP for many years. Spraying supported by PMI began in 2006 in three southern provinces with epidemic-prone malaria. Over the past year, based on discussions with the NMCP, spraying was continued in only one of these three southern provinces, Huila Province, which has the highest malaria burden, and was initiated in one new province, Huambo, where year-round, more intense malaria transmission occurs. During Year 3, PMI:

- Supported spraying of 139,700 houses in the three southern provinces of Cunene, Huila, and Namibe in late 2007 and early 2008. Ninety percent of the 154,662 houses targeted for spraying were successfully sprayed, and 745,061 residents were protected. More than 2,000 local personnel were trained to conduct and oversee operations;
- Funded spraying of 135,606 houses in Huila and Huambo Provinces with a synthetic pyrethroid insecticide, lambda-cyhalothrin, in late 2008. Ninety-seven percent of all houses targeted for spraying were sprayed,

It Begins With an ITN: Protecting Angola's Women and Children Against Malaria

Beatriz and her baby, Surpresa, residents of the municipality of Cazenga in Luanda Province, are thriving and in good health. In fact, all of Beatriz' children are alive and well. Ever since the birth of her first child, Beatriz and her four daughters have slept under ITNs. Beatriz sleeps with Surpresa while her other daughters sleep under the same net in a different bed. None of the girls has had malaria because Beatriz knows the importance of making sure that her children sleep under their nets every night.

Many children in Angola are not as fortunate. The death toll caused by malaria in Angola is alarming, but the good news is that the majority of these deaths can be averted. Providing free long-lasting ITNs to women and children is a simple and effective way of protecting them against the mosquito bites that lead to malaria. Thanks to the support of PMI and other partners, long-lasting ITNs are now being procured, distributed, and used all over Angola as part of an effort to integrate primary health services to reduce mortality and morbidity among women and children.



Beatriz and her daughter, Surpresa, sleep under an ITN every night. PMI funds the distribution of free ITNs in Angola as well as efforts to promote the correct use of the nets.

and a total of 678,030 residents were protected by the campaign. A total of 565 provincial and municipal health staff, as well as community members, were trained to conduct and oversee spraying activities; and

- Promoted acceptance of the IRS program and compliance with spray teams through house-to-house visits and distribution of informational materials.

Malaria in Pregnancy

Intermittent preventive treatment for pregnant women (IPTp) has now been implemented in all of Angola's 18 provinces and all 164 districts. This represents a dramatic scale-up since 2005, when PMI began work in the country and IPTp had been implemented in fewer than 10 districts. Training of health workers and provision of drugs for IPTp have been carried out, together with that for artemisinin-based combination therapies (ACTs). During 2008, with PMI support, 1,481 health workers were trained in IPTp, case management, and correct use of ITNs. All sulfadoxine-pyrimethamine (SP) drug needs for IPTp are being met by the MOH and the Global Fund. For the period of January–December 2008, support from PMI and other partners in Angola resulted in more than 300,500 pregnant women receiving their first dose of sulfadoxine-pyrimethamine and more than 228,400 receiving their second dose.

Diagnosis and Treatment

Artemether-lumefantrine (AL), an ACT, procured and distributed with PMI funds, has contributed to the expansion of ACT use in 1,075 health facilities in 156 of Angola's 164 districts. According to MOH reports, more than 160,000 AL treatments are being administered monthly. PMI also funded the strengthening of the MOH pharmaceutical logistics system and is seconding a technician to the National Essential Drugs Program to assist with pharmaceutical management issues. The NGOs that PMI is supporting at the provincial level are working with the NMCP to oversee the rollout of ACTs in five different provinces. Based on the success of this trial and, at the request of the NMCP, PMI will support expansion of ACT implementation, together with improved malaria in pregnancy services and distribution of ITNs, into three new provinces through additional NGO partners in 2009.

To broaden access to ACTs, particularly in areas that are underserved by the MOH, PMI is working with the British NGO MENTOR to conduct a trial of AL distribution for the treatment of uncomplicated malaria through private sector outlets in Huambo Province. If successful, the NMCP may choose to expand this effort to additional provinces in the future.

During Year 3, PMI:

- Made an emergency procurement of 3,035,520 AL treatments to avert a nationwide stockout of ACTs. A total of 2,985,958 of these treatments have already been distributed;
- Supported training of 1,357 health workers in case management with ACTs;
- Supported training of 1,356 health workers in the laboratory diagnosis of malaria with microscopy and/or rapid diagnostic tests (RDTs); and
- Procured 375,000 RDTs and distributed a total of 380,875 (some procured in Year 2) to improve diagnostic accuracy within health centers.

Pilferage of ACTs at the central warehouse and local airports was a major problem in 2008. A total of 404,134 treatments were stolen. This was reported to the USAID Inspector General and the Government of Angola; authorities are conducting an investigation. To avoid a repetition of this problem, stringent controls have now been established to ensure rapid and secure passage of PMI malaria drugs through customs, and to secure short-term storage in the capital and transportation to the provinces. In addition, PMI is working with the NMCP to strengthen the existing tracking system to verify that PMI commodities reach and are correctly used by recipients.

Monitoring and Evaluation

A nationwide Multiple Indicator Cluster Survey, combined with a World Bank Household Expenditure and Income Survey, began in May 2008. Data collection in the 12,000 households included in the survey is expected to last one year and will provide interim coverage results for PMI related to ITNs, ACT, and IPTp. During 2008, PMI contributed funding to this survey. Preliminary results should be available in April 2009 and are expected to show significant improvements in coverage of ITNs, ACTs, and IPTp.

Two other surveys were conducted by PMI in Angola during 2008. A blood smear and entomologic survey in the capital, Luanda, confirmed that very little malaria transmission occurs there except in peripheral areas of the city. This finding allows the NMCP and its partners to target their malaria control efforts to higher-risk areas in other parts of the country. A health facility survey in

Huambo Province showed that health facility staff were generally well prepared to handle malaria patients. All facilities had staff trained in the new ACT policy and in malaria diagnostic testing, although supervision was infrequent and health workers did not trust negative diagnostic test results. The first-line ACT, AL, was in stock at the time of the visit in all facilities, although more than half of the facilities had stockouts that occurred in the months before the survey. Since the survey, refresher training for health workers and more frequent supervisory visits have been carried out.

TANZANIA

Malaria in Tanzania

Tanzania is made up of the mainland, with a population of about 38 million, and the islands of Zanzibar, with a population of about 1 million. Nearly all of the population live in areas where malaria is transmitted during at least one month of the year. On Zanzibar, malaria has been brought under control during the last two to three years, but improved surveillance and epidemic response capabilities will be required to prevent a resurgence of disease.

Insecticide-Treated Nets

Although the 2007–2008 Tanzania HIV/AIDS and Malaria Indicator Survey (THMIS) shows that ITN ownership rose, from 23 to 39 percent in five years as a result of commercial sales supported by social marketing and subsidies for ITNs for pregnant women and infants through the Tanzania National Voucher Scheme, only 26 percent of pregnant women and 25 percent of children under five slept under their ITNs the night before the survey. Between 2004 and 2007, the prevalence of severe anemia, to which malaria is a major contributor, fell from 11 to 8 percent.

As a result of the slower-than-expected progress in achieving high ITN ownership and usage in Tanzania, the MOH made several important changes in its ITN policy during the past year. The voucher top-up value that the buyer has to pay will be reduced to Ts 500 (\$0.45) to enable families to afford a long-lasting ITN rather than a regular ITN. In addition, a catch-up campaign to distribute free long-lasting ITNs nationwide to children under five will be conducted in 2009. The NMCP has also decided to move toward a universal coverage strategy that will be implemented in late 2009 with Global Fund Round 8 support.

| PMI RESULTS IN TANZANIA ¹ | | | | | |
|--------------------------------------|---|--|---|--|--|
| Intervention | Indicator | Year 1 (2006) | Year 2 (2007) | Year 3 (2008) | Cumulative Results |
| Insecticide-Treated Nets | ITNs procured (distributed) | Zanzibar: 130,000 (130,000) | 0 | Mainland: 113,560 (113,560) Zanzibar: 30,000 (0) | Mainland: 113,560 (113,560) Zanzibar: 160,000 (130,000) |
| | ITNs procured by other partners and distributed with PMI support | 0 | 0 | Mainland: 350,000 ² | Mainland: 350,000 |
| | ITN vouchers distributed (redeemed) ³ | Mainland: 382,900 | Mainland: 1,493,100 (362,194) | Mainland: 1,844,225 (1,008,647) Zanzibar: 53,549 (26,064) | Mainland: 3,720,225 (1,370,841) Zanzibar: 53,549 (26,064) |
| | Insecticide treatment kits procured (distributed) | 0 | Mainland: 875,000 (875,000) | Mainland: 3,400,000 (3,400,000) ⁴ | Mainland: 4,275,000 (4,275,000) |
| | ITNs re-treated with insecticides | 0 | 0 | Mainland: 32,453 | Mainland: 32,453 |
| Indoor Residual Spraying | Spray personnel trained | Zanzibar I: 536 | Mainland: 164 Zanzibar II: 570 Zanzibar III: 570 | Mainland: 167 Zanzibar IV: 521 | – |
| | Houses targeted (% sprayed) | Zanzibar I: 212,244 (96%) | Mainland: 40,197 (89%) Zanzibar II: 217,737 (90%) Zanzibar III: 218,816 (97%) | Mainland: 100,258 (96%) Zanzibar IV: 218,816 (97%) Zanzibar (Outbreak): 3,588 (100%) | – |
| | People protected | Zanzibar I: 1,018,156 | Mainland: 159,579 Zanzibar II: 1,062,865 Zanzibar III: 1,120,381 | Mainland: 448,690 Zanzibar IV: 1,120,381 Zanzibar (Outbreak): 17,940 | – |
| Malaria in Pregnancy | Health workers trained in IPTp | Mainland: 376 | Mainland: 1,158 | Mainland: 4,145 Zanzibar: 24 | – |
| Diagnosis and Treatment | Health workers trained in ACT use | Mainland: 4,217 | Mainland: 1,011 | Mainland: 1,767 | – |
| | ACT treatments procured (distributed) | Mainland: 380,160 (380,160) | Mainland: 694,050 (494,050) | Mainland: 146,730 (346,730) | Mainland: 1,220,940 (1,220,940) |
| | RDTs procured (distributed) | Mainland: 775,000 (150,000) Zanzibar: 100,000 (100,000) | Mainland: 400,200 (1,025,200) Zanzibar: 150,000 (0) | Mainland: 1,075,000 (275,000) Zanzibar: 0 (150,000) | Mainland: 2,250,200 (1,450,200) Zanzibar: 250,000 (250,000) |
| BUDGET | \$2 million (FY05 jump start funds), \$11.5 million (FY06), \$31 million (FY07), \$33.7 million (FY08) | | | | |

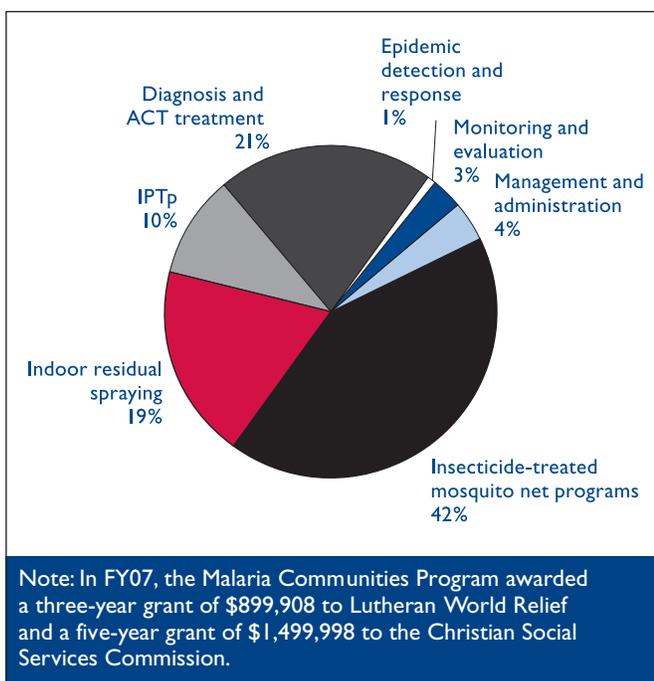
¹ PMI measured Year 1, 2, and 3 results in terms of process indicators. Interim results for PMI in Tanzania will be obtained from a 2008 nationwide household survey. Results reported in this table are up-to-date as of January 1, 2009. In addition to results reported here, PMI supported larviciding activities that benefited more than 300,000 people during Years 1 and 2, and 614,000 people during Year 3.

² These ITNs were procured by Malaria No More.

³ There is a lag time of several months between the distribution of vouchers and their redemption for a mosquito net.

⁴ These insecticide treatment kits were bundled with new nets for free distribution via the voucher program or sold as stand-alone kits through the commercial sector. During Year 3, PMI also distributed 1,993,599 insecticide treatment kits procured by other donors.

FIGURE 2.2
Allocation of \$33.7 Million
PMI Budget in Tanzania, FY08
 (Proportion of budget spent on commodities: 52%)



PMI has supported several elements of Tanzania's ITN strategy, including the nationwide expansion of the ITN voucher programs for infants and pregnant women, training of health facility workers on the voucher scheme, procurement of insecticide treatment kits for bundling with nets, and procurement of long-lasting ITNs for the campaign. During Year 3, PMI:

- Procured and distributed 113,560 long-lasting ITNs for a pilot campaign in Mpanda District, on the mainland, in October 2008. Preliminary results from a postcampaign evaluation indicate that it contributed to an increase in household ownership of one or more ITNs to 85 percent. PMI also committed to procuring 1 million long-lasting ITNs for the national catch-up campaign for children under five that will be conducted in 2009;
- Procured 30,000 long-lasting ITNs that will be distributed by the Zanzibar Malaria Control Program as a part of its universal coverage strategy in 2009;
- Provided support for the voucher program that resulted in 1,008,647 vouchers being redeemed for an ITN (463,137 infant vouchers and 545,510 pregnant

women vouchers) on the mainland and 26,064 vouchers on Zanzibar in 2008; and

- Procured and distributed 3,400,000 insecticide treatment kits and distributed an additional 1,993,599 kits funded by other donors. This support helps to ensure that nets distributed in Tanzania are treated with insecticide.

Indoor Residual Spraying

PMI has supported four rounds of IRS on the Zanzibar islands and two on the mainland since 2006. This intervention continues to be highly successful, with an average of at least 89 percent of targeted houses being sprayed per round. During 2008, PMI supported a fourth round of spraying on Zanzibar, in addition to focal spraying in Bumbwini District, in response to a malaria outbreak. On the mainland, PMI supported a second round of IRS in Muleba District, where the frequency of malaria infections has continued to decline (Box 1), and a first round in Karagwe District, in northwestern Tanzania. During Year 3, PMI:

- Supported the spraying of 212,021 houses (97 percent of target) and protected 1,120,381 people on Zanzibar, in addition to focal spraying of 3,588 houses (100 percent of target) in Bumbwini District that protected 17,940 residents;
- Supported the spraying of 36,860 houses (92 percent of target) and protected 181,343 people in Muleba District, on the mainland;
- Supported the spraying of 59,177 houses (98 percent of target) and protected 267,347 people in Karagwe District, on the mainland; and
- Trained 688 local residents to implement spray operations.

Larviciding

PMI has been supporting a larviciding program in 15 wards of urban Dar es Salaam that covers a population of 614,000. Field teams map mosquito breeding habitats, conduct regular inspections, and treat active breeding sites with a biological larvicide, *Bacillus thuringiensis var israelensis H-14*. Systematic monitoring in these areas showed a dramatic reduction in human-biting rates by *Anopheles gambiae*, the major malaria vector, following the larviciding program. More importantly, a household survey demonstrated up to 69 percent reduction in

malaria prevalence among children under five years of age, from 20 percent in 2006 to 6 percent in 2007.

Malaria in Pregnancy

PMI has supported the scale-up of IPTp through the focused antenatal care (FANC) approach recommended by the World Health Organization (WHO). Between 2005 and 2008, the proportion of pregnant women who received two or more doses of IPTp rose, from 22 to 30 percent. In Year 3, PMI:

- Provided funding for the training of 4,169 health workers and supervisors in FANC;
- Trained FANC trainers for all 131 districts on the mainland; and
- Addressed national stockouts in sulfadoxine-pyrimethamine for IPTp by supporting quantification of SP needs and tracking of drug stocks by the MOH.

Diagnosis and Treatment

PMI has supported a comprehensive approach to case management, including support for the rollout of RDTs, health worker training on case management and supply chain management for ACTs, and procurement of ACTs to fill critical gaps in the public and private sectors. A rapid survey of 116 facilities conducted early in 2008



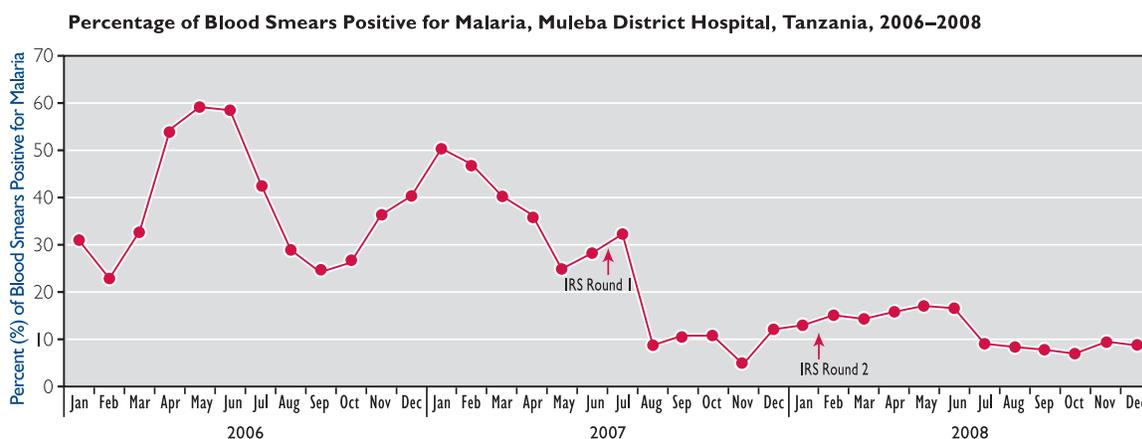
Fatuma Mamudi (right) gets tested for malaria with a RDT at the Ikwiriri Health Center in Tanzania. WHO recommends that treatment of all older children and adults with suspected malaria be based on laboratory diagnostic testing. In 2008, PMI purchased more than 1 million RDTs for use in Tanzania.

revealed that, on average, ACTs for all four weight presentations were available in 80 percent of public facilities. In Year 3, PMI:

- Trained 1,500 health facility staff and 267 private sector staff from Accredited Drug Dispensing Outlets (ADDOs), who are private drug sellers who have been trained and authorized to dispense ACTs at a highly subsidized price;

BOX 1

Decline in Malaria Prevalence Following Indoor Residual Spraying in Muleba District, Tanzania



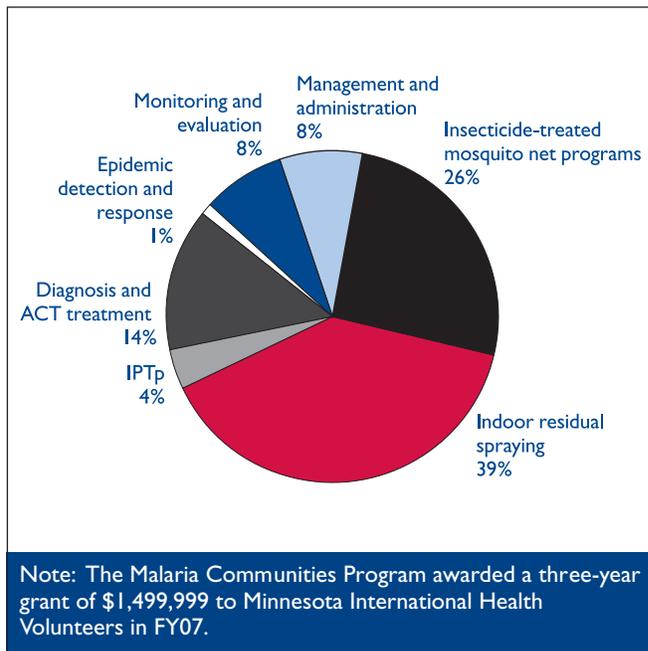
During 2008, PMI continued its support of indoor residual spraying in Muleba District, in northwestern Tanzania, consolidating the gains in malaria control seen during the previous year. A further drop of 55 percent in malaria-positive blood smears in patients of all ages was observed during 2008. In total, between 2006 and 2008, the prevalence of malaria during the peak transmission period of June–July fell by 73 percent.

- Distributed 200,000 ACT treatments (procured in Year 2) through private sector ADDOs;
- Procured and distributed 146,730 ACT treatments to the United Nations High Commissioner for Refugees for use in refugee camps;
- Procured 1,075,000 RDTs, and distributed 275,000 on the mainland and 150,000 on Zanzibar; and
- Supported the integration of ACTs into the new MOH integrated commodity logistics system, a pull system that will be rolled out across all 21 regions by the end of 2009.

Monitoring and Evaluation

PMI continues to work closely with the NMCP, the Zanzibar Malaria Control Program, and other implementation partners to strengthen the national monitoring and evaluation framework for malaria control in Tanzania. PMI supported the recently completed THMIS, the first combined HIV/AIDS and Malaria Indicator Survey in Tanzania. The 2007–2008 Malaria Indicator Survey results will serve as an interim measure of NMCP and PMI progress. Surveillance of malaria morbidity and mortality at four sentinel sites on the mainland was launched in 2008. In addition, a malaria early case detection and reporting system was established on Zanzibar in mid-2008 to provide weekly data for a rapid response in the event of an outbreak. During Year 3, PMI:

FIGURE 2.3
Allocation of \$21.8 Million
PMI Budget in Uganda, FY08
 (Proportion of budget spent on commodities: 40%)



- Assisted in establishing sentinel site surveillance to monitor malaria morbidity and mortality at six sites on Zanzibar; and
- Assisted in developing a written monitoring and evaluation plan for both the NMCP and the Zanzibar Malaria Control Program.

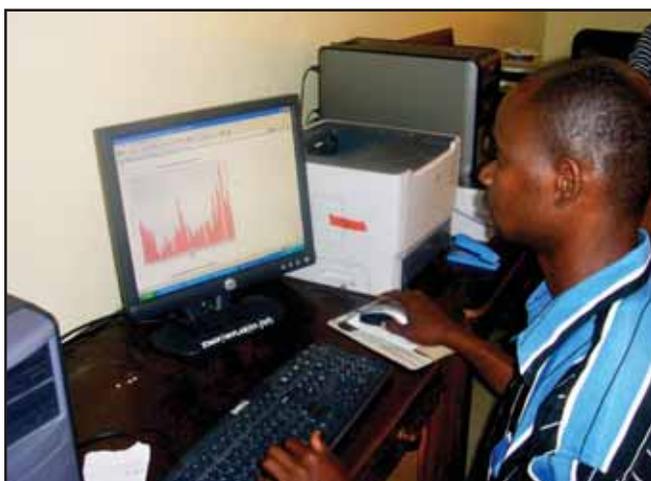
UGANDA

Malaria in Uganda

Malaria is the leading threat to the health of Uganda’s population and, according to the MOH, is responsible for approximately 40 percent of outpatient visits, 25 percent of inpatient visits, and nearly half of all deaths in children under five. Nearly 94 percent of Uganda’s population of 29 million people live in high-transmission areas and are exposed to the disease throughout the year.

Insecticide-Treated Nets

The scale-up of long-lasting ITNs and promotion of net retention and proper and consistent use among vulnerable groups are priorities of the NMCP. Based on the 2006 Demographic and Health Survey, only 16 percent of households owned at least one ITN, and approximately 10 percent of children under five and pregnant women



Makame Haji Makame of the Zanzibar Malaria Control Program reviews data from the malaria case detection and reporting system. A spike in the number of laboratory-confirmed malaria cases can alert officials to a suspected outbreak of malaria.

| PMI RESULTS IN UGANDA ¹ | | | | | |
|--|--|----------------------|--|---------------------------------------|--------------------------|
| Intervention | Indicator | Year 1 (2006) | Year 2 (2007) | Year 3 (2008) | Cumulative Results |
| Insecticide-Treated Nets | ITNs procured (distributed) | 376,444 (305,305) | 1,132,532 ² (683,777) ² | 480,000 (999,894) | 1,988,976 (1,988,976) |
| | ITNs procured by other partners and distributed with PMI support | 0 | 369,900 ³ | 0 | 369,900 |
| | ITNs sold with PMI marketing support | 586,284 | 932,033 | 1,115,074 | 2,633,391 |
| | ITNs re-treated with insecticides | 505,573 | 71,086 | 77,131 | 653,790 |
| Indoor Residual Spraying | Spray personnel trained | 450 | 4,062 | 4,945 | – |
| | Houses targeted (% sprayed) | 107,634 (96%) | 455,906 (98%) | 622,583 (94%) | – |
| | People protected | 488,502 | 1,865,956 | 2,211,388 | – |
| Malaria in Pregnancy | Health workers trained in IPTp | 168 | 807 | 649 | – |
| | SP treatments procured (distributed) | 0 | 0 | 18,333 (2,556) | 18,333 (2,556) |
| Diagnosis and Treatment | Health workers trained in ACT use | 2,844 | 12,637 | 9,159 | – |
| | Health workers trained in malaria diagnostics | 0 | 0 | 100 | – |
| | ACT treatments procured (distributed) | 261,870 (227,827) | 0 ⁴ | 1,140,480 (distribution under way) | 1,402,350 (227,827) |
| | ACTs procured by other partners and distributed with PMI support | 0 | 8,709,140 ⁵ | 112,330 ⁵ | 8,821,470 |
| BUDGET | \$510,775 (FY05 jump start funds), \$9.5 million (FY06), \$21.5 million (FY07), \$21.8 million (FY08) | | | | |
| <p>¹ PMI measured Year 1, 2, and 3 results in terms of process indicators. Interim results for PMI in Uganda will be obtained during 2009 from a nationwide household survey. Results reported in this table are up-to-date as of January 1, 2009.</p> <p>² In PMI's Second Annual Report, the number of ITNs procured and distributed during Year 2 was incorrect. The data reported here have been corrected.</p> <p>³ These ITNs were procured by Malaria No More.</p> <p>⁴ During Year 2, PMI did not procure any ACT treatments because sufficient quantities of ACTs were procured by other partners such as the Global Fund.</p> <p>⁵ These treatments were procured by the Global Fund.</p> | | | | | |



At a rural clinic in Uganda, waiting patients are shown the correct way to hang a mosquito net.

slept under an ITN the night before the survey. In its first two years, PMI procured and distributed more than 1.3 million long-lasting ITNs in Uganda to complement other partner contributions. To further increase ownership and maximize access and usage, in Year 3, PMI:

- Procured 480,000 long-lasting ITNs and distributed 999,894 nets. Nets were distributed via three channels:
 - Through rolling mass campaigns, 588,563 were distributed for free, primarily in eastern Uganda, an area not reached by previous campaigns;
 - Through antenatal clinics, 287,342 were distributed free to pregnant women and children under five in northern Uganda; and
 - Through community-based organizations (CBOs), 123,989 were distributed for free to pregnant women and children under five. More than 20 CBOs participated in this novel approach that capitalized on CBOs' interactions with difficult-to-reach populations.
- Supported the sale of 1,115,074 long-lasting ITNs through market stimulation;
- Re-treated 77,131 mosquito nets with insecticide; and
- Supported comprehensive community education and behavior change campaigns for net retention and proper use.

Indoor Residual Spraying

The NMCP has also prioritized a phased expansion of IRS. In 2006, with PMI support, the first-ever large-

scale IRS campaign in Uganda was implemented in Kabale District. It was met with remarkable public acceptance and attained high coverage. The following year, more than 446,000 houses were sprayed in the districts of Kabale and Kanungu, protecting 1.8 million people. During Year 3, PMI continued to expand the IRS program, including:

- Spraying 575,903 houses in five northern districts, including use of DDT in Apac and Oyam districts, protecting more than 2.2 million people, many of whom were internally displaced persons. Ninety-four percent of the 622,583 houses targeted for spraying were sprayed;
- Training 4,945 local personnel to conduct, supervise, and monitor IRS operations; and
- Conducting massive community sensitization, education, and mobilization drives through cinema programs, radio announcements, talk shows, community meetings, and print media to make residents aware of the value of IRS and the need to cooperate with spray teams.

Malaria in Pregnancy

Despite a long-standing policy promoting IPTp, only 16 percent of pregnant women receive the recommended two doses of SP in Uganda. To improve this situation and draw upon previous investments, PMI trained an additional 649 health workers in IPTp in two northern regions and distributed information, education, and communication materials on malaria in pregnancy during Year 3. In addition, PMI supported efforts to expand and strengthen access to and utilization of IPTp in the private sector. In Year 3, PMI procured 18,333 treatments of SP, of which 2,556 have been distributed. The Global Fund continues to meet most of the needs for SP treatment.

Diagnosis and Treatment

To increase access to ACTs at the community level, Uganda endorses the use of ACT for management of fever in children under five. In Years 1 and 2, PMI supported the rollout of home-based management of fever activities in nine conflict-affected districts in northern Uganda. In addition, PMI provided technical assistance in pharmaceutical management and drug quality control to the National Drug Authority. During Year 3, PMI:

- Procured more than 1.1 million ACT treatments in an emergency response to stockouts;

- Distributed 112,330 ACT treatments that were procured by the Global Fund;
- Trained 9,159 health workers in ACT use and 100 laboratory technicians in malaria microscopy;
- Trained 314 health workers in drug and logistics management in northern Uganda;
- Trained 292 health workers in severe malaria management; and
- Assisted regulatory authorities in establishing an antimalarial drug quality monitoring program and provided technical support for quantification and forecasting of drugs to minimize the number of treatment stockouts.

Monitoring and Evaluation

The MOH, with PMI support, conducted a national health facility survey to evaluate information on the availability and quality of malaria treatment. The results of this survey were released in September 2008 and demonstrate major improvements in malaria-related health services, but also highlight the need for improvements in service and commodity continuity and diagnostic capacity. For example, first-line treatments were available in approximately 80 percent of health facilities, and ITNs were available in 76 percent of health facilities; however, stockouts are frequent and just 5 percent of facilities offered ITNs free to antenatal clinic clients. Results will be used to guide further resource distribution. PMI is helping to support ten sentinel sites in eight districts to collect monthly data on malarial illnesses. In addition, PMI collaborated with the U.S. President's Emergency Plan for AIDS Relief in planning an integrated nationwide Malaria/AIDS Indicator Survey, scheduled to begin in May 2009.



A Ugandan community health worker holds packets of artemether-lumefantrine, an ACT used to treat malaria. The packaging provides easy-to-understand information on the correct dosage, which is based on weight. These packets are for children; older children get two pills twice a day.

BONNIE GILLESPIE/VOICES FOR A MALARIA-FREE FUTURE

CHAPTER 3

“With a coordinated effort and harmonization of actions and activities, there’s no doubt that we can get the results.” – President Paul Kagame of Rwanda, commenting during the United Nations 2008 Millennium Development Goals Malaria Summit, September 26, 2008



DEBBIE GUEYE/USAID SENEGAL

Mareme Diouf and her daughter are the beneficiaries of a long-lasting ITN provided through a PMI-supported mass distribution of ITNs in their village of Thiobe, Senegal, during a micronutrient supplementation day. PMI has been working in Senegal, as well as Malawi; Mozambique; and Rwanda, since 2006.

PROGRESS TO DATE IN PMI ROUND 2 COUNTRIES: MALAWI, MOZAMBIQUE, RWANDA, AND SENEGAL

In all four PMI Round 2 countries – Malawi, Mozambique, Rwanda, and Senegal – considerable progress has been made in the fight against malaria. More children and pregnant women are sleeping under insecticide-treated nets (ITNs); 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. In Rwanda, for example, preliminary results of a 2008 nationwide household survey showed a nearly four-fold increase in the proportion of children sleeping under ITNs, from 25 to 58 percent when compared with a similar survey in 2005. In addition, a 32 percent reduction in under-five childhood mortality (from 152 to 103 deaths per 1,000 live births) was seen over this period. This chapter details malaria control achievements in the four PMI Round 2 countries during the past year.

MALAWI

Malaria in Malawi

Malaria has always been a major health problem in Malawi. It is endemic in 97 percent of the country, although there is growing evidence that the rapid scale-up of malaria prevention and control measures during the last two to three years is producing a significant reduction in the frequency of malaria infections and associated anemia.

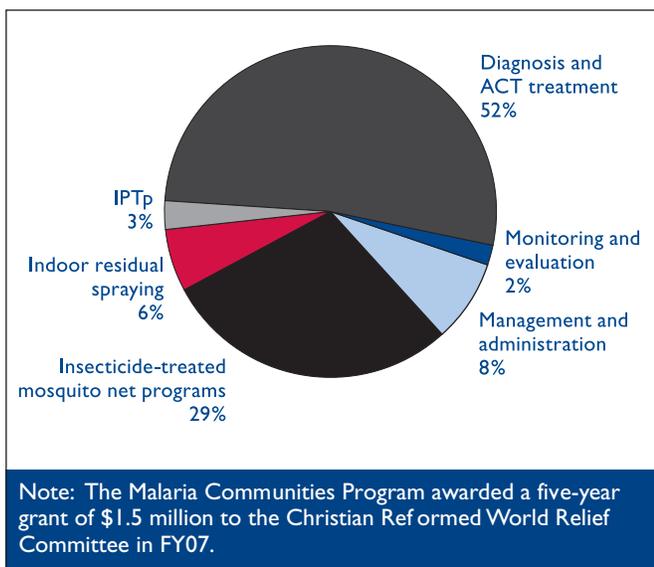
Insecticide-Treated Nets

Malawi is one of the first countries to have distributed ITNs through antenatal clinics and has been a leader in sub-Saharan Africa in making ITNs available and accessible to vulnerable populations. The national policy, revised in February 2008, calls for free distribution of ITNs to pregnant women through antenatal clinics and to children under five who attend clinics for immunization services or illness. In addition, children under five living in rural areas should receive a free net at least once every three years through an ITN campaign. Since July 2007, PMI has been the primary supporter of the clinic-based ITN distribution program, with the Global Fund supporting ITN campaigns. During Year 2, PMI:

- Procured 849,578 long-lasting ITNs, which the National Malaria Control Program (NMCP) distributed for free through clinics. An April 2008 survey in eight districts showed that ITN ownership in those areas had reached 51 percent; and
- PMI supported information, education, and communication (IEC) campaigns to promote correct and regular use of ITNs at both the national and community levels through national partners, small grants to community-based and nongovernmental organizations, and through PMI's Malaria Communities Program.

| PMI RESULTS IN MALAWI ¹ | | | | |
|--|---------------------------------------|-----------------------|-----------------------|-----------------------|
| Intervention | Indicator | Year 1 (2007) | Year 2 (2008) | Cumulative Results |
| Insecticide-Treated Nets | ITNs procured (distributed) | 1,039,400 (211,995) | 849,578 (849,578) | 1,888,978 (1,061,573) |
| Indoor Residual Spraying | Spray personnel trained | 300 | 309 | – |
| | Houses targeted (% sprayed) | 29,513 (91%) | 26,562 (93%) | – |
| | People protected | 126,126 | 106,450 | – |
| Malaria in Pregnancy | Health workers trained in IPTp | 0 | 2,747 | 2,747 |
| Diagnosis and Treatment | Health workers trained in ACT use | 0 | 5,315 | 5,315 |
| | ACT treatments procured (distributed) | 4,694,013 (4,694,013) | 4,501,740 (3,579,278) | 9,195,753 (8,273,291) |
| BUDGET: \$2 million (FY06 jump start funds), \$18.5 million (FY07), \$17.8 million (FY08) | | | | |
| ¹ PMI measured Year 1 and Year 2 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2009. | | | | |

FIGURE 3.1
Allocation of \$17.8 Million
PMI Budget in Malawi, FY08
 (Proportion of budget spent on commodities: 66%)



Indoor Residual Spraying (IRS)

PMI supported an initial round of IRS from November 2007 through March 2008 in rural areas around the Dwangwa Sugar Estates, in Nkhosakota District. In late 2008, a second round of IRS was conducted in the same area. During this second round of spraying, PMI supported:

- Spraying of 24,764 houses (93 percent of the 26,562 houses targeted), protecting a total of 106,450 people;
- Training of 309 local personnel to conduct and oversee spray operations; and
- Community education campaigns that included house-to-house visits by 125 community mobilizers as well as a one-day orientation for 703 village chiefs and volunteers to promote support for and acceptance of the IRS campaign.

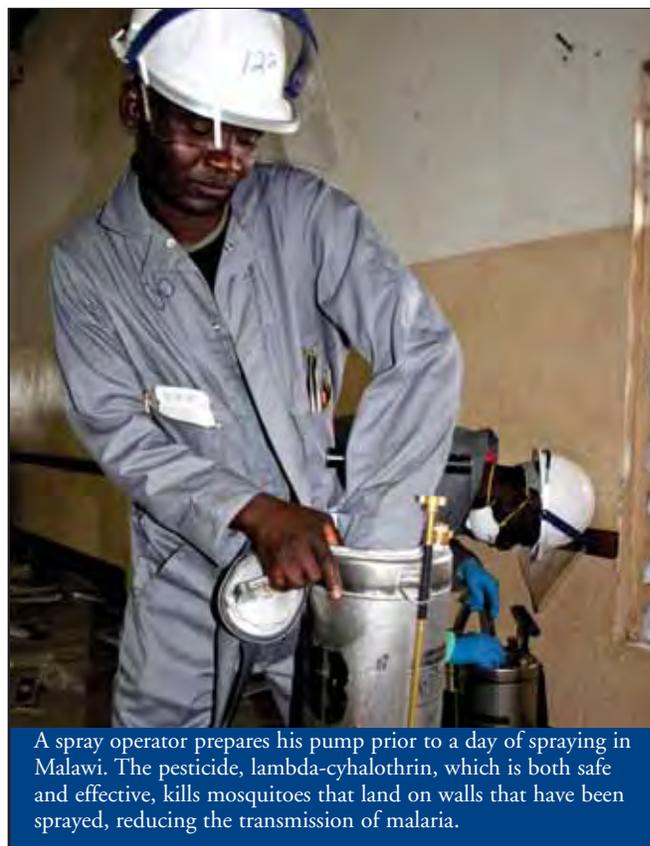
Malaria in Pregnancy

In Years 1 and 2, PMI assisted the Ministry of Health (MOH) to identify potential solutions to address the low uptake of second doses of intermittent preventive treatment for pregnant women (IPTp). This included retraining health workers, disseminating IPTp job aides, providing materials to facilitate directly observed treatment, and developing communications materials for both health staff and patients to increase understanding of the importance of receiving at least two doses of IPTp. During Year 2, PMI:

- Trained 2,747 health workers in IPTp, including health facility and community health workers. Supportive supervisory visits were made to each facility to follow up on these trainings; and
- Launched an IEC campaign via mass media and community volunteers to encourage pregnant women to attend the recommended number of antenatal clinic visits and to make those visits at the appropriate times. Through the Malaria Communities Program, 1,290 community volunteers were trained in IEC related to IPTp.

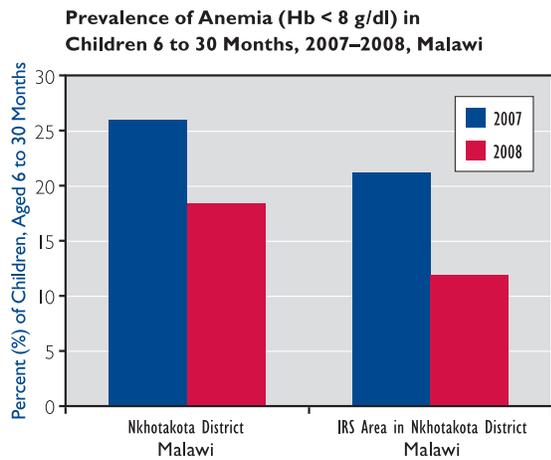
Diagnosis and Treatment

In late 2007, PMI supported the successful launch of Malawi's new national malaria treatment policy by providing all of Malawi's artemether-lumefantrine (AL), an artemisinin-based combination therapy (ACT), needs for an 18-month period. It is expected that future ACT needs at the health facility level will be largely met by the successful Global Fund Round 7 grant, which was signed in late 2008. An ACT gap remains at the community level, where effective antimalarials are not readily available or affordable. During Year 2, PMI:



BOX 1

Decline in Anemia in Children in Nkhotakota District, Malawi



Surveys conducted in Nkhotakota District in 2007 and 2008 show a relative reduction of 28 percent in anemia, which is closely associated with malaria infections, in children 6 to 30 months. A closer look at areas in Nkhotakota District, where PMI supported IRS in October–November 2007, shows an even more dramatic 44 percent reduction in the prevalence of anemia.

In light of such positive results, the MOH plans to scale up IRS in six additional high-risk districts. Representatives from those six districts participated in the 2008 spray round in Nkhotakota District to help them understand the best practices and common pitfalls of managing large-scale spray campaigns. The investment in Malawi's capacity to implement IRS will aid the country in moving forward with this life-saving malaria control intervention.

- Procured 4,501,740 ACT treatments and distributed 3,579,278 treatments to health facilities;
- Provided funding for training of 5,315 health workers on case management with ACT;
- Continued to provide technical assistance related to supply chain management that focused on improving the quality and flow of drug utilization data to improve drug management and facilitate decision-making;
- Supported efforts of Malawi's Pharmacy, Medicines and Poisons Board to regulate drug quality in the private sector; and
- Supported IEC and behavior change communication campaigns at the national and community levels through mass media and interpersonal communication. Messages focused on prompt and effective treatment with an ACT within 24 hours of onset of fever for children under five.

Monitoring and Evaluation

PMI is working with the NMCP and other partners to establish and strengthen sentinel malaria surveillance sites in eight districts and to conduct household malaria surveys in eight districts. Data collected during these surveys include ITN ownership and usage, treatment of fevers in children under five years, and anemia and parasitemia for children 6 to 30 months of age. These surveys have shown a striking reduction in malaria and anemia with the scale-up of IRS and ITNs.

Kuti mudziteteze koposa ku malungo kumbukirani zinthu izi

1 Udzuzu umene umabweretsa matenda a malungo umaluma usiku.

2 Amai oyembekazela ndi ana ochepela zaka zisanu ndiwo ali pa chiposo chachikulu cha matenda a malungo.

3 Gorani mu **CHITETEZO** kuti usiku uliwonse, chaka chonse.

4 Amai oyembekazela ndi ana ochepela zaka zisanu ayenera kupatsidwa mwayi woyamba kugona mu neli yomwe ili ndi mankhwalidwe othamangitsa udzuzu nibawi zonse.

Usiku uliwonse, chaka chonse

USAID UNICEF CDC PSI/MALAWI

Manufactured by Vestergaard-Frittsen, Material: 100% polyester, Insecticide: 35mg/m² deltamethrin

This packaging for a Malawian ITN tells users that to protect themselves from malaria they should remember that (1) mosquitoes that transmit malaria bite at night; (2) pregnant women and children under five are most at risk of malaria; (3) they should sleep under a net every night, all year round; and (4) pregnant women and children under five should always be given priority to use the net.

MOZAMBIQUE

Malaria in Mozambique

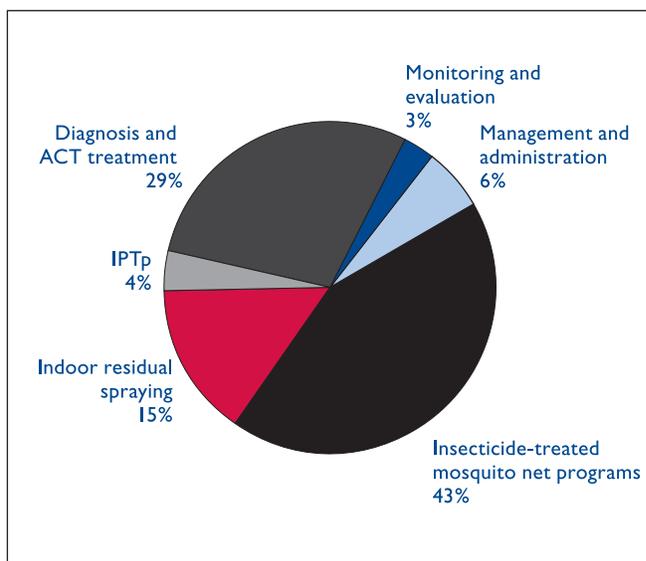
Mozambique has a population of approximately 21.5 million, and most live in areas where malaria is transmitted. A 2007 Malaria Indicator Survey showed malaria infections in almost 40 percent of children under five and in 16 percent of pregnant women. According to the MOH, 40 percent of all outpatient visits and 60 percent of all pediatric hospital admissions result from malaria.

Insecticide-Treated Nets

Mozambique's major approaches to ITN distribution are subnational campaigns directed at children under five and antenatal clinics to reach pregnant women. During Year 2, PMI:

- Provided technical support to the NMCP, which resulted in a new national policy that aims for universal coverage with long-lasting ITNs (i.e., at least two long-lasting ITNs per household);

FIGURE 3.2
Allocation of \$19.8 Million
PMI Budget in Mozambique, FY08
(Proportion of budget spent on commodities: 58%)



| PMI RESULTS IN MOZAMBIQUE ¹ | | | | |
|---|--|----------------------------|-----------------------|-----------------------|
| Intervention | Indicator | Year 1 (2007) | Year 2 (2008) | Cumulative Results |
| Insecticide-Treated Nets | ITNs procured (distributed) | 786,000 (565,000) | 720,000 (842,802) | 1,506,000 (1,407,802) |
| | ITNs procured by other partners and distributed with PMI support | 0 | 78,000 ² | 78,000 |
| | ITNs re-treated with insecticides | 454,986 | 0 | 454,986 |
| Indoor Residual Spraying | Spray personnel trained | 1,190 | 1,282 | – |
| | Houses targeted (% sprayed) | 603,862 ³ (97%) | 435,550 (95%) | – |
| | People protected | 2,593,949 | 1,457,142 | – |
| Diagnosis and Treatment | Health workers trained in ACT use | 174 | 422 | – |
| | Health workers trained in malaria diagnostics | 391 | 0 | 391 |
| | ACT treatments procured (distributed) | 1,440,000 (220,230) | 3,525,120 (1,440,000) | 4,965,120 (1,660,230) |
| BUDGET: \$6.3 million (FY06 jump start funds), \$18 million (FY07), \$19.8 million (FY08) | | | | |
| ¹ PMI measured Year 1 and Year 2 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2009. ² These ITNs were procured by PEPFAR. ³ IRS results for Year 1 are for the complete spray round that took place from October 2007 to February 2008. These numbers are therefore higher than those previously reported in PMI's Second Annual Report. | | | | |

- Procured 720,000 long-lasting ITNs and distributed them for free as part of a subnational integrated measles, vitamin A, deworming, long-lasting ITN campaign in Nampula Province;
- Distributed 75,998 free ITNs through antenatal clinics and another 46,804 free ITNs through other channels (procured in 2007); and
- Supported the distribution of 78,000 long-lasting ITNs, procured by the U.S. President's Emergency Fund for AIDS Relief (PEPFAR), through HIV treatment clinics and outreach activities directed at orphans and vulnerable children.

Indoor Residual Spraying

For the second year in a row, the NMCP requested PMI's support for IRS activities in six districts in Zambézia Province. In consultation with the NMCP and provincial health authorities, it was agreed that this year, more easily accessible houses would be sprayed, whereas houses located in more remote areas would be targeted for long-lasting ITN distribution. This accounts for the lower number of houses targeted for IRS during the second round of IRS. In Year 2, PMI:

- Conducted one round of IRS from September to November 2008, during which 412,923 houses were sprayed (95 percent of the 435,550 houses targeted), and 1,457,142 people were protected; and
- Trained 1,282 local personnel to conduct and supervise spraying.

Malaria in Pregnancy

With PMI technical and logistical support, a national health facility survey was conducted in December 2008. This survey evaluated antenatal care and qualitatively assessed the status of, and barriers to, IPTp. Results of the survey should be available in the second quarter of 2009. In collaboration with the MOH, PMI and PEPFAR staff are implementing an integrated package of services for antenatal visits. This package will include IPTp, long-lasting ITNs, services to prevent mother-to-child transmission of HIV and sexually transmitted diseases, and tuberculosis evaluation and treatment.

Diagnosis and Treatment

In 2008, PMI procured more than 3.5 million treatments of artemether-lumefantrine, the current second-line malaria treatment in Mozambique, and a total of 1.44

million treatments were distributed to health facilities. The remainder of these drugs will be used for the launch of a new malaria treatment policy in March 2009, when AL will become the first-line treatment. In addition, PMI provided emergency support for delivery of AL to provincial warehouses when the MOH had an unexpected shortfall of resources for distribution. PMI continues to support pharmaceutical management strengthening of the Central Medical Stores, including support for forecasting drug needs and improved tracking of drug consumption.

PMI supported the development of a training curriculum for health workers and trained 422 workers during a pilot study to identify the most efficient method for distribution of AL, which, because of the package size, cannot fit in the standard drug kits shipped to health facilities. In addition, a new policy and revised training material for diagnostic testing of malaria are being finalized with assistance from PMI.

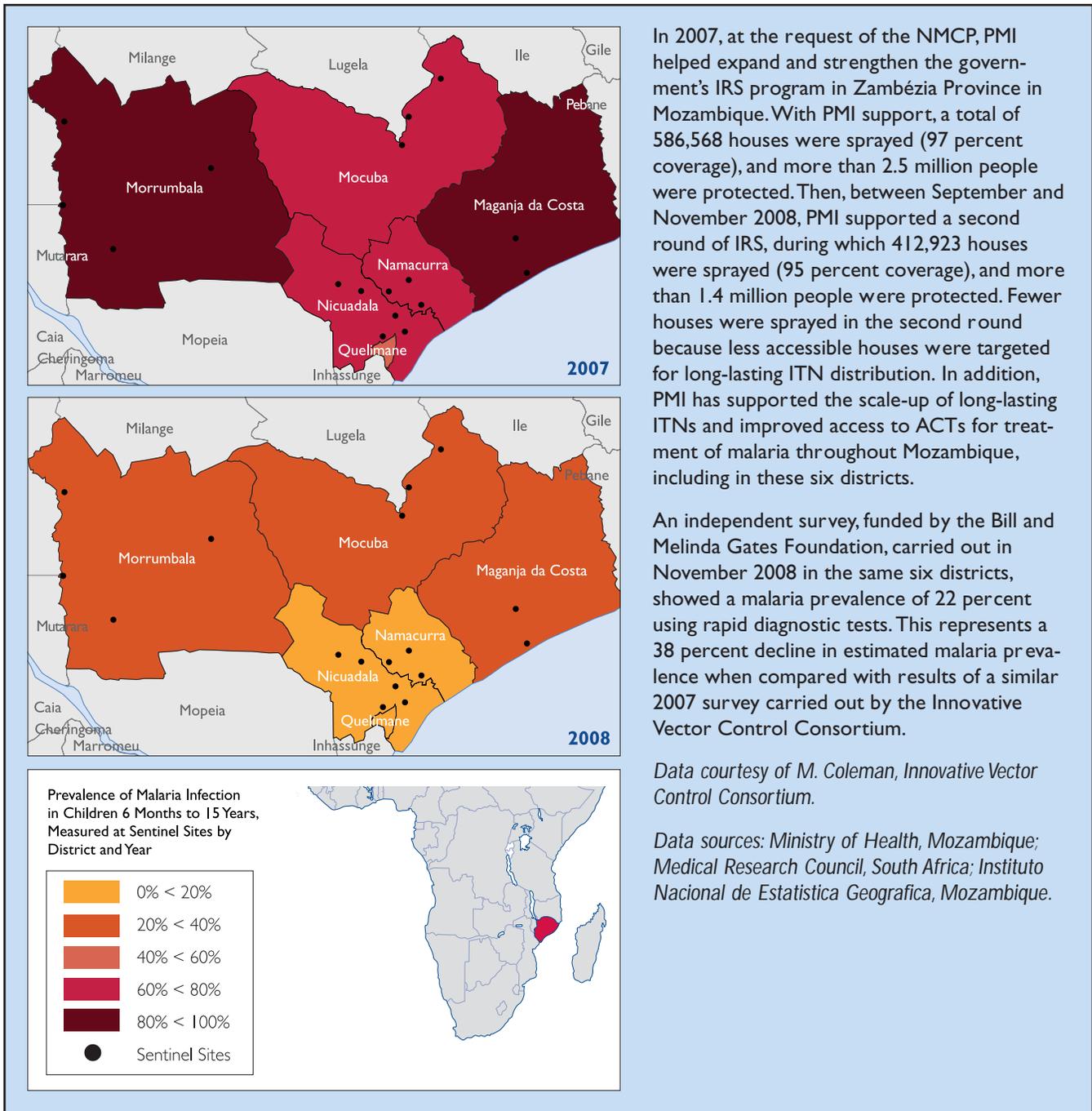


As part of a combined measles, vitamin A, deworming, and long-lasting ITN campaign in Nampula Province, 800,000 children received long-lasting ITNs, of which 720,000 were supplied by PMI. This family received three long-lasting ITNs – one for each immunized child.

REBECCA JONES/USAID

BOX 2

Decline in Malaria Prevalence in Zambézia Province, Mozambique



In 2007, at the request of the NMCP, PMI helped expand and strengthen the government's IRS program in Zambézia Province in Mozambique. With PMI support, a total of 586,568 houses were sprayed (97 percent coverage), and more than 2.5 million people were protected. Then, between September and November 2008, PMI supported a second round of IRS, during which 412,923 houses were sprayed (95 percent coverage), and more than 1.4 million people were protected. Fewer houses were sprayed in the second round because less accessible houses were targeted for long-lasting ITN distribution. In addition, PMI has supported the scale-up of long-lasting ITNs and improved access to ACTs for treatment of malaria throughout Mozambique, including in these six districts.

An independent survey, funded by the Bill and Melinda Gates Foundation, carried out in November 2008 in the same six districts, showed a malaria prevalence of 22 percent using rapid diagnostic tests. This represents a 38 percent decline in estimated malaria prevalence when compared with results of a similar 2007 survey carried out by the Innovative Vector Control Consortium.

Monitoring and Evaluation

With PMI support, two sentinel sites are functional and collecting data on both outpatient and inpatient malaria cases and deaths; four more sites are scheduled to commence data collection in 2009. PMI also provided technical support to a national AIDS Indicator Survey, to be implemented in early 2009 with PEPFAR funding.

This survey will collect information on key household- and individual-level PMI outcome indicators, including ITN ownership and use of ITNs and IPTp. In 2008, PMI provided partial financial support to an anemia and parasitemia survey in six districts in Zambézia Province, which demonstrated a reduction in malaria burden (Box 2).

RWANDA

Malaria in Rwanda

With a population of 9.5 million, Rwanda is one of Africa's most densely populated countries. Its entire population is at risk of malaria. Recent data indicate that malaria transmission has decreased substantially since 2005–2006. Reported malaria illnesses seen at health facilities have declined, from 1.5 million in 2005 to 900,000 in 2007.

Insecticide-Treated Nets

The NMCP aims to achieve 90 percent coverage of all age groups with ITNs. The recently revised strategy promotes one long-lasting ITN for every two people or three nets per household. Routine distribution of nets occurs at antenatal clinics and vaccination sites through social marketing in the commercial sector and community organizations. Preliminary results from the interim 2008 Demographic and Health Survey showed that 57 percent of households owned at least one ITN and 58 percent of children under five and 62 percent of pregnant women had slept under an ITN the previous night (Box 3). In Year 2, PMI:

- Procured 550,000 long-lasting ITNs for free distribution to the poorest households in early 2009; and

- Supported a study to examine determinants and barriers to long-lasting ITN ownership and use; final analysis of the data is in progress.

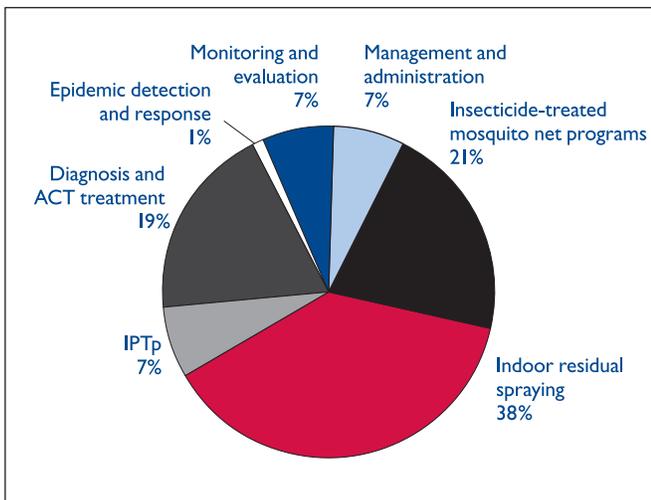
Indoor Residual Spraying

To complement the distribution of long-lasting ITNs, the NMCP uses IRS in targeted high-risk areas. With PMI's assistance in 2007, more than 159,000 houses were sprayed in three districts. In Year 2, PMI:

- Supported spraying in high-risk sectors of five districts that covered 189,756 houses and protected 885,957 residents. Ninety-four percent of the 201,545 houses targeted for spraying were successfully sprayed;
- Provided support for the recruitment and training of 2,451 spray operators to conduct and oversee operations;
- Raised awareness about IRS operations and the need to cooperate with spray teams within communities by training more than 3,000 community members as information, education, and communication implementers; and
- Provided technical assistance to the NMCP to build capacity to conduct entomological monitoring.

| PMI RESULTS IN RWANDA ¹ | | | | |
|---|---------------------------------------|-------------------|----------------------|---|
| Intervention | Indicator | Year 1 (2007) | Year 2 (2008) | Cumulative Results |
| Insecticide-Treated Nets | ITNs procured (distributed) | 0 | 550,000 ² | 550,000 (distribution planned for early 2009) |
| Indoor Residual Spraying | Spray personnel trained | 655 | 2,451 | – |
| | Houses targeted (% sprayed) | 165,098 (96%) | 201,545 (94%) | – |
| | People protected | 720,764 | 885,957 | – |
| Malaria in Pregnancy | Health workers trained in IPTp | 250 | 436 | – |
| | SP treatments procured (distributed) | 583,333 (583,333) | 0 | 583,333 (583,333) |
| Diagnosis and Treatment | Health workers trained in ACT use | 5,127 | 8,565 | – |
| | ACT treatments procured (distributed) | 715,000 (0) | 0 (411,788) | 715,000 (411,788) |
| BUDGET: \$1.5 million (FY06 jump start funds), \$20 million (FY07), \$16.8 million (FY08) | | | | |
| ¹ PMI measured Year 1 and Year 2 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2009. | | | | |
| ² As a result of changes in packaging, this shipment of 550,000 ITNs was procured in Year 2 (December 2008) and not Year 1 as previously reported in PMI's Second Annual Report. | | | | |

FIGURE 3.3
Allocation of \$16.8 Million
PMI Budget in Rwanda, FY08
 (Proportion of budget spent on commodities: 32%)



Malaria in Pregnancy

Because of decreasing malaria prevalence and increasing parasite resistance to sulfadoxine-pyrimethamine in Rwanda, the NMCP has decided to discontinue IPTp. In keeping with the new NMCP policy, PMI continues to support other aspects of prevention and treatment of malaria in pregnancy. In Year 2, PMI:

- Supported the training of 436 health workers to improve the quality of integrated focused antenatal care, a package of preventive measures to promote healthy pregnancies; and
- Procured a one-year supply of iron and folic acid (20 million tablets) to cover the annual need for all pregnant women in preventing anemia.

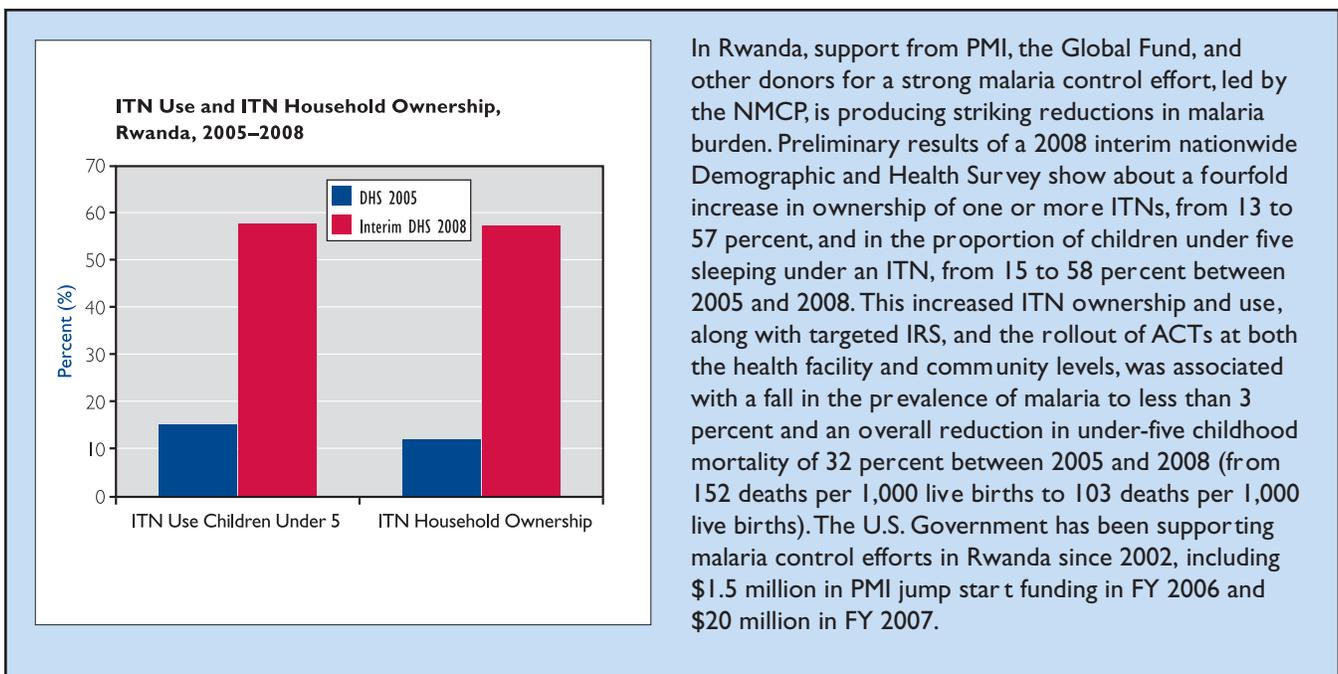
Diagnosis and Treatment

Artemether-lumefantrine, an ACT, is Rwanda's first-line treatment for uncomplicated malaria. With the fall in malaria prevalence, the NMCP now recommends laboratory confirmation of all cases before treatment. PMI efforts have focused on prompt and effective case management of malaria in health facilities, the private sector, and at the household level through community-based management. In Year 2, PMI:

- Distributed 411,788 ACT treatments procured in Year 1 to health facilities and community health workers, and through the commercial sector;
- Supported community-based treatment of malaria in 10 of 19 malaria-endemic districts in the country;
- Supported repackaging of ACTs for use at the community level and in the private sector to ensure recognition

BOX 3

Decline in Malaria Prevalence and Childhood Mortality in Rwanda



In Rwanda, support from PMI, the Global Fund, and other donors for a strong malaria control effort, led by the NMCP, is producing striking reductions in malaria burden. Preliminary results of a 2008 interim nationwide Demographic and Health Survey show about a fourfold increase in ownership of one or more ITNs, from 13 to 57 percent, and in the proportion of children under five sleeping under an ITN, from 15 to 58 percent between 2005 and 2008. This increased ITN ownership and use, along with targeted IRS, and the rollout of ACTs at both the health facility and community levels, was associated with a fall in the prevalence of malaria to less than 3 percent and an overall reduction in under-five childhood mortality of 32 percent between 2005 and 2008 (from 152 deaths per 1,000 live births to 103 deaths per 1,000 live births). The U.S. Government has been supporting malaria control efforts in Rwanda since 2002, including \$1.5 million in PMI jump start funding in FY 2006 and \$20 million in FY 2007.

Rolling Out ACTs in the Private Sector in Rwanda

John and Lydia Munkotanyi live in Rwanda with their five-year-old son Isaac, who has suffered from malaria many times. The last time Isaac had malaria John took him to a private clinic, where the doctor told them about PRIMO, the local brand name for a new ACT antimalarial treatment, artemether-lumefantrine (AL), for children under five years of age.

Rwanda converted to AL as the first-line antimalarial treatment in 2006 and rapidly scaled up access in health facilities, but this did not benefit the 40 per cent of patients who were treated by community health workers and the private sector. AL was available in only 6 percent of Rwanda's pharmacies, primarily in the capital, and at an average price of \$8.10 per treatment, it was priced well above what most Rwandans could afford to pay. If Rwanda was to achieve its goal of treating 80 percent of childhood fevers with an effective ACT within 24 hours, Rwanda needed to make AL more readily available.

The NMCP, with support from PMI, made AL available through private sector pharmacies nationwide at a subsidized price of \$0.55. A protective envelope for the drug with pictures and information in the local language was developed and launched under the brand name PRIMO. The innovative protective envelope provides low-literacy consumers with instructions they can understand and encourages correct and prompt treatment of childhood fevers.

PMI worked with the NMCP and the national Pharmacy Task Force to train pharmacy staff as a precondition for accessing PRIMO at subsidized prices. Sales were supported by behavior change communication activities that described the symptoms of malaria, appropriate treatment-seeking behavior, and PRIMO as the most effective drug for the treatment of uncomplicated malaria. With more than 60,000 PRIMO treatments sold to private sector pharmacies in 2008, access to AL increased significantly.

According to John, "The doctor told us all about PRIMO and how we could find it in the pharmacy near our home. We were surprised to find it there at an inexpensive price. After three days, Isaac was completely better; he regained his appetite quickly and, since then, we have told people in our village about PRIMO. The next time a child has a fever, we know we can treat it quickly with PRIMO, which is easy to find!"



Isaac Munkotanyi (center), who has suffered from malaria many times, recovered quickly after being treated with the ACT artemether-lumefantrine, marketed under the brand name PRIMO. Isaac's parents obtained PRIMO at a subsidized price through a private pharmacy in Rwanda.

PSI RWANDA

- and compliance among caretakers and to permit tracking of facility versus community treatments; and
- Assisted with the development of national guidelines and a standardized curriculum for training of health workers in monitoring of adverse drug reactions to ACTs.

Monitoring and Evaluation

The NMCP has developed a national malaria monitoring and evaluation plan, linked with the broader MOH monitoring and evaluation strategy. During Year 2, PMI:

- Supported verbal autopsies linked with the 2008 interim Demographic and Health Survey to measure malaria-specific mortality;
- Funded a national health facility survey that showed that although 86 percent of facilities surveyed had antimalarial drugs available, the capacity to examine blood smears for malaria is available in only about one-third of facilities; and
- Supported training for ten district-level health officials and four province-level NMCP coordinators, which included instruction in principles of vector control, treatment and prevention of malaria at the clinic and community levels, and monitoring and evaluation for malaria programs.

SENEGAL

Malaria in Senegal

All of Senegal's population of 11.6 million are at risk of malaria. Historically, malaria has been reported to be responsible for about one-third of outpatient consultations and one-quarter of deaths among hospitalized children under five.

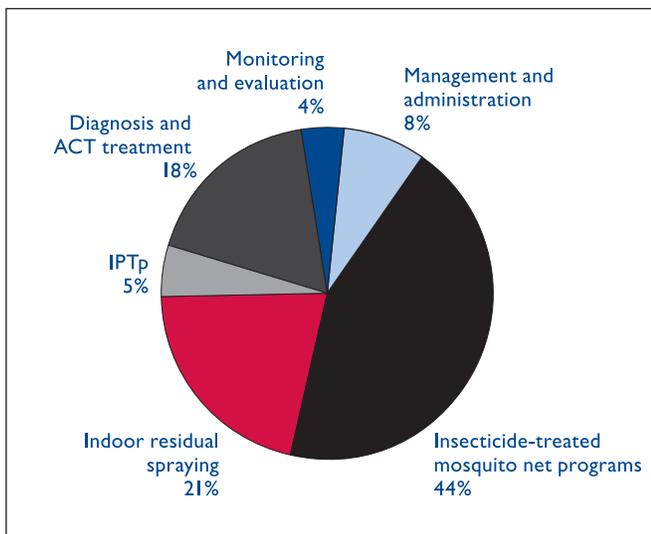
Insecticide Treated Nets

A key malaria prevention strategy of Senegal's NMCP is the distribution of long-lasting ITNs to pregnant women and children under five. During its first two years of implementation, PMI has supported a comprehensive strategy to increase household ownership and use of ITNs. In Year 2, PMI:

- Procured 790,000 long-lasting ITNs and distributed 792,951 nets (including some nets procured in Year 1). Of these:
 - 678,556 were distributed for free to young children in five regions participating in the MOH's micronutrient supplementation days, together with an additional 69,444 that were distributed to vulnerable populations after the campaign;
 - 42,000 were distributed to children under five and pregnant women in four districts of Dakar region that experienced heavy flooding in September 2008;
 - 2,000 were distributed to people living with HIV/AIDS through regional networks; and
 - 951 were distributed to other beneficiaries through Peace Corps volunteers.

| PMI RESULTS IN SENEGAL ¹ | | | | |
|--|---|----------------------------|---|--------------------|
| Intervention | Indicator | Year 1 (2007) | Year 2 (2008) | Cumulative Results |
| Insecticide-Treated Nets | ITNs procured (distributed) | 200,000 (196,872) | 790,000 (792,951) | 990,000 (989,823) |
| | ITNs sold with PMI marketing support | 158,060 | 57,832 | 215,892 |
| | ITN vouchers redeemed | 134,413 | 168,206 | 302,619 |
| | ITNs re-treated with insecticides | 125,632 | 0 | 125,632 |
| Indoor Residual Spraying | Spray personnel trained | 275 | 706 | — |
| | Houses targeted (% sprayed) | 172,020 ² (98%) | I: 34,802 ² (97%) II: 162,439 (95%) | — |
| | People protected | 678,971 | I: 135,661 II: 645,346 | — |
| Malaria in Pregnancy | Health workers trained in IPTp | 43 | 2,422 | — |
| Diagnosis and Treatment | Health workers trained in ACT use | 1,020 ³ | 4,776 ³ | — |
| | Health workers trained in malaria diagnostics | 0 | 90 | 90 |
| BUDGET: \$2.2 million (FY06 jump start funds), \$16.7 million (FY07), \$15.8 million (FY08) | | | | |
| ¹ PMI measured Year 1 and Year 2 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2009. ² For these spray rounds, the number of houses is an estimate based on the number of households reported as sprayed because the definition for "structure sprayed" changed between rounds. ³ In addition, 127 health workers were trained on ACT stock management procedures during Year 1 and 123 in Year 2. | | | | |

FIGURE 3.4
Allocation of \$15.8 Million
PMI Budget in Senegal, FY08
 (Proportion of budget spent on commodities: 40%)



- Distributed 168,206 long-lasting ITNs at a subsidized price to pregnant women and children under five in 550 health facilities in 38 of the country's 63 districts

through a voucher program that guarantees low-cost nets to vulnerable groups. Under this system, health committees at participating facilities negotiate agreements with private sector distributors to stock and sell nets through the health facility's pharmacies, and PMI reimburses the distributors a fixed amount for each net sold; and

- Provided support to commercial ITN vendors for developing marketing plans, recruiting new commercial partners, and producing billboards, television, and radio spots, which resulted in retail sales of 57,832 full-cost long-lasting ITNs to the general public.

To ensure high rates of net demand and use, PMI also invested in information, education, and communication and behavior change communication activities. For example, the well-known Senegalese actor Serigne Ngagne and his drama troupe participated in a "caravan" to distribute subsidized long-lasting ITNs in areas with poor access to nets. At each stop, the drama troupe let residents know that long-lasting ITNs were being distributed and where they could get them. Skits and health promotion sessions educated the population about the benefits of using long-

Reaching Villagers in Senegal with Malaria Interventions

"In 2006, during the rainy season, we lost seven children from malaria," said Momath Cissé, chief of the village of Keur Aly Samba. "But after the people sprayed our houses last year, not one child died during the rains." The village of roughly 1,600 people is located in the district of Nior o du Rip, one of the three districts where PMI is supporting IRS for the prevention of malaria. In 2007, nearly 30,800 households were sprayed, representing more than 99 percent of the 31,000 households approached by the spray teams in the district, and almost 276,000 people were protected.

Keur Aly Samba also benefits from a community health hut supported by PMI, where a community health worker provides treatment for malaria, respiratory infections, diarrhea, and tuberculosis; a birth attendant helps with antenatal care and the delivery of babies. Severe malaria cases have to be referred to the closest health post, which requires the health committee and the villagers to pay for transportation and medications. Keur Aly Samba's community health worker noted that in 2006, "We had to send more than 20 children to the health post" for treatment of severe malaria, but in 2007, "Only a handful had to be referred."



Children of Keur Aly Samba village stand with their village chief, Momath Cissé. PMI's support of IRS helps protect them from malaria, which caused the deaths of seven children in 2006.

ROBERT PERRY/CDC

Mosquito Nets Make All the Difference in Thiobe, Senegal

“Last year, during the peak season, I saw 584 cases of malaria,” says the chief nurse at the Thiobe health post in the Diourbel region of Senegal. “This year, there have only been 104. This is the difference that having mosquito nets makes.”

Malaria has practically disappeared from this village of approximately 1,000 people, in the heart of Senegal’s millet basin. A trained birth attendant at the health post noted that “There is hardly any malaria this year. We can be at the health post all day and only see maybe one case.”

Thiobe benefited from a PMI-supported mass distribution of long-lasting ITNs, in conjunction with the MOH’s local micronutrient supplementation days. More than 700,000 children ages 6 to 59 months in five regions received a free long-lasting ITN, in addition to vitamin A and deworming medication, during the campaign in June 2008, just prior to the start of seasonal rains and the peak malaria transmission season.

Marietou Sarr says that she sleeps under the net every night with her 11-month-old baby, Ndeye Maty. There haven’t been any cases of malaria in her household this year, a marked difference from last year. She is grateful to have the net, a sentiment echoed by the village chief. “Giving bed nets to all the young children in the village has really helped us. We won’t forget this.”



DEBBIE GUYE/USAID SENEGAL

Marietou Sarr and her 11-month old baby, Ndeye Maty, received a long-lasting ITN through a recent campaign that was supported by PMI.

lasting ITNs, especially for vulnerable groups, and the correct way to wash long-lasting ITNs.

Indoor Residual Spraying

In 2007, PMI funds supported Senegal’s first large-scale IRS campaign in the districts of Vélingara, Nioro, and Richard Toll, each district representing one of the country’s three ecological zones. During Year 2, PMI:

- Sprayed an estimated 33,915 houses in Richard Toll during March–April 2008 (97 percent of the 34,802 houses targeted), which protected 135,661 people;
- Sprayed a total of 153,942 houses in the same three districts as in Year 1 (Vélingara, Nioro, and Richard Toll) during June–August 2008, achieving 95 percent coverage among the 162,439 houses targeted for spraying and protecting 645,346 residents;

- Supported training of 706 local personnel to conduct and oversee spray operations;
- Funded an information campaign that included training 800 outreach workers and 582 community leaders on IRS promotion and organization; and
- Established a steering committee in each district to mobilize community groups, increase public support for IRS and collaboration among partners, and more effectively resolve IRS refusals. Peace Corps volunteers played a key role in supervision and community mobilization for this activity.

Malaria in Pregnancy

With the efforts of PMI and other partners, IPTp is now being administered in all MOH antenatal service delivery sites nationwide (all sulfadoxine-pyrimethamine needs are being met by the Government of Senegal). In Year 2, PMI:

- Supported training for 2,422 health care workers in IPTp;
- Provided funding that has enabled health post workers to provide malaria in pregnancy services, including IPTp, during their regular outreach visits to the community-based health huts; and
- Purchased and distributed water filters and reusable cups to facilitate directly observed treatment for IPTp.
- Trained 70 laboratory technicians and 20 supervisory staff on malaria laboratory diagnosis using the updated curriculum, and purchased 86 microscopes (including three teaching microscopes) and related supplies; and
- Supported refresher training in case management for 2,127 facility health care workers and 2,649 community health workers.

Diagnosis and Treatment

Since October 2007, the NMCP has required confirmatory testing of all suspected cases of malaria. For inpatients, this testing is through microscopy, while in outpatient facilities, rapid diagnostic tests are used. Case management with ACTs is currently available in all public health facilities. During 2008, with the help of PMI, treatment with ACTs at the community level was rolled out to all 1,297 health huts nationwide. As a result, more than 56,000 children under five were treated presumptively for malaria with ACTs at these health huts. On World Malaria Day 2008, the Minister of Health announced that co-payments for ACTs would be cut in half, and, as a result, dosage packs are now sold for 150 CFA for children (approximately \$0.36) and 300 CFA for adolescents/adults (approximately \$0.72). PMI continues to advocate that ACTs should be free for children under five. Through its Round 4 and 7 Global Fund grants, the NMCP is able to meet all public sector needs for ACTs through 2012. During Year 2, PMI:

- Supported the development of a new training curriculum for malaria laboratory diagnosis, together with a revised system of supervision, quality assurance, and quality control;

Monitoring and Evaluation

To measure interim coverage of key interventions, PMI and the NMCP supported a nationwide Malaria Indicator Survey, including anemia and parasitemia biomarkers, in October–November 2008. Preliminary results from this survey will be available in April 2009 and are expected to show a significant improvement in nationwide coverage of ITNs, ACTs, and IPTp when compared with the baseline Malaria Indicator Survey of 2006.

The NMCP also has a strong system of routine collection of surveillance and program-related data for monitoring and evaluation of program performance between surveys. This system relies on quarterly district-level review meetings using a standardized reporting form. In Year 2, PMI resident advisors participated in the quarterly reviews and served on a commission charged with improving data collection procedures for the reviews and the quality of the feedback given to districts. Simple feedback tools developed by this commission, with support of PMI advisors, have led to improved program performance. For example, analysis of first-quarter data showed significant overprescription of ACTs in relation to rapid diagnostic test-confirmed malaria cases. Districts took steps to address the situation, and, by the third quarter, the overuse had been greatly reduced.

CHAPTER 4

“President Boni Yayi's leadership has been a major factor in the success of the aggressive and comprehensive malaria intervention strategy in Benin. He has demonstrated that when leaders are committed to their people, lives will be saved; market places will flourish, and communities will benefit.” – Rear Admiral R.T. Ziemer USN (Ret.), U.S. Global Malaria Coordinator



BENOIST MATSIA-CARPENTIER/VESTERGAARD FRANDSEN

A young girl in Benin carries an ITN her family received as part of a national campaign to which PMI contributed ITNs and technical support. Children under five years of age are part of the most vulnerable population because they have not built up resistance to malaria parasites.

BENIN

Malaria in Benin

Benin has a population of approximately 8.3 million, all of whom live in areas where malaria is transmitted. Malaria is a leading cause of morbidity and mortality among children under five and accounts for 44 percent of all outpatient visits and 40 percent of hospitalizations. Benin is a low-income country and ranked 161 out of 179 countries on the 2008 United Nations Human Development Index; almost one-third of the population lives below the poverty line.

Insecticide-Treated Nets (ITNs)

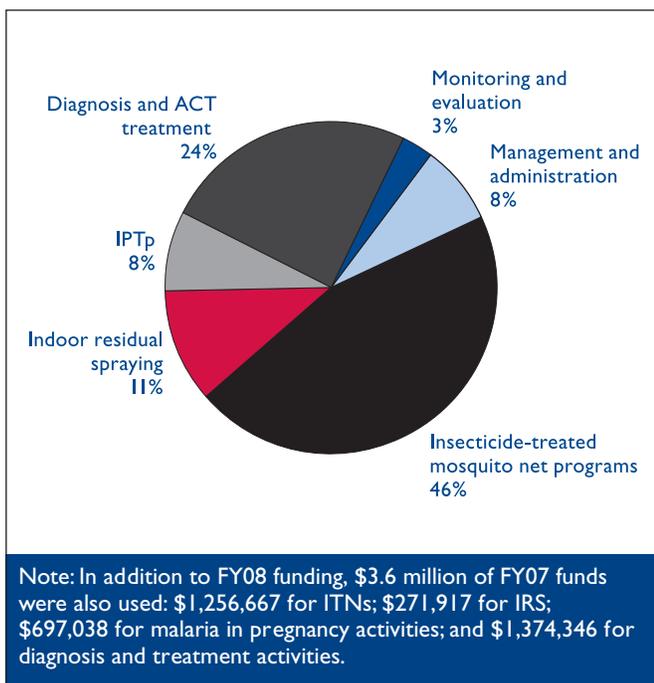
Benin's National Malaria Control Program's (NMCP's) strategic plan for 2006–2010 emphasizes ITN use by pregnant women and children under five. The NMCP supports a multipronged approach to net distribution, including free distribution via campaigns, routine visits to vaccination and antenatal clinics, and the commercial sale of nets. PMI supports these activities as well as the



| BENIN AT A GLANCE | | | |
|--|--------------------------------|--|--|
| Indicator | Baseline Coverage | PMI Jump Start Results (2007) ¹ | Year 1 (2008) ¹ |
| Pregnant women who slept under an ITN the previous night | 20% ² | 221,000 ITNs procured (215,627 distributed) | 385,697 ITNs procured (45,840 distributed) |
| Children under five who slept under an ITN the previous night | 20% ² | | |
| Houses in geographic areas targeted for IRS that were sprayed | No areas targeted ³ | – | 142,814 houses sprayed and 521,738 people protected |
| Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy | <1% ² | 605 health workers trained in IPTp 766,666 SP treatments procured and in-country | 1,267 health workers trained in IPTp |
| Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms | <1% ² | 605 health workers trained in ACT use and malaria diagnostics 1,465,170 ACT treatments procured (153,884 distributed to health facilities) 178,400 RDTs procured (73,815 distributed to health facilities) | 326,544 ACT treatments distributed to health facilities 104,585 RDTs distributed to health facilities |
| BUDGET: \$3.6 million (FY07 jump start funds) and \$13.8 million (FY08) | | | |
| ¹ PMI measured jump start and Year 1 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2009. The table includes USG-funded malaria jump start activities that took place in 2007 (reported in PMI's Second Annual Report) and PMI 2008 activities. ² Source: 2006 Benin Demographic and Health Survey. ACTs were adopted in November 2004, but national rollout of ACTs only began in August 2008. ³ At baseline, no areas were targeted for spraying by the National Malaria Control Program. | | | |

FIGURE 4.1
Allocation of \$13.8 Million
PMI Budget in Benin, FY08

(Proportion of budget spent on commodities: 42%)



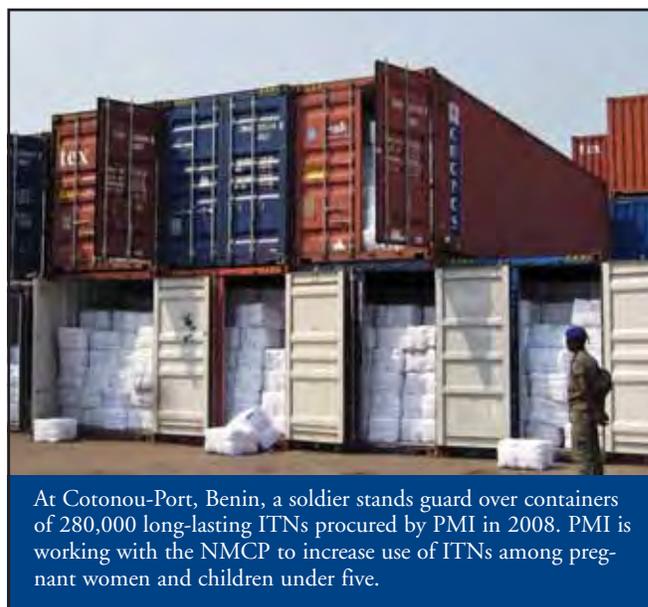
sale of highly subsidized, socially marketed nets. PMI's support of social marketing activities reinforces existing private sector ITN distribution channels by hosting wholesalers' meetings, identifying rural sales points, and training retailers. Since Benin became a focus country in December 2006, PMI has:

- Procured 606,697 long-lasting ITNs (including 2007 and 2008 procurements) and distributed 261,467 through a variety of channels, including health facilities, the commercial sector, and a national campaign; and
- Contributed 150,000 long-lasting ITNs and technical support for a national campaign in October 2007, during which a total of 1.7 million nets were distributed.

Indoor Residual Spraying (IRS)

During 2008, in partnership with the Government of Benin and local communities, PMI supported one round of IRS in four communes in the Ouémé Department in southern Benin. This was the first large-scale IRS program in Benin in 30 years. Due to high levels of pyrethroid resistance, a nonpyrethroid insecticide (bendiocarb) was used. As part of the IRS campaign, PMI:

- Provided support for training 335 local residents to conduct IRS and supervise operations;
- Supported a successful round of spraying in four communes (Sèmè-Kpodji, Adjohoun, Dangbo, and Akpro-Misséréte), during which 142,814 houses were sprayed (94 percent of targeted houses), and 521,738 people were protected;
- Informed communities about IRS through 150 community mobilizers and five community radio stations. In addition to door-to-door visits to all households in the communities, activities included local skits and interviews, four music concerts, distribution of 110,046 leaflets, 1,335 radio spots, 20 debates, and 575 radio shows on IRS; and
- Collaborated with entomologists at the Centre de Recherche Entomologique de Cotonou (CREC), an indigenous research institution, to develop and implement an IRS monitoring and evaluation plan. The plan included the routine capturing of mosquitoes to monitor vector species and densities, setting up mosquito traps inside and outside dwellings to monitor vector behavior change, conducting World Health Organization wall cone bioassays to assess insecticide decay rate, and collecting *Anopheles gambiae* larvae in different locations of the IRS area to determine and track resistance among mosquitoes.



At Cotonou-Port, Benin, a soldier stands guard over containers of 280,000 long-lasting ITNs procured by PMI in 2008. PMI is working with the NMCP to increase use of ITNs among pregnant women and children under five.

Women Pioneer Antimalaria Efforts in Benin

Diane Sagbohan is one of only six female spray operators among the 265 spray operators who participated in Benin's first IRS campaign in three decades. Diane is from Sèmè-Kpodji, one of the four communes selected for spray operations during 2008 and known for high rates of malaria transmission.

Diane, a 23-year-old mother of a two-year-old boy, works as a clerk typist. Despite the fact that spray operators for IRS campaigns are mostly men from her community, she was eager to join this effort against malaria. When asked what motivated her to become a spray operator, Diane responded that it was an exceptional opportunity to participate in the fight against malaria, the most common disease in her village and the disease that most people die from. "I feel valued and useful to my community by taking part in the IRS campaign," she stated, and concluded that she was "motivated and ready to participate in the next campaign."

Diane's participation in the IRS campaign opens a new social dimension for female leaders in combating malaria in Benin. In her community, she is viewed as a pioneer and an example for others to change their behavior and adopt practices to prevent malaria. The participation of Diane and other women will help raise awareness about malaria and induce behavior change in their communities.



Diane Sagbohan is one of a handful of female spray operators who are contributing to IRS operations in Benin. Prior to PMI, few countries in Africa were conducting large-scale IRS campaigns. Diane participated in one of the first campaigns in Benin in 30 years.

RTI

Insecticide Resistance

Because resistance to pyrethroid insecticides (used on long-lasting ITNs and for IRS) among mosquitoes is well documented in Benin due to agricultural use, PMI has also provided support to CREC to monitor and map mosquito resistance through the establishment of six entomological surveillance sites in various ecological settings throughout the country. PMI also is supporting focused operations research to better understand how mosquito resistance impacts the effectiveness of pyrethroid-based malaria control measures in Benin.

Malaria in Pregnancy

Intermittent preventive treatment for pregnant women (IPTp) was introduced nationally in 2005. While attendance of pregnant women at antenatal clinics (ANCs) is high in Benin (88 percent of pregnant women make at

least one ANC visit, according to the 2006 Demographic and Health Survey), only 3 percent reported receiving the recommended two doses of sulfadoxine-pyrimethamine (SP) during pregnancy. Since beginning work in Benin, PMI has:

- Procured 766,666 SP treatments as part of PMI 2007 jump start activities, which have arrived in country and are being distributed to health facilities;
- Supported training of 1,201 health workers and 66 trainers nationwide on how to administer IPTp in 2008, in addition to 605 health workers trained in 2007; and
- Supported the production of a facilitator and training guide for IPTp for the NMCP.

Diagnosis and Treatment

Use of artemether-lumefantrine (AL), an artemisinin-based combination therapy (ACT), as the first-line drug for uncomplicated malaria began in Benin in November 2004, in a small pilot area. Large-scale implementation did not begin until 2008. Under the policy, any child under five years of age with a fever should receive presumptive antimalarial treatment, either at a health facility or at the community level. The World Bank Malaria Booster Program in Benin is covering the bulk of needs for rapid diagnostic tests (RDTs) as well as some of the ACT needs. Global Fund Round 7 funds are being used to implement ACT distribution at the community level. PMI is complementing these efforts through ACT procurement, training for health workers, and support to nongovernmental organizations (NGOs) working at the community level. Since Benin became a PMI focus country, PMI has:

- Procured 1,465,170 ACT treatments (during 2007), which have arrived in country. Of these, 480,428 treatments have been distributed to health facilities;
- Procured and distributed 178,400 RDTs;
- Supported training of 605 personnel in malaria diagnostics and case management with ACTs during 2007;
- Procured 30 microscopes, which are scheduled to arrive in country in early 2009;
- Contributed to the development of guidelines for the Integrated Management of Childhood Illness at the community level (community IMCI).
- Led discussions with the NMCP, the Department of Family Health, donors, and NGOs to map case management activities and select geographic zones for PMI partners to implement community IMCI. The discussions and redistribution of implementation zones resulted in national coverage of all 34 health zones in the country with either community IMCI or community-based management of malaria; and
- Provided support to the NMCP to strengthen the national supervision system to improve the quality of malaria case management by Ministry of Health staff. With PMI support, the NMCP has developed a consolidated supervision plan that includes support from



Community helpers, wearing armbands, prepare to hand out ITNs during a national campaign in Benin, to which PMI contributed 150,000 long-lasting ITNs and technical support. A total of 1.7 million nets were distributed for free through this campaign.

the World Bank Malaria Booster Program as well as resources from the national budget. The supervision plan will roll out in March 2009.

One of the challenges over the coming year will be to strengthen supply chain management capacity in the National Medical Stores and health facilities to immediately reduce stockouts and overstocking of malaria commodities. An evaluation of the governance structure of the central drug store was conducted in November– December 2008. PMI is currently engaging in policy dialogue with the Ministry of Health and other donors to implement reforms that will make the central drug store more effective.

Monitoring and Evaluation

A Demographic and Health Survey conducted during 2006 provides baseline data for many PMI indicators. In 2008, PMI:

- Worked with the NMCP to enhance health facility-based surveillance in health zones designated as sentinel sites. Data collection is expected to begin in early 2009.
- Contributed, along with the World Bank Malaria Booster Program, to the NMCP survey in November–December 2008 to assess ITN ownership and use after the October 2007 national campaign of free distribution of long-lasting ITNs to children under five years.

CHAPTER 5

“On World Malaria Day, Americans stand in solidarity with Ethiopia and communities across the globe in the fight against malaria. Today, we commemorate World Malaria Day with you, celebrate your achievements, and rededicate our historic partnership between Ethiopia and the United States to defeat this preventable and treatable killer.” – Glenn Anders, USAID Ethiopia Mission Director, in remarks on the occasion of World Malaria Day, April 25, 2008



Children under five are especially vulnerable to malaria. In Ethiopia, where PMI has been working since December 2006, malaria is characterized by frequent and often large-scale epidemics. To lower infection rates, PMI is working with its partners to increase the use of long-lasting ITNs and the prompt and appropriate treatment for children under five with fevers.

BONNIE GILLESPIE/
VOICES FOR A MALARIA-FREE FUTURE

ETHIOPIA: OROMIA REGION

Malaria in Ethiopia: Oromia Region

Historically, malaria has been the leading communicable disease in Ethiopia, with major epidemics every five to eight years. Three-quarters of the country are malarious, and approximately 50 million people live in malarious areas. PMI's activities in Ethiopia are focused in Oromia Region, the largest and most malarious of Ethiopia's 11 regions, covering one-third of the country's landmass. In Oromia, more than 17 million people are at risk of infection, and malaria accounts for 20 to 35 percent of outpatient consultations, 16 percent of hospital admissions, and 18 to 30 percent of hospital deaths.

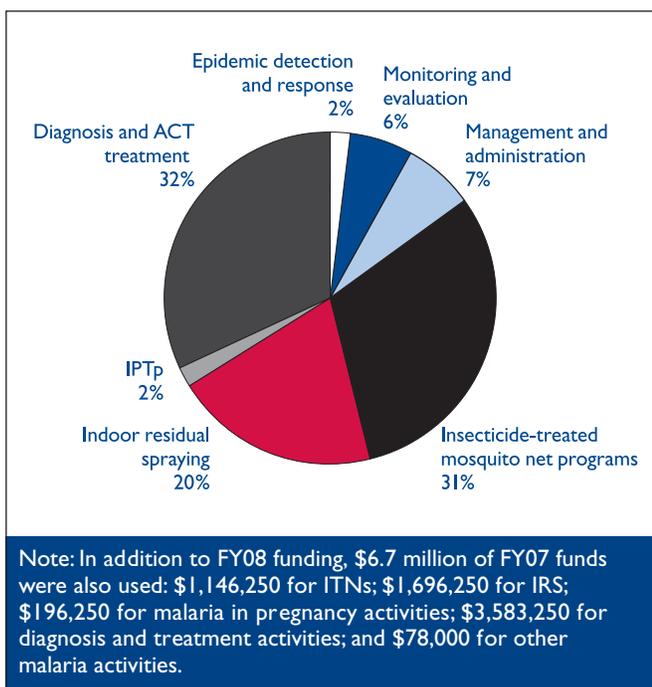
Insecticide-Treated Nets (ITNs)

Ethiopia's National Strategic Plan for Malaria Prevention and Control has a 2010 target of 100 percent coverage in malarious areas with two ITNs per household. As reflected in recent surveys, ITN and long-lasting ITN ownership has increased dramatically in recent years: In



| ETHIOPIA (OROMIA REGION) AT A GLANCE | | | |
|---|----------------------------|--|---|
| Indicator | Baseline Coverage | PMI Jump Start Results (2007) ¹ | Year 1 (2008) ¹ |
| Pregnant women who slept under an ITN the previous night | 29% ² | 102,145 ITNs procured and distributed | 22,284 ITNs procured and distributed |
| Children under five who slept under an ITN the previous night | 24% ² | | |
| Houses in geographic areas targeted for IRS that were sprayed | Not available ³ | Provided partial support to an IRS campaign, which protected 3.89 million people | 316,829 houses sprayed and 1,000,526 people protected; and provided partial support to an IRS campaign, which protected 4.92 million people |
| Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms | <1% ² | — | 600,000 ACT treatments procured and in-country 2,786 health extension workers trained in ACT use |
| BUDGET: \$6.7 million (FY07 jump start funds) and \$19.8 million (FY08) | | | |
| <p>¹ PMI measured jump start and Year 1 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2009. The table includes USG-funded malaria jump start activities that took place in Oromia in 2007 (reported in PMI's Second Annual Report) and PMI 2008 activities.</p> <p>² Source: 2007 Ethiopia Malaria Indicator Survey (Oromia only).</p> <p>³ Ethiopia has been conducting annual IRS applications since the late 1950s. In recent years, spray operations in Oromia covered between 450,000 and 750,000 houses per year.</p> | | | |

FIGURE 5.1
Allocation of \$19.8 Million
PMI Budget in Ethiopia (Oromia Region), FY08
 (Proportion of budget spent on commodities: 46%)



Oromia, 41 percent of households own at least one ITN, up from less than 2 percent in 2005. Nets are distributed through semiannual child health campaigns, routinely at health facilities, and door-to-door. Since Ethiopia became a focus country, PMI has:

- Procured a total of 124,429 long-lasting ITNs, which were distributed through health facilities (for free or with a high subsidy) or via the private sector (at a subsidized price);
- Worked with the Ministry of Health (MOH) and partners to develop a National Vector Control Strategy, including strategies for ITN replacement; and
- Supported a comprehensive package of information, education, and communication and behavior change communication activities to increase access to and utilization of long-lasting ITNs.

Indoor Residual Spraying (IRS)

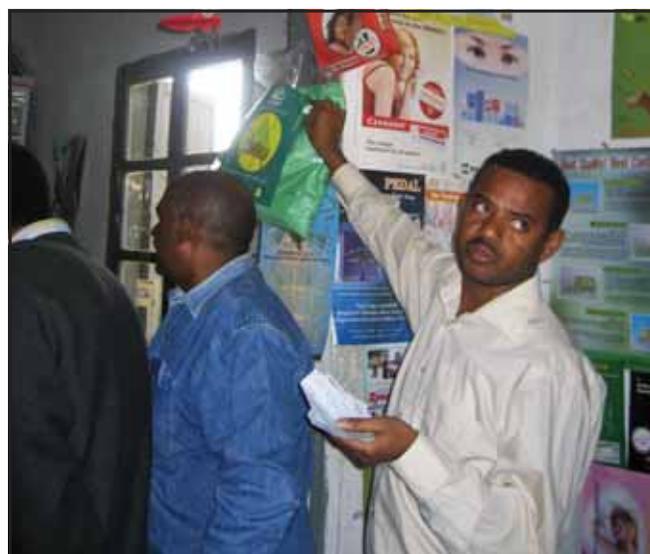
PMI extended and strengthened Ethiopia's long-standing IRS program through a range of activities. This included improving the targeting of IRS; strengthening procurement, storage, and distribution systems for commodities;

training and supervising spray operators; supporting environmentally sound pesticide management; and monitoring and evaluation. Since Ethiopia joined PMI in December 2006, PMI:

- Supported spraying of 316,829 houses in Oromia (74 percent of those targeted), providing protection to 1,000,526 residents;
- Purchased 970 spray pumps and spare parts kits, personal protection materials for spray personnel, and other IRS equipment;
- Trained 1,198 local personnel to conduct and supervise spray operations; and
- Provided partial support for IRS campaigns during two successive years. U.S. Government funds were used to procure insecticides, train IRS personnel, and plan, oversee, and monitor IRS operations. This resulted in protection of 3.89 million people in 2007 and 4.92 million people in 2008.

Malaria in Pregnancy

Because of generally low levels of malaria transmission, intermittent preventive treatment is not part of the National Strategic Plan for Malaria Prevention and Control. The MOH and PMI support other activities to prevent and treat malaria among pregnant women. Since beginning work in Oromia, PMI:



A storekeeper reaches for an ITN in Ethiopia. PMI subsidizes the sale of ITNs in the private sector as one of several ways of increasing net ownership.



Mothers wait with their babies at a clinic in Oromia Region, Ethiopia. PMI has targeted this region because it bears the brunt of the country's malaria burden.

- Supported training for 2,786 peripheral health extension workers on malaria case recognition and management of malaria in pregnancy;
- Provided for the distribution of ITNs through antenatal care clinics; and
- Collaborated with the U.S. President's Emergency Plan for AIDS Relief to support malaria health education activities aimed at increasing antenatal care and support for the prevention of mother-to-child transmission of HIV.

Diagnosis and Treatment

Ethiopia's national treatment guidelines recommend artemether-lumefantrine (AL) as the first-line treatment for uncomplicated falciparum malaria and chloroquine as treatment for the other three species of malaria parasites. Since December 2006, PMI has:

- Procured 600,000 AL treatments, which will be distributed in early 2009;
- Initiated the conceptualization and design of a quality assurance/quality control system for malaria laboratory diagnosis in health facilities;
- Assessed the antimalarial drug management practices at health facilities throughout Oromia; and
- Provided technical and financial support to the Drug Administration and Control Authority to assess the quality of antimalarial drugs on the market in selected sites in Oromia.

Monitoring and Evaluation

Ethiopia's recently revised Health Management Information System (HMIS) will measure several malaria indicators that will inform decisions on resource allocation, program activities, and policymaking at all levels of the health system. During the past year, PMI assisted with the Government of Ethiopia's rollout of HMIS routine data collection and analysis and dissemination of data from the 2007 Malaria Indicator Survey.

CHAPTER 6

“It is better to prevent malaria, but when you get it, treat it well. Mosquitoes do not need permission to enter your bedroom, nor do they need visas to travel from one community to the other or one district to the other, let alone fly to and from our neighboring countries and beyond. Partnership locally, nationally, and internationally is vital in our bid to conquer malaria.” – Dr. Constance Bart-Plange, National Malaria Control Program Manager, June 2008



RICHARD KAHN/CDC

Women from the rural Agona Abodum community in Central Region, Ghana, line up to redeem their vouchers for free ITNs. PMI works with the Government of Ghana to distribute ITNs through multiple channels, including voucher programs such as this one.

GHANA

Malaria in Ghana

Malaria is hyperendemic in all parts of Ghana, with the entire population of 23 million at risk. Malaria is also the number one cause of morbidity in Ghana and is thought to account for about 38 percent of all outpatient illnesses, 36 percent of all hospital admissions, and an estimated 20 percent of all deaths in children under five years of age.

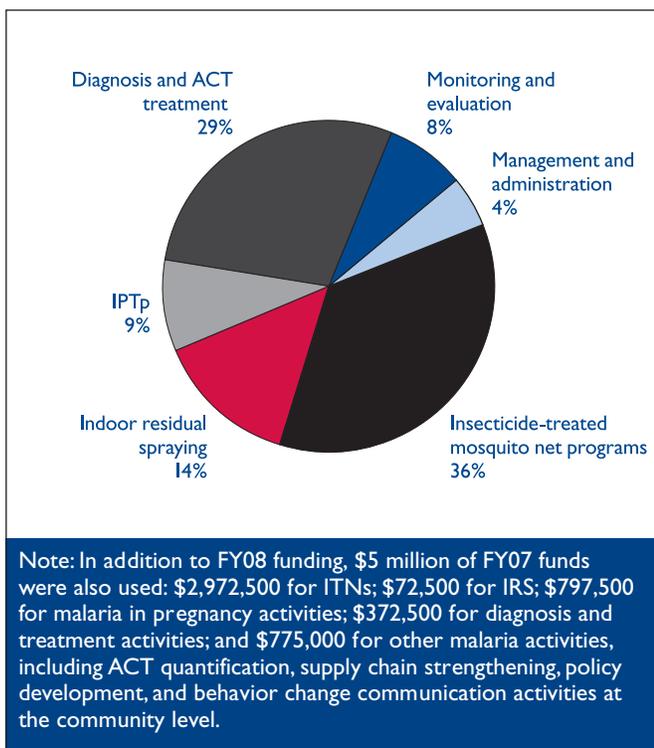
Insecticide-Treated Nets (ITNs)

In June 2008, the National Malaria Strategic Plan (2008–2015) was revised to include universal coverage with ITNs for all population groups. Ghana embraces a mixed model for the distribution of long-lasting ITNs, which incorporates multiple approaches: mass free distribution; targeted subsidy programs, including voucher schemes (in 5 of 12 regions); subsidized sales at public clinics (all regions); commercial sales; distribution at the



| GHANA AT A GLANCE | | | |
|---|-----------------------------|--|--|
| Indicator | Baseline Coverage | PMI Jump Start Results (2007) ¹ | Year 1 (2008) ¹ |
| Pregnant women who slept under an ITN the previous night | 3% ² | 60,023 ITNs procured and distributed | 350,000 ITNs procured 750,000 ITNs distributed ⁴ |
| Children under five who slept under an ITN the previous night | 22% ³ | 612,000 ITNs sold by commercial partners 151,036 nets re-treated with insecticide | 236,789 vouchers redeemed for ITNs 1,234,159 ITNs sold by commercial partners 429,213 nets re-treated with insecticide |
| Houses in geographic areas targeted for IRS that were sprayed | Not applicable ⁵ | — | 254,305 houses sprayed and 601,973 people protected |
| Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy | 25% ³ | — | 464 health workers trained in IPTp |
| Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms | <1% ³ | — | 1,142,759 ACT treatments procured and being distributed 368 health workers trained in ACT use |
| BUDGET: \$5 million (FY07 jump start funds) and \$16.8 million (FY08) | | | |
| ¹ PMI measured jump start and Year 1 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2009. The table includes USG-funded malaria jump start activities that took place in 2007 (reported in PMI's Second Annual Report) and PMI 2008 activities. ² Source: 2003 Ghana Demographic and Health Survey. ³ Source: 2006 Ghana Malaria Indicator Cluster Survey. ⁴ PMI helped to distribute these long-lasting ITNs that were procured by UNICEF and the World Bank. ⁵ No areas were targeted for public sector spray campaigns by the National Malaria Control Program prior to 2008. Since 2004, AngloGold Ashanti has implemented a spraying program in the Obuasi District, site of its gold mine. | | | |

FIGURE 6.1
Allocation of \$16.8 Million
PMI Budget in Ghana, FY08
 (Proportion of budget spent on commodities: 41%)



community level through nongovernmental organizations (NGOs); and workplace distributions. Since Ghana became a focus country, PMI has:

- Procured 410,023 long-lasting ITNs, of which 60,023 were distributed in 2007; the remaining 350,000 arrived in country in early 2009;
- Distributed 236,789 nets (vouchers redeemed) through ITN voucher schemes run by the Ghana Health Service;
- Promoted sales of more than 1.8 million ITNs (612,000 in 2007 and 1,234,159 in 2008) by supporting partnerships with six commercial ITN distributors in the private sector through technical assistance, advocacy, and advertising support;
- Assisted with campaign planning and transportation for 750,000 nets purchased by UNICEF and the World Bank as part of a nationwide campaign to distribute 1.5 million ITNs;

- Re-treated 580,249 nets (2007 and 2008) with insecticides for free in three regions. This ambitious mass re-treatment campaign, which exceeded its targets, was conducted in collaboration with local NGOs and a network of community volunteers. In 2009, PMI will discontinue the net re-treatment program and will replace old nets with new long-lasting ITNs; and
- Provided technical assistance to the National Malaria Control Program (NMCP) to develop a database system to track ITN distribution through all channels in Ghana.

A 2008 survey carried out by the PMI-funded NetMark Project showed that household ownership of ITNs had increased on average from 11 percent in 2004 to 64 percent in 2008 in five targeted regions, while the proportion of children under five who slept under an ITN increased, from 8 to 41 percent.

Indoor Residual Spraying (IRS)

In recent years, Ghana has moved aggressively to expand IRS. Based on the successful experience with IRS by the AngloGold Ashanti mining company, the National Malaria Strategic Plan was rewritten to incorporate IRS as a key component of an integrated vector control program. The national plan calls for rapidly scaling up IRS to protect at least one-third of Ghana's districts by the end of 2015.

During 2008, PMI supported the first large-scale implementation of IRS in the public sector, in collaboration with the Ghana Health Service. PMI-supported IRS operations benefited from technical assistance and collaboration provided by AngloGold Ashanti, particularly in the areas of community sensitization, training of trainers, and training of spray operators. After Ghana was named a focus country, PMI:

- Supported the spraying of 254,305 houses (94 percent of those targeted), protecting 601,973 people;
- Funded the training of 468 local personnel to conduct and oversee spray operations; and
- Mobilized community support for spraying through
 - stakeholder meetings at the regional, district, and community levels, targeting political leaders, administrators, traditional chiefs, women, religious leaders, environmental officers, and health workers;
 - brochures and clubs aimed at schoolchildren;

- radio spots across the Northern Region to disseminate messages about IRS; and
- press and media interviews sponsored by the regional health directorate.

PMI also assisted in the preparation of a successful Round 8 Global Fund grant proposal that includes a \$110 million IRS component, to be implemented between 2009 and 2013. The IRS component was designed to build on the AngloGold Ashanti private sector program and lessons learned from the PMI-funded public sector pilot.

Malaria in Pregnancy

The NMCP policy recommends three doses of sulfadoxine-pyrimethamine for intermittent preventive treatment for pregnant women (IPTp). During Year 1, PMI supported malaria in pregnancy interventions, with a specific focus on districts in southern Ghana, where USAID health programs have been supporting 30 of the most underserved districts in the country. For example, PMI:

- Provided technical and financial support to update the health care worker training curriculum on malaria in pregnant women; and
- Supported training of 464 health workers in IPTp.

Diagnosis and Treatment

Artemisinin-based combination therapy (ACT) has been Ghana's first-line treatment for uncomplicated malaria since 2004. With PMI support, a technical working group has been charged with developing a policy that lays out the role and use of both microscopy and rapid diagnostic tests for diagnosis of malaria and provides a framework for its implementation.

Since Ghana was named a focus country in December 2006, PMI:

- Carried out a quantification exercise for antimalarial drugs, which identified a serious threat of a nationwide stockout of ACTs by the end of 2008. With time running short and other funds unavailable, the Ministry of Health made a formal request to PMI to assist in procuring an emergency supply of ACTs. PMI procured 1,142,759 ACT treatments that arrived in November 2008 for distribution to health facilities;
- Supported training of 368 health workers on the proper use of ACTs;



RTI/GHANA

An IRS community liaison team crosses a tributary of the Volta River to reach isolated villages in Ghana. Information, education, and communication programs conducted by such teams prepare communities for IRS campaigns and increase cooperation with spray teams.

- Provided technical assistance to strengthen the supply chain for antimalarial medications and to promote their rational use by patients, pharmacists, and other health care workers; and
- Supported the further development of the national treatment policy, including the expansion of home management of malaria and the updating of training manuals.

Monitoring and Evaluation

The Ghana Health Service is moving toward a national integrated approach to disease surveillance. As part of this effort, PMI helped the NMCP develop a comprehensive malaria monitoring and evaluation plan. PMI provided support for the 2008 Demographic and Health Survey, which will provide baseline coverage for all PMI indicators. PMI also is supporting development of sentinel sites in various regions of the country that will collect routine facility-based data on malaria mortality and morbidity. The data collection protocols and instruments have been developed, and sentinel site data for the last quarter of 2008 have been collected.

CHAPTER 7

“The PMI has offered much needed support in the scaling up of critical interventions of the malaria control program in Kenya. The outcome is very promising. In the three districts where PMI supported the scaling up of indoor residual spraying, we are now documenting significant reductions in malaria morbidity, and we plan to make these districts our model districts for effective malaria control.” – Dr. Willis S Akhwale, Head, Department of Disease Prevention and Control, Ministry of Public Health and Sanitation, Kenya



A distributor hands out ITNs to mothers of young children in Kenya, where nets are provided for free to children under one and pregnant women. Since usage of nets has remained low despite a dramatic increase in net ownership, PMI will continue to support community-based information, education, and communication and behavior change communication campaigns to increase demand for ITNs and their correct usage.

KENYA

Malaria in Kenya

Seventy percent of Kenya's population of 34 million people are at risk of malaria, including an estimated 3.5 million children under five and 1.1 million pregnant women. Malaria is the leading cause of morbidity and mortality in Kenya. It accounts for about 30 percent of all outpatient consultations, 19 percent of all hospital admissions, and an estimated 34,000 deaths annually among children under five years of age.

Insecticide-Treated Nets (ITNs)

The policy of the Government of Kenya is to distribute long-lasting ITNs free to pregnant women at antenatal clinics (ANCs) and to children under one year of age. Since Kenya became a PMI focus country:

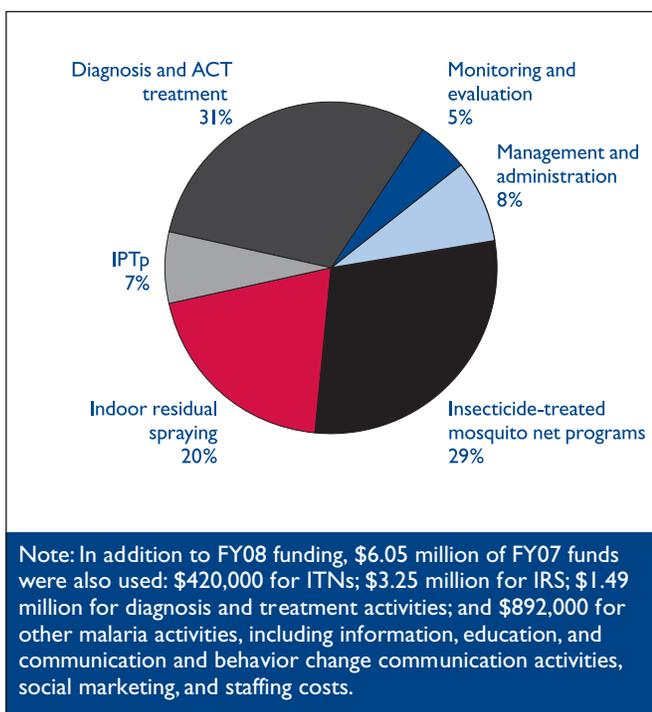
- PMI donated 60,000 long-lasting ITNs for the national net re-treatment campaign in October 2008



| KENYA AT A GLANCE | | | |
|--|----------------------------|---|---|
| Indicator | Baseline Coverage | PMI Jump Start Results (2007) ¹ | Year 1 (2008) ¹ |
| Pregnant women who slept under an ITN the previous night | 33% ² | — | 60,000 ITNs procured and distributed ³ |
| Children under five who slept under an ITN the previous night | 40% ² | | |
| Houses in geographic areas targeted for IRS that were sprayed | Not available ⁴ | Provided partial support to an IRS campaign in 14 districts, which protected 3.4 million people | 207,370 houses sprayed and 1,257,941 people protected in three districts; and provided partial support to an IRS campaign in 14 districts, which protected 1.8 million people |
| Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy | 12% ² | — | Training materials for malaria in pregnancy developed |
| Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms | 4% ² | — | 1,281,720 ACT treatments procured and distributed to an estimated 4,949 health facilities 77 laboratory technicians trained in malaria diagnostics |
| BUDGET: \$6.1 million (FY07 jump start funds) and \$19.8 million (FY08) | | | |
| ¹ PMI measured jump start and Year 1 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2009. The table includes USG-funded malaria jump start activities that took place in 2007 (reported in PMI's Second Annual Report) and PMI 2008 activities. | | | |
| ² Source: Kenya Malaria Indicator Survey 2007 – Preliminary data. | | | |
| ³ In PMI's Second Annual Report, 60,000 ITNs were reported as procured and 5,000 as distributed during 2007. Actual procurement and distribution took place in 2008. Of the 60,000 ITNs, 5,000 were distributed with PMI support and 55,000 were distributed in partnership with DFID. | | | |
| ⁴ At baseline, the Government of Kenya's policy was to conduct IRS in epidemic-prone districts only, supported by a Global Fund grant. With PMI's assistance, it has recently begun to refocus its IRS strategy to endemic areas. | | | |

FIGURE 7.1
Allocation of \$19.8 Million
PMI Budget in Kenya, FY08

(Proportion of budget spent on commodities: 49%)



to replace nets that were too worn to be re-treated. PMI distributed 5,000 of these nets directly; the remaining 55,000 were distributed by the British Department for International Development (DfID). In total, 3 million nets were re-treated in this campaign through a partnership among the Division of Malaria Control (DOMC), the World Health Organization, UNICEF, DfID, and PMI.

Indoor Residual Spraying (IRS)

While the Government of Kenya's policy is to conduct IRS in epidemic-prone districts (supported by a Global Fund grant), it has recently begun to refocus its IRS strategy to endemic areas, particularly those that border the highland districts covered by the existing IRS program. With the support of PMI, Kenya has strengthened its IRS program and expanded into one endemic district. Since the start of its work in Kenya, PMI has:

- Supported spraying of 207,370 houses with a synthetic pyrethroid insecticide in three districts (Nandi North, Nandi South, and Rachuonyo), protecting a total of 1,257,941 residents. Ninety-six percent of houses targeted for spraying were sprayed;

- Supported training of 1,452 local residents and district health staff to conduct and oversee spraying activities;
- Supported training of community volunteers who made house-to-house visits to educate residents about the risks of malaria and the value of spraying; and
- Provided partial support for IRS campaigns in 14 districts during two successive years, which protected 3,459,207 people in 2007 and 1,804,026 people in 2008 (when the spray efforts strategically targeted only the highest risk populations). PMI support exceeded \$350,000 and included the payment of allowances to spray operators and technical support to the DOMC to train supervisors on planning, implementing, monitoring, and evaluating spray operations.

Malaria in Pregnancy

Kenya has integrated prevention of malaria in pregnancy activities into its focused antenatal care program that promotes overall health of pregnant women. Each year, approximately 1.1 million pregnant women are at risk of acquiring malaria in Kenya. According to preliminary data from the 2007 Kenya Malaria Indicator Survey, the percentage of women receiving two or more doses of sulfadoxine-pyrimethamine for intermittent preventive treatment for pregnant women (IPTp) was only 12 percent in spite of high ANC attendance rates (52 percent of



Eunice Achieng, with her two-month old son, speaks with Dr. Akhwale, Head of the Department of Disease Prevention and Control. Since her home in Rachuonyo District in western Kenya was sprayed during a PMI-supported campaign, her family has been free of malaria. Mrs. Achieng's husband noted that "Mosquitoes were a problem before the spraying, but now there are no mosquitoes."

JAMES SANGKENYA DIVISION OF MALARIA CONTROL

Shedrack Maritim Awarded ‘Spear of Heroism’ for Fighting Malaria

During 2008, PMI protected nearly 400,000 people in the Nandi District, Rift Valley Province, in Kenya through an IRS campaign that sprayed more than 200,000 homes. The district is characterized by hilly terrain and, like many rural areas in Kenya, is home to villages that are often neglected and have difficulty accessing basic health services. With PMI support, motivated teams of spray operators reached these remote areas.

Shedrack Maritim is one of the committed spray operators who is making sure that isolated communities are not overlooked. Carrying a spray pump loaded with 10 liters of insecticide, he trekked more than two kilometers to Chemamul village. Previous spray campaigns, which began in the district in 1999, had not reached the village. A Chemamul village elder was so delighted that he honored Shedrack with a warrior’s spear for his commitment to fighting malaria.



JAMES SANGIENYA, DIVISION OF MALARIA CONTROL

After walking more than two kilometers to Chemamul village, Kenya, to take part in an IRS campaign, spray operator Shedrack Maritim was awarded a “spear of heroism” by a grateful village elder.

women made four or more ANC visits during pregnancy). During the past year, PMI developed materials on focused antenatal care and malaria in pregnancy for a wide-scale training program scheduled for 2009.

Diagnosis and Treatment

In September 2006, Kenya launched artemether-lumefantrine (AL), an artemisinin-based combination therapy (ACT), as its new first-line malaria treatment. In 2008, Kenya experienced difficulties in procuring new supplies of AL that, coupled with the postelection violence in 2007–2008, caused extensive stockouts for several months into 2008. In response to this crisis, PMI:

- Procured and distributed an emergency supply of 1,281,720 AL treatments to regional depots and health facilities nationwide. PMI expects to continue to procure AL to ensure that drug stockouts are minimized;
- Provided technical support to the Kenya Medical Supply Agency and the DOMC to strengthen supply chain management and monitor stocks of all malaria medicines. This included quantification of AL and other antimalarial drugs, stock inventory, distribution planning, and monitoring. In addition, PMI supported the development of a national curriculum package that will be used to train staff to manage all malaria medicines;

- Supported, in partnership with DfID, the development of materials for a health worker training program on malaria case management currently planned for 2009; and
- Trained 77 laboratory technicians on malaria microscopy and parasitological diagnosis to improve malaria diagnostics and case management.

Monitoring and Evaluation

In 2008, PMI funding was used to train 26 DOMC program staff to use the Malaria Information Acquisition System, a management tool the DOMC uses to monitor its activities. PMI supported the malaria module of the Kenya 2008 Demographic and Health Survey and analysis of data from the 2007 Malaria Indicator Survey. These two surveys will provide a baseline measure of malaria morbidity and mortality, as well as coverage of major interventions in Kenya. PMI also supported development of four health facility-based sentinel sites to track malaria-related morbidity and mortality.

CHAPTER 8

“One of the things I’m really proud about in every country that we work in, is the partnerships that develop. The countries design their strategy for approaching malaria, what they’re going to do and how they’re going to distribute the commodities. We support their plan, and I think that’s one of the reasons this program has been so effective, and one of the reasons leaders, like President Johnson Sirleaf, like it so much. It’s not just money that comes in – but it’s what they want and what they think will help their people the best.”

– Rear Admiral R.T. Ziemer USN (Ret.), U.S. Global Malaria Coordinator



Liberians in Tubmanburg, Bomi County, watch the launch of PMI’s ITN campaign in Liberia. ITNs, which have not been widely used in Liberia, are just one of the effective prevention measures PMI is using to reduce malaria-related deaths by 50 percent.

LIBERIA/REUTERS/USAID LIBERIA

LIBERIA

Malaria in Liberia

Until 2003, Liberia had been in a state of intermittent civil war for more than a decade, and almost all health services were provided by humanitarian assistance groups. With political stability, the Government of Liberia is increasingly taking over the provision of health services. Malaria is endemic throughout Liberia and is a leading cause of morbidity and mortality, with the entire population of approximately 3.5 million at risk. It accounts for more than 40 percent of all outpatient consultations and 18 percent of inpatient deaths.

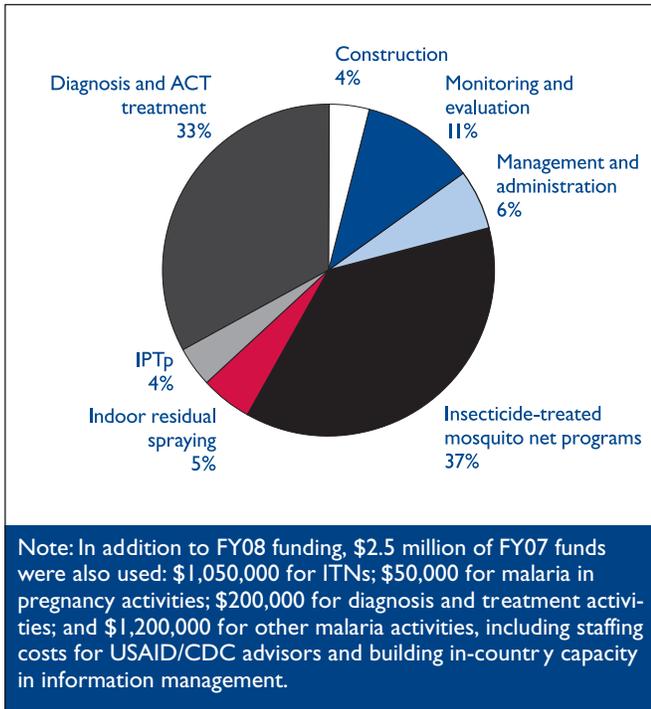
Insecticide-Treated Nets (ITNs)

Prior to the conflict, there was little history of ITN use in Liberia. The National Malaria Control Program's (NMCP's) Strategic Plan for 2008–2013 has a target of one long-lasting ITN for each sleeping space, or approximately three per household. To date, the Ministry of



| LIBERIA AT A GLANCE | | | |
|---|--------------------------------|--|---|
| Indicator | Baseline Coverage | PMI Jump Start Results (2007) ¹ | Year 1 (2008) ¹ |
| Pregnant women who slept under an ITN the previous night | Pending ² | 197,000 ITNs procured ³ | 184,000 ITNs distributed ⁴ |
| Children under five who slept under an ITN the previous night | Pending ² | | |
| Houses in geographic areas targeted for IRS that were sprayed | No areas targeted ⁵ | – | – |
| Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy | Pending ² | – | 417 health workers trained in IPTp |
| Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms | Pending ² | 496,000 ACT treatments procured | 496,000 ACT treatments distributed 595 health workers trained in ACT use |
| BUDGET: \$2.5 million (FY07 jump start funds) and \$ 12.4 million (FY08) | | | |
| ¹ PMI measured jump start and Year 1 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2009. The table includes USG-funded malaria jump start activities that took place in 2007 (reported in PMI's Second Annual Report) and PMI 2008 activities. ² Baseline coverage data will be provided by the 2008 Malaria Indicator Survey, which is currently being conducted. ³ In PMI's Second Annual Report, 196,000 ITNs were reported as procured. Actual procurement was 197,000. ⁴ Of the 197,000 nets procured by PMI, 13,000 were stolen from one of the county depots while awaiting distribution to health facilities. PMI and Liberian government authorities conducted a thorough investigation and have proposed corrective measures. ⁵ At baseline, no areas were targeted for spraying by the National Malaria Control Program. | | | |

FIGURE 8.1
Allocation of \$12.4 Million
PMI Budget in Liberia, FY08
 (Proportion of budget spent on commodities: 47%)



Health and Social Welfare (MOH), along with non-governmental and faith-based organizations (NGOs/FBOs), have been providing high-risk groups with free insecticide-treated nets with Global Fund support. Since its launch in Liberia, PMI has procured 197,000 long-lasting ITNs (using fiscal year 2007 jump start funding), of which 184,000 were distributed for free during 2008. The majority of these nets (172,000) were distributed as part of the door-to-door campaign carried out in two counties. The remaining 12,000 nets were distributed free to pregnant women through antenatal clinics (ANCs).

Indoor Residual Spraying (IRS)

In the late 1950s, IRS was used as part of a malaria control effort in Liberia. During and after the conflict, the NMCP used IRS primarily as an emergency response in internally displaced persons camps. It is anticipated that by the end of the first quarter of 2009, PMI will support spraying of 25,000 houses in Margibi as a first step toward rebuilding capacity for routine IRS in Liberia.

Malaria in Pregnancy

The NMCP's Strategic Plan promotes prompt and effective treatment of malaria in pregnant women and the use

of ITNs and intermittent preventive treatment for pregnant women (IPTp) with sulfadoxine-pyrimethamine (SP). The SP is free of charge, and health workers are encouraged to provide cups and water so that they can directly observe patients swallowing the medication. (All SP is being provided with funding from UNICEF and the Global Fund.) The policy also states that pregnant women are to be given a free ITN on their first ANC visit. Although there are no recent data on IPTp coverage, improved political stability and service coverage, as well as increased attendance at ANCs, should increase the use of IPTp in the country. Since Liberia became a PMI focus country, PMI has assisted the MOH in training 417 health workers about the risks of malaria in pregnancy, and supported demand creation for early and frequent ANC attendance through radio communications and training of community health workers.

Diagnosis and Treatment

The NMCP is in the process of updating its national policy guidelines for malaria diagnosis. Rapid diagnostic tests (RDTs) have been the primary means of malaria diagnosis. Liberia changed its national malaria treatment policy and adopted artemisinin-based combination therapy (ACT) in May 2003. Since program inception, PMI:

- Procured an emergency consignment of 496,000 ACT treatments during 2007 and distributed them to health facilities during 2008. This procurement was in response to a stockout of ACTs that occurred at the end of a Global Fund grant that had been covering the country's ACT needs; and
- Provided for the training of 595 health workers in malaria case management.



An IRS trainer in Liberia presents information on the proper handling and use of chemicals during the spray campaign. Local residents are recruited and trained to carry out and supervise the spray operations

BENOIST MATSHA-CARPENTER/THE MENTOR INITIATIVE

Reaching Vulnerable Women and Children in Liberia

Fatuma Sultan Koletima is a 30-year-old woman who lives in a small rural village in Cape Mount County. She is just one of many who have benefited from PMI's support in Liberia. During the last rainy season, Fatuma's children experienced many episodes of malaria and, despite visits to the traditional healer and self-medication with chloroquine, she and her children did not get well. Finally, Fatuma visited a health facility and was given ACTs that cured her children. And, because she was pregnant, Fatuma received a dose of sulfadoxine-pyrimethamine and a new long-lasting ITN, which was provided by PMI. Fatuma reported that her family has been malaria free, and she is looking forward to a smooth and healthy pregnancy.



KARE ATKINSON/USAID

A woman holds a dose of SP, which consists of three pills, for IPTp. Pregnant women should receive two doses of SP at least one month apart during the second and third trimesters of their pregnancies.

Monitoring and Evaluation

In Year 1, PMI funded a Roll Back Malaria Monitoring and Evaluation Systems Strengthening Tool workshop to help the NMCP and key partners develop a costed, national malaria monitoring and evaluation plan. PMI also funded a nationwide Malaria Indicator Survey to gather baseline data for all the major malaria prevention and treatment interventions. Preliminary results of this survey are expected in mid-2009.

Challenges and Future Directions

PMI and other donors have identified several key areas that will be targeted for support in the coming years to reduce the impact and burden of malaria in Liberia.

- Logistics systems for storage and distribution of commodities are extremely weak. PMI will work closely with the NMCP and other partners to improve these systems by renovating existing storage depots in the capital, Monrovia, as well as at the regional and county levels, and by strengthening commodity forecasting at all levels.

- A lack of qualified health staff is a major challenge to malaria control efforts in Liberia. PMI will provide opportunities for senior staff to receive long-term training in program management and monitoring and evaluation. PMI also will support training of technicians in malaria laboratory diagnosis.



BENOIST MATISHA-CARPENTER/THE MENTOR INITIATIVE

The proper way to hang a net is demonstrated during an ITN campaign in Liberia. PMI is working with its partners to increase demand for and proper usage of long-lasting ITNs.

CHAPTER 9

"This is a tremendous opportunity to scale up proven interventions to reduce the burden of malaria in Madagascar. Preventing this deadly disease will improve life, reduce costs related to illness, boost productivity and most importantly, save countless lives." – U.S. Ambassador James D. McGee, Antananarivo, Madagascar, commenting when Madagascar became a PMI country, December 16, 2006



Children proudly display an ITN their family received during Madagascar's national measles and malaria campaign, which PMI supported. Net recipients learn how to hang and care for their nets as well as the importance of sleeping under a net every night.

GENE DAILEY/AMERICAN RED CROSS/
VOICES FOR A MALARIA-FREE FUTURE

MADAGASCAR

Malaria in Madagascar

Malaria is responsible for about 16 percent of all outpatient visits and 20 percent of hospital admissions in children under five years of age, according to 2007 Ministry of Health (MOH) statistics. It is ranked as a leading cause of under-five mortality in the country. Malaria transmission rates vary across Madagascar, with higher levels of transmission on both the east and west coasts and lower transmission in the highlands and the south.

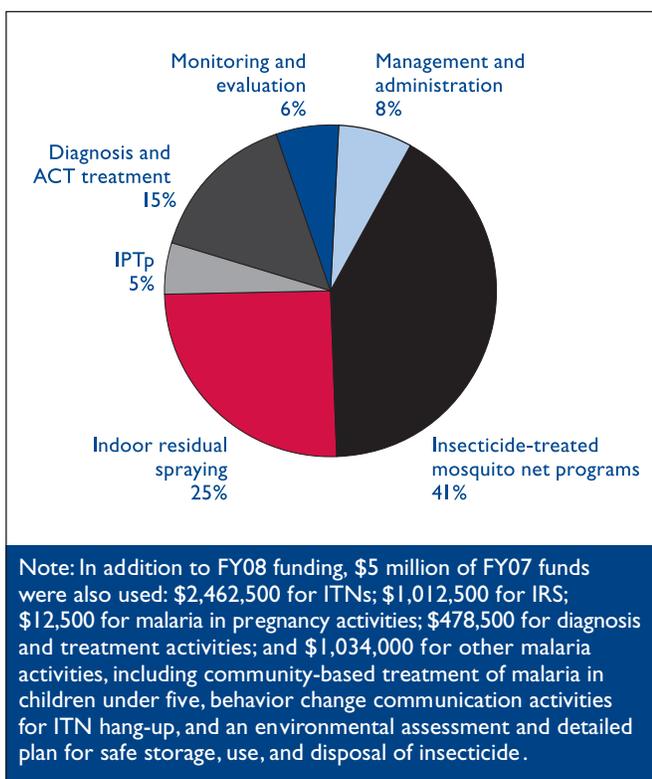
Insecticide-Treated Nets (ITNs)

Madagascar supports universal coverage with long-lasting ITNs (two nets per household) in all regions of the country except in the Central Highlands, where malaria transmission is low and unstable. There is relatively high community awareness and demand for ITNs in Madagascar. Long-lasting ITNs are distributed for free



| MADAGASCAR AT A GLANCE | | | |
|---|----------------------------|---|---|
| Indicator | Baseline Coverage | PMI Jump Start Results (2007) ¹ | Year 1 (2008) ¹ |
| Pregnant women who slept under an ITN the previous night | Pending ² | Provided \$1 million to support logistics, IEC/BCC, and a post-campaign evaluation associated with the distribution of 1,810,000 ITNs | 351,900 ITNs procured and distributed |
| Children under five who slept under an ITN the previous night | Pending ² | | |
| Houses in geographic areas targeted for IRS that were sprayed | Not available ³ | – | 205,383 houses sprayed and 1,241,344 people protected (February/March 2008) 216,749 houses sprayed and 1,319,690 people protected (November/December 2008) |
| Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy | Pending ² | Developed training materials and tools and a quality assurance system for implementing malaria in pregnancy activities | – |
| Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms | Pending ² | – | Supported community-based management of fever with a new ACT co-blister pack formulation Assisted in developing national guidelines on community case management |
| BUDGET: \$5 million (FY07 jump start funds) and \$16.8 million (FY08) | | | |
| ¹ PMI measured jump start and Year 1 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2009. The table includes USG-funded malaria jump start activities that took place in 2007 (reported in PMI's Second Annual Report) and PMI 2008 activities. ² Baseline coverage data will be provided by the 2008 Demographic and Health Survey, which is currently being carried out. ³ In January–March 2007, the Government of Madagascar sprayed selected communes in Fianarantsoa Province. The campaign treated 64,336 structures, protecting 409,231 inhabitants. | | | |

FIGURE 9.1
Allocation of \$16.8 Million
PMI Budget in Madagascar, FY08
 (Proportion of budget spent on commodities: 43%)



through campaigns and antenatal clinics (ANCs) and Expanded Program on Immunization (EPI) clinics, and at highly subsidized prices through volunteer community health agents and commercial outlets.

Since the start of activities in Madagascar, PMI contributed \$1 million to a national integrated measles/malaria campaign in October 2007 for logistics; information, education, and communication (IEC) and behavior change communication (BCC); and postcampaign evaluation of net ownership and use. The campaign distributed a total of 1,810,000 long-lasting ITNs, together with measles vaccinations, deworming medication, vitamin A, and other health interventions during the national mother and child health week. The National Malaria Control Program (NMCP) and the National Expanded Program of Immunization conducted the campaign in partnership with the World Health Organization; UNICEF; the World Bank; the American, Canadian and Malagasy Red Cross Societies; and Malaria No More. As part of the overall campaign, Malagasy Red Cross community volunteers worked to increase knowledge about correct net hanging and usage. The postcampaign evaluation showed

that in endemic areas, 71 percent of houses had at least one long-lasting ITN, and 62 percent of pregnant women and 75 percent of children under five had slept under a long-lasting ITN the previous night. PMI also:

- Procured and distributed 351,900 long-lasting ITNs through ANC and EPI clinics for free or at highly subsidized prices through community health workers and rural shops; and
- Promoted long-lasting ITN ownership and use through mass media, mobile units, printed materials, and local entertainers.

Indoor Residual Spraying (IRS)

Until it was discontinued in 1970, IRS was an important control measure in epidemic-prone areas of the Central Highlands of Madagascar. A resurgence of malaria between 1985 and 1988 prompted the re-introduction of IRS in 1989. Until 2008, IRS was applied selectively in the Central Highlands, targeting at-risk areas. The revised National Malaria Strategic Plan calls for an expansion of IRS activities to reach 95 percent of approximately 1.4 million dwellings in 32 health districts to protect an estimated population of 7 million in 2008 and 2009.

Since the start of PMI in Madagascar, PMI has funded two spraying campaigns:



Community-based health workers in Madagascar play a key role in the country's efforts to combat malaria. With funding from PMI and technical support from Institut Pasteur Madagascar, this team of community health workers participated in a pilot study on community-based ACT distribution in Manakara, Madagascar.

Combating Malaria While Safeguarding Madagascar's Unique Environment

Madagascar, the world's fourth largest island, is home to a great number of unique plants and animals. The island also faces high rates of malaria, and its elimination is one of the government's major goals. Protecting this unique environment during IRS programs is of prime importance to the country and has been the focus of PMI-supported IRS in Madagascar.

During a postcampaign environmental assessment visit following the first round of PMI-supported spraying in Madagascar, the USAID Regional Environmental Officer found weaknesses in the existing system for storage of pesticides, disposal of used insecticide sachets, and the release of pesticide residue in the environment. In response, PMI worked closely with representatives from both the NMCP and the National Environment Office to implement new environmental measures, including in-depth training of individuals in the safe handling of insecticides, preparation of improved storage facilities in environmentally sound sites, introduction of progressive rinsing of spray pumps, digging of soak pits for proper disposal of rinse water, and improved control of solid waste.

On a supervisory visit during the latest campaign, the USAID Regional Environmental Officer remarked on his "sense of satisfaction" with the implementation of the spraying operations, which showed a "vast improvement from previous campaigns," in terms of the practices adopted for the safe management and oversight of pesticides.

PMI's close collaboration with the NMCP and other partners will help to ensure that the newly instituted environmental compliance measures are practiced throughout the country's IRS campaign, including in those districts supported by the Global Fund. This will result in reduced health risks to sprayers and will help protect Madagascar's unique environment. These environmental measures also will help the country adopt other types of insecticides as needed to ensure ongoing, effective coverage against mosquitoes, and ultimately protect the people who live there.



DONALD DICKERSON/USAID MADAGASCAR

Vololona Rafidiarimanana prepares her home for spraying. She was happy to see the spray teams come to her house in Ambohimandroso, Ambatomaniona. "The last time the spraying was done was two years ago, and I noticed the difference in the number of people getting sick from malaria."



DONALD DICKERSON/USAID MADAGASCAR

Spray operators practice progressive rinsing of their pumps to minimize quantities of contaminated rinse water in Masakalina, Anjozorobe, Madagascar.



In a rural clinic in Mahajanga, Madagascar, a health care worker prepares to test a young woman for malaria. The NMCP supports malaria diagnosis with RDTs or microscopy.

February/March 2008:

- Supported spraying of 205,383 houses with a synthetic pyrethroid insecticide in selected communes in 24 districts in the Central Highlands, protecting 1.24 million people; 94 percent of houses targeted for spraying were sprayed during this focalized spraying campaign.
- Provided funding to train 677 local residents to conduct spraying and supervise operations; and
- Supported community education campaigns in all areas targeted for IRS, including radio spots in three local languages, pamphlets, and house-to-house visits by 2,032 community mobilizers and their supervisors to gain community acceptance and cooperation with spray teams.

November/December 2008:

- Supported spraying of 216,749 houses with insecticide in all communes in six districts in the Central Highlands, protecting 1.32 million people; 95 percent of houses targeted for spraying were sprayed;
- Provided funding for training 996 local residents to conduct spraying and supervise operations (including, for the first time in Madagascar, female sprayers); and
- Supported community education campaigns in all areas targeted for IRS, including radio spots in local languages, pamphlets, and house-to-house visits by 2,162 community mobilizers and their supervisors to

gain community acceptance and cooperation with spray teams.

Malaria in Pregnancy

In June 2004, the MOH adopted the strategy of providing two doses of directly observed sulfadoxine pyrimethamine (SP) treatments free of charge to pregnant women for the prevention of malaria during pregnancy in 91 coastal and lowland districts with moderate- to high-level malaria transmission. Although antenatal clinic attendance in Madagascar is relatively high, with 80 percent of women making one or more visits during their pregnancy, uptake of intermittent preventive treatment for pregnant women (IPTp) with SP remains low, at 50 percent for the first dose and only 36 percent for the second dose. Since activities began in Madagascar, PMI strengthened implementation of IPTp as part of antenatal clinic services by developing training materials and tools and a quality assurance approach to implementing malaria in pregnancy activities at health facilities.

Diagnosis and Treatment

In 2005, Madagascar adopted artesunate/amodiaquine (AS/AQ), an artemisinin-based combination therapy (ACT), as its first-line treatment for uncomplicated malaria. With PMI support, the MOH launched and began using AS/AQ co-blister packs at the community level for the presumptive treatment of uncomplicated malaria among children under five with a fever. At health facilities, the NMCP continues to support malaria diagnosis with rapid diagnostic tests (RDTs) or by microscopy. PMI has:

- Conducted an assessment of nine health facility laboratories with microscopy capacity to inform future training needs and to guide the development of a quality assurance/quality control system;
- Provided technical support and trained 24 people in supply chain management to strengthen the pharmaceutical and commodity management system;
- Provided technical assistance and training to 300 health professionals to enhance pharmacovigilance monitoring; and
- Strengthened drug quality control through the support and expansion of minilab sentinel sites, where drug quality can be monitored.

Monitoring and Evaluation

To obtain information on coverage of malaria interventions and provide a baseline for PMI in Madagascar, PMI contributed to the planning and implementation of the national 2008–2009 Demographic and Health Survey. In 2008, PMI began supporting 13 fever sentinel sites to collect data on confirmed malaria cases. These sites provide important epidemiological information on the proportion of fevers seen in outpatient clinics that are confirmed malaria cases.

CHAPTER 10

“The integrated campaign was a rewarding experience for Mali, with simultaneous delivery of five life-saving interventions to roughly 2.8 million children, with an aim to drop infant and child mortality and morbidity caused by polio, malaria, and measles. Partnership was key to the successful delivery of these interventions. . . . Any future campaigns will benefit from the lessons learned.” – Professor Toumani Sidibe, National Director of Health for Mali, April 25, 2008



Villagers celebrate at the launch of the net campaign in Mali, which is one of the new eight focus countries benefiting from PMI funding.

MALI

Malaria in Mali

Malaria is one of the major causes of morbidity and mortality in Mali. In 2006, health facilities reported more than 1 million clinical cases of malaria, accounting for 41 percent of outpatient visits and more than 50 percent of deaths in children under five years of age.

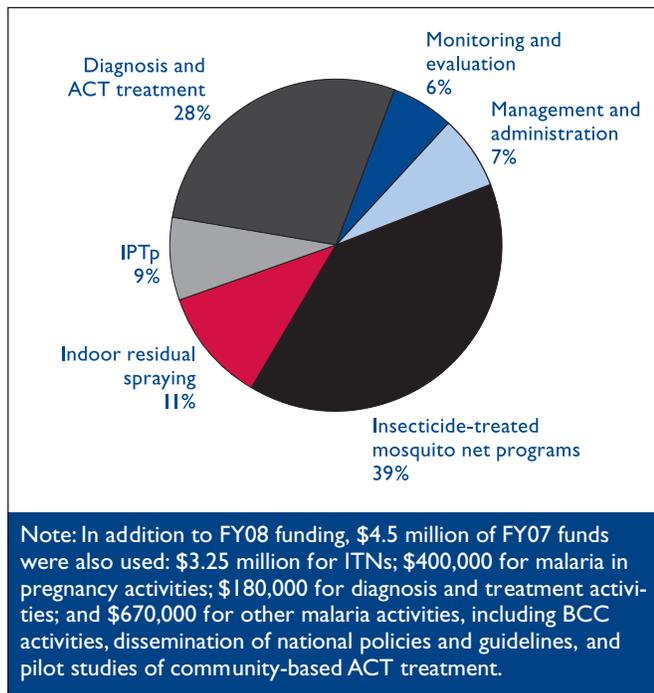
Insecticide-Treated Nets (ITNs)

Since 2006, the Ministry of Health (MOH) has supported free distribution of long-lasting ITNs to pregnant women during their first antenatal care visit and to children under five years with completed vaccination cards. During 2007, assisted by PMI, Mali focused on scaling up nationwide long-lasting ITN distribution through campaigns, which resulted in a substantial increase in long-lasting ITN ownership and use. A postcampaign follow-up survey conducted in August 2008 showed 74 percent use among pregnant women and 78 percent use



| MALI AT A GLANCE | | | |
|---|---------------------------------------|--|---|
| Indicator | Baseline Coverage | PMI Jump Start Results (2007) ¹ | Year 1 (2008) ¹ |
| Pregnant women who slept under an ITN the previous night | 29% ² | 369,800 ITNs procured and distributed | 858,060 ITNs procured (258,060 distributed) 42,522 ITNs re-treated with insecticides |
| Children under five who slept under an ITN the previous night | 27% ² | | |
| Houses in geographic areas targeted for IRS that were sprayed | No areas targeted ³ | — | 107,638 houses sprayed and 420,580 people protected |
| Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy | 4% ² | — | 1 million SP treatments procured 142 health workers trained in FANC, including IPTp |
| Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms | ACT implementation began in June 2007 | — | 101 health workers trained in ACT use 40 laboratory technicians trained in malaria diagnostics |
| BUDGET: \$4.5 million (FY07 jump start funds) and \$14.8 million (FY08) | | | |
| ¹ PMI measured jump start and Year 1 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2009. The table includes USG-funded malaria jump start activities that took place in 2007 (reported in PMI's Second Annual Report) and PMI 2008 activities. ² Source: 2006 Mali Demographic and Health Survey. ³ At baseline, no areas were targeted for spraying by the National Malaria Control Program. | | | |

FIGURE 10.1
Allocation of \$14.8 Million
PMI Budget in Mali, FY08
 (Proportion of budget spent on commodities: 40%)



among children under five compared with 29 percent and 27 percent, respectively, in 2006. Since beginning activities in Mali, PMI has:

- Procured and supported the distribution of 369,800 long-lasting ITNs (as part of 2007 PMI jump start activities). This included 200,000 nets provided to a subnational campaign in June–July 2007 and an additional 169,800 nets to an integrated campaign in December 2007, during which nearly 2.3 million free long-lasting ITNs were distributed to children under five in all regions, except Tombouctou and Gao, which were covered in the subnational campaign earlier in the year. This Malian campaign was supported jointly by PMI, the World Health Organization (WHO), the Canadian Red Cross, the United Nations Foundation, UNICEF, Malaria No More, the Global Fund, and nongovernmental organizations;
- Procured 858,060 long-lasting ITNs in 2008, of which 258,060 have been distributed to health facilities to support routine Expanded Program on Immunization and antenatal care services; and

- Supported the treatment with insecticide of 42,522 mosquito nets that had been procured by families through the private sector.

Indoor Residual Spraying (IRS)

The National Malaria Control Program (NMCP) supports IRS as part of an integrated vector control strategy. Before PMI began in December 2006, no large-scale IRS was being carried out in Mali; since then, IRS has gained high visibility and interest. PMI supports IRS in two districts in areas of seasonal malaria transmission. In 2008, in support of the national strategy, PMI:

- Provided technical support and financial resources for the NMCP to spray 107,638 houses during July–August 2008 in two districts (Bla and Koulikoro), which protected 420,580 residents. This represents 90 percent of all houses targeted for spraying;
- Supported training of 413 spray personnel and supervisors in IRS; and
- Supported training for 1,848 community health workers to promote the value of IRS for malaria control and encourage cooperation with the spray teams through group meetings and house-to-house visits.

Malaria in Pregnancy

Attendance at antenatal clinics (ANCs) and coverage of intermittent preventive treatment for pregnant women (IPTp) are still low in Mali, although IPTp has been a national policy since 2005. In 2006, the MOH announced that sulfadoxine-pyrimethamine (SP) for IPTp would be provided free during ANC visits. Since Mali became a PMI country in December 2006, PMI has:

- Procured 1 million SP treatments to fill the national gap and worked with UNICEF to quantify additional unmet needs for IPTp;
- Funded training for 142 health workers in the new in-service training module for comprehensive antenatal care and supported supervision of facility staff during the national scale-up of IPTp; and
- Supported a review of knowledge and perceptions related to malaria in pregnancy in Mali, which was used to create culturally appropriate behavior change communication (BCC) messages to increase women's awareness of risks of malaria during pregnancy and promote attendance at ANCs and use of IPTp.

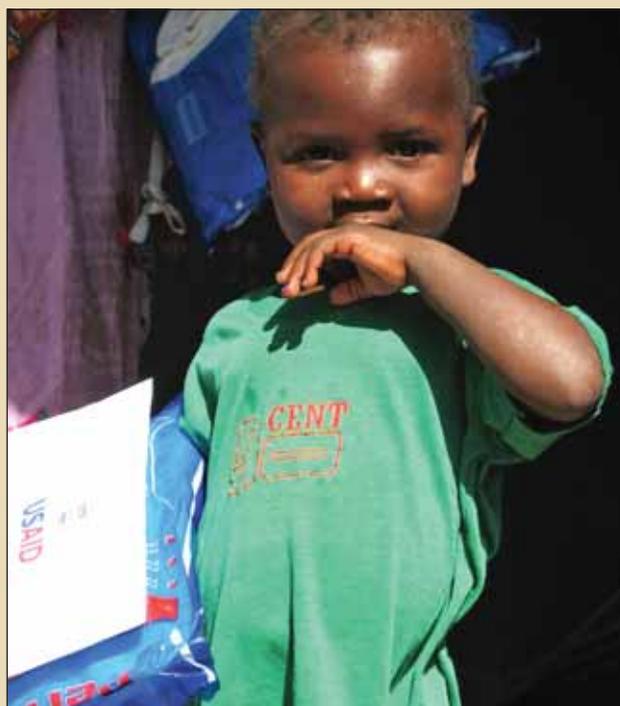
Mali's National Integrated Health Campaign

In December 2007, under the leadership of the MOH, Mali implemented its largest-ever national health campaign. This campaign delivered five health interventions: long-lasting ITNs, polio and measles vaccines for children under five, vitamin A supplements, and albendazole for deworming, to mothers and children under five, as applicable. The campaign was a joint effort among PMI (using jump start funds), the Canadian Red Cross, the United Nations Foundation, Malaria No More, WHO, UNICEF, and many other international and local organizations. Nearly 2.3 million free long-lasting ITNs were distributed to children under five in all regions, except Tombouctou and Gao, which were covered in a subnational campaign earlier in the year. PMI contributed 169,800 nets to the campaign.

The benefits of integration were numerous. Combining several interventions into one national effort enabled the Malian government and partners to reduce overall costs. The integrated campaign also made it possible for the MOH to consolidate its efforts on information and to target the specific populations of the campaign, train personnel, and implement the interventions effectively. Moreover, the promise of free ITNs provided by PMI and other partners helped mobilize the local population, as these nets are highly valued but are often too expensive for families to purchase.

A postcampaign follow-up survey conducted in August 2008 to measure coverage showed 74 percent use among pregnant women and 78 percent use among children under five compared with 29 percent and 27 percent, respectively, in 2006. The campaign is an example of how broad partnerships with the local and international community can successfully integrate health services.

Story submitted by Peace Corps Volunteer Ariel Wagner



This Malian child received a long-lasting ITN during the December 2007 integrated national campaign.

CHRISTHOMASUSAID

Diagnosis and Treatment

In Mali, PMI supports the improvement of malaria diagnosis by microscopy through increased training, supervision, and quality control. PMI also supports the NMCP's goal of ensuring prompt, effective, and safe artemisinin-based combination therapy (ACT) treatment for 85 percent of children under five with confirmed or suspected malaria. Since 2006, ACTs have been provided for free to children under five. Since beginning activities in Mali, PMI:

- Worked with the MOH to conduct a needs assessment to identify existing gaps in malaria laboratory diagnostic capabilities and supported training of 40 laboratory technicians in malaria microscopy and use of rapid diagnostic tests; and

- Supported training for 101 health workers in malaria case management and supported the NMCP to carry out supervision activities.

Monitoring and Evaluation

The NMCP, with support from PMI and other partners, developed an integrated national malaria monitoring and evaluation plan based on the findings of a Roll Back Malaria Monitoring and Evaluation System Strengthening Tool workshop. During Year 1, PMI also supported five sentinel sites in health facilities, which will collect routine information on laboratory-confirmed malaria illnesses and deaths.

CHAPTER 11

“Zambia has demonstrated that malaria can be prevented, controlled, efforts sustained, and the disease eliminated, no matter how poor or remote the population.” – Honorable Brigadier-General Dr. Brian Chituwo, Minister of Health, Zambia, May 19, 2008



PMI is working to save lives, like this child in Zambia, who was diagnosed using a rapid diagnostic test and then treated with an ACT provided by PMI.

ARTURO SANABRINI/ZAMBIA

ZAMBIA

Malaria in Zambia

Zambia has a population of approximately 12 million people, essentially all of whom are at risk of malaria. During the last three to four years, Zambia has made significant progress in malaria control with nationwide scale-up of insecticide-treated nets (ITNs), indoor residual spraying (IRS), artemisinin-based combination therapies (ACTs), and intermittent preventive treatment for pregnant women (IPTp).

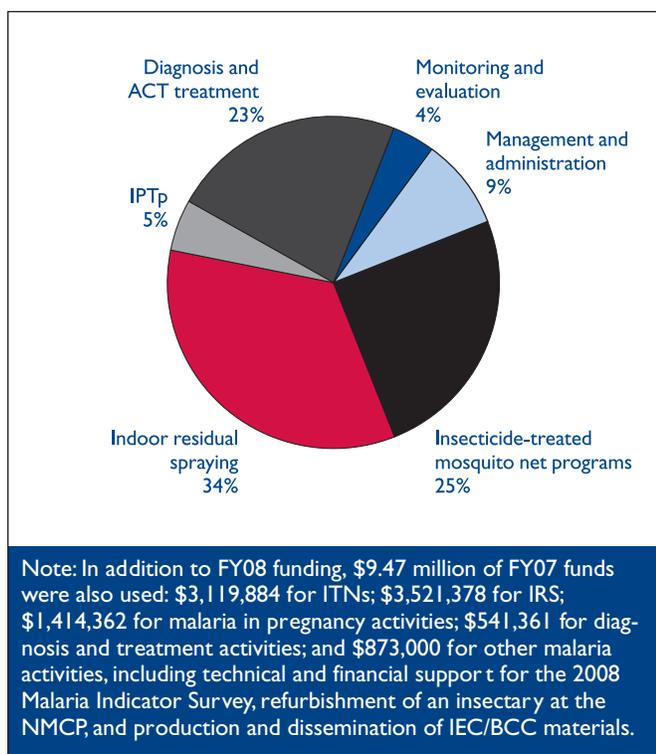
Insecticide-Treated Nets

Zambia has a multipronged approach to ITN distribution, including regional mass campaigns to distribute free long-lasting ITNs; provision of free long-lasting ITNs to pregnant women and children under five through antenatal clinics (ANCs); an equity program to provide free long-lasting ITNs to vulnerable populations, such as people living with HIV/AIDS and the poorest of the



| ZAMBIA AT A GLANCE | | | |
|--|----------------------------|--|--|
| Indicator | Baseline Coverage | PMI Jump Start Results (2007) ¹ | Year 1 (2008) ¹ |
| Pregnant women who slept under an ITN the previous night | 24% ² | 808,332 ITNs procured (550,017 distributed) | 186,550 ITNs procured and distributed |
| Children under five who slept under an ITN the previous night | 23% ² | | |
| Houses in geographic areas targeted for IRS that were sprayed | Not available ³ | 657,695 houses sprayed and 3.6 million people protected ⁴ | 762,479 houses sprayed and 4.2 million people protected |
| Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy | 61% ² | — | Conducted an assessment in two provinces to determine how best to improve uptake of IPTp and FANC services |
| Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms | 13% ² | 979,000 RDTs procured | 660,000 RDTs procured (979,000 RDTs distributed) 253,800 ACT treatments procured 186 health workers trained in ACT use |
| BUDGET: \$9.5 million (FY07 jump start funds) and \$14.8 million (FY08) | | | |
| ¹ PMI measured jump start and Year 1 results in terms of process indicators. Results reported in this table are up-to-date as of January 1, 2009. The table includes USG-funded malaria jump start activities that took place in 2007 (reported in PMI's Second Annual Report) and PMI 2008 activities. ² Source: 2006 Zambia Malaria Indicator Survey. ³ Zambia's national IRS strategy is to prioritize spraying for urban and peri-urban areas in 36 of the country's 72 districts. At baseline, 592,346 houses were sprayed (Source: National Malaria Control Center). ⁴ PMI's Second Annual Report incorrectly reported that two rounds of IRS were conducted during 2007. | | | |

FIGURE 11.1
Allocation of \$14.8 Million
PMI Budget in Zambia, FY08
 (Proportion of budget spent on commodities: 44%)



poor; and the sale of ITNs through the commercial sector. The goal of the Ministry of Health (MOH) and the National Malaria Control Program (NMCP) is for all households to have three long-lasting ITNs. Household ownership of at least one ITN is already relatively high in Zambia, at 60 percent, and usage rates are improving. The 2008 Zambia Malaria Indicator Survey showed that 43 percent of pregnant women and 41 percent of children under five had slept under an ITN the previous night.

Since Zambia became a PMI focus country in December 2006, PMI (including both PMI jump start activities in 2007 and PMI activities in 2008), has:

- Procured 994,882 long-lasting ITNs, of which 550,017 were distributed as part of a national campaign (PMI 2007 jump start activities), 78,315 for a campaign in North Western Province, and 108,235 through ANCs; and
- Supported national and community-based information, education, and communication (IEC) and behavior

change communication (BCC) campaigns to increase demand for, and correct usage of, ITNs.

Indoor Residual Spraying

The national strategy is to prioritize IRS to urban and peri-urban areas in 36 of the country's 72 districts. The MOH and NMCP have the responsibility for coordinating and managing the IRS program nationally, while District Health Management Teams are responsible for local implementation.

Since Zambia became a focus country, PMI supported:

- The national IRS program by spraying 657,695 houses in 15 districts and protecting 3.6 million residents during 2007. Ninety-four percent of the houses targeted for spraying were sprayed, and a total 1,300 local residents were trained to conduct and supervise spray operations; and
- The spraying of 762,479 houses (95 percent of those targeted), which protected 4.2 million people in 2008. A total of 1,413 local residents were trained as spray operators and supervisors.

PMI's support for these campaigns has included procuring insecticides and equipment, assessing the precampaign environment, monitoring and evaluation, and ensuring appropriate insecticide storage and waste disposal. The high IRS coverage rates reflect the interest of local communities in IRS and the intense IEC/BCC activities undertaken in each community.



PMI's support in Zambia includes supplying RDTs, such as these being stacked here. As malaria transmission is reduced, Zambia is transitioning from malaria treatment based largely on clinical symptoms to diagnoses based on laboratory testing.

Nationwide household surveys conducted in Zambia in 2006 and 2008 show that malaria control efforts, including both IRS and distribution of ITNs, supported by PMI, the Global Fund, Malaria Control and Evaluation Partnership in Africa, World Bank, and other partners, together with a strong NMCP, are already having a dramatic impact on the prevalence of malaria and anemia (Box 1).

Malaria in Pregnancy

IPTp was introduced as policy in Zambia in 2003 and became standard practice in 2004. The MOH's Reproductive Health Services unit incorporates IPTp into the national strategy of focused antenatal care (FANC), an integrated package of preventive measures to promote healthy pregnancies; however, rollout of this strategy has been underfunded. Despite the fact that 61 percent of pregnant women nationwide receive two or more doses of IPTp, the 2008 Malaria Indicator Survey showed gaps in two-dose IPTp coverage among poorer women and those living in rural areas, especially in Central and Eastern Provinces. In 2008, PMI conducted

an assessment in those two provinces to determine how best to improve uptake of IPTp and FANC services. Findings from this assessment showed that the major reason for failing to provide IPTp and FANC services was a lack of drugs and other supplies. PMI currently is working with the Zambia MOH to address these barriers to achieving improved coverage with IPTp and FANC.

Diagnosis and Treatment

With the reductions in malaria transmission, Zambia is transitioning from malaria diagnosis based largely on clinical symptoms to laboratory confirmation with microscopy or a rapid diagnostic test (RDT). PMI has been working closely with the MOH and NMCP to expand the quality and availability of malaria diagnostic services. Since program inception, PMI has:

- Procured a total of 1,639,000 RDTs (979,000 in 2007 and 660,000 in 2008), of which 979,000 have been distributed to health facilities; the remaining 660,000 arrived in country in early 2009;

Malaria on the Retreat in Zambia: Community Sees Results from Indoor Residual Spraying

Eunice Mwachilele of Kanyama compound in Lusaka heard about the IRS campaign from community workers who went door-to-door informing and motivating residents to support the spraying program. After she agreed to participate, her house was marked with a sticker signaling her consent. Some weeks later, a vehicle with loud speakers plied the narrow streets, informing residents to prepare for the spraying. "They told us to remove our household goods and food from the house and move our beds to the center of the room to allow spraying of the walls," said Eunice. "We followed their instructions. They sprayed, and we remained outside for the given time before re-entering the house."

Eunice and her family are among the estimated 3.6 million beneficiaries of the IRS program that PMI supported in 15 densely populated districts of Zambia in late 2007. After her four-room cinderblock house was sprayed in December 2007, Eunice commented, "We noticed since that day that any mosquito that lands on the wall dies." Neither Eunice, her four children, nor her five dependents have suffered from malaria since the spraying. Eunice, who is also a community health worker, noted that even with unusually high rainfall during the 2007–2008 season, many fewer malaria cases occurred in her area than in the years before the spraying program began.

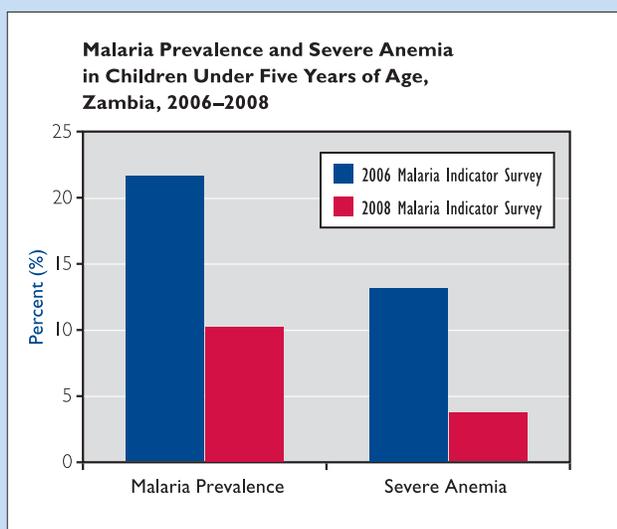


Eunice Mwachilele (left, rear), her children, and her dependents in Kanyama benefited from a PMI-supported IRS campaign. "I am very happy because we sleep freely with no mosquitoes in the house. I have nothing to fear."

LIZZIE PEINE AND MELINDA OERMARK/HEALTH SERVICES AND SYSTEMS PROGRAM

BOX 1

Decline in Malaria Prevalence, Severe Anemia, and Under Five Mortality in Zambia



Nationwide household surveys conducted in Zambia in 2006 and 2008 show that malaria control efforts supported by the U.S. Government (USG), the Global Fund, World Bank, the Bill and Melinda Gates Foundation, and other partners, together with a strong NMCP, are having a dramatic impact on the prevalence of malaria and anemia. Between 2006 and 2008, malaria prevalence declined by 53 percent, and the prevalence of severe anemia, which is closely associated with malaria, declined by 68 percent in children under five years old. In addition, a 2007 nationwide Demographic and Health Survey showed a 29 percent reduction in all-cause mortality in children under five, to which malaria is a major contributor. The USG has been supporting the Zambian National Malaria Control Program since 2002, including \$7.6 million in FY 2006 and \$9.5 million in PMI jump start funding in FY 2007.

- Purchased 253,800 ACT treatments that have arrived in country; and
- Supported training 186 health workers in case management with ACTs.

Monitoring and Evaluation

The MOH and NMCP and other partners have developed a National Malaria Prevention and Control Monitoring and Evaluation Plan for 2006–2011, which establishes clear goals, objectives, and indicators for program monitoring and evaluation. To date, PMI also is supporting the strengthening of sentinel sites for malaria surveillance in ten districts that will provide regular facility-based data on the burden of malaria.



Workers load bales of ITNs onto a truck in Zambia. ITNs procured by PMI were distributed free through national campaigns and at antenatal clinics.

CHAPTER 12

“We want to strengthen the ability of faith-based and community organizations to fight malaria while also building local ownership. Groups with local connections that have worked to build trust and provide hope are key partners in the effort to combat malaria at the local level.” – Rear Admiral R. T. Ziemer USN (Ret.), U.S. Global Malaria Coordinator, October 5, 2007, at the announcement of the first Malaria Communities Program grantees



A team of well-protected sprayers prepares for a round of indoor residual spraying in the sprayers' community in Zambézia Province, Mozambique. PMI supports programs that equip people with the knowledge and skills to help their communities fight malaria.

USAID

SUPPORTING INTERVENTIONS AT THE COMMUNITY LEVEL

Community-level interventions are core components of PMI's strategy to expand malaria prevention and treatment measures to 85 percent of vulnerable populations in the 15 focus countries. At the community level, PMI supports communication and social mobilization, as well as prevention, care, and treatment activities. PMI's support is frequently provided through nongovernmental, faith-based, and community-based organizations (NGOs, FBOs, and CBOs) because of their strong bases of operation in peripheral areas. Through support to these groups, PMI builds local capacity and program sustainability. Moreover, by strengthening community programs in underserved areas, PMI improves access to and increases use of critical malaria services.

Collaboration with NGOs, CBOs, and FBOs

PMI collaborates with NGOs, CBOs, and FBOs to expand malaria activities and leverage resources. These collaborative efforts have brought long-lasting insecticide-treated nets (ITNs), antimalarial treatment, and referral services, provided education about how to prevent and treat malaria to underserved communities. Additionally, PMI's work with these organizations facilitates communication, sharing of best practices, and development of common systems. To date, PMI has supported nearly 150 nonprofit organizations; more than 40 of these are FBOs. Collaborative examples in Year 3 include the following:

- In Malawi, PMI launched an information, education, and communication campaign at the community level through CBOs and NGOs. Funding was provided to organizations working in six districts to encourage women to seek antenatal care early in their pregnancy, go for all scheduled antenatal visits, and take at least two doses of sulfadoxine-pyrimethamine for intermittent preventive treatment at the appropriate times during pregnancy.
- In Uganda, PMI supported a virtual net facility for NGOs that provides long-lasting ITNs to CBOs at no cost; these organizations then distribute the nets to hard-to-reach populations in their catchment areas and educate the recipients about how to hang and use their nets. During 2008, more than 20 CBOs used this facility, and, as a result, more than 123,000 long-

lasting ITNs procured by PMI were distributed for free to pregnant women and children under five.

- In Rwanda, PMI helped a local FBO train 100 religious leaders from Christian and Muslim faith-based groups regarding the importance of focused antenatal care and prevention of malaria during pregnancy. As a result of the training and a series of malaria workshops, these religious leaders now include malaria prevention and control messages in their sermons.
- In Mozambique's Zambézia Province, PMI funded the Together Against Malaria project, which is being implemented by the Inter-Religious Campaign Against Malaria in Mozambique, a consortium of 12 major religious groups. The objective of the project is to equip faith leaders with the knowledge and skills to help people in their communities fight malaria. During the first year, the project worked with partners to develop key malaria prevention and treatment messages and training materials. More than 1,200 faith leaders from 79 faith groups received training on malaria interventions and messages to share with their communities. Together Against Malaria is now expanding its activities to two additional provinces in Mozambique.

Community-based Treatment

In most African countries, more than 50 percent of malaria patients seek malaria treatment outside the formal health care system. Consequently, PMI supports efforts to provide effective community-based management of fever to increase access to prompt and effective antimalarial treatment that may reduce the risk of severe malaria and improve child survival. Five PMI focus countries with successful pilot programs have policies in place to expand their community-based management of fever programs nationwide and have begun to integrate treatment of malaria with pneumonia and diarrhea (Ethiopia, Madagascar, Rwanda, Senegal, and Uganda). Nine PMI focus countries are beginning to introduce community-based management of fever and are in the early stages of policy development (Angola, Benin, Ghana, Kenya, Liberia, Malawi, Mali, Mozambique, and Zambia).

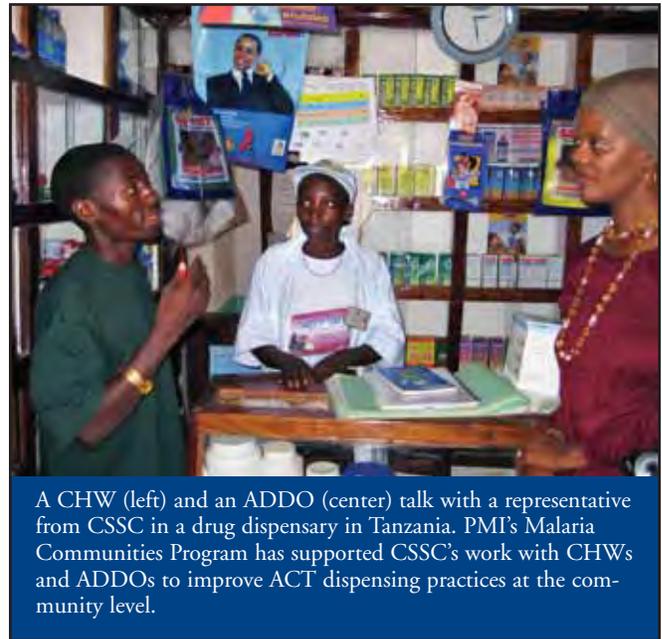
During Year 3, PMI:

- Expanded a community-based malaria treatment program in Mali to cover three new districts in Sikasso Region;
- Trained 3,669 community health workers (CHWs) in Senegal to diagnose and treat cases of uncomplicated malaria using artemisinin-based combination therapy (ACT) and to refer patients with more serious illnesses to the nearest health facility. In 2007 and 2008, these CHWs treated more than 67,000 patients with ACTs; and
- Trained more than 2,700 health extension workers in Ethiopia on malaria case management, recognition of acute malaria episodes, and management of malaria in pregnant women.

Malaria Communities Program

The Malaria Communities Program builds community and indigenous organizations' capacities and supports their efforts to combat malaria. Grantees are new to partnering with the U.S. Government and are uniquely positioned to work at the community level. Through the Malaria Communities Program, PMI issued eight new grants to NGOs and FBOs to work at the community level in seven African countries, representing \$11 million in total funding over the next four years. During the first year of the Malaria Communities Program, PMI supported:

- The Christian Social Service Commission (CSSC) in Tanzania to train private drug dispensers, known as Accredited Drug Dispensing Outlets (ADDOs), and CHWs – often the first points of contact for malaria prevention and control. In 2008, CSSC trained 192 ADDOs and CHWs. ADDOs and CHWs have used their training to improve their health education messages and rationalize drug dispensing;



A CHW (left) and an ADDO (center) talk with a representative from CSSC in a drug dispensary in Tanzania. PMI's Malaria Communities Program has supported CSSC's work with CHWs and ADDOs to improve ACT dispensing practices at the community level.

- The Episcopal Relief and Development in Uige Province, Angola, to build community-based malaria prevention programs. As part of this effort, ITN ownership and use in the area have increased dramatically. According to a recent survey, the proportion of households with one or more ITNs increased, from 8 to 86 percent in less than one year. Currently, 80 percent of pregnant women and 72 percent of children under five are reported to be sleeping under an ITN, coverage figures that closely approach the PMI target of 85 percent;
- The Lutheran World Relief and its partner, the Evangelical Lutheran Church in Tanzania, to extend malaria prevention and control activities to five underserved rural dioceses in mainland Tanzania. Through these efforts, 507 church leaders were mobilized to expand community outreach and education on ITN use, fever management, and timely and effective treatment with ACTs. In addition, 184 health professionals from 31 mission hospitals and dispensaries were trained on early and correct malaria diagnosis and treatment, intermittent preventive treatment in pregnancy, and focused antenatal care.

Partnering with Churches in Rural Malawi to Prevent Malaria

Lifa Zakeyo from Matate village in Mchinji District, Malawi, has changed her behavior in preventing malaria, thanks to her neighbor Godfrey Nkhoma. Mrs. Zakeyo and many others in her community receive regular visits from Mr. Nkhoma, who has been trained to educate his neighbors about malaria prevention and treatment. He has taught them about the importance of using an ITN every night and of seeking early treatment for children with fever, and for pregnant women, taking intermittent preventive treatment. Mr. Nkhoma also shares messages about malaria at large gatherings in his area, where he uses a variety of communication techniques, including songs and drama or dance performances. Now Mrs. Zakeyo uses her mosquito net every night to protect herself and her four children from malaria: “In the past we only used our net in the rainy season when the mosquitoes keep us from sleeping well. Now we understand the importance of using a net every night of the year to prevent malaria.”

Mr. Nkhoma’s training was provided by his community’s Presbyterian church with funding and support from the Christian Reformed World Relief Committee (CRWRC). A grant from PMI’s Malaria Communities Program allows CRWRC to address malaria prevention and treatment through local churches, which provide access to some of Malawi’s most remote communities. This project has mobilized a total of 1,320 volunteers in 13 congregational areas. A representative of Mr. Nkhoma’s village expressed his appreciation of CRWRC’s work, stating, “Thank you for reaching our area with more education – we have a large population and a small health center.”



PHIL GRABOWSKI/CRWRC MALAWI

Lifa Zakeyo, Matate village, Malawi, holds an ITN she received through PMI. Following training on malaria prevention provided by the CRWRC through a Malaria Communities Program grant, she and her family now sleep under an ITN every night.

CHAPTER 13

“One of the principles of the President’s Malaria Initiative is partnership.... While the most important partner is the host country, we also work with NGOs and the private sector through to the faith-based communities and other partners. So we look at partnering at every level for the President’s Malaria Initiative.”

– Rear Admiral R. T. Ziemer USN (Ret.), U.S. Global Malaria Coordinator, July 1, 2008



BENOIST MATSHA-CARPENTIER

To reduce the burden of malaria in the 15 focus countries, PMI works closely with its partners to implement malaria control measures, as is happening during this ITN campaign in Mali, where a Red Cross worker checks that an ITN is hung properly.

PROGRESS THROUGH PARTNERSHIPS

Partnership Successes

Partnerships are at the heart of PMI's strategy and operational plans. PMI works closely with host country governments; other U.S. Government agencies; international organizations; other bilateral, multilateral, and private donors; nongovernmental and faith-based organizations (NGOs and FBOs); and the private sector. Achieving the ambitious PMI coverage targets and reducing malaria deaths by half across 15 focus countries can only be achieved through a coordinated approach with a broad partner base, at both the country and international levels. Over the past three years, PMI has forged strong partnerships in all PMI focus countries. In 2008, PMI coordinated its country programs in a combined effort with many partners; some examples are outlined in the table below:

Private Sector Contributions

- In FY 2008, the ExxonMobil Foundation made a third \$1 million donation to USAID Angola to support PMI objectives in the country. These funds are being used to finance international and local NGOs to deliver malaria services at the district and village levels in underserved areas of Angola.
- In Malawi, Illovo Sugar Estates, a private company, contributed labor toward a successful PMI indoor residual spraying (IRS) campaign.
- The AngloGold Ashanti mining company in Ghana has successfully implemented IRS campaigns in the Obuasi District since 2005. The company assisted PMI's efforts to expand IRS in Ghana by helping to conduct spray operator training and community mobilization activities.

| EXAMPLES OF PMI PARTNERSHIPS 2008 | | | |
|-----------------------------------|---|--|--|
| Country | Partners | Activity | PMI Contribution |
| Ghana | UNICEF, World Bank | National integrated child vaccination/ITN campaign, with 1.5 million ITNs distributed | PMI transported 750,000 ITNs to local distribution points and assisted with campaign planning |
| Kenya | WHO, UNICEF, DfID | National net re-treatment campaign, with 3 million ITNs re-treated | PMI contributed 60,000 long-lasting replacement ITNs |
| Mozambique | UNICEF, American Red Cross, Mozambique Red Cross | Integrated health campaign in Nampula Province, with 800,000 long-lasting ITNs distributed with measles vaccination, vitamin A supplements, and deworming treatments | PMI procured and distributed 720,000 long-lasting ITNs |
| Senegal | MOH, including NMCP/Nutrition and Child Survival Divisions, Senegalese Red Cross and Red Crescent Societies, International Federation of Red Cross, Peace Corps, Christian Children's Fund Consortium | National campaign for vitamin A distribution and deworming, with 678,556 ITNs distributed in 5 of 11 regions | PMI procured and distributed 678,556 long-lasting ITNs free to young children and another 69,444 nets to vulnerable populations as part of postcampaign activities |

U.S. President's Emergency Plan for AIDS Relief (PEPFAR)

PEPFAR and PMI have seven focus countries in common: Ethiopia, Kenya, Mozambique, Rwanda, Tanzania, Uganda, and Zambia. Since both programs target pregnant women, there are programmatic reasons to combine intermittent preventive treatment for pregnant women (IPTp) and the distribution of insecticide-treated nets (ITNs) with services to prevent mother-to-child transmission of HIV/AIDS. Examples of 2008 PMI-PEPFAR collaboration include the following:

- In Uganda, a USAID-supported partnership has enabled PMI to leverage additional funds for malaria control. Private companies contribute funds by either matching PMI funds or by contributing funds for malaria control in communities around their operations. Partnership funds from FY 2008 allowed PMI to enhance PMI-PEPFAR integration and support delivery of long-lasting ITNs and IPTp to an estimated 12,000 pregnant women throughout 10 major companies, including large sugar and tea producers and cement and manufacturing firms;
- In Tanzania, PMI worked with PEPFAR to develop a single procurement plan to strengthen laboratories; and
- In Rwanda, PMI and PEPFAR are coordinating the procurement of long-lasting ITNs to protect people living with HIV/AIDS as well as orphans and vulnerable children. PMI is also coordinating with PEPFAR and tuberculosis programs to improve the quality of malaria diagnosis through integrated training and supervision of laboratory workers.

Multilateral Organizations

In planning its activities, PMI attempts to identify and fill gaps in funding from other global partners involved in controlling malaria. In each focus country, PMI coordinates its efforts with the Global Fund, the World Bank, the World Health Organization, and UNICEF, among others. For example:

- In Ghana, PMI staff provided technical assistance in writing the successful Global Fund Round 8 proposal that includes a \$110 million IRS component. This grant will scale up IRS activities to cover 40 districts, and PMI, along with AngloGold Ashanti and the Ministry of Health (MOH), will collaborate closely during implementation; and

- In Liberia, PMI collaborated with UNICEF, the Global Fund, and the German International Development Agency in distributing 480,000 ITNs in three large counties (172,000 nets were contributed by PMI).

After only a 32 percent success rate for Round 6 Global Fund malaria proposals, PMI worked with other partners as part of the Roll Back Malaria Harmonization Working Group to make a concerted effort to improve the quality of malaria proposals to the Global Fund. In Round 7, the success rate increased to 75 percent. In the most recent round (Round 8), 14 (78 percent) of the 18 countries that received technical support from the Harmonization Working Group were successful in their grant applications. This includes four PMI focus countries that applied for Round 8 grants: Ethiopia, Ghana, Rwanda, and Tanzania. Because of their strong performance under existing Global Fund grants, Ghana and Tanzania were also successful in their Rolling Continuation Channel malaria grant.



Sprayers practice their techniques during a PMI-supported IRS training session that took place at the AngloGold Ashanti malaria control center in Obuasi District, Ghana.

USAID GHANA

A Public-Private Partnership Helps to Contain Malaria Outbreaks on Zanzibar

Malaria has declined to such low levels on Zanzibar that early detection and prompt reporting of malaria cases have become critical to prevent outbreaks. Using cell phones, 52 participating health facilities report weekly malaria data via a customized text messaging menu. This innovative approach has been made possible through a public-private partnership between Selcomwireless, (a Tanzanian information technology company), the Zanzibar Malaria Control Program (ZMCP), PMI, and Research Triangle Institute. The malaria data are transmitted to a secure computer server, processed, and then sent to the ZMCP program manager, district medical officers, and other MOH authorities. When the number of weekly laboratory-confirmed malaria cases exceeds the average number of cases from the previous three-month period, representatives from the district health management team and ZMCP visit the health facility within 24 hours. If an outbreak is confirmed, the district surveillance officer will notify the affected community and alert all health facilities in the affected district. Officials will then make house-to-house visits to provide presumptive ACT treatment to all residents with a fever, regardless of whether they have laboratory-confirmed malaria. Officials may also decide to initiate selective IRS to supplement the already high levels of ITN ownership and usage.



HAFIDH MOHAMMED/RTI

Using a cell phone, a health worker enters data into Zanzibar's early case detection and reporting system, made possible through a novel public-private partnership. Participating health facilities report the total number of outpatient visits, number of laboratory-confirmed malaria cases, and number of persons tested for malaria that week.

CHAPTER 14

“The people who really make a difference in all of this are actually the health workers out in the health clinic, who work under very hard conditions. But they still manage to go on and they still manage to somehow provide the services that are necessary to save mothers and children. Those are the real heroes of this story.”

– Lotta Sylwander, UNICEF Representative in Zambia, May 28, 2008



In rural Ethiopia, a community health worker instructs a family on the proper use of ACTs. PMI is working with the Ethiopian government to strengthen management of antimalarial drugs throughout the health care system.

BONNIE GILLESPIE/
VOICES FOR A MALARIA-FREE FUTURE

BUILDING HEALTH SYSTEMS AND NATIONAL CAPACITY

PMI supports the sustainability of its programs by strengthening health systems and building the capacities of public and private sector health workers and managers. All PMI activities directly support national malaria control plans and strategies and are implemented together with national Ministries of Health (MOHs). As part of that approach, PMI interventions typically build on and support the overall health system and delivery of primary health care services at the country level.

Pharmaceutical Management

PMI's support of national pharmaceutical management systems is improving not only the management of malaria commodities, but also the management of all essential drugs. In FY 2008, PMI allocated more than \$8.4 million to help build the pharmaceutical management systems of PMI focus countries, including forecasting the needs of commodities, storing and distributing commodities, and training medical store staff and health workers in these and other skills. In Kenya, for example, PMI's support for improved procurement, management, and distribution of antimalarial drugs is combined with support for management and distribution of other health commodities and essential medicines through the Kenya Medical Supply Agency (KEMSA). PMI's investments in the strengthening of the supply chain system, inventory



DELIVERISI

Meba Kagone (center), a PMI project manager, and Gabriel Thompson (right), from the NMCP, give nets and review data with a community health worker in Bomi County, Liberia. During this door-to-door campaign, which took place in February 2008, 172,000 nets were distributed in two counties. PMI is working with the NMCP and other partners to improve Liberia's system for storing and distributing commodities.

SUSTAINABILITY – A HIGH PRIORITY FOR PMI

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

- Increased funding by host governments for their national malaria programs;
- Increased diversification and long-term funding by donors and partners;
- Improved quality of malaria services;
- High and sustained national coverage rates for malaria prevention and treatment interventions;
- Active involvement of community, nongovernmental, and private sector organizations in malaria control at all levels; and
- Long-term changes in behavior (e.g., culture of using ITNs, care-seeking behavior) among vulnerable populations.

management and reporting of consumption data, quantification, supervision, and KEMSA's procurement capacity not only are critical to effective delivery of malaria drugs, but also contribute to the overall essential medicines delivery system. Similarly, in Zambia, PMI, the U.S. President's Emergency Plan for AIDS Relief, USAID child health and family planning programs, the U.K. Department for International Development, and the World Bank are working together to improve the essential drug system in Zambia.

PMI also designed and began implementing a commodity end-use verification program to help MOHs monitor the availability and correct use of essential malaria drugs. In eight countries, PMI is helping MOHs monitor the quality of artemisinin-based combination therapies (ACTs) and other drugs. Results from the initial pilot of this tool implemented in Tanzania are already being used by the MOHs to improve distribution of antimalarials and other essential medicines.

Health Management Information Systems

PMI is working with National Malaria Control Programs (NMCPs) and other partners to develop and implement comprehensive national malaria monitoring and evaluation plans, many of which are incorporated within overall health information systems. As a result of these efforts, program managers at all levels are gaining

PMI Stock Monitoring System

In 2008, PMI worked with two of its implementing partners to develop and roll out a stock monitoring tool to track supplies of drugs and other commodities. In the case of ACTs, the tool reports on central-level ACT stocks from all sources – PMI, the Global Fund, and other donors – and serves as an early warning system for impending ACT stockouts or overstocks. It is currently in use in ten countries, and additional countries are expected to join. The first quarterly monitoring report was issued in October 2008, and the results were used to plan the procurement of PMI-funded ACTs.



ARTURO SANABRIA DELIVERISI ZAMBIA

A worker reviews medicine stock cards at the Chainama Clinic in Lusaka, Zambia. Monitoring stocks of drugs is essential to avert shortages.

experience and developing the capacity to collect and more effectively use data for programmatic decisions. This skill is critically important for all public health interventions. Specifically:

- Monitoring and evaluation system strengthening workshops have been completed in 14 of the 15 PMI focus countries, in collaboration with the Global Fund and the World Bank. PMI, along with partners, is helping NMCPs finalize their national malaria monitoring and evaluation plans and implement the key recommendations from these workshops.

- PMI has supported ten nationwide household surveys with plans for future surveys to help countries establish baselines and track progress in their malaria control efforts. Through support of these surveys, PMI also is building capacities within MOHs to collect, analyze, and use data for better decision-making and planning.

Integrated Maternal and Child Health Services

Under PMI, malaria prevention and control activities are implemented as part of integrated maternal and child health services and make a significant contribution to the strengthened capacity to deliver these services. Insecticide-treated nets (ITNs) are distributed principally through antenatal care and child health services or through integrated campaigns that include other interventions such as vitamin A supplements or measles vaccinations.

Intermittent preventive treatment for pregnant women (IPTp) with sulfadoxine-pyrimethamine is a key element of antenatal care; ACTs are provided as part of child health services. Due to its unique nature, indoor residual spraying (IRS) is implemented by NMCPs and communities as a discrete intervention. PMI also supports:

- Integrated Management of Childhood Illness programs in four countries, including training and supervision of health workers in the diagnosis and treatment of common childhood illnesses and appropriate referral;
- Implementation of community-based management of fever in six countries, in which child pneumonia and malaria are diagnosed and treated by trained community volunteers; and
- Focused antenatal care (FANC) programs in seven countries. FANC deals broadly with the full set of services for pregnant women during their antenatal care visits, rather than focusing on disease-specific interventions.

Quality of Laboratory Services

With several PMI countries achieving reductions of malaria burden, the need to accurately diagnose malaria through high-quality laboratory services is becoming even more important. Fourteen PMI countries are investing in strengthening laboratory diagnostic systems, including training and supervision of laboratory workers and establishing quality assurance systems for microscopy and rapid diagnostic tests. In several countries, PMI is also helping to support national reference laboratories. These efforts to upgrade laboratory services help improve the overall quality of primary health care, diagnosis, and treatment.

Building Health Workers' Skills to Implement a New Malaria Treatment Policy in Malawi

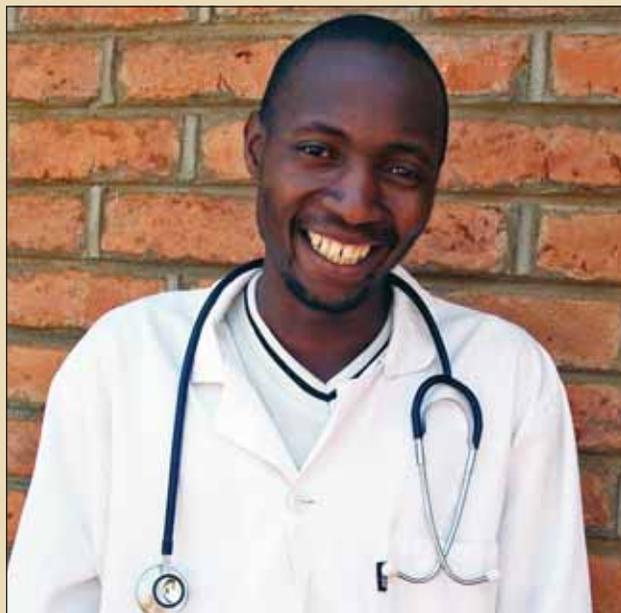
In 2006, the Malawi MOH selected the ACT artemether-lumefantrine (AL) as its first-line drug for the treatment of uncomplicated malaria. In November 2007, Malawi officially launched the new policy countrywide; however, one of the greatest challenges to implementation of the new policy was a lack of capacity among health care workers and pharmacy personnel to manage the new treatment, particularly its storage, rational use, and inventory control, including good record-keeping and reporting.

In response to this problem, PMI provided technical support for staff training and supervision for Malawi's NMCP and district health offices. More than 500 health workers were trained in filling out and maintaining stock cards for AL, recording actual AL consumption data in the dispensing register, and filing reports using the national logistics management information system.

Bernard Jali, a medical assistant, attended this training in April 2008 in Dedza District. When he transferred to the Kaphuka Health Centre in early June 2008, he found that, as with many health facilities in Malawi, it had poor pharmaceutical management practices. For example, stock cards to record the quantity of drugs received or issued were either nonexistent or were not updated regularly.

These practices affected the quality of information that district health officers, regional medical stores, and central medical stores receive on consumption of drugs, which they need to replenish stock at the health centers.

Mr. Jali immediately applied his new knowledge to improve the management of AL. Kaphuka Health Centre now has accurate stock cards for AL, and since June 2008, the facility has submitted its AL consumption and stock-on-hand reports to the district hospital on time every month. Through his pharmaceutical management training, Mr. Jali has been able to share his knowledge and transform the way his health facility manages AL and other essential medicines, which help ensure that the health center always has the medicines it needs.



Bernard Jali, a medical assistant in Malawi, has used the training he received on pharmaceutical management to make sure his health center is well stocked in antimalarial and other essential drugs.

STRENGTHENING PHARMACEUTICAL SYSTEMS

Strengthening Health Worker Performance

In 2008, PMI trained more than 35,000 health workers on case management with ACTs, more than 1,600 in malaria laboratory diagnostics, and more than 14,000 in IPTp. In 11 countries, PMI also is funding the strengthening of integrated health worker supervision systems, which will contribute to the effective delivery of other health interventions, in addition to malaria.

Controlling Malaria Reduces the Burden on the Health Sector

By reducing the burden of malaria in highly-endemic countries, PMI is helping to improve the functioning of host country health systems. The reductions in malaria cases (currently, malaria accounts for 30 to 40 percent of

outpatient cases in many PMI focus countries) is expected to allow needed resources and overstretched health care workers to concentrate on controlling other childhood illnesses, such as diarrhea and pneumonia. Studies are currently under way to measure the increased productivity of health workers when malaria rates fall.

Overall Capacity Building

In all its activities, PMI works to develop the capacities of host country health workers and institutions. In 2008, PMI developed tools to track the transfer of skills to national staff in the areas of IRS and pharmaceutical management. For example, PMI is tracking 30 key activities that are critical for the effective planning, conducting, and monitoring of IRS programs.

APPENDIX 1

BASELINE AND INTERIM COVERAGE OF MALARIA INTERVENTIONS IN PMI FOCUS COUNTRIES

| ROUND 1 FOCUS COUNTRIES | | | | | | |
|--|--------------------------------|--------------------------------|---------------------------------------|------------------|---------------------------------------|------------------|
| Indicator | ANGOLA <i>Baseline</i> | UGANDA <i>Baseline</i> | TANZANIA | | | |
| | | | Mainland | | Zanzibar | |
| | | | <i>Baseline</i> | <i>Interim</i> | <i>Baseline</i> | <i>Interim</i> |
| Pregnant women who slept under an ITN the previous night | 22% ¹ | 10% ¹ | 16% ¹ | 26% ³ | 20% ¹ | 51% ³ |
| Children under five who slept under an ITN the previous night | 18% ¹ | 10% ¹ | 16% ¹ | 25% ³ | 22% ¹ | 59% ³ |
| Houses in geographic areas targeted for IRS that were sprayed | No areas targeted ² | No areas targeted ² | No areas targeted ² | N/A | No areas targeted ² | N/A |
| Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy | 3% ¹ | 16% ¹ | 22% ¹ | 30% ³ | 14% ¹ | 52% ³ |
| Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms | 1.5% ¹ | 1% ¹ | ACTs not yet implemented ¹ | 14% ³ | ACTs not yet implemented ¹ | 8% ³ |
| <p>ANGOLA: ¹ 2006–2007 Malaria Indicator Survey. ² At baseline, no areas were targeted for spraying by the NMCP.</p> <p>UGANDA: ¹ 2006 Demographic and Health Survey. ² At baseline, no areas were targeted for spraying by the NMCP.</p> <p>TANZANIA: ¹ 2004–2005 Demographic and Health Survey. ² At baseline, no areas were targeted for spraying by the NMCP. ³ 2007–2008 HIV/AIDS and Malaria Indicator Survey.</p> | | | | | | |

| ROUND 2 FOCUS COUNTRIES | | | | | |
|--|--------------------------------|-------------------------------|---------------------------------------|----------------------|----------------------------|
| Indicator | MALAWI <i>Baseline</i> | MOZAMBIQUE <i>Baseline</i> | RWANDA | | SENEGAL <i>Baseline</i> |
| | | | <i>Baseline</i> | <i>Interim</i> | |
| Pregnant women who slept under an ITN the previous night | 15% ¹ | 7% ¹ | 17% ¹ | 62% ³ | 17% ¹ |
| Children under five who slept under an ITN the previous night | 23% ² | 7% ¹ | 13% ¹ | 58% ³ | 16% ¹ |
| Houses in geographic areas targeted for IRS that were sprayed | No areas targeted ³ | Not available ² | No areas targeted ² | N/A | Not available ² |
| Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy | 43% ¹ | 16% ¹ | <1% ¹ | 14% ³ | 49% ¹ |
| Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms | ACTs not yet implemented | 4.5% ¹ | ACTs not yet implemented ¹ | Pending ³ | 3% ¹ |
| <p>MALAWI: ¹ 2004 Demographic and Health Survey. ² 2006 Multiple Indicator Cluster Survey. ³ At baseline, no areas were targeted for spraying by the NMCP.</p> <p>MOZAMBIQUE: ¹ 2007 Malaria Indicator Survey, Preliminary Report. ² Two large-scale IRS programs were under way in 2006, supported by the MOH and the Lubombo Spatial Development Initiative.</p> <p>RWANDA: ¹ 2005 Demographic and Health Survey. ² At baseline, no areas were targeted for spraying by the NMCP. ³ 2008 Demographic and Health Survey, Preliminary Report.</p> <p>SENEGAL: ¹ 2006 Malaria Indicator Survey. ² The 2006 Malaria Indicator Survey showed that 2.2% of households nationwide had been sprayed.</p> | | | | | |

| ROUND 3 FOCUS COUNTRIES | | |
|--|----------------------------|------------------|
| Indicator | ZAMBIA | |
| | Baseline | Interim |
| Pregnant women who slept under an ITN the previous night | 24% ¹ | 43% ³ |
| Children under five who slept under an ITN the previous night | 23% ¹ | 41% ³ |
| Houses in geographic areas targeted for IRS that were sprayed | Not available ² | N/A |
| Women who completed a pregnancy in the last two years and who received two or more doses of IPTp during that pregnancy | 61% ¹ | 60% ³ |
| Children under five with suspected malaria who received ACT treatment within 24 hours of onset of symptoms | 13% ¹ | 8% ³ |

¹ 2006 Malaria Indicator Survey.
² Zambia's national IRS strategy is to prioritize spraying for urban and peri-urban areas in 36 of the country's 72 districts. At baseline, 592,346 houses were sprayed (Source: National Malaria Control Center).
³ 2008 Malaria Indicator Survey.

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 five and pregnant women.

- More than 90% of households with a pregnant woman and/or children under five will own at least one ITN;
- 85% of children under five will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses in geographic areas targeted for IRS will have been sprayed;
- 85% 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% 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% of governmental health facilities will have ACTs available for treatment of uncomplicated malaria; and
- 85% of children under five with suspected malaria will have received ACT treatment within 24 hours of onset of symptoms.

APPENDIX 3

SUMMARY OF RESULTS BY INTERVENTION

| INSECTICIDE-TREATED NETS (ITNs) PROCURED BY PMI AND DISTRIBUTED WITH PMI SUPPORT | | | | |
|--|----------------------|----------------------|----------------------|------------|
| Country | ITNs Procured | | | |
| | ITNs Distributed | | | |
| | PMI Year 1 (2006) | PMI Year 2 (2007) | PMI Year 3 (2008) | Cumulative |
| Angola | 540,949 | 294,200 | 734,198 | 1,569,347 |
| | 540,949 | 0 | 339,440 | 880,389 |
| Tanzania | 130,000 | 0 | 143,560 | 273,560 |
| | 130,000 | 0 | 113,560 | 243,560 |
| Uganda | 376,444 | 1,132,532 | 480,000 | 1,988,976 |
| | 305,305 | 683,777 | 999,894 | 1,988,976 |
| Malawi | – | 1,039,400 | 849,578 | 1,888,978 |
| | – | 211,995 | 849,578 | 1,061,573 |
| Mozambique | – | 786,000 | 720,000 | 1,506,000 |
| | – | 565,000 | 842,802 | 1,407,802 |
| Rwanda | – | 0 | 550,000 | 550,000 |
| | – | 0 | 0 | 0 |
| Senegal | – | 200,000 | 790,000 | 990,000 |
| | – | 196,872 | 792,951 | 989,823 |
| Benin | – | 221,000 ¹ | 385,697 | 606,697 |
| | – | 215,627 ¹ | 45,840 | 261,467 |
| Ethiopia (Oromia) | – | 102,145 ¹ | 22,284 | 124,429 |
| | – | 102,145 ¹ | 22,284 | 124,429 |
| Ghana | – | 60,023 ¹ | 350,000 | 410,023 |
| | – | 60,023 ¹ | 0 | 60,023 |
| Kenya | – | – | 60,000 | 60,000 |
| | – | – | 60,000 | 60,000 |
| Liberia | – | 197,000 ¹ | 0 | 197,000 |
| | – | – | 184,000 | 184,000 |
| Madagascar | – | – | 351,900 | 351,900 |
| | – | – | 351,900 | 351,900 |
| Mali | – | 369,800 ¹ | 858,060 | 1,227,860 |
| | – | 369,800 ¹ | 258,060 | 627,860 |
| Zambia | – | 808,332 ¹ | 186,550 | 994,882 |
| | – | 550,017 ¹ | 186,550 | 736,567 |
| TOTAL | 1,047,393 | 5,210,432 | 6,481,827 | 12,739,652 |
| | 976,254 | 2,955,256 | 5,046,859 | 8,978,369 |

¹ 2007 PMI jump start activities.

| ARTEMISININ-BASED COMBINATION THERAPIES (ACTs) PROCURED BY PMI AND DISTRIBUTED WITH PMI SUPPORT | | | | |
|---|-------------------|------------------------|-------------------|------------|
| Country | ACTs Procured | | | |
| | ACTs Distributed | | | |
| | PMI Year 1 (2006) | PMI Year 2 (2007) | PMI Year 3 (2008) | Cumulative |
| Angola | 587,520 | 2,033,200 | 3,035,520 | 5,656,240 |
| | 0 | 1,101,801 | 2,985,958 | 4,087,759 |
| Tanzania | 380,160 | 694,050 | 146,730 | 1,220,940 |
| | 380,160 | 494,050 | 346,730 | 1,220,940 |
| Uganda | 261,870 | 0 | 1,140,480 | 1,402,350 |
| | 227,827 | 0 | 0 | 227,827 |
| Malawi | – | 4,694,013 | 4,501,740 | 9,195,753 |
| | – | 4,694,013 | 3,579,278 | 8,273,291 |
| Mozambique | – | 1,440,000 | 3,525,120 | 4,965,120 |
| | – | 220,230 | 1,440,000 | 1,660,230 |
| Rwanda | – | 715,000 | 0 | 715,000 |
| | – | 0 | 411,788 | 411,788 |
| Senegal | – | 0 | 0 | 0 |
| | – | 0 | 0 | 0 |
| Benin | – | 1,465,170 ¹ | 0 | 1,465,170 |
| | – | 153,884 ¹ | 326,544 | 480,428 |
| Ethiopia (Oromia) | – | – | 600,000 | 600,000 |
| | – | – | 0 | 0 |
| Ghana | – | – | 1,142,759 | 1,142,759 |
| | – | – | N/A | 0 |
| Kenya | – | – | 1,281,720 | 1,281,720 |
| | – | – | 1,281,720 | 1,281,720 |
| Liberia | – | 496,000 ¹ | 0 | 496,000 |
| | – | – | 496,000 | 496,000 |
| Madagascar | – | – | 0 | 0 |
| | – | – | 0 | 0 |
| Mali | – | – | 0 | 0 |
| | – | – | 0 | 0 |
| Zambia | – | – | 253,800 | 253,800 |
| | – | – | 0 | 0 |
| TOTAL | 1,229,550 | 11,537,433 | 15,627,869 | 28,394,852 |
| | 607,987 | 6,663,978 | 10,868,018 | 18,139,983 |

¹ 2007 PMI jump start activities.

| INSECTICIDE-TREATED NETS PROCURED BY OTHER PARTNERS AND DISTRIBUTED WITH PMI SUPPORT | | | | |
|--|-------------------|-------------------|-------------------|------------------|
| Country | PMI Year 1 (2006) | PMI Year 2 (2007) | PMI Year 3 (2008) | Cumulative |
| Angola | 0 | 0 | 109,624 | 109,624 |
| Tanzania | 0 | 0 | 350,000 | 350,000 |
| Uganda | 0 | 369,900 | 0 | 369,900 |
| Mozambique | – | 0 | 78,000 | 78,000 |
| Ghana | – | – | 750,000 | 750,000 |
| TOTAL | 0 | 369,900 | 1,287,624 | 1,657,524 |

| ARTEMISININ-BASED COMBINATION THERAPIES PROCURED BY OTHER PARTNERS AND DISTRIBUTED WITH PMI SUPPORT | | | | |
|---|-------------------|-------------------|-------------------|------------------|
| Country | PMI Year 1 (2006) | PMI Year 2 (2007) | PMI Year 3 (2008) | Cumulative |
| Uganda | 0 | 8,709,140 | 112,330 | 8,821,470 |
| TOTAL | 0 | 8,709,140 | 112,330 | 8,821,470 |

| PEOPLE PROTECTED BY PMI-SUPPORTED INDOOR RESIDUAL SPRAYING | | | | |
|--|-------------------|------------------------|------------------------|--|
| Country | PMI Year 1 (2006) | PMI Year 2 (2007) | PMI Year 3 (2008) | |
| Angola | 590,398 | 612,776 | 992,856 ¹ | |
| Tanzania (Zanzibar) | 1,018,156 | 1,120,381 ¹ | 1,120,381 ¹ | |
| Tanzania (Mainland) | 0 | 159,579 | 448,690 | |
| Uganda | 488,502 | 1,865,956 | 2,211,388 | |
| Malawi | – | 126,126 | 106,450 | |
| Mozambique | – | 2,593,949 | 1,457,142 | |
| Rwanda | – | 720,764 | 885,957 | |
| Senegal | – | 678,971 | 645,346 ¹ | |
| Benin | – | – | 521,738 | |
| Ethiopia (Oromia) | – | 3,890,000 ² | 5,921,906 | |
| Ghana | – | – | 601,973 | |
| Kenya | – | 3,459,207 ² | 3,061,967 | |
| Liberia | – | – | 0 | |
| Madagascar | – | – | 2,190,989 ¹ | |
| Mali | – | – | 420,580 | |
| Zambia | – | 3,600,000 ² | 4,200,000 | |
| TOTAL | 2,097,056 | 18,827,709 | 24,787,363 | |

¹ Indoor residual spray operations typically involve successive rounds of spraying in the same geographical area. To avoid counting the same people twice, only one round is counted within any given year.

² 2007 PMI jump start activities.

| HEALTH WORKERS TRAINED WITH PMI SUPPORT IN ACT USE | | | |
|--|----------------------|----------------------|----------------------|
| Country | PMI Year 1 (2006) | PMI Year 2 (2007) | PMI Year 3 (2008) |
| Angola | 1,283 | 290 | 1,357 |
| Tanzania | 4,217 | 1,011 | 1,767 |
| Uganda | 2,844 | 12,637 | 9,159 |
| Malawi | – | 0 | 5,315 |
| Mozambique | – | 174 | 422 |
| Rwanda | – | 5,127 | 8,565 |
| Senegal | – | 1,020 | 4,776 |
| Benin | – | 605 ¹ | 0 |
| Ethiopia (Oromia) | – | – | 2,786 |
| Ghana | – | – | 368 |
| Kenya | – | – | 0 |
| Liberia | – | – | 595 |
| Madagascar | – | – | 0 |
| Mali | – | – | 101 |
| Zambia | – | – | 186 |
| TOTAL | 8,344 | 20,864 | 35,397 |

¹ 2007 PMI jump start activities.

| HEALTH WORKERS TRAINED WITH PMI SUPPORT IN IPTp USE | | | |
|---|----------------------|----------------------|----------------------|
| Country | PMI Year 1 (2006) | PMI Year 2 (2007) | PMI Year 3 (2008) |
| Angola | 1,450 | 290 | 1,481 |
| Tanzania | 376 | 1,158 | 4,169 |
| Uganda | 168 | 807 | 649 |
| Malawi | – | 0 | 2,747 |
| Mozambique | – | 0 | 0 |
| Rwanda | – | 250 | 436 |
| Senegal | – | 43 | 2,422 |
| Benin | – | 605 ¹ | 1,267 |
| Ethiopia (Oromia) | – | – | 0 |
| Ghana | – | – | 464 |
| Kenya | – | – | 0 |
| Liberia | – | – | 417 |
| Madagascar | – | – | 0 |
| Mali | – | – | 142 |
| Zambia | – | – | 0 |
| TOTAL | 1,994 | 3,153 | 14,194 |

¹ 2007 PMI jump start activities.

ACKNOWLEDGMENTS

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