

This Malaria Operational Plan has been endorsed by the President's Malaria Initiative (PMI) Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. If any further changes are made to this plan, it will be reflected in a revised posting.

PRESIDENT'S MALARIA INITIATIVE

Malaria Operational Plan – FY08

MOZAMBIQUE

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ABBREVIATIONS and ACRONYMS

ACT – artemisinin-based combination therapy
 AIDS – Acquired Immuno-Deficiency Syndrome
 AL – artemether-lumefantrine
 ANC – antenatal clinic
 APE – community health worker
 AQ – amodiaquine
 ARV – anti-retroviral therapy
 AS – artesunate
 BCC – communications and behavior change
 CDC – US Centers for Disease Control and Prevention
 CMAM – Central de Medicamentos e Artigos Médicos
 DDT – dichloro-diphenyl-trichloroethane
 DHS – Demographic and Health Survey
 DPS – Departamento Provincial de Saude (Provincial Health Department)
 DfID – Department for International Development, United Kingdom
 FBO – faith-based organization
 Global Fund – Global Fund to fight AIDS, Tuberculosis, and Malaria
 HIV – Human Immunodeficiency Virus
 IMCI – integrated management of childhood illnesses
 IPTi – intermittent preventive treatment of infants
 IPTp – intermittent preventive treatment of pregnant women
 INS – Instituto Nacional de Saude (National Institute of Health)
 IQC – indeterminate quantity contract
 IRS – indoor residual spraying
 IRCMM- Inter-Religious Campaign against Malaria in Mozambique
 ITN – insecticide-treated bed net
 KAP – knowledge, attitudes, and practices
 LLIN – long-lasting insecticide-treated bed net
 LSDI – Lubombo Spatial Development Initiative
 M&E – Monitoring and Evaluation
 MISAU – Ministerio da Saude (Ministry of Health)
 NAIMA + – Network of NGOs Working in Health and HIV/AIDS
 NMCP – National Malaria Control Program
 NGO – non-governmental organization
 PARPA – Plano de Acção para a Redução da Pobreza Absoluta (Poverty Reduction Strategy Plan)
 PEPFAR – President’s Emergency Plan for AIDS Relief
 PLWHA – people living with HIV/AIDS
 PMI – President’s Malaria Initiative
 PMTCT – prevention of mother to child transmission (of HIV/AIDS)
 PSI – Population Services International
 RBM – Roll Back Malaria
 RDT – rapid diagnostic test
 RESP – Repartição de Educação em Saúde Pública
 SADC – Southern Africa Development Community

SDC – Swiss Development Corporation
SP – sulfadoxine-pyrimethamine
SWAp – Sector Wide Approach
UNICEF – United Nations Children’s Fund
WHO – World Health Organization

EXECUTIVE SUMMARY

Mozambique was one of the four countries selected during the second year of the President's Malaria Initiative (PMI). The goal of PMI is to assist African countries, in collaboration with other partners, to reduce malaria mortality by 50% by rapidly scaling-up coverage of vulnerable groups with four highly effective interventions: artemisinin-based combination therapy (ACT), intermittent preventive treatment for malaria in pregnancy (IPTp), insecticide-treated bed nets (ITNs), and indoor spraying with residual insecticides (IRS).

Malaria is a major cause of morbidity and mortality in Mozambique. Approximately 6 million cases are reported each year. Malaria accounts for approximately 40% of all outpatient visits and 60% of pediatric hospital admissions. It is the leading cause of death among children admitted to pediatric services. Malaria transmission takes place year round with a seasonal peak extending from December to April. More than 18 million people in Mozambique are considered to be at-risk of malaria, including an estimated 3.6 million children less than five years and almost one million pregnant women.

The Government of the Republic of Mozambique subscribes to the Roll Back Malaria Abuja Targets and the Millennium Development Goals. Malaria is considered a priority for poverty reduction and the government's development agenda. Although the Ministerio da Saude (MISAU) is committed to increasing access to health services and increasing the efficiency and quality of those services nationwide, a weak health infrastructure and shortage of health workers are formidable obstacles. In 2000, Mozambique adopted a sector-wide approach for health, led by the MISAU and with the participation of more than 15 bilateral and multilateral agencies.

Mozambique has received a two-year \$28 million Round 2 grant from the Global Fund to fight AIDS, Tuberculosis and Malaria (Global Fund). This award is the first Global Fund grant to be pooled in the Ministry of Health's central basket funding. Mozambique has also been awarded a two-year \$36 million Round 5 grant, which has not yet been signed. In addition, the Lubombo Spatial Development Initiative (LSDI), a three-country control initiative— involving southern Mozambique, Swaziland, and South Africa— has received two two-year \$21 million grants from Global Fund (Round 2 and Round 6). With support from the World Health Organization, UNICEF, and other national and international partners, scaling up of malaria prevention and control interventions has already started. The World Bank is also preparing a five-year credit that would allocate approximately \$12 million of a \$35 million health sector credit for malaria control. This credit will primarily focus on system strengthening at the national and provincial levels, with a particular emphasis on three Northern provinces. In addition, Japanese Cooperation has donated to Mozambique 600,000 long-lasting insecticide-treated nets (LLINs). Additional technical support will be mobilized through a developing bilateral cooperation between the Governments of Brazil and the United States, which is focused on strengthening malaria control in lusophone countries in Africa.

The following table shows Year 1 targets and the early implementation activities supported by PMI:

Proposed Year 1 Targets (PMI and partners)	Expected Results after 1 Year of Implementation (February 2008)
Procure and distribute 450,000 long-lasting insecticide-treated bed nets (LLINs) and conduct a bed net re-treatment campaign	As of September 2007, 638,370 LLINs have been distributed free-of-charge (200,000 contributed by FY06 PMI funds). An additional 800,000 LLINs are scheduled for delivery by the end of 2007. This should raise percent of households with at least one ITN above 40%. In November 2006, a campaign in five provinces treated 450,000 nets with insecticide.
Spray 180,000 houses in three districts and provide technical and logistical support to MISAU for IRS activities in 3 additional districts in Zambézia Province	By January 2008, IRS completed on-schedule in 3 districts supported by PMI, covering more than 85% of approximately 200,000 targeted households (protecting an estimated population of 795,000). IRS completed in 3 remaining districts by MISAU with technical and financial assistance from PMI.
Train and supervise health workers in prevention of malaria in pregnancy and IPTp	By February 2008, first in series of training courses will be carried out and supervision initiated.
Procure approximately 1 million treatments of first and second-line antimalarial drugs	122,310 treatments of artemether-lumefantrine (AL) procured with FY06 PMI funds and delivered to MISAU. Approximately one million additional treatments of AL purchased with planned delivery in first quarter of 2008, coinciding with the launch of new malaria treatment policy
Conduct national Malaria Indicator Survey	Data collected from approximately 6000 households in June and July 2007. Analysis and dissemination of data to be completed by December 2007.

PMI achievements in Year 1 and plans for Year 2 are listed below:

ITNs: During Year 1, 638,370 LLINs were distributed free-of-charge through antenatal clinics (ANCs) and sub-national campaigns for children less than five years. USG contributed 200,000 of these LLINs which were purchased with FY06 funding. PMI also supported a net re-treatment campaign in November 2006 during which 450,000 nets were treated with insecticide. An additional 2.3 million LLINs are currently in the pipeline, including 800,000 LLINs purchased with PMI funding. Distribution of these nets will commence no later than the first quarter of 2008.

In FY08, another 2.2 million LLINs (of which PMI will provide one million) will be distributed free-of-charge to children less than five years and pregnant women. This should raise household ownership of at least one ITN to approximately 75% nationwide.

IRS: A total of 136 tons of DDT, 60 tons of ICON, and 13 tons of bendiocarb, along with 1,275 spray pumps, were procured and distributed using FY06 PMI funds. With Global Fund support, Mozambique recently purchased and has received delivery of 900 tons of DDT, which is enough insecticide to cover at least two years of spraying for all targeted areas within the country. In addition, using FY06 malaria funds, USAID procured 6650 spray pumps, 55 maintenance kits, and 1300 personal protective equipment units. Spraying activities commenced in three districts in Zambézia in September 2007 and should be completed by January 2008. This should cover approximately 200,000 households, with an estimated 795,000 persons protected. PMI also is providing technical and logistics support to improve the quality of IRS for the three other districts in Zambézia Province.

In FY08, PMI will support full expansion of IRS to all six districts in Zambézia, where at least 85% of houses will have been sprayed. This translates into approximately 471,000 houses with 1.88 million residents who will be protected by IRS.

Malaria in Pregnancy: ANC's continue to be a primary route for distribution of LLINs to pregnant women. MISAU and provincial authorities continue to roll-out training of ANC staff. PMI and the President's Emergency Plan for AIDS Relief (PEPFAR) staff have been working to harmonize service delivery at ANC and PMTCT clinics. With PMI support, training and supervision will be accelerated in the first quarter of 2008. Sufficient quantities of SP have been purchased by MISAU to cover IPTp needs through 2008.

In FY08, pregnant women will continue to be a primary target for LLIN distribution, as outlined above. Training and supervision on IPTp will be implemented in all health facilities in all 11 provinces. By the end of FY08, coverage with two doses of IPTp is expected to rise to 40% of Mozambique's pregnant women.

Malaria Diagnosis: In FY07, PMI assisted the NMCP to develop a written strategy for malaria diagnosis, including the use of microscopy and rapid diagnostic tests (RDTs). In addition, PMI is purchasing approximately 80 microscopes and microscopy supplies, as part of plan to improve malaria diagnosis countrywide. PMI also is refurbishing and re-equipping the national malaria laboratory, which will be used for reference diagnosis and training of laboratory technicians.

In FY08, this strategy for improving the quality of laboratory diagnosis will be rolled-out in all provinces. This will include training of laboratory technicians in microscopy and training of other health workers in the use of RDTs and the appropriate clinician indications for diagnostic testing.

Malaria Treatment: PMI country staff have assisted the NMCP in developing an implementation plan for the roll out of artemether-lumefantrine (AL), the new first-line treatment for malaria. With PMI support, a detailed quantification of the drug requirements for each province for the full implementation of the new drug policy has been carried out. Training materials for the new drug policy have been developed and will be piloted in the coming months. PMI has purchased approximately one million doses of AL, with planned delivery in the first quarter of 2008, in time for the launch of the new malaria treatment policy in April 2008.

In FY08, approximately eight million treatments of AL will be procured by all partners (of which PMI will provide more than one million treatments). These will be provided free-of-charge to children <5 years at public and non-governmental health facilities. PMI will support training in the new drug policy, which will be implemented in more than 60% of health facilities in all 11 provinces (covering at least 30% of fever episodes in children less than five years).

Communications and Behavior Change: A number of highly-publicized events took place during PMI Year 1, including: 1) the official PMI launch in December 2006, at Coca Missava, Gaza Province, coinciding with the kick-off of the net re-treatment campaign; 2) Africa Malaria Day ceremonies in Mocuba, Zambézia Province, attended by the Minister of Health; 3) a visit by US First Lady, Mrs. Laura Bush, in June 2007, where she delivered her remarks on PMI; and 4) a visit in August by a delegation led by HHS Secretary Michael Leavitt, CDC Director Julie Gerberding,

USAID Associate Administrator Kent Hill, and National Institutes for Allergy and Infectious Diseases Director Anthony Fauci.

During the US First Lady's visit, she announced the award of PMI funding to the Inter-Religious Coalition Against Malaria in Mozambique (IRCMM). This coalition— comprised of organizations from all 12 major religious groups in Mozambique, the Adventist Development and Relief Agency (ADRA), and the Washington National Cathedral's Center for Global Justice and Reconciliation—is currently initiating community mobilization activities related to malaria in Zambézia Province.

In FY08, PMI will continue support to IRCMM for the expansion of their activities to additional provinces. PMI also will finance a coordinated national communications and behavior change campaign to promote correct care seeking and treatment for fever, antenatal clinic attendance and IPTp, and ownership and use of ITNs.

Monitoring and Evaluation: A PMI-supported MIS was conducted during June and July 2007, which surveyed almost 6000 households. Analysis of this data is underway and will provide a baseline for a number of key malaria control indicators to be used within PMI. In late 2007, Mozambique will conduct a mortality survey, which will provide specific estimates of malaria mortality over the previous twelve months. In early 2008, a PMI-supported M&E specialist will join the NMCP and work to strengthen the program's capacity to analyze and use M&E data.

In FY08, PMI will support the development and implementation of a comprehensive, integrated monitoring and evaluation system for malaria. The system will collect information on health worker and health facility performance, numbers of health workers trained and commodities distributed and number of stock-outs. PMI will continue training activities for health workers at district and provincial levels in the proper collection and use of surveillance and service data.

HIV/AIDS and Malaria: To improve coordination between PEPFAR and PMI, the CDC PMI Advisor now participates in PEPFAR working groups on prevention and M&E. In 2007, ARV treatment and OVC clinics began distributing free LLINs, purchased with PEPFAR funds, with distribution supported by PMI. LLINs have also been added to the home-based care package provided to people with HIV/AIDS.

In FY08, the collaboration between PEPFAR and PMI partners will expand in a number of areas. These will include strengthening of laboratories, M&E, and drug management systems, as well as coordinated services for pregnant women.

Budget: The FY2008 PMI budget for Mozambique is \$20 million. Thirty-four percent will support scaling-up ownership and use of ITNs, 16% for IRS, 30% for procurement of antimalarial drugs and improved malaria case management, 3% for malaria in pregnancy activities, 8% for communication and behavior change activities, and 4% for monitoring and evaluation. Overall, 53% will be spent on commodities.

INTRODUCTION

President's Malaria Initiative

In July 2005, the United States Government announced a five-year, \$1.2 billion President's Malaria Initiative (PMI) to rapidly scale up malaria prevention and treatment interventions in 15 high-burden countries in sub-Saharan Africa. The goal of PMI is to reduce malaria-related mortality by 50% after three years of accelerated implementation in each country, which endeavors to achieve 85% coverage of children less than five years of age and pregnant women with proven preventive and therapeutic interventions, including artemisinin-based combination therapy (ACTs), insecticide-treated bed nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

Proposed funding levels are \$135 million in FY07, \$300 million in FY08 and FY09, and \$500 million in FY10. The aim is to cover a total population of 240 million in 15 countries by 2010. Mozambique was one of the four countries selected in the second year of PMI.

In implementing PMI, the United States Government is committed to working closely with host governments and within existing national malaria control strategies and plans. Efforts will be coordinated with other national and international partners, including the Global Fund, Roll Back Malaria (RBM), the World Bank Malaria Booster Program, the World Health Organization (WHO), UNICEF, non-governmental organizations (NGOs), and the private sector to ensure that investments are complementary and that RBM and Millennium Development goals can be achieved. The US Government is also exploring additional support to Mozambique through a developing cooperative effort with the Government of Brazil to jointly support malaria control activities in lusophone countries in Africa. This collaboration has already begun between the two governments and the Government of the Democratic Republic of Sao Tome and Principe.

This document presents a detailed implementation plan for the second year of the PMI in Mozambique. It was developed in close consultation with the national malaria control program (NMCP) and with the participation of nearly all national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing to support fit well with the Ministry of Health Strategic Plan for Malaria Control and build upon investments made with Year 1 PMI funding. This plan reviews the current status of malaria burden, control policies, and interventions in Mozambique. It identifies challenges and unmet needs if the targets of the PMI are to be achieved, reviews the status of Year 1 activities, and provides a description of proposed Year 2 activities under the PMI.

BACKGROUND

Malaria Situation in Mozambique

Malaria is a major cause of morbidity and mortality in Mozambique. It also greatly limits productivity, particularly among rural populations, and is a leading cause of school absenteeism. About six million cases of malaria are reported each year. Malaria accounts for 40% of all

outpatient consultations and 60% of all pediatric hospital admissions. The estimated prevalence of malaria among children 2-9 years of age ranges from 40% to 80%. Malaria is reported to be the leading cause of death among children admitted to pediatric services in Mozambique.

Approximately 20% of pregnant women in rural areas are infected with malaria parasites and, among primigravidae (first pregnancies) this figure can reach 30%. Anemia due to malaria is a major cause of morbidity and mortality in children and pregnant women, and malaria is a leading cause of low birth weight in the newborn.

Most of Mozambique has year-round malaria transmission with a seasonal peak from December to April. Mozambique is, however, prone to natural disasters such as drought, cyclones and floods and these have in past years contributed to increases in malaria transmission, particularly in low-lying coastal areas and along major rivers.

Plasmodium falciparum infections account for about 90% of all malaria infections, with *P. malariae* and *P. ovale* responsible for about 9% and 1%, respectively. The major vectors in Mozambique are *Anopheles gambiae s.s.*, *A. arabiensis* and *A. funestus s.l.* and *A. funestus s.s.* Among the major subspecies of the *A. gambiae* complex present, *A. arabiensis* is more prevalent in the south and *A. gambiae*, in the north.

Based on the 2005 population projections of 19,420,000 and the assumption that approximately one million residents of central Maputo City are at little risk of malaria, the population at risk of malaria is assumed to be 18 million; vulnerable populations in Mozambique comprise an estimated 3,600,000 children under five and 900,000 pregnant women.

Malaria Indicators in Mozambique 2007 compared with 2003 Demographic and Health Survey

Recent Estimates of Malaria Indicators	MIS 2007 %	DHS 2003 %
Proportion of households with at least one ITN	*	
Proportion of children less than five years old who slept under an ITN the previous night	*	10
Proportion of pregnant women who slept under an ITN the previous night	*	12
Proportion of women who received two or more doses of IPTp during their last pregnancy in the last two years	*	
Proportion of targeted houses adequately sprayed with a residual insecticide in the last 12 months	*	
Proportion of children under five years old with fever in the last two weeks who received treatment with an antimalarial according to national policy within 24 hours of onset of fever	*	
Proportion of children less than five years old with fever in the last two weeks who received treatment with an ACT within 24 hours of onset of fever	*	

* Results of Malaria Indicator Survey still pending as of 11-07

Current Status of Malaria Indicators

Preliminary results from the MIS carried out in June- July 2007 are still pending at the time of this report.

The 2003 DHS survey showed that 18% of women between 15 and 49 years of age owned at least one bed net, but only 12% of pregnant women and 10% of children under five had slept under an ITN the previous night. A survey in Manica and Sofala Provinces following the large measles-ITN distribution campaign in November 2005 showed >90% usage rates among residents who had an ITN.

GOAL AND TARGETS OF PRESIDENT'S MALARIA INITIATIVE

Approximately one million persons who reside in urban Maputo (5.1% of the population) are likely to be at very low risk of malaria and, therefore, are not included in the population at-risk in Mozambique. This leaves approximately 18 million persons who are at-risk of malaria. The goal of PMI is to reduce malaria-related mortality by 50% by the year 2010, as compared to pre-Initiative levels.

By the end of 2010, the PMI will provide accelerated resources to achieve the following targets in populations at risk of malaria in Mozambique:

1. More than 90% of households with a pregnant woman and/or a child less than five years of age will own at least one ITN;
2. 85% of children less than five years of age will have slept under an ITN the previous night;
3. 85% of pregnant women will have slept under an ITN the previous night;
4. 85% of houses in geographic areas targeted for IRS will have been correctly sprayed;
5. 85% of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been sprayed with a residual insecticide within three months before the last transmission season;
6. 85% of pregnant women who have completed a pregnancy in the last two years will have received two or more doses of SP for IPTp during that pregnancy;
7. 85% of government health facilities will have ACTs available for the treatment of uncomplicated malaria; and
8. 85% of children under five with suspected malaria will have received treatment with an ACT in accordance with national malaria treatment policies within 24 hours of the onset of symptoms.

SUMMARY OF PROGRESS IN YEAR ONE

1. In November 2006, a mass bed net re-treatment campaign took place in five provinces, during which 450,000 nets were treated with insecticide;

2. During 2007, 638,370 long-lasting insecticide-treated nets (LLINs) were distributed through antenatal clinics (ANCs) and campaigns for children less than five years. USAID contributed 200,000 of these LLINs, purchased with FY06 funding, including 47,000 to pregnant women through ANC and 153,000 to children less than 5 years through campaigns;
3. Taxes and tariffs on ITNs were removed and the NMCP, along with partners, is revising the National ITN Policy to achieve maximal distribution coverage of ITNs;
4. Environmental and logistical assessments were completed and IRS activities initiated in six districts in Zambézia Province, to be completed by no later than January 2008;
5. More than 122,000 treatments of artemether-lumefantrine (AL) were procured and delivered to MISAU, then subsequently distributed to health facilities. Approximately one million additional treatments of AL will be purchased by November 2007 with planned delivery in first quarter of 2008;
6. A national policy for the use of rapid diagnostic tests (RDTs) for malaria is being developed by NMCP, in collaboration with partners. This document will cover the criteria for RDT use, as well as the issues that relate to quality assurance, transportation, storage, forecasting and implementation;
7. The NMCP, along with partners, is initiating the systematic compilation of activities data on prevention activities related to scaling up of ITN, IPTp, and IRS;
8. PMI assisted in the drafting of training material, and organized and directly supported training in Zambézia for 166 community health workers (known as APEs) in treatment of malaria with ACTs; and
9. Data collection for a nationwide MIS was completed in July 2007. Almost 6000 household were visited and an estimated 7440 women between the ages of 12 and 49 were interviewed. Data from this survey will establish baseline information on coverage of malaria interventions and malaria mortality. Analysis of these data is currently underway.

EXPECTED RESULTS – YEAR TWO

At the end of Year 2 of the PMI in Mozambique (March 31, 2009), the following targets will have been achieved:

Prevention:

- Approximately 2.2 million LLINs (of which PMI will provide one million) will have been distributed free-of-charge during PMI year two to children under five and pregnant women (this should bring household ownership of at least one ITN to approximately above 75% nationwide);

- At least 85% of houses in six districts targeted by the MISAU and PMI for IRS in Zambézia Province will have been sprayed (approximately 471,000 houses with 1.88 million residents will be protected by IRS);
- IPTp will have been implemented in all health facilities in all 11 provinces (providing coverage with 2 doses of IPTp to 40% of Mozambique's total population of pregnant women);
- A pilot intervention to assess logistics and feasibility issues related to the implementation of IPTp will be initiated and discussions with key stakeholder will be begun in preparation for national scale up of this intervention in Mozambique.

Diagnosis and Treatment:

- A plan for improving the quality of laboratory diagnosis including RDT and microscopy will have been implemented in all provinces. This training will include microscopy training for laboratory technicians, and wide scale training of health care workers RDTs and the appropriate use of diagnostic testing.
- Approximately eight million treatment doses of AL will be procured (of which PMI will provide one million treatment doses), which will be provided free-of-charge to children less than five years at public and NGO health facilities.
- Malaria treatment with AL will have been implemented in more than 60% of health facilities in all 11 provinces (covering at least 30% of fever episodes in children less than five years).

Other:

- The collaboration between the President's Emergency Plan for AIDS Relief (PEPFAR) and PMI partners will expand in a number of areas including distribution of LLINs to people with HIV/AIDS; strengthening of laboratories, M&E, and drug management systems; and coordinated services for pregnant women.
- Assessment of malaria risk in metropolitan Maputo will be carried out.

INTERVENTIONS - PREVENTION

Vector Control - General

As described in the PMI Mozambique Year 1 MOP, the 2006 interim Strategic Plan for Malaria Control of the MISAU and RBM partners places considerable emphasis on vector control and recommends IRS, ITNs, as well as larval control through environmental management and biological and chemical control. In principle "these interventions may be used singly or in combination, depending upon the epidemiological setting." In practice, however, ITNs are not being targeted for districts where there are IRS operations.

Insecticide resistance: Insecticide resistance studies were carried out at 17 localities throughout Mozambique between 2000 and 2002 by the NMCP in collaboration with the Medical Research Council of South Africa and the London School of Tropical Medicine. Although these studies were done several years ago, insecticide resistance does not appear to be an operational impediment to vector control activities except in Maputo Province, where *A. funestus* populations resistant to both pyrethroids and carbamates has been observed. No resistance to dichloro-diphenyl-trichloroethane (DDT) or the organophosphate insecticide, malathion, has been detected in *A. funestus*. *Anopheles gambiae s.s.* shows a low level of pyrethroid and carbamate resistance in Maputo Province but is fully susceptible to DDT and malathion. Carbamate resistance has been detected in *A. arabiensis* in Maputo Province. Fortunately, the *kdr* mutation in the mosquito gene, which is associated with resistance to pyrethroid insecticides and cross-resistance to DDT, has not been detected in Mozambique.

Progress to date: Support for entomological monitoring continued in 2007 with plans to upgrade the central insectary and entomological laboratory. Equipment and supplies to establish ELISA and molecular capabilities within the lab have been ordered. This equipment will support identification of malaria-infected vector mosquitoes by ELISA, and PCR-based monitoring for insecticide resistance and for identification of members of mosquito species complexes. An entomology workshop will be conducted in late 2007, once the laboratories and insectary are equipped and renovated.

Insecticide-treated Nets:

Current Status, Challenges, and Needs

National plan for ITNs: In January 2006, the MoH declared that malaria is a national emergency and, as such, malaria prevention and treatment services must be provided free-of charge to at-risk populations through the public health service. A national ITN distribution policy was drafted in 2005 but did not receive approval. The National Strategic Plan for Malaria Control points out the need to finalize this document and the NMCP is currently working with partners to update and complete the ITN policy. The national policy will highlight the growing global trend toward universal access to nets, rather than solely targeting nets to vulnerable populations. Currently, the draft policy promotes LLINs (rather than traditional ITNs), which are distributed free of charge through the health system to all pregnant women and children less than five years. In the immediate to short term, two approaches are being proposed to scale-up ITN coverage:

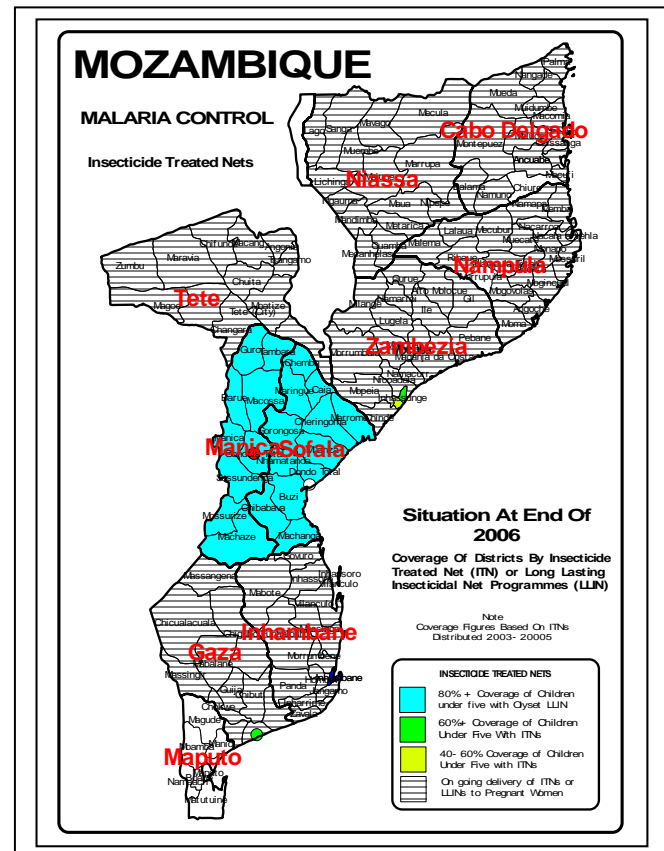
1. “Catch up” - rapid scale up through the distribution of LLINs to children less than five through an integrated campaign approach in order to allow for a rapid acceleration of LLIN coverage. This approach is being carried out, by partners such as PSI and Malaria Consortium, district by district or province by province, with the objective of reaching 100% coverage of all children under five years of age by the end of 2008. Large national campaigns are not scheduled for. This campaign approach should be integrated, whenever possible, with other child survival interventions, such as vaccinations, vitamin A distribution, and de-worming, along with supportive communication to ensure proper use of the nets;

2. “Keep up” - routine delivery of LLINs to pregnant women through routine ANC (85% of pregnant women attend ANC at least once).

In the mid- to longer-term, ANCs will be used to sustain the high coverage levels achieved during the “catch-up” phase described above. However, NMCP and partners are trying to devise a method of distribution to reach households that don’t have either a pregnant woman or children under 5. This is in order to ensure that all sleeping spaces in Mozambique have a net (~2 nets per household).

Progress to date: During calendar year 2006, 638,370 LLINs were distributed through ANCs and sub-national campaigns for children less than five years. USAID contributed 200,000 of these LLINs which were purchased with FY06 funding. These nets were distributed to pregnant women through ANCs by PSI (47,000 LLINs) and through district and provincial level campaigns to children less than five years (153,000 nets) coordinated by PSI and UNICEF.

The total number of nets in the pipeline (including nets from Global Fund, PMI and JICA) for 2007 is 2,345,000. National policy is that these ITNs should be delivered free to pregnant women and children less than five through the public sector. Figure 1 indicates ITN disbursements vs. estimated populations in areas where there are not IRS operations as of 2006. (It is important to note that the “coverage” data are not derived from surveys, but rather from disbursement compared to rough estimates of population.)



ITNs have been delivered through a variety of channels and partners, including:

- free as part of a campaign to those affected by flood emergencies, including 200,000 ITNs in 2000 and 56,000 LLINs in 2007;
- free of charge to children under five years of age in an integrated measles campaign in November 2005 in Manica and Sofala provinces (400,000 LLINs);
- subsidized and free LLINs through health facilities and sub-national campaigns to pregnant women and children under five years of age in Zambezia, Gaza, Tete, Inhambane and Cabo Delgado; distribution of free nets to vulnerable groups is being expanded to Niassa and Nampula Provinces;
- community-level distribution through a variety of NGOs; and

- commercial sector distribution in collaboration with Population Services International (PSI) and the Malaria Consortium.

To support these activities, UNICEF has purchased a shipping container, which it has converted into a warehouse for the LLINs for Gaza and Zambézia Provinces. For those going to ANCs, LLINs are requested by the districts and are forwarded using PSI vehicles; the districts then take responsibility for ensuring that the LLINs get to each health facility.

Taxes and tariffs: As of March of 2007, bed nets are no longer subjected to duties in Mozambique. Clearing costs are still applicable – between 1.0 and 1.5% of the CIF value of the goods.

Population-based survey information on ITN coverage and use: The most recent DHS survey, which was carried out between September and December 2003, did not provide information on the number of households having at least one bed net or ITN, but 18% of women between 15 and 49 years of age had a bed net (treated or untreated). Only 12% of pregnant women and 10% of children under five had slept under a bed net the previous night. A survey in Manica and Sofala Provinces following the large measles-ITN distribution campaign in November 2005 showed >90% usage rates among residents who had a bed net.

Preliminary results from the PMI malaria indicator survey undertaken in July 2007 are still pending at the time of this report.

Communications and behavior change for LLIN uptake and appropriate use: With funding from USAID, PSI is working with partner NGOs in Zambézia and Nampula Provinces to increase demand for and access to LLINs in rural communities. PSI provides NGO staff and volunteers with training in recognition and prevention of malaria. PSI also is conducting communications and behavior change activities in support of MoH efforts to provide free LLINs to pregnant women through government health facilities and to children less than five through campaigns (Zambézia Province). PSI will also conduct a mapping exercise in 2007, with non-PMI funds, which will reflect geographic gaps in LLIN coverage, as well as for clients, including children less than five.

Projected ITN requirements for FY08: The table on the following page, provided by UNICEF, provides the data used to calculate the requirements for ITNs for the remainder of calendar year 2007 and all of calendar year 2008. These figures are based on best available estimates of the population for individual provinces and assume that all pregnant women and 20% of all children <5 years will require an LLIN each year. These estimates take into account that more than 2.3 million LLINs have already been purchased, including 605,000 LLINs provided to the Malaria Consortium by JICA, 450,000 procured by PSI using FY07 PMI funding, and 1.29 million purchased with Global Fund support.

Estimation of LLIN requirements for the remainder of 2007 and 2008 for areas not covered by IRS⁺

2007 ITNs/LLINs	Total Population Unsprayed Population	Population Less than Five	Less than Fives plus 20%*	All Pregnant Women Including Sprayed Areas	Total Vulnerable Groups	LLIN Needs 2007	LLIN Needs 2008	Total LLIN Needs 2007/8	Needs Met 2007	GAP 2007	GAP 2007/8
Niassa	713,069	133,102	159,722	47,497	207,219	207,219	48,922	256,140	97,757	109,462	158,383
Cabo Delgado	1,402,142	232,208	278,650	75,766	354,416	354,416	78,039	432,454	160,000	194,416	272,454
Nampula	2,540,944	453,397	544,076	173,761	717,837	717,837	178,973	896,810	131,850	585,987	764,960
Zambézia	2,006,323	336,268	403,521	174,608	578,129	578,129	179,847	757,976	200,000	378,129	557,976
Tete	1,072,850	200,512	240,614	71,697	312,311	312,311	73,848	386,158	113,000	199,311	273,158
Manica	679,857	130,485	156,582	63,019	219,601	63,019	64,909	127,928	27,000	36,019	100,928
Sofala	823,703	154,541	185,449	77,200	262,649	77,200	79,516	156,716	0	77,200	156,716
Inhambane	1,087,117	184,255	221,106	64,993	286,098	286,098	66,942	353,041	164,993	121,105	188,048
Gaza	96,756	16,739	20,086	61,298	81,384	81,384	63,137	144,521	30,000	51,384	114,521
Maputo	0	0	0	49,448	49,448	0	50,932	50,932	0	0	50,932
Maputo Cidade	0	0	0	57,221	57,221	0	58,937	58,937	0	0	58,937
TOTALS	10,422,761	1,841,505	2,209,806	916,506	3,126,312	2,677,613	944,001	3,621,613	924,600	1,753,013	2,697,013
PSI - Zambézia						578,129	179,847	757,976	200,000	378,129	557,976
UNICEF - Tete, Niassa, Gaza						600,913	185,906	786,819	240,757	360,156	546,062
Malaria Consortium - Cabo Delgado, Nampula, Inhambane						1,358,351	323,955	1,682,306	456,843	901,508	1,225,463
Manica/Sofala						140,219	144,425	284,644	27,000	113,219	257,644

⁺ Courtesy of UNICEF Mozambique

*Assumes population growth

Proposed USG Component: (\$6,725,000)

Based on calculations carried out by UNICEF, in consultation with all key partners, a gap of about 1.3m LLINs is projected for 2008. PMI is proposing a contribution of one million LLINs to be delivered free-of-charge to pregnant women, children less than five years of age and persons living with HIV/AIDS through ANC and district and provincial level campaigns.

- **LLIN procurement.** Procurement of one million LLINs, largely for distribution to Nampula, Zambézia, Manica, Sofala, Niassa and Tete Provinces. Cost per LLIN delivered is \$6.50 per unit. (\$6,500,000)
- **LLIN distribution through ANCs and child health and immunization days.** Provide support to NGOs and provincial and district health teams for management, logistic, and promotional activities related to the LLIN delivery to ANCs and for provincial and district-level campaigns. (\$225,000)

Indoor Residual Spraying

Current Status, Challenges, and Needs

Indoor residual spraying is a priority vector control intervention for MISAU in Mozambique and in the southern African region as a whole. Several neighboring countries, including the Republic of South Africa, Zimbabwe and Zambia, have large-scale IRS programs using DDT. Indoor residual spraying is considered by the NMCP to be most appropriate in areas of higher population density, such as urban and peri-urban areas and areas of economic importance, which are estimated to include approximately 25%-30% of the Mozambican population. There is also interest on the part of the NMCP to extend spraying to more rural areas and to scale up coverage to 40% of the country's population in 2007 and to 45% by 2008.

Three major IRS efforts are currently underway in Mozambique:

1. The MoH has been supporting IRS in peri-urban and urban areas for several years (spraying commenced during the 1960's eradication era), although this program has been under-resourced;
2. LSDI has been supporting large-scale IRS in Maputo Province since 2000. This program expanded into Gaza province in 2006, beginning in three districts with plans to expand province-wide; and
3. Based on the success of the LSDI program, the MoH has piloted IRS in six rural districts of Zambézia Province in 2005-06 to assess the feasibility and impact of IRS in a more highly-endemic rural area.

locally and given a 10-day training course. Many district-level staff are also involved in the spraying effort. Household level coverage has been maintained at greater than 90%.

A significant reduction in malaria parasitemia prevalence has been recorded in children aged 2-15 years old from greater than 60% prevalence to less than 4% prevalence in the south of the province, and from 69% to 33% prevalence in the north of the province, where IRS was only introduced in 2004. The financial costs per person, per year in rural and peri-urban areas were \$3.86 and \$2.41, respectively. These costs were estimated to fall to \$2.94 and \$1.46 if DDT is used for one spray round each year. An updated cost analysis is ongoing.

The LSDI program in Maputo Province, received \$21.4 million in the Global Fund Round 2 in 2002, and this funding will continue for an additional two years. Using resources from a successful Global Fund Round 5 proposal (\$21.2 million), which only includes Mozambique, IRS will be expanded to three districts (Chókwè, Guijá and Massingir) in Gaza Province in 2007. Further expansion in subsequent years is expected to cover a population of approximately one million by 2009 throughout the province. DDT will be used with one spray round per year in rural areas, and carbamates in two rounds per year in urban areas.

Zambézia Province IRS activities: Following the success of IRS and ACTs in Maputo Province, MISAU has been conducting IRS with DDT in the more highly endemic Zambézia Province in a total of six districts (470,000 households) over the past two spraying cycles, 2005-06 and 2006-07, using resources from the PROSAÚDE Common Fund. The Medical Research Council of South Africa, who are partners on the Research Triangle Institute IQC, is supporting insecticide resistance testing and entomological monitoring for this program, but due to limited funds, this not been conducted consistently. The Zambézia IRS program was initiated in 2005 in the provincial capital of Quelimane and in some villages within the districts of Nicoadala and Namacurra and expanded to the districts of Mocuba, Milange and Morrumbala in 2006. Lack of availability of funds and insecticide delayed the start up of the spraying in 2006. In addition, supervision and support from the Provincial Health Department has been limited.

Public acceptance of IRS: Indoor residual spraying is generally very well accepted in Mozambique, but some complaints have been voiced. These include the belief that spray personnel are diluting the insecticide (to allow them to profit from the sale of any left over insecticide), a failure to adhere to preset schedules in a given village causing inconvenience to the residents, and an increase in the number of houses locked when spray teams arrive. These problems are apparently more common in urban and peri-urban areas and there is a somewhat higher rate of refusals with DDT, but the well-run LSDI spraying program has been able to keep refusals below 5-10% over the course of 11 rounds of spraying.

Progress to date: The map on the previous page indicates locations where IRS activities were carried out in 2006-2007. MISAU invested significantly more resources in IRS this past year. A total of 136 tons of DDT, 60 tons of ICON, and 13 tons of bendiocarb were procured and distributed in 2006, along with 1,275 spray pumps. Procurement of insecticide and spraying supplies and equipment is done by MISAU's Central de Medicamentos e Artigos Médicos (CMAM). In addition, using FY06 malaria funds, USAID procured 6650 spray pumps, 55 maintenance kits, and 1300 personal protective equipment (PPE) units.

With Global Fund support, Mozambique recently purchased and has received delivery of 900 tons of DDT, which is enough insecticide to cover at least two years of spraying for all targeted areas within the country. No additional DDT will be needed until 2009, at the earliest.

USAID's Vector Control Task Order, managed by RTI, has conducted environmental and logistical assessments of the three districts in Zambézia where spraying will commence in 2007. In September 2007, the start of spraying season in Mozambique, training of spray teams was begun with a plan to train about 285 spray personnel. Spray operations are being initiated at the time of this report and are planned to cover a total population of 795,000 persons.

Inputs required to implement IRS in Zambézia Province, 2008

District	Quelimane	Namacurra	Nicoadala	Morrumbala	Mocuba	Milange	Maganja C.	Mopeia	Total DPS- 8 districts	Total PMI- 6 districts
Year start PMI support	FY07	FY07	FY07	FY08	FY08	FY08	TBD	TBD		
Spray Operators	83	65	80	91	88	123	80	25	629	531
Team leaders	21	16	20	23	22	31	20	6	157	133
Total personnel	104	81	100	114	110	154	101	31	786	663
Spray pumps	42	33	40	45	44	61	80	25	370	265
Spare kits	8	7	8	9	9	12	16	5	74	53
Gloves	209	163	200	227	221	307	201	63	1,572	1,326
Boots	104	81	100	114	110	154	101	31	786	663
Hats	104	81	100	114	110	154	101	31	786	663
Masks	9,385	7,313	9,000	10,218	9,941	13,834	9,054	2,822	70,745	59,690
Soap	1,356	1,056	1,300	1,476	1,436	1,998	1,308	408	10,219	8,622
Buckets	3	0	0	2	2	55	80	25	168	62
Vans	1	1	1	1	1	1	2	2	10	6
Motorcycles	0	0	0	0	0	0	1	1	2	0
Bicycles	0	0	0	3	2	69	101	31	206	74
Population '000	300	221	274	327	318	447	290	90	2,263	1,884
Houses	75,078	55,482	68,453	81,742	79,530	110,672	72,431	22,573	565,960	470,956
DDT (kg)	28,483	21,048	25,969	31,011	30,172	41,986	27,479	8,564	214,711	178,669
Pyrethroids (kg)	369	273	336	402	391	544	356	111	2,782	2,315

IRS planning and inputs: Eight districts in Zambézia Province, with a population of 2.26 million, have been designated for IRS by the NMCP. The NMCP has requested PMI’s assistance in covering six of these districts. In FY07, PMI is fully supporting spray operations in three districts— Quelimane, Namacurra, and Nicuadala— and providing limited support to three others— Murrubala, Mocuba and Milange. In FY08, PMI will fully support IRS in all six districts. In the table on the previous page, the column “Total DPS” (Departamento Provincial da Saude) includes the total for all eight districts. The column “Total PMI” represents the total for the 6 districts expected to be covered by PMI in FY08.

During FY07 and FY08, PMI will focus on consolidating IRS in areas where it is currently targeted by improving coverage, quality, and timeliness of spraying. The DDT spraying program will cover an estimated population of 1.88 million once full coverage is achieved in all six districts supported by USAID.

Larval control: MISAU has expressed strong interest in larval control. However, much uncertainty exists regarding the costs and effectiveness of this intervention relative to IRS and ITNs. Limited larval control activities have been undertaken by the municipalities of Maputo City, Xai-Xai Town, and Inhambane Town. PMI Year 1 financing has been allocated to assess the cost-effectiveness of larval control. This assessment, which will be carried out once spray operations are well underway, will help to clarify the appropriate niche for larval control activities for malaria control in Mozambique.

Proposed USG Component: (\$3,135,500)

Proposed PMI FY08 activities related to IRS include:

- **Support training, operations and supervision of IRS activities in 6 districts of Zambézia province.** This will include hiring and training nearly 700 spray personnel, who will spray approximately 471,000 houses (1.88 million persons) over a three-month period. (\$2,460,000)
- **Purchase equipment and supplies for the IRS operations in these 6 districts.** Enough DDT and spray pumps are currently available in Mozambique to cover IRS needs through 2008. However, there is still a need to purchase approximately 2,400 kg. of pyrethroids (for areas where DDT is not indicated), spare parts, and PPEs for the spray operators in the six targeted districts. (\$463,000)
- **Strengthen entomological capacity.** In FY08, PMI will continue to strengthen entomological capacity at the NMCP and provincial levels, with further support for training and vector control operations throughout Mozambique. (\$200,000)
- **TDY from CDC-Atlanta.** CDC scientist to provide technical support to entomologic monitoring activities. (\$12,500)

Malaria in Pregnancy

Current Status, Challenges, and Needs

ANC attendance in Mozambique is relatively high, with 84% of pregnant women attending at least once during their pregnancy and 81% making two or more visits (DHS 2003). These visits, though, tend to take place late in pregnancy. ANC attendance rates are lower in rural than in urban areas. There is anecdotal evidence that free distribution of ITNs has increased ANC attendance rates.

Since May 2004, the MISAU has promoted the use of IPTp for all pregnant women. At least three monthly doses of SP after quickening are recommended because of high HIV prevalence rates. While the use of IPTp is a national policy in Mozambique, the roll-out of this intervention has been limited to Manica and Sofala provinces where the intervention was pilot tested. IPTp is reportedly available in almost all health facilities throughout Mozambique, initially starting at facilities in the provincial and district capitals and now expanding out to all 1,000 health facilities nationwide that provide ANC services. It remains unclear, though, to what extent IPTp has expanded at all beyond Manica and Sofala, and even to what extent it continues in Manica and Sofala after the end of the pilot intervention.

The NMCP and Reproductive Health Unit staffs have collaborated in developing and implementing the policy, while the reproductive health officials have provided training on IPTp to the Provincial Coordinators for Malaria, HIV/AIDS, and Tuberculosis, staff from NGO implementing partners, and MISAU maternal and child health nurses who provide ANC services that include prevention of mother to child transmission (PMTCT) as well as IPTp.

The table below gives the target for IPTp established by the NMCP in their Strategic Plan for Malaria Control. Unlike the RBM Monitoring and Evaluation Reference Group (MERG) indicator for IPTp, this target includes pregnant women receiving at least one dose of SP (as opposed to at least two doses) and only applies to women attending health facilities:

Targets for intermittent preventive treatment for pregnant women (IPTp) attending ANC

INDICATOR	Baseline 2001	2006	2007	2008	2009
Proportion of pregnant women receiving at least one dose of IPTp (among those who attend ANC)	0%	50%	60%	70%	≥85%

Assuming that pregnant women make up about 5% of the population, we can estimate that approximately 900,000 women will become pregnant in Mozambique each year. Using this figure, a total of 2.7 million treatments will be required if each woman is to receive three doses of IPTp. The NMCP reports that there are sufficient quantities of SP in the planned kit procurements to meet all needs through 2008.

There remains an ongoing need for training of staff in those health facilities that have yet to implement IPTp and of new staff, and refresher training and supervision of all ANC staff. In addition, there is still a largely unmet need for communications and behavior change activities encouraging pregnant women to seek early antenatal care and take all doses of IPTp.

Although intravenous quinine is listed in the national therapeutic guidelines as the recommended treatment for malaria in pregnant women and no mention of ACTs is made, the NMCP has stated that oral quinine would be used in patients who can ingest tablets without vomiting and ACTs will be recommended in women in the second and third trimesters of pregnancy, in line with WHO guidelines.

In Mozambique, many pregnant women are also HIV-positive and are learning their serologic status when they present for ANC services. Seropositive women are referred to HIV Day Hospitals for CD4 testing and enrollment in antiretroviral therapy as appropriate. Many of the PEPFAR PMTCT partners have begun to introduce cotrimoxazole prophylaxis for HIV-infected women, precluding the use of SP for IPTp for these women. To date, though, comprehensive guidelines to address malaria prevention in seropositive pregnant women have not been developed. CDC and USAID staff are working with the MISAU Reproductive Health Section officials to develop appropriate ANC protocols and guidelines, while PEPFAR and PMI implementing partners will assist in developing the training materials and the training and supervision of ANC providers to make sure that these two important interventions are delivered in a coordinated and complimentary manner.

The quantity of quinine tablets needed to treat malaria in pregnant women in 2007 was calculated assuming 900,000 projected pregnancies, two malaria episodes per woman, 50% health facility utilization rate, and 42 tablets per full treatment. The accuracy of this estimate is questionable. Two clinical episodes of malaria during pregnancy is almost surely an overestimate, but facility utilization rate may actually be higher given the high percentage of women reportedly attending ANC. Another consideration is that pregnant women will probably receive at least part of their treatment with intravenous quinine, given the specifications for doing so in the current treatment guidelines. The use of tablets to treat malaria in pregnant women will depend on how thoroughly the changed recommendations are disseminated.

Progress to date: ANC continues to be a primary route for distribution of LLINs to pregnant women (refer to ITN section for more details). Sufficient SP has been purchased by MISAU to cover IPTp needs through 2008. MISAU and individual DPS continue to roll-out training of ANC staff, but have not kept records of the numbers of staff trained. PMI and PEPFAR staff have been working to harmonize service delivery at ANC and PMTCT clinics. With the awarding of the TASC3 task order, an accelerated plan of training and supervision will be implemented in the next quarter.

Proposed USG Component (\$400,000):

As the MISAU expands IPTp to more peripheral health facilities, support will be needed for training, re-training, and supervision of ANC staff. In addition, training and communications materials will need to be reviewed to make sure that it reflects current policies, particularly related to IPTp, prevention of malaria in HIV-infected pregnant women, and treatment of clinical malaria during pregnancy. The government of Mozambique has already procured sufficient doses of SP to cover the needs for 2008. Distribution of ITNs to pregnant women through ANCs will continue to be an important intervention for providing protection from malaria to pregnant women and their newborn children. The following activities are planned for 2008.

- **LLIN distribution through ANCs.** Procure LLINs and support their free distribution through ANCs. (covered in ITN section – page 17)
- **Support training and supervision of health care workers in the prevention of malaria in pregnancy.** This will cover the correct use of ITNs and IPTp, and the diagnosis and management of clinical malaria during pregnancy. (\$400,000)
- **Integrate malaria prevention during pregnancy with HIV services.** Delivery of ANC services will be integrated with PMTCT by linking Reproductive Health staff at MISAU with PEPFAR and PMI partners who will coordinate policy development, planning, and implementation. This will be performed mainly through the partnership with JHPIEGO, with funding from PEPFAR, which will support the assessment of the availability and use of HIV and Malaria services at ANC and PMTCT sites. Based on the findings from this assessment, JHPIEGO will perform a revision of existing national ANC and PMTCT guidelines, training and supervision. These guidelines focus on refining protocols to ensure that pregnant women with HIV receive the full package of ANC services regardless of whether they present at ANC or for PMTCT services. (no additional resources needed)
- **Promote ANC attendance and LLIN and IPTp use.** Support the updating of communications materials and the implementation of a communications and behavior change strategy to raise awareness of the risk of malaria during pregnancy, and promote attendance at ANCs, the use of ITNs, and adherence with IPTp. (covered in Communications and Behavior Change section– page 33)

Intermittent Preventive Treatment of Infants (IPTi)

Current Status, Challenges, and Needs

Mozambique was one of the first countries in Africa to evaluate the effectiveness of IPTi. The study, conducted by the Mahniça Health Research Center, demonstrated that during the first year of life, intermittent treatment with SP reduced the incidence of clinical malaria by 22% and hospital admissions by 19%. Similar results have been demonstrated in Tanzania, Ghana, and The Gambia. It is expected that WHO will recommend that all infants be given IPTi during immunization visits.

As Mozambique was one of the first countries to test out this new approach, it is well positioned to be one of the first-mover countries to implement this new policy. Mozambique also has high coverage of routine immunization services. Data from UNICEF demonstrate DPT3 coverage of 72% and Measles vaccine coverage of 77%. In anticipation of this impending change in guidance, additional information will be required by MISAU to facilitate the necessary policy discussions. Toward this end, a pilot assessment will be carried out that will examine IPTi in a different geographic and epidemiologic location from the earlier study in Mahniça. This assessment will focus on collecting information on cost, logistical and training requirements, acceptability, adverse events, and other factors needed to inform future policy dialogue

Proposed USG Component (\$150,000):

Funds have been allocated to support a small pilot assessment of financial and logistics requirements for full-scale implementation, and for consultation and policy development activities involving key stakeholders— including child health, malaria control, immunization, and others— anticipating imminent guidance from WHO. (\$150,000)

INTERVENTIONS – CASE MANAGEMENT**Malaria diagnosis**Current Status, Challenges, and Needs

Malaria diagnosis in most MISAU facilities is based on clinical grounds. Only about 20% of all malaria diagnoses in Mozambique are based on microscopic examination and the quality of those diagnoses is unknown. The Instituto Nacional de Ciências da Saúde (INS) is responsible for the training and supervision of malaria microscopists and quality control of malaria microscopy. Senior laboratory technicians from the INS and the NMCP make periodic supervisory visits to provincial laboratories for refresher training and quality control of microscopy but the quality and consistency of these are not known.

The most recent refresher training conducted, in February 2007, included two microscopists from each province. These laboratory technicians were trained in malaria diagnosis, including microscopy and RDTs although the curriculum was not complete. The Secção de Laboratórios of MISAU is responsible for evaluating laboratory equipment and reagent needs and for the training of staff in the use of new equipment. A plan for laboratory diagnosis, including specific tests for each age group and epidemiologic profile, is currently under development.

Although not stated as such in the 2006-2009 Strategic Plan for Malaria Control, there is a dispatch from the Minister of Health stating that children less than 5 years of age in highly endemic areas with symptoms suggestive of malaria will be treated presumptively, while older children and adults should have a diagnostic test (which is consistent with WHO recommendations). In areas with low prevalence of malaria, primarily the area currently covered by LSDI, all children and adults undergo malaria diagnostic testing before treatment.

Progress to date: Despite the absence of a more comprehensive policy on laboratory diagnosis, the NMCP introduced RDTs in public health facilities in 2007 and has plans to strengthen microscopic diagnosis where it already exists. The goal is to have RDTs in emergency departments at hospitals where demand for parasitological diagnosis exceeds the capacity of the laboratory and in health facilities during hours when a microscopist is not available. An RDT produced by Amrad-ICT, which identifies *P. falciparum* infections based on detection of the histidine rich protein-2 (HRP-2), was introduced at health facilities in Maputo Province as part of the LSDI Project in 2003. According to the 2006 Strategic Plan for Malaria Control, the use of RDTs was extended to all provinces in 2007.

In FY07, PMI supported the NMCP to develop a written strategy for malaria diagnosis, including the use of microscopy and RDTs. In addition, PMI is purchasing approximately 80 microscopes and microscopy supplies to be distributed to health facilities as an effort to improve malaria diagnosis countrywide. Finally, PMI is refurbishing and re-equipping the national malaria laboratory. PMI did not purchase RDTs in 2007 as it awaited the completion of the strategy and sufficient funds were available through other sources.

FY08 Planning: According to a draft Gap Analysis conducted in February 2007 by a World Bank-financed consultant, a total of \$4.5 million from different partners has been available for the purchase of RDTs in 2008. Assuming that each test costs around \$0.60, this amount would be enough to purchase 7.5 million tests (delivery costs not included). Information is not available on the need for microscopes or microscopy supplies, or for the cost of training and supervision to ensure that microscopy and RDTs will be correctly used.

In March 2007, the Presidents of USA and Brazil agreed to collaborate on an initiative to support and strengthen malaria control efforts in lusophone countries in Africa. This collaboration is already underway in São Tome e Principe. In Mozambique, PMI intends to extend this collaboration by mobilizing technical support from Brazil to strengthen the capacity of diagnostic testing and develop an effective system for quality control of laboratory testing for malaria.

As a result of a meeting held during a visit from the U.S. Secretary of Health, Michael Leavitt in August 2007 with the Minister of Health Dr. Ivo Garrido, a regional training center for lusophone health professionals was proposed. MISAU strongly supports such a center. The proposal, between the two USG funded projects PEPFAR and PMI, is to improve an existing training center, the Centro Regional de Desenvolvimento Sanitario (CRDS), to perform short term training for mid- to high-level health care workers in specific areas. This would include topics such as training for laboratory technicians on microscopy (refresher courses for malaria and/or tuberculosis) or for medical technicians on rapid diagnostic tests (HIV, syphilis, malaria). Training for repair of medical equipment, such as microscopes, X-ray machines, etc. were suggested to be included in the curriculum. Upgrading the Center with equipment, including microscopes, would be necessary.

Proposed USG Component: (\$777,500)

As Mozambique implements a malaria treatment policy using AL as first-line treatment, which will be more costly than previous first-line treatments, diagnostic testing will become an increasingly important tool to reduce the unnecessary use of these drugs that occurs when patients are presumptively treated for malaria. PMI views strengthening capacity for diagnostic testing as a key component of good case management and will support the new policy on diagnostic testing currently under development. The roll-out of this strategy should be accompanied by appropriate supervision and quality control. Whenever possible, these activities will be integrated with similar efforts by PEPFAR partners and other disease control programs. Some of these resources will be directed towards supporting CRDS, however these funds will be specifically used to support training of Mozambicans.

Proposed activities during Year 2 are as follows:

- **Procure additional microscopes, microscopy supplies, and RDTs.** This includes 20 binocular microscopes (some of which will be allocated to CDRS), 100 microscopy kits (slides, lancets, reagents, etc. for 10,000 tests each), and approximately 250,000 RDTs. (\$325,000)
- **Support training and supervision of laboratory diagnosis.** Work with the NMCP and the INS to increase the quality and quantity of pre-service and in-service training and supervisory visits for laboratory technicians and other health staff who are using microscopy and/or RDTs. Whenever possible, this activity should be coordinated with activities to improve laboratory diagnosis of other diseases, e.g., HIV/AIDS and tuberculosis. (\$240,000)
- **Technical assistance from Brazil to strengthen malaria diagnostic capacity.** This support will help mobilize technical expertise from Brazil to assist with strengthening of laboratory diagnosis of malaria and the development and maintenance of a system of quality control of malaria microscopy with the support of INS. Support for travel and training expenses will be covered. Some activities may be implemented in conjunction with CDRS. (\$200,000)
- **TDY from CDC-Atlanta.** CDC scientist to provide technical support to laboratory strengthening activities. (\$12,500)

Pharmaceutical Management and Treatment

Current Status, Challenges, and Needs

Antimalarial treatment: In the last five years, Mozambique has undergone three changes in national malaria treatment policy. In 2002, AQ-SP was introduced as an interim first-line treatment until ACTs could be adopted. In late 2004, the policy was changed to AS-SP, with AL as the second-line therapy.

In 2007, AL was chosen as the first-line treatment, and AQ-AS as second-line (primarily intended for use in the 2nd or 3rd trimester of pregnancy and in those with hypersensitivity to AL). This change was motivated by concerns regarding the efficacy of SP, which when used alone proved to have a clinical efficacy of only 83% in 2000. Quinine is the third-line drug and is also recommended for the treatment of severe malaria. New MISAU treatment guidelines for malaria were recently released and distributed to all provinces. The NMCP has stated that artesunate rectal suppositories can be used for the emergency treatment of severe malaria in settings in which intramuscular or intravenous quinine cannot be administered. The treatment guidelines also state that quinine should be used in pregnant women during the first trimester and AQ-AS in second and third trimesters. This new policy is expected to roll out in July 2007 with a training-of-trainers workshop in Maputo, with full roll-out of the policy to begin in April 2008.

All antimalarial treatment in MISAU facilities is free of charge, although patients do have to pay a minimal fee for being seen in a health facility (approximately US \$0.05) and a similar fee for their prescription. MISAU lacks a clear policy on user fees, which often vary from one facility to another.

Although not stated as such in the 2006 Strategic Plan for Malaria Control, the Minister of Health, in accordance with WHO recommendations, agreed that children less than 5 years of age with symptoms suggestive of malaria will be treated presumptively, while older children and adults should undergo diagnostic testing before treatment. In areas with low prevalence of malaria, mainly Maputo and areas south, all children and adults should undergo diagnostic testing before treatment. To date, the needs in supplies and staffing that would be required to implement this policy have not been determined. The treatment regimens recommended by the NMCP are as follows:

Uncomplicated malaria:

First-line treatment: AL (co-formulated, each tablet contains 20 mg of artemether and 120 mg of lumefantrine). Dosing schedule (six doses over three days):

Weight	Age	Number of tablets/dose	Total number of tablets
<5 kg	<6 months	Not recommended	
5-14 kg	<3 years old	1	6
15-24 kg	3-8 years old	2	12
25-34 kg	9-14 years old	3	18
>34 kg	> 14 years old	4	24

Second-line treatment: AQ-AS (co-blistered, each blister contains tablets with 67.5 mg and 25 mg (infants), 135 mg and 50mg (children), and 270 mg and 100 mg (adults) of amodiaquine and artesunate, respectively. Dosing schedule (one daily dose over three days):

Weight	Age	Tablet dosage (AQ-AS)	Number of tablets per day (3 days)
<4.5 kg	<6 months old	Not recommended	
4.5-9 kg	6-11 months	135/ 50 mg	½
9-18 kg	1-5 years old	135/ 50 mg	1
18-36 kg	6-13 years old	270/100 mg	1
>36 kg	>13 years old	270/100 mg	2

(PMI is skeptical of the need for a second-line treatment, as those patients could be treated with quinine.)

Third-line treatment:

Quinine: 30mg/kg/day x 7 days (adult dose: 1800 mg/day).

Severe malaria:

Quinine: 20 mg/kg (loading dose) IV followed by 10 mg/kg every 8 hours; changed to oral quinine as soon as patient can take oral medicines, for a total of seven days.

Malaria in pregnant women:

First trimester: Quinine: 10 mg/kg IV per dose every 8 hours (always start IV treatment regardless of case severity; no loading dose), change to oral dosing, for a total of seven days.

Second and third trimesters: AQ-AS as prescribed above.

Structure of the pharmaceutical management system: CMAM has primary responsibility within MISAU for supplying the national public health system with medicines and medical supplies, including all malaria-related drugs and supplies other than ITNs. CMAM is responsible for forecasting needs and for supervising the procurement, storage and distribution of medicines and supplies. The latter activities have been contracted-out to MediMoc, a parastatal agency. MediMoc has been responsible for managing the tender process, customs clearance, central warehouse storage and delivery to provincial warehouses. CMAM oversees all of these activities, maintains full authority over decision-making, and provides MediMoc with direct instructions. After 2007, MISAU intends to have CMAM carry out procurement and warehousing functions itself and to outsource importation, custom clearance and in-country transportation to local companies. The NMCP coordinates with CMAM on the purchase, and distribution of antimalarial drugs and supplies. During the last few years, USAID's DELIVER Project has played an essential supportive role in strengthening capacity of CMAM on all aspects of their work.

There are two systems for delivery of medicines. Most commonly used medicines are supplied to health facilities and APEs through a kit system. There are three types of kits— Kit A for health centers, Kit B for health posts, and Kit C for APEs. Kits are prepared by the supplier and delivered into the four ports (Maputo, Beira, Quelimane, and Nacala). They then are delivered to provincial authorities, thereby bypassing the central medical stores, and delivered to the districts, for onward distribution. These kits are fully financed using pooled MISAU/donor resources.

Drugs and supplies that are not contained in the kits go through what is known as the *Via Classica*. These commodities are delivered to one of the two central warehouses in Maputo City and Beira City, managed by CMAM and MediMoc. They, in turn, supply the three central hospitals and ten provincial warehouses. The provincial warehouses are then responsible for distributing medicines and supplies to district warehouses, rural hospitals, general hospitals and provincial hospitals, which distribute them to their dependent health units, including district hospitals, health centers and health posts. Storage facilities for medicines at the provincial and municipal levels are often inadequate.

In the past, first-line antimalarial drugs have been supplied via the kit system, while second- and third-line through the *Via Classica*. The adoption of AL as first-line treatment poses a new challenge for Mozambique, as the bulkiness of the blister packs make it impossible for sufficient quantities of this drug to be included in the kits. A third system is now being developed that will be a blend of the two systems. AL blister packs will be imported in the same manner as the kits, through the four main ports, and delivered to provincial warehouses. AL will then be delivered down the supply chain through the *Via Classica*.

Quantification of antimalarials: Although the NMCP uses the morbidity method to estimate antimalarial needs due to a lack of consumption data at the facility and district levels, there is an interest in collecting data and working towards a consumption-based estimation of needs in the next few years. Based on calculations of an external consultant, estimates for first- and second-line treatments in 2008 are based on an expected total of 8,865,021 episodes of malaria to be treated in the public health system. This figure was reached after agreement with NMCP, WHO, PMI and based on malaria prevalence, number of episodes per age group (ranging from one to three), accessibility to health services, and expected impact of IRS and ITNs.

The estimated quantity of AQ-AS (the second-line treatment which will be delivered through the *Via Classica*) needed for second-line treatment in 2008 was calculated presuming that 5% of the total number of expected cases treated in the public health system would require second-line treatment; a total of 427,462 treatments. The PMI team feels this estimate is too high considering the expected good clinical response to and acceptability of AL. According to the forecast, the estimated need of quinine ampoules and tablets for treatment of severe malaria, which is also delivered via the *Via Classica*, was calculated as 344,622 treatments or approximately 4% of the first-line treatments. Artesunate rectal suppositories are to be included in Kits B and C, six and five units, respectively.

Estimated antimalarial drug needs and costs

Drug	2008 estimated need (treatments)	2008 cost (US\$)
AL		
6 tablets per blister	1,583,216	1,424,894.40
12 tablets per blister	2,718,375	3,805,725.00
18 tablets per blister	1,170,564	2,224,071.60
24 tablets per blister	3,392,866	8,142,878.40
AS-AQ (loose tablets)		
3+3 tablet (50mg/153mg)	160,712	718,382.87
6+6 tablet (50mg/153mg)	84,285	753,503.92
12+12 tablet (50mg/153mg)	182,465	3,262,472.38
Quinine		
Ampoules	413,547	157,189.18
Tablets	275,698	159,794.51
SP (IPTp)	839,463	33,242.73

According to a World Bank sponsored malaria gap analysis update in February 2007, \$10.7 million is needed to cover antimalarial drug costs, which the analysis expected to be fully covered with donor support, including PMI. The gap analysis update, though, was done before the change in first-line antimalarial treatment and does not take into account the costs associated with this change. A more recent forecast conducted by the PMI consultant estimated the first year drug cost of the change in policy to be around \$20.5 million.

Procurement: CMAM's procurement procedures appear to be compliant with international standards, enforced, and well-established. Medimoc is responsible for procuring the antimalarials used in the public health system. The importation process in Mozambique can be long and complicated, particularly for non-government procurements. The Supply Change Management System Program of PEPFAR has developed step-by-step instructions to facilitate this process and prevent unnecessary delays. Following these steps will help expedite the importation process for PMI.

Two mechanisms are used to ensure the quality of medicines and supplies: (1) bid documents must include an origin certificate issued by laboratories that are certified by accredited bodies acceptable to MISAU and comply with WHO certification scheme of pharmaceuticals; and (2) samples are required to be sent for testing by the National Pharmaceutical Quality Control Laboratory prior to

the award of a contract. Furthermore, goods must have at least 75% of their shelf-life remaining at the time of arrival in the country to be accepted.

Distribution: Kits are delivered directly to provinces by the supplier semi-annually and are then distributed on a monthly basis to the district warehouse, from which they are then sent out to the health centers (Kit A), health posts (Kit B) and APEs (Kit C) on a monthly basis. Hospitals do not receive medicine kits. The number of kits distributed to a facility each month is based on the facility's reported number of consultations in the previous month (push system).

	Type of facility	Provider type	No. of consultations	No. of drugs in kit	Antimalarials in 2008 kits
Kit A	Health center	Physician	1,000	60	No antimalarial
Kit B	Health post	Nurse	500	40	Artesunate suppositories, 6
Kit C	APE	APE	250	25	Artesunate suppositories, 5

The *Via Classica*, the system for distributing all other medicines (including antimalarials), is a pull system. Warehouses and hospitals at the central, provincial, and district levels submit requisitions to the distribution point above them on a quarterly basis. Previous health facility assessments have demonstrated that stock-outs of antimalarials delivered through the *Via Classica* are common.

As the first-line malaria treatment will no longer be delivered in the kits, an alternative stock management system has to be developed. With the support of the USAID DELIVER Project through PMI, a "two-bin" system will be piloted to determine if it is feasible to implement nationwide. APEs and health post staff will receive two bins of AL. They will use medicines from one bin until the supply is exhausted, at which time he/she will request a refill. The second bin will then be used while awaiting the refill. The size of each bin will be based on forecasts of expected use, with the goal that the second bin medicines are not exhausted before the refill is received. In that way, the APE should never be stocked out of first line treatment. AQ-AS and quinine will continue to be distributed to health posts and health centers using the *Via Classica* as described above.

CMAM, in collaboration with USAID's DELIVER Project and the Supply Chain Management Service, with funding from USAID, is in the process of implementing a computerized integrated drug management system (SIGM) to improve the distribution and overall management of stock. SIGM is currently implemented in Maputo province and is expected to be rolled-out to other provinces by the end of 2008. Although SIGM will not yet be implemented at the district level due to lack of necessary infrastructure to support it (e.g., electricity, internet access), district- and facility-level data will be entered into the system at the provincial level. The data available through SIGM will also generate more reliable consumption data, which will allow better forecasting of future need.

Pharmacovigilance: The pharmacovigilance system in Mozambique was implemented by the Center for Drug Information, based at the Universidad Eduardo Mondlane, in collaboration with disease control programs, including malaria, to monitor the safety of all drugs, particularly those that have been newly introduced. Current pharmacovigilance activities for malaria are limited due

primarily to lack of resources. With the introduction of AL as first-line treatment in mid-2008, it will be necessary to monitor adverse reactions closely.

Non-governmental organizations and the private sector: It appears that NGOs are not currently involved in providing treatment with ACTs, although many do work with APEs. Use of the formal private sector for malaria treatment in Mozambique is low and concentrated primarily in urban areas, where private health facilities and pharmacies operate. The number of informal drug sellers is not well known, although they are thought to be uncommon. Private pharmacies are regulated by the Pharmacy Department and must be registered with the MISAU in order to operate. Legally, pharmacies are not allowed to dispense antimalarials or other regulated classes of drugs without a prescription. PSI conducted a survey in private pharmacies in Maputo City, which looked at the availability of antimalarials and prescribers' reported treatment practices for malaria. A report on this survey is expected for the second part of 2007.

Antimalarial drug efficacy: Between 1998 and 2001, a series of 28-day *in vivo* drug efficacy studies of chloroquine, AQ, and SP monotherapies were conducted in Manhiça, using the WHO standardized protocol. Researchers reported clinical and parasitological failure rates of 80% for chloroquine, 26% for AQ, and 21% for SP. Studies from 2003 at two sites in the LSDI Project area showed failure rates of 9% and 12% with SP monotherapy and 2% and 4% with AS-SP.

Progress to date: PMI country staff have assisted the NMCP in developing a detailed implementation plan for the roll out of AL. USAID DELIVER has carried out a detailed quantification of the drug requirements by province for the full implementation of the new drug policy. DELIVER consultants have developed training materials for the two-bin system and are currently piloting its use. Training materials and tools for health workers at various levels also are under development. AL has been ordered from Novartis (\$3 million in FY07 PMI funds).

Proposed USG Component: (\$5,247,000)

Ensuring prompt, effective, and safe ACT treatment to 85% of patients with confirmed or suspected malaria in Mozambique represents a major challenge for the NMCP, given the country's weak pharmaceutical management system, the introduction of laboratory diagnosis, the change in national treatment policy, the short shelf-life of ACTs, and the need for behavioral change among patients and health workers. Since increasing ACT coverage rates is a high priority for both PMI and the NMCP in their National Malaria Strategic Plan for 2006-2009, PMI will coordinate its activities with those of the NMCP and other partners.

Beyond the challenges of ensuring a consistent supply of antimalarial drugs to health facilities and community workers, a number of steps will be needed if the MISAU's plan to change first-line treatment to AL is to be successfully implemented, including: a review of existing guidelines and training and communications materials, training of health workers, and educating the public about the new treatment policy.

Proposed activities during Year 2 of the PMI are as follows:

- **Procure supplies of AL and quinine.** PMI investments will focus on procuring approximately 1 million treatments of AL and 50,000 quinine treatment courses. (\$3,250,000)
- **Provide technical assistance for pharmaceutical management system strengthening.** This will include improved coordination between the NMCP and CMAM and additional support to SIGM. (\$850,000)
- **Support implementation of the new malaria treatment policy.** Provide training and supervision to support the implementation of AL at provincial, district, and health facility levels. Also support system of pharmacovigilance to monitor adverse reactions to AL and other antimalarials. (\$987,000)
- **Support communications and behavior change activities in support of the new drug policy.** As part of a comprehensive communications initiative on malaria in Mozambique, support the implementation of communications and behavior change activities promoting early care seeking for fever and compliance with prescribed treatment, as well as introducing the public to new first-line malaria treatment. (Costs covered in Communications and Behavior Change section-page 35)
- **Design and pilot private sector interventions.** Based on planned evaluation of malaria treatment in the private sector funded with FY07 PMI resources, design and pilot test plan for strengthening malaria case management in the private sector. (\$110,000)
- **Monitor drug efficacy.** Support *in vivo* malaria treatment efficacy studies of first- and second-line treatments. (\$50,000)

COMMUNICATIONS AND BEHAVIOR CHANGE

Current Status, Challenges, and Needs

According to both the NMCP and partners, malaria advocacy, prevention, and control awareness continue to be in great need. The NMCP completed their “Health Communication Strategy” in October of 2006. However, this document has not received final approval by the Minister of Health’s office. The goal of this strategy is to reduce the burden of malaria by 2015 to half of 2001 levels. The three strategic malaria communication themes are:

- Case management of malaria, including preventive treatment of pregnant women
- Indoor residual spraying
- ITNs ownership and correct use

In addition to the Health Communication Strategy, the MISAU has included a section on “Health Promotion and Mobilization” in its “2006 Strategic Plan for Malaria Control.” MISAU also plans to work more closely with NGOs, traditional healers, community leaders, and community-based organizations to improve local residents’ understanding of and ability to deal with malaria. The Minister of Health, Dr. Ivo Garrido, emphasized during a meeting on Community Participation held in Maputo in June 2006 the need to break with “uncoordinated” practices of community

mobilization. He declared that the government is “committed to a generalized organizational offensive throughout the country to mobilize communities for involvement in protecting their own health.”

The Minister is advocating for a model that returns to the principles of primary health care, health promotion, with use of non-medical activities and raised the issue of APEs as a means of community mobilization and not for curative treatments. How these recent statements will affect the activities routinely performed by APEs has yet to be clarified.

At the central level, there is a Communications officer at the NMCP, and there is the Health Education Department (RESP) at MISAU. There is a health education and communication coordinator in each province who is expected to play an active role in educating communities about malaria interventions and other health-related topics. These coordinators are over-stretched and not able to devote much time to communications activities on malaria prevention and treatment. Funding for activities, both at the central and provincial level, is scarce.

According to the 2006 Strategic Plan for Malaria Control, a total of \$546,000 was allocated to communications, behavior change, and community mobilization activities for 2006. However, it appears that most of this sum was not made available to NMCP. Most communications activities focused on radio programs in 2006. Ten such programs focusing on malaria transmission prevention were performed in various local languages throughout Mozambique on Radio Moçambique, at a cost of approximately \$5,300 each.

Prior to IRS campaigns throughout Mozambique, especially those where DDT will be used, the NMCP communications officer pays a visit to sensitize the community. This usually involves discussions with local community leaders, community gatherings and accompanying sprayers to homes to interact directly with community members. Neither TV programs or spots nor mass national communications campaigns for malaria control have been carried out in the past.

The 2007 MISAU Communications budget has not been finalized. However, the 6 main activities, of which only three have earmarked funding, are: pre-testing of communications materials, establishing a national coordinating mechanism for communications and behavior change activities, establishing a multi-sectoral commission to organize the commemoration of National Malaria Days, commemorate National Malaria Day, implementation of community participation strategy, and assessment of the effectiveness of communication materials.

Progress to date: During PMI’s first year in Mozambique, two well-publicized events related to malaria prevention programs occurred with PMI’s support. First, the official PMI launching took place in December 2006, at Coca Missava, Chibuto, Gaza Province along with the kick off of the net re-treatment campaign. In addition, Africa Malaria Day ceremonies were held in Mocuba, Zambézia Province. The Minister of Health was present at both events with extensive media coverage.

In addition, two high level visits from the US Government have also received a great deal of internal press coverage. In June 2007, the US First Lady, Mrs. Laura Bush, along with the PMI Coordinator Admiral Timothy Ziemer, visited Maputo during a four country tour of Africa. Mrs.

Bush chose Maputo as the location to deliver her remarks on PMI. This event was widely publicized and included the presence of the First Lady of Mozambique, Mrs. Maria da Luz Guebuza. In August 2007, a large delegation led by HHS Secretary Michael Leavitt, CDC Director Julie Gerberding, and National Institutes for Allergy and Infectious Diseases Director Anthony Fauci spent three days in Mozambique reviewing PMI and PEPFAR activities.

The First Lady of Mozambique, Maria da Luz Guebuza, has recently established a foundation, “Children without Malaria,” which received technical support from NMCP and funding from private and government sources. The activities of this foundation are to come under the committee that will coordinate national communications activities.

In November 2006, PMI offices in Maputo received an unsolicited proposal from the Inter-Religious Coalition Against Malaria in Mozambique (IRCMM). This locally-formed coalition is comprised of organizations representing all 12 major religious groups in Mozambique, along with the Adventist Development and Relief Agency (ADRA) and the Washington National Cathedral’s Center for Global Justice and Reconciliation. IRCMM proposed to decrease malaria morbidity and mortality in Zambézia province by using the faith community at community level, in partnership with MISAU, to carry out community mobilization activities directly reaching over 1.6 million people with information on malaria control and prevention. Priority would be given to high risks groups of pregnant women and children less than five years of age. The proposal, known as “Together against Malaria”, was awarded funding and formally announced by the US First Lady during her visit to Mozambique in June 2007. A coordinator for IRCMM has been hired and activities are already underway. PMI first year funding was set at \$670,000.

Proposed USG Component: (\$1,550,000)

The success of an integrated malaria control program depends, in large part, on the understanding and acceptance of the population about the cause of malarial illnesses and its prevention and treatment, and the ability of households and communities to easily adopt new behaviors and access products and services. The development of appropriate messages that facilitate increased knowledge and result in adoption of appropriate behaviors for communities with different ethnicities and in different geographic areas will be critical for the success of the NMCP’s efforts to control malaria over the coming years.

- **Expand communications and behavior change activities on malaria.** Continue to scale-up implementation of culturally-appropriate communications and behavior change activities initiated with FY07 funding to increase the acceptance of and access to the key malaria interventions--ITNs, IPTp, ACTs, and IRS. This will include providing support to RESP at MISAU and Provincial Health Departments, as well as support to NGOs. (\$450,000)
- **Promote ITN ownership and use.** Strengthen PSI communications activities for promotion of ITN ownership and use. (\$300,000)
- **Expand IRCMM’s “Together against Malaria” community mobilization activities.** Build on their first year experience with community mobilization activities on malaria in Zambézia and begin expansion into at least one or two additional provinces. (\$800,000)

CAPACITY BUILDING WITHIN THE NMCP

Current Status/ Challenges and Needs

NMCP is responsible for policy development, establishing norms, and planning, organizing, and oversight of all malaria control activities in the country. It also coordinates with key staff from the Community Health Department, the Pharmacy Department, CMAM, Epidemiology Department, and with NGOs, donors, and other partners. The NMCP staff currently consists of a Director/Medical Epidemiologist, one entomology technician, two entomology assistants, a parasitologist, one communications officer, three IRS officers, and one field officer. At the provincial level, Provincial Coordinators are responsible for malaria control activities, as well as HIV/AIDS, tuberculosis, leprosy, and sexually transmitted infections. MISAU has recruited five provincial level entomology/vector control technicians and is recruiting for similar positions in the remaining six provinces.

MISAU has been in the midst of a re-organization, started in late 2006. This re-organization has affected the NMCP, which has been moved under the Department of Prevention and Control of the Main Transmissible Diseases (DPCPDT). As part of this re-organization, a new director of NMCP was appointed in July 2007.

The NMCP should link with the Community Health Department, Child Health and Reproductive Health Sections to integrate malaria prevention and treatment into IMCI and ANC and with the Health Education Section to develop and implement communications and behavior change activities, but contacts have not been routine. These groups also have staff at provincial and district levels who help implement malaria activities. IRS activities including distribution, use, and monitoring of pesticides are linked with the Ministry of Agriculture staff at central, provincial and district levels to guarantee safe pesticide use and follow-up on mitigation measures.

The NMCP staff at the central level are severely overstretched and in need of additional staff and training. The recently created post of Provincial Coordinator for HIV/AIDS, Tuberculosis and Malaria is intended to provide leadership at the provincial level, but many of these officers already have other responsibilities in their provinces and are not able to devote more than a small percentage of their time to malaria.

The NMCP also recognizes the need to strengthen its entomologic capabilities. The entomology lab has received PMI support for the purchase of equipment and for training. These laboratory improvements consist of new equipment for vector identification by PCR, ELISA for resistance testing and minor improvements of the national reference insectary. In late 2007, CDC staff will be providing these entomology staff with training in the use of these equipment and other entomologic techniques.

Progress to date: A CDC PMI Advisor was hired in 2006 to support PMI activities and the NMCP in Mozambique. The CDC PMI Advisor has played a key role in the country's malaria technical working group. This group is the mechanism by which the NMCP can coordinate with PMI and other partners. However, because the NMCP has not developed an annual implementation plan and

lacks a partner coordinator, most of the recommendations from the technical working group have not yet been followed. Initial recruitment of a USAID PMI Advisor was unsuccessful. The position was re-posted in July 2007 and candidates are now being screened.

The NMCP recently moved to new offices. After some delay, these offices now have internet connectivity and a work space has been allocated for the CDC PMI Advisor. The CDC PMI Advisor is now spending two days a week at the NMCP.

Proposed USG Component: (no additional cost to PMI)

Strong and effective leadership by the NMCP will be critical to the success of the Mozambique MISAU malaria control efforts funded by the Global Fund, other international donors and partners, and PMI. With the spotlight on Mozambique as the recipient of funds from Global Fund, World Bank, PMI and other donors for malaria, the pressure for positive results is great.

Recommendations from the RBM Harmonization Working Group focused on the need for coordination of the partners and a clear implementation plan for the program put forward by the NMCP. The group pointed to the lack of human resources in Mozambique, at the central and especially at the provincial level, as the key obstacle to success.

To reach the NMCP targets for coverage with ACTs, ITNs, IPTp, and IRS, PMI and other partners will need to support efforts to strengthen the capacity of the NMCP and other collaborating departments and sections at the central, provincial, and district levels to plan, conduct, supervise, monitor and evaluate malaria prevention and control activities. This will require improved working and communication facilities and logistic support, as well as staff building and training.

MONITORING AND EVALUATION OF MALARIA CONTROL ACTIVITIES

Current Status, Challenges, and Needs

Strengthening monitoring and evaluation (M&E) capabilities, within the context of other M&E systems in MISAU is a high priority for NMCP and its partners. With the re-organization of the MISAU, M&E activities are slated to fall under the control of the INS. However, it is not clear how INS will link to the NMCP.

For routine surveillance, clinical and laboratory confirmed malaria cases are included in the reporting system of notifiable diseases managed by the Departamento de Epidemiologia. All public health facilities are expected to report on the number of malaria cases on a weekly basis. These data are transmitted to the provincial and then national level. While considered to be the best functioning health information system in the country, it has limited capacity and there are concerns about the accuracy, completeness, and timeliness of the data.

A sentinel surveillance system based in provincial, general, and rural hospitals at five sites was established in 2003 by Management Sciences for Health with USAID funding. These sites, though, are not currently functioning because of lack of support from MISAU.

Limited information is available on the quality of malaria diagnosis or delivery of malaria interventions at the health facility level. The recent distribution of RDTs for malaria across the country, with little or no pre-service training on these assays, raises questions about what impact this will have on case reports.

UNICEF maintains maps with the coverage of malaria control interventions nationwide (particularly ITNs and IRS), but these tables are updated infrequently. With the rapid scale-up and evolution of malaria interventions in Mozambique, information will need to be updated regularly.

In addition, it is widely believed that the city of Maputo and surrounding areas are at low risk for malaria transmission, but data supporting this claim are mostly anecdotal. Understanding the actual risk of malaria in metropolitan Maputo has implications for both targeting of malaria control interventions and for monitoring and evaluation of PMI. Currently, PMI assumes that approximately 1 million people in urban Maputo and surrounding areas are at very low risk of malaria and excludes that population from the total population at-risk for malaria in Mozambique. Systematic data on malaria risk in Maputo would enable the NMCP and its partners to better target malaria control interventions and improve the estimates used for monitoring and evaluation of the impact of control activities.

Progress to date: In late 2006, the M&E consultant for the USAID bilateral project FORTE Saude initiated a review of the M&E for the NMCP. As part of this assessment, a detailed table of indicators from the Strategic Plan for Malaria Control was developed, but the NMCP has not been able to pursue this further. Currently, NMCP and partners are compiling data from all surveys, operational research activities, surveillance, and service data, such as number of nets procured or distributed or number of IPTp doses administered. The addition, through the TASC 3 procurement, of an M&E specialist should help the program improve upon the current status of surveillance data.

PMI supported an MIS, which was conducted during June and July 2007. The survey was implemented by the Malaria Consortium, under the supervision of INS. A total of almost 6000 households were included in the survey sample. Data collection is now completed and analysis of these data is underway. This will provide a baseline for a number of key malaria control indicators to be used within PMI.

In late 2007, Mozambique will conduct a mortality survey (called INCAM) in follow-up to the 2007 National Census with funding from PEPFAR and technical assistance from the U.S. Bureau of Census and the University of North Carolina MEASURE/Evaluation Project. The INCAM survey will provide provincial, urban/rural, and sex specific estimates of the levels of HIV and malaria mortality over the twelve months prior to the Census. A representative population of approximately 1,000,000 residents in all 11 provinces will be covered by the INCAM survey. This survey will be implemented by National Institute of Statistics with assistance from MISAU.

Proposed USG Component: (\$890,000)

Reliable and well-functioning malaria surveillance and health information systems are crucial for monitoring trends in malaria morbidity and mortality, coverage of key interventions, and guiding the NMCP's implementation of control measures. The existing surveillance system continues to be

weak and does not meet all the needs of the MISAU or the NMCP. Efforts to improve malaria surveillance in Mozambique should complement those of other disease control programs, such as HIV/AIDS and tuberculosis, by strengthening the MISAU notifiable disease system.

An effort will be made to integrate all M&E activities funded by the PMI with those of the NMCP and other partners into a single system to avoid duplication, conserve resources, as well as ensure as much uniformity as possible in the indicators chosen to measure progress, approaches to collecting and analyzing data, and reporting. For this, the M&E team from CDC will play a leadership role in the development of the overall NMCP M&E action plan, capacity building of NMCP on M&E, and support RBM efforts to carry out the Monitoring and Evaluation System Strengthening Tool (MESST) process in Mozambique (which will be financed with PMI FY07 funds).

In order to strengthen the NMCP's ability to conduct surveillance on malaria morbidity and mortality as well as to monitor the status of implementation of prevention and control activities throughout the country, the PMI proposes the following activities:

- **Strengthen the malaria surveillance system.** Continue support, in close coordination with other partners, the INS, and the NMCP, to assess and improve the quality, accuracy, completeness, and timeliness of malaria-related surveillance data at the district, provincial, and national levels and at sentinel malaria surveillance sites. (\$515,000)
- **Design and implement an integrated M&E system for malaria.** Work with the NMCP and other partners (FORTE Saude, RBM High-level Working Group) to develop and implement a single, comprehensive and integrated monitoring and evaluation system for malaria in Mozambique. The system will collect information on a variety of measures including health worker performance, health facility functioning, numbers of workers trained, commodities distributed and number of stock-outs. It will also include supervision of health workers and strengthening of the capacity of the NMCP to use these data for decision making. (\$300,000)
- **Monitor drug efficacy.** Continue to support malaria treatment efficacy studies on first- and second-line drugs at sentinel sites. (Costs covered in treatment section-- page 33)
- **Assess malaria risk in metropolitan Maputo.** Conduct an epidemiologic and entomologic assessment of malaria risk in metropolitan Maputo, including an assessment of insecticide resistance. This activity will be implemented in collaboration with INS, in conjunction with the planned entomology training course to be supported by CDC/PMI. (\$50,000)
- **TDYs from CDC-Atlanta.** CDC scientists to provide technical assistance to monitoring and evaluation strengthening activities (1 visit) and Maputo malaria risk study (1 visit). (\$25,000)

HIV/AIDS AND MALARIA

Current Status, Challenges, and Needs

Based on a 2004 National HIV Sentinel Survey, adult HIV sero-prevalence is approximately 16%, with a projected 1.5 million people living with HIV/AIDS as of 2007. Unlike neighboring countries,

there still is no evidence to suggest HIV incidence is declining in Mozambique, although more persons living with HIV/AIDS are receiving treatment.

The Mozambique National AIDS Council, together with the newly organized Departamento de Asistencia Medica, and the Departamento do Controlo e Prevencao de Doencas sections of MISAU are leading the national response through the implementation of the National Strategic Plan to Fight HIV/AIDS (PEN II 2005—2009). Mozambique's five-year national HIV/AIDS strategy, "Defesa de Vida," focuses on scaling up prevention, care and treatment services taking into account the current state of programs and human capacity, trends in the HIV/AIDS epidemic, and the national and international resources being made available to assist in the fight against HIV/AIDS. The US Government inter-agency team for PEPFAR is supporting the scale-up of activities for prevention, care and treatment within the context of the national strategy.

As of March 31, 2007, through US Government direct and indirect support, 99,718 pregnant women received HIV counseling and testing through PMTCT services and 8,861 had completed a course of ARV prophylaxis for PMTCT; 135,102 orphans and vulnerable children (OVCs) had received services; 264,777 people affected and living with HIV/AIDS had received palliative care; 161,624 Mozambicans visited counseling and testing centers and received their test results; and 48,872 individuals were on ART. These numbers are all below the targets especially for pregnant women and OVCs.

Mozambique's national response to HIV/AIDS has progressed considerably but still suffers from inadequate infrastructure, a scarcity of skilled human resources and the limitations of the MISAU management systems. These limitations have meant that many of HIV/AIDS services were not reaching beyond the capital, Maputo. This is gradually changing with more partners establishing care and treatment and PMTCT services throughout the country.

Linkages and Areas for Collaboration between PMI and PEPFAR

The target populations of PMI and PEPFAR overlap for children less than five years and pregnant women. In addition, persons living with HIV/AIDS are considered a population vulnerable to malaria. A few PMI and PEPFAR-supported activities for these groups should be seen as opportunities for collaboration. Specifically, at ANCs where PMTCT is being offered, ITPp and the distribution of LLINs should be provided routinely. The services these PEPFAR partners offer must also include access to diagnostic testing for malaria and malaria treatment for clients who present with symptoms consistent with malaria. For all these activities to occur consistently, the PMI partners involved in the procurement and distribution of SP for ITPp, LLINs, RDTs and AL need to work with PEPFAR partners supporting ANC services for planning, training and logistics to procure these commodities. For adults living with HIV/AIDS, PMI partners should work with PEPFAR partners who provide antiretroviral therapy and/or home-based care services, to ensure access to appropriate diagnostic, treatment and prevention options (including LLINs).

Policies for the malaria interventions need to be clearly defined and the guidelines for training and implementation need to be established by the NMCP. PEPFAR partners involved in the drafting of guidelines for training on the treatment of HIV-related opportunistic infections, or for training maternal and child health nurses (who perform counseling and testing, PMTCT, and testing for

sexually transmitted diseases, among other activities) need to have the technical support from PMI for the malaria specific topics.

Technical support from PMI also is needed to improve case management of malaria in HIV-exposed infants, HIV-infected young children, and OVCs. Where PEPFAR partners provide direct and intensive technical support to pediatric staff in hospitals and health centers, they will help facilitate the delivery of the malaria prevention and treatment services by ensuring training and supervision in malaria case management, developed with technical support from PMI, and by assisting with the distribution of ITNs, including educating clients on proper use.

PMI and PEPFAR advisors and implementers will also work with CMAM to strengthen the pharmaceutical distribution system to limit stock-outs of all commodities for either program through the different services. PMI and PEPFAR supported laboratory-related activities also have opportunities to join forces. The NMCP has declared an interest in decentralizing reference laboratory services outside of the National Reference Laboratory for Malaria in Maputo. Laboratories are being refurbished or constructed by PEPFAR partners for decentralized tuberculosis reference diagnosis in Beira and Nampula. These labs could also become regional malaria diagnosis labs. Specifically, equipment (microscopes, RDTs) could be shared and training courses for technical personnel could be coordinated for these peripheral labs.

A PEPFAR-funded mortality survey will be carried out after the 2007 National Census. The U.S. Bureau of Census and the University of North Carolina MEASURE Evaluation project are providing technical assistance and local cost support to implement the survey and analyze the results which will provide important data on HIV/AIDS and malaria-related mortality that will be used to improve program implementation and monitoring for both initiatives. Other surveys being supported by either initiative, such as the national sentinel surveillance for HIV prevalence, could include malaria-specific questions, and vice versa for a PMI supported survey.

Progress to date: To improve coordination between PEPFAR and PMI, the CDC PMI Advisor now participates in PEPFAR working groups on prevention and M&E. In 2007, ARV treatment and OVC clinics began distributing free LLINs, purchased by PSI with PEPFAR funds. An LLIN is also part of the home-based care package provided to people with HIV/AIDS.

Proposed USG component: (Costs covered in diagnosis, treatment, and M&E sections)

The collaboration between PEPFAR and PMI will be expanded this year. Activities will focus on:

- **Ensure all at-risk groups are provided LLINs.** LLINs will be delivered through all points of service, including ANC, OVC clinic, ARV treatment sites, and home-based care.
- **Coordinate services for pregnant women.** A coordinated plan for delivering IPTp and PMTCT to pregnant women through ANC and other appropriate points of care will be developed and implemented.
- **Strengthen coordination of M&E activities.** Coordination of M&E activities for malaria and HIV/AIDS will be improved, whenever possible, including utilizing opportunities for collecting

data on both diseases when surveys or assessments are conducted (integrating some malaria-specific questions into HIV surveys, and vice versa).

- **Joint strengthening of clinical laboratories.** This will initially concentrate at the reference level, but should then extend down to the point of service.

IN-COUNTRY MANAGEMENT

One health professional has been hired by CDC to oversee PMI in Mozambique. Another health professional is being sought to represent USAID. This position was re-posted in July 2007, after the initial solicitation was unsuccessful. Candidates for the USAID PMI position will be evaluated jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by USAID.

All PMI staff members will be part of a single inter-agency team led by the USAID Mission Director or his/her designee in country. The PMI team will share responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, management of collaborating agencies and supervision of day-to-day activities.

Currently, the CDC PMI professional staff person works with USAID Mozambique health staff to oversee all technical aspects of the PMI in Mozambique, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, and reporting of results. The CDC PMI staff person also spends two days per week at the NMCP supporting policy development, planning, and coordination activities. The CDC staff person is supervised by CDC, both technically and administratively. All technical activities will be undertaken in close coordination with the MISAU/NMCP and other partners, including the WHO, UNICEF, the Global Fund, World Bank and the private sector.

Locally-hired staff to support PMI activities either in Ministries or in USAID will be approved by the USAID Mission Director. Because of the need to adhere to specific country policies and USAID accounting regulations, any transfer of PMI funds directly to Ministries or host governments will need to be approved by the USAID Mission Director and Controller.

Proposed USG component: (\$1,125,000)

These resources will be used to support two PMI staff people (one USAID and one CDC) based at the USAID Mission in Maputo, including all work-related expenses (e.g., travel, supplies, etc.) Support will also be provided for travel expenses for supervision of planned FY08 PMI activities by staff from USAID- Washington (2 visits).

ANNEX 1

Tables

Table 2

President's Malaria Initiative— Mozambique
Planned Obligations for FY08

Proposed Activity	Mechanism	Budget	Commodities	Description of Activity	Geographic Area
PREVENTIVE ACTIVITIES					
ITNs					
Procure LLINs for distribution through ANCs and child health days	PSI	\$6,500,000	\$6,500,000	Procurement of 1,000,000 LLINs	Nationwide
LLIN distribution through ANCs and child health and immunization days	NGOs/FBOs via PSI	\$225,000		Support to NGOs, DPS, and District Teams for logistics of LLIN distribution	Nationwide
Subtotal ITNs		\$6,725,000	\$6,500,000		
IRS					
Support IRS in six districts of Zambézia Province	RTI Vector Control Task Order	\$2,460,000		IRS campaign in six districts of Zambézia Province covering 471,000 houses (1.88 million residents)	Zambézia Province
Procure IRS commodities	RTI Vector Control	\$463,000	\$463,000	Procure PPE, spares and pyrethroid insecticides. Pumps and DDT available in sufficient quantities.	Zambézia Province and others
Strengthen entomologic capacity of NMCP	RTI Vector Control	\$200,000	\$50,000	Procure needed supplies and support training and field operations	Nationwide
TDY for TA of entomology activities	CDC	\$12,500		Technical support for entomologic monitoring	Nationwide
Subtotal IRS		\$3,135,500	\$513,000		
IPTp and IPTi					
Training and supervision of ANC staff in prevention and treatment of malaria in pregnancy	TASC3	\$400,000		Training/supervision of health workers in prevention and treatment of malaria in pregnancy	Nationwide
Pre-implementation activities for IPTi	Mahniça HRC via TASC3	\$150,000		Support for pilot assessment of operational requirements	Nationwide
Subtotal: IPT		\$550,000	\$0		
SUBTOTAL: Preventive		\$10,410,500	\$7,013,000		

Proposed Activity	Mechanism	Budget	Commodities	Description of Activity	Geographic Area
CASE MANAGEMENT					
Diagnosis					
Purchase of microscopy supplies and RDTs	TASC3	\$325,000	\$325,000	Purchase of microscopy kits, RDTs, and additional microscopes, as required	Nationwide
Support training and supervision of laboratory diagnosis of malaria	TASC3	\$240,000		Pre- and in-service training and supervision in laboratory diagnosis of malaria, including quality control	Nationwide
TA from Brazil for lab strengthening	Brazilian partner TBD (via TASC3)	\$200,000		Support for training and quality control of laboratory diagnosis of malaria	Nationwide
TDY for TA of lab strengthening	CDC	\$12,500		Technical support for lab strengthening	Nationwide
Subtotal: Diagnostics		\$777,500	\$325,000		
Treatment					
Procurement of first- and second-line drugs	DELIVER	\$3,250,000	\$3,250,000	Procure AL, quinine, and related supplies for administration	Nationwide
Strengthen MoH antimalarial drug management system	DELIVER	\$850,000		Strengthen MoH capacity for forecasting need, timely ordering and delivery, and storage of ACTs and other antimalarials	Nationwide
Support training of health workers on treatment of uncomplicated and severe malaria	TASC3 with subgrants to NGOs/FBOs	\$987,000		Support training and supervision of health workers at all levels in new malaria treatment guidelines	Nationwide
Improve malaria treatment in the private sector	TASC3	\$110,000		Disseminate guidelines for private sector on case management. Pilot intervention in private sector	TBD
Conduct malaria treatment efficacy studies	Instituto Nacional da Saude via TASC3	\$50,000		Support in vivo drug efficacy studies of first- and second-line treatments	Sentinel sites
Subtotal: Treatment		\$5,247,000	\$3,250,000		
SUBTOTAL: Case Management		\$6,024,500	\$3,575,000		

Proposed Activity	Mechanism	Budget	Commodities	Description of Activity	Geographic Area
COMMUNICATIONS AND BEHAVIOR CHANGE					
Implement communications and behavior change activities	TASC3	\$450,000		Implement communications and behavior change activities promoting appropriate malaria prevention and treatment	Nationwide
Promote LLIN ownership and use	PSI	\$300,000		Promote LLIN ownership and use via mass media and community-based approaches	Nationwide
Support to NGOs to conduct community mobilization activities	IRCMM	\$800,000		Provide support to FBO consortium to mobilize communities around prevention and treatment of malaria	Zambézia and 1-2 additional provinces
Subtotal BCC		\$1,550,000	\$0		
MONITORING AND EVALUATION					
Strengthen malaria surveillance system	TASC3	\$515,000		Strengthen malaria surveillance system, including sentinel sites	Nationwide and Sentinel Sites
Develop and implement integrated M&E plan for malaria	TASC3	\$300,000		Develop and implement integrated malaria M&E plan.	Nationwide
Conduct assessment of malaria risk in Maputo	INS via TASC3	\$50,000		Conduct epidemiologic and entomologic assessment of malaria risk in Maputo	Maputo
2 TDYs for TA to Maputo study and M&E strengthening	CDC	\$25,000		Technical support to M&E strengthening activities	Nationwide
SUBTOTAL: M&E		\$890,000	\$0		
IN-COUNTRY MANAGEMENT					
In-country administrative expenses	CDC/USAID	\$1,100,000		Salaries, benefits of PMI in-country staff; office equipment and supplies	
TDYs- General supervision of PMI activities	USAID	\$25,000		Supervision of FY08 MOP activities- 2 TDYs	
SUBTOTAL: In-Country Management		\$1,125,000	\$0		
GRAND TOTAL		\$20,000,000	\$10,588,000	Percent commodities- 53%	

Table 3
Mozambique – Year 2 Targets
Assumptions and Estimated Year 2 Coverage Levels

Year 2 PMI Targets:

- *Approximately 1 million LLINs will have been distributed to children less than five and pregnant women (this translates to about 75% household ownership of at least one ITN)*
- *At least 85% of houses targeted by MISAU for indoor residual spraying will have been sprayed (a total of 1.4 million additional residents will be protected)*
- *IPTp will have been implemented in all health facilities in all 11 provinces (resulting in 35% of pregnant women having received two or more doses of SP for IPTp during their pregnancy)*
- *Malaria treatment with ACTs will have been implemented in all health facilities of all 11 provinces (resulting in 25% of children under five with suspected malaria will have received treatment with an ACT within 24 hours of the onset of their symptoms).*

Assumptions:

Population of Mozambique at risk of malaria (estimated): 19,000,000 – 1,000,000 in Maputo City = 18,000,000

Pregnant women:	5% of total population = 900,000 pregnant women
Infants (children <1):	3% of population = 540,000 infants
Children <5:	20% of population = 3,600,000 children under five 1,500,000 people

Average number of residents/household = 5.5

PLWHA:

Average number of malaria-like illnesses per year and cost per AL treatment:

Children <3:	2-3 illnesses/year at \$0.45 each
Children 3-8:	2-3 illnesses/year at \$0.90 each
Children 8-14:	2 illnesses/year at \$1.35 each
Adults:	1-2 illnesses/year at \$1.80 each

Inter-vention	Needs for 100% Nationwide Coverage over 3 Years	Needs for 85% Nationwide Coverage over 3 Years	Annual Needs to Achieve 100% Coverage	Needs to Achieve Year 1 PMI Targets	Year 1 Contributions
IPTp	900,000 pregnant women x 3 treatments/woman = 2.7million treatments/year x 3 years = 8.1 million treatments	6.9 million SP treatments	2.7million SP treatments	Target: 35% of pregnant women receive 3 doses of IPTp = 945,000 treatments	MISAU Common Basket – has procured sufficient SP to achieve 100% coverage, if fully implemented
LLINs	3.3 million households x 2.5 nets/household = 8.25 million nets	7 million LLINs (assume ITNs distributed more than 2 yrs ago will have to be replaced)	One-third of 8.25 million LLINs = 2.75 million LLINs	Target: 70% of households have at least one ITN 1.9 million ITNs	MISAU Common Basket – estimated 1.7 million LLINs available USG (PMI) – 450,000 TOTAL = 2.15 million LLINs Thus, more than 100% of Year 1 LLIN needs are met
ACTs – children < 5	3.6 million children under 5 x 3.5 episodes/year = 12.6 million treatments/year x 3 years = 37.8 million	12.6 million x 85% = 10.7 million treatments x 3 yrs = 32.1 million	12.6 million treatments	Target: 35% of children under 5 receive ACTs 12.6 million x 35% = 4.4 million treatments	TOTAL available for ACTs = \$3.25million (PMI) + an unknown amount from the Common Basket. If all 4.4 million child treatments are covered at \$0.60/treatment = \$2.64 million, all 3.8 million older child treatments are covered at \$0.90/treatment = \$3.42 million and all 1.58 million adult treatments are covered at \$1.50/treatment = \$2.37 million = total of \$8.43 million needed Thus, assuming level funding from central basket, 100% of need will be covered
ACTs – older children	5.4 million older children x 2.0 episodes/year = 10.8 million treatments/year x 3 years = 32.4 million	10.8 million x 85% = 9.2 million x 3 yrs. = 27.5 million	10.8 million treatments	10.8 million x 35% = 3.8 million treatments	
ACTs- adults	9 million adults x 0.5 episodes/year = 4.5 million treatments x 3 years = 13.5 million	4.5 million x 85% = 3.8 million treatments x 3 yrs = 11.4 million	4.5 million treatments	4.5 million x 35% = 1.58 million treatments	
TOTAL	83.7 million treatments	71 million treatments			
IRS	1.25 million population (200,000 houses to be targeted for IRS annually)	660,000 houses	220,000 houses	Target: 85% of targeted houses to be sprayed 187,000 houses to be sprayed	USG (PMI) – More than 200,000 houses scheduled for spraying in Zambézia Provinces Thus, 100% of Year 1 needs are met.

Table 4

**President's Malaria Initiative – Mozambique
Year 2 (FY08) Estimated Budget Breakdown by Intervention (\$)**

Area	Commodities (%)	Other (%)	Total (\$)
Insecticide-treated Nets	\$6,500,000 (97)	\$225,000 (3)	\$6,725,000
Indoor Residual Spraying	513,000 (16)	2,622,500 (84)	3,135,500
Case Management	3,575,000 (59)	2,449,500 (41)	6,024,500
Intermittent Preventive Treatment	0 (0)	550,000 (100)	550,000
Monitoring and Evaluation	0 (0)	890,000 (100)	890,000
Communications and Behavior Change	0 (0)	1,550,000 (100)	1,550,000
In-Country Management	0 (0)	1,125,000 (100)	1,150,000
Total	10,588,000 (53)	9,412,000 (47)	20,000,000

Table 5**Year 2 (FY08) Budget Breakdown by Partner (\$)**

Partner Organization	Geographic Area	Activity	Budget*
RTI Vector Control	Zambézia Province; LSDI Project area	Procurement of insecticide and IRS equipment; support to NMCP IRS activities; strengthen entomologic capabilities of NMCP	\$3,123,000
Population Services International	Five provinces	Procurement and distribution of LLINs	\$7,025,000
JSI DELIVER	Nationwide	Strengthen pharmaceutical management system, procure antimalarial drugs	\$4,100,000
TASC 3 IQC with sub-grants to NGOs/FBOs	Nationwide	Training of health workers/laboratory technicians; support to ACT implementation; communications on malaria treatment and malaria in pregnancy; support to sentinel sites; development of M&E plan; procurement of lab supplies	\$3,777,000
IRCMM	Zambézia and 1-2 other provinces	Community mobilization by FBOs and NGOs	\$800,000

*Staffing and administration and CDC technical assistance not included