

Additional funding for the President's Malaria Initiative has been allocated under a Continuing Resolution from Congress for the remainder of FY07. USAID Malaria Programs were allotted \$248 million (\$25 million above the President's 2007 request) to allow the Agency to expand its bilateral global malaria initiative activities from the current 3 countries to 7. Country programs will expand access to long-lasting insecticide treated bednets and indoor residual spraying, promote and support effective malaria treatment through the use of proven combination therapies; and increase prevention efforts targeted to pregnant women. With the additional funding FY 2007 Malaria Operational Plans (MOPs) will be updated. Revised MOPs will be posted soon.

PRESIDENT'S MALARIA INITIATIVE

Malaria Operational Plan – FY07

MOZAMBIQUE

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ABBREVIATIONS and ACRONYMS

ACT – artemisinin-based combination therapy
 AIDS – Acquired Immuno-Deficiency Syndrome
 AM-LUM – artemether-lumefantrine
 ANC – antenatal clinic
 AQ – amodiaquine
 AS - artesunate
 BCC – behavior change and communication
 CIDA – Canadian International Development Agency
 CMAM – Central de Medicamentos e Artigos Médicos
 DDT – dichloro-diphenyl-trichloroethane
 DHS – demographic and health survey
 DfID – Department for International Development, United Kingdom
 FBO – faith-based organization
 GFATM – Global Fund to Fight AIDS, Tuberculosis, and Malaria
 GRM – Government of the Republic of Mozambique
 HIV – Human Immunodeficiency Virus
 IMCI – integrated management of childhood illnesses
 IPTp – intermittent preventive treatment in pregnant women
 IRS – indoor residual spraying
 IRCMM- Inter-Religious Campaign against Malaria in Mozambique
 ITN – insecticide-treated net
 KAP – knowledge, attitudes, and practices
 LLIN – long-lasting insecticide-treated net
 LSDI – Lubombo Spatial Development Initiative
 MoH – 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 has been selected as one of the four countries to receive funding during the second year of the President's Malaria Initiative. The objective of this Initiative is to assist African countries, in collaboration with other partners, to rapidly scale 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 mosquito nets (ITNs), and indoor spraying with residual insecticides (IRS).

Malaria is a major cause of morbidity and mortality in Mozambique. It accounts for about six million reported cases per year, 44% of all outpatient consultations, and 65% of all pediatric hospital admissions, and is reported to be the number one cause of death among children admitted to pediatric services. Malaria transmission is stable and takes place year round with a peak which extends from December to April. The population at risk of malaria is assumed to be 18 million, including an estimated 3,600,000 children under five and 900,000 pregnant women. *Plasmodium falciparum* infections account for about 90% of all malaria infections.

According to the most recent Demographic and Health survey, carried out in 2003, only 12% of pregnant women and 10% of children under five had slept under an ITN the previous night. Indoor residual spraying covers parts of 46 districts, but the proportion of households covered is not known. No up-to-date information exists on national- or provincial-level coverage with ACTs or IPTp.

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 development agenda. Although the Ministry of Health 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 MoH and with the participation of more than 15 bilateral and multilateral agencies.

Mozambique is the recipient of a \$28 million malaria grant from the Global Fund to Fight AIDS, Tuberculosis and Malaria. A multi-country malaria control project in southern Mozambique, the Lubombo Spatial Development Initiative, has received two \$21 million Global Fund malaria grants. With support from the World Health Organization, UNICEF, and other national and international partners, a scaling up of malaria prevention and control interventions has already started.

This PMI Year 1 Malaria Operational Plan for Mozambique was developed in close consultation with the National Malaria Control Program and with participation of nearly all national and international partners involved with malaria prevention and control in the country. The activities that the PMI is proposing to support fit in well with the Ministry of Health Strategic Plan for Malaria Control 2007-2009, which was being finalized as this plan was developed, and build on investments made by USAID to improve and expand malaria-related services over the past several years.

A total of \$17 million of funding is proposed during Year 1 of the PMI in Mozambique. The following major activities are proposed:

1. strengthen the capabilities of the National Malaria Control Program in surveillance and monitoring and evaluation (\$680,000);
2. improve the quality of laboratory diagnosis of malaria and extend the use of rapid diagnostic tests to more peripheral levels of the health system (\$860,000);
3. strengthen the Ministry of Health's pharmaceutical management system (\$710,000);
4. support safe and effective implementation of ACTs and IPTp nationwide (\$4,600,000);
5. scale up coverage of children under five and pregnant women with ITNs (\$3,500,000);
6. support well-organized IRS activities in up to six districts of Zambézia Province targeted by the Ministry of Health (\$4,400,000); and
7. support a nationwide survey to measure coverage of major malaria interventions and under five mortality rates to provide baseline information for the PMI (\$600,000).

As a "jump start" activity for the PMI in Mozambique, support will be provided to a large-scale bed net re-treatment campaign scheduled for November 2006, in which an estimated 500,000 bed nets will be re-treated (paid for primarily with USG FY06 funds).

INTRODUCTION

President's Initiative on Malaria

In July 2005, the United States Government announced a new five-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions in high-burden countries in sub-Saharan Africa. The goal of this Initiative is to reduce malaria-related mortality by 50% after three years of full implementation. This will be achieved by reaching 85% coverage of the most vulnerable groups---children under five years of age and pregnant women---with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

The President's Malaria Initiative (PMI) began in 2006. 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 175 million in 15 countries by 2010. Three countries were selected in the first year of the PMI. Mozambique was one of the four countries selected in the second year.

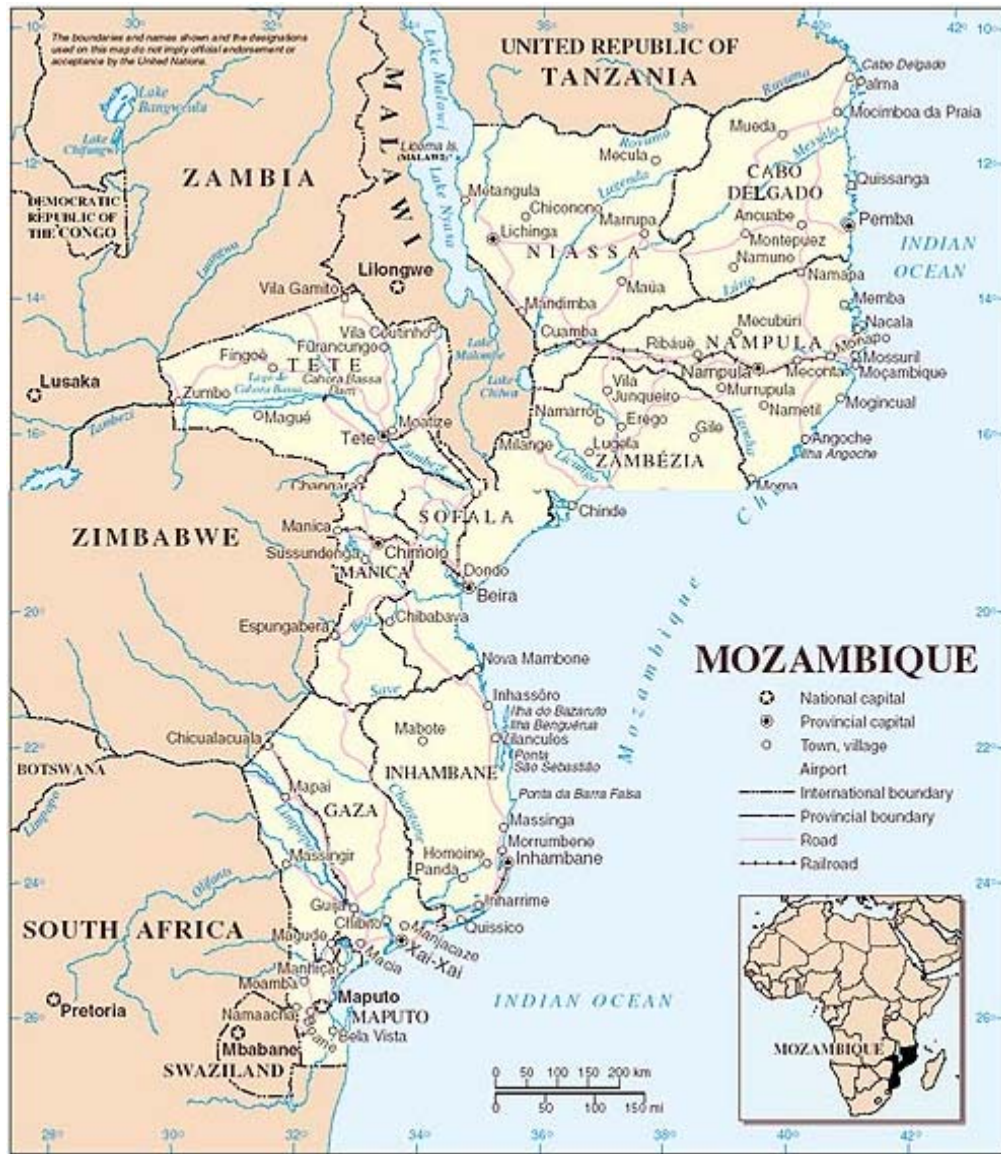
In implementing this Initiative, the United States Government is committed to working closely with host governments and within existing national malaria control strategies and plans. Efforts will be coordinated with other national and international partners, including the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), Roll Back Malaria (RBM), the World Bank Malaria Booster Program, and the non-governmental and private sectors, to ensure that investments are complementary and that RBM and Millennium Development goals can be achieved.

This document presents a detailed one-year implementation plan for the President's Malaria Initiative (PMI) in Mozambique. It was developed in close consultation with the National Malaria Control Program and with the participation of nearly all national and international partners involved with malaria prevention and control in the country. The activities that the PMI is proposing to support fit in well with the Ministry of Health Strategic Plan for Malaria Control, which was being finalized as this plan was developed, and build on investments made by USAID to improve and expand malaria-related services over the past several years. This plan reviews the current status of malaria control policies and interventions in Mozambique, identifies challenges and unmet needs if the targets of the PMI are to be achieved, and provides a description of proposed Year 1 activities under the PMI. A 3-Year Strategy and Plan for Mozambique is presented in Annex 2.

BACKGROUND

Mozambique has a population of approximately 19.4 million, 44% of which is between 0 and 14 years of age. The total expenditure on health in Mozambique represents 5% of the country's Gross Domestic Product. More than 50% of the population lives below poverty line. Life expectancy is 47 years and the fertility rate about 5.4 children per woman. The most common causes of death are malaria, respiratory infections, diarrheal diseases, and malnutrition.

Administratively, the country is divided into 146 districts and 11 provinces, of which Maputo City is one.



National health system

The Mozambican national health system covers only part of the population, primarily in urban and periurban areas and is heavily dominated by the public sector. The for-profit sector is largely confined to major cities. Many national and international non-governmental organizations (NGOs) and faith-based organizations (FBOs) operate in conjunction with MoH facilities and staff mainly at the district level and offer a range of preventive and curative services. Networks of community health workers (CHWs), most of whom serve on a voluntary

basis, are limited in size and distribution. In rural areas, traditional healers and herbalists are often the first source of health care.

The Government of the Republic of Mozambique (GRM) subscribes to the RBM Abuja targets and the Millennium Development Goals. Within this context, the GRM endeavors to increase access and equity to health care with particular emphasis on those living in rural remote areas of the country. This commitment is spelled out in the Strategic Plan for the Health Sector (Portuguese acronym, PESS), in which malaria is considered a priority for poverty reduction and the government development agenda.

Although the Ministry of Health (MoH) is committed to increasing access to health services and increasing the efficiency and quality of those services nationwide, the weak health infrastructure and shortage of health workers are formidable obstacles. Geographic, economic, and cultural factors are barriers to accessing health care. Limited career development opportunities and low wages for health workers affect not only the quality of care but also the MoH's ability to retain staff.

The National Health Service has four levels of referral. Levels I and II include health posts, health centers, and district hospitals. Most district hospitals offer basic diagnostic services, including microscopy, haematology, biochemistry, and X-rays, as well as surgical and obstetric services. In more rural areas, many districts have no district hospital, but only health centers with limited capacity for admitting patients with medical and non-surgical obstetric conditions. District hospitals are staffed with general medical doctors. Below this level, care is provided by clinical officers, nurses, and medical technicians (técnicos de medicina); however most health facilities are understaffed. Level III consists of provincial hospitals, which provide greater diagnostic and curative services, and include training centers for provincial health care staff. The Level IV hospitals in Maputo, Beira, and Nampula are the major referral centers for southern, central, and northern Mozambique, respectively.

District Health Management Teams are the basic health program planning and implementation units in the country. These teams are in charge of all health services at the district and community levels. Malaria control is an integrated activity within the district health plan and most of services are provided within the context of primary health care.

Sector wide approach in health

In 2000, Mozambique adopted a sector wide approach (SWAp) for health, led by the MoH and with the participation of more than 15 bilateral and multilateral agencies. The MoH and donors signed a Code of Conduct May 2000, which agreed to pool resources, focus attention on shared objectives, and monitor developments in the health sector against previously agreed benchmarks. A revised Code of Conduct was signed in 2003. Following a joint effort by the MoH and its partners, a Strategic Plan for the Health Sector (PESS) for 2001-2005 was developed, endorsed by the partners, and approved by the Council of Ministers in 2001. This Strategic Plan became the basic strategy document for government and external partners to work towards a common vision in health. This Plan was drafted concurrently with the first Action Plan for the Reduction of Absolute Poverty (Portuguese acronym, PARPA), the Mozambican Poverty Reduction Strategy Paper 2001-2005. The PARPA II 2006-2010 is in the process of being finalized. One

of the four key PARPA II objectives for health is: reduce the burden of malaria especially on the most vulnerable groups by increasing the use of ITNs and insecticides. This will be measured by the percentage of pregnant women and children under five years who have at least one ITN in non-IRS districts, increasing from a base of 18% in 2005 to 45% in 2009. The MoH Annual Operational Plan (Portuguese acronym, POA) provides the details of implementation of policies and strategies defined in the PESS. The MoH POA for 2007 is under development at the present time and should be finalized in November 2006. Most groups within the MoH, such as the NMCP, also have their own strategic plans. A POA-like document also exists at the provincial level, although the linkage between central and provincial levels still needs to be strengthened.

Three levels and structures for dialogue and consensus have been established within the SWAp to allow the MoH and its partners, through a consultation process, to forge a productive relationship based on mutually agreed priorities and strategies:

1. Sector Coordination Committee – chaired by the Minister of Health, this committee meets twice a year and includes the Minister of Health’s cabinet, provincial health directors, and representatives of development partners active in health. Its role is to endorse key reports and recommendations and keep development partners informed about significant issues or decisions related to health. One of the donors, currently the Swiss Development Corporation, serves as a focal point for the SWAp;
2. SWAp Forum – a working group of MoH and donor and NGO representatives, which meets on a monthly basis; and
3. SWAp Joint Working Groups – made up by more technical staff of the MoH and partners to jointly review or oversee specific areas of health policy or implementation. Working groups on medicines, human resources, monitoring and evaluation, and HIV/AIDS/TB/Malaria already exist.

Pre-SWAp meetings, consisting only of donors, meet approximately twice a month to discuss issues to be tabled in the larger SWAp Forum meetings.

Three pooled funds for the health sector have been established: (1) a common general fund known as PROSAÚDE; (2) a provincial common fund; and (3) a common fund for drugs and medical supplies. Indicators that have been jointly agreed upon by the MoH and donors are used to track progress. Development partners indicate their contributions to these common funds in July of each year, then endorse the POA in November before releasing the first tranche of funding. The completion of the joint mid-year progress review with the MoH and the annual audit report are also used by donors to trigger the release of funds. Any changes to the POA must be agreed upon by both the MoH and donors. Some donors, such as the United States Government, do not contribute directly to any of the common funds but do participate actively in SWAp planning, implementation and evaluation activities and discussions. These “vertical” programs and the activities they support are expected to be reflected within the POA. In 2005, the total health budget for Mozambique was \$348 million, with approximately 30% coming from the GRM, 30% from the three common funds, and 40% from vertical funds, which include the United States Government contributions.

Mozambique was the first country in which a GFATM grant was implemented through the pooled funding mechanism of a SWAp. This was done to reduce transaction costs for the MoH and its partners. A memorandum of understanding has been signed between the MoH and the

GFATM and in 2006 the GFATM contribution to the common fund budget will be more than \$23 million in support of HIV/AIDS, tuberculosis, and malaria activities.

MALARIA SITUATION IN MOZAMBIQUE

Malaria is a major cause of morbidity and mortality in Mozambique. It severely limits productivity, particularly among rural populations, and results in reduced school attendance. Malaria accounts for about six million reported cases per year, 44% of all outpatient consultations, and 65% of all pediatric hospital admissions. The estimated malaria prevalence among children 2-9 years of age in Mozambique ranges from 40% to 80%. Malaria is reported to be the number one cause of death among children admitted to pediatric services in Mozambique (32% in 1998, 42% in 1999 and 40% in year 2000). 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.

Malaria is endemic nationwide, ranging from mesoendemic to holoendemic in most parts of the country. A few small areas have the potential for epidemics, but this has not been a major public health problem. Mozambique is, however, prone to natural disasters such as drought, cyclones and floods and these can contribute to dramatic increases in malaria transmission, particularly in low-lying coastal areas and along major rivers.

Malaria transmission is stable and takes place year round with a peak that extends from December to April. *Plasmodium falciparum* accounts 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.* with *A. funestus s.s.* composing most of the exit catches reported from southern Mozambique. Among the major subspecies of the *A. gambiae* complex present, *A. arabiensis* is more prevalent in the south and *A. gambiae* more prevalent northward. Other members of the *A. funestus* and *A. gambiae* complexes occur but are believed to be minor or only locally important vectors.

The NMCP Strategic Plan for the next three years (2007-2009) is currently being re-designed with support from WHO, UNICEF, and other major stakeholders. The implementation of this plan will focus on the peri-urban and the rural areas. An interim Strategic Plan was being finalized at the time of the PMI Planning visit to provide a strategic framework for malaria control operations for the remainder of 2006 and a basis on which to build the GFATM Round 6 proposal. Both the interim 2006 and the 2007-2009 Strategic Plans lay out goals and objectives and have defined targets and indicators for monitoring and evaluation of malaria control implementation and progress. Some of the targets changed slightly between the PMI Needs Assessment and Planning visits and the following description is based on the latest available information.

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.

CURRENT STATUS OF MALARIA INDICATORS

According to the most recent Demographic and Health (DHS) survey, carried out between September and December 2003, 18% of women between 15 and 49 years of age had a 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 a bed net. Indoor residual spraying covers parts of 46 districts, but the proportion of households covered is not known. No up-to-date information exists on national or provincial coverage with ACTs or IPTp.

GOAL AND TARGETS OF PRESIDENT'S MALARIA INITIATIVE

Although the WHO reports that 100% of Mozambique's population of 19.4 million is at risk of malaria, it is unlikely that there is malaria transmission in central urbanized areas of the capital, Maputo, where approximately 1 million (5.1% of the population) people reside. Thus, for the purposes of establishing targets for the PMI in Mozambique, it will be assumed that 95% of the population (or 18 million people) are at risk of malaria.

Goal: By the end of 2010, reduce malaria-related mortality by 50% compared to pre-Initiative levels.

Targets: 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 under five (in areas not covered by IRS) will own at least one ITN;
2. 85% of children under five (in areas not covered by IRS) will have slept under an ITN the previous night;
3. 85% of pregnant women (in areas not covered by IRS) will have slept under an ITN the previous night;
4. 85% of houses in geographic areas targeted for IRS will have been sprayed;
5. 85% of pregnant women and children under five will have slept under an ITN 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 antimalarial drug in accordance with national malaria treatment policies within 24 hours of the onset of their symptoms.

EXPECTED RESULTS – YEAR ONE

At the end of Year 1 of the PMI in Mozambique (31 March, 2008), the following targets will have been achieved:

Prevention:

- Approximately 500,000 bed nets will have been retreated as part of a large-scale retreatment campaign of which the USG will support mobilization and re-treatments (this should translate to retreatment of approximately 40% of the non-LLINs existing in the country);
- Approximately 1.7 million long-lasting ITNs (LLINs) (of which PMI will provide 450,000) will have been distributed to children under five and pregnant women (this should bring household ownership of at least one ITN to approximately 70% nationwide);
- At least 85% of houses in districts targeted by the MoH and PMI for IRS in Zambézia Province will have been sprayed (a total of 1,000,000 additional residents will be protected by IRS); and
- Intermittent preventive treatment with SP in pregnant women will have been implemented in all 11 provinces and in all health facilities in 4 provinces (providing IPTp coverage to 35% of Mozambique's total population).

Treatment:

- The National Malaria Diagnosis Reference Laboratory will have been strengthened and a plan for improving the quality of microscopic diagnosis developed and implemented with training of trainers; and
- Malaria treatment with ACTs will have been implemented in health facilities in all 11 provinces and in all health facilities of 4 provinces (making up 35% of Mozambique's total population).

Other:

- A nationwide survey to establish baseline information on coverage of malaria interventions and malaria mortality will have been completed.

INTERVENTIONS - PREVENTION

Vector Control - General

The 2006 interim Strategic Plan for Malaria Control of the MoH 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. These interventions may be used singly or in combination, depending upon the epidemiological setting.

The targets being set by the MoH for IRS and ITNs over the next three years were evolving during the PMI needs assessment and planning visits and are not yet final. The PMI team was also able to review a draft Gap Analysis being undertaken by a World Bank consultant to the

MoH to assist with planning for the GFATM Round 6 proposal. For the purposes of the PMI Year 1 Malaria Operational Plan for Mozambique, the targets given in the draft Strategic Plan for Malaria Control will be used: The two major vector-related targets are:

- By 2008, 45% of the population of Mozambique will be protected through IRS
- By 2008, 90% of all pregnant women and children under five in target districts (districts where IRS will not be done) will sleep under an ITN.

Additional details of the targets for vector control in the interim Strategic Plan are shown below:

Vector control and personal protection targets
(Draft Interim Strategic Plan for Malaria Control, July 2006)

INDICATOR	Baseline 2001	2006	2007	2008	2009
No. of trained sprayers	980	1,806	2,800	3,080	3,080
No. of households sprayed	754,000	1.6m	2.5m	2.75m	2.75m
% of households sprayed in target areas	60%	80%	>80%	90%	90%
Population protected through spraying	3m	4.8m	8m	9m	9m
% of the national population protected through spraying	13%	25%	40%	45%	45%
No. of ITNs distributed		800,000	2.8m	3.6m	2.2m
% of pregnant women and children under 5 who have at least one ITN in target areas.	8%	41%	>95%	>95%	>95%
% of children under 5 sleeping under an ITN in target districts.	11%	30%	80%	90%	95%
% of pregnant women sleeping under a ITN in the targeted districts	1%	40%	90%	90%	95%
No. of sites with organized programs for larval control	3	4	11	11	11

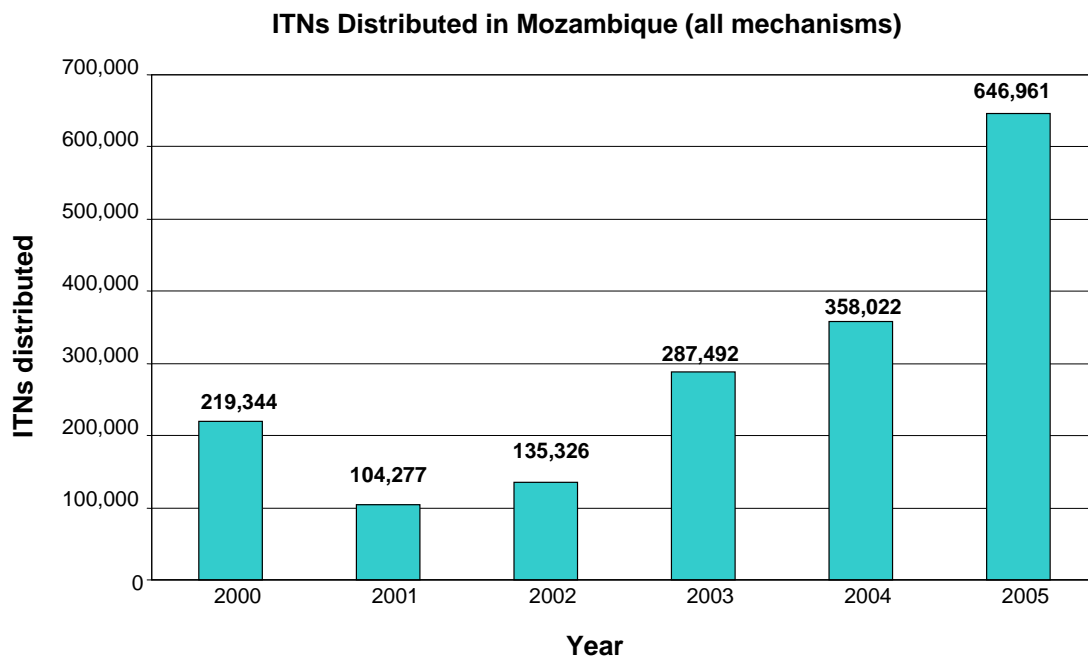
Insecticide resistance: Insecticide resistance studies were carried out at 17 localities throughout Mozambique between 2000 and 2002 by the NMCP in collaboration with the Medical Research Council of South Africa and the London School of Tropical Medicine. Although these studies were done several years 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 genome, which is associated with resistance to pyrethroid insecticides and cross-resistance to DDT, has not been detected in Mozambique.

Insecticide-treated Nets:

Current Status, Challenges, and Needs

Insecticide-treated nets are a priority intervention for the MoH in Mozambique, particularly in rural areas. 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 net. 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 a bed net.

Many of the nets distributed to date have been conventional nets, bundled with an insecticide re-treatment kit, rather than LLINs. The MoH is now supporting widespread distribution of LLINs, particularly in hard-to-reach rural areas, where re-treatment may be especially difficult.



Bednet Distributions: Insecticide-treated nets were introduced in Mozambique in 2000. To date, approximately 1.75 million ITNs have been delivered (approximately one million of these during the last two years) through a variety of channels and partners including:

- free as part of an emergency in 2000 through a campaign approach (200,000 ITNs);
- 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 ITNs through health facilities to pregnant women and children under five years of age in Zambézia, Gaza, Tete, Inhambane and Cabo Delgado Provinces; Distribution of free nets to vulnerable groups is being expanded to Niassa and Nampula Provinces;

- community-level distribution through a variety of NGOs; and
- strengthening sustainable private, commercial sector distribution in collaboration with Population Services International (PSI) and the Malaria Consortium.

The Malaria Consortium, with Department for International Development (DfID), United Kingdom funding, is currently supporting commercial businesses and networks to increase the market availability of ITNs in Mozambique. Recognizing the risks and start-up costs for entering and/or developing a new market or product, the Malaria Consortium provides credit to help the commercial sector to procure LLINs/ITNs. These bed nets are then sold at prices roughly competitive with untreated nets currently on the market. A subsidy of \$1.25 for an ITN and \$2.50 for a LLIN is provided to distributors on each net distributed in Nampula, Cabo Delgado and Inhambane Provinces, making the price more affordable. The Malaria Consortium also provides communication assistance to help create a culture of net use. It is expected that approximately 200,000 nets will be distributed through this system in the next two years.

Population Services International is working with partner NGO activists in Zambézia and Nampula Provinces to increase demand for and access to LLINs in rural communities. Population Services International provides training in malaria transmission and prevention to these NGO activists. Also with funding from USAID and funds from UNICEF, PSI is providing support to the MoH to provide free LLINs to pregnant women through government health facilities (Gaza and Zambézia Provinces) and to children under five through campaigns (Zambézia Province). UNICEF has procured a container, which serves as a warehouse for the ITNs in Gaza and Zambézia Provinces. Nets are requested by the districts and are forwarded to the district level using PSI vehicles; the districts then take responsibility for ensuring that the ITNs get to each health facility.

Net re-treatment campaign: According to the Director of the NMCP a mass mosquito net re-treatment campaign is planned for November of this year. The goal will be to re-treat up to 500,000 nets in Gaza, Tete, Inhambane, Zambézia, and Cabo Delgado Provinces. Funding is being provided by UNICEF for the re-treatment kits while USAID will finance most of the logistic and promotion costs of this activity.

Taxes and tariffs: Nets produced within the South Africa Development Community (SADC) can be imported duty free, meaning that Tanzanian produced Olyset[®] nets are not taxed. Permanets[®], which are produced outside of Africa, are taxed at 7.5% and organizations such as PSI and Malaria Consortium pay these charges. Raw materials used to fabricate nets are also taxable. Import taxes on spray pumps are set at 5% and on insecticides at 2.5%.

ITN needs and funding gap: Assuming a total cost of approximately \$7 for a LLIN, including operational costs for transportation, information, education and communication (IEC), and promotion, a funding gap of \$9.4 million remains to reach the country's ITN coverage targets. In-country partners already have well-developed plans to scale up ITN coverage. The World Bank project for Niassa, Nampula and Cabo Delgado Provinces, which is in its early stages of development, is expected to meet some of these needs in the future.

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 sector health services. As a result, beginning this year, all ITNs are now distributed free of charge through the health system to children under five years of age and pregnant women. 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 under five through an integrated campaign approach in order to allow for a rapid acceleration of LLIN coverage. This will be done on a district by district, province by province approach, reaching 100% coverage of all children under five years of age by the end of 2008. This campaign approach will be integrated as far as 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 visits (85% of pregnant women attend ANC at least once).

It is estimated that the distribution of nets through these two approaches will result in a national coverage of at least two nets per household.

Based on the GFATM Round 6 Proposal, of the estimated 4.3 million pregnant women and children under five years of age living in Mozambique, an estimated three million are eligible for LLIN distribution (with Maputo Province, three districts in Gaza Province, six districts in Zambézia province and people living in peri-urban and urban areas discounted as they are, or will be, covered by IRS). It is estimated that approximately 1.7 million LLINs are planned and financed for 2006-2007 through partners such as UNICEF, DfID, JICA, Spanish Co-operation and USAID (FY06 malaria funding). This leaves a gap of approximately 1.8 million additional nets over the next two years, if the very ambitious MoH 100% coverage of pregnant women and children under five years in ITN targeted areas are to be achieved.

Estimated ITN Needs and Gaps by Province* for 2006-2007
(Global Fund Round 6 Proposal)

Province	Children under five	Pregnant Women	Total nets required 2006	Total nets required 2007	Nets planned/ already financed 2006-2007	Gap 2006-2007
Niassa	144,000	45,892	189,892	47,039	195,891	41,039
Cabo Delgado	235,600	68,312	303,912	70,020	185,000	188,932
Nampula	504,488	167,721	672,209	171,914	280,000	564,123
Zambézia	359,963	87,344	447,308	89,528	317,344	249,491
Tete	250,247	69,335	319,581	71,068	177,834	212,814
Manica	222,414	56,610	279,024	58,025	266,609	70,438
Sofala	235,682	65,346	301,028	66,980	255,346	112,661
Inhambane	152,537	66,561	219,098	68,225	11,656	170,761
Gaza	144,426	40,696	185,122	41,714	50,696	186,139
Totals	2,249,356	667,818	2,917,174	684,513	1,845,284**	1,796,402

*Other provinces will be covered by IRS.

**Correct total should be 1,740,376.

In the mid- to longer-term, ANCs will be used to sustain the high coverage levels achieved during the “catch-up” phase described above. Long-lasting insecticide-treated nets will be distributed to pregnant women through routine ANCs, supported by the stimulation of commercial sector distribution through market priming approaches (currently ongoing through the Malaria Consortium and PSI). It is estimated that approximately 700,000 LLINs will be required annually to maintain distribution to newly pregnant women through ANCs, at an annual cost of approximately \$5 million.

Proposed USG Component: (\$3,650,000)

Insecticide-treated nets are a priority control intervention in Mozambique, particularly in rural areas and the MoH has declared that all nets distributed through public health facilities be free of charge. The NMCP emphasis on LLINs is appropriate, given the difficulties in trying to support regular net re-treatments in widely scattered populations. The NMCP supports distribution of free LLINs to children under five through the integrated campaign approach, as well as distribution of free LLINs to pregnant women through routine ANC visits. Since no nationwide child health days are planned for 2007, the PMI will coordinate with provincial level health departments to identify and/or promote provincial child health days and fund distribution of free LLINs in provinces that have low ITN ownership rates. Given the very high coverage targets set by the NMCP for both ITNs and IRS in Mozambique, the PMI will follow the national plan of targeting ITNs and IRS to different geographical areas over the next two to three years.

Assuming a total cost of approximately \$7 for a LLIN (including operational costs for transportation, IEC, and promotion) and a total of 1.7 million nets needed in 2006-07, a funding gap of \$9.4 million remains to reach the country’s ITN coverage targets. In-country partners already have well-developed plans to scale up ITN coverage. The World Bank project for Niassa, Nampula and Cabo Delgado Provinces and the PROSAÚDE Common Fund might finance some of the needs. The PMI will contribute to this effort to scale up distribution and usage of LLINs by:

- Procuring LLINs for free distribution through large-scale provincial child health campaigns (approx. 325,000 nets) and through MOH ANC services (approx. 125,000 nets). For distribution of ITNs to pregnant women through ANCs, the UNICEF/PSI approach described above for Gaza and Zambezia Provinces will be used (\$3,150,000). Note: This is in addition to the 250,000 LLINs provided by USAID with FY06 funding, bringing the grand total of LLINs procured through the PMI to approximately 700,000;
- Supporting additional distribution and IEC costs associated with ITN distribution through ANCs, (\$100,000);
- Supporting promotion, IEC/behavior change and communication (BCC), and distribution costs of ITNs during large-scale, provincial-level child health campaigns; (\$250,000)
- Contributing to the mass ITN re-treatment campaign that will take place in November 2006 (\$150,000). Note: USAID with FY06 malaria funding will provide a major portion of the funding for the November 2006 bed net re-treatment campaign, which will serve as a “jump start” activity for the PMI);

- Working with other partners and the MoH to investigate the existing GRM tax system to facilitate large-scale importation of nets from areas outside SADC (no additional cost to PMI); and
- Establishing entomology sentinel sites to monitor the levels of resistance to insecticides in selected areas where LLINs and IRS are used as well as where insecticides are used for agriculture; developing MoH capacity to ensure the quality of nets by monitoring insecticide concentrations on ITNs (no additional cost to PMI - this activity is covered under strengthening NMCP capabilities in general entomology and vector control in the IRS section).

Indoor Residual Spraying

Current Status, Challenges, and Needs

Indoor residual spraying is a priority vector control intervention of the MoH in Mozambique and in the southern African region as a whole. Several neighboring countries, including the Republic of South Africa and Zimbabwe, 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. In spite of this, 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 eradication era), although this program has been under-resourced;
2. The Lubombo Spatial Development Initiative (LSDI) has supported large-scale IRS in Maputo Province since 2000. This program is expanding into Gaza province in 2006, beginning in three districts but eventually expanding province wide; and
3. Based on the success of the LSDI program, the MoH is currently piloting IRS in three districts of Zambézia Province in 2006 to assess the feasibility and impact of IRS in a more highly-endemic rural area, with a plan to expand to a total of six districts in the province.

Lubombo Spatial Development Initiative IRS activities: The LSDI is a public-private trilateral program of the governments of Mozambique, South Africa and Swaziland to develop the Libombo region into a globally competitive zone for trade and tourism. Since malaria was identified as a major deterrent to development, the LSDI developed a specific program with the aim of reducing malaria throughout the region. The LSDI receives resources from the private sector and the GFATM via the South African Medical Research Council. It places a strong emphasis on evidence-based planning and implementation to demonstrate best practices.

LSDI introduced IRS in 2000 in the south of Maputo Province using bendiocarb (because of high levels of *A. funestus* resistance to pyrethroids) in two spray rounds a year and was incrementally extended to cover seven districts (population of 1.1 million) in the province by 2004. Manhica

District was the only district that was not covered, but beginning in 2006, the MoH will support spraying in Manhiça district (population of 142,164), Matola (population of 688,668) and Maputo City (population of 1.1 million). A total of 11 rounds of spraying have now been completed. A great deal of attention has been placed on training and supervising spray personnel and preventing leakage of insecticides from the program. Beginning in late 2005, DDT was re-introduced with one spraying round per year, when the GRM withdrew its ban on DDT. Spraying begins in September/October each year and is completed in a three-four month period, before the start of the main malaria season. DDT is now being used with one round of spraying/year in rural areas and carbamates in two rounds/year in urban areas. Spray personnel are recruited locally and given a two-week 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 the prevalence of malaria parasitemia has been recorded in children aged 2-15 years old from greater than 60% to less than 4% in the south of the province, and from 69% to 33% in the north of the province, where IRS was only introduced in 2004. In addition, a significant reduction in hospitalized cases of malaria and malaria deaths has been documented and mosquito densities have been significantly reduced. The financial costs per person covered in rural and peri-urban areas per year 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 analysis of the economic costs is ongoing.

The LSDI program in Maputo Province, received \$21.4 million in the GFATM Round 2 in 2002, and this funding will continue for an additional two years. Using resources from a successful GFATM Round 5 proposal (\$21.2 million), which only includes Mozambique, IRS is now being expanded to three districts (Chókwè, Guijá and Massingir) in Gaza Province in 2006 and is expected to cover a population of approximately one million throughout the province by 2009. 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 well-documented success of IRS and ACTs in Maputo Province, the MoH is piloting the introduction of IRS in the more highly endemic Zambézia Province in 2006 in a total of six districts over the next two years, using resources from the PROSAÚDE Common Fund. The LSDI provided start-up assistance to this program including survey support. LSDI staff is also well positioned to assist in monitoring and evaluation of implementation and impact, if additional resources are available, although no requests for further assistance have been forthcoming. The Medical Research Council of South Africa is supporting insecticide resistance testing and entomological monitoring of this program. The Zambézia IRS program was initiated in 2006 in the provincial capital of Quelimane and in some villages within the districts of Nicoadala and Namacurra with plans for expansion to the districts of Mocuba, Milange and Morrumbala in 2006/2007. This DDT spraying program will cover an estimated population of 1.64 million if 100% coverage is achieved.

Mozambique is currently expanding its IRS program to 25% of the population in 2006 and 30% in 2007, with IRS taking place in 46 different districts (partial coverage) out of 146 districts countrywide. During 2006-2007, the focus will be on consolidating IRS in areas where it is

currently targeted by improving coverage, quality, and timeliness of spraying. The MoH has invested significantly more resources in IRS in 2006. 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 the MoH's Central de Medicamentos e Artigos Médicos (CMAM). In addition, using FY06 malaria funds, USAID plans to procure spraying supplies, equipment and insecticide to support this activity.

The majority of targeted areas commenced spraying towards the end of January 2006. Of 442,000 structures that were planned for spraying nationwide by the MoH, 219,000 were sprayed, resulting in coverage rates of approximately 50%. Constraints identified by the MOH spraying program in 2006 included: a lack of co-operation by community leaders, theft of insecticide, rain hampering spraying, lack of transport, lack of co-operation by residents due to weak IEC, and insufficient operational costs.

At an approximate estimated cost of \$3.5 per person per year, covering 45% of the population with IRS will cost an estimated \$32 million a year. The table below shows a breakdown of estimated costs and available funding by year for the period 2006-2009.

Indoor residual spraying financial gap analysis
(2006 Interim Strategic Plan for Malaria Control, July 2006)

	2006	2007	2008	2009	Total
Population target (Strategic Plan)	5,101,186	8,161,898	9,182,136	9,182,136	-
Proportion of total population	25%	40%	45%	45%	-
Cost (\$3.5/person/year)	\$17,854,151	\$28,566,644	\$32,137,474	\$32,137,474	\$110,695,743
Funds available	\$17,076,170	\$18,030,752	\$7,487,372	\$5,019,731	\$47,614,025
Funding gap	\$777,981	\$10,535,892	\$24,650,102	\$27,117,743	\$63,081,718

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 that are 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.

Larval control: The MoH 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. Other larval control activities are being conducted by LSDI in the western part of Maputo province.

Proposed USG Component: (\$4,800,000)

The MoH views IRS as one of its major malaria control measures and wants to scale up coverage to 40% of the country's population in 2007 and to 45% by 2008. Nationally, spraying is scheduled to take place in all or part of 46 districts in 2006-2007 and efforts will be made to increase coverage, quality, and timeliness of spraying in areas where it is currently targeted. There is considerable expertise in-country to support planning, implementation, and monitoring and evaluation of spraying activities, particularly from the LSDI, and this valuable resource can be utilized to support the quality implementation and monitoring of IRS country-wide. To achieve the full impact of IRS, spraying campaigns must be carefully planned, initiated within one to two months before the rains (and the major malaria transmission season), and conducted with a well-trained and supervised staff who have strong logistic support.

The USAID FY06 malaria budget includes \$3,600,000 to finance commodities, technical assistance and local costs of the MoH IRS component. An Environmental Assessment covering the use of the insecticides DDT and bendiocarb for IRS in Mozambique is currently being prepared by USAID and the MoH and will be revised to reflect any concerns raised by citizens about the use of those insecticides during a period set aside for public comment. The Environmental Assessment also identifies risk-reduction actions that will be carried by the MoH and US Government contractors to ensure the safe and effective use of those insecticides. Following completion of the Environmental Assessment, these funds will be used to initiate the IRS activities that will be expanded and strengthened when PMI Year 1 funds are added in FY07.

Proposed PMI activities related to IRS include

- Building upon existing USAID FY06 activities by supporting the NMCP IRS program to achieve >85% coverage of households in up to six districts in Zambézia Province. This will include an assessment of ongoing spraying operations, assistance with planning, training and supervision of their next round of spraying (to begin in August 2007), extension of IRS to uncovered areas of the initial three districts, and a decision to extend to one or more additional districts in the province; (\$4,400,000 + \$3,600,000 of FY06 USAID malaria funds)
- Working with the NMCP to conduct a thorough evaluation of cost-effectiveness of the ongoing IRS program in Zambézia Province; (no cost to PMI as this activity is covered by USAID-Mozambique FY06 funds)
- Assisting the NMCP in strengthening their general entomologic and vector control capabilities. This will include upgrading insectary facilities and training of MoH staff at the central, provincial, and district levels in standard entomologic field and laboratory techniques; (\$250,000)
- In collaboration with LSDI staff, conducting an entomologic and cost evaluation of the larval control activities currently underway in the LSDI Project area. Determine whether larviciding has an impact on mosquito density and entomologic inoculation rates in an area with larviciding and a comparison area which is under IRS. The economic analysis will compare the costs and cost-effectiveness of larviciding with IRS; (\$150,000) and
- Working with the MoH and partners, including local officials, to strengthen the role of district health offices in urban and periurban areas, especially with regard to training of mid-level vector control staff and developing collaborative malaria-related

activities with municipal authorities (no additional cost to PMI, as this will be covered under other vector control activities).

Malaria in Pregnancy

Current Status, Challenges, and Needs

According to the 2003 DHS survey, 84% of pregnant women attend an ANC at least once during their pregnancy in Mozambique. Approximately 81% of pregnant women make two or more visits, although these visits tend to take place late in pregnancy. As would be expected, ANC attendance rates were found to be lower in rural than in urban areas. Several partners reported that ANC attendance rates have increased following distribution of free ITNs in those clinics.

Intermittent preventive treatment for pregnant women was approved as a national policy in May 2004. Because of high HIV seroprevalence rates, the NMCP recommends that women receive three doses of SP during their second and third trimesters. Thus far, implementation is limited to provincial and district capitals, but the NMCP is counting on the MoH Reproductive Health Section to expand this intervention to all 1,000 health facilities nationwide that provide ANC services over the next year. 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 MoH maternal and child health nurses who provide ANC services that include prevention of mother to child transmission of HIV/AIDS (PMTCT) as well as IPTp.

The table below gives the target for IPTp established by the NMCP in their draft interim 2006 Strategic Plan for Malaria Control. This target is similar to the RBM indicator for IPTp but much more restrictive, in that it only applies to women attending health facilities:

Intermittent preventive treatment target (Draft Interim Strategic Plan for Malaria Control, July 2006)

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

If it is assumed that pregnant women make up about 5% of the total population, then approximately 900,000 women will be pregnant in Mozambique during any year. If each pregnant woman is to receive three treatments with SP, a total of 2.7 million treatments will be required annually. According to the NMCP, there is sufficient SP in the planned kit procurements to meet all SP needs for 2006-2007. The amount allotted to training, BCC, and health education related to IPTp and diagnosis and treatment of malaria in pregnancy in general is not clear in the interim Strategic Plan or the Gap Analysis.

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.

Many pregnant women are also HIV+ and are learning their serologic status when they receive PMTCT services offered as part of an ANC visit. Seropositive women are referred to HIV Day Hospitals for CD4 testing and enrollment in antiretroviral therapy as appropriate. In FY07, many of the President's Emergency Plan for AIDS Relief (PEPFAR) PMTCT partners will introduce cotrimoxazole prophylaxis for seropositive women, which will preclude the provision of SP because of an increased risk of adverse drug reactions. Centers for Disease Control and Prevention and USAID officials will work closely with the MoH Reproductive Health Section officials to develop appropriate ANC protocols and guidelines, while PEPFAR and PMI implementing partners will assist in 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 800,000 projected pregnancies annually, 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.

Proposed USG Component: (The costs for this component are covered under Case Management)

Although ANC attendance rates for pregnant women in Mozambique are reported to be quite high, visits often occur late in pregnancy. If distribution of free ITNs to pregnant women through ANCs increases attendance earlier in pregnancy and the number of ANC visits, these clinics would be the best setting in which to deliver IPTp. As the MoH plans to expand IPTp to more peripheral health facilities over the next year, a review of existing training and IEC materials related to malaria in pregnancy will be needed and additional support should be provided to the MoH in training health workers and disseminating health messages about malaria in pregnancy.

- Support distribution of free LLINs through ANCs (covered in ITN section – page 17);
- Support training and supportive supervision of health care workers in IPTp and the diagnosis and management of malaria in pregnancy (covered in Case Management section – pages 33-34). Optimize delivery of the full package of ANC services which includes PMTCT by linking PEPFAR and PMI implementing partners working in the same health facilities and technical advisors working with central level reproductive health staff to review and refine protocols and guidelines to include pregnant women who are HIV positive;

- Support a review of existing information on knowledge and perceptions related to malaria in pregnancy in Mozambique and development of IEC/BCC messages to make women aware of the risk of malaria during pregnancy, promote attendance at ANCs and the use of IPTp beginning early in the second trimester of pregnancy, and completing the recommended three treatments (covered in Case Management section – pages 33-34); and
- SP needs for IPTp and quinine needs for treatment of malaria during pregnancy are already met by the MoH through donor funding to the Medicines Common Fund.

INTERVENTIONS – CASE MANAGEMENT

Malaria diagnosis

Current Status, Challenges, and Needs

Malaria diagnosis in most MoH 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 unclear. The Instituto Nacional de Ciências da Saúde is responsible for the training and supervision of malaria microscopists and quality control of malaria microscopy. Senior laboratorians from the Instituto Nacional de Ciências da Saúde and the NMCP make periodic supervisory visits to provincial laboratories for refresher training and quality control of microscopy. The most recent refresher training conducted in November/December 2005 included two microscopists from each province. The periodicity and content of such courses is not clear. The Secção de Laboratórios of MoH 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 which tests will be recommended and quality control is currently under development.

Although not stated as such in the 2006-2009 Strategic Plan for Malaria Control, it appears that in rural areas, in accordance with WHO recommendations, children less than 5 years of age with symptoms suggestive of malaria will be treated presumptively, while older children and adults will have a diagnostic test. In urban areas, all children and adults will undergo malaria diagnostic testing before treatment.

No written policy on laboratory diagnosis of malaria or the proposed role of microscopy and rapid diagnostic tests (RDTs) exists, but the NMCP has expressed interest in introducing the use of RDTs in public health facilities in 2006 and strengthening microscopic diagnosis where it already exists. An RDT produced by Amrad-ICT, which identifies *P. falciparum* infections based on detection of the histidine rich protein-2 of that species, was introduced at health facilities in Maputo Province as part of the LSDI Project in 2003. According to the 2006 interim Strategic Plan for Malaria Control, the use of RDTs will be extended to the remainder of Mozambique in the near future. 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.

Ministry of Health procurement of RDTs will be handled through CMAM. With FY06 malaria funds, USAID will procure RDTs through the USAID/Washington central mechanism with UNICEF. According to the draft Gap Analysis (July 2006) conducted by a consultant to the MoH, assuming a cost of \$0.60 per RDT and the estimated annual needs, the total required budget for procurement of RDTs in 2007 will be \$3 million, rising to \$4.2 in 2008 and \$4.8 in 2008. A total of \$2.7 million is already available for the purchase of RDTs in 2007. No information is 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 2005, USAID procured microscopes that were delivered in 2006.

Proposed USG Component: (\$860,000)

With ACTs costing considerably more than AQ-SP, accurate diagnosis will be critical to target antimalarial drug use to infected patients and reduce the unnecessary use of these drugs that occurs when patients are presumptively treated for malaria. The PMI views malaria laboratory diagnosis as a key component of good case management and will support strengthening of malaria diagnosis in MoH facilities with diagnostic laboratories. The PMI also recognizes the benefits of combining malaria laboratory training with training done by partners working on other diseases.

Proposed activities during Year 1 are as follows:

1. Together with the MoH and partners, develop a strategy and plan for the use of microscopy and RDTs at different levels of the health system and in different clinical settings in the country, including decisions on which age groups should have malaria laboratory diagnosis; (\$30,000)
2. Procure additional microscopes and microscopy supplies. This includes one multiple-headed teaching microscope, 80 binocular microscopes and 80 microscopy kits (slides, lancets, reagents, etc. for 1,000 diagnoses each); (\$450,000)
3. Establish a renovated and fully equipped primary reference diagnostic and training center at the National Institute of Health in Maputo; (\$60,000)
4. Work with the NMCP and the Instituto Nacional de Ciências da Saúde to strengthen pre-service and in-service training for laboratory technicians in malaria diagnosis, including both microscopy and RDTs. This will include the following: (\$320,000)
 - a. develop and implement a plan for microscopy training among MoH laboratorians, including training for incoming laboratory workers and refresher training for current technicians;
 - b. provide an in-depth refresher course on malaria for senior laboratory staff at the reference diagnostic and training center. These will be the professionals responsible for training laboratory technicians at the provincial level, quality control, and other activities related to malaria diagnosis;
 - c. provide support for on-the-job training for MoH laboratory workers in malaria microscopy and the use of RDTs at the province level. This activity should be coordinated with activities of the MoH or other partners related to improving laboratory diagnosis of other diseases, e.g., HIV/AIDS, tuberculosis, etc.; and
 - d. develop and implement a plan on quality control of microscopy and RDT diagnosis, including regular supervisory visits, systematic review of a

predetermined percentage of positive and negative blood smears, and simultaneous use of both tests in a small percentage of cases to check accuracy.

Pharmaceutical Management and Treatment

Current Status, Challenges, and Needs

Structure of the pharmaceutical management system: The Central de Medicamentos e Artigos Medicos (CMAM), under the direction of the National Health Directorate within the MoH, has primary responsibility for supplying the national public health system with medicines and medical supplies, including all malaria-related supplies other than ITNs. CMAM is responsible for forecasting drug needs and for supervising the procurement, storage and distribution of medicines and supplies, which have been out-sourced to the recently privatized company, Medimoc. Under its contract with the MoH until the end of 2007, Medimoc is responsible for managing the tender process, customs clearance, central warehouse storage and delivery to provincial warehouses. CMAM is directly involved in all of these activities, maintains full authority over decision-making and provides Medimoc with direct instructions. The NMCP coordinates with CMAM on issues related to the quantification, purchase and distribution of antimalarials.

Medicines and supplies for the public health system are delivered to one of the two central warehouses in Maputo City and Beira City, managed by CMAM and Medimoc, which 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 in turn 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. Where CHWs operate, health facilities supply them with the appropriate medicines, which are contained in a kit designed for use in the community.

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. Estimates for first- and second-line treatments in 2007 are based on an expected total of 6,733,887 episodes of malaria to be treated in the government health system, using the following assumptions:

	Rural Areas	Urban Areas	Total
Projected population	13.9 million	6.5 million	20.4 million
Malaria prevalence	50%	10%	-
Episodes per person	2	2	-
Health facility utilization	40%	90%	-
Total number of episodes treated	5,565,514	1,168,373	6,733,887

The use of prevalence and an estimate of two episodes per person uniformly across all age groups to calculate the expected number of episodes, rather than incidence data by age group, raises concerns about the accuracy of the forecasted needs. In particular, an estimate of two

episodes per person in the population of children under five seems low, while two episodes per adult may be too high. The quantity of AM-LUM treatments needed for second-line treatment in 2007 was calculated as 10% of the total number of expected cases to be treated in the government health system for each of the four treatment groups, for a total of 673,389 treatments.

According to one calculation seen by the PMI assessment team in July 2006, the estimated need of quinine ampoules (600mg/2ml) for treatment of severe malaria was calculated as 10% of the total need, i.e. 673,388 ampoules. In almost all drug calculations reviewed by the PMI assessment team, an additional 10% was added to the estimate for safety stock, as is customarily recommended.

Once the NMCP estimates its needs, it submits them to CMAM, which reviews the Program's calculations of quantities needed, verifies the accuracy of the estimates by comparing them with the data they have in their records from the previous year on the number of antimalarials requested from the provinces in their quarterly requisitions and subtracting the amount of stock-on-hand at the central and provincial levels. The final list is then shared and discussed with the NMCP, which has the opportunity to appeal the revised list. After the cost of the NMCP's needs have been estimated, CMAM considers the total cost of medicines and supplies for all the health programs and allocates a portion of its total budget to each program. When the budget is insufficient to cover all programs' needs, CMAM allocates its funds to the different programs based on the total cost of the programs' estimated needs, the programs' relative priority within the MoH, expected donations, and other considerations.

In 2006, the NMCP's needs were estimated at \$16,935,000, of which \$5,000,000 was earmarked for antimalarials and the remainder was for insecticides, spraying equipment, and diagnostic equipment and supplies. CMAM ended up allocating \$9,767,500 to the NMCP (57.7% of the total estimated need), of which \$2,500,000 (50% of the need) was assigned to antimalarials. According to CMAM, it funded only 50% of the estimated malaria needs because: (1) the MoH was expecting an in-kind donation from the World Bank; (2) it was concerned about the availability of ACTs in the international market and was not confident that it would be able to buy as had been estimated; and (3) it did not think the new treatment policy would be implemented as quickly or as widely as the NMCP was planning.

Estimated antimalarial drug needs and costs (Gap Analysis, June 2006)

Drug	Tablet	Cost	2007 estimated need	2007 cost	2008 estimated need	2008 cost
AS	100 mg	\$1.14*	6.7 m	\$7.6 m	6.7 m	\$7.6 m
SP	500mg/25 mg					
AM-LUM	20mg/120 mg	\$1.65*	670,000	\$1.1 m	670,000	\$1.1 m
Quinine (tablets)	300 mg	\$0.022	36.9 m	\$800,000	36.9 m	\$800,000
Quinine (ampoules)	300 mg	\$0.11	670,000	\$74,000	670,000	\$74,000
SP (IPTp)	500mg/25 mg	\$0.015	6.3 m	\$95,000	6.3 m	\$95,000

*Average costs of the four different pre-packaged dosages for the different age and weight groups.

Because first-line treatments are included in the medicine kits, some of the antimalarials are purchased through the medicine kit program, which has its own line of funding. The quantity of first-line treatments is determined by the Technical Therapeutic Committee, using criteria that are either not clear or are not made known to the health programs. In 2006, CMAM's budget covered 100% of the estimated needs for the kits.

Procurement: CMAM's procurement procedures appear to be compliant with international standards, enforced, and well-established. Medimoc, under the supervision and direction of CMAM, is responsible for procuring the antimalarials used in the public health system. CMAM supervises the process to ensure that it involves free and fair competition and that the medicines and supplies comply with international quality standards.

Two quality assurance mechanisms are used to ensure the procurement of quality medicines and supplies: (1) bid documents must include an origin certificate issued by laboratories that are certified by accredited bodies acceptable to the MoH and according to the WHO certification scheme of pharmaceuticals in international commerce; and (2) samples are required 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.

According to numerous sources, the importation process in Mozambique can be long and complicated, particularly for non-GRM procurements. The Supply Change Management System Program of PEPFAR has documented step-by-step instructions designed to facilitate the process and prevent unnecessary delays. Following these steps will help expedite the importation process for PMI.

CMAM procures medicines through one large annual tender, as well as smaller quarterly tenders, as needed. First-line antimalarials included in the medicine kits, and all the other contents of the kit, are procured once a year from a single supplier. Thus, suppliers put in a bid to supply all of the medicines and commodities included in the three different kinds of kits (A, B and C), assemble the kits and deliver them directly to the provinces. In 2006, most kits were procured through the International Dispensary Association. All other antimalarial drugs, including artesunate, which was introduced in some provinces as part of the new first-line therapy, are procured independently by CMAM and Medimoc.

Distribution: Currently, antimalarials are distributed through two mechanisms: the kit system, which is considered a "push" system, and the 'via classica,' which is a "pull" system.

The kit system distributes three different kits, each with its own pre-defined set and quantity of essential medicines. Kits are delivered directly to provinces by the supplier semi-annually and are then distributed on a quarterly basis to the district warehouse, from which they are then sent out to the health centers, health posts and community health workers 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 and the stock-on-hand.

	Type of facility	Provider type	No. of consultations	No. of drugs in kit	Antimalarials (and quantities of tablets) in 2006 kits
Kit A	Health center	Physician	1,000	60	AQ – 3,500 SP – 1,500
Kit B	Health post	Nurse	500	40	AQ – 1,500 SP – 1,000
Kit C	Community health worker	CHW	250	25	Chloroquine – 1,000

Because AQ-SP was the first-line treatment when the 2006 kits were ordered, these drugs are still being distributed in the kits. Facilities that have already changed to AS-SP, but are still receiving kits with AQ, have been instructed to remove the AQ from the kits and to discontinue its use. All of the kits being procured this year for distribution in 2007, including Kit C (per an authorization given during the time of the assessment visit), will contain AS-SP. Artemether-lumefantrine and quinine (tablets and ampoules) are not used at the lower levels of the health system, and therefore are not included in any of the kits.

The so-called “via classica” is the system for distributing antimalarials to warehouses and hospitals at the central, provincial, and district levels. In the “via classica,” warehouses, hospitals, and facilities submit requisitions to the distribution point above them for the medicines they will need for the next quarter, in addition to a 3-month buffer stock. Assessments of availability and stock-out times of first-line antimalarial drugs as well as anecdotal evidence from informants interviewed, suggest that stock-outs of antimalarials are common at MoH facilities.

CMAM, in collaboration with John Snow International DELIVER Project and the Supply Chain Management Service, with funding from USAID, is in the process of setting up a computerized integrated drug management system (SIGM by its Portuguese acronym) to improve the distribution and overall management of stock. SIGM is currently being implemented at the central level and will be rolled out to the provinces by the end of 2007. 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 for quantification purposes.

The MoH, with assistance from the John Snow International DELIVER Project, has developed a detailed procedural manual for the management and distribution of medicines at the provincial, district, hospital, and health facility levels. The manual is an accurate and in-depth resource on such topics as requisition, central level supply, stock management and storage, distribution to a dependent unit, scheduled supply of medicine kits, collection and recovery of costs, and flow of information and filing. During 2004, most pharmacy and some clinical staff (1,700 in total) working in the 1,200 health facilities of the country were trained to use the updated drug management procedures.

Pharmacovigilance: The pharmacovigilance system in Mozambique was implemented by the Center for Drug Information in collaboration with disease control programs, including malaria,

to monitor the safety of all drugs, particularly those that have been newly introduced. There is little information on how well the pharmacovigilance system for malaria is functioning. With the introduction of ACTs, it will be necessary to monitor adverse reactions closely for several years.

Non-governmental organizations and the private sector: Although none of the NGOs reported distributing ACTs, many do work with CHWs, who are potential mechanisms for delivering these drugs at community-level in accordance with the NMCP's strategy to increase access. Because Mozambique does not have a long-standing or extensive MoH-sponsored CHW program, major considerations would include: distribution of kits, inventory management, supervision, and prescribing quality.

Use of the formal and informal private sector for malaria treatment in Mozambique is very low and is concentrated primarily in urban areas, where private health facilities and pharmacies operate; informal drug sellers are uncommon in rural areas. Private pharmacies are regulated by the Pharmacy Department and must be registered with the MoH in order to operate. Legally, pharmacies are not allowed to dispense antimalarials or other regulated classes of drugs without a prescription. Population Services International has plans to conduct a survey in private pharmacies in Maputo City, which will look at the availability of antimalarials, as well as prescribers' reported treatment practices for malaria.

Antimalarial drug efficacy: Between 1998 and 2001, a series of 28-day *in vivo* drug efficacy studies of chloroquine, amodiaquine (AQ), and sulfadoxine-pyrimethamine (SP) monotherapy were conducted in Manhiça, using the WHO standardized protocol. Researchers reported resistance levels of 80% for chloroquine, 26% for AQ, and 21% for SP. Studies that were done in 2003 at two sites in the LSDI Project area showed failure rates of 9% and 12% with SP monotherapy and 2% and 4% with artesunate-SP (AS-SP). USAID is currently funding additional efficacy tests on two combination therapies AS-SP and SP-AQ at six sentinel sites. Results should be available by the end of this year.

Antimalarial treatment: Over the last four years, Mozambique has undergone two 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 another ACT, artemether-lumefantrine (AM-LUM) as the second-line therapy. Sulfadoxine-pyrimethamine was chosen over AQ because of the side effects of AQ and the potential for cross resistance with chloroquine. Quinine is the third-line drug and is recommended by the NMCP for the treatment of severe malaria. New MoH treatment guidelines for malaria were recently released and distributed to all provinces. Although not included in the written guidelines, the NMCP has stated that artesunate rectal suppositories can be used for the emergency treatment of severe malaria in children in settings in which intramuscular or intravenous quinine can not be administered, as recommended by the WHO. The treatment guidelines also state that AS-SP should not be used in children under six months of age but no alternative is offered. The use of ACTs by CHWs is not authorized by the MoH.

Implementation of AS-SP started in Maputo Province in late 2002 as part of the LSDI. The MoH began to scale up implementation of AS-SP in the remainder of the country beginning in

early 2006, but the level of ACT roll out varies from province to province, being most advanced in Maputo, Gaza, Sofala, Zambézia, and Nampula Provinces. The Malaria, HIV and Tuberculosis Coordinators in each province were trained on the new policy in 2006 as part of a one-day workshop and they were then made responsible for training health workers at the district and health facility levels. At the present time, only those health facilities with a physician are using AS-SP. The NMCP estimates that 50% of malaria patients attending MoH facilities received a combination therapy (AQ-SP or an ACT) in 2005, but this information is not based on any large-scale survey. It is expected that all levels of health facilities (including community health posts) will be implementing ACTs by 2007. Problems with ACT implementation have also been reported, including drug stock outs, AM-LUM being used as the first-line drug, and frustration on the part of patients because of poor health worker attendance at health facilities.

All antimalarial treatment in MoH facilities is free of charge, although patients do have to pay a minimal fee for being seen in a health facility (\$0.05) and a similar fee for their prescription. There is no clear MoH policy on user fees, so that most patients do not know what the true fees are and these may vary from one facility to another.

Although not stated as such in the interim 2006 Strategic Plan for Malaria Control, it appears that in rural areas, in accordance with WHO recommendations, children less than five years of age with symptoms suggestive of malaria will be treated presumptively, while older children and adults will have a diagnostic test. In urban areas, all children and adults will undergo malaria diagnostic testing before treatment.

Very little is known about antimalarial drug prescribing practices in the public and private sectors. A health facility survey on the quality of malaria care, including health worker performance, is currently underway and results should be available by the end of this year.

The treatment regimens recommended by the NMCP are as follows:

Uncomplicated malaria:

First-line treatment: AS-SP

AS: 3.2 mg/kg/day for three days (adult dose: 200 mg per day)

SP: (25mg/kg sulfadoxine and 1.25 mg/kg pyrimethamine) in a single dose on the first day (adult dose: 1500 mg of sulfadoxine and 75 mg pyrimethamine per day)

Age	Dose in number of tablets			
	Artesunate (100mg)			SP (500mg/25mg)
	Day 1	Day 2	Day 3	Day 1
< 6 months	Not recommended			
6–11 months	¼	¼	¼	½
1–6 years	½	½	½	1
7–13 years	1	1	1	2
>13 years	2	2	2	3

Second-line treatment: AM-LUM (co-formulated, each tablet contains 20 mg of AM and 120 mg of LUM). Dosing schedule (6 doses over three days):

Weight	Age	Number of tablets/dose	Total number of tablets
<5kg	<1 year old	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
>34kg	> 14 years old	4	24

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 to complete a 7-day course as soon as patient can take oral medicines.

Malaria in pregnant women:

Quinine: 10 mg/kg IV per dose every 8 hours (always start IV treatment regardless case severity; no loading dose).

The table below gives the indicators and targets for malaria case management established by the NMCP in their draft interim 2006 Strategic Plan for Malaria Control. It should be noted that several of these indicators are similar, but not identical, to RBM indicators:

Malaria case management targets

(Draft Interim Strategic Plan for Malaria Control, July 2006-2009)

INDICATOR	Baseline 2001	2006	2007	2008	2009
Proportion of people with fever who receive treatment at health facility within 24 hours of start of symptoms	17-20%	25%	35%	50%	60%
Proportion of children under five with uncomplicated malaria treated according to national guidelines	40%	60%	80%	95%	100%
Proportion of under fives with severe malaria treated according to national guidelines in health facilities	28%	≥95%	≥95%	≥95%	≥95%
Proportion of non-urban districts with one or more CHWs trained in diagnosis and management of fevers	1%	1%	10%	30%	40%

According to the draft Gap Analysis, 6.7 million people will need to be treated annually with AS-AQ in 2007, 2008, and 2009. It is estimated that this will cost \$9.8 million annually. In 2006, the estimated cost for AS-AQ was \$5 million, of which approximately \$2.5 million in funding is already available from the Common Basket for drugs fund, leaving a gap of \$2.5 million. No information is available on the cost of training, supervision, drug distribution and

management or BCC related to the roll out of ACTs, but these activities are likely to increase the total cost considerably.

Proposed USG Component: (\$5,410,000)

Ensuring prompt, effective, and safe ACT treatment to 85% of patients with confirmed or suspected malaria in Mozambique will represent one of the greatest challenges for the NMCP, given the country's weak pharmaceutical management system, the scale up of laboratory diagnosis, and the need for behavioral changes among patients and health workers. The complexity of ACT implementation should not be underestimated with the short shelf-life of AS and AM-LUM (18-24 months), and the high levels of coverage that need to be attained. Since increasing ACT coverage rates is a high priority both for the NMCP in their National Malaria Strategic Plan for 2006-2009 and the PMI, the PMI will coordinate its activities with those of the NMCP and other partners. As the MoH plans to expand ACTs to more peripheral health facilities, a review of existing training and IEC materials related to malaria case management in general and ACTs specifically will be needed and additional support provided to the MoH in training health workers and disseminating health messages about the new treatment policy. The USAID FY06 malaria budget includes \$500,000 for the purchase of AM-LUM.

Proposed activities during Year 1 of the PMI are as follows:

- Procure supplies of AS-SP, AM-LUM, and artesunate suppositories through a central mechanism; (\$3,000,000);
- Together with other partners, provide technical assistance to the NMCP in updating the national malaria treatment policy (including use of rectal artesunate suppositories, treatment of children under 6 months of age, and clarification of the role of CHWs in dispensing ACTs) and development of a detailed, written ACT implementation plan that addresses: (the cost of this activity is covered under the following point)
 - estimation of drug needs and gaps;
 - importing, quality control, storage, and inventory management;
 - coordination with the MoH on drug distribution;
 - appropriate use;
 - training and supervision of health workers (including instructions on how to deal with children less than 6 months of age);
 - IEC for health workers and patients;
 - phasing out of AQ from the public and private sectors;
 - pharmacovigilance and surveillance for adverse drug reactions and rapid response to reports/rumors of severe reactions; and
 - monitoring of implementation/evaluation of coverage;
- Facilitate importation of PMI-funded ACTs and provide expert technical assistance for the planned MoH pharmaceutical management system strengthening activities, including improved coordination between the NMCP and CMAM and additional support to the US Government-funded computerized drug information system (SIGM); (\$710,000)
- Support pre- and in-service training and supportive supervision of health workers in the public and private sectors to ensure good ACT prescribing and dispensing practices in coordination with MoH Integrated Management of Childhood Illness (IMCI) program. Support training on severe malaria recognition and case management; (\$700,000)

- Support a review of existing information on knowledge and perceptions related to malaria treatment in Mozambique and development and implementation of an IEC/BCC plan for ACT implementation, including field testing and roll out of training materials. This activity could include other sectors of the civil society in Mozambique, such as the use of traditional healers and the school system; and (\$700,000)
- Support implementation of ACTs at provincial, district, and health facility levels through improved storage, distribution, inventory, and monitoring/information systems; (\$200,000)
- Support development of policy on the role of the private sector in antimalarial treatment, including ACTs; (\$100,000)
- Support *in vivo* drug efficacy studies of first- and second-line treatments; (the cost of this activity is covered under Monitoring and Evaluation section).

BEHAVIOR CHANGE AND COMMUNICATION/INFORMATION, EDUCATION AND COMMUNICATION

Current Status, Challenges, and Needs

Both the NMCP and partners agree that BCC/IEC related to malaria advocacy, prevention, and control needs to be strengthened. The NMCP reports that public awareness about how to prevent and treat malaria is low, particularly in rural areas, in spite of the MoH's twice yearly promotion of National Malaria Awareness Days. In addition to the NMCP IEC officer, each province has a health education and communication coordinator who is expected to play an active role in educating patients and communities about malaria interventions and other health-related topics, but these coordinators are over-stretched and not able to devote significant time to malaria prevention and treatment messages.

The MoH has taken some steps to begin addressing this problem. A draft communication strategy called, "Moving from Malaria Awareness to Behavior Change Communication" has been developed. The goal of this strategy is, "to reduce malaria morbidity and mortality in Mozambique through the adoption of positive behavior change among members of key target groups." The five strategic malaria communication themes are:

- indoor residual spraying;
- case management of malaria;
- ITNs and other vector control methods;
- prevention of malaria in pregnancy; and
- community-based malaria activities and advocacy.

In addition to the draft communication strategy, the MoH has included a section on "Health Promotion and Mobilization" in its interim 2006 Strategic Plan for Malaria Control. These two documents offer a starting point for developing a unified and comprehensive national plan for BCC related to malaria. The MoH 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.

According to the draft interim Strategic Plan for Malaria Control, a total of \$466,640 will be spent on BCC/IEC and community mobilization interventions between 2006 and 2009. This figure depends largely on the assumption that many of the interventions will be conducted through volunteer means, therefore reducing costs. Depending on the extent of research, pre-testing and dissemination methodologies used, i.e., radio public service announcements or longer-running serials, local music and theatre groups, mobilizing communities through participatory research or training techniques, the real cost for a comprehensive BCC program for malaria will likely be much higher.

Proposed USG Component: (the cost for this activity is included in the Treatment section – pages 33-34)

The success of an integrated malaria control program depends in large part on the understanding and acceptance of residents 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. Understanding the physical and cultural constraints that limit the ability of men and women to prevent and reduce malaria morbidity and mortality, to develop appropriate messages that facilitate increased knowledge and result in adoption of appropriate behaviors for communities with different ethnicities and geographic features will be critical for the success of the NMCP's efforts to control malaria over the coming years.

- Provide experienced BCC advisors to assist the Health Education Department (RESP) at the central MoH and the Provincial Health Educators to implement IEC/BCC activities that are culturally suitable and appropriate to increase the acceptance of and access to the key malaria interventions--ITNs, IPTp, ACTs, and IRS.
- Provide a mechanism to increase and expand the role of FBOs, community-based organizations, local leaders such as village chiefs and town mayors, and traditional healers and birth attendants in educating, promoting and facilitating the adoption of behaviors that will result in significant decreases in malaria in urban and rural communities.

CAPACITY BUILDING WITHIN THE NATIONAL MALARIA CONTROL PROGRAM

Current Status/ Challenges and Needs

The NMCP is responsible for policy development, establishing norms, and planning, organizing, and oversight of all malaria control activities in the country, in collaboration with other key staff from the Community Health Department, the Pharmacy Department, CMAM, the Epidemiology Department, and others. NMCP is staffed with a medical epidemiologist director, an entomology technician, two entomology assistants, a parasitologist, an IEC 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. The MoH is currently recruiting entomology/vector control technicians for each of the 11 provinces. The NMCP links 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 delivery IEC/BCC messages. These

groups also have staff at provincial and district levels who help to implement malaria activities. In addition, 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 is severely overstretched and in need of additional 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 current level of training of staff in MoH facilities related to malaria prevention and treatment is quite variable, and most are in need of training or re-training on the appropriate use of ACTs, IPTp, ITNs and IRS. The NMCP also recognizes the need to strengthen its entomologic capabilities. With the initiation of the MOH's accelerated plan for long-term training and a myriad of short-term in-service training activities programmed and/or underway, there are many opportunities to include malaria-related training in other courses, particularly those funded by the US Government through PEPFAR and other USAID Health Team training interventions.

Proposed USG Component: (no additional cost to PMI)

Strong and effective leadership by the NMCP will be critical to the success of the Mozambique MoH malaria control efforts funded by the GFATM, other international donors and the PMI. Successful implementation of the new treatment, IPTp, and ITN policies will depend on a well-trained and active malaria staff at all levels and their ability to work collaboratively with MoH coordinators and health workers in implementing maternal and child health services and with those who provide support services in pharmaceutical logistics management and health information systems.

To reach the NMCP targets for coverage with ACTs, ITNs, IPTp, and IRS, the 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 municipal 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 training. The PMI plans to place two health professionals in country in FY 2007. Ideally, these two individuals should occupy working space in or near the NMCP offices to ensure close contact and coordination and provide maximum opportunity for building technical, managerial, and logistic capacity within the NMCP. They should also work closely with technical advisors and MoH program managers in related maternal and child health/reproductive health programs, in CMAM and others. Proposed activities are as follows:

- Work with other partners and the NMCP to assess Malaria Program staff training and development needs and infrastructure needs at the central, provincial, and district levels; develop a plan to fulfill those needs; and
- Work with other partners and the NMCP to identify ways to increase the staff available to and collaborating with the NMCP at all levels to implement the key components of the PMI.

MALARIA SURVEILLANCE/MONITORING AND EVALUATION OF MALARIA CONTROL ACTIVITIES

Current Status, Challenges, and Needs

Malaria is included in the reporting system of notifiable diseases managed by the Departamento de Epidemiologia in which all public health facilities are expected to report on the number of malaria cases on a weekly basis. Although cases are stratified by age group (<5 years old and ≥ 5 years old), no effort is made to distinguish clinically diagnosed cases from those that are confirmed by laboratory testing. The data are transmitted to the provincial and, subsequently, to the national level. While this program is 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.

The NMCP also collects information on malaria case fatality rates from a sentinel surveillance system based in provincial, general, and rural hospitals throughout the country. UNICEF has recently completed an exercise to map the geographic location and extent of malaria control interventions nationwide, but with the rapid scale-up and evolution of malaria interventions in Mozambique, information will need to be updated on a regular basis.

Although the NMCP recognizes the importance of close monitoring and periodic evaluation of its activities, national capability for data gathering and analysis is quite limited and little up-to-date information is available on the coverage or quality of malaria control operations. The last large-scale health survey in Mozambique was the DHS in October-December 2003. This included a module on malaria, but some of the questions differed slightly from those present in the current standardized malaria module recommended by the RBM Monitoring and Evaluation Working Group. Little information is available on the quality of malaria diagnosis or delivery of malaria interventions at the health facility level.

Strengthening its monitoring and evaluation capabilities is a high priority for the NMCP and its partners. A large-scale survey that will provide reporting information for the GFATM grant and baseline data for the 2007-2009 Strategy and Plan is planned for late 2006 or early 2007. A serious complication is the fact that the staff of the National Institute of Statistics, who have the mandate and expertise to conduct this type of large-scale survey, are already heavily committed with the planning, implementation and tabulation of the National Census of 2007 and may not be able to support another large-scale survey before 2008.

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 determine the levels of HIV and malaria mortality over the previous twelve months as initially reported during the Census. A total population of approximately 844,000 residents in all 11 provinces will be covered by the INCAM survey. This survey, which will be implemented by National Institute of Statistics with assistance from the MoH and the Center for Health Investigation in Manhica, can also strengthen the overall health information system by providing estimates of mortality indicators. A PEPFAR-funded National Institute of Statistics pilot census,

which will be conducted in October-November 2006, one year before the actual Census, will include a pilot mortality survey to ensure logistic and economic feasibility.

Proposed USG Component: (\$1,280,000)

Reliable and well-functioning malaria surveillance and health information systems are crucial for monitoring trends in malaria morbidity and mortality and guiding the NMCP's implementation of control measures. The existing surveillance systems are weak and do not meet all the needs of the MoH or the NMCP. Efforts to improve malaria surveillance in Mozambique should complement those of other disease control programs, such as HIV/AIDS and tuberculosis, as well as strengthen the MoH Departamento de Epidemiologia's notifiable disease system. One way in which this might be done is by strengthening malaria surveillance at sentinel sites throughout the country, where the quality of parasitologic diagnosis and regular reporting can be ensured.

Monitoring and evaluation to measure progress against project goals and targets, to identify problems in program implementation and allow modifications to be made, and to confirm that those modifications are having their desired effect will be a critical component of the PMI. In Mozambique, rapid scale up of malaria prevention and control interventions and achieving high coverage rates with ACTs, ITNs, IPTp, and IRS are priorities not only for the PMI, but also for the NMCP, the GFATM, and other national and international partners working on malaria.

The PMI has adopted a general monitoring and evaluating framework that has been adapted to the context of each country. According to this framework, specific activities are monitored on a regular basis to allow in-country program managers to assess progress and redirect resources as needed. Activities within four main intervention areas, ITNs, IRS, IPTp, and case management with ACTs, will be tracked through periodic reports from groups providing commodities, health facilities, and international and local partners. Types of activities that will be monitored will include procurement and distribution of commodities, availability of commodities for prevention, diagnosis and treatment of malaria, health worker performance, IEC efforts, supervision and training for health care workers, and monitoring drug and insecticide efficacy and effectiveness.

Nationwide information on coverage with ITN, IPTp and ACTs will be obtained from periodic, large-scale surveys. The first of these is the nationwide MIS survey, which is tentatively scheduled for February 2007. To complement these data, hemoglobin levels in pregnant women and children under five and malaria parasitemia in a sample of children under five will also be measured during the survey. Given the high cost of such surveys and the fact that the results will be of general use to the GFATM, UNICEF, the World Bank, and other groups, other donors will be approached to provide partial funding for this survey. The number of houses in areas targeted by the NMCP for IRS in Mozambique during Year 1 will depend on the detailed mapping of provinces and districts where spraying will be conducted in 2007. Once that information is available, the proportion of targeted houses that were sprayed can be calculated from IRS weekly and monthly field records.

The evaluation framework is based on the PMI goal to reduce malaria deaths by 50% and to achieve coverage targets with specific interventions over the course of the program. The framework is aligned with the standard methodology for malaria program evaluation that is being adopted and promoted by WHO Roll Back Malaria. Program evaluation will be based on coverage outcomes that will be measured at baseline, midpoint and the end of the Initiative, and impact on malaria mortality, which will be measured at baseline and the end of the Initiative. Information used to evaluate program outcomes and impact in PMI will be collected primarily through household surveys of a representative sample of the national population. All-cause mortality and malaria-specific mortality in children under five (collected through verbal autopsies) will be interpreted together with data on anemia, parasitemia, available information on malaria cases and deaths reported from health facilities, rainfall and PMI coverage indicators to consider changes in mortality at the population level that can be attributed to reductions in malaria over the course of PMI.

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 during Year 1:

- In collaboration with the Instituto Nacional de Estadística, conduct a nationwide Malaria Indicator Survey (MIS) to establish baseline data on the coverage of ITNs, ACTs, and IPTp. The MIS survey consists of the malaria module from the DHS survey, which permits easy comparison of results from survey to survey. (\$600,000) (Note: This information will be supplemented through collaboration with the PEPFAR supported large nationwide mortality survey (INCAM) to be carried out with the 2007 Census in late 2007, which will measure malaria-related mortality);
- In coordination with other partners, assist the Departamento de Epidemiologia and the NMCP to assess and improve the quality, accuracy, completeness, and timeliness of malaria-related surveillance data (cases of malaria and anemia, severe malaria, and malaria- and anemia-related deaths) and reporting at the district, provincial, and national levels, with particular emphasis on supporting sentinel malaria surveillance sites; (\$250,000)
- Following on the UNICEF mapping exercise on the status of malaria interventions throughout the country, work with the NMCP and other partners to develop and implement a single, comprehensive and integrated monitoring and evaluation plan for malaria in Mozambique. The system will collect information on health worker performance, health facility functioning, and numbers of workers trained and commodities distributed, including a large-scale health facility survey. It will also include supportive supervision of health workers and strengthening of the capacity of the NMCP to collect and analyze data, reach conclusions, and respond in a rational and timely fashion; (\$300,000); and
- Support the conduct of antimalarial drug efficacy studies on AM-LUM and other potential first- and second-line drugs at geographically representative sites throughout the country; (\$130,000).

Data will be collected and reviewed on a regular basis by the PMI team, the NMCP, and other partners to identify potential problems and implement solutions. Much of this information will also be of interest to other partners in Mozambique, and an effort will be made to seek partial

support from them for these activities. A more detailed description of the PMI monitoring and evaluation plan is given in Annex 2.

HIV/AIDS AND MALARIA

Current Status, Challenges, and Needs

Based on a 2004 National HIV Sentinel Survey, adult HIV sero-prevalence is approximately 16% and a projected 1.5 million people were living with HIV/AIDS as of 2005 in Mozambique. HIV prevalence is higher in the southern and central provinces, possibly as a result of the major transportation corridors and highly mobile populations, the national and foreign troops in the Beira transport corridor during civil war, and the return of 1.7 million refugees (mostly Malawi and Zimbabwe) from 1992 to 1995. In the Northern provinces, HIV prevalence is lower and may possibly be attributed to geographic isolation, lower population mobility, the higher prevalence of male circumcision, and possible cultural influence of Islam. Unlike neighboring countries, there is no evidence to suggest HIV incidence is declining in Mozambique.

HIV Prevalence by Province, Region and Nation in Mozambique 2001 – 2004

Province	2001	2002	2004	Region	2001	2002	2004
Maputo City	15.5%	17.3%	20.7%	South	14.4%	14.8%	18.1%
Maputo Province	14.9%	17.4%	20.7%				
Gaza	19.4%	16.4%	19.9%				
Inhambane	7.9%	8.6%	11.7%				
Zambézia	15.4%	12.5%	18.4%	Central	16.8%	16.7%	20.4%
Sofala	18.7%	26.5%	26.5%				
Manica	18.8%	19.0%	19.7%				
Tete	16.7%	14.2%	16.6%				
Niassa	5.9%	11.1%	11.1%	North	6.8%	8.4%	9.3%
Nampula	7.9%	8.1%	9.2%				
Cabo Delgado	5.0%	7.5%	8.6%				
National					13.0%	13.6%	16.2%

Source: MoH - Relatório sobre a Revisão Dados de Vigilância Epidemiológica do HIV, Ronda 2004

The Mozambique National AIDS Council, the MoH, Ministry of Women and Social Action and other Mozambican institutions are leading the national response through the implementation of the National Strategic Plan to Fight HIV/AIDS (PEN II 2005—2009). Mozambique's national HIV/AIDS theme, "Defesa de Vida" focuses on a five-year strategy of 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 MoH HIV Strategic Plan (PEN SAUDE), which was launched a year earlier in 2004, is a sub-plan under PEN II that guides the implementation of the clinical HIV/AIDS services provided by the MoH. The US Government inter-agency team for PEPFAR is working to mitigate the impact of HIV/AIDS by scaling up activities for prevention, care and treatment within the context of the national strategy. As of March 31, 2006, through US Government direct and indirect support, 61,032 pregnant women received HIV counseling and testing through PMTCT services and 5,354 had completed a course

of ARV prophylaxis for PMTCT; 110,000 orphans and vulnerable children had received services; 94,557 people affected and living with HIV/AIDS had received palliative care; 95,271 Mozambicans visited counseling and testing centers and received their test results; and 22,849 individuals were on ART. The US Government aims to directly provide palliative care to 572,400 people living with HIV/AIDS (PLWHA) and provide anti-retroviral therapy to 60,500 PLWHA by the end of FY07 in Mozambique.

Mozambique's national response, while progressing in the last year; still suffers from inadequate infrastructure, a scarcity of skilled human resources and the limitations of the MoH management systems. These limitations have meant that many HIV/AIDS services do not yet reach beyond the capital, Maputo. By the end of March 2006, an estimated 22,849 PLWHA were on anti-retroviral therapy, with 51% of those living in Maputo City. In 2006, the MoH set new targets to increase the number of patients receiving antiretroviral therapy in the northern and central provinces, not only in large urban hospitals but also in rural hospitals and health centers. The MoH target for patients on antiretroviral drugs by the end of calendar year 2006 is 55,000.

Linkages and Areas for Collaboration between PMI and PEPFAR

Under the direction of the MoH Reproductive Health and Child Health Sections, both PMI and PEPFAR can provide technical support, training and supplies to improve the quality of ANC and IMCI services. Specifically, PMI will support IPTp, distribution of ITNs to pregnant women, improved detection and case management of malaria in infants and young children while PEPFAR will support activities to identify infants and children who are HIV+ and add the HIV module to the IMCI protocol. Where PEPFAR partners provide direct and intensive technical support to pediatric staff in hospitals and health centers, they will facilitate the delivery of the malaria prevention and treatment services by ensuring training and supervision of malaria case management and by assisting with the distribution of ITNs including educating clients on proper use. PMI, conversely, will make sure that sites with PEPFAR-funded PMTCT and pediatric AIDS services are included to the maximum extent possible in the ITN distribution plan for Year One. PMI and PEPFAR advisors and implementers will also work together to facilitate optimal prevention and treatment regimes for pregnant women, infants and children who are HIV+ and/or who have malaria. Together, they will also work with CMAM to strengthen the pharmaceutical distribution system to limit stock-outs of medicines for either program. Beyond this collaboration, some PEPFAR implementers who provide antiretroviral therapy to PLWHAs will also provide ITNs to these clients. PMI will also assist all PEPFAR treatment partners in finding appropriate sources of ITNs and training/education materials to ensure proper use. PEPFAR partners are also working with PSI to secure ITNs for orphans and for home-based care patients. Starting in FY06, PSI will provide a total of 50,000 ITNs per year for these two target groups.

In addition to activities related to service delivery, PEPFAR and PMI will collaborate on the PEPFAR-funded mortality survey that will be piloted in October-November 2006 and carried out one year later in conjunction with 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.

STAFFING AND ADMINISTRATION

Two new health professionals will be hired to oversee the PMI in Mozambique, one representing CDC and one representing USAID. In addition, one or more Foreign Service Nationals will be hired to support the PMI team. Other than this, no additional locally-hired staff are envisioned in the Year 1 Plan.

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. Candidates for these positions will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

It is envisioned that these two PMI professional staff will work together to oversee all technical and administrative 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. Both staff members will report to the USAID Mission Director or his/her designee. The CDC staff person will be supervised by CDC, both technically and administratively. All technical activities will be undertaken in close coordination with the MoH/PNLP and other national and international partners, including the WHO, UNICEF, the GFATM, 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.

ANNEX 1

Tables

Table 2
President's Malaria Initiative – Mozambique
Planned Obligations for FY07 (\$000)

Proposed Activity	Mechanism	Budget (<i>commodities</i>)	Geographic Area	Description of Activity
PREVENTIVE ACTIVITIES				
ITNs				
Procure LLINs for distribution through ANCs and child health days (see below)	PSI	3,150 (3,150)	Not applicable	Procurement of approximately 450,000 LLINs
LLIN distribution through ANCs	UNICEF and/or NGOs	100	Provinces to be determined	Distribute approx. 125,000 LLINs to pregnant women attending ANCs
LLIN distribution through child health/immunization days	NGOs	250	Provinces to be determined	Logistic support/promotion/IEC of LLIN campaign (approx. 325,000 nets)
ITN re-treatment campaign	PSI	150	Gaza, Inhambane, Tete, Zambézia, and Cabo Delgado	Logistic costs of ITN re-treatment campaign in 2007
IPTp				
Training/supportive supervision of health workers in prevention/treatment of malaria in pregnancy	TASC 3 IQC / NGOs/FBOs	No additional cost - covered under case management training/supervision.	Nationwide	Training/supervision of health workers in prevention/treatment of malaria in pregnancy
Development/dissemination of IEC messages for malaria in pregnancy	Johns Hopkins University/HCP or TASC 3 IQC with sub-grants to NGOs/FBOs	No additional cost - covered under IEC related to ACTs	Nationwide	Development/dissemination of IEC messages for malaria in pregnancy
IRS				
Evaluation of ongoing IRS activities in Zambézia Province	IVM Task Order	No additional cost – covered by FY06 funds	Three districts in Zambézia Province	Entomologic evaluation of MoH-supported IRS activities
Support IRS in additional districts of Zambézia Province	IRS competed contract	4,400 (1,200)	Zambézia Province	IRS campaign in MoH-targeted districts of Zambezia Province
Strengthen entomologic capabilities of NMCP	IRS competed contract	250	Nationwide	Strengthen NMCP capabilities in entomologic skills and procedures
Evaluation of larval control activities in southern Mozambique	IVM Task Order	150	LSDI Project area	Evaluation of cost-effectiveness of ongoing larval control program
SUBTOTAL: Preventive		8,450		

		(4,350)		
CASE MANAGEMENT				
Diagnosis				
Develop written strategy for microscopy/RDTs	CDC/TASC 3 IQC	CDC-10 TASC 3 IQC - 20	Not Applicable	Assist MoH in developing national strategy and plan for use of microscopy and RDTs
Purchase of microscopes, microscopy supplies	TASC 3 IQC or Local Contract	450 (450)	Nationwide	Purchase of 80 microscopes and microscopy kits
Refurbish central reference laboratory	TASC 3 IQC or Local Contract	60	Maputo City	Refurbish central reference laboratory
Pre-/in-service training in laboratory diagnosis of malaria; quality control	CDC/ TASC 3 IQC	CDC-20 TASC 3 IQC- 300	Nationwide	Pre-/in-service training in laboratory diagnosis of malaria/quality control
Treatment				
Procure AS-SP, AM-LUM, and artesunate suppositories	UNICEF or other central mechanism	3,000 (3,000)	Not applicable	Procurement of first-/ second-line drugs
Develop detailed written ACT implementation plan	DELIVER follow-on	No additional cost to PMI	Not applicable	Develop detailed written plan for ACT implementation
Strengthen MoH antimalarial drug management system	DELIVER follow-on	710	Nationwide	Strengthen MoH antimalarial drug management system
Support training and supportive supervision of health workers on treatment of uncomplicated and severe malaria and malaria in pregnancy	TASC 3 IQC with sub-grants to NGOs/FBOs	700	Nationwide	Support training of health workers on treatment of uncomplicated and severe malaria and malaria in pregnancy
Develop and disseminate IEC/BCC messages on treatment of uncomplicated and severe malaria and malaria in pregnancy	Johns Hopkins University/HCP with sub-grants to NGOs/FBOs	700	Nationwide	Develop and disseminate IEC/BCC messages on treatment of uncomplicated and severe malaria and malaria in pregnancy; mobilize communities
Support ACT implementation at provincial, district, and at health facility levels	TASC 3 IQC with sub-grants to NGOs/FBOs	200	Nationwide	Support ACT implementation at provincial, district, and at health facility levels
Develop policy on role of private sector in ACT treatment	TASC 3 IQC	100	Not applicable	Develop policy on role of private sector in ACT treatment
SUBTOTAL: Case Management		6,270 (3,450)		

MONITORING AND EVALUATION				
Baseline nationwide Malaria Indicator Survey	Malaria Consortium	600	Nationwide	Baseline nationwide household survey to collect coverage, mortality data
Assess and strengthen MoH malaria sentinel site surveillance system	CDC/TASC 3 IQC	CDC – 50 TASC 3 IQC – 200	Nationwide	Assess and strengthen MoH malaria surveillance system for reporting of malaria and anemia cases and deaths
Develop and implement an integrated M&E plan for malaria and strengthen NMCP M&E capabilities	CDC/TASC 3 IQC	CDC – 20 TASC 3 IQC - 280	Nationwide	Develop integrated malaria M&E plan and strengthen NMCP M&E capabilities; large-scale health facility survey
Antimalarial drug efficacy studies at sentinel sites	TASC 3 IQC	130	Nationwide	In vivo efficacy testing potential first- and second-line drugs
SUBTOTAL: M&E		1,280		
IN-COUNTRY MANAGEMENT AND ADMINISTRATION				
In-country staff and administrative expenses	CDC/USAID	1,000	Nationwide	Salaries, benefits of PMI in-country staff; office equipment and supplies
SUBTOTAL: Management and Administration		1,000		
GRAND TOTAL		17,000 (7,800)		Commodities represent 46% of total budget

Table 3

**Mozambique – Year 1 Targets
Assumptions and Estimated Year 1 Coverage Levels**

Year 1 PMI Targets:

- *A total of 700,000 bed nets will have been treated as part of a large-scale re-treatment campaign (this translates to re-treatment of more than 40% of the existing ITNs in the country)*
- *Approximately 1.7 million long-lasting ITNs (LLINs) will have been distributed to children under five and pregnant women (this translates to about 70% household ownership of at least one ITN)*
- *At least 85% of houses in geographic areas targeted for indoor residual spraying (IRS) by the MoH will have been sprayed (a total of 1,000,000 additional residents will be protected)*
- *Intermittent preventive treatment with SP in pregnant women (IPTp) will have been implemented in all 11 provinces and in all health facilities in 4 provinces (making up 35% of Mozambique's total population)*
- *Malaria treatment with ACTs will have been implemented in health facilities in all 11 provinces and in all health facilities of 4 provinces (making up 35% of Mozambique's total population).*

Assumptions:

Population of Mozambique (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 AS-SP treatment:

Children <5: 3.5 illnesses/year at \$0.60 each

Older children 1.0 illnesses/year at \$0.90 each

Adults 0.5 illnesses/year at \$1.50 each (assume that the PMI will cover only one-third of adult episodes)

Intervention	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 = 2.7 million treatments/year x 3 years = 8.1 million treatments	6.9 million SP treatments	2.7 million SP treatments	Target: 35% of pregnant women receive 3 doses of IPTp = 950,000 treatments	MoH 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 that ITNs distributed >2 years 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 3.3 million households x 70% = 2.3 million – 1 million already distributed = 1.3 million ITNs	MoH 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	10.7 million treatments	Target: 35% of children under 5 receive ACTs 10.7 million x 35% = 3.7 million treatments	TOTAL available for ACTs = \$3.0 million (PMI) + an unknown amount from the Common Basket (assume \$2.5 million as in 2006). If all 3.7 million child treatments are covered at \$0.60/treatment = \$2.2 million, all 3.2 million older child treatments are covered at \$0.90/treatment = \$2.9 million and all 500,000 adult treatments are covered at \$1.50/treatment = \$750,000 = total of \$5.8 million needed
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	9.2 million treatments	9.2 million x 35% = 3.2 million treatments	
ACTs- adults	9 million adults x 0.5 episodes/year = 4.5 million treatments/year x 33% of treatments covered = 1.5 treatments/year x 3 years = 4.5 million	1.5 million x 85% = 1.3 million treatments x 3 yrs = 3.9 million	1.3 million treatments	1.3 million x 35% = 500,000	
TOTAL	54.9 million treatments	63.5 million treatments			If assume an equal amount from Common Basket for antimalarial drug purchase as in 2006, >90% of Year 1 ACT needs are covered.

IRS	1 million population (180,000 houses to be targeted for IRS annually)	540,000 houses	180,000 houses	<p>Target: <i>85% of targeted houses to be sprayed</i></p> <p>153,000 houses to be sprayed</p>	<p>USG (PMI) – More than 180,000 houses scheduled for spraying in Zambézia Provinces</p> <p>Thus, 100% of Year 1 needs are met.</p>
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Table 4

**President's Malaria Initiative – Mozambique
Year 1 (FY07) Estimated Budget Breakdown by Intervention (\$)**

Area	Commodities (%)	Other (%)	Total (\$)
Insecticide-treated Nets	3,150,000 (86.3)	500,000 (13.7)	3,650,000
Indoor Residual Spraying	1,200,000 (25.0)	3,600,000 (75.0)	4,800,000
Case Management	3,450,000 (55.0)	2,820,000 (45.0)	6,270,000
Intermittent Preventive Treatment	-	Covered under Case Management	Covered under Case Management
Monitoring and Evaluation	0 (0.0)	1,280,000 (100.0)	1,280,000
Administration	0 (0.0)	1,000,000 (100.0)	1,000,000
Total	7,800,000 (45.9)	9,200,000 (54.1)	17,000,000

Table 5**Year 1 (FY07) Budget Breakdown by Partner (\$000)**

(Once the FY07 Implementation Plan is approved and contracts/grants cooperative agreements awarded, all other partners will be listed here)

Partner Organization	Geographic Area	Activity	Budget*
UNICEF	Nationwide	Procurement of LLINs, antimalarial drugs, microscopy equipment and supplies	3,100
IRS Competed contract	Zambézia Province; LSDI Project area	Procurement of insecticide and IRS equipment; support to NMCP IRS activities; strengthen entomologic capabilities of NMCP	4,650
IVM Task Order	LSDI Project area	Evaluation of cost-effectiveness of ongoing larval control program	150
Population Services International	Five provinces	ITN retreatment campaign	3,300
JSI DELIVER follow-on	Nationwide	Strengthen MoH pharmaceutical management system	710
TASC 3 IQC	Nationwide	Training of laboratorians; procurement of diagnostic equipment/supplies; support to sentinel sites; development of M&E plan	1,540
TASC 3 IQC (or Johns Hopkins University/HCP) with sub-grants to NGOs/FBOs	Nationwide	Training of health workers; IEC/BCC for treatment of malaria and malaria in pregnancy; support ACT implementation	1,600
NGOs/FBOs	Provinces to be determined	LLIN distribution	350
Malaria Consortium	Nationwide	National Malaria Indicator Survey	600

*Staffing and administration and CDC technical assistance not included

ANNEX 2

MOZAMBIQUE

President's Malaria Initiative Three-Year Strategy

Malaria is a major cause of morbidity and mortality in Mozambique. The disease is endemic nationwide, ranging from mesoendemic to holoendemic. Transmission is stable and takes place year round with a peak from December to April. *Plasmodium falciparum* accounts for about 90% of all malaria infections.

Based on the 2005 population projection of 19.4 million and the assumption that approximately one million residents live in central Maputo City where the risk of malaria is low, vulnerable populations in Mozambique comprise an estimated 3,600,000 children under five and 900,000 pregnant women. There are also an estimated 1,500,000 persons living with HIV/AIDS, some of whom also fall within the two previous groups.

TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

By the end of 2010, the PMI will provide 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 under five (in areas not covered by IRS) will own at least one ITN;
2. 85% of children under five (in areas not covered by IRS) will have slept under an ITN the previous night;
3. 85% of pregnant women (in areas not covered by IRS) will have slept under an ITN the previous night;
4. 85% of houses in geographic areas targeted for IRS will have been sprayed;
5. 85% of pregnant women and children under five will have slept under an ITN 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 antimalarial drug in accordance with national malaria treatment policies within 24 hours of the onset of their symptoms.

PREVENTION ACTIVITIES

Intermittent preventive treatment in pregnant women (IPTp): According to the 2003 DHS survey, 84% of pregnant women attended an ANC at least once during their pregnancy and 81% made two or more visits, although most visits tended to occur late in pregnancy. Intermittent preventive treatment for pregnant women was approved as a national policy in Mozambique in May 2004. Thus far, implementation is limited to health facilities in provincial and district

capitals. No up-to-date information is available on the proportion of pregnant women who receive one or more doses of sulfadoxine-pyrimethamine for IPTp.

The PMI will fund the distribution of free ITNs through ANCs as a means of promoting attendance earlier in pregnancy and increasing the total number of ANC visits each pregnant woman makes. The PMI will support training and supportive supervision of health care workers in the diagnosis and treatment of malaria in pregnancy and the use of IPTp. Support will also be provided for development and dissemination of IEC/BCC messages to ensure that women and their families are aware of the risks of malaria during pregnancy, to promote attendance at ANCs and IPTp beginning early in the second trimester of pregnancy, and to complete the recommended three doses of SP.

If each pregnant woman is to receive three treatments with SP during her pregnancy, a total of approximately 2.7 million treatments will be required annually in Mozambique. According to the NMCP, there is sufficient SP in the planned medicine kit procurements to meet all SP needs for 2006-2007. It is also expected that SP needs for IPTp and quinine needs for treatment of malaria during pregnancy will continue to be financed by the MoH Common Fund for Medicines over the next 3-4 years.

Insecticide-treated nets (ITNs): Increasing coverage with ITNs is a high priority for the Mozambican MoH. According to the current Strategic Plan for Malaria Control, ITN distribution will be targeted to approximately 55% of the population living in more rural areas of the country. The MoH will only support distribution of free ITNs. Nets produced within the South Africa Development Community (SADC), such as the Tanzanian Olyset[®] net can be imported duty free; all others are subject to a 7.5% tax.

The most recent DHS survey, carried out between September and December 2003, indicates that approximately 20% of households own one or more ITNs, but only 12% of pregnant women and 10% of children under five had slept under an ITN the previous night. A more recent survey in Manica and Sofala Provinces following a large measles-ITN distribution campaign in November 2005 showed greater than 90% usage rates among families who had a net.

The PMI will support distribution of free long-lasting ITNs (LLINs) to children under five through national-, provincial- or district-level child immunization or health campaigns and to pregnant women during routine ANC visits. Efforts will also be made to improve ANC utilization rates, as these clinics offer the most attractive way to reach new pregnant women and sustain high ITN coverage rates of vulnerable groups once all children under five have received a net.

Given the challenges of trying to ensure regular net re-treatment in widely-scattered and difficult to reach populations, the PMI should only procure LLINs, which do not require re-treatment. With increasing worldwide production, sufficient numbers of LLINs are expected to be available over the next 3-4 years to meet needs in Mozambique. Since many of the 1.75 million nets already distributed in Mozambique are not LLINs, PMI will support net re-treatment efforts over the next two to three years, until those nets reach the end of their useful lifetimes. Evidence suggests that K O Tab 123 (Bayer Environmental Science) is the best available product for net

re-treatments, although it is not equivalent to a factory-produced LLIN in terms of the duration of the insecticidal effect.

It is estimated that 1.7 million additional nets will be needed to meet 2006-2007 needs and reach 100% coverage of pregnant women and under fives in those provinces and districts targeted for ITNs. After that, approximately 700,000 nets will be needed annually to sustain 100% coverage of newly pregnant women through ANCs, before those nets provided to children under five will need to be replaced. PMI plans to procure 400,000 to 500,000 LLINs annually over the next three years. If other partners maintain their current level of support to ITNs, it should be possible to meet all needs for 2008 and beyond. A four- to six-month lag period for deliveries of LLINs is expected for at least the next 12-24 months.

Indoor residual spraying (IRS): The NMCP considers IRS to be most appropriate in areas of higher population density (i.e., urban and periurban areas) and areas of economic importance, where currently about 25-30% of the Mozambican population lives. There is also interest on the part of the NMCP to extend spraying to more rural areas, gradually increasing coverage to 45% of the total population by 2008. Mozambique already has considerable expertise in planning, conducting, and monitoring and evaluation of spraying activities using DDT, synthetic pyrethroids, and carbamates through the Lubombo Spatial Development Initiative and the MoH, but it is recognized that efforts must be made to improve the coverage, quality, and timeliness of MoH-supported spraying. In addition risk-reduction activities identified through the USAID Environmental Assessment and Pesticide Evaluation and Safer Use Action Plan for IRS will need to be implemented in all US Government-supported IRS activities.

During FY07, the PMI will provide assistance with planning, training, and supervision of the ongoing MoH-supported spraying program with DDT in three districts in Zambézia Province. The PMI will also support extension of the spraying to more rural, uncovered areas of those three districts, as well as and one to three additional districts in the province. These six districts have a total population of 1.6 million residents. This will be combined with a careful assessment of the cost per person protected by the IRS program to allow comparisons with ITNs. Based on the results of this analysis, PMI will work with the NMCP to refine their national IRS and ITN strategies to provide maximum protection together with the most cost-effective use of resources. PMI support to IRS beyond FY07 will depend on this analysis. Fogging and outdoor ultra low volume application of insecticides are not effective methods for malaria vector control and their use should not be supported with PMI resources.

PMI will also support strengthening of the general entomologic and vector control capabilities of the NMCP, including upgrading insectary facilities and training of MoH staff at the central, provincial, and district levels in standard entomologic field and laboratory techniques. This will include monitoring the insecticide resistance status of malaria vectors at selected sites to ensure continued efficacy of IRS- and ITN-based strategies.

CASE MANAGEMENT ACTIVITIES

Malaria diagnosis: Only about 20% of all malaria diagnoses in Mozambique are based on microscopic examination of blood smears and the quality of those diagnoses is unknown. The

NMCP is committed to strengthening microscopic diagnosis where it already exists and introducing RDTs in health facilities where microscopy is not feasible. Although not stated as such in the 2006-2009 Strategic Plan for Malaria Control, in rural areas, children less than five years of age with symptoms suggestive of malaria are to be treated presumptively, while it is recommended that older children and adults undergo a diagnostic test before treatment. In urban areas, all children and adults will have malaria diagnostic testing before treatment.

With the increased cost of the new first-line treatment, accurate diagnosis will be critical to target treatment to infected patients and reduce the overuse of antimalarial drugs. In addition, accurate information on the geographic and seasonal distribution of malaria will be needed for planning and evaluation of malaria control activities. The PMI views malaria laboratory diagnosis as a key component of good case management and will support strengthening of malaria diagnosis in MoH facilities. The PMI will work with the NMCP and other partners to develop a strategy and plan for the use of microscopy and RDTs at different levels of the health system and in different clinical and epidemiological settings. The PMI will support pre-service and in-service training for MoH laboratory technicians in malaria diagnosis and renovation and equipping the primary reference diagnostic and training center at the National Institute of Health in Maputo. The PMI also recognizes the benefits of combining malaria laboratory training with training for other diseases, such as tuberculosis, and will work with PEPFAR and other groups to strengthen laboratory facilities. It will be particularly important to ensure that health workers are trained in the proper interpretation of laboratory tests for malaria, as some clinical officers and physicians ignore the results of laboratory tests when the results do not agree with their clinical judgment.

Decisions on PMI procurement of microscopes, microscopy supplies, and RDTs will be based on an FY07 PMI-supported evaluation of the existing malaria diagnostic network and estimated funding from the Global Fund and Common Basket.

Treatment: In late 2004, Mozambique adopted AS-SP as its first-line therapy for uncomplicated malaria and artemether-lumefantrine (Coartem[®]) as the second-line therapy. Quinine is recommended for the treatment of severe malaria. Although not included in the written guidelines, the NMCP has agreed that artesunate rectal suppositories can be used for the emergency treatment of severe malaria in children in settings in which intramuscular or intravenous quinine cannot be administered. Implementation of AS-SP began in early 2006, but the extent of the roll out varies from province to province, and is most advanced in Maputo, Gaza, Sofala, Zambézia, and Nampula Provinces. No up-to-date information is available on the proportion of children under five who receive ACTs for a suspected malarial illness. Although antimalarial treatment in MoH facilities is free of charge, patients do have to pay a minimal fee for being seen in a health facility (\$0.05) and a similar fee for prescriptions.

According to the NMCP Strategic Plan for Malaria Control, 60% of children under five are expected to receive ACTs in 2006, rising to 95% by 2008. In the GFATM Round 6 proposal, it is estimated that approximately 7 million ACT treatments will be needed annually over the next 3-4 years, but this estimate only takes into account patients seeking care at health facilities. If it is assumed that there are 3.6 million children under five in Mozambique and each one has 2-4 episodes of fever annually, this age group alone would require 7.2-14.4 million treatments per year. Consequently, even with improved diagnosis and expanded IRS and ITN coverage

resulting in lower transmission, the nationwide requirements for ACTs are expected to be considerably higher than the GFATM proposal estimate. In addition, in 2006, the Common Fund financed only one-half of the estimated antimalarial drug needs for that year. The pharmaceutical management system in Mozambique is also quite weak and is unlikely to be able to meet all of the needs of the health care system.

Ensuring prompt, effective, and safe ACT treatment to 85% or more patients with confirmed or suspected malaria will represent one of the greatest challenges for the NMCP, given the country's weak pharmaceutical management system and the high cost and short shelf life of AS-SP. The PMI will coordinate its activities with those of the NMCP, CMAM and other partners. The PMI will provide technical assistance to the NMCP in updating their national malaria treatment policy and developing a detailed, written ACT implementation plan. The PMI will also support pre- and in-service training and supportive supervision of health workers to ensure good ACT prescribing and dispensing practices in coordination with MoH Integrated Management of Childhood Illness program and development and implementation of an IEC/BCC plan for ACT implementation. Decisions on procurement of supplies of AS-SP, AM-LUM, and artesunate suppositories by PMI will be based on improved forecasting of drug needs, the results of the Global Fund Round 6 proposal, and discussions with the MoH Pharmaceutical Department and CMAM on the availability of financing from the Common Fund for antimalarial drugs. Global production of ACTs is expected to be sufficient to meet the country's needs over the next two to three years, but the PMI will monitor worldwide demand and supplies closely.

MONITORING AND EVALUATION

The PMI's monitoring and evaluation plan related will be coordinated with those of the NMCP, the GFATM, and other partners, and it is hoped that all partners will contribute to a single national monitoring and evaluation plan. A nationwide MIS will be conducted soon after the rainy season in 2007 to provide baseline information on coverage of the four major interventions. A PEPFAR funded mortality survey will provide all cause and malaria-related mortality in children under five. A mid-project DHS in 2009 and an end-of-project MIS survey in 2011 will measure progress related to the coverage and mortality targets. Information on other indicators of interest, including the number of children and pregnant women attending child health and ANC clinics, the number of health facilities delivering IPTp and ACTs, the number of ITNs distributed, stockouts of drugs, and the quality of health services will be collected through routine monitoring by the MoH and other partners and/or smaller, targeted surveys or studies.

SUSTAINABILITY

The three-year strategic plan for Mozambique is designed to begin addressing the complex issues of long-term sustainability and building national capacity over time. The PMI's framework for sustainability addresses three major components: management capacity; technical knowledge and skills; and financial strengthening.

Strengthening management capacity: The NMCP is currently understaffed, especially at provincial and district levels and training and regular supervision are needed. In addition, basic management systems such as financial management, planning, budgeting, human

resources and operations need strengthening. The PMI plans to place two full-time malaria advisors in country to increase the ability of the MoH and USAID to manage implementation. It is hoped that these two individuals will be located in or near the NMCP offices and will work closely with NMCP counterparts on day-to-day management and implementation of the PMI and NMCP. Special attention will be given to identifying weaknesses in managerial systems, building capacity in areas such as planning, budgeting, human resources management, and financial management systems and working in collaboration with other MoH departments and sections as well as with implementing partners. Strengthening these systems will be integral to the NMCP's effective use of resources and ability to attract further resources through the national budget and other donors, such as the GFATM.

Technical knowledge and skills: The implementation of the PMI will result in the transfer of technical knowledge and skills to local partners including staff of the NMCP and other MoH departments, NGOs, community- and faith-based organizations, health workers, and private sector partners. The PMI will also focus on IEC/BCC activities directed at increasing Mozambicans' understanding of the risks of malaria, and encouraging the adoption of prevention measures, and seeking appropriate treatment in a timely manner.

Financial sustainability: Financial sustainability will be one of the most challenging areas to address within the PMI. There are legitimate concerns that 85% coverage levels for key interventions such as ITN and IRS coverage and access to ACTs are unlikely to be sustained over time without adequate future financing. However, improved local managerial and technical capacity, in addition to reductions in the cost of key malaria commodities should make it easier for the MoH/NMCP to take on increased responsibility to fund key interventions. Other financing sources available to the MoH/NMCP will include an increased portion of the national budget, resources from other donor including the GFATM, and a greater private sector market share for malaria commodities, such as ITNs. Over time, shifting those beneficiaries that can afford to pay to the private sector will enhance sustainability and enable the government to more effectively target resources. Strategies to prime the local market will include working with private sector pharmacies, shops, and social marketing networks on training, IEC, and distribution.

Table 1
Proposed Coverage of Interventions by Year – Mozambique

Coverage Target	Baseline 2006-2007*	End Year 1**	End Year 2	End Year 3**	Final Evaluation
Proportion of households with at least one ITN	30%	70%	80%	85%	>90%
Proportion of pregnant women sleeping under an ITN the previous night	20%	30%	50%	70%	85%
Proportion of children under five sleeping under an ITN the previous night	20%	30%	50%	70%	85%
Proportion of households in areas targeted for IRS that have been sprayed	70%	85%	85%	85%	85%
Proportion of pregnant women and children under five sleeping in a sprayed house and/or under an ITN the previous night	30%	40%	60%	75%	85%
Proportion of pregnant women receiving 2 or more doses of IPTp	10%	25%	40%	60%	85%
Proportion of government health facilities with ACTs available for the treatment of uncomplicated malaria	30%	50%	60%	80%	85%
Proportion of children under five with fever in previous 2 weeks treated with appropriate antimalarial drug within 24 hours of onset of symptoms	25%	35%	50%	70%	85%

*These figures represent best estimates of coverage as of September 2006; final baseline figures will be available following the 2007 MIS survey

**Nationwide coverage of interventions will be measured on three occasions: (1) 2007 (baseline); (2) end of Year 2; and (3) after the end of 2010. Year 1 and Year 3 coverage levels are shown in italics to indicate that they will be estimated based on delivery of ACTs and IPTp treatments, distribution of ITNs, and households protected by IRS.

Table 2

Illustrative 3-Year Budget and Expected Coverage Levels

PMI Targets: After three years of full implementation, the PMI will achieve the following targets in populations at risk of malaria in Mozambique:

- >90% of households have at least one ITN;
- 85% of children under five will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses targeted for indoor residual spraying will have been sprayed;
- 85% of pregnant women and children under five will have slept under an ITN or in a house that has been sprayed in the previous six months the previous night;
- 85% of women who completed a pregnancy in the last two years will have received two or more doses of SP for IPTp during that pregnancy;
- 85% of government health facilities with ACTs available for the treatment of uncomplicated malaria
- 85% of children under five with suspected malaria will have received treatment with an antimalarial drug in accordance with national malaria treatment policies within 24 hours of the onset of their symptoms.

Assumptions:

Population of Mozambique (estimated): 19,000,000 persons – 1,000,000 (Maputo City) = 18,000,000

Pregnant women: 5% of total population = 900,000 pregnant women

Children <5: 20% of population = 3,600,000 children under five

Average number of persons per household = 5.5

Average number of malaria-like illnesses per year and cost per treatment with AS-SP:

Children <5: 3.5 febrile episodes/year (\$0.60 per treatment)

Older children 2.0 febrile episodes/year (\$0.90 per treatment)

Adults: 0.5 malaria illnesses/year at (\$1.50 per treatment)(assume that PMI will only cover one-third of adult illnesses)

Cost of IPTp with SP: \$0.30 (\$0.10 for each of the three treatments a woman will receive during her pregnancy)

Average household will require 2.5 ITNs to cover all children under five and pregnant women in the family; cost of a long-lasting ITN = \$7.00

Costs per person for implementation support was taken from a detailed cost analysis prepared for Uganda.

Item/Activity	Annual Cost per Person	Annual Cost	3-Year Total	Assumptions/Comments
Prevention – insecticide-treated nets		\$12,400,000	\$37,200,000	18 million population at risk of malaria = 3.3 million households x 2.5 nets/household x 85% coverage – 1.7 million nets already distributed x \$7.00/net
Prevention – indoor residual spraying		\$24,300,000	\$72,900,000	IRS will target 45% of population at an estimated cost of \$3.00/person once a year
Treatment – malarial illnesses		\$16,600,000	\$49,800,000	Children under 5 = 3.6 million x 3.5 episodes x 85% x \$0.60; Older children = 5.4 million x 2 episode x 85% x \$0.90; Adults = 9 million x 0.5 episodes x 85% x 33% x \$1.50
Treatment – IPT for pregnant women		\$230,000	\$690,000	900,000 pregnant women x \$0.30 per year x 85% coverage
Epidemic preparedness		-	-	Not included in Mozambique plan
Implementation Support	\$0.50	\$9,000,000	\$27,000,000	Estimated cost for commodity management, human resources, supervision, training, social mobilization, etc., assuming IRS support costs covered under that category and 45% of the country under IRS
Monitoring and Evaluation		\$1,000,000	\$3,000,000	Based on Year 1 MOP
Cost of program			\$190,590,000	
USG Implementation Support Costs		\$800,000	\$2,400,000	Long-term expatriate advisors' salaries, benefits, travel; local staff; office supplies and equipment for PMI in-country office; TDY from CDC and USAID
Total funding needed (including USG program costs)			\$192,990,000	
Government of Angola malaria budget		\$3,000,000	\$9,000,000	Based on GFATM Round 6 information
GFATM 2-year approved funding		\$15,000,000	45,000,000	Round 2 three-year approved funding; Round 5 LSDI \$6 million three year grant for Mozambique; will assume that GFATM funding becomes available in Years 2-3 at \$12 million/year
World Bank malaria funding		4,000,000	12,000,000	\$20 million over five years
Available funding from other sources			\$63,000,000	
PMI funds available (estimated):				Assumes PMI funding is divided between countries based roughly on their populations
Year 1		\$17,000,000		
Years 2 and 3		\$20,000,000		Assumes 15 PMI countries for both years
Years 1 through 3			\$57,000,000	
Total available funding			\$120,000,000	
Remaining Gap			\$72,990,000	3-year shortfall to meet total need

