

PRESIDENT'S MALARIA INITIATIVE

Malaria Operational Plan – FY08

MOZAMBIQUE

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ABBREVIATIONS and ACRONYMS

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

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

EXECUTIVE SUMMARY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

INTRODUCTION

President's Malaria Initiative

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

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

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

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

BACKGROUND

Malaria Situation in Mozambique

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

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

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

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

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

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

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

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

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

Current Status of Malaria Indicators

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

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

GOAL AND TARGETS OF PRESIDENT'S MALARIA INITIATIVE

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

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

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

SUMMARY OF PROGRESS IN YEAR ONE

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

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

EXPECTED RESULTS – YEAR TWO

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

Prevention:

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

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

Diagnosis and Treatment:

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

Other:

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

INTERVENTIONS - PREVENTION

Vector Control - General

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

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

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

Insecticide-treated Nets:

Current Status, Challenges, and Needs

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

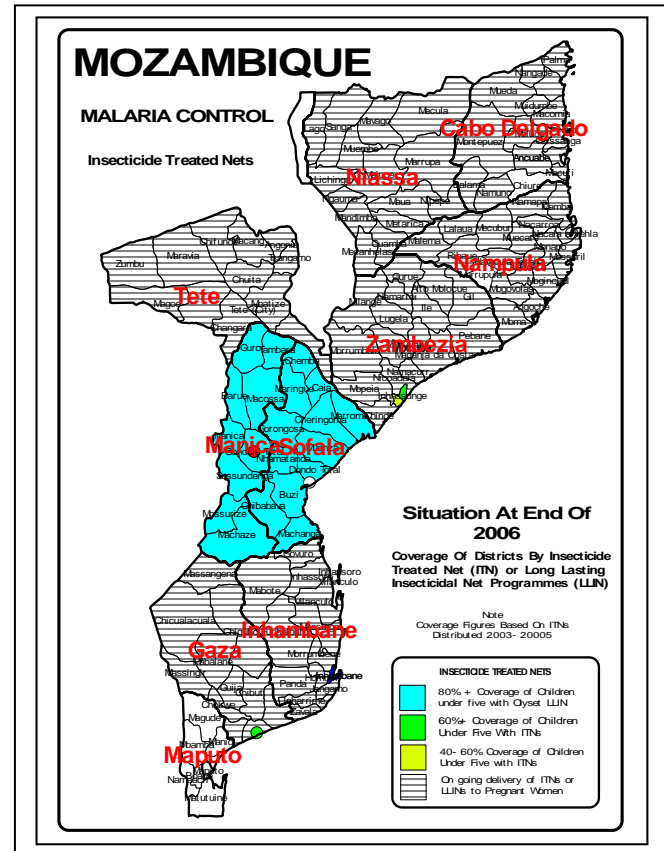
1. “Catch up” - rapid scale up through the distribution of LLINs to children less than five through an integrated campaign approach in order to allow for a rapid acceleration of LLIN coverage. This approach is being carried out, by partners such as PSI and Malaria Consortium, district by district or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

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

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

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

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



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

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

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

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

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

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

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

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

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

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

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

⁺ Courtesy of UNICEF Mozambique

*Assumes population growth

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

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

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

Indoor Residual Spraying

Current Status, Challenges, and Needs

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

Three major IRS efforts are currently underway in Mozambique:

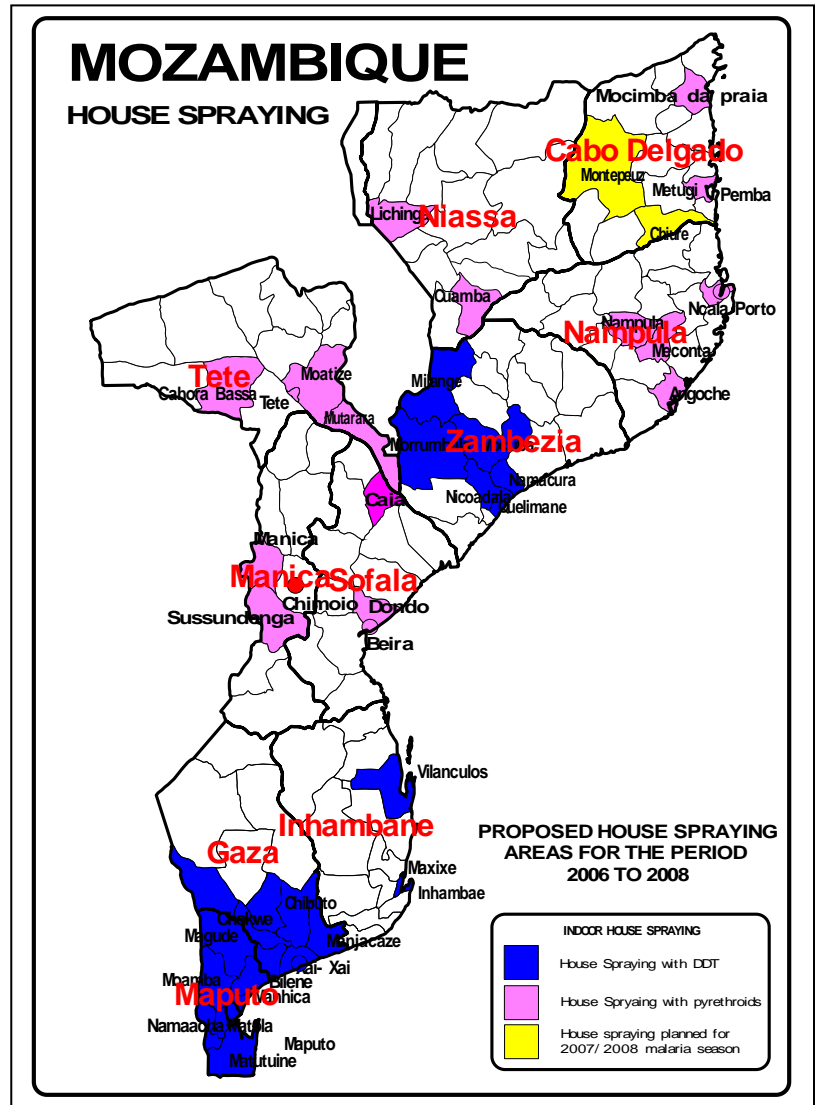
1. The MoH has been supporting IRS in peri-urban and urban areas for several years (spraying commenced during the 1960's eradication era), although this program has been under-resourced;
2. LSDI has been supporting large-scale IRS in Maputo Province since 2000. This program expanded into Gaza province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

Urban and peri-urban IRS activities:

Limited IRS activities have been carried out in a number of urban and peri-urban areas throughout Mozambique (see map). These activities, which are supported by MISAU, have suffered from a lack of financial and skilled human resources. The quality and impact of these small-scale activities is unknown but probably very limited.

Lubombo Spatial Development Initiative activities:

The LSDI is a public-private trilateral program of the governments of Mozambique, South Africa and Swaziland to develop the Lubombo 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 Global Fund 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. Manhiça District was the only district that was not covered. Beginning in 2006, the MoH began to 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 13 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. It is unclear, though, whether and how much leakage is actually occurring. Beginning in late 2005, DDT was re-introduced with one spraying round per year, when the Government of Mozambique withdrew its ban on DDT. In areas where bendiocarb is still being used LSDI is continuing with two rounds per year.

Spraying is scheduled to begin in September/October each year and is to be completed in a three-four month period, before the start of the main malaria season. Spray personnel are recruited

Table 2

President's Malaria Initiative— Mozambique
Planned Obligations for FY08

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

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

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

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

Year 2 PMI Targets:

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

Assumptions:

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

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

Average number of residents/household = 5.5

PLWHA:

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

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

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

Table 4

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

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

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

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

*Staffing and administration and CDC technical assistance not included