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

PRESIDENT'S MALARIA INITIATIVE

Malaria Operational Plan – FY08

MADAGASCAR

October 19, 2007

TABLE OF CONTENTS

EXECUTIVE SUMMARY

In December 2006, President George W. Bush announced that Madagascar had been selected as one of the final eight countries in a five-year, $1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions in high-burden countries in sub-Saharan Africa.

Malaria is a major health problem in Madagascar. It is reported to account for about 16% of all outpatient visits and 20% of all children less than five years of age admitted to a hospital are diagnosed with severe malaria. The epidemiology of malaria varies considerably in different regions of the country. On the East and West Coasts transmission is stable and perennial, while in the Central Highlands it is seasonal and moderately unstable with occasional epidemics. In the most recent large-scale epidemic in the late 1980s, an estimated 30,000 people died. In the semi-desert region of the South, malaria transmission is seasonal, very unstable and in many years almost completely absent. No up-to-date information is available on nationwide coverage of key malaria prevention and control measures in Madagascar. The last Demographic Health Survey (DHS) was conducted in 2003-2004, well before the recent, rapid scale up of Insecticide Treated Nets (ITNs) distribution and the introduction of Artemisinin-based combination therapy (ACTs) as a first-line treatment for severe malaria.

Madagascar is the recipient of a $10 million Round 3 and a $41 million Round 4 malaria grant from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM). Both grants have performed well and more than 90% of these funds have been disbursed. The Service de Lutte Contre le Paludisme (National Malaria Control Program; NMCP) applied for a Round 7 GFATM grant. Madagascar has also applied for support through the newly established UNITAID initiative, an international drug purchasing facility, to fill anticipated gaps in ACTs for 2007 through 2009, not covered by existing GFATM support. The United Nations Children's Fund (UNICEF) has played a major role in the prevention and treatment of malaria during pregnancy as well as supporting the distribution of ITNs. The World Health Organization (WHO) is a major source of technical assistance to the NMCP. PMI will continue to explore opportunities for partnerships in malaria control efforts with large private companies, such as QIT Madagascar Minerals and potentially Exxon Mobil.

The PMI 3-Year Strategy and Year 1 Implementation Plan for Madagascar were based on an assessment visit carried out in March 2007 by representatives from U.S. Agency for International Development (USAID), the Centers for Disease Control and Prevention (CDC), the Rational Pharmaceutical Management Plus (RPM+) Project of Management Sciences for Health (MSH), the Madagascar NMCP, the WHO, UNICEF, bilateral donors and a number of NGOs/FBOs. This was followed by a planning visit in May 2007, which brought together all national and international partners involved in malaria control activities in Madagascar to develop a detailed Year 1 implementation plan.

The PMI is committed to supporting the existing strategy and plans of the NMCP and will coordinate with international and national partners to complement their funding and efforts. To achieve the goal and targets of the NMCP and PMI in Madagascar, the following major activities will be supported during Year 1:

Community and NGO Mobilization: The PMI will build on and expand Mission investments in community mobilization, empowering local leaders, civil society and NGOs to improve maternal and child health at the household and community level. To engage NGOs and commune leaders, USAID/Madagascar employs an innovative approach called Kominina Mendrika (KM) or Champion Commune. KM is a participatory process that engages all the stakeholders in a commune: the mayor and council members, religious and traditional leaders, community health committee, school teacher, scouts and women's groups etc. Together with NGOs, and the public and private sectors, they set short term achievable health objectives that include malaria prevention and control targets and work together to achieve these objectives. The beauty of this approach is that the community is truly empowered to make the positive changes that improve the overall health and well being of the population. The approach has demonstrated excellent comprehensive results – including improvements in vaccination rates, pre-natal consultations, infant and child nutrition, family planning, and reductions in diarrhea and malaria. Over the past four years USAID/Madagascar has supported this approach primarily through grants to local NGOs that work with the communes to implement the approach and provide training, materials and socially marketed products such as LLINs to the volunteer community health workers (CHW) who in turn serve as continuous behavior change agents providing education to mothers and community members. To date the Mission has reached about a quarter of the 1560 communes with this effective approach. We expect that by the end of PMI at least three quarters of the communes will have KM status with measurable results in malaria control for vulnerable populations.

Insecticide-treated nets: PMI will support the existing Ministry of Health (MoH) strategy of providing long lasting ITNs (LLINs) free of charge to pregnant women, and children under five through antenatal care (ANC) and immunization clinics. Given that 30% of the Malagasy population lives more than 10 km from a health facility, marketing highly subsidized LLINs at the community level has offered an alternative network for routine distribution. Population Services International (PSI), working in cooperation with a network of local and international NGOs/FBOs, has been a major distributor of LLINs through social marketing. Between 2003 and 2006, PSI sold 1,848,000 LLINs and is expected to sell approximately 900,000 LLINs in 2007.

PMI will support free delivery through ANC and immunization clinics and marketing of highly subsidized LLINs through the network of local NGOs/FBOs who support the KM approach, working at the community level through the CHWs and shops. USAID Fiscal Year 2007 funds and funds from other malaria partners will support procurement and distribution of an estimated 1,600,000 LLINs to families with children under five years of age during the October 2007 child and maternal health week as part of the measles/malaria/LLIN integrated campaign. There are currently no other partners, aside from PMI, who have committed funds for the procurement of LLINs for 2008, however the GFATM round 7 proposal submitted by Madagascar emphasizes the LLINs need. A total of 1.6 million nets are needed for 2008, with PMI procuring approximately 525,000 nets for free distribution at health facilities and an additional 250,000 nets for distribution through social marketing. This is expected to increase the proportion of households with one or more ITNs to 70% of the population living in areas with stable malaria transmission.

Indoor residual spraying: PMI will support an ongoing IRS program that has conducted annual spraying in the Central Highlands since 1993, with the exception of 2000 and 2001 when funds were not available. In the absence of other donor funds to support spraying in 2007 and 2008, PMI and USAID/Madagascar will jointly support the November 2007 and November 2008 spraying of approximately 250,000 households each year (population of over one million). An analysis of the spray campaign will be used to review the vector control strategies and better define the role of IRS in Madagascar.

The MoH currently supports four sites for insecticide resistance monitoring (two sites on the East coast and two sites in the Northwest), and conducts knockdown tests of locally-caught mosquitoes on ITNs. The NMCP intends to increase the number of sites in the high transmission areas. PMI will support training and provide equipment to build entomologic capacity within the NMCP for insecticide resistance testing.

Intermittent preventive treatment of pregnant women: The 2003/2004 DHS estimated that 80% of women made one or more antenatal clinic visits, although many of these occur late in pregnancy. In June 2004, the MoH adopted the strategy of providing two doses of directly observed SP for prevention of malaria during pregnancy in 92 coastal and lowland districts, where malaria transmission is stable or seasonal. Nineteen districts in the Central Highlands, which are epidemic-prone, were excluded from this policy. To increase coverage of pregnant women who receive two doses of sulphadoxine-pyrimethamine (SP), PMI will support strengthening of the MoH pharmaceutical management system and implementation of IPTp as part of Focused ANC. The PMI will also work to include IPT targets as a part of the KM approach and the CHWs will extend information, education, and communication (IEC), and behavior change messages to families in the communities which will highlight the risks of malaria in pregnancy, the importance of early and frequent ANC visits and the need to complete the two doses of SP for IPTp. We expect that activities supported by the PMI and our partners will increase the proportion of pregnant women receiving two doses of SP to about 35% nationwide. Sufficient quantities of SP are being procured by other donors to meet all drug needs for IPTp for 2008-2009.

Case management: Currently, only a small percentage of all malaria diagnoses in Madagascar are based on laboratory examination and the quality of those diagnoses is unknown. The high cost of ACTs is a compelling reason to target treatment to patients who are diagnosed with laboratory confirmation. This is particularly true among older children and adults, where treatment doses are two to three times more expensive than for young children and where the risks associated with failure to promptly treat malaria are less dire. PMI's efforts will be directed towards improving malaria laboratory diagnostic capabilities through training, quality control, and supervision of malaria microscopists and workers using rapid diagnostic tests (RDTs) in public health facilities. PMI will procure 300,000 RDTs for use in peripheral health facilities and evaluate diagnosis with RDTs at the peripheral facilities, which will be used to guide interventions to improve quality.

As in many African countries, ensuring prompt, effective, and safe treatment with ACTs to patients with confirmed or suspected malaria in Madagascar represents the single greatest

challenge for the NMCP and the PMI. GFATM grants and UNITAID donations are expected to fill all ACT procurement needs in Madagascar for 2008. PMI will support the rollout of ACTs to facilities at all levels in the health system. In past years the Ministry of Health and NGO/FBO networks have used the KMs to implement community-based treatment through CHWs using subsidized, pre-packed chloroquine (PaluStop®). From 2005 to 2007, an estimated 2,275,000 PaluStop treatments were sold by CHWs. The private sector also plays a significant role in delivery of anti-malarials at the community level and about 1,125,000 treatments of PaluStop were sold in pharmacy depots and general shops in rural areas in 2006. PMI will support the roll out of ACTs through NGO/FBO networks using CHWs and providing the IEC and behavior change interventions needed to promote demand for and correct use of ACTs. PMI support will be supervision of the delivery of ACTs through health facilities at all levels and through CHWs at the community level. PMI will also work to strengthen the MoH's pharmaceutical management system and provide technical assistance to improve drug quality testing.

Monitoring and evaluation: The PMI will work with the NMCP, the GFATM, and other partners to develop a single national malaria monitoring and evaluation plan to which all partners can contribute. The PMI and USAID Mission FY 2007 funds will provide partial support towards a 2008 nationwide DHS, including a verbal autopsy component. Data from the 2008 DHS will provide baseline coverage and mortality indicators for PMI evaluation in Madagascar. The PMI will fund the 12 existing malaria sentinel surveillance sites and support an expansion up to 16 sites. PMI will support strengthening the monitoring and evaluation capacity within the NMCP by providing additional training, increasing the frequency of supervisory and reinforcing the analytic capacity at the central and district levels.

Building NMCP capacity: NMCP is relatively well staffed but there are specific and critical needs for capacity building within the NMCP and other MoH units that provide vital support in the areas of pharmaceutical management, quality control for drugs and diagnostic examinations. PMI will provide support to enhance NMCP supervision, monitoring and evaluation capacities through training, refresher training, coaching and support for information gathering. PMI will also support NMCP to improve capacity to test for insecticide resistance and other MoH departments to improve supply chain management to ensure a steady supply of ACTs, RDTs and LLI Ns at the facility and community levels.

Jump Start: For the launch in Madagascar, PMI will support the October/November 2007 IRS campaign in the Central Highlands using both USAID FY07 and PMI FY08 funds.

The proposed FY 2008 PMI budget for Madagascar is $17 million. Of this, 36% will support procurement and distribution of LLINs, 25% will support IRS and entomological activities, 2% will support implementation of IPTp activities, 13% for case management, including the procurement of RDTs, support for implementation of ACT/RDT roll-out, strengthening supply chain management, monitoring of drug quality and expanding the national pharmacovigilance system, 11% will support expansion of community efforts with the successful KM approach implemented through NGOs/FBOs to scale up IEC and behavior change interventions such as consistent LLIN use; IPT ; appropriate community-based care; and recognition of danger signs

for appropriate referral , 6% will support monitoring and evaluation activities and 7% will support staffing and administrative costs.

Of the $17 million, more than 45% will be spent on commodities.

ACRONYMS AND ABBREVIATIONS

AS/AQ	Artesunate-amodiaquine
ACT	Artemisinin-based Combination Therapy
AL	Artemether-lumefantrine
ANC	Antenatal Care
AQ	Amodiaquine
BCC	Behavior Change Communication
CCM	Country Coordinating Mechanism
CDC	Centers for Disease Control and Prevention
CHD	*Centre Hospitalier de District* (District Hospital)
CHW	Community health worker
CIDA	Canadian International Development Agency
CSB	Centre de Santé de Base (Most basic health clinic)
CSHGP	Child Survival and Health Grants Program
DAMM	*Direction de l'Agence du Médicament de Madagascar* (Drug Regulatory Authority)
DDT	Dichloro-diphenyl-trichloroethane
DHS	Demographic and Health Survey
DPLMT	*Departement de Pharmacie, Laboratoire et Medicine Traditionelle* (Department of Pharmacies, Laboratories and Traditional Medicine)
DPM	*Direction des Pharmacies et du Médicament* (Directorate of Pharmacies and Medicines)
DSF	*Direction de Santé Familiale* (Directorate of Family Health)
EML	Essential medicines list
EPI	Expanded Program on Immunization
FBO	Faith-Based Organization
GFATM	The Global Fund to Fight AIDS, Tuberculosis and Malaria
GoM	Government of Madagascar
HBMF	Home-Based Management of Fever
HMIS	Health Management Information System
IDA	International Development Association
IEC	Information, Education, Communication
IMCI	Integrated Management of Childhood Illnesses
INSTAT	*Institut National de la Statistique* (National Institute of Statistics)
IPM	Institut Pasteur Madagascar (Institute Pasteur)
IPTp	Intermittent Preventive Treatment of pregnant women
IRS	Indoor Residual Spraying
ITN	Insecticide-Treated Net
KM	Kominina Mendrika
LLIN	Long-Lasting Insecticide-Treated Net
LNCQ	*Laboratoire National de Contrôle de Qualité* (National Laboratory for Quality Control)
LQAS	Lot Quality Assurance Sampling

M&E	Monitoring and Evaluation
MAC	Malaria Action Coalition
MAP	Madagascar Action Plan
MCH	Maternal and Child Health
MICS	Multiple Indicator Cluster Survey
MIP	Malaria in Pregnancy
MIS	Malaria Indicator Survey
MoH	Ministry of Health
MNM	Malaria No More
MSH	Management Sciences for Health
NGO	Non-Governmental Organization
NMCP	National Malaria Control Program (Service de Lutte Contre le Paludisme (SLP))
PhaGCom	*Pharmacie de Gros de Commune* (Community pharmaceutical depots)
PhaGDis	*Pharmacie de Gros de District* (District pharmaceutical depots)
PLWHA	People living with HIV/AIDS
PMI	President's Malaria Initiative
PMTCT	Prevention of Mother-to-Child Transmission
PSI	Population Services International
PSSE	*Postes Sentinelles de Surveillance Epidémiologique* (Epidemiologic Sentinel Surveillance Sites
PSSI	*Postes Sentinelles de Surveillance des Indicateurs RBM* (RBM Sentinel Surveillance Sites
PVO	Private Voluntary Organization
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test
RPM+	Rational Pharmaceutical Management Plus
RTI	Research Triangle International
SIS	*Système d'Information Sanitaire* (Health Information Management System)
SP	Sulfadoxine-pyrimethamine
SSD	*Service de Santé de District* (District Health Office)
UNICEF	United Nations Children's Fund
UNITAID	
USG	United States Government
WHO	World Health Organization

PRESIDENT'S MALARIA INITIATIVE

In late June 2005, the United States Government (USG) 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 in each country. This will be achieved by reaching 85% coverage of the most vulnerable groups – children under five years of age, pregnant women, and people living with HIV/AIDS – with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated bed nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

The President's Malaria Initiative (PMI) began in three countries in 2006: Angola, Tanzania, and Uganda. In 2007, four countries were added: Malawi, Mozambique, Senegal, and Rwanda. In 2008, eight additional countries will be added to reach a total of 15 countries covered under the PMI. Madagascar is one of the eight countries selected for 2008. Funding began with $30 million in Fiscal Year (FY) 06 for the initial three countries, and will increase to $160 million in FY 07, $300 million in FY 08, and reach $500 million in FY 10.

In implementing this Initiative, the USG is committed to work closely with host governments and within existing national malaria control plans. Efforts will be coordinated with other national and international partners, including the World Health Organization (WHO), United Nations Children's Fund (UNICEF), 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 are achieved. Country Assessment and Planning visits for the PMI, as well as subsequent evaluations, will be highly consultative and held in collaboration with the national malaria control program and other partners.

This document presents a detailed one-year implementation plan for the first year of the PMI in Madagascar. It briefly reviews the current status of malaria control, prevention policies and interventions, identifies challenges and unmet needs, and provides a description of planned year one activities under the PMI. The document was developed in close consultation with the NMCP and with participation of many national and international partners involved in malaria prevention and control in the country. The total amount of PMI funding requested for Madagascar in FY 2008 is $17 million.

BACKGROUND

Madagascar has a population of approximately 18 million, 17% of whom are children under five years of age. One of the poorest countries in the world, the average per capita income is only $255 (World Bank 2005); 46% of the population is illiterate; 70% of the population lives below the poverty line; and 49% of children under age five are malnourished (DHS 2004). The most common causes of death among children under five are malaria, diarrheal diseases, respiratory infections often associated with malnutrition. Life expectancy hovers at 55 years. This dire

social situation springs from several factors: a weak health system, poor economic growth, and a high population growth rate of 2.8%.

The 2002 political crisis brought to power a democratic government with a reform agenda and renewed hope for the future. The new democratic Government of Madagascar (GoM) recognizes that improvements in health, nutrition, and food security are critical components for rapid and sustainable economic development and have incorporated ambitious health objectives in the new Madagascar Action Plan, including a bold goal to eliminate malaria by 2012.

The last decade has witnessed marked health improvements in Madagascar, especially among children. According to the 2004 Demographic and Health Survey (DHS), infant and child mortality fell by 43% and 41%, respectively, between 1997 and 2004. It should be noted that several partners have raised questions about the reliability of the child mortality figure due to potential bias. However, other determinants of child survival – such as morbidity and coverage of important health interventions – have improved significantly. For instance, the prevalence of diarrhea in children decreased about 63% and the proportion of anemic children fell about 31% between 1997 and 2004. At the same time, the coverage of vaccinations, vitamin A supplementation, and exclusive breastfeeding increased.

Despite these recent improvements in child health indicators, Madagascar still faces major health challenges, which threaten social and economic development. Health service quality is substantially below standard and basic medicines and supplies are regularly in short supply. Public and non-governmental sector capacity to plan effectively and manage health programs is weak, particularly in the areas of financial and administrative management, and the use of data for program planning and monitoring. National health infrastructure, information and commodity management and logistics systems are extremely weak, and much remains to be done at central and regional levels to ensure sustainable health financing.

Administratively, the country is divided in 6 provinces (which are being phased out), 22 new regions (created in 2005), and 111 districts.

National Health System

The health delivery system in the country consists of a four-step pyramidal system. The basic health centers (Centre de Santé de Base I or CSB I and Centre de Santé de Base II or CSB II) represent the first level of the health system. The distinction between CSB II and I is that the former is staffed with a physician whereas the latter is staffed by nurse provider or other healthcare worker. In each of the 111 districts, the CSBs are under the Service de Santé de District (SSD). In 2004, there were 1,842 CSB II and 1,106 CSB I in the country. There are also 85 district hospitals Centre Hospitalier de District (CHD I) offering similar services to those offered in a CSB II. The next level in the pyramid is composed of CHD II or district hospitals offering emergency surgery and comprehensive obstetrical care. There were 55 CHD II in 2004, and 4 Centres Hospitaliers Régionaux offering second referral services. There are 6 Centres Hospitaliers Universitaires offering comprehensive national referral services.

The private sector, mainly concentrated in urban areas, represents an important source of service delivery. About one out of every five primary health care facilities and two out of every five referral hospitals are privately owned. The majority of these facilities are concentrated in Antananarivo and other major cities. The private sector has an even larger presence in the retail sale of pharmaceuticals. There are 203 pharmacies, mainly concentrated in Antananarivo, and 1,625 drug retailers more evenly distributed throughout the country.

The public sector, especially the CSBs I and II, are a major source for health care in the Madagascar, especially in rural areas, where they account for more than 70% of first contacts. In urban areas fewer than 40% of first contacts occur in the public health facility.

A growing network of more than 12,000 volunteer community health workers (CHWs) provide health education and promotion to families in their villages. Most of these workers are trained and supervised by local, international and faith-based non-governmental organizations (NGOs). Many of the NGOs work with the USAID-supported social marketing program which provides a start-up stock of education materials, health products including safe water solution and LLINs that the CHWs sell at a highly subsidized price to families in the community. The revenue from these products allows the CHWs to procure replacement stock and earn some income as well. This income motivates the volunteers to remain in service and is an effective strategy to increase availability of LLINs in rural areas. Some, but not all of the CHWs are adequately linked to the public health center. The MoH is currently in the process of formalizing a structure that would recognize the volunteers and create a stronger relationship with the public health clinics.

The health sector in Madagascar faces many challenges relating to the level of overall financing, utilization of health services, distribution of health personnel, availability of drugs and medical supplies in health facilities, and internal administration of the health system, especially in respect to budget execution. Also, not enough resources flow to the CSBs, which partially explains the low quality of the services rendered at the periphery.

Health sector reform: Madagascar's efforts to provide services to the poor have focused on increasing the availability of quality services and ensuring the financial accessibility of these services. Health is a key goal of Madagascar's poverty reduction strategy, and health policy

issues feature prominently in the country development plans, including the Madagascar Action Plan 2007-2011. The Plan sets very ambitious targets in the areas of maternal and child mortality, fertility rate, malaria, tuberculosis, sexually transmitted diseases and HIV/AIDS control, and reduction of malnutrition in children under the age of five. Following publication of these broad objectives, the MoH prepared a National Health Sector Strategy and Development Plan (Plan de Développement du Secteur Santé) for the period 2007-2011, which seeks to define the various interventions necessary for the realization of the MAP objectives within a logical framework of priorities, activities and results.

Health care financing: Foreign aid represents the main source of funding for the health system, followed by public and private funds. In 2003, it was estimated that donor funds represented 37% of all finances flowing to the health sector. Public funds represent about 32% of the total, the majority of which come from general taxation. Finally, the private sector represents 31% of the total financing by source. Families themselves are the main source of private financing. Community health insurance schemes are starting in the country, but currently cover only a very small percentage of the population.

Data from a 2005 household survey show that only 40% of residents receive care in case of illness or injury. In addition, large regional differences occur in the proportion of people receiving care. Financial barriers to accessing health care represent the main cause of low utilization of health services. These financial barriers are often related not only to the direct cost of the services but also to other expenditures, such as transportation costs and the opportunity cost of seeking care.

The government has tried to alleviate these financial barriers, first by eliminating user fees during the political crisis and then by creating a new cost-recovery system and Equity funds, in which 2.2% of the sale of drugs is now set aside for a special fund in each CSB to allow free access to drugs for the poor. After the 2001 economic crisis, health service fees were abolished, including co-payment on drugs, following which utilization of health services increased significantly. However, as the increase in health resources was not sufficient to compensate for the loss of user fees, drug stock-outs became common, the quality of services deteriorated further, and the workload of the already over-extended health personnel increased. At the end of 2003, the Government reinstated user fees, and by 2004 a new cost recovery system was put in place that was accompanied by an exemption mechanism to ensure that the poor had access to health care.

Despite the documented high prevalence of poverty among the general population and the introduction of payment mechanisms to assist those who have been identified as too poor to access basic health services, the small number of persons who claim to be indigent suggests that there may be significant cultural barriers to identifying oneself publicly as poor or indigent. Geographic access to health care facilities is limited in rural areas, and approximately 30% of those needing care live more than 10 km from the nearest health facility causing a delay or non utilization of health services when ill.

Distribution of health services: A fundamental issue underlying the uneven production and delivery of health services in Madagascar is the large variation in the allocation, training and

competency levels of medical personnel. Almost 50% of MoH personnel are concentrated in the region where Antananarivo is located. Nurses and midwives are much better distributed as the share of each province is similar to their population share. The distribution of doctors across rural and urban areas also shows large imbalances. In addition, the relatively low productivity of medical personnel in the public sector also poses a major problem, together with a lack of essential supplies and equipment to facilitate diagnosis and treatment.

Quality of services: The quality of health care, especially at the level of the CSB and in rural areas has suffered and the system is characterized by little or no integration of preventive and curative care, poor continuity of care, and irrational use of drugs. Even non-clinical activities are of poor quality, with poor patient reception, long waiting times, and insufficient communication with the patient. Only 59% of basic public health centers have access to clean water, 53% have electricity, and only 16% have transportation available. Furthermore, only 21% of public facilities collected all the information required by the IMCI protocol (age, weight, health card, temperature, and breathing frequency). Similarly, in only eight of 58 public facilities, were children examined for the standard four signs of health risk (vomiting, convulsions, anemia, and capacity to drink). Additionally, only 61% of patients with anemia or severe malnutrition were correctly identified in public facilities.

The health system also performs poorly at the hospital level, limiting referral to urban areas and only when it is not further compounded by financial barriers. The quality of services at hospital level is affected by the lack of medical specialists, equipment, maintenance, essential drugs, and consumables. However, the creation of the health regions has significantly modified the set-up of district health facilities and reference hospitals. With support from development partners, hospital level services are being reviewed. This should lead to a reorganization of the referral system and a transformation of the role and mandates of district and regional hospitals for more effective and efficient service delivery.

Supply chain management: After the 2001 crisis, the GoM eliminated user fees at facility level and started to distribute drugs free of charge. During this time, a health facility survey recorded widespread drug stock-outs in the CSBs. Only 15% of the CSBs did not suffer shortages. About 30% of facilities had shortages of chloroquine, cotrimoxazole (trimethoprim-sulfamethoxazole), mebendazole, and alcohol; about 46% had shortages of paracetamol (acetaminophen); and more than half had no acetylsalicylic acid. The mean duration of the stockouts varied from 32 days for mebendazole to 70 days for acetylsalicylic acid. After the re-introduction of user fees and the cost-recovery/Equity Fund, the situation improved, although drug shortages are still a problem.

The 35% markup on generic drugs in Madagascar is among the lowest in Africa; however, this low mark-up does not leave much room for additional resources to improve quality. While the GoM has succeeded in maintaining low drug prices through subsidies to compensate for the 2004 devaluation, it will have to carefully manage the restoration of prices reflecting drugs' real cost in the near future.

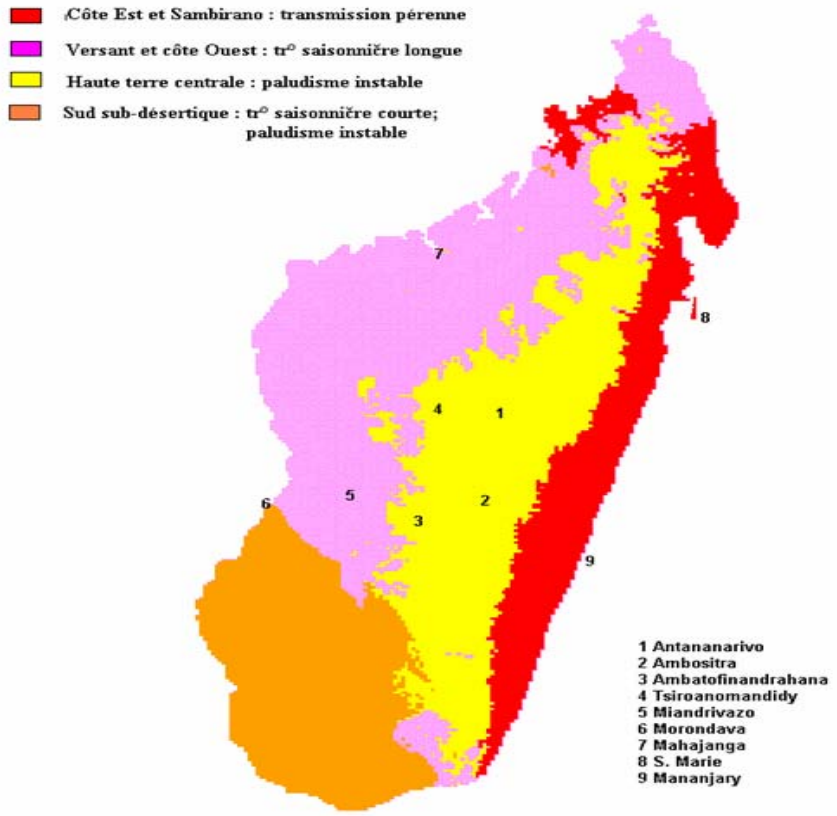
Budget execution: Health system management at the local level is improving, although budget management capacity remains a major challenge. The planning, programming, and monitoring functions of regional and district health management teams have been strengthened. All regions

and districts have adjusted their budgeting process to the new budget/program format, and some have begun to introduce performance-based planning. The performance of the district management teams has started to improve as a result of technical support and staff recruitment and all but a few of the districts are now able to formulate their three-year plans and develop annual work programs. However, implementation of those annual plans is still weak due to insufficient resources and low capacity for procurement of the large quantities of commodities and equipment needed to expand health services. Furthermore, support from regional and communal administrative authorities is still weak.

MALARIA SITUATION IN MADAGASCAR

Malaria is a major health problem in Madagascar with about 90% of the population being at risk. Malaria is responsible for about 16% of all outpatient visits and 20% of all children under five years of age admitted to a hospital are diagnosed with severe malaria. It is ranked as a leading cause of under-five mortality, and according to UNICEF, kills approximately 20,000 Malagasy children every year.

The country has been stratified into four distinct malaria epidemiologic zones: West Coast including the North, Central Highlands, East Coast and South. For these areas the rainy season usually starts in late October/early November and lasts until April. On the East and West Coasts transmission is stable and perennial (although in the West, transmission does decrease somewhat in July and August). In both regions, immunity among adults is reported to be high and morbidity and mortality is mainly among children under five and pregnant women. In the Central Highlands, transmission is seasonal and moderately unstable. In the semi-desert of the



Malariometric stratification of Madagascar: red, lowland perennial transmission+; pink, lowland long transmission season; yellow, highland unstable seasonal transmission (epidemic prone); orange, semi-desert unstable seasonal transmission (epidemic prone).

South, transmission is also seasonal but very unstable and in many years is almost absent. In both the Central Highlands and in the South, immunity is limited and the whole population is vulnerable to periodic epidemics, which are often associated with high levels of mortality in all age groups. The most recent large-scale epidemic in the late 1980s killed an estimated 30,000 people. Almost one third of the Central Highlands lies above 1,500 meters where malaria transmission tends not to occur.

All four species of human plasmodia are endemic in Madagascar. While *Plasmodium falciparum* predominates in all areas, *P. vivax* and other species may make up as much as 10-15% of all cases, especially in the highlands. The two primary vectors are *Anopheles gambiae* (East and West Coasts) and *A. funestus* (Central Highlands and South). *Anopheles arabiensis* is also present in all four epidemiological zones. *Anopheles funestus* increases in density during the rice-growing season and was the primary vector responsible for the outbreaks which occurred in the Central Highlands in the late 1980s. Since this vector is highly endophilic, it is quite sensitive to IRS. *Anopheles arabiensis* is also present in the highlands, but is more exophilic.

NATIONAL MALARIA CONTROL PROGRAM PLAN AND STRATEGY

The current national malaria control strategy divides the country into four separate intervention zones, each with a different set of priorities. The interventions in the eastern and western part of the country (stable malaria transmission) focus primarily on ITN distribution, case management, IPTp, home-based management of fever (HBMF), and community education. The interventions in the Central Highlands focus on IRS, case management, HBMF, epidemic surveillance and community education. In the South, the main activities are epidemiological surveillance, case management, HBMF, IPTp, ITNs, and community education.

The NMCP is currently preparing a National Strategy for 2007-2012, which has the long-term goal of malaria eradication in Madagascar by 2015, with a preparatory phase (1 year), attack phase (3-4 years), consolidation phase (3-5 years), and maintenance phase. The draft strategy document lays out ambitious targets for:

- IRS in the Central Highlands and West Coast;
- LLIN distribution will include all areas except the Central Highlands and will employ several strategies: free LLINs will be distributed to pregnant women at antenatal care (ANC)clinics, to infants at immunization visits and to children under five years of age through large-scale campaigns, and social marketing of highly subsidized LLINs;
- Improved case management in health facilities combined with increased use of rapid diagnostic tests (RDTs) nationally and community-based treatment with ACTs in areas of stable transmission; and
- IPTp in all areas but the Central Highlands.

The draft document also details costs for each of these interventions for the period 2007-2012 and the NMCP is planning to submit a Round 7 GFATM proposal for malaria to support these activities.

CURRENT STATUS OF MALARIA INDICATORS

The most recent DHS survey in Madagascar was carried out between November 2003 and March 2004 during the malaria transmission season. This survey showed that 39% of households owned one or more bednets (of all types) and that 36% of children under five and 35% of pregnant women slept under a bednet the night before. This survey, conducted before a set of standard malaria indicators was available, and before the rapid scale up of ITNs in Madagascar, did not measure ITN coverage or use.

A community-based household survey (PSI TRaC Survey) was carried out in malaria endemic areas in 2004 and again in 2006. This was not a standard malaria indicator survey. PSI reported household ownership of 22% and 45% respectively in surveyed areas. In 2006, 38% of children under five and 28% of pregnant women had slept under an ITN the previous night in survey areas.

Data collected by the NMCP/SIS for ongoing program monitoring indicate that 35 % of pregnant women received two or more doses of IPTp with SP in 2006

The 2003-2004 DHS the survey showed that approximately 80 % of women visited an ANC clinic for each live birth in the five years preceding the survey and 58% received antimalarial medication. IPTp was not yet implemented at the time of the survey; hence nationally representative data is not available. A repeat DHS is planned for 2008 and results from those surveys will serve as the PMI baseline for Madagascar.

Recent Estimates of Malaria Indicators: (PSI TRaC survey in malaria endemic areas)	
Indicator	**Estimates**
Proportion of children under five years old with fever in the last two weeks who received treatment with ACTs within 24 hours of onset of fever	Not available, ACTs not implemented
Proportion of households with at least 1 ITN	45%
Proportion of children under 5 years old who slept under an ITN the previous night	38%
Proportion of pregnant women who slept under an ITN the previous night	28%
Proportion of women who received 2 or more doses of IPTp during their last pregnancy in the last 2 years	Not available
Proportion of targeted houses adequately sprayed with a residual insecticide in the last 12 months (NMCP)	97%[+]

[+] Activity Reports from NMCP/SIS

GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

Goal

The goal of the PMI is to reduce malaria-associated mortality by 50% compared to pre-initiative levels in all PMI countries.

Targets

By the end of 2010, PMI will assist Madagascar to achieve the following targets in populations at risk for malaria:

- More than 90% of households with a pregnant woman and/or children under five will own at least one ITN;
- 85% of children under five will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses in geographic areas targeted for IRS will have been sprayed;
- 85% of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been sprayed with IRS in the last 6 months;
- 85% of women who have completed a pregnancy in the last two years, and who live in areas where IPTp is recommended by MOH policy, will have received two or more doses of IPTp during that pregnancy;
- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria; and
- 85% of children under five with suspected malaria will have received treatment with an ACT within 24 hours of onset of their symptoms.

EXPECTED RESULTS – YEAR ONE

At the end of Year 1 of the PMI in Madagascar (March 2009), the following results will have been achieved:

Prevention:

- More than 525,000 free LLINs will have been distributed along the East and West coasts and the South to pregnant women and children under five at health facilities (ANC and EPI clinics). PMI will participate in the Oct. 2007 campaign during which an estimated 1.6 million LLINs will be distributed. In addition more than 250,000 LLINs will have been distributed through social marketing. These activities are expected to increase household ownership of at least one ITN to 70% nationwide;
- Approximately 250,000 households in the Central Highlands targeted for IRS will have been sprayed in 2007 and 2008, protecting more than 1.25 million residents in 85% of houses in geographic areas targeted for IRS.

Treatment:

- Malaria treatment with ACTs will have been implemented in government health facilities in 80% of districts (with estimated coverage of 60% of children under five);

- Community-based treatment of malaria with ACTs will have been implemented in 60 districts nationwide (with estimated coverage of about 40% of the population).

Other:

- A DHS, including a malaria module and biomarkers (anemia and verbal autopsy), will be completed to provide baseline data for the PMI on coverage of the major interventions;
- A national policy on malaria diagnosis including a strategy on the use of malaria microscopy and RDTs in different malaria epidemiologic and health care settings will have been developed; and
- A costed national M&E plan for malaria will be developed.

INTERVENTIONS – PREVENTION

Insecticide-treated nets (ITNs)

Current Status, Challenges, and Needs:

Ministry of Health Policy on ITNs: Since 2004, the GoM has focused its distribution strategy on LLINs, with a target of two nets per household in all areas except the Central Highlands. The ITN distribution strategy varies by region; the first targeted and highest priority area was the highly endemic East Coast, while the West Coast, with somewhat lower transmission, is currently being targeted. The epidemic-prone South and Central Highland areas have not been targeted for generalized ITN distribution, but the South is included in future plans for routine LLIN distribution. There is a culture of net use in Madagascar, with relatively high coverage of locally made nets, which are generally untreated, and a high community awareness of and demand for ITNs. Since 2001, 3.65 million ITNs have been distributed: 2.1 million subsidized LLINs were sold through community agents and general shops, and 1.55 million were provided free through campaigns and routine health services. Household ownership of one or more ITNs has reached 45%, and 38.5% of children under five and 28% of pregnant women reported sleeping under an ITN the previous night (PSI TRaC Survey, 2006).

Distribution of ITNs: There is a three-pronged approach for distribution, supporting both free distribution and sale of highly-subsidized LLINs:

1. Free distribution through health centers during ANC and immunization clinic visits: The MoH has adopted a strategy of distributing LLINs to pregnant women during their first ANC visit and to infants on completion of routine vaccinations, at around nine months of age. Since 2003, approximately 1.1 million nets have been distributed through this mechanism. ITN distribution has been focused on the East Coast, which experiences high transmission year round. In 2006 alone, 818,000 were distributed through CSBs on the East Coast. Most of the funding is provided by GFATM, and a total of 264,000 LLINs remain from the GFATM Round 4 for distribution in 2008.

2. Free distribution in campaigns during the bi-annual mother child health weeks:

LLINs have been distributed free of charge through integrated biannual mother and child health weeks, which began in October 2006. The Measles Malaria Campaign in October 2007 will focus LLIN distribution (up to two nets per household) on the West Coast, North and South covering approximately 59 districts and targeting all children under five years of age. 936,000 LLINs will be procured by the GFATM Round 4 phase 2 grant, 110,000 LLINs will be donated by Malaria No More (MNM) and 491,800 LLINs will be procured by the Canadian Red Cross. USAID and other partners have contributed funds for logistical support. The MoH also supports distribution of free LLINs for emergency situations. During March and April 2007, UNICEF distributed 200,000 LLINs free of charge as part of the emergency relief response in the South following major flooding.

3. Social marketing of highly-subsidized ITNs through community health workers and rural shops:

Social marketing of highly-subsidized ITNs through volunteer community health agents and commercial outlets is a complementary strategy to establish market demand and expand rural reach. Volunteer community health agents are trained and supported by NGOs, to provide health education, home-based management of fever (HBMF), and many other health services, as well social marketing of ITNs. Demand for ITNs is high, and community health agents consistently report being unable to meet the demands of the populations they serve. Given that 30% of the Malagasy population lives more than 10 km from a health facility, community and commercial distribution has offered an alternative network for routine distribution of highly subsidized ITNs. Population Services International (PSI), a Principal Recipient of the Round 4 GFATM grant, working in cooperation with a network of local and international NGOs, has been a major distributor of ITNs through social marketing. PSI introduced the social marketing of LLINs (Permanet®) through the commercial sector in 2001 and sold 141,000 ITNs at full cost recovery of $6/net. In 2003, with the support of USAID, GFATM, and World Bank/CRESAN, PSI marketed subsidized LLINs for US$1.50. Following this price reduction, PSI sold 1,848,000 LLINs by the end of 2006. They are expected to sell approximately 900,000 ITNs in 2007. Revenue from the sales of the nets is reinvested by commercial shop owners and community health workers toward the purchase of additional bednets. All PSI GFATM funds for ITN procurement have been disbursed, and funds to support subsidized LLINs are currently not available beyond 2007.

Since 2003, all nets procured on behalf of the MoH by PSI, UNICEF and GFATM have been LLINs. Recently the MoH decided to procure larger LLINs moving from a standard sized 150x180x190cm to 190x180x180cm. These large nets will likely cost at least $0.50 more than standard-sized nets with potentially longer lead times for production.

Net re-treatment: MoH has no formal policy or plans to support ITN re-treatment in Madagascar. Some NGOs distribute subsidized K.O. Tab 123® (Bayer) for net re-treatment through their community health agents for $0.10 per sachet.

Information, education, communication/ behavior change communication: NGOs have used a variety of IEC/BCC mechanisms to increase ITN ownership and correct usage. Some employ teams of educators who stage performances, show videos, and/or use marionettes, which are popular in Madagascar. One has produced short movies starring popular Malagasy personalities

in which ITNs figure prominently. Radio spots are also used. Many of the community health agents that distribute socially-marketed products are also responsible for educating local residents on ITNs and their use.

Monitoring and Evaluation

Partners involved in distribution keep records of ITNs distributed to each area; CSBs and community volunteer health agents also keep records of how many ITNs they have distributed. Indicators on household net ownership and usage by pregnant women and children under five are collected from several sources: focused surveys conducted by the NMCP in areas targeted for distribution and nationally representative DHS, MICS and MIS surveys. The 2008 DHS will provide nationwide data on ITN coverage and use. Monitoring of insecticide resistance is done in two districts biennially.

Total LLIN needs for distribution through CSBs and social marketing

	2007	2008	2009	2010
Total population at risk[1]	13,749,720	14,134,712	14,530,484	14,937,338
Expected pregnancies[2]	618,737	636,062	653,872	672,180
Expected infants	618,737	636,062	653,872	672,180
Populations targeted through social marketing[3]	580,295	596,543	613,246	630,417
Projected LLIN need	1,817,769	1,868,667	1,920,990	1,974,777
Planned procurements[4]	2,437,800	264,000	0	0
Gap (Surplus)	(620,031)	1,604,667	1,920,990	1,974,777

[1] Population of Madagascar outside the Central Highlands; assumes a population growth rate of 2.8% annually.

[2] Assumes 4.5% of the population becomes pregnant annually; includes 100% coverage of pregnant women and infants; if this full number cannot be accessed through CSB-based distribution in remote areas, community-based strategies may be employed.

[3] Assumes a mean household size of 5 members, 30% of households have neither a pregnant woman nor a child under five and thus no access to free ITNs through CSB or campaign mechanisms, and each household needing to buy a new net every other year to maintain the goal of two nets per household. (Total population*0.2*0.30*0.5)

[4] 2007 procurements include nets procured for distribution during the integrated campaign; 2008 procurements are planned using the GFATM round 4 grant and are for distribution to the districts primarily in the western coastal region.

Proposed USG Component: ($6,200,000)

Distribution of LLINs is a high priority in Madagascar, especially on the East and West Coasts, where transmission is stable. There is already a well-developed policy of free ITN distribution through antenatal care and immunization clinics, through campaigns during biannual mother and child health weeks, and for disasters such as cyclones and epidemics. In addition, there is an

extensive network for nationwide social marketing of ITNs in rural shops and by volunteer community health agents. To date, increases in coverage, primarily on the East Coast, has been achieved by free distribution through ANC and routine vaccination visits and by social marketing. The epidemic-prone South is now targeted for ITN distribution; though this has not yet been implemented in the CSBs. Social marketing of ITNs has included the South, and this year 200,000 ITNs were distributed free of charge for epidemic prevention after a cyclone. The first large-scale campaign distribution of free ITNs will take place on the West Coast and parts of the South and North in October 2007, as part of an integrated child health campaign that in addition to LLINs includes measles, vitamin A and deworming.

Although the usual estimated cost per LLIN is $7, in Madagascar, it is likely this will increase to $8 per LLIN due to costs of distribution of nets through for CSBs with Salama, and higher cost (~$0.50) due to the larger sized net requested by the MoH. An estimated total of 1.6 million nets are needed for FY 2008 (~$12,800,000), and therefore a funding gap of $6,600,000 remains to reach the coverage targets. There are currently no other partners who have committed funds for LLINs for FY 2008, though several NGOs have shown interest.

Proposed Year 1 activities:

1. Procure LLINs for health facility-based free distribution on the East and West Coasts and South through CSBs, ANCs, and EPI clinics for pregnant women and children under five, respectively (approx. 525,000 nets) ($4,200,000);

2. Procure LLINs for social marketing using community health workers and rural shops as outlets in areas with poor access to health facilities (approx. 250,000 nets) together with IEC/BCC to promote demand for and correct use of ITNs in these areas ($2,000,000);

3. Support for national level mass media and community IEC/BCC that will address correct usage of ITNs, the risks and danger signs of malaria in children under five years, and educating pregnant women about the benefits of prenatal care, including iron/folate, IPTp, and ITNs costs (Cost referenced in Community-based interventions section);

4. Training, supervision and community mobilization for a community package of interventions. Work with the NMCP and other partners to strengthen community interventions, including community-based malaria treatment, strengthening links between community health workers and CSBs, and developing uniform training modules for community health workers (Cost discussed in Community-based interventions section);

5. Strengthen entomological capacity of the NMCP especially concerning insecticide resistance monitoring of LLINs. Support for LLIN insecticide testing every two years in two districts (Cost referenced in IRS section).

Indoor residual spraying (IRS)

Current Status, Challenges, and Needs:

The NMCP policy includes IRS as a major prevention strategy for malaria in areas of seasonal or unstable transmission such as the Central Highlands of Madagascar and GoM has a long-term objective of malaria elimination. IRS campaigns first started in the Central Highlands in 1993 and have been carried out every year since then until present with the exception of 2000 and 2001 when spraying was discontinued due to a lack of funding (see table below). Until 2004, Dichloro-diphenyl-trichloroethane (DDT) was the insecticide of choice for all spray campaigns. In 1999, 2002, and 2003 small amounts of deltamethrin were also used in selected sites. In 2004, pyrethroids were chosen as the primary and only insecticide for all the spray campaigns. The switch from DDT to pyrethroids was done in part to slow the development of insecticide resistance and partly in response to increasing international pressure following the Stockholm Convention on Persistent Organic Pollutants.

In the past few years, focal spraying has been carried out in the Central Highlands with 95-98% of the houses targeted for IRS sprayed during each campaign. The last spray campaign (2006/2007) covered 184,494 households in 33 communes protecting a total population of 1,117,511. This represents 97% coverage of targeted households.

The strategy for IRS follows what could be described a “checkerboard pattern.” Communes with a population size averaging from 4,000 to 15,000 are the units targeted for IRS each year. All structures in the target communities are sprayed. The selection criteria for target communes are based on: altitude (between 900 and 1500 meters), exclusion from the previous two spray campaigns, and/or reported caseload exceeding an “epidemic threshold” calculated based on reported malaria cases during the previous years.

The NMCP also conducts focal spraying operations in response to outbreaks of malaria. The program has implemented a malaria-specific reporting system in all epidemic-prone areas (all of the Central Highlands and nine districts of the southern region), which collects weekly data on malaria cases reported at health facilities.

In 2005, WHO reviewed the national IRS strategy and proposed conducting blanket spraying in the Central Highlands for three years instead of the previous focalized spray campaigns. This new strategy will allow time for the development and implementation of a new resistance management policy, including the development of a reliable entomological surveillance system and strengthening of the epidemiological surveillance system. The development and strengthening of a monitoring system may eventually contribute to more effective target spraying. It has also been suggested to prolong the three-year IRS campaign strategy with the objective of eliminating *An. funestus* from the highlands. The WHO consultants proposed that spray campaigns use a combination of insecticides (rotational use of a pyrethroid, carbamate, and DDT over a 3-year period) to halt an increase in DDT resistance and to delay and/or prevent other insecticide resistance (Drs. Guillet and Govere. Rapport de mission 7-19/11/2005). As yet, no final decision has been made by the MoH and the NMCP on the national IRS strategy.

In addition, the NMCP has suggested conducting biannual spray campaigns in the western region of the country in combination with other interventions such as LLINs, IPTp, ACT/RDTs, and HBMF in an effort to achieve malaria elimination by 2012, a goal set by the government. Until present, the NMCP and partners have not reached a consensus regarding the proposed plans, which would increase the annual IRS budget from $1.5 million to over $10 million.

The cost of focalized IRS campaign in the Central Highlands targeting 250,000 households as proposed by the NMCP will cost between $1.6 million and $3 million annually. This difference is a reflection of the relatively low costs for MOH implementation versus that of a contactor, projected to be $12/household. The MOH costs, however, do not include deprecation or replacement costs for vehicles and other equipment. The projected cost for either approach is expected to remain virtually unchanged from 2007 through 2010.

In the past, IRS campaigns were fully funded through the CRESAN Project (World Bank). With the CRESAN Project ending in May 2007, funding for spraying was limited and USAID funded part of the 2006 campaign. No further funding is available from CRESAN and at present no other donors have committed to fund future IRS campaigns.

Insecticide Resistance Monitoring: The MoH currently supports four sites (two sites on the east coast and two sites in the northwest) for monitoring of insecticide resistance, and conducts knockdown tests of locally-caught mosquitoes on ITNs, but there is currently no mechanism for testing the concentration of insecticide on nets locally. An additional site will be established in the south after the distribution of LLINs (GFATM Round 4) to prevent increased malaria transmission following the most recent cyclone. To conduct a baseline evaluation of insecticide resistance for LLINs, the NMCP has the intention to increase the number of sites in the high transmission areas.

Last year, insecticide resistance monitoring in IRS targeted areas was conducted at three sites in the region around Antananarivo (Anjozorobe - Ankazobe – Antananarivo) and two sites in the region of Fianarantsoa (Ambatofinandrahana – Fanjakana). These activities are conducted by staff from the NMCP and were financed by GFATM Round 3. However, studies on insecticide resistance are conducted on a case-by-case basis when funding is available. There is no official collaboration with experts from the Institute Pasteur Madagascar, however in the past, molecular and biochemical testing has been done at the Institute (lack of adequate supplies at the NMCP). The NMCP plans to develop a reliable network of sentinel sites to monitor insecticide resistance and they planned to establish a national reference laboratory to conduct biological, biochemical and if possible molecular testing.

Community Mobilization, Information, Education, and Communication for IRS: IRS does not require individual behaviour change or community normative change. However, a safe and effective IRS campaign does require the community leaders' support and adequate clear information for the population about what to expect and what to do when their house is to be sprayed. To date, the IEC efforts around IRS campaigns have been carried out by the NMCP staff and the people hired to do the spraying. IRS campaigns have been conducted over the past 14 years and are generally well accepted by the population. If the MOH and partners reach

consensus to carry out a broader IRS campaign in areas where ITNs are in use, it is likely that a more robust and adapted IEC campaign will be required.

Monitoring and Evaluation of spray campaigns: Periodic evaluations of spray campaigns are conducted by PROCHIMAD and AVIMA, both companies involved in insecticide marketing and procurement. The last evaluation was completed in January 2007 and generally found a well planned and implemented spray operation.

Proposed USG Component: ($4,263,000)

IRS is a major strategy for the prevention and control of malaria in the Central Highlands and in response to epidemics. The new national malaria control strategy proposes blanket spraying in the highlands as well as expansion to the West Coast. Because there is no other funding available from donors, PMI proposes to fully support IRS campaigns in the Central Highlands, targeting approximately the same population as in the previous years. PMI will support an evaluation of Year 1 activities that will provide guidance to NMCP, PMI and other donors for future activities.

Proposed Year 1 activities:

1. Spray campaigns in the Central Highlands in November 2007 and 2008. As one of the jump-start activities to officially launch PMI in Madagascar, PMI will support spraying in epidemic-prone areas of the Central Highlands in 2007. USAID FY07 monies will be used to purchase insecticides, equipment, and protective gear. An additional $1,075,000 of PMI FY08 funds will also be used to support this campaign and $3 million will be used to support the 2008 IRS campaign. Approximately 250,000 households will be sprayed each year, protecting an estimated 1.25 million residents. A portion of these funds will be used for training, supervision, IEC/BCC to ensure public support of the spraying activities, and monitoring and evaluation of the IRS program. A small amount will be set aside for IRS activities in response to an outbreak. One CDC TDY will provide TA support for the IRS spraying. ($4,075,000);

2. Support an evaluation and of Year 1 activities that can be use by NMCP, PMI and other donors to guide future decision on the most effective and cost-effective approaches for vector control in areas of unstable transmission in Madagascar. One USAID TDY and one CDC TDY will support this activity ($45,000);

3. Strengthen entomologic capabilities at the NMCP to ensure continuous entomological monitoring of IRS and ITN activities and insecticide resistance testing;
   $15,000 of the total amount allocated for this activity will be used to procure necessary entomological equipment such as microscopes and other laboratory supplies ($100,000);

4. Implementation support for the long term vector strategy in the Central Highlands. Specific activities will be based on recommendations identified during the evaluation of Year 1

vector control activities in Madagascar. Two CDC TDYs, one from Tanzania and one from USA to develop and guide potential Operations Research (OR) ($43,000).

Malaria during pregnancy/Intermittent preventive treatment of pregnant women (IPTp)

Current Status, Challenges, and Needs:

The 2003/2004 DHS estimated that 80% of women made one or more antenatal clinic visits, although many of these occur late in pregnancy. In June 2004, the MoH adopted the strategy of providing two doses of directly observed SP for the prevention of malaria during pregnancy in 92 coastal and lowland districts, where malaria transmission is stable or seasonal. Nineteen districts in the Central Highlands, which are epidemic-prone, were excluded from this policy. The first dose of SP is to be given when the mother first senses fetal movements, but not before the 16th week of gestation, with a second dose not less than 30 days later. A third dose is recommended for HIV-positive mothers. Voluntary counseling and testing is available, although the prevalence of HIV is low. SP is provided free of charge at the CSBs by personnel with a medical, nursing, or midwifery background. All antenatal care activities, including tetanus vaccination and malaria prevention activities are integrated at the level of the CSB. The NMCP works closely with the *Direction Santé Familiale* (DSF; Directorate of Family Health) to plan and implement IPTp and malaria in pregnancy activities.

It is national policy to treat malaria infection during pregnancy with quinine during the first trimester, and ACTs during the second and third trimesters, however this practice is highly variable. Some health workers prescribe chloroquine during the first trimester and SP during the second and third trimesters. According to the 2003/2004 DHS, 50% of pregnant women are anemic. The MoH began training of health workers in the CSBs on delivery of IPTp in late 2004, with support of the Malaria Action Coalition (MAC). To date, 2,300 CSB staff, mostly midwives, have been trained in delivery of SP for IPTp and in distribution of ITNs in 92 districts. An additional 14 trainers and 6 regional supervisors have been trained, and a training manual, materials for midwives, and wall posters for health clinics have been developed. There are currently no plans to involve CHWs in the delivery of IPTp, however, these workers play an essential role in promoting the use of antenatal services.

Documentation of SP administration is noted on the ANC card and the clinic log. CSBs collect data on the number of women who attend prenatal consultation and receive one or two doses of SP and forward this information to the district level. The data transmitted are of questionable quality and reporting from the district to the central level is incomplete. The number of women who receive the second dose of SP is currently not included in data requested at the central level. As a result, accurate national figures for coverage of IPTp are not yet available. For 2006, data regarding the number of women who took the first and second doses of SP are available for 30 districts, with fairly even geographic distribution throughout the country. Of the 30 districts that reported, 43% of women took at least one dose of SP, and 35% took the second dose. It is unclear why the percent of women who receive IPTp is so much lower than those who receive prenatal care.

A projected 2,500,000 SP tablets will be needed to treat an estimated 430,000 pregnant women expected to attend ANC clinics in the 92 selected districts. UNICEF will donate all of the SP required for IPTp in 2008 and will use its own distribution channels to deliver the drug to the district level. The Service de Santé de District (SSD) is responsible for assigning the estimated number of SP needed by each CSB. CSB staff or community members are responsible for transporting the SP from the SSD to their local CSB. The SP administration kits include cups for administration of SP and a water purifier.

One area of need within the system is to strengthen the package of services offered to pregnant women through the CSBs, especially improving supply chain management and distribution systems to ensure that ITNs and SP will be available when women seek prenatal care. Though health care providers at CSBs have been trained in IPTp, there is need for supervision and reinforcement of training both in SP and in treatment of malaria during pregnancy, particularly the need to use quinine and to avoid use of ACTs during the first trimester. In addition, support and continued training of CHWs is necessary to promote demand for and utilization of prenatal services.

Estimated SP needs and gaps for IPTp at ANC clinics from 2007-2010[1]

	2007	2008	2009	2010	Total
Est. target population[2]	12,415,876	12,763,521	13,120,899	13,488,285	51,788,581
Est. number of new pregnancies[3]	558,714	574,358	590,440	606,973	2,330,486
Est. percentage of pregnancies seen at ANC[4]	391,100	430,769	472,352	485,578	1,779,800
No. of SP needed (tablets)[5]	2,346,601	2,584,613	2,834,114	2,913,469	10,678,797
Planned SP purchases for IPT[6]	UNICEF has committed to purchasing the required SP through 2008, most likely throughout the life of the program.				
Gap	0	0	0	0	0

Notes:
[1] This quantification does not make any adjustments for expected uptake of the policy. Preliminary consumption data for the first quarter of 2007 show that approximately 75% of the SP for IPT distributed for use in that quarter had actually been used. If this situation does not change, then these requirements may represent an overestimation of the real requirements. Timely and accurate consumption tracking will be required to track use and make the required adjustments to these estimated requirements.
[2]Assumes that IPT will be applied to only 92 of the 111 districts, (excluding the districts in the central highlands, which are in Antananarivo and Fianarantsoa provinces) and that the population will continue to grow at 2.8% annually
[3]Assumes that pregnant women constitute 4.5% of the population each year
[4]Using the estimated number of pregnancies in 2004 and the number of ANC consultations from the 2004 HMIS data, we calculated that 68% of pregnant women are seen are seen at the ANC each year. Thus, this quantification assumes that the proportion of pregnant women who will have prenatal care at the CSB, and thus receive IPT, will be 70% in 2007; 75% in 2008; 80% in 2009; 85% in 2010.
[5]Assumes each pregnant woman will receive 2 doses of SP (6 tablets) during the course of a pregnancy.
[6]These planned purchases only include the donations from UNICEF, and does not include the planned procurements by Salama as these have not been categorized as solely for IPT. In February 2007, Salama had 776,600 tablet of SP in stock, with 363,000 on order. They had provisionally planned to procure an additional 1,000,000 tablets of SP in 2007.

Proposed USG Component: ($300,000)

The MoH has trained CSB staff and implemented IPTp delivery through ANC clinics in 92 districts (excluding the Central Highlands). CHWs through the vast network of NGOs play an important role in IEC/BCC. ANC clinic attendance rates are approximately 80%, but the percentage of women who complete two doses of SP is only 40%. Key needs are: increasing early and frequent prenatal clinic attendance through IEC/BCC interventions, improving the quality of prenatal services to increase the proportion of pregnant women who receive two or more doses of IPTp, ensuring continuous SP availability and consistent and accurate reporting of prenatal clinic attendance, including doses of SP given, to the central level. For FY 2008, PMI will not purchase SP as the needs are being met through funding from UNICEF.

Proposed Year 1 activities:

1. Strengthen implementation of IPTp as a part of focused antenatal care. This will include an evaluation to determine why IPTp coverage is low especially in areas where the new IPTp policy has been implemented and health care workers have been trained since 2004. PMI will also support refresher trainings, supportive supervision, and quality assurance of IPTp ($300,000);

2. Support IEC/BCC interventions to improve IPTp outcome by increasing the number of pregnant women who make ANC visits early and frequently during their pregnancy. (Cost referenced in the Community-based Interventions section).

INTERVENTIONS – CASE MANAGEMENT

Malaria Diagnosis

Current status, Challenges and Needs

The recently adopted National Malaria Control Policy (*Politique Nationale de Lutte Contre le Paludisme à Madagascar, 2005*) describes the diagnosis of malaria at three levels.

1. At reference facilities, malaria diagnosis should be based on microscopic examination;
2. At CSBs, diagnosis should be based on either microscopy or RDTs. Where these examinations are not available, diagnosis is clinical after all other causes of fever have been eliminated, and
3. At the community/home level, in regions of stable transmission, diagnosis is based on a history of fever.

Each of the 111 districts is mandated to have a referral facility with laboratory capabilities for microscopic diagnosis of malaria. These are usually district hospitals, either a CHD I (85 nationwide) or CHD II (55 nationwide). There are also 10 secondary referral hospitals. It is unknown how many of these referral facilities have a functioning microscope, if laboratory diagnosis is performed regularly and if the quality of these services is adequate.

As part of the GFATM Round 4 grant, 24 laboratory technicians, including one each for the 22 regions of the country, will be trained as trainers for microscopic diagnosis of malaria. These individuals will conduct refresher training for the technicians from the districts in their region and serve as a part of a quality control system managed under the NMCP. The details of how this quality control system will function are still under discussion.

Of the approximately 1,200,000 patients with suspected malaria who sought treatment at a health facility in 2006, the vast majority went to one of the approximately 3,000 CSBs. Until 2006 all fever cases at the CSB level were treated presumptively with chloroquine. Under the new policy guidelines, all presumed malaria cases utilizing a health facility, including children under five, will be tested using a RDT. RDTs may also be used in reference facilities, but those results should be confirmed by microscopic examination. The testing of children under five with RDTs in areas of stable transmission is not in line with WHO recommendations. However, Madagascar has areas of stable transmission with low prevalence and using RDTs to test all age groups is a reasonable approach. Sound data on malaria prevalence and slide positivity rates at health facilities are needed to guide policy decisions.

Field observations and interviews with health workers in peripheral health facilities and with NMCP staff indicate that health workers have little confidence in negative tests results and often treat clients with antimalarials in spite of negative results. The cost of both testing and then treating all individuals regardless of the test results will quickly exhaust the resources of the program. For this reason changing behavior among health workers presents a major challenge for the program in Madagascar.

Two of three RDTs tested in Madagascar, Optimal ® and CareStart ®, showed high sensitivity and specificity and both have been used in health facilities. In 2006, 1,400,000 RDTs were received and distributed to the East Coast as part of the initial roll out of the new treatment policy. Reports from CSB staff and observation by the PMI assessment team indicated that adoption of routine use of RDTs has been slow and in many facilities, supplies of RDTs will expire before being used.

Both the World Bank funded CRESAN Project and the NMCP have provided estimates of the number of RDTs needed in 2008. These vary considerably due to different assumptions, but both are based on estimates of the number of suspected malaria cases seeking treatment at a public health facility. Because protocol calls for elimination of other possible causes of fever before classifying a case as suspected malaria, these numbers will underestimate the number of RDTs needed if all fever cases are to be tested. The projected RDTs needed if all fevers are tested is about double the CRESAN and NMCP estimates.

Estimates of RDT needs for 2008 - CRESAN and NMCP

Facility-based needs 2008	**CRESAN**	**NMCP** [1]
RDTs		
Number of districts	111	111
Projected total population	18,371,523	18,371,523
Health facility utilization	50% = 9,185,761	55% = 10,104,338
Suspected malaria cases as percentage of health facility utilization	10%	14%
RDT needs for all suspected malaria cases	918,576	1,414,607
Partner procurement of RDTs [2]	900,000	900,000
PMI projected procurement [3]	300,000	300,000
GAP (Surplus)	(281,424)	214,607

Notes:
1. NMCP spreadsheet *Besoin en ACT CSB 07 12* dated 05-06-07.
2. Procured by CRESAN with GF Rd. 4 funds.
3. Assumes a cost of $.095/RDT.

Given the relatively slow uptake and use of RDTs reported on the East Coast in 2006 and the unknown pace of rollout into the other provinces, the CRESAN and NMCP figures are believed to be reasonable estimates of the level of use of RDTs in 2008. Ultimately, documentation of actual usage should drive procurement and distribution.

Proposed USG component: ($687,000)

The PMI sees improving malaria diagnostics as the best way to promote rational use of antimalarials such as ACTs and will support acquisition of RDTs and improved microscopic capabilities. Establishing clear guidelines at all levels, but particularly at the CSB, to implement the new strategies for diagnosis and treatment of malaria is key, as is a system to ensure sustained quality of laboratory diagnosis. PMI sees need for an evaluation of the performance of health workers' use of RDTs and health workers' use of those results to guide treatment decisions at the CSB level. Results will be used to guide training, supervision and other interventions designed to improve outcomes related to diagnosis. PMI will also invest in strengthening the pharmaceutical and commodity supply chain to ensure that a continuous supply of RDTs is available at the peripheral CSBs.

Proposed Year 1 activities:

1. Procure approximately 300,000 RDTs to fill a portion of the expected RDTs needs in 2008 ($285,000);

2. Support an assessment of malaria diagnostic capabilities in MoH facilities in Madagascar. This activity will better define the capabilities and needs related to microscopic diagnostics in Madagascar ($25,000);

3. Support development of a detailed written national malaria diagnosis plan/technical guide including detailed description of standards and procedures. This activity will ensure that clear, easy to use materials are in place at all levels, particularly the CBS, to guide health workers in diagnosis and treatment of malaria following the new policies including use of RDTs and ACTs ($25,000);

4. Support for the implementation of the newly developed national diagnosis strategy/technical guide including training and supervision of laboratory workers and clinical staff that emphasizes the need to base treatment decisions on the results of laboratory tests ($300,000);

5. Support for an evaluation of the performance of health workers' use of RDTs and health workers' use of those results to guide treatment decisions at the CSB level. Results will be used to guide training, supervision and other interventions designed to improve outcomes related to diagnosis ($52,000);

6. Support and strengthen pharmaceutical and commodity management systems. PMI will provide support the MoH to strengthen the commodity management system through Salama, including forecasting, storage, monitoring and distribution of commodities. (Cost referenced in Pharmaceutical and Commodity Management section).

Malaria Treatment

Current status, Challenges and Needs

Uncomplicated malaria. Because of increasing resistance to chloroquine, the MoH made the decision in 2005 to change the first-line treatment for *P. falciparum* malaria to artesunate/amodiaquine (AS/AQ) combination therapy. The second-line drug is artemether/lumefantrine (AL; Coartem®) and the third-line, and for cases of severe malaria, is quinine in association with tetracycline or doxycycline (Politique Nationale de Lutte Contre le Paludisme a Madagascar, 2005). The guidelines for this policy have been distributed throughout the country. In the public health system no consultation fees are charged for sick child visits and treatment for uncomplicated malaria is free.

The treatment dose by age group for AS/AQ is shown in the table below:

Prescription of AS+AQ combination		
Age	**Artesunate 50mg**	**Amodiaquine 153mg**
2 – 11 months	25mg	75mg
1 – 6 years	50mg	150 mg
7 – 13 years	100mg	300mg
> 14 years	200mg	600mg

The rollout of this treatment policy began in 2006 with the training of health workers and delivery of AS/AQ and RDTs in twenty-one districts on the East Coast where malaria transmission has historically been the highest. The national policy supports community/home-

based treatment of fever in regions of stable transmission and specifies presumptive treatment of all febrile children under five years of age at the home or community level.

Several NGOs are providing support for community-based treatment through CHWs who provide subsidized, pre-packed chloroquine (PaluStop®). Since 2005, an estimated 2,275,000 PaluStop treatments have been sold by CHWs. The private sector also plays a significant role in delivery of anti-malarials at the community level. About 1,125,000 treatments of PaluStop were sold in pharmacy depots and general shops in rural areas in 2006. PaluStop® was sold by CHWs and in shops for the same subsidized price of 100 Ariary (~$0.50). There are plans to use these same approaches to launch community-based treatment using AS/AQ in 11 districts during the fourth quarter of 2007.

Monitoring Drug Efficacy: Responsibility for *in vivo* monitoring of therapeutic efficacy of antimalarial drugs is being transferred from the Institute Pasteur de Madagascar (IPM) to the NMCP. There are plans to reduce the number of monitoring sites and to conduct monitoring activities every two years. Training in monitoring of molecular PCR and other laboratory techniques has improved the capacity of the NMCP. The IPM will retain responsibility for *in vitro* drug resistance monitoring.

Quantification of AS/AQ: The absence of reliable data on the use of antimalarials in Madagascar makes accurate estimation of requirements challenging as only the morbidity method of quantification can be used. CRESAN has been responsible for estimating the requirements of AS/AQ (and RDTs) procured to date. Both have provided estimates of the number of ACTs needed in 2008, shown in the table below. As with the calculations for RDTs, both are based on estimates of the number of suspected malaria cases seeking treatment at a public health facility.

The assumptions used to estimate requirements for AS/AQ for distribution at the community level are also shown in the following table. It is expected that community distribution will only occur in 91 districts (excluding the low transmission districts in the highlands). The calculations assume that the expected number of malaria episodes per child under 5 years of age will decline from two episodes per year in 2008. No data were available at the time of the needs assessment visit to determine the accuracy of these estimates.

Estimates of ACT needs for 2008 - CRESAN and NMCP

Facility-based needs 2008	**CRESAN**	**NMCP** [1]
Artesunate/Amodiaquine		
Number districts	111	111
Projected total population	18,371,523	18,371,523
Health facility utilization	50% = 9,185,761	55% = 10,104,338
Suspected malaria cases as a percentage of health facility utilization	10% = 918,567	14% = 1,414,607
Confirmed cases as proportion of suspected malaria	40% [2] = 367,427	18% = 254,629
Estimate requirement for <7 years (treatment doses)[3]	124,926	86,573

Planned procurements <7 years (treatment doses)	239,024	239,024
Estimate requirement for 7-13 years (treatments)[4]	73,486	50,926
Planned procurements 7-13 years (treatment doses)	140,602	140,602
Estimate requirement for >13 years (treatments)[5]	169,078	117,129
Planned procurements >13 years (treatment doses)	323,385	323,385
ACT treatments for total population for facility based treatments of simple malaria	367,430	254,629
Procurements for facilities[6]	703,011	703,011
GAP (Surplus)	(335,581)	(448,382)
Community-based needs 2008		**NMCP**[7]
Number districts		91
Projected <5 population		2,939,444
Number cases of fever (X 2)		5,878,887
Projected number <5s needing treatment a community level in 2008		1,410,932[8]
Procurement for community distribution[9]		1,435,011
Gap (Surplus)		(24,078)

Notes:

1. NMCP spreadsheet *Besoin en ACT CSB 07 12* dated 05-06-07.
2. Based on preliminary findings from IPM in 11 districts where RDTs have been introduced.
3. Assumes 34% of confirmed cases of malaria <7 years
4. Assumes 20% of confirmed cases of malaria 7 – 13 years
5. Assumes 46% of confirmed cases of malaria > 13 years
6. Anticipated procurements by CRESAN using GFAMT Rd 3&4 and UNITAID funds.
7. NMCP spreadsheet *Besoin en ACT communautaire 07 12* dated 05-06-07.
8. NMCP spreadsheet assumptions indicate a coverage of 80% and that 33% of children will have a fever.
9. Procured by PSI with GF Rd. 4 funds.

Severe malaria: Quinine as the treatment of choice for severe malaria. Confirmed cases of malaria in pregnant women are treated as severe malaria. In the first trimester a pregnant woman with malaria should be treated with quinine, 10 mg/kg every 8 hours for 7 days. Pregnant women in the second and third trimester should be treated with AS/AQ at the recommended dose. All patients with severe illnesses identified in peripheral outpatient health facilities should be referred to a larger health facility with an inpatient ward or a hospital. The NMCP confirmed that there is no need to procure additional quinine for 2008.

Proposed USG component: ($800,000)

Using GFATM and UNITAID funds, CRESAN, PSI and the NMCP have programmed purchases of ACTs for 2008 that exceed the projected needs. PMI has identified several key areas that will directly support the implementation of ACTs nationwide, both at the facility and community level. These include training and supervision at all levels in the health system and extending to the community level in those districts where HBMF will be implemented in 2008. PMI will also support broad public awareness campaigns utilizing mass media and community mobilization activities. These IEC/BCC activities will include introduction of ACTs as the new drug of choice for malaria. PMI will also invest in strengthening the pharmaceutical and commodity supply chain to ensure that a continuous supply of ACTs is available at all levels.

Proposed Year 1 activities:

1. Support the NMCP program supervision at all levels of the health care system. Training and refresher training, along with increased visits monitoring and supervisory visits will be used to ensure proper use of RDTs and ACTs at health facilities and to the community level in areas where HBMF has been implemented. This funding will be provided directly to the NMCP ($300,000);

2. Facilitate implementation of ACTs at facility and community levels. Support for training on appropriate treatment with ACTs for both the facility and community health workers in all regions, except the East Coast where refresher training will be delivered to already trained health workers. ($500,000);

3. Support for national level mass media and community IEC/BCC that will address introduction of ACTs in health facilities and through HBMF through educating care givers about the dangers of malaria in children under five, the signs of severe illness and the need to refer severely ill patients to a health facility (Cost referenced in Community-based Interventions section);

4. Training, supervision and community mobilization for a community package of interventions. PMI will work with the NMCP and other partners to strengthen community interventions, including community-based malaria treatment, strengthening links between community health workers and CSBs, and developing uniform training modules for community health workers (Cost referenced in Community-based interventions section);

5. Support and strengthen pharmaceutical and commodity management systems. PMI will encourage collaboration with and give support to the existing supply chain management system with the goal of ensuring availability of ACTs in all health facilities and at community level. For FY 2008, PMI will not purchase ACTs as the needs are being met through funding from GFATM and UNITAID (Cost referenced in Pharmaceutical and Commodity Management section)

Pharmaceutical and Commodity Management

Registration: All antimalarials currently included in the national treatment policy have been registered for use in the country by the drug regulatory authority (*Direction de l'Agence du Médicament de Madagascar* (Drug Regulatory Authority; DAMM). Also registered is a quinine combination (Qunimax®) which is not included in the current treatment policy, and is most likely only used in the private sector at this time.

List of registered antimalarial products (February 2007)

Chloroquine phosphate tablet
Quinine dihydrochloride solution injectable
Quinine resorcine sol. Injectable
Quinine sulfate injectable
Amodiaquine tablet

Combination of arthemeter + lumefantrine (Coartem®)
Combination of artesunate + amodiaquine
Sulfadoxine – pyrimethamine tablets
Combination of quinine dihlorhydrate + quinidine chlorhydrate + cinchonine chlorhydrate + cinchonidine chlorhydrate (Quinimax®)

Essential Medicines List: The *Departement de Pharmacie, Laboratoire et Medicine Traditionelle* (DPLMT) is the primary regulatory authority for the pharmaceutical sector within the MoH. It is responsible for the development of the National Pharmaceutical Policy and the Essential Medicines List (EML). Both of these were last revised in 2006 though they are still awaiting printing. The antimalarial medicines included in the EML as of 2005, as well as the level of the health facilities where they may be used are listed in the table below. Quinine tablets should only be available in the CHD1 level, however they are available and in use in all the CSBs.

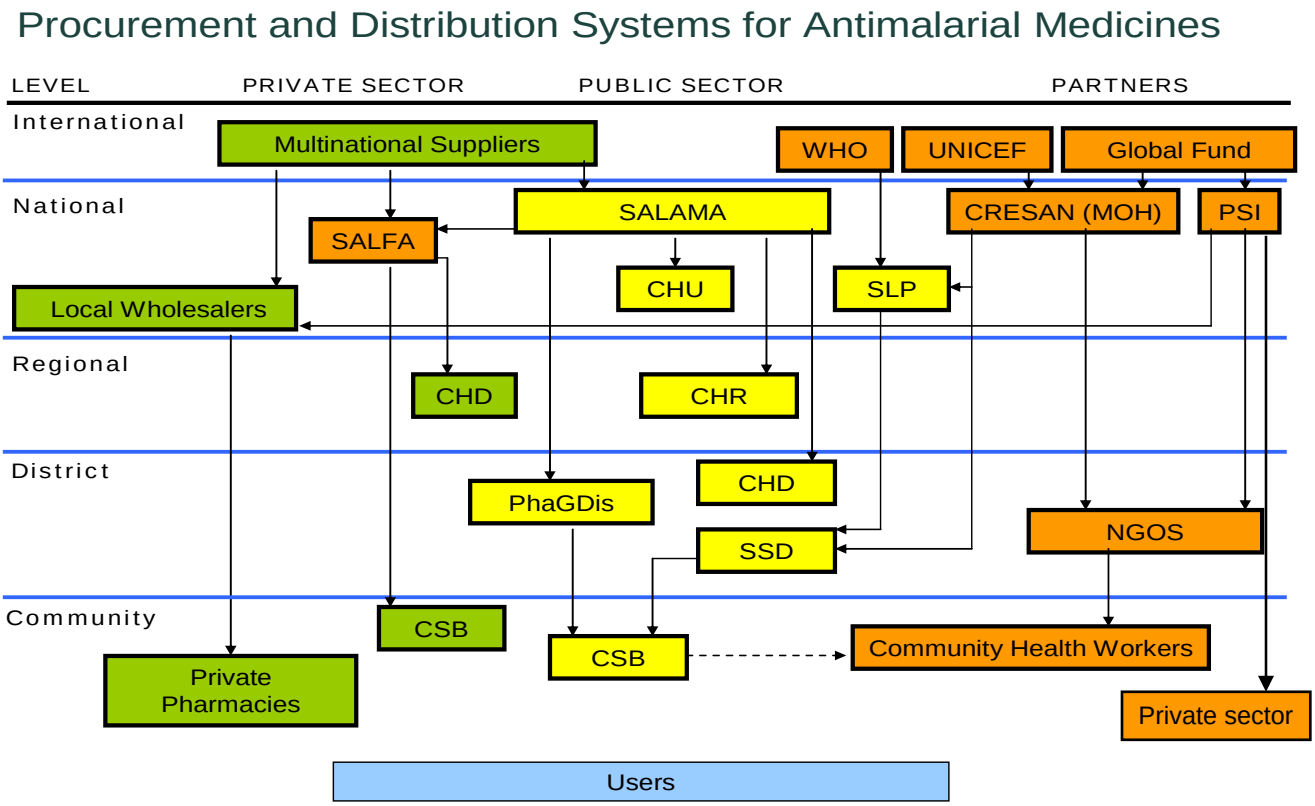
Item	CHD I	CSB II	CSB I
Chloroquine 150mg tablet	x	X	X
Doxycycline 100mg tablet	x	X	X
Quinine 300mg/ml injectable in 2ml ampoule	x	X	X
Quinine 300mg tablet	x		
Sulfadoxine-pyrimethamine 500mg/25mg tablet	x	X	

There has been a request for AS/AQ to be added to the revised EML, however this could not be confirmed at the time this document was written. In the event that it has not been included, the NMCP can request a temporary authorization from the DPLMT for its inclusion while awaiting the next revision of the EML which occurs every 2-3 years.

Quality Assurance: The *Direction de l'Agence de Medicament de Madagascar* (DAMM) is responsible for testing most pharmaceutical products destined for use in the country, and products already on the market. The DAMM is able to conduct tests of AS/AQ and other antimalarials although its capacity to conduct tests is still limited to three to four samples per week due to insufficient financial and human resources and equipment. The DAMM conducts testing of most antimalarial pharmaceutical products on behalf of Salama and CRESAN, the two main agents currently procuring antimalarials in the country. To decentralize its testing operations and reduce the burden at the central laboratory, the DAMM is in the process of establishing peripheral minilabs. The first four have been established and two additional sites are planned. Approximately 50 samples are analyzed at each minilab site per trimester.

Only five technicians/pharmacy inspectors and one supervisor currently work at the DAMM, all based at the central level and are responsible for post-marketing surveillance. No pharmacy inspectors work at the regional level. This limits their ability to conduct regular and effective post-marketing surveillance and they only intervene when a specific problem is suspected and referred by prescribers.

Procurement and Distribution



Procurement and distribution system of antimalarials and other health related products such as ITNs and RDTs in Madagascar

<u>Public Sector</u>

Financing: The procurement of products for use in the public sector and their distribution to the district level is the role of Salama, the central purchasing agency of the MoH. Salama is an autonomous non-profit organization that was established in 1997 with the support of various donors. They finance all their activities from the resources generated by their sales.

Each financial year, the DPLMT receives a predetermined budget from the government for the purchase of pharmaceuticals, which it uses to maintain a line of credit at Salama on behalf of the health facilities. The DPLMT is responsible for determining the line of credit that will be available for each health facility from this budget. When the health facility purchases a product on the EML, they draw down on their line of credit. Each health facility is responsible for determining how to allocate the line of credit to cover all the required products on the EML with oversight from the district health teams and the DPMLT, as needed. Once exhausted, there is no additional credit available for the health facility to use until the next financial year. The health facilities can also use the money they generate as part of the cost recovery process to make additional purchases from Salama (and this is usually the only option available once they have

exhausted their line of credit). All medicines dispensed at public health facilities are sold at a margin of +35% of the Salama price.

At the regional level, the district depots (*Pharmacie de Gros de District* – PhaGDis) are the intermediary points in the public sector supply chain. They are managed primarily by NGOs under a contract with the MoH through the DPLMT. The PhaGDis adds a 7% margin to its sales to the health facility pharmacies (*Pharmacie de Gros de Commune* – PhaGCom).

Central level procurement and distribution: Procurement is done once a year through an international open tender. The tenders are developed in consultation with the DPLMT and are ranked based on their price, quality, services included, and business samples included in the tender documents. Salama reviews all the tenders received, and assigns a code for each of the four key elements. It takes approximately 1.5 months from the time a tender is advertised to the selection of a successful bidder. After placing an order, the lead time to delivery is approximately 4 months. All procurement done through Salama is tax free.

Salama is only authorized to procure items that are included in the national EML. Procurement of items outside the EML can only be done after submission of a special request to Salama by the MoH. Salama is currently not procuring any ACTs or RDTs, as these had not yet been included in the EML at the time of their last procurement, and it had not received any special authorization to procure them. It has been procuring quinine, SP, and chloroquine. It also procures related consumables, including intravenous kits and syringes, and laboratory reagents for microscopy. Salama had been procuring ITNs, but stopped doing so as it was not cost-effective given the availability of free and subsidized nets.

Salama's contract with the GoM only authorizes it to distribute products to the PhaGDis. Salama develops a distribution plan for delivery of pharmaceuticals to all 111 PhaGDis every December, in consultation with the PhaGDis and the district health teams. Distribution occurs every three months to the PhaGDis in accessible areas and every six months to the PhaGDis in hard-to-reach areas. As Salama does not maintain its own transportation fleet, it contracts out the actual transportation to private transport companies.

The introduction of the free distribution of some antimalarial products through the public sector has resulted in alternative procurement and distribution channels for these products. The CRESAN Project, a principal recipient of the GFATM Round 3 and 4 grants, has procured ACTs, RDTs, ITNs and some laboratory equipment and distributed these to the district level. CRESAN has rented some warehouse space in Antananarivo for short-term storage before transportation to the districts. UNICEF has also procured or plans to procure ITNs, ACTs, SP (for IPTp) and prepackaged chloroquine as their donations, and on behalf of other agents including CRESAN, PSI, and JICA. UNICEF also contracts out the transportation of the products to the district level, as needed.

While the quantity of antimalarials distributed to the districts by Salama is determined by the districts and the information sent to Salama at least two months before delivery (a 'Pull' system of distribution), the quantity of the free products procured and distributed to each district by

UNICEF and CRESAN, is determined centrally in consultation with the NMCP (a 'Push' system).

Given the multiple procurement and distribution strategies currently in use, good coordination is critical to ensure that no wastage occurs due to excess products. This is particularly important for procurements done through the regular public sector supply system, which relies on cost-recovery funds to meet their operating costs and provide funds for additional purchases. This coordination has been poor, resulting in excess chloroquine and SP stocks in the PhaGDis and PhaGCom in those districts currently implementing ACTs.

Salama can also serve as procurement agency on behalf of non-GoM clients who wish to provide free or donated pharmaceutical products for use in the public sector. Their preferred option would be to procure, store and distribute the products as they would then be able to assume responsibility for all quality assurance requirements. However, they are also willing to store and distribute previously procured products as required by the donor agency. There is a fee associated with these activities that depends on the weight and volume of the products, and the frequency of distribution. Large volume items (e.g. ITNs) or distribution outside the regular Salama schedule would require the hiring of additional transport vehicles and would increase the charges.

Peripheral level procurement and distribution: As with the central level distribution, there are multiple channels for distributing antimalarial medicines and products at the district level. The free and donated antimalarial products are received and managed by the SSD while the products from Salama are managed by the PhaGDis. In both circumstances, CSBs are responsible for the actual collection and transportation of their supplies from the district level, thus limiting the quantities that most of them can transport at any one time as they mainly rely on public transportation.

Private sector

Non-commercial Private Sector: Several NGOs and faith-based organizations (FBOs)also procure and/or distribute antimalarial medicines and supplies. SALFA, the health agency for the Lutheran mission in Madagascar, is one of the largest of the FBOs working in the country. It procures and distributes pharmaceuticals, including antimalarials, for its network of 27 health facilities and affiliated community health workers. These health facilities purchase the pharmaceuticals at a 15%-25% margin from SALFA.

PSI is the largest organization involved in the procurement and distribution of chloroquine and ITNs for distribution in the private sector and the community as part of a social marketing strategy. The items are highly subsidized through funds from USAID, GFATM, and other donors and are distributed to NGOs, private sector pharmacies, *depots pharmaceutiques*, shops and private doctors through PSI-contracted pharmaceutical wholesalers. PSI determined the margins at which these items are sold to the consumers by these private providers. In 2007, PSI plans to stop the distribution of chloroquine and begin the distribution of ACTs to the depots pharmaceutiques through the wholesalers, and to the community health workers through pre-identified NGOs.

Commercial Private Sector: There is also a small but active distribution system of antimalarials in the commercial private sector, particularly in urban areas. There are at least three local manufacturers who mostly import finished products for repackaging and sales, approximately 20-30 wholesalers, approximately 200 private pharmacies and approximately 2000 *depots pharmaceutiques*. FARMAD, the largest local manufacturer, currently sells several antimalarials as part of its regular sales. As of February 2007, there were six antimalarial drugs on sale through FARMAD.

- Neoquine® (chloroquine) 100mg tablets
- Amodiaquine 200mg tablets
- Artesunate 50mg tablets
- CombiPalu® (artesunate-amodiaquine)
- Quinine injectable 600mg/2ml ampoule
- Paludar® (sulfadoxine-pyrimethamine)

FARMAD has also been working with PSI to repackage chloroquine for sale as Palustop® for distribution through its networks.

Storage and Inventory Management: Standard inventory management forms and registers have been developed by the DPLMT; however, their use and the quality of the storage conditions and inventory management procedures in place depend on who is managing the PhaGDis and PhaGCom. Some of the inventory management problems identified include: lack of stock records or incomplete records; expired medicines still on the shelves and included in records of available medicines; inability to correctly determine the quantities of products to order (despite the existence of a formula developed by DPLMT and Salama); and dirty, hot, humid storage areas.

The DPLMT has direct oversight over the PhaGDis and is responsible for their regular supervision and training. Reports on the activities of the PhaGDis, including information on their sales receipts, expenses and inventory are supposed to be sent to the DPLMT each month. This appears to be the only central source of data on consumption of any pharmaceutical product by the health facilities.

The PhaGCom, which serve as the health facility dispensaries, are owned by the community and managed by a community health management committee that includes a representative of the district health team. The district chief medical officer and health team are responsible for supervising the activities of the PhaGCom, though most of them have had no training in proper inventory management procedures nor do they have standardized supervision tools to use during their supervision visits.

Management of donated antimalarials at district level: The establishment of a separate supply system for donated antimalarials and those purchased from GFATM grants through the SSD has required that they store and manage pharmaceuticals, although they do not have warehouses to do so. In some districts with large SSD offices, the medicines are stored there while in some districts the Medicin Inspector has reached an agreement with a neighboring PhaGDis to store the medicines for them. No standard inventory management forms or registers have been provided.

At the health facility level, the ACTs and RDTs are managed by the physician in charge while the SP for IPTp is managed by the midwife (or whoever is in-charge of the ANC). These workers have not had any training in inventory management nor do they have standardized stock records. In some health facilities visited, they had decided to use the same stock records used by the PhaGDis.

Pharmacovigilance: **In early** 2006 Madagascar's national pharmacovigilance center and system were established. Since then, the center has developed its national strategy, developed a national adverse events reporting form, conducted a training of trainers workshop (with the assistance of the Moroccan pharmacovigilance center) and conducted trainings in four districts of the Atsinanana region (around Toamasina) which were coupled with the scheduled ACT trainings executed by WHO/Madagascar and NMCP. In addition, a second pharmacovigilance focal person for the *Direction de l'Agence du Médicament de Madagascar* has been hired and she recently completed a three-month internship at the pharmacovigilance center in Morocco. The impetus for the development and establishment of an effective pharmacovigilance system has come from the NMCP as part of the introduction of the new treatment policy.

Proposed USG component ($800,000)

Several key areas are in need of support for launching ACTs nationwide, both at the facility and community level. Public awareness campaigns will be supported to introduce ACTs as the new drug of choice for malaria. PMI will also provide support to strengthen Salama's capacity to store, deliver and forecast commodity needs so as to ensure a steady supply of ACTs, SP, RDTs and other drugs and commodities.

Proposed Year 1 activities:

1. Strengthen the MoH pharmaceutical and commodity management system, including support to Salama's capacity to store, distribute and forecast commodity needs, in particular for ACTs ($550,000);

2. Support to strengthen the national drug quality control system. PMI will support the DAMM to strengthen its capabilities to perform frequent and high quality testing of antimalarials, especially ACTs, to ensure high quality drugs in health facilities and communities, in particular ACTs ($100,000);

3. Support to strengthen and expand the national pharmacovigilance system. PMI will support the expansion and strengthening of the national pharmacovigilance system, including direct support to DAMM, through trainings and supportive supervision ($150,000).

COMMUNITY-BASED INTERVENTIONS

Current Status, Challenges, and Needs

Mobilizing community, traditional and religious leaders, and civic organizations to support and promote malaria prevention and control including the use of LLINs by pregnant women and children under 5, encouraging correct prompt treatment of suspected malaria, and encouraging women to go to the health center for IPTp is critical for achievement of the national malaria strategy and PMI objectives.

With the MOH, NGOs and RBM partners have established innovative and effective community empowerment and mobilization approach called Kominina Mendrika (KM), or champion commune. The KM approach engages all the stakeholders in the commune (the mayor and council members, religious and traditional leaders, community health committee, school teacher, scouts and women's groups etc.) who set short-term achievable health objectives that include malaria prevention and control targets. Together, civil society, NGOs, and the public and private sectors work together to achieve these objectives. The beauty of this approach is that the community is truly empowered to make the positive changes that improve the overall health and well being of the population, and the results are comprehensive – including improvements in vaccination rates, pre-natal consultations, family planning, and reductions in diarrhea, pneumonia and malaria.

The KM approach is complemented by a comprehensive behavior and community norm change strategy that makes full use of a variety of information, education and communication (IEC) channels. The MOH and RBM partners have established an IEC and behavior change strategy for malaria prevention and control. Partners use mass media, including radio shows, mobile videos with local actors and print materials for broad dissemination of key malaria prevention and treatment education messages.

To complement the mass media efforts, interpersonal communication and community-based behavior change interventions are implemented through NGOs and community health agents. CHWs work with local civic groups to implement malaria prevention education through participatory radio listening groups, skits and local drama, small group education sessions, mobile videos (Mobile Cinemas), and marionettes, which are popular in Madagascar. CHWs also can be instrumental in encouraging pregnant women and women with children needing vaccinations to visit the health center to receive a free ITN. These efforts have been limited to date because of the unreliability of stocks at the public health centers. However, when stocks are assured, a promotion campaign will be included in the health agents' work. The CHWs that distribute socially-marketed products are also responsible for educating local residents on ITNs and their use. These agents will also be responsible for educating care givers on prompt correct treatment with ACT for children under 5 at the household level, and understanding the danger signs of severe malaria that will need treatment at the clinic.

PMI supports the continuation of the successful collaboration in Madagascar between partners with direct USAID contracts and their subcontracted local NGOs, who work effectively at community level.

Proposed USG component ($1,800,000)

Proposed Year 1 activities:

1. Support a harmonization workshop to establish best IEC practices bringing together national and international NGOs working on malaria in Madagascar to ensure uniform IEC messages and promote improved coordination of NGO malaria activities with the NMCP strategy and plans ($25,000);

2. Support for national level mass media and community IEC/BCC for increasing knowledge and enabling behaviors related to ITN use, IPTp through ANC visits, and malaria case management at health facility and community levels. This strategy continues to aggressively engage local NGOs as partners in rolling out the community-based interventions. ($800,000);

3. Training, supervision, and community mobilization for a community package of interventions. PMI will work with the NMCP and other partners to strengthen community interventions, including community-based malaria treatment, strengthening links between CHWs and CSBs, and developing uniform training modules for those workers. To the extent possible local NGOs will be engaged to strengthen the community interventions. ($975,000);

MONITORING AND EVALUATION PLAN

Current Status, Challenges, and Needs

One of the major NMCP priorities is to strengthen their monitoring and evaluation capabilities. The NMCP is developing a national monitoring and evaluation strategy, which is expected to be completed in the near future.

The Malagasy malaria surveillance system obtains data from three sources: (1) the National Health Information System; (2) sentinel sites located in all six former provinces (now 22 regions), and (3) sentinel sites located in the two epidemic-prone zones monitoring the reported number of malaria cases for epidemic surveillance. The two separate sentinel surveillance systems use the same data collected from the national Health Information System reporting forms.

Health Information System (*Systeme d'Information Sanitaire* – SIS): The SIS collects monthly data from all health facilities on outpatient diagnoses and inpatient morbidity and morality aggregated by age categories (0-11 months, 1-4 yrs, 5-14 yrs, 15-24 yrs, 25+ yrs). Other data collected include vaccinations, laboratory tests (microscopy and RDTs), and number of days of medication stock outs (quinine injectable, chloroquine, folic acid). Following the

recent changes in malaria interventions, additional information such as that related to stocks of ACTs available or number of RDTs used is recorded on the front of the monthly report form as a temporary solution until an updated standard form is developed. The CSBs and CHDs are requested to complete the monthly reports and deliver them to the District Health Service. Compilation and data entry occurs at the district level, and transmission of data to the regional and central levels should occur before the tenth day of the following month. According to the SIS, the timeliness and completeness of the monthly reports is estimated at 80%. The reasons cited for delayed reporting are insufficient personnel especially at the district level, malfunctioning computers, limited ability for the districts to transmit reports to the regional or central level via the wireless internet connection, and inadequate financial resources to purchase registers for the CSBs.

Sentinel Sites (*Postes Sentinelles de Surveillance des Indicateurs RBM* – PSSI):

In 2004, the NMCP established a system of sentinel surveillance in order to monitor the progress of malaria control activities. The objectives of the PSSI include measuring malaria-associated morbidity and mortality, the impact of prevention interventions, early diagnosis and treatment strategies, and community mobilization activities. PSSIs are situated in two each in the 6 former provinces. A trained physician works in collaboration with the regional supervisor for malaria activities to collect data from all health facilities within their catchment areas (CSB, CHD, CHU).

The populations targeted for the PSSI include hospitalized patients with suspected malaria, outpatients, and pregnant women delivering at the health facilities. Data is collected through review of registers, review of monthly reports, and microscopic slide readings.

Funding for PSSI ended in December of 2006, but will resume with temporary funding through the World Bank from July 2007 until April 2008.

Sentinel Sites for Epidemic Surveillance (*Postes Sentinelles de Surveillance Epidemiologique* - PSSE):

Madagascar, as a signatory of the Abuja Declaration and Millennium Development Goals, aims to control and detect at least 80% of malaria epidemics within the first two weeks of their onset. With support from WHO, GFATM, and other partners, the NMCP has been gradually improving its capacity to forecast and detect malaria epidemics by using meteorological information as well as weekly case-based surveillance data (presumed uncomplicated and severe cases of malaria) from health facilities within the epidemic-prone areas. There are 12 sites (nine in the Central Highlands and three in the southern epidemic-prone area) collecting data from 36 districts and covering approximately seven million people. Each site is intended to have a physician/technician and laboratory equipped with the capacity for microscopy. The GFATM has supported the establishment of micro-weather stations in all 36 districts of the PSSE system in order to collect data on rainfall, temperature, and humidity. All 12 sites are collecting reported malaria cases from the health facilities in their catchment areas, while some micro-weather stations have malfunctioning equipment that are in the process of repairs. No entomological data are routinely collected at the PSSEs, however, when case detection surpasses

the alert threshold and the alert is confirmed, an entomologic survey is conducted to confirm the epidemic and to guide the response.

The PSSE functions as follows: when the number of cases of presumed and confirmed malaria cases surpass the alert threshold at the CSBs; district health authorities and the PSSE respond to the alert; the PSSE conducts a parasitological survey to confirm the alert and reports to district authorities and the NMCP; the NMCP conducts an entomologic survey to confirm the epidemic and report back to the district health authorities and those responsible for the stock of insecticide and antimalarial medication. This is followed by an epidemic response with mass treatment using AS/AQ in the affected communities and targeted IRS. Finally the PSSE conducts follow up parasitological surveillance. The alert threshold for malaria cases is set at 2 standard deviations above the mean number of weekly case for the five previous years. To illustrate the high sensitivity and relatively low specificity of the PSSE, over a five-year period, case detection surpassed the threshold 4,197 times, and only 718 (17%) of the alerts were confirmed as true outbreaks. Funding support for the 12 malaria epidemic surveillance sites is provided by GFATM Round 3 and covers 2004-2009.

Other data sources:

National Institute for Statistics *(Institut National de la Statistique* – INSTAT): INSTAT coordinates and provides technical support for national-level surveys in collaboration with partners such as universities, the World Bank, the Millennium Challenge Account, or in sectors involving health, education, and agriculture. The role of coordination also involves harmonizing survey indicators with the national plan. Information on the health infrastructure, health-related human resources, access to health facilities, and information related to development and health is available through this institute. At the present time, INSTAT is involved with planning for the next DHS survey, which is scheduled to take place in 2008; however, due to the need to complete a mapping of the population to develop a sampling framework, the timeframe for the survey is uncertain. Approximately one-half of the country has been mapped, and the World Bank has agreed to fund the remainder.

NGO Surveys: A national bednet KAP survey is conducted by PSI every two years. This survey was most recently conducted in 2006; the final report is pending.

Proposed USG Component: ($960,000)

In summary, weaknesses of the overall health surveillance system include: 1) limited data collected at facilities given only 50% health facility utilization rate by the population, 2) no community level data, 3) lack of adequate analytic capacity of staff at health facilities, 4) minimal evaluation by partners implementing activities, 5) no budget devoted to monitoring and evaluation, and 6) no central database for the harmonization, synthesis, and centralization of data from various sources such as national system, NGO reports, surveys. PMI will address the weaknesses and gaps of the monitoring and evaluation activities for malaria by primarily supporting the NMCP in developing its M&E capacity, assisting in the development of an M&E plan, and reinforcing the existing surveillance systems.

Proposed Year 1 activities:

1. Support a verbal autopsy following and in conjunction with the 2008 DHS, which will provide a base line for malaria specific mortality among children aged less than five years. ($450,000);

2. Provide support to the network of 12 sentinel sites for monitoring RBM indicators after current funding ends in April 2008, to ensure the collection of data in order to monitor the progress of the ongoing malaria control interventions. Expansion to an additional four sentinel sites will also be supported. One CDC TDY will provide TA support for this activity. ($162,000);

3. Strengthen the NMCP monitoring and evaluation capacity. PMI will support M&E activities through increased frequency of supervisory visits; additional trainings, and refresher training, to reinforce the analytic capacity at the central and district levels, and support for the development of a system to promote the centralization and warehousing of data (including surveys and program reports) gathered by various NGOs, implementing partners, and other donors. This funding will be provided directly to the NMCP ($275,000);

4. Support for a workshop to develop a costed national M&E plan for malaria. Work with the NMCP and partners to reach consensus on a costed national malaria M&E plan using the Global Fund M&E Systems Strengthening Tool, which all partners can support. One CDC and one USAID TDY will provide TA support for this activity ($73,000)

EPIDEMIC PREVENTION, PREPAREDNESS, AND RESPONSE

Current Status, Challenges, and Needs

According to the national strategy, IRS is the main malaria prevention activity in the Central Highlands and the fringe areas between unstable and stable transmission zones that are more likely to experience epidemics when environmental and meteorological factors favor transmission. In preparation for epidemics, medicines, insecticides, RDTs, and ITNs are pre-positioned at the regional level for deployment. The response using targeted IRS is based on surveillance information, altitude and monitoring of key entomological, environmental, and demographic variables. Larval control and other source reduction interventions, particularly targeting rice fields, are to be considered although not yet applied routinely in the country. The response also uses mass treatment with AS/AQ distributed by CHWs in targeted areas. To illustrate the epidemic response in the Central Highlands, a recent outbreak of malaria cases was detected in the village of Marinarivo in late December of 2006. One week after the epidemic was confirmed, 2,500 doses of AS/AQ were given over a 17-20 day period to all children under five in the affected communities and to all household members of the cases. Indoor residual spraying was not conducted during this outbreak, because the community had already been sprayed in early December, although this occurred later than programmed.

In the semi-arid southern part of the country, ITN distribution, prompt case management, and IEC are the main strategies to prevent and contain malaria epidemics. During emergencies related to cyclones and flooding, risk factors are assessed and interventions put in place to respond to the situation.

Proposed USG component: (No funding during Year 1 of the PMI)

1. PMI will support the early warning system for epidemic detection (PSSE) as described in the Monitoring and Evaluation section; and PMI in-country staff will work with the NMCP and other partners to revise, update, and strengthen the national plan for epidemic prevention, preparedness and response.

2. Targeted IRS in response to an outbreak will be conducted following the NMCP protocol. (Cost referenced in the IRS section under the annual spray campaigns)

HIV/AIDS AND MALARIA

Current Status, Challenges, and Needs

Although the 1% seroprevalence of HIV infections in Madagascar is low compared to other southern African countries, the prevalence of the infection is rising and Madagascar has a high rate of sexually transmitted diseases. Since the inauguration of the new government in 2002, there has been a strong political commitment to fight the spread of the infection. A National HIV/AIDS Strategic Framework was approved in late 2001 and then modified after the first national seroprevalence survey in 2003. This plan focuses on behavior change and prevention, treatment of HIV infections and sexually transmitted diseases, and AIDS education. With funding from the GFATM, USAID, the World Bank, and other donors increasing numbers of voluntary counseling and testing sites have been opened and emphasis is being placed on prevention of mother to child transmission (PMTCT), improving access to health care for patients living with HIV/AIDS, and prevention and treatment of sexually transmitted diseases.

Proposed USG Component: (no funding during Year 1 of the PMI)

PMI in-country staff will work with the national HIV/AIDS program and the NMCP to identify potential areas for future collaboration, such as the distribution of LLINs to people living with HIV/AIDS and coordination of malaria prevention activities in PMTCT clinics.

CAPACITY BUILDING WITHIN NATIONAL MALARIA CONTROL PROGRAM

Current Status, Challenges, and Needs

Recently, Madagascar has made many improvements in child health indicators; nevertheless, it still faces major health challenges, which threaten social and economic development. Health service quality is substantially below standard and basic medicines and supplies are regularly in short supply. Public and non-governmental sector capacity to plan effectively and manage health

programs is weak, particularly in the areas of financial and administrative management, and the collection and use of data for program planning and monitoring. National health infrastructure, information and commodity management and logistics systems are extremely weak, and much remains to be done at central and regional levels to ensure sustainable health financing.

Proposed USG Component: (Costs referenced in IRS, Case management, pharmaceutical management, and M&E sections)

The three-year strategic plan for malaria prevention and control in Madagascar is designed to begin addressing the complex issues of long-term sustainability and building national capacity over time. With malaria program resources expanding rapidly the NMCP must acquire adequate managerial and technical capacity to provide effective leadership and coordination within the MOH, with other Government ministries and with partners. In its first year, PMI will contribute to this capacity building as follows:

1. PMI will strengthen entomological capacity of the NMCP concerning entomological and insecticide resistance monitoring through trainings and supportive supervision. (Cost referenced in IRS section);

2. PMI will provide support to the NMCP for training and supportive supervision of malaria case management and diagnosis activities at the central, regional and district levels. (Cost referenced in Case Management section);

3. Strengthen the MoH pharmaceutical and commodity management system, including support to Salama's capacity to store, distribute and forecast commodity needs. Support will also be given to DAMM to strengthen the national drug quality control and pharmacovigilance systems. (Costs referenced in Pharmaceutical and Commodity Management section);

4. The PMI will work with the NMCP, the GFATM, and other partners to develop a single national malaria monitoring and evaluation plan to which all partners can contribute. PMI will support M&E activities through increased frequency of supervisory visits; additional trainings, and refresher training, to reinforce the analytic capacity at the central and district levels, and support for the development of a system to promote the centralization and warehousing of data (including surveys and program reports) gathered by various NGOs, implementing partners, and other donors. (Costs referenced in Monitoring and Evaluation section).

COMMUNICATION AND COORDINATION

Current Status, Challenges, and Needs

Coordination and communication among partners involved in malaria prevention and control in Madagascar is strong. The GFATM Country Coordinating Mechanism (CCM) and the Health Donors Group, which includes USAID and a representative of the MoH, meet on a monthly basis to discuss issues of mutual interest. In addition, the Roll Back Malaria Partnership is very active in Madagascar with meetings every two to three months.

Proposed USG Component: (costs referenced in Community-Based Intervention and Monitoring and Evaluation sections)

PMI, lead by the PMI in-country team, will support coordination among on-going USAID and other health-related activities in Madagascar, including maternal, newborn and child survival programs, HIV-AIDS activities and others. This will ensure the most cost-effective implementation of prevention and treatment measures.

For the NMCP to fulfill its leadership role in malaria control efforts in Madagascar, continued communication with international and national partners will be critical. A close and well-functioning partnership will also be important for successful GFATM malaria grants in the future.

To promote close coordination of the activities supported by the PMI in Madagascar with the NMCP, the two PMI in-country malaria advisors should ideally have office space within the NMCP and spend a major portion of their time working closely with the NMCP staff on program implementation, monitoring and evaluation.

Since most of the GFATM Round 6 malaria proposals submitted by African countries (including the proposal from Madagascar) were unsuccessful, the Roll Back Malaria Harmonization Working Group, with funding from PMI, RBM, the World Bank, UNICEF, and others, provided technical assistance to countries during the preparatory stage of their Round 7 malaria proposals. Representatives from the NMCP and the CCM have attended a training workshop in Douala, Cameroon to provide them with a background for GFATM proposal preparation. Two experienced consultants spent 3-4 weeks in Madagascar during May to work with the NMCP to prepare the proposal, which then went through a mock Technical Review Panel discussion in early June before finalization and submission to the GFATM.

Proposed Year 1 activities:

1. Support a meeting to bring together national and international NGOs working on malaria in Madagascar as a first step towards establishing a mechanism to ensure coordination of NGO-supported malaria activities with the NMCP strategy and plans (Cost referenced in Community-Based Interventions);

2. Work with the NMCP and other partners to develop a costed national M&E plan for malaria that will meet the needs of the NMCP and major donors (Cost referenced in Monitoring and Evaluation).

PUBLIC-PRIVATE PARTNERSHIPS

Opportunities to collaborate with private industry in malaria control activities and to leverage additional resources exist in Madagascar. Two prime examples of potential public-private partnerships are with QIT Minerals Madagascar (QMM -- a subsidiary of Rio Tinto) and ExxonMobil.

QMM operates in the Fort Dauphin area in the southeastern part of the country. The company has developed a malaria prevention and control program for its employees and would like to extend malaria interventions to the surrounding communes of Taolagnaro, Mandromondromotra, Ampasy, and Nahampoana. The current program includes malaria chemoprophylaxis for the non-immune personnel, treatment for malaria with ACTs, and vector control strategies in the QMM compound including larviciding and IRS in select buildings. The community malaria control interventions could include the plan to distribute 20,000 ITNs through PSI and community health agents, support of malaria case management with RDT based diagnosis and treatment with ACTs, and other recommended strategies such as IPTp and IEC.

ExxonMobil in Madagascar will begin exploratory drilling for oil off the northwest coast of the country near Mahajanga. If their preliminary ventures lead to a long-term presence in the country, ExxonMobile has indicated an interest in contributing to malaria control activities. ExxonMobil has supported the purchase of ITNs in other countries such as Angola and could provide similar support to the malaria control strategy in Madagascar.

Proposed USG Component: (no funding during Year 1 of the PMI)

PMI will continue to discuss and plan with the NMCP and private sector partners the complementary activities and support to the national malaria control strategy that could result from the partnership. The activities supported by the private sector partners will be in line with the national strategy and should fill identified gaps.

STAFFING AND ADMINISTRATION

Two new health professionals will be hired to oversee the PMI in Madagascar, one representing CDC and the other representing USAID. In addition, two Malagasy will be hired as Foreign Service Nationals to support the PMI team. 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 a consensus between the agencies.

It is envisioned that these two PMI professional staff will work together to oversee all technical and administrative aspects of the PMI in Madagascar, 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/NMCP 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 1

President's Malaria Initiative – Madagascar
Year 1 (FY08) Timeline of Major Activities

ACTIVITY	2007	2008											
	OCT-DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Hire PMI in-country staff (USAID and CDC advisors)													
Amendments to current USAID cooperative agreements													
Determine needs and procure commodities (insecticides, LLINs; RDTs)													
Free routine distribution of LLINs at ANC and EPI clinics;													
Distribution of subsidized LLINs through social marketing													
IRS in the Central Highlands													
Vector control: evaluation of year 1 activities: exact timeframe TBD													
Entomological and insecticide resistance monitoring													
Implementation support for long term vector control strategy: timeframe TBD													
MIP/IPTp activities													
Strengthening malaria diagnostic capabilities													
RDT evaluation													
Training and supervision for ACT implementation													
Strengthen national logistics and pharmaceutical mgmt. system, drug quality monitoring and pharmacovigilance													
National mass media and community BCC campaigns													
Training and supervision of CHWs													

Harmonization workshop for IEC/BCC :TBD													
Demographic and Health Survey													
Sentinel site support													
M&E support for NMCP													
M&E workshop													

Table 2

President's Malaria Initiative – Madagascar
Planned Obligations for FY08 ($000)

Proposed Activity	Mechanism	Budget (*commodities)*	Geographic Area	Description of Activity	Relation to Interventions
PREVENTIVE ACTIVITIES					
ITNs					
Procure LLINs for health facility-based distribution	DELIVER	4,200 *(4,200)*	Nationwide	Procure LLINs (~525,000) for free distribution at CSBs	ITNs
Procure LLINs for social marketing	PSI	2,000 *(2,000)*	Nationwide	Procure LLINs (~250,000) for social marketing, through community health workers and shops	ITNs
IRS					
IRS in Central Highlands	RTI; *(subgrant to NMCP)* CDC/IAA	4,075 * *(1,230)*	Central Highlands	Support spray operations in the Central Highlands in areas targeted by the NMCP (approx. 250,000 households), in 2007 and 2008. One CDC TDY from Tanzania will provide TA for IRS operations.	IRS

* 1,075 *(320)* to support 2007 campaign (~ 250,000 households); 3,000 *(900)* for 2008 campaign (~250,000 households)

Evaluation of Year 1 activities	RTI; USAID; CDC/IAA	45	N/A	Support an evaluation of Year 1 activities that can be used by NMCP, PMI and other donors to guide future decision on the most effective and cost-effective approaches for vector control in areas of unstable transmission in Madagascar. One USAID and one CDC TDY from Tanzania will provide TA for finalizing and presentation of conclusions.	IRS
Strengthen entomology capabilities of NMCP including entomological and insecticide resistance monitoring	RTI *(subgrant to NMCP)*	100 *(15)*	N/A	Work with Institute Pasteur Madagascar to strengthen entomological capabilities of the NMCP staff (including training and supportive supervision); procurement of necessary supplies	IRS; Capacity building
Implementation support for long term vector control strategy in the Central Highlands	TBD; CDC/IAA	43	Central Highlands	Specific activities will be based on the recommendations following the evaluation of year 1 activities and detailed entomological assessment. Two CDC TDYs, one from Tanzania and one from US, to develop and guide potential OR.	IRS
IPTp					
Strengthen implementation of IPTp as a part of Focused Antenatal Care	ACCESS	300	Nationwide	Assess barriers to IPTp uptake in areas where IPTp coverage is low; support implementation of MIP activities, including: training and supervision; evaluate and reinforce quality assurance of health service delivery; and strengthen supervision at district level	IPTp
SUBTOTAL: Preventive		**10,763** ***(7,445)***			

CASE MANAGEMENT ACTIVITIES					
Diagnostics					
Procurement of RDTs	DELIVER	285 *(285)*	N/A	Procure RDTs (approximately 300,000)	Case management
Support an inventory and assessment of malaria diagnostic capabilities	New Diagnostic RFA	25	Nationwide	Conduct an inventory of microscopes at CHDIIs, referral hospitals and university hospitals and assess the diagnostic capabilities of laboratory technicians	Case management
Development of a detailed written national malaria diagnosis plan and technical guide	New Diagnostic RFA	25	N/A	Develop detailed written national malaria diagnosis plan/technical guide including detailed description of standards and procedures	Case management
Implementation of the new national diagnosis strategy.	New Diagnostic RFA; *(subgrant to NMCP)*	300	Nationwide	Training, supportive supervision and quality control of the new malaria diagnosis	Case management
An evaluation of the performance of health workers' use of RDTs at the CSB level.	New Diagnostic RFA; CDC/IAA	52	N/A	RDT results from 10 CSBs will be compared with microscopic examination at Institute Pasteur from the same patients. One CDC TDY to support implementation of diagnostic strategy and RDT evaluation	Case management
Treatment					

Support to the NMCP for program supervision	SPS (*subgrant to NMCP*)	300	Nationwide	Train personnel and support supervision of malaria case management at the central, regional and district levels	Case management; Capacity building
Facilitate implementation of ACTs	SPS (*subgrant to local NGOs/FBOs*)	500	Nationwide	Conduct training/refresher training and provide supportive supervision at all levels for the implementation of ACTs.	Case management
Pharmaceutical and Commodity Management					
Support/ strengthen pharmaceutical and commodity management systems	SPS DELIVER	350 200	Nationwide	Work with Salama on procurement, forecasting, distribution, and management of pharmaceuticals, RDTs, and LLINs	Case management
Monitoring of antimalarial drug quality	USP *(subgrant to DAMM)*	100	Nationwide	Technical support for drug quality testing; equipment and supplies	Case management
Support for pharmacovigilance	USP *(subgrant to DAMM)*	150	Nationwide	Expand and strengthen the national pharmacovigilance system through trainings and supervision	Case management
SUBTOTAL: Case Mgmt.		**2,287** ***(285)***			
COMMUNITY-BASED INTERVENTIONS					
Harmonization workshop to establish best practices in IEC	BASICS	25	N/A	Workshop to harmonize IEC/BCC strategies and materials and establish a NGO/FBO working group to update and	CM, LLINs, IPTp

				share health messages	
Support for national-level mass media and community IEC/BCC	PSI *(subgrants to local NGOs/FBOs)*	800	Nationwide	National IEC/BCC and mass media activities; train CHWs; and produce/distribute job aides; NGOs/FBOs will be responsible for implementation of community based IEC/BCC	CM, LLINs, IPTp
Training, supervision, and community mobilization for the community package of interventions	BASICS *(subgrants to local NGOs/FBOs)*	975	Nationwide	Standardize training modules among implementing partners; train and supervise of CHWs through health facilities; NGOs/FBOs will be responsible for implementation of community-based interventions	CM, LLINs, IPTp
SUBTOTAL: Community-based interventions		**1,800** ***(0)***			
MONITORING AND EVALUATION					
Support for verbal autopsy	MEASURE Evaluation Task Order	450	Nationwide	Support for a verbal autopsy survey following and based on the 2008 DHS.	M&E
Strengthen sentinel site surveillance system	MEASURE Evaluation Task Order; CDC/IAA	162	Nationwide	Support to 12 RBM sentinel sites; reinforce quality of data collected; expand to additional four sites. One CDC TDY to provide TA.	M&E
Strengthen NMCP monitoring and evaluation capacity	MEASURE Evaluation Task Order *(subgrant to NMCP)*	275	Nationwide	Conduct district level training linked with strengthening supervisory visits; and provide support to the M&E unit of the NMCP.	M&E; Capacity building
Workshop to develop	MEASURE	73	N/A	Logistical support for the M&E workshop;	M&E

costed national M&E plan for malaria	Evaluation Task Order; USAID; CDC/IAA			use of M&E systems strengthening tool. One CDC and one USAID TDY to provide TA.	
SUBTOTAL: M&E		**960** ***(0)***			
IN-COUNTRY MANAGEMENT AND ADMINISTRATION					
2 PMI international staff, 2 FSN staff and other in-country administrative expenses	CDC USAID	1,190	Nationwide	Coordination of in-country PMI activities	All interventions
SUBTOTAL: Mgmt. and Admin.		**1,190** ***(0)***			
GRAND TOTAL		**17,000** ***(7,730)***	***Commodities represent 45% of total budget***		

Table 3

Madagascar – Year 1 Targets
Assumptions and Estimated Year 1 Coverage Levels

Year 1 PMI Expected Results:

Prevention:

- More than 525,000 free LLINs will have been distributed along the East and West costs and the South to pregnant women and children under five at health facilities (ANC and EPI clinics); in addition more than 250,000 highly subsidized LLINs will have been distributed through community health workers. This is expected to increase household ownership of at least one ITN to 70% nationwide;
- The proportion of children under five and pregnant women sleeping under an ITN the previous night will have increased to 65%;
- Approximately 250,000 households in the Central Highlands targeted for IRS will have been sprayed in 2007 and 2008, protecting more than 1.25 million residents each round;
- The proportion of pregnant women who receive two or more doses of IPTp during their pregnancy will have increased to 40%.

Treatment:

- Malaria treatment with ACTs will have been implemented in government health facilities in 80% of districts (with estimated coverage of 60% of children under five) nationwide;
- Community-based treatment of malaria with ACTs will have been implemented in 60 districts nationwide (with estimated coverage of about 40% of the population) nationwide; and
- The proportion of children under five with suspected malaria attending a government health facility who have received treatment with an ACT within 24 hours of the onset of their illness will have increased to 40%.

Assumptions:

Population of country (estimated): 18,000,000

Pregnant women: 4.5% of total population = 810,000 pregnant women (575,000 pregnant women living in areas of stable malaria transmission where IPTp will be employed)

Infants (children <1): 3% of population = 540,000 infants
Children <5 years: 20% of population = 3,600,000 children under five

Average number of malaria-like illnesses per year and cost per treatment (costs given are for artemether-lumefantrine):

Children <5: 3.0 illnesses/year at $0.60 each
Older children 2.0 illnesses/year at $1.00 each
Adults 1.0 illnesses/year at $1.50 each (assume that the PMI will cover only one-third of adult episodes)

Cost of a LLIN = $8.00, $1 per net higher than usually used; average of 2.5 nets/household needed to cover all pregnant women and children under five in family

Cost of spraying a house with an average of 5-6 inhabitants = $12.00

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	575,000 pregnant women x 2 treatments/woman = 1.15 million treatments/year x 3 years = 3.45 million treatments	2.93 million SP treatments	1.15 million SP treatments	**Target:** 45 *% of pregnant women receive 2 doses of IPT = 517,500 doses (1 dose = 3 SP tablets)*	• **UNICEF will purchase all SP needs for 2008/No commodity gap;**
LLINs	3 million households x 2.5 nets/household = 7.5 million nets	6.375 million LLINs (or 2.125 million nets per year for 3 yrs)	2.5 million LLINs	**Target**: *65% of children under 5 and pregnant women sleep under an LLIN, = 1,625,000 LLINs among population at risk.*	• **GFATM will purchase 264,000 and PMI another 525,000. PMI is also supporting 250,000 subsidized LLINs** • **Gap of about 586,000 LLINs for population at risk. distribution in ANC and vaccination clinics in 92 districts with stable malaria transmission;**

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
ACTs – children < 5	3.6 million children under 5 x 3.0 episodes/year = 10.8 million treatments/year x 3 years = 32.4 million	10.8 million x 85% = 9.2 million treatments x 3 yrs = 27.6 million	10.8 million treatments	**Target**: *60% of children under 5 receive ACTs in government health facilities, 40% of children under 5 in 60 districts receive treatment at the community level. Total treatment of 1,650,000 doses needed.*	• **1,675,000 doses procured by GFATM and UNITAID exceeding the needs for 2008 by purchasing.** • **No commodity gap for treatment in public health facilities for patients of all ages, and for treatment in 10% of communities for <5s; projected purchases using.**
ACTs – older children	5.4 million older children x 2.0 episode/year = 10.8 million treatments/year x 3 years = 32.4 million	10.8 million x 85% = 9.2 million tx x 3 years = 27.6 million	10.8 million treatments		
ACTs - adults	9.0 million adults x 1.0 episodes/year x 33% = 3.0 million treatments/year x 3 years = 9.0	3.0 million x 85% = 2.55 million tx x 3 yrs. = 7.65 million	3.0 million treatments		
TOTAL	73.8 million treatments	62.8 million treatments	24.6 million treatments		
IRS	250,000 households x 1 spraying round/year x 3 years = 750,000 households (HH) sprayed	750,000 households sprayed x 85% = 640,000 households	250,000 households	**Target**: *85% of targeted houses to be sprayed* 250,000 households x 85%, or 212,500 households to be sprayed	• **No commodity gap for the geographic area targeted; PMI supporting complete coverage for about 250,000 households.**

Table 4

Madagascar Year 1 (FY08) Estimated Budget Breakdown by Intervention ($)

Area	Commodities (%)	Other (%)	Total
Insecticide-treated Nets	6,200,000 (100%)	0	6,200,000 (100%)
Indoor Residual Spraying/vector control	1,245,000 (29%)	3,018,000(71%)	4,263,000 (100%)
Intermittent Preventive Treatment	0	300,000 (100%)	300,000 (100%)
Case Management	285,000 (12%)	2,002,000 (88%)	2,287,000 (100%)
Community based interventions	0	1,800,000 (100%)	1,800,000 (100%)
Monitoring and Evaluation	0	960,000 (100%)	960,000 (100%)
Administration	0	1,190,000 (100%)	1,190,000 (100%)
Total	7,730,000(45%)	9,270,000 (55%)	17,000,000 (100%)

Table 5

Year 1 (FY08) Budget Breakdown by Partner ($000)

Partner Organization	Geographic Area	Activity	Budget* ($)
ACCESS	Nationwide	IPTp, performance quality improvement, supervision and refresher training of health care workers in IPTp	300,000
BASICS	Nationwide	Facilitate workshop to harmonize IEC/BCC messages; implementation of community based IEC/BCC	1,000,000
CDC	Nationwide	TA support for various activities: IRS/ entomology, Diagnosis, M&E	71,000
DELIVER	Nationwide	Procurement of LLINs, RDTs, strengthen supply chain management/distribution systems	4,685,000 = 1285 000 for RDT and 3400000 for LLIN???
MEASURE Evaluation Task Order	Nationwide	DHS, evaluation of RDTs in hands of health care workers, support for sentinel sites, strengthening NMCP monitoring and evaluation capabilities, support for M&E workshop	964,500
New Diagnostic RFA	Antananarivo	Strengthen diagnostic capabilities; support development and implementation of technical guidelines regarding laboratory diagnosis (RDTs and microscopy)	350,000
PSI	Nationwide	Procurement of LLINS for social marketing; implementation of community based interventions	2,800,000
RTI	Highlands	IRS spray campaigns in the Central Highlands; strengthen entomological capacity, support IRS workshop	4,206,000
SPS	Nationwide	Antimalarial drug management capacity building; implementation of ACTs, NMCP program supervision	1,150,000
TBD	Nationwide	Implementation support of long term vector control strategy	23,500
USAID HQ	Nationwide	TDY to the costed M&E workshop and for the evaluation of vector control strategy.	$10,000
USP	Nationwide/Antananarivo	Continue to develop and expand the system of drug quality assurance and pharmacovigilance	$250,000

* Staffing, administration and USAID/CDC Core TA not included

ANNEX 2

MADAGASCAR

President's Malaria Initiative Three-Year Strategy

Malaria is a major cause of morbidity and mortality in Madagascar. The disease is endemic in 90% of the country. Transmission is stable and perennial on the East and West Coasts. In the Central Highlands transmission is unstable and seasonal with a peak from January-April. Transmission is very low in the arid southern part of the country, but both the Central Highlands and the South are prone to periodic epidemics associated with high morbidity and mortality. *Plasmodium falciparum* accounts for more than 90% of all malaria infections. *Anopheles gambiae* (East and West Coast) and *An. funestus* (Highlands and South) are the major vectors.

Based on a total population of 18 million, groups particularly vulnerable to malaria in Madagascar comprise an estimated 3.6 million children under five and 900,000 pregnant women. The HIV seroprevalence of only 1% in Madagascar is low compared with other African countries.

TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

By 30 September, 2010, the PMI will provide accelerated resources to achieve the following targets in populations at risk of malaria in Madagascar:

1. More than 90% of households (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 areas targeted by the MoH 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 residual insecticides;
6. 85% of pregnant women will have received two or more doses of SP for IPTp during their pregnancy;
7. 85% of government health facilities have ACTs available for treatment of uncomplicated malaria; and
8. 85% of children under five with suspected malaria will have received treatment with an ACT within 24 hours of the onset of their symptoms.

PREVENTION ACTIVITIES

Insecticide-treated nets (ITNs): Rapidly increasing coverage with ITNs is a high priority for the Madagascar MoH. There is a culture of net use in Madagascar, with relatively high coverage of locally-made nets, most of which are untreated. Since 2001, 3.65 million ITNs have been

distributed: 2.1 million sold through CHWs and general shops, and 1.55 million distributed free through ANC and vaccination visits and large-scale campaigns. According to current *Service de Lutte Contre le Paludisme* (NMCP; National Malaria Control Program) policy, ITN distribution will be targeted to pregnant women and children under five using a segmented market approach. This includes distribution of free ITNs through large-scale maternal and child health campaigns, distribution of free ITNs through MoH antenatal clinics (ANCs) and to children coming for their third DPT vaccination, and the sale of highly subsidized ITNs (price $1.50) by volunteer community health workers. The MoH supports the use of long-lasting ITNs (LLINs) over conventional ITNs. According to a survey conducted in 2006 by Population Services International, 64% of households own one or more ITNs and 38% of children under five and 28% of pregnant women slept under an ITN the previous night. The Government has waived taxes and tariffs on ITNs.

With the 1.9 million LLINs distributed during the 2006 maternal and child health-ITN campaign and the 2.1 million targeted for the 2007 campaign, household ownership rates of one or more ITNs should increase to 70% or more. At the present time, it is not clear whether another ITN distribution will take place during the October 2008 maternal and child health week. Consequently, PMI will support the NMCP policy of filling in remaining gaps in coverage through procurement and distribution of free LLINs through antenatal and child immunization clinics in MoH facilities and through volunteer CHWs. Efforts will also be made to improve ANC clinic utilization rates by supporting Focused Antenatal Care, an integrated package of antenatal care services, 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. With the relatively low net usage rates reported in the 2006 survey, PMI will place a major emphasis on behavior change communication efforts directed at increasing net usage over the next two to three years.

Given the challenges of trying to ensure regular net re-treatment in widely-scattered and difficult to reach populations, the PMI will 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 all needs in Madagascar. Since nearly all nets distributed in Madagascar over the last 2-3 years are LLINs and the older, conventional nets in use are nearing the end of their useful lifetimes, the NMCP and PMI will not support net re-treatment efforts.

After 2008, approximately 900,000 nets will be needed annually to sustain 100% coverage of newly pregnant women through ANC clinics. Depending on contributions by other partners, beginning in FY 2009, PMI should plan to procure approximately 400,000 LLINs annually. If other partners maintain their current level of support to ITNs, it should be possible to meet nearly all needs for 2009 and beyond.

Indoor residual spraying (IRS): The MoH and NMCP place a high priority on scaling up IRS activities in areas with seasonal or unstable transmission and there is already considerable in-country experience with IRS. The NMCP wants to expand the existing spraying program in the Central Highlands from a checkerboard pattern to blanket spraying. There is also interest in extending IRS in the future to the West Coast in combination with other control measures. During the last five years, both DDT and synthetic pyrethroids have been used in the spraying

program; insecticide resistance has not been a problem. An environmental assessment and detailed plan for safe storage, use, and disposal of insecticides has already been developed with support from USAID using FY 2007 funding.

During FY08, the PMI will provide support to sustain the existing IRS program in the Central Highlands covering approximately 250,000 households. The exact areas to be sprayed will be determined in discussions with the NMCP. In addition, because of NMCP plans to expand spraying substantially during the next 2-3 years, PMI will work with the NMCP and other partners to develop a comprehensive and integrated national vector control strategy and plan to ensure the most cost-effective use of vector control measures. PMI support to IRS beyond FY 2008 will depend on the finalized national strategy and plan.

PMI will also support strengthening of the general entomologic and vector control capabilities of the NMCP and MoH staff at the central and regional levels, including support for routine entomologic monitoring and baseline entomologic assessments in other areas of the country where IRS may be used in the future. This will include monitoring the insecticide resistance status of malaria vectors at selected sites to ensure continued efficacy of IRS- and ITN-based strategies. Fogging and outdoor ultra-low volume spraying of insecticides are not effective methods for malaria vector control and their use should not be supported with PMI resources.

Intermittent preventive treatment in pregnant women (IPTp): According to the 2003-04 DHS survey, approximately 80% of women make one or more antenatal clinic visits. In June 2004, the MoH adopted the strategy of providing two doses of directly observed sulfadoxine-pyrimethamine (SP) for prevention of malaria during pregnancy in 92 coastal and lowland districts nationally, where malaria transmission is stable or seasonal. Nineteen districts in the Central Highlands, which are epidemic-prone, were excluded from this policy. Pregnant women who are HIV-positive are to receive a third dose of SP. The treatment is free of charge. At the time this report was prepared, no up-to-date information was available on the proportion of pregnant women who had received one or more doses of SP for IPTp.

The PMI will fund the distribution free LLINs 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 pre- and in-service training and supportive supervision of health care workers in the diagnosis and treatment of malaria and anemia in pregnancy and the use of IPTp as part of overall strengthening of Focused Antenatal Care. Support will also be provided for development and dissemination of information, education and communication messages to ensure that women and their families are aware of the risks of malaria during pregnancy, to promote attendance at ANCs and the use of IPTp beginning early in the second trimester of pregnancy, and completing the recommended three doses of SP.

If each pregnant woman living in high transmission areas of Madagascar is to receive two treatments with SP during her pregnancy, a total of approximately 1.2 million treatments will be required annually in Madagascar. Currently all SP needs are being met by UNICEF. It is expected that SP needs for IPTp and quinine needs for treatment of malaria during pregnancy will continue to be financed by other donors and the MoH over the next 3-4 years.

CASE MANAGEMENT ACTIVITIES

Malaria diagnosis: The NMCP is committed to strengthening laboratory diagnosis of malaria in Madagascar. According to NMCP policy, malaria diagnosis in MoH health facilities will be based on laboratory examination (either microscopy or rapid diagnostic tests [RDTs]) for patients of all age groups, including children under five. Where laboratories do not exist, treatment will be based symptoms after all other causes of fever have been eliminated. At the community level, clinical diagnosis will be used. No quality control system is currently functioning and little information is available on the quality of malaria laboratory diagnoses. Two RDTs are being used in Madagascar, Optimal ® and CareStart ®. Although health workers on the East Coast have been trained in the use of RDTs and appropriate delivery of ACTs, they reportedly have little confidence in negative tests results and will treat patients anyway if the laboratory diagnosis does not agree with their clinical impression.

With the increased cost of ACTs when compared with traditional monotherapies, 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. Support will be provided for a detailed assessment and inventory of the existing malaria laboratory diagnostic network in FY 2008. The PMI will work with the NMCP and other partners to develop a detailed written implementation plan for microscopy and RDTs at different levels of the health system and in different clinical and epidemiological settings. The PMI will support strengthening of pre-service and in-service training for MoH staff in malaria diagnosis and upgrading capabilities for quality control of laboratory diagnosis of malaria. The PMI also recognizes the benefits of combining malaria laboratory training with training for other diseases, such as tuberculosis, and will work with the tuberculosis and HIV/AIDS 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 ignore the results of laboratory tests when their results do not agree with their clinical judgment.

Decisions on PMI procurement of microscopes, microscopy supplies, and RDTs for FY 2009 and later will be based on the initial assessment of the existing malaria diagnostic network, together with estimated funding for malaria diagnosis from the GFATM and other partners.

Treatment: In 2005, Madagascar adopted AS/AQ as its first-line therapy for uncomplicated malaria; the second-line drug is artemether-lumefantrine. Thus far, implementation of the new policy has been limited to 21 districts on the East Coast. Treatment for uncomplicated malaria is free in MoH facilities. Quinine plus tetracycline is recommended for the treatment of severe malaria. It is also recommended for the treatment of malaria in pregnant women in the first trimester, with AS/AQ being the drug of choice in the second and third trimesters. Consideration has not yet been given to the use of artesunate rectal suppositories for the emergency pre-referral treatment of severe malaria in children in settings in which intramuscular or intravenous quinine cannot be administered. The national policy also supports community-based treatment of fever.

Thus far, this policy has been implemented in East Coast and all febrile children under five years of age are treated presumptively with pre-packaged chloroquine, which is sold for $0.05 per treatment by community health workers. There are plans to build upon this experience to launch community-based treatment using AS/AQ in the fourth quarter of 2007, but no detailed implementation plan yet exists. No up-to-date information is available on the proportion of children under five with a suspected malarial illness who received an ACT in the previous 24 hours.

The absence of reliable consumption data on the use of antimalarials in Madagascar makes accurate estimation of requirements challenging. Forecasting of required quantities of AS/AQ for first-line treatment has been based on the expected number of malaria patients in different age groups that would attend public health facilities. Using this approach, it is estimated that about 1.5 million treatments would be needed annually for health facilities in 2007-2009. Without a clear understanding of how fast community-based treatment of malaria with ACTs will be scaled up, it is difficult to accurately forecast AQ/AS needs for community health workers.

With Global Fund Round 4 funds, sufficient AS/AQ treatments will be procured to meet all needs for 2008, but more accurate forecasting based on consumption at the health facility and community levels will be needed for 2009 and beyond. If it is assumed, however, that there are 3.6 million children under five in Madagascar, that each one has just 2 episodes of fever annually, and that 50% of them are treated presumptively at the community level, this age group alone would require 3.6 million treatments. Consequently, even with improved diagnosis and expanded IRS and ITN coverage (and the subsequent reduction in malaria transmission), the nationwide requirements for ACTs in the future are expected to be considerably higher than these initial estimates. The MoH contracts with a non-profit autonomous organization, Salama, for all drug procurement and distribution. ACTs procured and distributed by the GFATM are managed through a parallel system to that used by the MoH. In the private sector, a variety of antimalarial drugs are available for purchase without prescription including artemisinin monotherapies.

Ensuring prompt, effective, and safe ACT treatment to $\geq$85% of patients with confirmed or suspected malaria will represent one of the greatest challenges for PMI, given the need to strengthen the existing pharmaceutical management system and the high cost and short shelf life of AS/AQ. The PMI will coordinate its activities with those of the NMCP, MoH, Salama, and other partners. The PMI will work with partners to provide technical assistance to the NMCP in developing a detailed, written ACT implementation plan. Technical assistance will be provided to Salama to strengthen the pharmaceutical management system to ensure constant supplies of antimalarial drugs and avoid stockouts and loss of drugs due to expiration. Efforts also need to be made to strengthen in-country capabilities in monitoring drug quality, given the increasing numbers of fake or substandard antimalarial drugs circulating in Africa. The PMI will support pre- and in-service training and supportive supervision of health workers to ensure good ACT prescribing and dispensing practices in coordination with Integrated Management of Childhood Illness program and development and implementation of an information, education, and communication plan for ACT roll out. Support will also be provided for scale up of the community-based treatment of malaria with AS/AQ. Consensus also needs to be reached on a

system for monitoring the efficacy of the first- and second-line antimalarial drugs on a regular basis and PMI will work with other partners to provide support for this activity in the future. Decisions on PMI procurement of supplies of AS/AQ in FY 2009 and later will be based on improved forecasting of drug needs, the results of the Global Fund Round 7 proposal, and discussions with the MoH and NMCP. Global production of ACTs is expected to be sufficient to meet Madagascar's needs over the next two to three years, but the PMI will monitor worldwide demand and supplies closely. A decision will also need to be made once co-formulated preparations of AS/AQ have been approved by WHO whether to adopt this prevention or continue with the current AS/AQ blister packs.

MONITORING AND EVALUATION

The PMI's monitoring and evaluation plan related will be coordinated with those of the NMCP, the GFATM, and other partners. A nationwide Demographic and Health Survey (DHS) will be conducted in 2008 (during or soon after the peak malaria transmission season). This survey will be used to provide baseline information on coverage of the four major interventions, together with data on the prevalence of anemia. Verbal autopsies will be conducted as part of the DHS to estimate malaria-related mortality. An end-of-Initiative Malaria Indicator Survey in 2011 will measure progress related to the key coverage indicators and impact of PMI. Information on other indicators of interest, such as 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. The PMI will also support the 12 sentinel sites established to monitor Roll Back Malaria indicators and upgrading of the data management capabilities of the NMCP and training to improve the malaria surveillance and monitoring and evaluation system.

SUSTAINABILITY

The three-year strategic plan for Madagascar 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 PMI plans to place two full-time malaria advisors in country to support the MoH and NMCP and to oversee implementation of PMI-supported activities with the USAID Mission. It is hoped that these two individuals will be located in or near the NMCP offices and will work closely with their NMCP counterparts on day-to-day management and implementation of malaria control activities. Special attention will given to work with the NMCP to build capacity in areas such as planning, budgeting, human resource management, and monitoring and evaluation and working in collaboration with other MoH departments and sections as well as with other 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: PMI activities will be implemented in a way that will result in the transfer of technical knowledge and skills to local partners including staff of the NMCP and other MoH departments, non-governmental organizations, community- and faith-based organizations, health workers, and private sector partners. The PMI will also focus on IEC/BCC activities directed at increasing Malagasy's understanding of the risks of malaria, encouraging the adoption of prevention measures, and seeking appropriate treatment in a timely manner, and promoting demand for quality health services related to malaria. .

Financial sustainability: Financial sustainability will be one of the most challenging areas to address within the PMI. The 85% coverage levels for key interventions such as ITNs 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, together with reductions in the cost of and need for key malaria commodities as malaria transmission is brought under control should make it easier for the MoH to take on increased responsibility to fund key interventions. Other financing sources available to the MoH 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

Timeline of Expected Coverage of Interventions – Madagascar

Indicator	2006 PSI data*	Year 1**	Year 2**	Year 3**
Proportion of women who received two or more doses of IPTp during their last pregnancy in the last two years.	**NA**	**40%**	**60%**	**85%**
Proportion of households with at least one ITN	**45%**	**70%**	**85%**	**>90%**
Proportion of pregnant women sleeping under an ITN the previous night	**28%**	**65%**	**75%**	**85%**
Proportion of children under five years old sleeping under an ITN the previous night	**38%**	**65%**	**75%**	**85%**
Proportion of targeted houses adequately sprayed with a residual insecticide in the last 12 months.	**97%**‡	**97%**	**97%**	**97%**
Proportion of children under five years old with fever in the last 2 weeks who received an ACT within 24 hours of onset of fever.	**NA**	**30%**	**65%**	**85%**

*These figures represent best estimates at the time the Year 1 Malaria Operational Plan was prepared based on a 2006 ITN survey (PSI TRaC). Baseline indicators for use in PMI will be based on the 2008 DHS survey.

**Nationwide coverage of interventions will be measured on two occasions: (1) 2008 (baseline); (2) after September 2010. Coverage during the intervening two years will be estimated based on delivery of ACTs and IPTp treatments, distribution of ITNs, and households protected by IRS.

‡ Data provided by the NMCP/SIS

Table 2

Illustrative PMI 3-Year Budget and Expected Coverage Levels - Madagascar

PMI Targets:

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

- 85% of pregnant women will have received at least three doses of SP for IPTp during their pregnancy;
- >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 in a sprayed house or under an ITN the previous night;
- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria; and
- 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 Madagascar (estimated): 18,000,000 persons

Pregnant women:	4.5% of total population = 810,000 pregnant women *(Note: IPTp is implemented in all areas except for the highlands, hence the target population is approximately 575,000 pregnant women*
Children <5:	20% of population = 3,600,000 children under five
Infants (children <1):	3% of population = 540,000 infants

Average number of persons per household = 5-6.

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

Children <5:	3.0 febrile episodes/year ($0.60 per treatment)
Older children	2.0 febrile episodes/year ($1.00 per treatment)
Adults:	1.0 malaria illnesses/year at ($1.50 per treatment)

Cost of IPTp with SP: $0.30 ($0.10 for each of the two 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 = $8.00

Costs per person for implementation support and USG implementation costs were taken from a detailed cost analysis prepared for Uganda. USG implementation support costs are expected to increase after Year 1 as more in-country staff come on board.

Item/Activity	Annual Cost / Person	Annual Cost	3-Year Total	Assumptions/Comments
Prevention – insecticide-treated nets		$19,200,000	$57,600,000	18 million population at risk of malaria = 3.6 million households x 2.5 nets/household x 85% coverage – 1.6 million nets already distributed (campaign)-3.65 million nets distributed through other channels x $8.00/net
Prevention – indoor residual spraying		$3,000,000-$10,000,000	$9,000,000-$30,000,000	IRS will target 7%-25% of population (250,000 - households at a cost of $12/household once a year (Central Highlands-and some areas in the West).
Treatment – malarial illnesses		$26,163,000	$78,489,000	Children under 5 = 3.6 million x 3 episodes x $0.60 x 85%; Older children = 5.4 million x 2 episode x $1.00 x 85%; Adults = 9 million x 1 episodes x $1.50 x 85%
Treatment – IPTp for pregnant women		$146,625	$439,875	~575,000 pregnant women (average over next 4 years-all areas excluding the Central Highlands) x $0.30 per year x 85% coverage
Epidemic preparedness		-	-	included under IRS
Implementation Support	0.92	$5,000,000	$15,000,000	Estimated cost for commodity management, human resources, supervision, training, social mobilization, etc.
Monitoring and Evaluation		$1,360,000	$4,080,000	8% of total yearly PMI budget
Cost of Program			**$185,608,875**	
USG Implementation Support Costs		$1,190,000	$3,570,000	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)			**$189,178,875**	
National Funding resources			$1,104,006	This amount reflects national funding resources available to the NMCP: 2008-2010
GFATM round 3 and 4			$1,469,173	The funds from both rounds will have ended by the end of 2007 but there seems to be an additional 1.47 million in the pipeline for 2008 and 2009; Note: Madagascar will submit a GFATM round 7 proposal
Principality of Monaco			$202,500	For 2008-2010
UNICEF		$1,800,000	$5,400,000	2008-2010
UNITAID		$1,282,160	$3,846,480	This contribution is not fixed and may change
WHO		$72,000	$144,000	2008-2009
Available funding from other sources			**$12,166,159**	
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		$40,000,000		Assumes a slight increase in funding in Years 2 and 3
Years 1 through 3			**57,000,000**	
Total Available funding			***$69,166,159***	
Remaining Gap			**$120,012,716**	3-year shortfall to meet total need