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PRESIDENT'S MALARIA INITIATIVE

Malaria Operational Plan – FY 2012

MADAGASCAR

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ACRONYMS AND ABBREVIATIONS

ACT	Artemisinin-based Combination Therapy
AMFm	Affordable Medicines Facility-malaria
ANC	Antenatal Care
AS/AQ	Artesunate-Amodiaquine
CDC	Centers for Disease Control and Prevention
CHW	Community Health Worker
c-IMCI	Community Integrated Management of Childhood Illnesses
CSB	<i>Centre de Santé de Base</i> (Most basic health clinic)
DAMM	<i>Direction de l'Agence du Médicament de Madagascar</i> (Drug Regulatory Authority)
DHS	Demographic and Health Survey
DOT	Directly Observed Therapy
FANC	Focused Antenatal Care
FBO	Faith-Based Organization
FY	Fiscal Year
Global Fund	The Global Fund to Fight AIDS, Tuberculosis and Malaria
GMP	Global Malaria Program
GoM	Government of Madagascar
HBMF	Home-Based Management of Fever
HMIS	Health Management Information System
IEC/BCC	Information, Education, Communication/Behavior Change Communication
IPM	<i>Institut Pasteur de Madagascar</i> (Pasteur Institute)
IPTp	Intermittent Preventive Treatment of pregnant women
IRS	Indoor Residual Spraying
ITN	Insecticide-Treated Net
LLIN	Long-lasting insecticide-treated net
M&E	Monitoring and Evaluation
MCH	Maternal and Child Health
MIS	Malaria Indicator Survey
MoH	Ministry of Public Health
NGO	Non-Governmental Organization
NMCP	National Malaria Control Program (<i>Programme National de Lutte contre le Paludisme (PNLP)</i>)
NSA	Global Fund National Strategy Application
NTD	Neglected Tropical Disease
PAIS	<i>Programme d'Action pour l'Intégration des Intrants de Santé</i> (Health Product Integration Project)
PERSUAP	Pesticide Evaluation Report and Safer Use Action Plan
PMI	President's Malaria Initiative
PSI	Population Services International

PSSE	<i>Postes Sentinelles de Surveillance Epidémiologique</i> (Epidemiologic Sentinel Surveillance Sites)
QA/QC	Quality Assurance /Quality Control
RBM	Roll Back Malaria
RCC	Rolling Continuation Channel
RDT	Rapid Diagnostic Test
RTI	Research Triangle International
SALAMA	Madagascar central medical stores
SP	Sulfadoxine-Pyrimethamine
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

EXECUTIVE SUMMARY

Malaria prevention and control are major foreign assistance objectives of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the United States will help partner countries improve health outcomes, with a particular focus on improving the health of women, newborns, and children.

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS and tuberculosis programs. The PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa by 2010. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through FY2014 with the goal of reducing malaria-related morbidity and mortality by 70% compared to pre-initiative levels in the original 15 PMI countries. Programming of PMI activities follows the core principles of GHI: encouraging country ownership and investing in country-led plans and health systems; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; implementing a woman- and girl-centered approach; improving monitoring and evaluation; and promoting research and innovation.

In December 2006, Madagascar's selection as a PMI country was announced, with full implementation beginning with FY 2008 funding. Malaria is a major health problem in Madagascar, although its epidemiology varies considerably in different regions of the country. On the East Coast transmission is stable and perennial, and the West Coast has one long, rainy transmission season and a brief dry season. Almost one third of the Central Highlands is above 1,500 meters elevation, where malaria transmission rarely occurs. In the rest of the Central Highlands, however, transmission is seasonal and moderately unstable with occasional epidemics. The semi-desert South has highly seasonal and unstable transmission and is also vulnerable to epidemics. In the most recent large-scale epidemic in the late 1980s, an estimated 30,000 people died.

In recent years, Madagascar has been the recipient of several Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) grants: a Round 7, 5-year, \$69 million malaria grant signed in August 2008; a \$64 million Rolling Continuation Channel grant signed in October 2009; and a \$73 million Round 9 National Strategy Application for 2010 to 2012 was signed in 2010. In addition, Madagascar was selected as a pilot country for the Global Fund-managed Affordable Medicines Facility-malaria (AMFm) which also began in 2010. The United Nations Children's Fund (UNICEF) has played a major role in the prevention and treatment of malaria during pregnancy, the distribution of insecticide-treated nets (ITNs), and the implementation of integrated community case management of malaria, pneumonia and diarrheal diseases in children under five at the community level. The World Health Organization has been a major source of technical assistance to the *Programme National de Lutte Contre le Paludisme* (National Malaria Control Program; NMCP).

Following the political crisis and *coup d'état* in March 2009, all USG support to the current government, from the central Ministry of Health to the primary care health facility level, was suspended until a freely and fairly elected government is in place. The FY 2012 Malaria Operational Plan has been developed based on the assumption that USG suspensions will remain in place. Planning for FY 2012 was carried out in Madagascar in May 2011 and included representatives from USAID and CDC staff based in Washington, Atlanta, and Madagascar. The planning team met with implementing and international partners to better coordinate PMI activities; the team also met with NMCP and other Government of Madagascar (GoM) personnel. The proposed FY 2012 PMI budget for Madagascar is \$25.92 million.

The suspension of direct collaboration with the GoM has impeded full application of the fundamental tenets of the GHI; nevertheless, over the past three years, PMI has focused support on the Madagascar national strategic plan for malaria, increased efficiencies through greater coordination and programmatic integration with key partners; implemented woman- and girl-centered approaches through its community-level programming; and improved and expanded the monitoring and evaluation of the program. The following major activities will be supported with FY 2012 funding:

Insecticide-treated nets (ITNs): PMI is supporting the Ministry of Health goal of universal coverage with two long-lasting ITNs (LLINs) per household in 91 of the 111 health districts where seasonal or perennial malaria transmission occurs. PMI supports free mass distribution campaigns to achieve equitable coverage as well as free routine distribution through antenatal care (ANC) and immunization clinics to pregnant women and children under one year old, and social marketing of highly subsidized ITNs at the community level.

PMI supported a rolling mass ITN distribution campaign from November and December 2009 through November 2010. PMI's contribution of 3.6 million LLINs towards free mass distribution represented 49% of the nets distributed. Donor-coordinated mass distribution of LLINs during the 2009-2010 rolling campaign among 91 targeted districts increased the proportion of houses with at least one net to 94%, and usage among all individuals, to more than 82%. The average number of LLINs per household was 1.8 vs. the national goal of 2. With FY 2011 funding, PMI will procure approximately 2.1 million LLINs for free distribution to replace those LLINs delivered to 19 districts in the East and Southeast, in 2009 as part of the first mass distribution campaign.

With FY 2012 funding, PMI will procure approximately 2.5 million LLINs, which along with Global Fund contributions, will replace those LLINs delivered to the 72 remaining districts during the 2010 universal coverage campaign. The Global Fund will also support the distribution of additional LLINs through community-based social marketing and subsidized sales, as well as routine keep-up distribution in ANC and immunization clinics.

Indoor residual spraying (IRS): In May 2008, an international conference to address the goal of elimination was held in Madagascar. The revised 2008-2012 National Malaria Strategy calls for four years of IRS blanket coverage in the Central Highlands and Fringe districts followed by targeted spraying, and continuation of universal IRS in the Western 'transition' zone and the South zone. The 2011 Malaria Indicator Survey (MIS) showed 79% of households in the IRS

targeted areas reported being sprayed sometime during the 12 months preceding the survey, 82% of children under 5 years, 78% of pregnant women and 82% of all individuals in the IRS targeted districts slept in households protected by IRS. In 2012, the national plan includes a transition to targeted IRS among the 32 health districts in the Central Highlands and Fringe districts, and a continuation of the third year of universal IRS in the 21 extension districts to the West and the South bordering the Fringe districts and Central Highlands. Targeted IRS will be conducted in high-risk communes identified using clinical data, backed up by an epidemic response system capable of rapid detection and response to outbreaks. With FY 2011 funds, PMI's participation in the 2012 national plan will be to support blanket IRS in 13 health districts with an estimated population of 2.6 million inhabitants.

With FY 2012 funds, and in coordination with Global Fund-supported IRS activities, PMI will support targeted IRS in six districts in the Central Highlands and Fringe areas, and blanket IRS in seven districts in the South, covering a total population of approximately 1.6 million. PMI will also continue its environmental mitigation measures, improve monitoring and supervision, as well as expand its support for entomologic monitoring and evaluation.

Intermittent preventive treatment of pregnant women (IPTp): IPTp using sulfadoxine-pyrimethamine (SP) was adopted as a national policy in late 2004 in the 92 districts where stable malaria transmission occurs. A column to record SP administration during ANC visits has been added to the ANC cards and registers. The 2008/2009 Demographic Health Survey (DHS) showed that 86% of pregnant women reported making two or more ANC visits. Despite this high rate of ANC attendance, the percentage of women in zones who reported receiving at least one dose of SP during an ANC clinic visit was only 15%, and only 8% reported receiving two or more doses, increasing to 35% and 23% by 2011, respectively (2011 MIS preliminary results). The causes for the poor uptake of IPTp are unclear. Because of the political constraints related to working with GoM since March 2009, PMI has focused its malaria in pregnancy efforts on IEC to promote early and frequent ANC clinic attendance and to improve the understanding among the population of the benefits of IPTp. With FY 2012 funding, PMI will continue to support client-targeted IEC/BCC, focusing on malaria in pregnancy services using trained community health workers. PMI will coordinate with the NMCP and the Division of Mother and Child Health and partners, to link malaria in pregnancy and integrated health services.

Case management: Preliminary results from the 2011 Malaria Indicator Survey show that among children under 5 with fever in the two weeks preceding the survey, only 43.8% sought any kind of treatment and only 2.1% were treated with an ACT within 24 hours of fever onset. The NMCP policy requires that, where possible, all cases of malaria be diagnosed by microscopy or a rapid diagnostic test (RDT). PMI activities to improve diagnostics, supply chain management and case management at the health facility level had to be suspended in FY 2009. The restrictions on work with the GoM and public health care system during the past three years resulted in greater investment by PMI in community-based interventions. PMI supported community-based treatment for malaria, pneumonia and diarrhea in communities more than five kilometers from the nearest health facility and has reached about one-third of those communities nationwide. To date, PMI has supported training of more than 4,400 community health workers in malaria case management including use of RDTs for diagnosis.

With FY 2012 funding, PMI will strengthen the supply chain for community health workers and support the procurement of RDTs for community-based treatment of malaria. PMI will also provide RDTs to trained NGO and faith based providers. All ACT needs for facility and community levels are expected to be met through 2012 by Global Fund grants and UNITAID donations. PMI will coordinate with the NMCP and other partners to improve drug quality control monitoring. PMI will also continue its support for the rollout of ACTs and RDTs, and training for integrated case-management of malaria, pneumonia and diarrheal diseases for community health workers.

IEC/BCC: PMI continues its support for the *Champion Commune* approach, which works with the MoH, NGOs and Roll Back Malaria partners to establish an innovative and effective community empowerment and mobilization program. PMI supports a variety of IEC/BCC strategies to promote healthy behaviors including: radio spots, mobile videos with local actors, and print materials. This approach is comprehensive in scope, and program monitoring results indicate improvements in immunization rates, pre-natal consultations, family planning, and reductions in the prevalence of diarrhea, pneumonia and malaria.

In FY 2012, PMI will coordinate with the NMCP and partners to strengthen IEC/BCC approaches for malaria prevention and treatment at the community level. This will include expansion of the *Champion Commune* approach, with a particular focus on an integrated community management of pneumonia, diarrheal diseases, and malaria. PMI will be a major contributor to IEC/BCC activities supporting the national LLIN and IRS campaigns. PMI will also collaborate with the Peace Corps on activities to improve treatment-seeking and prevention behaviors.

Monitoring and evaluation (M&E): The NMCP, with the support of PMI, Global Fund, and other partners, has developed a National Malaria M&E Strategy and Plan. PMI contributed to the nationwide 2008/2009 DHS and has continued support for fever surveillance at 15 sentinel sites through *Institut Pasteur Madagascar*. PMI provided support for the 2011 Malaria Indicator Survey and is working with partners to strengthen M&E for community-based interventions.

With FY 2012 funding, PMI will strengthen M&E nationally by supporting expansion, improved reporting quality and timeliness of epidemic surveillance. PMI will support the planning and implementation of the next national household survey (either an MIS in 2013 or a DHS in 2014-15, and will also continue to support high quality data reporting of malaria indicators from the 15 sentinel sites.

A. INTRODUCTION

Global Health Initiative

Malaria prevention and control is a major foreign assistance objective of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the United States will help partner countries improve health outcomes, with a particular focus on improving the health of women, newborns and children. The GHI is a global commitment to invest in healthy and productive lives, building upon and expanding the USG's successes in addressing specific diseases and issues.

The GHI aims to maximize the impact the United States achieves for every health dollar it invests in a sustainable way. The GHI's business model is based on: implementing a woman- and girl-centered approach; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; encouraging country ownership and investing in country-led plans and health systems; improving metrics, monitoring and evaluation; and promoting research and innovation. The GHI will build on the USG's accomplishments in global health, accelerating progress in health delivery and investing in a more lasting and shared approach through the strengthening of health systems. Framed within the larger context of the GHI and consistent with the GHI's overall principles and planning processes, BEST (Best practices at scale in the home, community and facilities) is a USAID planning and review process that draws on our best experience in Family Planning, Mother and Child Health and Nutrition to base our programs on the best practices to achieve the best impact.

President's Malaria Initiative

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, and tuberculosis. The PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through FY 2014 and, as part of the GHI, the goal of the PMI has been adjusted to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by continuing to scale up coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

Madagascar was selected as a PMI country in FY2006. Large-scale implementation of IPTp began in 2004-5 and ACTs in 2007, and has progressed with support from PMI and other partners. Artemisinin-based combination therapies and IPTp are now available and being used in all public health facilities nationwide. By early 2011, approximately 6,000 community health workers (CHWs) in 59 districts had been trained to provide community case management of fever for children under five years. More than 9.4 million long-lasting insecticide treated nets (LLINs) have been distributed from 2009-2011 in 91 LLIN targeted health districts, and more than ten million individuals were protected by IRS in 53 districts in 2010.

This FY 2012 Malaria Operational Plan presents a detailed implementation plan for Madagascar, based on the PMI Multi-Year Strategy and Plan and the National Malaria Control Program's (NMCP's) five-Year National Strategic Plan. It was developed in consultation with the Madagascar NMCP, with participation of national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the 2008-2012 National Malaria Control Strategy and build on investments made by PMI and other partners to improve and expand malaria-related services, including the Global Fund Rolling Continuation Channel (RCC) 4, Round 7 and National Strategy Application grants. This document briefly reviews the current status of malaria control policies and interventions in Madagascar, describes progress to date, identifies challenges and unmet needs if the targets of the NMCP and PMI are to be achieved, and provides a description of planned FY 2012 activities.

Due to the political crisis in Madagascar and the USG suspension in March 2009 of non-lifesaving assistance and direct support to the Government of Madagascar (GoM), the PMI team reprogrammed FY2011 funds from activities that would have required working with or engaging the GoM, to activities using international and local NGOs as implementing partners. Because of the lack of progress in resolving the crisis after more than two years, the FY 2012 MOP has been developed based on the assumption that suspension of USG assistance will continue over the next 12 months and still be in place when the FY 2012 funding becomes available. Should the suspension be lifted prior to implementation of Year 5 activities, the MOP team will review the planned activities and reprogram as necessary to begin directly supporting the GoM.

B. MALARIA SITUATION IN MADAGASCAR

Madagascar has a population of approximately 20.7 million, 19% of whom are children under five years of age and an estimated 4.5% are pregnant women (INSTAT, 2011). One of the poorest countries in the world, the average per capita income in Madagascar is only \$430 (World Bank, 2009); 24% of the population 15-49 years old is illiterate (DHS 2008/2009); the population living below the poverty line increased from 76.5% from 68.7% in 2005 (EPM 2010); and 50% of children under age five are malnourished (DHS 2008/2009). The most common causes of death among children under five are malaria, diarrheal diseases, and respiratory infections, often associated with malnutrition. Life expectancy hovers at 62 years for women and 59 years for men (UN 2010).

The last decade has witnessed marked health improvements in Madagascar, especially among children. According to the 2008/2009 Demographic and Health Survey (DHS), infant and child mortality fell from 159 per 1000 live births in 1997 to 72

Figure 1: Madagascar



per 1,000 live births by 2008. Other determinants of child survival—such as morbidity and coverage of important health interventions—have improved significantly during this period. For instance, between 1997 and 2008, the prevalence of diarrhea in children decreased by about 70% and respiratory infections by approximately 87%, and the proportion of moderately or severely anemic children fell 59% between 1997 and 2008.

Despite recent improvements in child health indicators, Madagascar still faces major health challenges which threaten social and economic development. The quality of health service is low and basic medicines and supplies are often in short supply. Public and non-governmental sector capacity to plan effectively and manage health programs is limited, particularly in the areas of financial and administrative management, as is 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. A political crisis starting in January 2009 and culminating in a *coup d'état* on March 17, 2009, led to the suspension by the USG and many other partners of financial and technical assistance to the current transitional government. During this time, Madagascar has maintained a relatively stable fiscal situation by severely cutting public spending to 12% of GDP, one of the lowest ratios in the world (World Bank 2011). The overall government-financed health budget was reduced by more than 30% from 2008 to 2010.

These changes are having a significant impact on the overall health and malaria activities at every level of the public health system. There have been delays in planned health policy reform, decreased supervisory and monitoring visits due to security issues and lack of funds, delayed data reporting, and interruptions in the supply chain of essential medicines down to the health facility level resulting in stock outs. The non-governmental sector has reported difficulties due to insecurity in the field and reduced capacity of the health sector at the decentralized level as a result of changes in personnel and delays in fund disbursements.

Administratively, Madagascar is divided into 22 regions, 111 health districts (119 administrative districts), 1,557 communes and 17,900 fokontany, which is the smallest administrative unit.

Malaria transmission and epidemiology

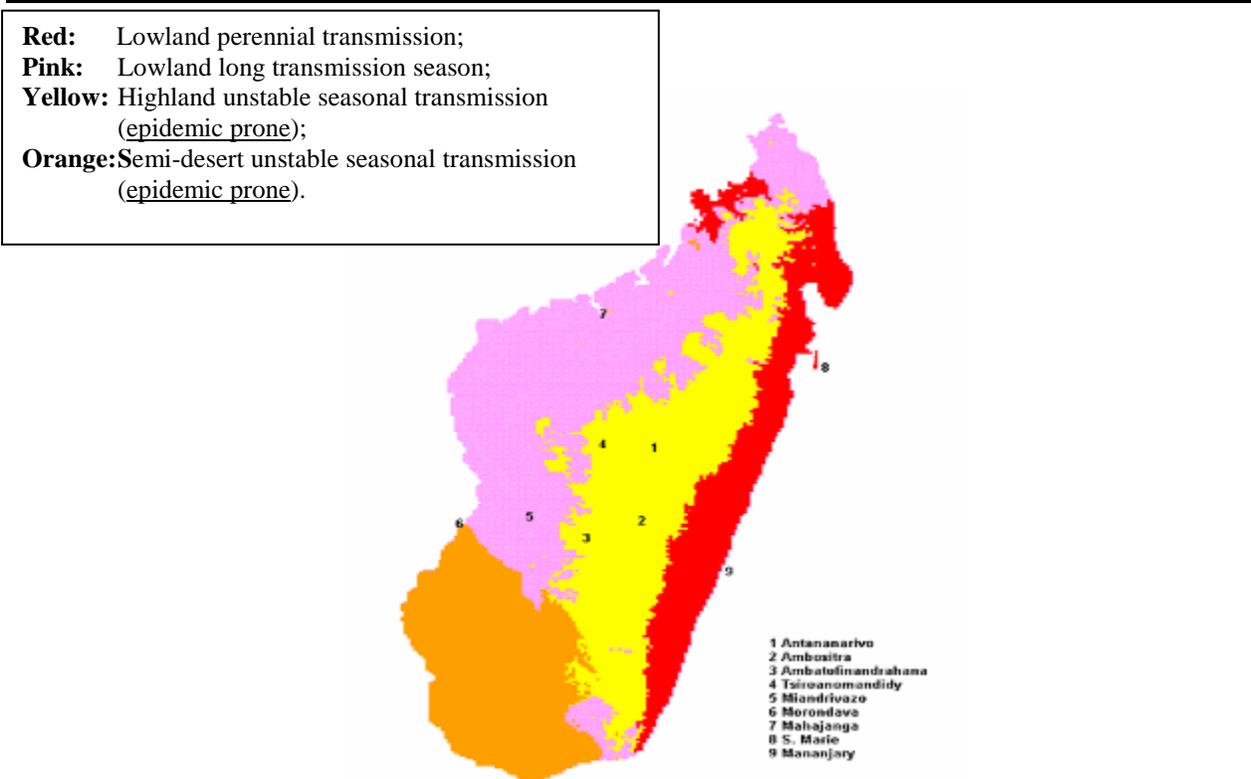
Malaria is endemic in 90% of Madagascar, however, the entire population is considered to be at risk for the disease. Reported malaria cases and deaths through the national HMIS system have shown decreasing trends in morbidity and mortality between 2003 and 2009. Overall, hospital deaths attributed to malaria fell from 17% in 2003 to 6% in 2009 (PNLP, 2010). In 2009, malaria was responsible for an estimated 4% of all reported outpatient visits, and 14% of all children under five years of age admitted to a hospital were diagnosed with severe malaria (SSS, 2010). In spite of this, malaria remained the leading reported cause of overall hospital mortality and hospital under-five mortality in 2009.

The country has been stratified into four distinct malaria epidemiologic zones based on the length and intensity of malaria transmission: the West Coast including the North, the Central Highlands, the East Coast, and the South. For all areas, the rainy season usually starts in late October/early November and lasts until April. Cyclone season runs from December to April and

the island typically suffers direct hits or near misses, both accompanied by flooding and increased risk of malaria and communicable diseases.

On the East and West Coasts malaria transmission is stable. The East Coast has perennial transmission and the West Coast has seasonal transmission (> 6 months) with decreased transmission in July and August. In both regions, immunity among adults is reported to be high and most morbidity and mortality is among children under five and pregnant women. Almost one-third of the Central Highlands lies above 1,500 meters where malaria transmission tends not to occur or transmission is short, seasonal and unstable. In the semi-desert South, transmission is also seasonal but very unstable and in some areas is almost absent for many years. Immunity is limited in both the upper Central Highlands and the South, and the population in those areas 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. The “fringe” districts of the Central Highlands are those geographical areas with a transition in altitude (between 800 m and 900 m) that lie between the epidemic-prone areas of upper Central Highlands and the malaria endemic areas of the coasts.

Figure 2: Madagascar Malariometric Stratification



While *Plasmodium falciparum* is the predominant species of malaria parasite in all areas, *P. vivax* and two 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 abundance 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 prefers to feed and rest indoors, it is quite sensitive to IRS. *Anopheles arabiensis* is also present in the Highlands, but is more ecologically independent of humans and their domestic environment, and *Anopheles mascarensis* has been reported as a primary vector in the south east and as a secondary vector on the island district of Sainte Marie.

In addition to PMI, major partners working with the NMCP include the Global Fund, UNICEF, UNITAID, WHO and the Principality of Monaco. Key implementing partners include numerous local and international non-government organizations (NGOs) and faith based organizations (FBOs). Since the beginning of the political crisis in 2009, several key partners have restrictions on working directly with the GoM resulting in major program cuts or significant changes in malaria specific support.

National Malaria Control Plan and Strategy

An International Conference entitled “Intensification of Malaria Control towards Elimination” was hosted in Antananarivo May 28-30, 2008 by the Ministry of Health (MoH) with strong international participation, including representatives from PMI. A key recommendation was that the national strategy be revised to adopt the WHO’s recommended approach of four program phases: intensification of control, pre-elimination, elimination, and prevention of reintroduction, and to accelerate the scale up of malaria prevention and case management activities. The NMCP subsequently revised its original 2007-2012 National Strategy to integrate recommendations from the conference and republished the revised strategy in early 2009 as the “National Malaria Strategy of Madagascar 2008-2012: from Control towards Pre-elimination of Malaria.” This effort was led by the NMCP and local Roll Back Malaria in-country partners. PMI provided substantial technical support to those efforts.

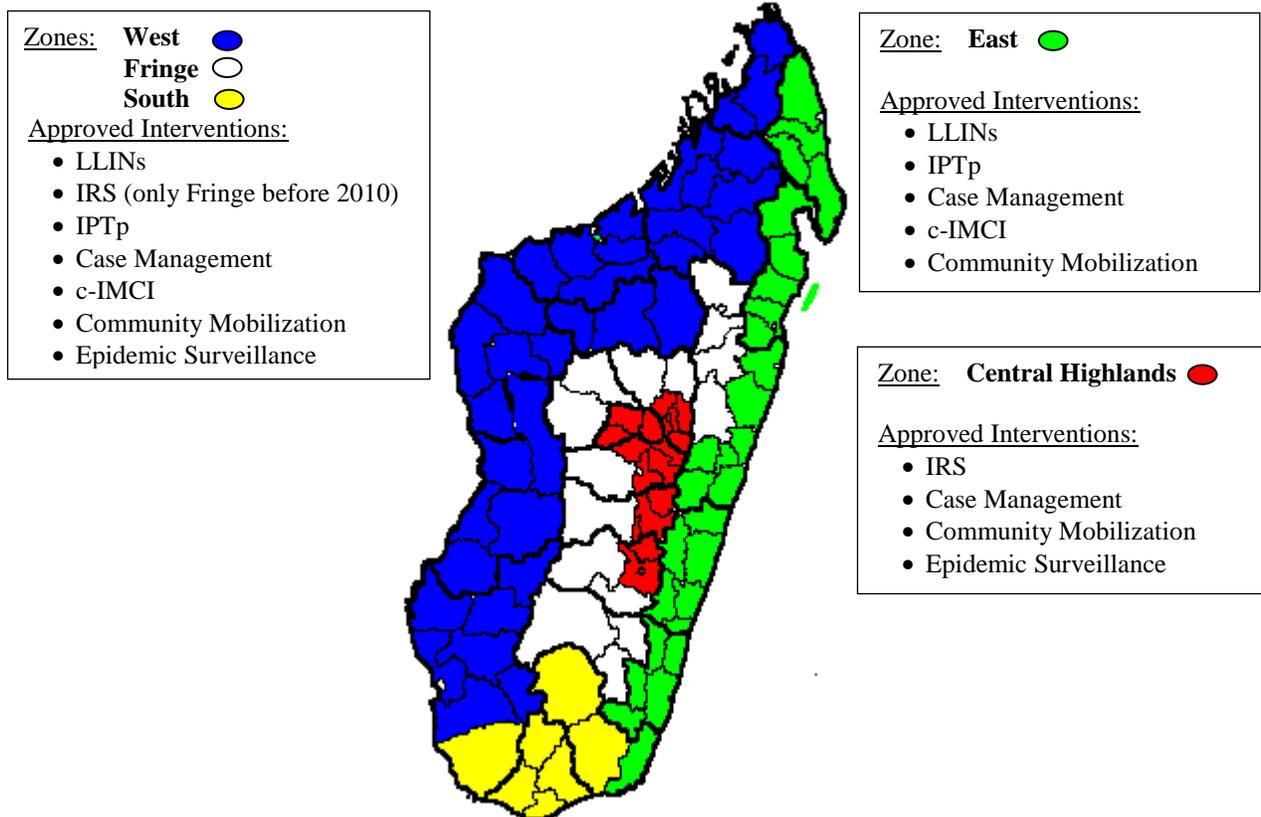
Five key approaches of the revised 2008-2012 National Strategy include:

- Generalized IRS in the Central Highlands and surrounding districts, and Fringe area, with extension to the South and West, for four consecutive years, followed by targeted IRS.
- Distribution of long-lasting insecticide-treated nets (LLINs) in all areas except the Central Highlands, employing the following strategies: “catch up” by free distribution of LLINs through mass campaigns to meet the national objective of two LLINs per household; “keep-up” through routine free distribution of LLINs to pregnant women as part of antenatal care (ANC) services and to infants during immunization visits; and social marketing of highly-subsidized LLINs to the population in general;
- IPTp in all areas except the 19 health districts of the Central Highlands.
- Improved case management in health facilities combined with increased use of rapid diagnostic tests (RDTs) nationally; and community-based treatment of fever with ACTs
- Epidemic surveillance, detection and control in areas of low or unstable transmission

The strategy also emphasizes the need for comprehensive and effective information, education, communication and behavior change communication (IEC/BCC), monitoring and evaluation (M&E) and on-going drug resistance surveillance.

As shown in Figure 3, below, the revised national malaria control strategy divides the country into five operational zones: Central Highlands, Fringe, East Coast, West Coast and South with some variation in interventions by zone.

Figure 3: National malaria control strategy interventions, by operational zone



Progress toward National Malaria Strategic targets

The *National Malaria Strategy of Madagascar 2008-2012: From Control towards Pre-elimination of Malaria*, set ambitious targets for IRS and ITN coverage. With a population at risk of malaria of approximately 20 million, the coverage targets for the control phase of Madagascar's strategic plan calls for reaching about 80% of the population at risk of malaria with both IRS and LLINs. Preliminary results from the 2011 MIS show 88% of the population is now protected by LLINs and/or IRS.

The free mass LLIN distribution campaign 2009-2010 covered the 91 targeted health districts in endemic areas, with the goal of achieving 2 LLINs per household. Also in late 2010, generalized IRS was carried out in the Central Highlands, the Fringe, adjacent districts in West and much of the South (see Figure 3), protecting approximately 10.1 million people with one annual spray round.

This level of IRS and LLIN coverage should produce dramatic reductions of malaria transmission in Madagascar. With the anticipated achieved impact after four years of

generalized spraying in the Central Highlands and Fringe areas, the national strategic plan calls for moving from universal spraying to targeted IRS in these areas in 2012. Malaria parasitemia prevalence results among children under 5 years old from the 2011 MIS are still pending.

C. CURRENT STATUS OF MALARIA INDICATORS

The most recent DHS was carried out from November 2008 to August 2009 and provides baseline indicators for PMI in Madagascar. Child mortality was estimated at 72 per 1,000 live births. Additional data, including routine malaria-specific HMIS data and malaria program data compiled by the NMCP, are reported and centrally stored in a national malaria database. Some national malaria indicators have been estimated based on these data and additional sources such as special studies and limited surveys.

The preliminary results from the 2011 MIS showed that all bednet indicators have increased substantially since the 2008/2009 DHS. Among LLIN targeted districts, ownership increased from 72% for one or more LLINs in a household in 2008/2009 to 94% for ownership of at least one LLIN per household in 2011. Net use increased between these surveys from 58% of children under five sleeping under an LLIN to 89% sleeping under an LLIN the previous night. Among pregnant women, use in LLIN targeted districts increased from 57% to 85% from 2008-2009 to 2011.

The 2008/2009 DHS data showed that 90% of women who had a pregnancy in the two years had at least one ANC visit and 87% had two or more visits. Among the 92 targeted districts for IPTp, only 15% reported receiving at least one dose of SP during ANC visits and only 8% reported receiving two doses of SP. In 2011, IPTp coverage increased to 35% and 23% having received at least one and two doses of SP during ANC visits respectively. In contrast, facility-level data collected by the NMCP estimates that 55% of pregnant women attending more than one ANC visit received two doses of SP for IPTp during their pregnancy in 2010; however these data are based on partial reporting (district-level reporting completeness of 70%) and reflects information from health facilities regarding pregnant women who have access to ANC services.

Table 1: Madagascar malaria indicator estimates (2011 MIS Preliminary Report)

Indicator	National	Intervention Targeted Districts
Proportion of all households with at least one ITN	N/A*	94%
Proportion of children under 5 years old who slept under an ITN the previous night	N/A*	89%
Proportion of pregnant women who slept under an ITN the previous night	N/A*	85%
Proportion of houses sprayed with IRS in the 12 months preceding the survey	N/A**	79%
Proportion of population who slept under an ITN the previous night or in a house that has been sprayed with IRS in the last 12 months	88%	88%

Proportion of women who received 2 or more doses of IPTp during their last pregnancy in the last 2 years ¹	20%	23%
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	2%	N/A

The national malaria policy adopted ACTs as the first-line treatment for malaria in 2005. ACTs and RDTs were rolled out in public health facilities from late 2006 through early 2008; however, because of production and packaging delays, community-level ACTs for treatment of fever by CHWs were only introduced in late 2008. The 2008/2009 DHS reports that only 0.4% of children with fever in the last two weeks received treatment with an ACT within 24 hours of fever onset. This increased to only 2% in 2011 (2011 MIS Preliminary Report). Among children with fever in the last two weeks, only 44% sought any treatment for their fever. Health facility utilization is low (EPM 2010, 2011 MIS) and chloroquine is still widely available on the market for self-treatment.

*N/A because only targeted districts get nets from the RBM partnership

** N/A because only targeted districts benefit from IRS

D. GOAL AND TARGET OF THE PRESIDENT’S MALARIA INITIATIVE

The goal of PMI is to reduce malaria-associated mortality by 70% compared to pre-Initiative levels in the 15 original PMI countries and to reduce malaria-associated mortality by 50% in the three new countries added to the PMI in FY2010 and later. By the end of 2014, PMI will assist Madagascar to achieve the following targets in populations at risk for malaria:

- >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 12 months;
- 85% of women who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy; and
- 85% of children under five with suspected malaria will have received treatment with ACTs within 24 hours of onset of their symptoms.

E. EXPECTED RESULTS

Prevention:

1. PMI will have supported universal IRS spraying in seven districts and targeted IRS in six districts, protecting a population of approximately 1.5 million people.

- PMI will have procured and begun the free distribution of approximately 2.5 million LLINs to help maintain universal coverage in 72 districts in Madagascar.

Case management:

- Home-based management of malaria will continue to reach over 50% of all communes located more than five kilometers from a health facility nationwide, providing diagnosis with RDTs and treatment with an ACT to more than 35% of children under five with fever. This will be done as part of an integrated approach that will also provide treatment as needed for acute respiratory infections and diarrhea.
- PMI will have procured approximately one million RDTs: 700,000 RDTs for trained community health workers and the remaining 300,000 RDTs for trained NGO and faith based providers.

F. PREVENTION ACTIVITIES

Insecticide-treated nets (ITNs)

Background:

In May 2008, during an international conference to realign national malaria control strategies towards elimination, Madagascar’s national strategy and goals for malaria control through 2012 were revised. The major strategic change regarding ITN distribution was to scale up to universal coverage, defined in the National Strategy as two nets per household in all areas, except 20 (out of 111) health districts of the Central Highlands. Madagascar has prioritized free ITN distribution through mass campaigns as a key strategy in scaling up to universal coverage. In addition, three “keep up” strategies are supported: routine distribution of free ITNs through ANC and EPI clinics targeting pregnant women and infants, free targeted distribution to communities most affected by natural disasters, such as cyclones, and the sale of highly subsidized ITNs in urban and rural communities.

There is a culture of net use in Madagascar, high community awareness, and a high demand for ITNs. With approximately 30% of the Malagasy population living more than ten kilometers from a health facility, community and commercial distribution of highly-subsidized ITNs offers an alternative network for routine distribution. Madagascar’s multi-pronged approach for ITN distribution is summarized below.

Table 2: Madagascar national ITN distribution strategies, by distribution method

Approach	Target Pop	Target Areas	Method	Current Donors
Mass distribution	Two LLINs/household in whole country except 20 districts in the Central Highlands (i.e., 91 of the 111 health districts)	Districts selected at time of campaign; goal is universal coverage in 91 health districts	Free of charge	Multiple, including PMI
Distribution in	People living in communities	Communities most affected by	Free of charge	UNICEF and

response to natural disasters and emergencies	most affected by natural disasters, such as cyclones	natural disasters such as cyclones		PMI
ANC and EPI clinic distribution	Pregnant women and infants (children < 1 year old)	Whole country except 20 districts in the Central Highlands (i.e., 91 of the 111 health districts)	Free of charge	Global Fund
Social marketing: communities	Pregnant women and children under five who can afford subsidized nets	Whole country except 20 districts of the Central Highlands (i.e., 91 of the 111 health districts)	Sold for ~ \$1.50 by community health workers	PMI and Global Fund
Social marketing: commercial	Those who can afford subsidized nets	Urban centers	Sold for ~\$1.50 in shops and markets	PMI and Global Fund

To fund its ambitious ITN distribution goals, the GoM, with assistance from PSI and RBM, successfully submitted a \$64 million Rolling Continuation Channel (RCC) Grant proposal for Global Fund Round 4. The grant includes two large universal “catch up” LLIN campaigns, one each in 2009-10 and 2012-13, with support for free routine and subsidized sales of LLINs for “keep up” activities between the two mass campaigns. The grant’s original gap analysis was calculated based on LLIN needs for a “fill-in” campaign to achieve two LLINs per household assuming a 10% loss per year. After expert consultation with the Alliance for Malaria Prevention, it soon became apparent that a “fill-in” campaign was technically not feasible nor cost-effective from a distribution standpoint. Moreover, limited results from a WHOPEs multi-country PermaNet 2.0 efficacy study, showed that after 3 years of routine use, over 87% of PermaNets collected in Madagascar had a concentration of insecticide below the detectable level and 83% did not meet WHO criteria as an LLIN.^{1,2} The NMCP with RBM partners made the decision to recommend and plan for LLIN replacement after 3 years. RBM recalculated the gap analysis based on a universal coverage distribution to all households in the 91 targeted districts and sought additional funding from other donors, including PMI to fill the gap.

The GoM’s ITN distribution strategy is moving forward and significant numbers of ITNs are reaching priority communities throughout the country. Between 2009 and the end of 2011, 9.4 million LLINs have been distributed throughout the priority 91 health districts in the country, as outlined in Table 3, below.

¹Report of the 12th WHOPEs Working Group Meeting, December 2008. WHO/HTM/NTD/WHOPEs/2009.1

²Madagascar participated in a recent multi-country WHOPEs evaluation of LLINs to assess efficacy, longevity and fabric integrity. Results from 90 polyester nets collected from four sites in Madagascar under normal use conditions showed high insecticide decay, poor insecticide performance and were in poor physical condition (poor fabric integrity, very dirty despite > 15 washes reported by users) after three years. As a result, a maximum of three years is used as an estimate for net longevity modeling to establish the net gap.

Table 3: Annual ITN Distribution in Madagascar, by year and method

Method	2009	2010	2011†	Total
Mass Distribution	1,738,469	5,698,980	0	7,437,449
	(1,000,000 PMI)	(2,579,520, PMI)		(3,579,520 PMI)
Routine and Emergencies	0	90,400	682,957	773,357
Social marketing*	291,636	163,636	120,000	575,272
Total	2,030,105	5,953,016	802,957	8,786,078

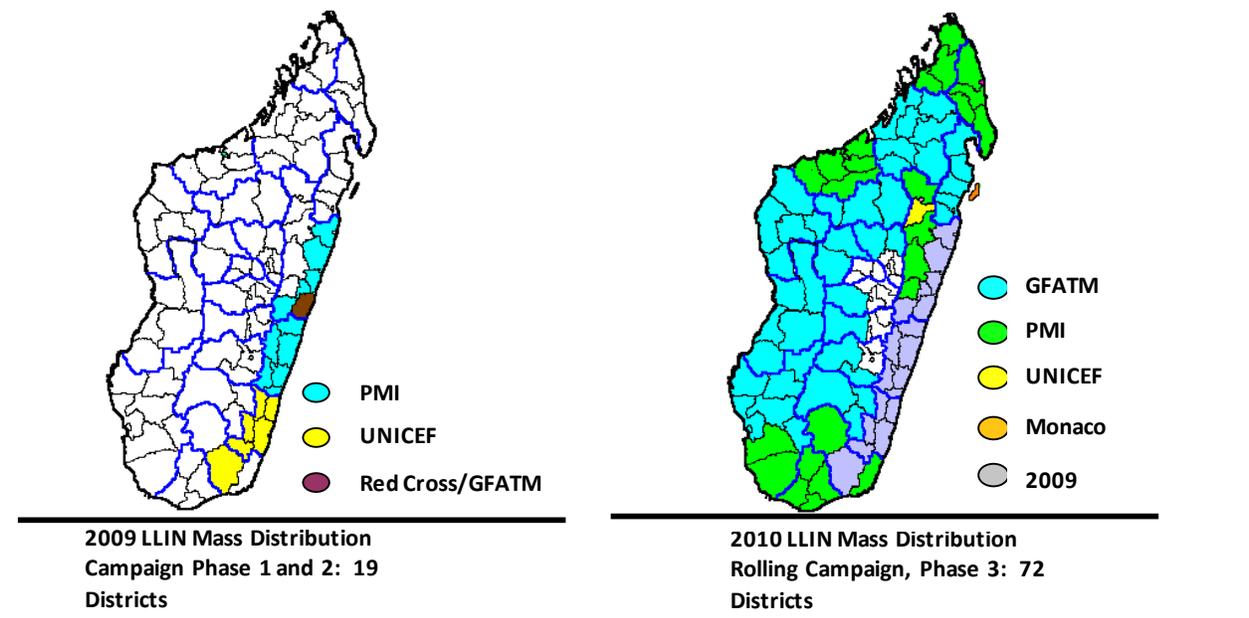
Notes:
 * Reflects the number distributed to retail outlets or distribution warehouses from the central level
 † Reflects the expected total distribution achieved by December 31, 2011, based on current estimates and plans.

Progress in the past 12 months:

Free distribution in “catch up” campaigns

The first national targeted universal coverage mass distribution campaign was planned and implemented in a phased roll out from November 2009 through the end of 2010. The first two phases of the campaign were implemented in November and December 2009, in 19 priority districts on the East coast. Over 1.7 million LLINs were distributed. A separate distribution of 11,000 LLINs in the district island of Ile St. Marie occurred in March 2010, and a third phase of the universal campaign for the remaining 71 districts occurred in November 2010, where 5,691,100 LLINs were distributed. Figure 4, below, graphically presents the rolling distribution campaigns conducted in 2009 and 2010.

Figure 4: Distribution of districts targeted for rolling ITN distribution campaigns, by year



PMI contributed 49% of all campaign LLINs for the 2009-2010 campaigns. PMI also provided substantial training, logistics and IEC/BCC support for the rolling campaign, which is the largest free mass distribution of LLINs ever organized in Madagascar. A post-campaign evaluation was

conducted during the rainy season after the distribution to the 19 districts that received LLINs in 2009. Results showed high levels of ownership and use: 74% of households reported owning at least two LLINs and 84% of all persons reported sleeping under a net the night before the survey. However, 10% of households received no campaign LLINs and only 58% of HH reached the RBM target of 1 LLIN per 2 people.

Preliminary results from the MIS conducted during the rainy season in 2011 shows high ownership and usage: 94% of households in the 91 targeted districts owned at least 1 LLIN. Households owned an average of 1.8 LLINs per household (vs. the 2 per household objective) but only 58% of households owned 2 LLINs or more, likely because of shortfalls observed during campaign implementation. LLIN use among all individuals was high with 82% reporting they slept under an LLIN the night before the survey and even higher among children under 5 and pregnant women: 89% and 85% respectively.

Lessons learned from the rolling campaign will be used to plan the next free mass distribution replacement campaign planned in two phases: September-November 2012, and September-November 2013, targeting the 19 districts covered in 2009, and 72 districts covered in 2010, respectively. Based on a distribution strategy of 1 LLIN for 1 to 3 persons (i.e. a distribution strategy of 1 per 3 persons which equates to 1 per 2.4 persons based on the distribution of household sizes in Madagascar 2008-9 DHS), and the LLIN household census population that is approximately 30% higher than the official census numbers, an estimated 9 million LLINs will be needed to achieve coverage targets during the 2012-13 rolling campaign. In FY 2011, PMI procured 1.8 million LLINs and supported pre-campaign activities for the replacement campaign in 19 districts. Additional nets will be provided by Global Fund grants and other donors.

Distribution of ITNs during disaster response

The national Office of Risk Management and Disaster Response (*Le Bureau National pour la Gestion des Risques et Catastrophes*) reports that from 2005 to 2010 Madagascar suffered from 17 cyclones destroying structures and displacing families, with over 240,000 structures destroyed during that period. With FY 2011 funds, PMI can support the distribution of approximately 50,000 LLINs as part of a coordinated disaster response effort and to replace physically destroyed LLINs to families most in need.

Distribution of socially marketed ITNs

With FY 2011 funding, PMI supported ITN keep-up strategies by the distribution and sale of 250,000 LLINs procured for social marketing at a subsidized price of 3000Ar (\$1.50) per net. PMI-procured socially marketed nets were prioritized for use and sale by the established network of CHWs working in fokontany > 5km from the nearest CSB and sales points in remote areas to promote access in hard to reach communities.

Pilot project to collect and recycle old retired LLINs

Old, expired LLINs were collected as part of a recycling pilot project in six districts in the South of Madagascar in conjunction with the 2010 LLIN distribution campaign. Over 22,500 old nets, voluntarily given up by community members, were collected, transported, sorted, compacted, baled and shipped to a plastics recycling company for processing. Collection of these nets was found to be acceptable and feasible. Key lessons learned include: households were more likely

and ready to give up old nets after they had collected and installed their new nets during the immediate post-campaign period, and successful collection was more likely at more geographically accessible sites. The cost per net was high at an estimated \$2.72/net collected. Preliminary results from a qualitative survey underway revealed that net collection could be enhanced if information, education and expectation setting in communities are well-established prior to the collection-campaign.

Information, education, communication/behavior change communication:

PMI, through a partnership with PSI, aired radio spots, displayed mobile cinema shows at the community level and disseminated posters to CSBs and CHWs promoting proper on-going care and use of LLINs with educational and promotional messages. These messages included how to prepare a new net for use, how to repair a torn net, how to wash a net and not to use nets inappropriately (for example do not fish with the net). IEC/BCC messages were also developed and disseminated to inform communities of the LLIN mass distribution campaign dates and emphasized that LLINs should be distributed for free. PMI also educated CHWs through SanteNet2 community-based activities to promote LLIN use among pregnant women and children under five years old.

Proposed activities with FY 2012 funding: (\$19,832,224)

In analyzing the 2012 and 2013 LLIN needs, only partial donor funding has been identified. The National Strategy goal 2008-2012 is two LLINs per household (i.e. a distribution strategy of 1 per 3 persons which equates to 1 per 2.4 persons based on the distribution of household sizes in Madagascar 2008-9 DHS). WHO now promotes the universal coverage goal of one ITN per two persons and it is anticipated Madagascar will adopt this in the follow-on National Strategic Plan 2013-2018. However, even with the projected funding from the Global Fund RCC4 grant and the proposed PMI contributions, it is unlikely the LLIN needs can be met to achieve a coverage goal of one ITN per two persons for 2012-13 campaign. The ITN gap analysis outlined in Table 4 below, documents that there remains a significant need to support the 2012-13 replacement campaign.

PMI FY 2011 funding was used to procure 1.9 million LLINs to contribute towards the 2012 campaign because of the lead time required to purchase LLINs. FY 2012 funds will support organization, training, logistics and distribution costs of these LLINs, procure additional 2.55 million LLINs and fund pre-campaign activities for the 2013 campaign.

Table 4: Universal ITN Coverage Gap Analysis 2012-13

Coverage goal	2 LLINs per household	1 ITN per 2 persons
<i>Distribution equivalent based on DHS 2008-9 estimates of household population size</i>	<i>1 LLIN per 2.4 persons</i>	<i>1 LLIN per 1.8 persons</i>
A. Total ITN replacement nets needed in targeted districts 2012-13 ¹	9,015,348	12,020,464

B. Estimated number of ITNs for 2012-13 replacement campaign from other partners ²	4,981,476	4,981,476
C. PMI contribution of ITNs for 2012-13 replacement campaign ³	4,350,000	4,350,000
D. Total ITNs pledged for mass distribution in 2012 (B+C)	9,281,476	9,281,476
E. Remaining ITN gap to reach goal coverage in 2012-13 (A-D)	0	2,688,988
Assumptions		
¹ Targeted population underestimated in the 2009-2010 campaign, revised total estimated population targeted for LLINs based on available campaign census data: 19,669,849 ² GFATM RCC4 grant - Phase II proposal has been submitted and is pending approval expected by the end of 2011 ³ Total PMI contribution: FY 2011 1,800,000 + FY 2012 2,550,000 = 4,350,000 ITNs		

In 2010, PMI supported CHWs promoting use of LLINs with educational and promotional messages. PMI also trained CHWs through USAID’s community-based projects to promote LLIN use among pregnant women and children under five years old.

PMI will continue its commitment and support for increased ITN ownership and use in Madagascar. This approach ensures that high ITN coverage will be maintained and that continuous access to ITNs is provided to new cohorts of pregnant women and infants. The FY 2011 and FY 2012 strategy is based on the following assumptions and information from in-country partners:

- The LLINs distributed in 2009 to the first 19 districts covered in the national target universal coverage campaign will be three years old and should be replaced by the end of 2012.
- The LLINs distributed in 2010 to the remaining 72 districts will be three years old and should be replaced by the end of 2013.
- The consensus of the NMCP and its partners is that free mass distribution campaigns are successful in equitably boosting ITN ownership and use across the wealth quintiles.

Based on these assumptions and identified needs, the specific activities supported by PMI with FY 2012 funding include:

1. *Procure LLINs for the 2013 phase of the 2012-13 rolling free LLIN mass distribution campaign to maintain the national universal coverage goal:* PMI will procure approximately 2.55 million LLINs in Year 5 to replace the nets distributed in the 72 districts of the 2009-2010 universal LLIN campaign. Other partners (Global Fund, UNICEF, Canadian Red Cross, etc.) will be sought to fund the remaining net gap to maintain national coverage targets in the 2013 phase of the replacement campaign. (\$15,520,224)
2. *Support logistics, distribution, social mobilization, IEC/BCC and hang-up activities for the 2012 phase of the 2012-13 rolling free LLIN mass distribution campaign:* PMI will support the logistics, distribution, social mobilization, IEC/BCC and active hang-up activity needs associated with the 2012 phase of the mass distribution campaign. This,

combined with funds obligated in FY11 will bring the total costs to \$1.50/net delivered. (\$1,800,000)

3. *Support logistics, distribution, social mobilization, IEC/BCC and hang-up activities for the 2013 phase of the 2012-13 rolling free LLIN mass distribution campaign:* PMI will support the logistics, distribution, social mobilization, IEC/BCC and active hang-up activity needs associated with the 2013 phase of the mass distribution campaign. This, combined with funds from FY13 will bring the total costs to \$1.50/net delivered (\$2,500,000)
4. *Technical assistance to LLIN activities:* PMI will provide technical assistance for the supervision, monitoring and evaluation of the rolling campaign and will build partner management and process evaluation capacity. (\$12,000)
5. *Provide support for implementation of national and targeted mass media and community focused IEC/BCC campaigns:* This activity will promote correct care and use of ITNs, communicate the risks and danger signs of malaria in children less than five years, and educate pregnant women about the benefits of prenatal care, including iron/folate, IPTp, and ITNs. (Costs covered in IEC/BCC section)
6. *Training, supervision and community mobilization for a community package of interventions:* Work with the NMCP and other partners to strengthen community malaria prevention interventions, including awareness raising about the availability of routine ITNs at CSBs for pregnant women and infants, promotion of appropriate LLIN use, care and repair. (Costs covered in the IEC/BCC section)
7. *Support to Peace Corps Volunteers to promote malaria prevention:* Work with PCVs to promote malaria prevention, and correct use and care of ITNs. (Costs covered in the IEC/BCC section)

Indoor Residual Spraying

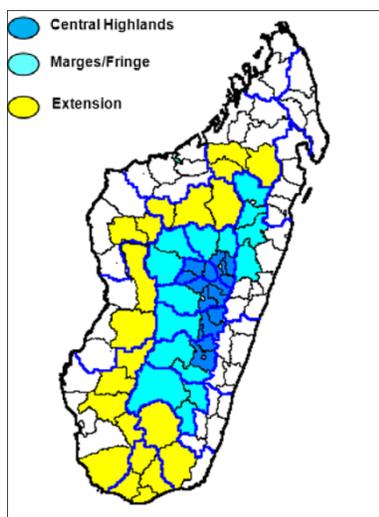


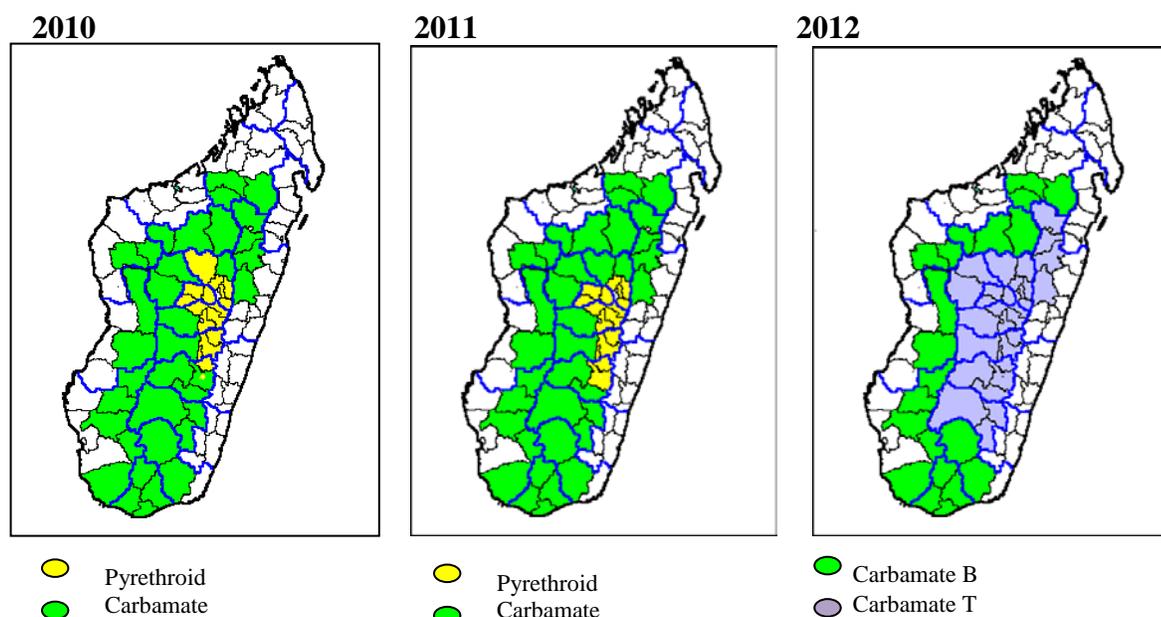
Figure 5: IRS Geographical areas

Background:

The current national malaria strategy covers the period from 2008-2012. It calls for IRS in three geographic regions, highlighted in Figure 5: the Central Highlands, an area surrounding the Highlands, referred to as the Fringe and in the extension districts to the West and South. LLIN coverage overlaps with IRS in 35 out of the 53 districts that received IRS in 2010-2011. This included all IRS districts except for those in the Central Highlands. IRS is intended to cover all houses in these areas for the first four years, after which the spraying becomes targeted. With the 2012 spray round, both the Central Highlands and Fringe districts will have had four consecutive years of blanket IRS coverage and will transition to targeted IRS. Blanket IRS coverage is defined as spraying at least 80% of all

target households. Targeted IRS, spraying approximately 25% of all communes in a selected district, is carried out in priority areas where: a) clinical and entomological data indicate significant ongoing transmission; b) there is evidence of pyrethroid resistance in the vector (a threat to LLIN efficacy that can be managed by IRS); and c) there was no IRS during the preceding spray round.

Figure 6: IRS target areas, insecticides, and coverage, either blanket (B) or targeted (T) by year



During the first two years of the current strategy, from 2008 until 2010, Madagascar conducted IRS in 32 health districts, reaching 6.8 million in 2008 and 6.9 million in 2009. In 2010, the country added 21 more health districts in the South and West, covering a total population of 10.1 million inhabitants. IRS coverage in the new districts follows the same pattern as in the older ones, universal coverage for the first four years, with a transition to targeted spraying in 2014. The mid and long term strategy is to identify potential malaria transmission sites (based on malaria case surveillance system), stratify and target for IRS with insecticide/formulation that provides best/longest lasting protection. The plan for IRS from 2008- 2012 is summarized in Table 5.

Table 5: Madagascar Strategic Plan for IRS Coverage, by year

Area/year	2008	2009	2010	2011 ¹	2012
Central Highlands	Blanket	Blanket	Blanket	Blanket	Targeted
Margin/Fringe areas	Blanket	Blanket	Blanket	Blanket	Targeted
South/West	No IRS	No IRS	Blanket	Blanket	Blanket
Notes:					
1. If adequate M&E and entomologic monitoring suggest additional years of generalized spraying are not needed, the program can shift to targeted spraying at an earlier time.					

Resources for IRS in all districts are coming from a combination of partners, including: the Government of Madagascar, a Global Fund Round 7 grant, a Global Fund National Strategy Application grant, and PMI. IRS program decisions, e.g., the number of spray rounds and the choice of insecticide, are made based on entomology indicators such as duration of IRS insecticidal effects and insecticide resistance. Program evaluation indicators include quality assurance of IRS operations, vector indoor biting and resting densities, and vector seasonality. The indicators and their measurements are described in the Madagascar Entomology Monitoring and Evaluation Plan, which parallels PMI technical guidelines.

The choice of insecticide for IRS is to better manage the threat of vector-insecticide resistance, especially resistance to pyrethroid class insecticides used on ITNs. Pyrethroid insecticides, used for IRS from 2005-2009, were replaced with carbamate class insecticides beginning in 2010. Pyrethroid resistance in Madagascar remains at a low level – based on 2010 M&E data. Recently pyrethroid resistance was detected in two monitoring sites in zones covered by LLINs. Widespread, repeated use of pyrethroids for IRS could change this and jeopardize the LLIN strategy that depends on pyrethroid susceptibility. In theory, genes for resistance can ‘flow’ to the coastal area vectors and create problems for LLIN strategy that has no alternative insecticide. Two exceptions are the central Highlands and one Fringe district (Ankazobe), which were recently sprayed with pyrethroids in 2010. All of the Central Highland districts will be sprayed with pyrethroids again in 2011 and Fringe districts as well as extension districts will be sprayed with carbamates. The NMCP and partners coordinate entomology surveillance activities with the goal of conducting routine vector-insecticide resistance surveillance in at least one district in each region receiving IRS and/or ITNs.

Entomology Monitoring and Evaluation of IRS

Madagascar’s entomology M&E activities, supported by Institute Pasteur Madagascar, occur in the Central Highlands at Kiangara, Betafo, and Bienville, and at Amboasary in the South. Malaria vectors include: *Anopheles arabiensis* (most common), *An. funestus* and *An. mascarensis*. Mosquito populations are characterized by density, by parity (proportion of older, epidemiologically dangerous females), by behavior (proportion of mosquitoes inside of houses), and for insecticide (pyrethroid class) susceptibility. IRS (alpha-cypermethrin) sprayed walls are also tested for duration of insecticidal effect. IRS is associated with a decline in all indicators, independent of seasonal effects. The duration of effect for IRS is as long as two to three months, which generally corresponds to the rainy season and malaria transmission season. Evidence shows there is vector-insecticide susceptibility as well.

Recent results from the 2011 MIS show that among the 53 IRS targeted districts, 79% of households report having been sprayed in the previous 12 months. This is lower than anticipated given program reports indicate over 95% of households are reached each year. As a result, plans are underway to improve supervision and monitoring of spraying activities and ensure all households are reached and that program information is complete. The MIS also reported that 81.5% of the population in IRS targeted districts slept in households that had received IRS, including 78.1% of pregnant women and 81.7% of children under 5 years.

Overall population protection with malaria prevention interventions was high with 88.5% of all individuals having slept under and LLIN or in a household protected by IRS, including 92.7% of children under 5 and 88.4% of pregnant women.

Since Madagascar has extensive areas classified as ecologically sensitive, an updated environmental assessment for all approved pyrethroid insecticides was completed in 2009. Similar documentation for carbamate class insecticides in IRS intervention areas was submitted and approved in 2010. The mitigation measures and conditions described in the assessment are supported by PMI, including insecticide chain-of-custody, disposal of used insecticide sachets, and post-IRS environmental assessments.

Progress during last 12 months:

In 2010, PMI trained 1,653 non-government personnel (administrative, operational, clinical, environmental staff and community health workers) in IRS operations. PMI also supported IEC and social mobilization programs to sensitize communities before, during and after spraying with the goal of increasing community awareness and reducing IRS refusal rates. PMI supported environmental mitigation measures, including: establishing insecticide chain-of-custody and using adequate facilities for insecticide storage, preparation and use of soak pits, progressive rinsing of spraying equipment, adequate insecticide sachet disposal, and a post-IRS environmental assessment. Finally, PMI continued to strengthen entomologic surveillance and insecticide resistance monitoring activities to guide IRS decision-making in key area such as vector-insecticide resistance assessment to inform insecticide selection and entomologic verification of IRS impact. For example, vector populations from a total of 18 sites across the country were tested for insecticide resistance.

Table 6 presents a historical summary of IRS and the role played by the PMI.

Table 6: IRS activities, by year and funding partner

Year	No. of districts	Number of individuals targeted	Actual or projected percentage of districts covered, by funding partner		Actual coverage achieved in PMI spray areas
			PMI	GF Rd 7 or NSA	
2008/9	32	7,000,000	20%	80%	1,222,000 houses sprayed; 6.7 million people protected (>95% coverage) PMI supported blanket spraying in 6 health districts (1.4 million population) among the Highlands and Fringe districts.
2009	32	7,000,000	20%	80%	1,222,000 houses sprayed; 6.7 million people protected (>95% coverage); PMI supported blanket spraying in 6 health districts (1.4 million population) in the Highlands and Fringe districts.
2010	53	10,100,000	30%	70%	1,852,000 houses sprayed; 9.8 million people protected (>95% coverage); PMI supported blanket spraying in 16

					health districts (approx. 2.9 million population) in the Highlands, Fringe, west and south extension districts
2011	53	10,100,000	(26%)	(74%)	Not yet available
2012	53	4,600,000	(32%)	(68%)	Not yet available

Proposed activities with FY 2012 funding: (\$1,029,000)

The 2012 IRS activity will protect approximately 4.6 million people in 53 districts. The program will be implemented from October-December 2012. PMI will continue to partner with the NMCP, and the Global Fund to spray the 53 targeted districts. The PMI contribution to this effort will include support for universal spraying in seven health districts in the South and targeted communes (approximately 25%) in six Highland districts to protect an estimated population of 1.5 million.

Parasitemia survey data are often used to develop malaria risk maps and geographically stratify areas with varying levels of malaria transmission.^{2 3} The Central Highlands is the geographical area prioritized for malaria pre-elimination per the 2008-2012 National Strategic Plan. As Madagascar transitions to targeted spraying, criteria will be reassessed to prioritize high risk communes. Traditionally, health facility data has been used to identify and prioritize high risk communes for targeted spraying, however, this approach is problematic because of the variable quality and completeness of health facility data, as is the case in Madagascar.^{4 5} Furthermore, given the political crisis, it has become increasingly difficult for PMI to access public health facility data.

PMI proposes to support a limited commune-based school survey to determine malaria prevalence in a sub-sample of targeted districts. Six districts will be chosen out of the 32 total districts as an initial pilot evaluation and will include testing school children in 107 primary schools with an average of 100 primary school children per school in each commune. These data will be used in conjunction with facility-based data to identify communes with the highest transmission risk and prioritize districts for targeted spraying. This proposal will be submitted to the PMI Operational Research committee for review.

These data, in conjunction with facility based data, epidemic surveillance monitoring from health facility data, spatial resolution human settlement and land use information, and available climate data will potentially identify risk models mapping priority zones for targeted IRS in subsequent years.^{6 7 8 9}

² Hay SI, Guerra CA, Gething PW, Patil AP, Tatem AJ, et al. (2009) A world malaria map: Plasmodium falciparum endemicity in 2007. PLoS Med 6(3): e1000048. doi:10.1371/journal.pmed.1000048

³ 2 Supplement to: GHME Conference Organizing Committee. Shared innovations in measurement and evaluation. Lancet 2011; published online March 14. DOI:10.1016/S0140-6736(11)60169-4.

⁴ Mission conjointe OMS-CDC/PMI pour documenter une meilleure pratique en matière de gestion de la base de données Paludisme de l'OMS «GMP Country Profile», Antananrivo, Madagascar, 7 – 19 mars 2010.

⁵ Madagascar Final Report Malaria Data Quality Audit, The Global Fund to Fight AIDS, Tuberculosis and Malaria, December 2010.

⁶ Rogers DJ, Randolph SE, Snow RW, Hay SI: Satellite imagery in the study and forecast of malaria. Nature 2002, 415:710-715

Specific activities include:

1. *Blanket IRS in seven districts and targeted IRS in six districts as part of the national IRS campaign and strategy towards malaria elimination:* The total budget reflects costs related to: procurement of carbamate-class insecticide (for one round of IRS in seven health districts in the south) and pyrethroid-class insecticide (for one round of targeted IRS in six highland and Fringe districts) and spray equipment; also, logistical support for delivering IRS to target districts, and administrative/operational support for IRS personnel. The Global Fund and the NMCP will provide support for IRS in targeted districts not covered by PMI. The estimated cost of PMI supported IRS activities in Madagascar is approximately \$7 million, covering IRS activities until September 2013. The majority of funding will be covered with existing pipeline and by repayment of a \$3 million loan to the Zambia PMI program in 2011, which will be transferred back to Madagascar in 2012. (\$920,000)
2. *Entomological surveillance and insecticide resistance monitoring:* PMI will continue building entomology surveillance capacity within the malaria control program. The IRS implementing partner will be supported to conduct comprehensive entomological surveillance including ongoing monitoring of insecticide resistance during periods of peak transmission at eight entomology sentinel sites, two in each of the four main eco-epidemiological zones of the country. Health districts targeted for IRS / LLIN campaigns in the FY12 plan that are not co-located with a sentinel site will also receive insecticide resistance surveillance scrutiny as in 2011. To support accurate taxonomic identification of malaria vectors, as proposed in recent PMI technical guidance, microscopes, both compound and stereo models, will be purchased for each of the eight entomology surveillance sites. Taxonomic keys and training in their use will be provided as needed to support comprehensive vector identification. The funding for this activity will be covered with existing pipeline that was described above. (\$0)
3. *Entomological inoculation rate and vector survival rate indicator:* Additional entomological monitoring will be carried out in eight sites including sporozoite rates, vector survival assessments in selected sentinel sites to identify a change in vector behavior following exposure to IRS and LLINs. (\$80,000)
4. *School-based parasitemia survey to prioritize districts for targeted IRS:* School-based parasitemia surveys to identify priority communes for targeted IRS among the highland and Fringe districts. Parasitemia prevalence information will be used in conjunction with facility-based data to guide the choice of communes and to be sprayed in 6 out of 32 districts with targeted spraying. (\$80,000)

⁷ Omumbo JA, Hay SI, Snow RW, Tatem AJ, Rogers DJ: Modelling malaria risk in East Africa at high-spatial resolution. *Trop Med Int Health* 2005,10:557-566.

⁸ MARA/ARMA. <http://www.mara.org.za/>

⁹ Rakotomanana F, Randremanana R, Rabarijaona P, et. al. Determining areas that require indoor insecticide spraying using multi-criteria evaluation, a decision support tool for malaria vector control programmes in the Central Highlands of Madagascar. *Int J Health Geographics* 2007,6:2. <http://www.ij-healthgeographics.com/content/6/1/2>

5. *Technical assistance to implement PMI IRS activities:* One CDC technical assistance visit to support enhanced insecticide resistance monitoring, based on the CDC bottle bioassay method, at sites where 2010-11 assessments indicate suspected insecticide pyrethroid resistance (Morondava and Brickaville). (\$12,000)
6. One USAID technical assistance visit to support the IRS program will be conducted. (Core funding)

Intermittent Preventive Treatment of Pregnant Women

Background:

As part of the national strategy to prevent and limit morbidity associated with malaria during pregnancy, IPTp has been implemented since 2004 in 92 lowland and coastal districts where malaria transmission is stable or seasonal. The policy excludes the remaining 19 districts in the Central Highlands, which are epidemic prone. The strategy includes the provision and promotion of LLIN use during pregnancy, and early, effective IPTp, which are delivered as a package at the ANCs. The IPTp policy calls for two doses of SP taken at least one month apart: the first dose after quickening and the second dose one month later. Administration of IPTp should be directly observed and free of charge. Starting in 2004, the MoH trained health workers at the CSBs on the provision of IPTp and plans to extend the training to the private sector with the support of Global Fund NSA funds. 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. All focused antenatal care (FANC), activities including tetanus vaccination and malaria prevention activities are integrated at the level of the CSB. The NMCP works closely with the *Direction Santé de la Mère* (Directorate of the Health of Mothers) to plan and implement malaria in pregnancy activities, including IPTp. To further promote MIP, the NMCP has integrated IPTp as part of integrated ANC services into the biannual outreach activity during the mother and child health promotion weeks in April and October. During these biannual health weeks, vitamins and deworming medicines are distributed; mass immunization campaigns and ANC counseling activities are conducted, and health promotion messages are disseminated. Program surveillance data shows that IPTp uptake peaks during and right after the mother and child health weeks (NMCP, 2010). The NMCP has also revised the reporting form for the HMIS in order to monitor and capture the number of women who receive SP for IPTp; however reporting remains weak, especially regarding the number of doses taken.

The 2003/2004 DHS reported that 80% of women made one or more antenatal clinic visits, while in the latest 2008/2009 DHS, this percentage increased to 90%, with 86% making two or more visits. In addition, according to the latest DHS, the average month during pregnancy at which the women reported presenting to ANC for the first time was 4.8 months. Despite this high reported rate of ANC attendance, and relatively early attendance during the course of the pregnancy, IPTp uptake remains low. Preliminary results from the 2011 MIS reported only 23% of pregnant women took two doses of SP for IPTp among the 92 IPTp targeted districts. It is unclear what obstacles are responsible for the poor uptake of IPTp, but lack of opportunity for administration at ANC may not be the main obstacle.

Due to the political constraints related to working with GoM since March 2009, PMI and other donors have not been able to support ANC services at the CSBs. As a result, inadequate supervision, lack of refresher training, staffing shortages, and stock-outs have been reported and these may be factors in limiting progress in IPTp implementation. In response to the reported low uptake of SP for IPTp, the NMCP along with partners have employed alternative strategies such as using CHWs to deliver targeted messages for the prevention of malaria in pregnancy to pregnant women and encouraging them to attend ANC early and often and demand IPTp during their visits. CHWs also play an important role in planning, organizing and conducting health promotion outreach activities, including IPTp for pregnant women, during the biannual mother and child health campaign weeks. Another strategy which was piloted in six districts included free distribution of iron/folic acid to pregnant women who received their first dose at the primary health care center and were followed for up to six months with the assistance of a CHW in their community providing a subsequent supply iron/folic acid. An evaluation in 17 communes implementing CHW distribution of iron/folic acid showed a significant increase in uptake of iron/folic acid among pregnant women receiving ANC care compared to the two preceding years.

In 2012, an estimated 4 million SP tablets are needed to treat approximately 675,000 pregnant women expected to attend ANC clinics in the 92 malaria endemic health districts. Global Fund will provide the entire SP need for IPTp from 2010 to 2012 and will use its national health commodity distribution channels to deliver the drug to the district level. The *Service de Santé de District* (District Health Office) is responsible for assigning the estimated amount of SP needed by each CSB. CSB staff or community members are responsible for transporting the SP from the District Health Office to their local CSB. The SP administration kits include cups for directly observed administration of SP and a water purifier. Additionally, the Global Fund NSA grant will provide funding to introduce SP among private and NGO providers and purchase SP for this sector, although distribution strategies have not yet been identified. Resources to procure SP for 2013 have not yet been identified. PMI will provide technical assistance in developing the follow-on Global Fund National Strategic Application grant phase II bridge funding proposal in early 2012 and the follow-on NSA II grant proposal both of which will include commodities for health facilities.

It is national policy to treat malaria infections during pregnancy with quinine during the first trimester and with ACTs during the second and third trimesters; however, in reality, adherence to this national policy is unknown.

Even though the need to strengthen the package of services offered to pregnant women through the CSBs remains high, especially ensuring adequate stock of LLINs and SP, PMI is unable to provide direct technical assistance under the current USG restrictions. PMI is working with local partners to identify other funding sources such as Global Fund NSA to help strengthen malaria in pregnancy activities at government health facilities. In addition, continued support and training of CHWs to promote demand for and utilization of prenatal services remains an important activity for PMI.

Progress in the past 12 months:

All 2010 and 2011 activities relating to strengthening of ANC/IPTp services delivered at public health facilities were put on hold and the funding reprogrammed because of the on-going USG suspension of support for all non-life-saving assistance and direct support to the GoM. Since the strengthening of ANC/IPTp services has been suspended, all MIP activities will continue to utilize community health workers to deliver IEC/BCC messages including the importance of two doses of IPTp and utilization of LLINs. During the past 12 months more than 5,000 CHWs have been trained in IPTp promotion and delivery of an integrated package of services for the prevention of malaria in pregnancy.

Proposed activities with FY 2012 funding: (\$300,000)

Community health workers, through a network of NGOs, play an important role in delivering key IEC/BCC messages and delivering an integrated package of malaria in pregnancy prevention services. Recent evaluations have shown that CHWs engagement with MIP activities may contribute to increased ANC attendance. PMI will support CHWs to raise awareness about MIP and promote IPTp including emphasizing key messages about the safety of taking IPTp in the second and third trimesters. If USG sanctions are lifted within the next 12 months, certain activities will be reprogrammed to help strengthen MIP/IPTp services at government health facilities as well.

Specific activities to be supported by the PMI with FY 2012 funding include:

1. *Community-based promotion of MIP uptake:* Support community-based IEC/BCC promotion for uptake of MIP services (LLINs and IPTp) at ANCs. This activity will be linked into the integrated services and promotion of ANC attendance provided to remote communities through SanteNet2-sponsored CHWs. (\$300,000)
2. *Provide support for implementation of targeted mass media and community-focused IEC/BCC campaigns:* PMI will support IEC/BCC activities focusing on early and frequent ANC attendance by pregnant women in order to prevent malaria in pregnancy. Messages will focus on the dangers of malaria in pregnancy, the risks to the newborn and the importance of nightly LLIN use, IPTp and prevention of anemia. (*Costs covered in the IEC/BCC section*).

G. CASE MANAGEMENT

Malaria Diagnosis

Background:

The national rollout of training for health facility workers on the new policies for malaria diagnostics and treatment with ACTs, as outlined in the 2005 *Politique Nationale de Lutte Contre le Paludisme a Madagascar* was completed in late 2007. The policy calls for diagnostic testing in public health facilities for all suspected cases of malaria. The policy also states that

where biological diagnosis is not possible, diagnosis should be based on clinical evaluation after all other causes of fever have been eliminated. By the end of 2008, RDTs had been implemented in all public primary health care facilities. In January 2009, the MoH adopted the new National Community Health Policy (*Politique Nationale de Santé Communautaire*), which provides a framework for the implementation of health and social protection activities at the community level, including establishing a cadre of volunteer CHWs that are selected by their communities. A study conducted by Institut Pasteur de Madagascar in 2008 and 2009 provided evidence of a high standard of performance among CHWs trained to use RDTs. Soon after, in August 2009, the MoH revised the national guide on community case management of children under 5 years old (*Guide de Mise en Œuvre pour l'Introduction de la Prise en Charge Communautaires des Infections Respiratoires Aigues de la Diarrhée et du Paludisme chez les enfants de moins de 5 ans à Madagascar*). This guide calls for the introduction and scale up of RDTs at the community level as well as an expansion of c-IMCI for children under 5 years old to all geographic areas of Madagascar except for very large urban areas. RDTs were introduced for use by CHWs at the community level beginning in March 2010.

Prior to 2011, two main partners implemented the c-IMCI model in Madagascar. USAID, through PMI and MCH funds has supported the SanteNet2 project to roll out the integrated approach to villages in 800 communes and over 5,000 villages, reaching about half of all remote populations in the country. This approach includes the use of RDTs. UNICEF has had an active c-IMCI program and has trained over 600 CHWs since 2005 but without the use of RDTs. In addition to ACTs, UNICEF also supplied cotrimoxazole for the treatment of respiratory infections and oral rehydration salts (ORS)/zinc for diarrhea. The NMCP was awarded a Global Fund NSA grant starting in October 2010, which included scaling up the c-IMCI model nationally as one of its main activities. With this funding also came a change in the national policy that expanded the c-IMCI scope to reach all villages except large towns in Madagascar, a total of approximately 17,000 villages. The NSA grant also specified that each village should have two c-IMCI trained CHWs. In early 2011, a phased implementation plan was developed; training curriculum and tools have been standardized with the participation of several partners and scale-up training began in March 2011. Coordination meetings have identified overlap areas between partners and efforts have been made to reduce potential redundancy in training, supervision and supplies.

By mid-2011, about 4,400 CHWs had been trained in c-IMCI and over 3,700 trained in the use of RDTs. Early results indicate that each CHW trained in RDT use should receive a starter pack of 40 RDTs for suspect malaria cases in children under five in their communities. Partial consumption data reported by SanteNet2 indicates that between March 2010 and April 2011 the average number of RDTs used per CHW per month was one (range 0 to 30 RDT per CHW per month) in a setting of frequent stockouts. Maintaining continuous supplies of RDTs and ACTs for the CHWs is a huge challenge for the program. This is complicated in Madagascar by having to establish resupply points outside of the primary health care facility. PMI has also provided RDTs to the private sector, namely to approximately 500 faith based clinics.

Ensuring that the large number of recently trained CHWs is providing quality services to the population they serve is another major challenge. PMI funding for supervision of RDT use at

the community level has been included in the overall monitoring of case management of malaria treatment with ACTs. SanteNet2 manages implementation of c-IMCI through a series of local partner NGOs. Each commune, where trained CHWs are active, organizes a monthly meeting to review achievements and problems. These meetings are organized by partner NGOs and community leaders with the head of the health facility acting as the technical supervisor. The partner NGO field workers aggregate the CHWs' information and data. SanteNet2 also conducts quarterly supervision of the CHWs using locally recruited and trained independent supervisors who work in collaboration with primary care health facility staff. In reality, this system is not yet fully functional and the monthly meetings and quarterly supervisions are seldom done on a routine basis. Finally, PMI is undertaking a rigorous third party assessment of the overall community-based program, including measures of the quality of service for case management of malaria, pneumonia and diarrheal disease.

Due to USG restrictions, PMI is unable to support public facility based activities and is therefore unable to monitor malaria microscopy in public facilities in Madagascar.

Progress in the past 12 months:

Of the more than 4,400 CHWs trained for c-IMCI, more than 3,000 were trained between March 2010 and April 2011, and 80% (over 3,700) of those were trained in the use of RDTs. Although monthly reporting from these CHWs has been irregular, with a 37% reporting rate from March 2010 to April 2011, those limited reports indicate that CHWs saw 34,100 cases of fever, used slightly over 12,000 RDTs and provided ACTs treatment to 10,500 children. CHWs also reported treating over 29,000 cases of diarrhea and over 20,000 cases of acute respiratory infections.

Proposed activities with FY 2012 funding: (\$1,512,000)

The most recent RDT gap analysis is shown in Table 7 below. RDT estimated needs are based on the NMCP calculations on projected number of cases and the number likely to seek treatment through the community-based and facility-based activities. Projections indicate that RDT needs through 2012 will be met by Global Fund grants and PMI. With PMI support, a second Global Fund NSA proposal will be submitted in early 2012. That proposal will include some malaria commodities, including an unknown number of RDTs for the calendar year 2013.

Table 7: RDT Gap Analysis

	2011	2012	2013
RDT needs			
Public health facilities	856,620	836,575	814,736
Community level and Private Health Facilities	1,343,204	1,311,773	1,277,529
Total RDT Needs	2,199,824	2,148,348	2,092,265
Include 10% loss	214,835	209,226	215,085
TOTAL Needs	2,363,183	2,301,491	2,365,933
RDT sources			
Global Fund (GF7, NSA)	1,737,596	1,176,377	0

PMI	703,100	1,450,000	1,000,000
Total estimated RDT supply	2,440,696	2,626,377	1,000,000
RDT Gap*	-240,872	-478,029	1,365,933
*Based on the most recent gap analysis in March 2011 - morbidity method			

With FY 2012 funds, PMI will procure RDTs to support c-IMCI in approximately 1,000 communes supported through PMI implementing partners. PMI will also procure and deliver RDTs to the private, not-for-profit sector clinics, mostly faith-based organizations. Support for supervision to ensure appropriate use of RDTs is included under the Treatment section and improvements to the supply chain are included under the Pharmaceutical and Commodity Management section.

1. *Procure RDTs for malaria case management at community level and for private sector/NGO and faith based providers:* Procure an estimated 1 million RDTs: 700,000 RDTs for community-based case management, including gloves and sharps boxes; and 300,000 for private sector (NGOs/FBOs) who will be trained by the NMCP. For community activities, the funds will support integrated community case management (CCM) in up to 800 communes. The roll out of the CCM training and the uptake of RDTs by trained CHWs will be closely monitored to ensure that there are not excess RDTs entering the country. The delivery schedule of RDTs will be adjusted to reflect actual usage. (\$1,000,000)
2. *Implementation and on-going supervision of diagnosis and treatment of malaria at community level:* Provide support for training/refresher training and routine supervision of community health workers in current intervention areas, including supervision for appropriate use of RDTs. Support ACT supply chain and reporting of cases from the community level. Includes sub-grants to NGOs/FBOs. (\$500,000)
3. *Provide support for community-focused IEC/BCC campaigns:* PMI will support IEC/BCC to promote early treatment seeking for children with signs of malaria and the need for diagnosis to ensure appropriate treatment for childhood illness. (Costs covered in the IEC/BCC section).
4. *Provide technical assistance for diagnostic activities:* One CDC TDY for malaria diagnostics implementation at the community level. (\$12,000)

Pharmaceutical and Commodity Management

Background:

Public Sector: SALAMA, the central purchasing agency of the MoH, is responsible for procurement of essential medicines and medical consumables for use in the public sector and for their distribution to districts. SALAMA is an autonomous, non-profit organization established in 1997 with the support of various donors. SALAMA finances all its activities from the resources generated by sales.

At the district level, the district pharmaceutical depots are the intermediary points in the public sector supply chain. They are managed primarily by NGOs under a contract with the MoH through the Department of Pharmacies, Laboratories and Traditional Medicine and sell to the health facility pharmacies. All medicines dispensed at public health facilities are sold with a mark-up of approximately 35% of the SALAMA price.

The introduction of the free distribution of some malaria commodities through the public sector has resulted in alternative procurement and distribution channels to the district level for these products. There are also multiple channels for distributing antimalarial medicines and products within districts. Free and donated antimalarial products are received and managed by the District Health Office while the products from SALAMA are managed by the district pharmaceutical depots. In both cases, CSBs are responsible for the 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 primarily rely on public transportation.

In response to the multiple procurement and distribution strategies in use, the MoH, with support from UNICEF, established the health product integration system, *Programme d'Action pour l'Intégration des Intrants de Santé* (PAIS), for which planning was completed in 2008. However, since the political crisis began, little progress has been made in implementing this project.

An assessment of the national pharmaceutical management capacity in 2008 highlighted the following constraints: (1) lack of trained pharmacists in public pharmacies; (2) weak institutional capacity; (3) insufficient pharmaceutical policies and guidelines; (4) low capacity and inadequate human resources for pharmaceutical management in the health care system; (5) multiple vertical programs lacking integration and coordination; and (6) logistics and distribution challenges at the peripheral level.

PMI interventions have been aimed at addressing point (1) by supporting the *Institut National de Santé Publique et Communautaire* (INSPC) in pre-service training on pharmaceutical management; points (2), (3), (5) and (6) by strengthening the *Direction des Pharmacies, des Laboratoires et de la Médecine Traditionnelle* (DPLMT) pharmaceutical management capacity; and (4) through training and supervision of personnel. However, implementation of these activities was stopped in March 2009, as part of the USG suspension of support to the GoM.

Private sector: Highly-subsidized ACTIpal[®] (the socially-marketed ACT for under five year old children; ~\$0.50 per treatment) are distributed to CHWs through various NGOs, private sector pharmacies, pharmacy depots, and private doctors through PSI-contracted pharmaceutical wholesalers. PSI determines the profit margin at which these items are sold to the consumers by these private providers.

There is also a small but active distribution system of antimalarials in the commercial private sector, particularly in urban areas with at least three local manufacturers who import finished antimalarial drugs for repackaging and sales, in addition to approximately 33 wholesalers, 200 private pharmacies and 2,000 pharmacy depots.

Quality Assurance: The *Direction de l'Agence de Médicament de Madagascar* (DAMM) which includes the national medicines quality control laboratory, is responsible for testing most pharmaceutical products destined for use in the country and products already on the market. The medicines quality monitoring program is designed to help the national drug authority, DAMM, to detect substandard and counterfeit medicines and take immediate action to remove such medicines from the market. With USG support, the DAMM established seven peripheral sentinel sites where samples of antimalarials are regularly collected and tested using minilab kits. The goal is to have minilabs/peripheral drug quality testing sites in all 22 regional hospitals of Madagascar. With funding from the Global Fund NSA, 15 regional hospitals will receive equipment (minilabs) and training by the end of 2012. The original plan was to have central level laboratory analysis conducted every three months, however, lack of funding only allows for testing every six months.

Pharmacovigilance: In early 2006, Madagascar's national pharmacovigilance center and system were established. Although ACTs are generally considered safe, routine surveillance should still be undertaken as some adverse effects may be very rare and only detected through long-term surveillance. As fake antimalarials, and locally produced antimalarials are also common, pharmacovigilance and drug quality assurance are complementary and ensure a safe product. Since its inception, the center developed a national strategy and a national adverse events/adverse drug reactions (ADR) reporting system, conducted a training of trainers workshop (with the assistance of the Monacan pharmacovigilance center), and trained approximately 3,000 medical professionals (pharmacists, medical pharmacists, doctors and nurses) in 91 out of 111 districts. Initially, training was supported by PMI but was suspended at the time of the political crisis in 2009. The Global Fund NSA is now supporting this activity and training of approximately 3,000 health professionals from the public and private sector by 2012. From January 2007 to May 2011, the pharmacovigilance center received 1,646 adverse drug reaction reports of which 34 were related to ACTs. Most reports originated from district level hospitals. As part of educational and promotional material, a poster showing the ADR form, the chain of reporting/information flow and the importance of reporting has been developed and will be distributed to district level health centers and CSBs. Currently the ADR form is only available in paper format, however, the center is working with a web-engineer to include an electronic version of the form on the MoH website to be filled in and submitted online in an effort to facilitate reporting.

Madagascar became the 94th full member of the WHO's international pharmacovigilance program. As a member, Madagascar has access to valuable resources which will help the country to strengthen its pharmacovigilance system.

Progress in the past 12 months:

All of the envisioned activities designed to support the public sector pharmaceutical and commodity management were stopped in March 2009, as part of the USG suspension of non-lifesaving assistance and support to the GoM. As of June 2011, USG sanctions have not been lifted and PMI support for these activities has not yet resumed. Limited Global Fund resources were made available to continue support for supply chain, drug quality and pharmacovigilance over the last 12 months.

Proposed activities with FY 2012 funding: (\$300,000)

1. *Strengthen the supply chain for malaria commodities at the community level through trained CHWs:* PMI will ensure the continuous supply of malaria commodities, specifically RDTs and ACTs, to support the timely diagnosis and treatment of malaria at the community level. The main objective is to prevent and eliminate stock-outs of malaria commodities and to ensure that expired commodities are disposed of properly. This activity will be co-funded with other USG/GH funding streams. (\$300,000)

Malaria Treatment

Background:

In 2005, Madagascar adopted artesunate/amodiaquine (AS/AQ) combination therapy as the first-line and artemether/lumefantrine (AL) as the second-line treatment for uncomplicated malaria. Where biological diagnosis is not possible, patients at clinics and at community level should be treated based on clinical signs. In 2009, the MoH adopted the new National Community Health Policy (*Politique Nationale de Santé Communautaire*) which provides a framework for the implementation of health and social protection activities at the community level. The national guide on community case management of children under 5 years old (*Guide de Mise en Œuvre pour l'Introduction de la Prise en Charge Communautaires des Infections Respiratoires Aigues de la Diarrhee et du Paludisme chez les enfants de moins de 5 ans à Madagascar*) calls for the introduction and scale up of integrated case management by CHWs including the use of RDTs for diagnosis of all fevers at the community level and treatment with ACTs as appropriate. Except when delivered at community level, ACTs require a prescription for purchase; however, regulation and enforcement of prescriptions for antimalarials are weak.

ACT needs for the public sector in Madagascar, including distribution through CHWs at community level through 2012 have been covered under the Global Fund Round 3 and 7 grants, a large contribution from UNITAID and the Global Fund NSA grant. Procurement needs for 2013 will be included in the next NSA follow-on proposal which will be submitted for consideration in early 2012.

Madagascar is one of eleven countries selected as part of a pilot for the AMFm project to increase availability of ACTs in the private sector. AMFm uses a subsidy at the level of purchase from the manufacturers to provide ACTs at low prices to vetted wholesalers in participating countries. Co-formulated AS/AQ became available in Madagascar through AMFm in early-2011 and the recommended retailer markup is 150 Ariary per treatment (~\$0.06). The price to the consumer ranges from approximately 300-1000 Ariary (~\$0.12 - \$0.50), across the formulation for the lowest to highest age groups. The AMFm project also includes training for private and NGO providers on the national policy for case management and encourages confirmation of all malaria cases using a diagnostic test.

The 2008/2009 DHS, which was conducted over a period of eight months and included both the low and high malaria transmission season, reported that 9% of children under five nationwide had a fever in the two weeks prior to the survey. Twenty percent of those reported being treated

with an antimalarial but only 8% received an antimalarial the same day or the day following fever onset. Eleven percent received chloroquine, 6% quinine and only 1% received an ACT. Another household survey conducted in late 2008, conducted by the Gates Foundation-supported project, ACT Watch, showed that 90% of caregivers first sought treatment for the child's fever at pharmacies or drug shops 27% of the time, at public health facilities 20% of the time, and at grocery stores 17% of the time. An ACT Watch outlet survey in 2010 found that while over 95% of the public health facilities, pharmacies and *dépositaires* or depots stocked antimalarials, ACTs represent less than 20% all antimalarials sold or distributed free of charge from all sources. Chloroquine was the most frequently sold or distributed antimalarial, representing 57% of all antimalarials. At the Ministry level, there have been a number of delays in approving a government ban on the sale of chloroquine in Madagascar. The regulatory note has only recently been approved in July 2011. The combination of a ban on the sale of chloroquine and the introduction of relatively inexpensive co-formulated AS/AQ in the private sector is expected to improve the uptake of ACTs for the treatment of malaria in all sectors.

Global Fund Round 3 and Round 7 grants provided initial support for home-based management of fever/malaria at the community level. PMI and UNICEF supported the first projects to implement c-IMCI on a large scale. With PMI support, the SanteNet2 project began a scale up of integrated community case management through c-IMCI to reach remote villages (> 5km from the nearest health facility) in 800 communes, roughly half of the communes in the country. CHWs were trained and equipped for case management of malaria, pneumonia and diarrheal diseases, including malaria diagnosis using RDTs. The Global Fund National Strategy Application agreement also includes plans for significant scale up of c-IMCI, including expanding from one to two CHWs per village.

Major challenges for c-IMCI include: 1) ensuring a continuous supply of commodities, including ACTs, RDTs, cotrimoxizol, and oral rehydration salts with zinc (cotrimoxizol and ORS are provided through USAID MCH funds); 2) providing oversight and supervision of CHWs; and 3) establishing reliable and timely information systems to inform managers, manage stock, and provide feedback to CHWs.

Recent preliminary results from the 2011 MIS show that among children under 5 years old who had fever in the 2 weeks preceding the survey, 56% did not seek any treatment and only 1.2% saw a CHW for care. Furthermore, only 6% had a diagnostic test and only 2% of these children were treated with an ACT within 24 hours of fever onset, a slight increase from 0.4% in 2008-2009 (2008/2009 DHS). The contribution of c-IMCI programs towards improving early and correct case management have not yet reached their intended potential. It is possible that both commodity stockouts and inadequate coordination between NGO community program partners and the local primary care health facilities may have led to low recognition and underutilization of CHWs for home-based management of suspect malaria cases. BCC will be emphasized to encourage early care-seeking for ill children, supportive supervision and coordination with the formal health sector in communities will be improved.

Severe malaria: Quinine is the recommended treatment for severe malaria in Madagascar. NMCP policies do not yet include a recommendation for pre-referral treatment. The NMCP is considering implementing pilot projects to implement pre-referral treatment both at primary

health care facilities and at the community level to work out operational considerations prior to adopting it on a larger scale. There have been several discussions at the national level of policy changes to ensure that diagnosis and treatment of severe malaria is free. Implementation will depend on high-level approval from the GoM. Confirmed cases of malaria in pregnant women are treated as severe malaria.

Progress in the past 12 months:

CHW training in RDT diagnosis began in March 2010. More than 4,400 CHWs received c-IMCI training, with PMI support, over the past 12 months for appropriate case management of malaria. Over 3,700 of these received training on the use of RDTs and treatment with ACTs. This integrated training included community case management for pneumonia and diarrhea following the c-IMCI model. Monthly reports from SanteNet2, representing partial data from approximately 37% of CHWs reporting, between April 2010 and March 2011, showed that over 34,100 cases of fever were seen by CHWs, about 12,200 were screened for malaria using RDTs and 10,500 treated with an ACT. Considering that these figures come from only a third of the CHWs whose reports are available at the central level, it is likely the actual number of malaria cases seen and treated was significantly higher. This is supported by the fact that over this same time frame slightly over 200,000 ACTipal and 270,000 RDTs were delivered to community-based outlets used by CHWs to restock and frequent stockouts of both commodities at the community level were reported.

Proposed activities with FY 2012 funding: (\$12,000)

PMI will continue to provide support for expanding and improving malaria case management at community level as a part of integrated community case management and c-IMCI in the areas already included under the SanteNet2 Project. PMI will work closely with the NMCP and Global Fund Principal Recipients to coordinate activities to maximize effective use of funds.

The ACT gap is based on the same principle as the RDT gap, i.e. anticipated number of cases of malaria that will seek treatment at community-level and in a health facility. This was prepared by the NMCP in March 2011, and includes the needs for 2013. The most recent ACT gap analysis, summarized in Table 8 below, shows there is no gap for ACTs through 2012. In early 2012, PMI will support the development of a second Global Fund NSA proposal which will include some malaria program commodities including ACTs for the calendar year 2013. PMI will therefore not procure ACTs with FY 2012 funding. PMI will reassess the commodity needs based on program consumption data. PMI will also stand ready to cover shortfalls if funding through the NSA Second Wave is not in place in time to cover the projected needs in 2013.

Table 8: ACT Gap Analysis

	2011	2012	2013
Total ACT treatment doses needed at public health facilities ¹	290,386	283,591	276,188
Total ACT treatment doses needed for children under 5 at the community level	455,333	444,679	433,070
Total Annual ACT Treatment Need	745,719	728,270	709,258

Total projected procurement for all donors	853,290	800,000	709,258
Annual ACT Treatment Gap	-107,571	-71,730	0
Note: estimates come from a March 2011 projection prepared by the NMCP that are based on projected cases of malaria and consumption based on expected attendance.			

Specific activities to be supported by PMI with FY 2012 funding include:

1. *Implementation and on-going supervision of diagnosis and treatment of malaria at community level:* Provide support for training/refresher training and routine supervision of community health workers in current intervention areas. Support ACT supply chain and reporting of cases from the community level. Includes sub-grants to NGOs/FBOs. (*Costs included in Diagnosis section*)
2. *Provide support for community focused IEC/BCC campaigns:* PMI will support IEC/BCC to promote early treatment-seeking for children with signs of malaria and the need for diagnosis to ensure appropriate treatment for childhood illness. (*Costs covered in the IEC/BCC section*)
3. *TA to support community case management of malaria:* One USAID TDY to provide technical support for community case management of malaria. (No additional cost to program)
4. *TA to support community case management of malaria:* One CDC TDY to provide technical support for community case management of malaria. (*\$12,000*)

I. EPIDEMIC PREPAREDNESS AND RESPONSE

Background:

The Central Highlands, the transition zones between the highlands and the coast and the sub-desert South, are the areas of unstable transmission where epidemics can occur as a result of meteorological factors favoring transmission. With Global Fund Round 7 support, the national guidelines on epidemic preparedness and response were updated in 2010. The National Strategic Plan epidemic detection and response goals include detecting, investigating and controlling at least 80% of epidemics within 15 days of the initial alert. Primary response activities include: investigation, early diagnosis and treatment of malaria cases (including active case detection), and raising awareness with IEC. Secondary response activities include: IRS if appropriate (at the beginning of the transmission season), distribution of LLINs, and inter-sectoral collaboration. In preparation for epidemics, ACTs, insecticides, RDTs, and variably, LLINs, are pre-positioned at the regional level for deployment. The decision to respond with targeted IRS is based on several factors including the malaria transmission season, recent spray history, surveillance information, altitude and monitoring of key entomological, environmental, and demographic variables. The response also uses mass treatment with AS/AQ distributed by CHWs in targeted areas. To illustrate the epidemic response in the Central Highlands, an 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 AS/AQ treatments had been distributed over a 17-20 day period to all children under five in the affected communities and to all household members with fever. Indoor

residual spraying was not conducted during this outbreak, because the community had already been sprayed in early December.

The current epidemic surveillance monitoring system (*Postes Sentinelles de Surveillance* or PSS) was established in 1997 with eight original districts and later expanded to cover 36 districts at risk for epidemics in the Central Highlands and South by 2005. This system was established with support from Global Fund Round 3 and supported 12 dedicated staff working at the district level to report suspected and confirmed malaria cases weekly. District-level and central-level data bases are established and functional, reporting both suspected and confirmed malaria cases. Although data reporting is of variable quality from individual reporting health facilities, it is much better than data from districts outside of the 36 epidemic risk districts which rely on the general HMIS reporting system. The Global Fund Round 3 grant ended in late 2008 and the 12 dedicated staff were not paid and did not work for a period of approximately one year due to the delayed original signing of the Global Fund Round 7 grant. Coverage of these posts resumed in late 2009 as planned during Year 2, Phase I of Global Fund Round 7.

As the data from the PSS districts are substantially better than from districts without the dedicated staff and a dedicated malaria reporting system, the national strategy was revised to expand PSS coverage and staffing prioritizing districts that were at risk of becoming epidemic prone as a result of large scale prevention efforts (universal coverage with LLINs and generalized IRS). The NMCP strategy calls for a total of 69 PSS staff covering 102 districts to be functional by the end of 2012, prioritizing the IRS districts. With Global Fund Round 7 funds, an additional 16 staff members were recruited to work in 16 new districts increasing the number of districts reporting and analyzing malaria data weekly, to 52 (previous 36 districts plus 16 additional new districts). As part of the MOP FY 2008, PMI was planning to support the expansion by also adding 16 PSS staff covering 16 additional districts in 2009 and 2010 (bringing the total number of districts covered to 68). But no additional support could be planned because of the USG suspension of technical assistance to the government.

The national strategic plan aims to expand the number of districts and improve both epidemic detection and timely response, as well as data reporting on the number of confirmed malaria cases. Districts in areas of the expanded generalized IRS (West and South) will be prioritized, as transmission is likely to decrease substantially making these areas more epidemic-prone in the coming years. The Global Fund NSA grant recently supported the recruitment and training of additional staff. By the end of 2010 there were 25 PSS staff working in 52 districts. By the end of 2011, an additional 38 staff will be recruited and trained in order to expand the network. In general, the system works well but suffers from staff attrition. In 2010, 15 alerts were reported, of these 15 (100%) were verified within 15 days and three were confirmed as epidemics. Among the three epidemics, two were brought under control within 15 days of the alert.

In addition to the above surveillance system, the NMCP has adopted the Malaria Early Warning System (MEWS) framework, which is functional and includes analysis of climate data for predicting epidemics.

Proposed FY 2012 activities: *(No cost to PMI)*

There are currently no PMI-specific epidemic preparedness and response activities planned for FY 2012. In the event of an organized response to an epidemic, PMI is prepared to support distribution of LLINs, targeted IRS as appropriate, prompt case management, and IEC 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 as appropriate.

Specific activities to be funded by PMI in FY12 include:

1. *PMI is prepared to support targeted IRS and distribution of LLINs in response to an outbreak:* Following the NMCP protocol, PMI will assist with a rapid IRS response and/or LLIN distribution if appropriate, complimenting the response by the malaria program with diagnosis and treatment using ACTs. *(Equipment and insecticide costs are covered in the IRS section as part of the annual spray campaigns, LLIN costs are covered in the LLIN section)*

I. INTEGRATION WITH OTHER GLOBAL HEALTH INITIATIVE PROGRAMS

Since its launch in 2008, PMI/Madagascar has actively sought opportunities to collaborate with complementary USG health investments so as to ensure maximum impact for every health dollar the USG invests. PMI is collaborating with the following programs:

Maternal and Child Health Services and Malaria: Under PMI, malaria prevention and control activities have been implemented as part of integrated maternal and child health services, and make a significant contribution to strengthening capacity to deliver these services. PMI/Madagascar supports the integrated management of childhood illness programs, including the implementation of community-based diagnosis and treatment of fever as part of c-IMCI, in which childhood malaria, pneumonia, and diarrhea are diagnosed and treated by trained CHWs. PMI will continue to support the strengthening of supply chains for malaria commodities, namely RDTs and ACTs, and training for CHWs on RDTs and ACTs. In addition, PMI will work with other USG-funded programs and other partners to carry out malaria-related activities, such as a country-wide assessment of CHWs.

HIV/AIDS and Malaria: The seroprevalence of HIV infections is low at an estimated 0.2% among individuals aged 15 to 49 years old in Madagascar (UNAIDS, 2009) and is a focalized epidemic affecting high-risk groups such as commercial sex workers, men who have sex with men, and marginalized youth. Areas where integration has been pursued between the HIV/AIDS and NMCP include promoting adherence to universal precautions when taking blood samples, integrating pharmacovigilance activities, providing LLINs to people living with HIV/AIDS, and ensuring appropriate malaria prevention services at Prevention of Mother-to-Child Transmission clinics. As in previous years, PMI will continue to coordinate with the NMCP and other partners to maximize any potential areas for synergy between the two programs, such as supply chain management and laboratory programs.

Neglected Tropical Diseases and Malaria: Madagascar is endemic for six of the seven diseases targeted for mass drug administration under the Neglected Tropical Disease (NTD) Program and five of these are widely prevalent in the country: lymphatic filariasis, schistosomiasis, and soil transmitted helminths (*Ascaris*, *Trichuris*, and hook worms). Trachoma is present but rare in Madagascar. Currently there is no USG NTD program in Madagascar; however, other partners have implemented large-scale campaigns to treat filariasis and schistosomiasis. The *Anopheles* mosquito is an important vector in the transmission of lymphatic filariasis in Madagascar. It is possible that malarious areas where lymphatic filariasis is endemic will benefit from malaria vector control interventions such as LLINs. PMI will continue to coordinate with the MoH to identify how best to integrate future NTD and PMI activities. PMI will also encourage its NGO partner organizations and others to apply for future funding from the USG NTD program.

J. CAPACITY BUILDING AND HEALTH SYSTEM STRENGTHENING

Background:

Although Madagascar has made many improvements in child health indicators, it still faces major health challenges which threaten social and economic development. Health service quality is substantially below standard for basic medical services and commodities are often 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. Much remains to be done at central and regional levels to ensure sustainable health financing.

The National Malaria Strategic Plan identifies the ineffective implementation of the “Three Ones” principle (one national strategy, one coordinating body and one M&E plan), as a major weakness of the NMCP in Madagascar. The plan recognizes that reaching the goal of elimination of malaria will require strengthening the NMCP, both in quantity and quality of human resources, at all levels of the health system. The plan further states that, as the coordinating body for malaria control interventions, the NMCP needs to “increase its capacity to plan, coordinate and monitor implementation of malaria control activities.” Furthermore, as malaria interventions are scaled up and malaria incidence decreases, epidemic surveillance and response will become increasingly important.

Madagascar will begin a field epidemiology and laboratory training program (FELTP) in 2011 with support from the Indian Ocean Commission Epidemic Surveillance Network (SEGA, *Surveillance des Epidémies et Gestion des Alertes*) led by the regional Health Watch Unit (*l'Unité de Veille Sanitaire*). Public health staff will be recruited to participate in a two-year applied epidemiology training program which will include conducting epidemiologic investigations and field surveys, evaluating surveillance systems, performing disease control and prevention measures, reporting findings to decision and policy-makers and training other health workers. The objective of the program is to strengthen the public health system and infrastructure in Madagascar and the region. FELTP trainees will be based in the Ministry of Public Health's Health Watch and Epidemiologic Surveillance Department (*DVSSE, Direction de la Veille Sanitaire et de la Surveillance Epidémiologique*).

Progress during last 12 months:

Again in Year 4, direct activities to strengthen MOH capacity remained suspended. In spite of this, the PMI team was able to strengthen the capacity of the overall malaria program through collaboration and coordination with the RBM partnership and sub-committees, especially related to planning of the IRS and LLIN distribution campaigns, and monitoring and evaluation.

Proposed activities with FY 2012 funding: *(No additional cost to PMI)*

The National Malaria Strategic Plan recognizes 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. PMI and its partners will continue to help develop and strengthen capacity of the overall RBM partnership through the activities described above for prevention, case management, epidemic surveillance, monitoring and evaluation. As part of the community-level activities described above, PMI will focus on improving the private sector supply chain of products from the central level to the CHWs. This activity will be co-funded with other Global Health accounts.

K. COMMUNICATION/COORDINATION WITH OTHER PARTNERS

Background:

Commitment to malaria elimination is evident at the highest levels of the GoM. In 2010, the NMCP was elevated to the status of a Directorate reporting directly to the Director General of Health (*Directeur Général de la Santé*). The Health Donors Group, which includes USAID, meets on a monthly basis to discuss issues of mutual interest. The Global Fund Country Coordinating Mechanism also meets monthly (or more often if necessary). Before the USG sanctions, USAID played an active role in this group. In spite of the on-going crisis, USAID is exploring possibilities with the State Department to rejoin the Country Coordinating Mechanism. The RBM Partnership continues to be strong. Good examples of this effective partnership include both the 2010-2011 IRS campaign and the 2009-2010 LLIN mass distribution campaign. These campaigns were supported by PMI and other partners in a harmonious manner and with good results.

Progress during last 12 months:

PMI staff remains closely engaged with partners on key activities, such as the IRS campaign and the LLIN mass distribution campaign, the coordination of community-based activities, and monitoring and evaluation activities, including the Malaria Indicator Survey (MIS) and the Malaria Program Review (MPR). In addition, PMI staff provides leadership and technical assistance in other coordinating bodies such as the local RBM partnership, the fever sentinel surveillance steering committee, and the c-IMCI steering committee.

At the planning and implementation levels, PMI and other partners continued working together to effectively fill commodity and human resource gaps. This coordination was extremely important for the large number of integrated activities implemented by the two USAID-funded bilateral projects: SanteNet2 and Social Marketing of Health Products. The PMI FSN Program Assistant acts as the Agreement Officer's Technical Representative of the Social Marketing of Health Products cooperative agreement.

Proposed activities with FY 2012 funding: *(No additional costs to PMI)*

PMI, led by the PMI in-country team, will work closely with the three USAID bilateral projects, RBM partners, Global Fund-funded and other health-related programs in Madagascar to provide integrated services at the facility and community level. The focus will be malaria and childhood illnesses, but also include integration with maternal, newborn and child survival programs, family planning, HIV/AIDS activities and others.

The PMI in-country team will continue to coordinate closely with the NMCP and partners. In addition to the on-going campaign and community-based activities, the major activities will include the finalization and dissemination of the MIS and Malaria Program Review results, contribution to the RBM Impact Series document on Madagascar, and participation in the development of the new National Strategic Plan for Malaria Control 2013-2018 and the new Global Fund National Strategy Application. The team will also continue to participate in coordination bodies and meetings. The PMI advisors will spend a significant portion of their time working closely with RBM partners and the NMCP staff on program implementation, monitoring and evaluation.

L. PRIVATE SECTOR PARTNERSHIPS

Background:

Opportunities to collaborate in malaria control with private national or international industries have been complicated by the civil and political unrest beginning in early 2009. Two potential public-private partnerships are with 1) QIT Minerals Madagascar, QMM, a subsidiary of Rio Tinto, that has a ilmenite mine in the south east district of Toalagnaro and 2) Ambatovy, a large nickel and cobalt mining partnership run by four companies. QMM has a trained entomologist at their site who is a local resource for entomologic monitoring. Ambatovy is a partnership of four companies, Sherrit, Sumitomo Corporation, Kores Resource Corporation and SNC Lavalin, Inc. The Ambatovy operation works primarily in two districts: the mine in Moramanga (Fringe district) and the processing site in Toamasina II (east coast district). The NMCP provides technical assistance as needed to Ambatovy health staff and contractors and recently assisted in response to a malaria alert among contractor staff at the Toamasina site. PSI and SanteNet2 have independently contracted Sherrit in regards to community-based health activities and preventing sexually transmitted infections and HIV/AIDS, and have pointed out that efforts by private companies to improve the health of their workers and their families have repeatedly been shown to be economically sound investments.

In view of the USG suspension on direct assistance to the GoM, private sector implementing partners and international and local NGOs and FBOs will take on a greater importance for PMI during much of 2011 and 2012. Distribution of ITNs and ACTs and the 2010 IRS campaign are major areas for public-private partnerships in Madagascar. PMI will work with international and local companies in Madagascar to identify opportunities to provide cost-effective malaria interventions.

M. BEHAVIOR CHANGE COMMUNICATION

Background:

Mobilizing traditional and religious community leaders and civic organizations to support and promote malaria prevention and control is critical for achievement of the national malaria strategy and PMI objectives. These include activities that promote the use of LLINs by pregnant women and children under five, community acceptance of indoor residual spraying, early and regular antenatal clinic attendance to ensure uptake of IPTp and correct prompt diagnosis and treatment of malaria.

In 2009, the MoH adopted the new National Community Health Policy (*Politique Nationale de Santé Communautaire*) which provides a framework for working in community health. This document also promotes the use of the *Champion Commune* approach for working with communities. Through the *Champion Commune* program, the MoH, with NGOs and RBM partners have established an innovative and effective community empowerment and mobilization program. This approach empowers the community to make positive changes that improve the overall health and well-being of the population.

The *Champion Commune* approach is reinforced by a comprehensive behavior and community norm change strategy that makes full use of a variety of IEC channels. 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 these mass media efforts, interpersonal communication and community-based behavior change interventions are implemented through NGOs and CHWs. The CHWs work with local civic groups to implement malaria awareness raising and education through: participatory radio listening groups, skits and local drama, small group education sessions, and puppets, which are popular in Madagascar. Community health workers can also be instrumental in encouraging pregnant women and women with children needing immunizations to visit ANC and EPI clinics and request a free ITN, if available.

As described in more detail in the earlier sections of this operational plan, community health workers and NGOs help support the nationwide, biannual mother and child health weeks, which provide catch-up immunizations, vitamin A supplements, deworming medicine and, at times, free ITNs for children under five years of age. The CHWs who distribute socially-marketed products are also responsible for educating local residents on proper care and use of ITNs, on the necessity of prompt diagnosis and correct treatment with ACT if appropriate, for children under

five at the household level. CHWs also educate community members in recognizing clinical danger signs of severe malaria that require immediate attention.

The *Plan Stratégique National* for malaria cites the adoption of the *Politique Nationale de Santé Communautaire* as a key element in mobilizing communities but decries the lack of any mention of a sustainable motivational strategy to encourage retention of community health workers (community health workers are not paid).

Progress in IEC/BCC activities will be monitored through partner reports and large household surveys, including the MIS in 2013 and the DHS in 2014.

Progress during the last 12 months:

PMI's support for community based interventions was intensified in the aftermath of the March 2009 USG suspension of non-lifesaving assistance and support to the GoM. Consequently, SanteNet2 continued its expansion of the *Champion Commune* approach. As part of the *Champion Commune* approach, SantéNet 2 and its partners are implementing a new monitoring and supervision system for CHWs that will utilize local-level *Comités de Développement Social*, whose objectives are to identify communities' health services needs and to monitor and supervise CHWs work. The SanteNet2 project, which covers 72 of the 111 total health districts in Madagascar, reaching 800 communes and approximately 5,758 rural fokontanys, continues to train CHWs to provide and promote malaria prevention and treatment services in priority communities including c-IMCI, malaria case management and the use of RDTs for malaria diagnosis.

Between October 2010 and March 2011, PSI aired malaria radio spots over 1,849 times and presented 335 mobile video unit shows. Radio spots and mobile video unit shows were designed to promote knowledge about malaria, malaria prevention including ITN use, to seek prompt and effective care for fever and that availability of ACTs for treatment. In addition, interpersonal communication by trained community volunteers regarding the LLIN campaign comprised of door-to-door visits benefited approximately 6.9 million households. IEC posters were developed and displayed in CSBs, at the house of community-based health agents and in villages for various aspects of the malaria program activities. PMI, through partners, also developed an ACTour to encourage the population to seek prompt and effective care for fever. During the ACTour, 33 Cinemobile entertainment shows were held, reaching 167,800 people. In addition, mobile video unit shows reached approximately 37,000 people during the ACTour.

SanteNet2 established collaborations with local radio stations in over 700 communes to air spots on malaria and diarrhea prevention in local communities. In preparation for the 2010 IRS campaign, PMI supported community sensitization campaigns to educate the community and promote acceptance of IRS. Community volunteers were recruited to visit houses door-to-door and share information about the campaign. In addition, mass media messaging was developed and disseminated reaching approximately 2.3 million people.

Proposed activities with FY 2012 funding: (\$615,000)

PMI support of behavior change communication activities will continue and expand to cover more of the country. Malaria messaging will focus on rural areas and will include community-based interpersonal communication, mobile video unit shows, and radio spots. Preliminary 2011 MIS results show IRS coverage of 79% in targeted districts – the coverage is lower than expected and attributed to households refusing IRS – especially in extension districts and the south. IEC/BCC will focus on community sensitization for these zones in particular. IEC/BCC messages for LLINs will promote correct use, discourage unsafe and inappropriate use, encourage correct LLIN care (washing, storage) to help promote LLIN maintenance over time, and encourage people to use their new nets and replace old nets that are past their effective life span. Local mass media will be used to inform people of campaign dates and activities and encourage full participation and on-going care and use of LLINs. PMI supported IEC/BCC activities will promote increasing knowledge and enabling behaviors related to malaria prevention and treatment. PMI will continue support for the National Strategic Plan goal to implement community case management of malaria, pneumonia and diarrheal diseases in all districts.

Specific activities to be funded by PMI in FY12 include:

1. *Implementation of national and targeted mass media and community focused IEC/BCC campaigns:* These will include television and radio spots, billboards, malaria commodity point of sale educational materials. Materials will be designed for community level use. These campaigns will follow national IEC/BCC norms and be approved by the NMCP prior to dissemination. Pre-tested IEC/BCC materials promoting LLIN ownership use and care, IRS acceptance, uptake of IPTp among pregnant women and correct case management will be developed for use at the community level. (\$400,000)
2. *Support implementation of community-based malaria activities through integrated CCM interventions with existing NGOs/FBOs:* Continued support for NGO/FBO grants to expand the implementation of community-based IEC/BCC interventions through CHWs. (\$75,000)
3. *Support expansion of implementation of community-based malaria activities to the West and North of the country through integrated CCM interventions with NGOs/FBOs:* Support for NGO/FBO grants to expand the implementation of community-based IEC/BCC interventions. (\$100,000)
4. *Support to Peace Corps Volunteers:* Provide support for four malaria volunteers to promote malaria prevention and treatment-seeking behaviors in their communities. The support for PCV activities is coordinated through a malaria volunteer based in Antananarivo. The malaria volunteer is a second- or third-year health volunteer who has the capacity to organize volunteers' activities so they contribute to PMI Madagascar's objectives. Indicators developed by Peace Corps to monitor volunteers' activities include: 1) Number of people trained with USG funds in malaria treatment or prevention

(male/female) and 2) Number of people reached with IEC/BCC message on malaria treatment or prevention (male/female). (\$40,000)

N. MONITORING AND EVALUATION

Background:

The M&E strategy for malaria has been developed to facilitate the collection, analysis, and quality assurance of data from health centers, partners, communities, sentinel sites, and household surveys. A comprehensive National Monitoring and Evaluation Plan, 2008-2012, was revised in August 2009. The current M&E system for malaria is comprised of: 1) the national Health Management Information System (HMIS) which reports malaria cases and deaths monthly; 2) a malaria specific district-level surveillance system for epidemic-prone districts reporting and monitoring weekly confirmed malaria cases and deaths (described above); 3) an integrated fever sentinel surveillance system which provides highly accurate and rapid reporting of data from individual sentinel health facilities; and 4) population-based surveys. These data can be triangulated to assess progress in malaria prevention and case management. Additional data are available, including insecticide resistance monitoring; antimalarial drug resistance testing conducted approximately every two years (the next round of *in vivo* studies are planned in 2010-11 at eight sentinel sites); and pharmacovigilance monitoring.

As a key component of the M&E strategy, the NMCP is expanding district-level epidemic surveillance known as the *Postes Sentinelles de Surveillance (PSS)*, that cover 36 high risk districts from the Central Highlands and the semi-arid southern region, to the margins of the plateau and the West Coast, and then throughout the remainder of the country.¹⁰ PMI is not able to contribute to the expansion or the quality of these data because of the current restrictions in working with the government.

A complementary fever surveillance system developed by the *Direction des Urgences et de la Lutte contre les Maladies Négligées*, the NMCP, and IPM is actively collecting data on fever cases from 26 sentinel CSB sites. These sites use syndromic surveillance coupled with biologic confirmation to systematically classify all fever cases as a laboratory-confirmed malaria case, a suspected case of an outbreak-prone disease (i.e., arbovirus, influenza), or other fever. In 2007, thirteen sites were established in CSB's across four malaria epidemiological zones with support from World Bank. PMI began supporting these sites in Year 1 (FY08) and increased the number of sites to fifteen in April 2010. Aggregate data on the number of fever cases is transmitted daily to the central level from each site using short message service phone technology, including demographic information, clinical symptoms, RDT or thick blood smear results, and history of antimalarial treatment before clinical consultation. Weekly feedback on reported data is provided by IPM to the sentinel sites, and a monthly newsletter summarizing the reported cases and trends is distributed to the MoH and partners. Promptness of reporting and quality of data is very good, and the aggregate reports are received daily >95% of the time.

A twice-yearly RDT quality control system has been established to monitor RDT quality, storage and use. During joint supervision visits, RDT storage areas are visited and the storage area

¹⁰ For a full description of the PSS program, see page X.

temperature taken, health staff are observed performing RDTs over two days and a second RDT, microscopy slide and dried blood spot are collected for each patient seen with a fever. Feedback is given on RDT use and their RDT readings are compared to the control RDT and microscopy. In 2010, QC monitoring evaluated health workers conducting RDTs and collected samples from 234 patient. Results showed 100% concordance between results of RDTs read by health staff and RDTs conducted and results read by expert observers. When compared with gold standard microscopy readings, the performance of health care staff read RDTs under routine program conditions was good: 86.9% sensitivity, 97.1% specificity, Positive Predictive Value of 76.9% and Negative Predictive Value of 98.5%.

Several of the fever surveillance sites are also part of the network of IPM sites used in monitoring antimalarial resistance. First-line antimalarial drug (AS/AQ) efficacy monitoring is done every two years by IPM with funding provided by the Global Fund. A 2009 study conducted in Maevatanana showed 100% efficacy of AS/AQ with antimalarial drug efficacy monitoring continuing at two additional sites in 2010.

Coverage data for malaria interventions and program indicators are reported from several sources. Compilation of malaria data reported through the routine national health information system is completed with the assistance of a data manager financed by Global Fund Round 7. Starting in 2008, all reports have been entered into the central database. The NMCP has developed a format for a periodic reporting of key indicators and has begun publishing regular periodic bulletins to share information. The creation of a central M&E unit in the NMCP, consisting of an epidemiologist, a computer expert and an assistant will be supported by the Global Fund Round 7 grant. The staff of the central M&E unit train regional staff and have created a network of 22 regional malaria program specific staff that assist in monitoring and supervision, data collection and analysis. Sites are equipped with computer and office equipment.

As a result of recommendations from a Global Fund Data Quality Assurance evaluation conducted in 2010 by the Global Fund in 2011, the NMCP began conducting routine data quality assessments every six months with the goal of identifying problems and monitoring and improving data quality. Findings are discussed and reviewed with RBM partners regularly.

The baseline standard national household survey for PMI is the DHS 2008-9. Follow-up national surveys include the MIS 2011 (analysis of results underway) and another large household survey, either an MIS in 2013 with a full birth history or a DHS in 2014/2015. The choice between the MIS and the DHS will be discussed and coordinated with key partners both in-country and at the global level to ideally support and conduct one national survey. The next large household survey will be a key survey to show program results after implementation of the first phase (2 years) of the 3-year Global Fund National Strategic Application grant.

Progress in the past 12 months:

As a result of suspension of activities with the GoM, most activities directly supporting M&E were reprogrammed to support other areas for FY 2010 and FY 2011. In spite of this, PMI continues to coordinate with the GoM to streamline investments in priority surveillance systems.

PMI continues to support the fever surveillance sites. In Year 1, PMI supported 13 fever sentinel sites and added two more sites in 2010 (using FY09 funds). These sites are managed by IPM. IPM has funding from other donors and will expand their total number of functional sites to 33 by the end of 2012. Because of the on-going political crisis limiting data access, the fever sentinel sites system is currently the only readily available source of timely malaria morbidity trend data available to PMI and USG.

An MIS was conducted during the high malaria transmission season from April-May 2011. The 2011 MIS was co-funded by PMI and the Global Fund RCC4 grant. With RBM partners, PMI co-lead the in-country steering committee, organized planning meetings, contributed to survey design and the analysis plan. Biomarkers from children under 5 years of age were collected and will provide the first nationwide sample of parasitemia in Madagascar. Preliminary results are expected in August 2011. Over 6,800 blood samples from children under 5 years old were collected, approximately 50% more than originally estimated, increasing the time needed for microscopy reading. MACRO predicts the final report will be delayed from October 2011 until January 2012.

In 2010, the NMCP with WHO/AFRO and PMI in-country staff led an evaluation of the national Global Malaria Database. Findings and recommendations from this evaluation were used in conjunction with results of a Global Fund-led Data Quality Assurance evaluation to develop a national Plan to Reinforce Malaria Program Monitoring and Evaluation (*Plan de Renforcement du Système de Suivi et Evaluation du Programme National de lutte contre le Paludisme à Madagascar*) in early 2011. Funding to support recommendations was identified and an action plan developed. Activities include on-going supervision and a data quality assessment every 6 months.

PMI collaborated with WHO and other RBM partners to conduct a Malaria Program Review, including thematic desk reviews of each aspect of the program (Phase II) and a joint internal-external team review from June 27 – July 8, 2011 (Phase III). This timely review provides an evaluation of malaria program activities at a mid-point in the implementation of the 2008-2012 National Strategic Plan, after significant scale up of activities supported by GFATM, WHO, UNICEF, PMI and other partners. Recommendations from the 2011 MPR and results from the 2011 MIS will provide a basis for developing an evidence-informed 2013-2018 National Strategic Plan.

PMI has built upon the experiences of IPM in Madagascar and those from other countries to introduce the use of RDTs at the community level and has developed a simplified M&E system of reporting confirmed malaria cases. To date, reports are incomplete – however, as the system matures, this information will be available in a timely manner and used for forecasting both ACT and RDT needs at the community level.

Proposed activities with FY 2012 funding: (\$1,212,000)

In Year 5, PMI will continue to support IPM fever sentinel site surveillance with a reduced level of funding. PMI will also support RBM/PMI evaluation methodology development and analysis. This will include an analysis of child mortality trends, an inventory of major child health

program interventions and their results over the last decade, secondary analysis and results from large standard survey data (DHS, MIS, MICS) to inform the development of a plausibility model to estimate the contribution of malaria interventions to the decreasing trend in under 5 child mortality. One large household survey will be co-funded by PMI to monitor malaria program progress either through the MIS in 2013 or DHS in 2014.

Specific M&E activities to be funded by PMI in FY12 include:

1. *Continued support for 15 fever sentinel sites managed by IPM* to monitor impact of program interventions on malaria within the same catchment areas. (\$300,000)
2. *Support the RBM/PMI evaluation* including identifying key data sources, data collection and data analysis. (\$100,000)
3. *Support the next large national household survey (MIs or DHS) planned in 2013 or 2014:* PMI will provide support to complement the funding provided by other donors, dependent upon the status of current restrictions for working with the GoM. The total estimated cost is \$1.2 million for an MIS and \$2.5 million for a DHS. (\$800,000)
4. *Technical assistance* to support strengthening NMCP M&E capacity. One CDC TDY will support the implementation of the next large national household survey (MIs or DHS) and sentinel site surveillance. (\$12,000)

O. STAFFING AND ADMINISTRATION

The PMI in-country team consists of the CDC and USAID PMI Resident Advisors and two Malagasy staff, a Senior Public Malaria Manager/Epidemiologist and a Program Management Assistant. All PMI staff members are part of a single inter-agency team led by the USAID HPN Officer who has been delegated that authority by the USAID Mission Director. The PMI team shares 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. The two PMI Advisors work together and oversee all technical and administrative aspects of PMI in Madagascar, including finalizing details of project design, implementing malaria prevention and case management activities, monitoring and evaluation of input, process, output, outcomes and impact indicators, and reporting of results. Both advisors report to the USAID HPN Officer. The CDC advisor is supervised by CDC, both technically and administratively. All technical activities are undertaken in close coordination with the MoH/NMCP and other national and international partners, including the WHO, UNICEF, the Global Fund, World Bank and the private sector including NGOs and FBOs.

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

Proposed USG Component: (\$1,044,776)

1. In country PMI staff salaries, benefits, travel and other PMI administrative costs: Continued support for two PMI (CDC and USAID) Resident Advisors and FSN staff members to oversee activities supported by PMI in Madagascar. Additionally, these funds will support pooled USAID Madagascar Mission staff and mission-wide assistance from which PMI benefits. (*\$1,044,776*)

Table 1: FY 2012 Planned Obligations Madagascar

Proposed Activity	Mechanism	Total Budget	Commodities	Geographic Area	Description of Activity
ITNs					
Procure LLINs for the rolling campaign to reach the national goal of 2 LLINs per household	DELIVER	\$15,520,224	\$15,520,224	72 districts	To purchase nets for 2013 mass distribution campaign covering 72 districts (replacing nets which were distributed in 2010). Approximately 2.5 million nets at \$6 per net.
Campaign logistics -- distribution activities for the 2012 campaign	Social marketing follow on	\$1,800,000	\$0	19 districts	Logistics, distribution, social mobilization, IEC/BCC and active hang-up activity support associated with the 2012 mass distribution campaign. \$1.50 per net total. \$.50 was programmed in FY11 MOP; remaining balance of \$1/net in this budget.
Campaign pre-logistics for the 2013 campaign	Social marketing follow on	\$2,500,000	\$0	72 districts	Logistics, distribution, social mobilization, IEC/BCC and active hang-up activity support associated with the 2013 mass distribution campaign. \$1.50 per net total. \$1 programmed in FY12 MOP; remaining balance will be budgeted for in FY13 MOP.
Technical assistance to PMI LLIN activities	USAID	\$0	\$0	Nationwide	Technical assistance for the 2010 rolling campaign (costs covered in core budget).
Technical assistance to PMI LLIN activities	CDC IAA	\$12,000	\$0	Nationwide	Technical assistance for supervision and monitoring of the LLIN campaign and build local capacity.
Subtotal: ITNs		\$19,832,224	\$15,520,224		
IRS					

IRS in 13 health districts as part of the National IRS campaign and strategy towards elimination	IRS IQC 2 Task Order 4	\$920,000	\$0	13 districts	Conduct IRS in 13 districts: 7 in the south (universal spraying) and 6 in the CHL/fringe districts (targeted spraying). This includes procurement of insecticides, spray pumps and other logistics required for spray operation, necessary environmental assessments, monitoring, and IEC/BCC activities. GF will support IRS in the remaining targeted districts. Total budget is approximately \$7.3 million. Majority of this budget is covered in pipeline.
Entomological surveillance and monitoring	IRS IQC 2 Task Order 4	\$0	\$0	8 sites	Conduct comprehensive IRS-related vector surveillance, assess resistance and other indicators of IRS impact: vector taxonomy and density, and insecticide decay rates. Cost: \$250,000 (To be managed out of pipeline)
Entomological inoculation rate and vector survival rate indicators	CDC IAA with a sub-grant to IPM	\$80,000	\$0	8 sites	Additional entomological monitoring in 8 sites including sporozoite rates, vector survival assessments in selected sites to identify a change in vector behavior following exposure to IRS and LLINs.
School-based parasitemia survey to prioritize districts for targeted IRS.	CDC IAA with a sub-grant to IPM	\$80,000		6 districts	School-based survey to identify priority communes for targeted IRS among the highland and fringe districts. Parasitemia prevalence information will be used in conjunction with facility-based data to guide the choice of communes and to be sprayed in 6 out of 32 districts with targeted spraying.
Technical assistance to PMI IRS activities	CDC IAA	\$12,000	\$0	53 IRS Target Districts	One CDC TDY to provide support for IRS entomological monitoring.
Technical assistance to PMI IRS activities	USAID	\$0	\$0	53 IRS Target Districts	One USAID TDY to provide support for IRS (costs covered in core budget).
Subtotal: IRS		\$1,092,000	\$0		
IPTp					

Community based promotion of MIP uptake	SanteNet2	\$50,000	\$0	SanteNet2 Districts	Support Community-based IEC/BCC promotion for uptake of MIP services (ITNs and IPTp) at ANCs. This activity will be linked into the integrated services and promotion of ANC attendance provided to remote communities through SanteNet2-sponsored community health workers.
	New RFA	\$250,000	\$0	SanteNet2 Districts	
Subtotal: IPTp		\$300,000	\$0		
Case Management					
Diagnostics					
Procure RDTs for malaria case management for community level and for private sector/NGOs/FBOs	DELIVER	\$1,000,000	\$1,000,000	Nationwide	Procure an estimated 700,000 RDTs for community based case management, and 300,000 RDTs for use in the private sector with NGOs/FBOs. Note that NMCP will train private sector providers in the use of RDTs according to national policy. Includes gloves and sharps boxes.
Implementation and on-going supervision of community case management of malaria with ACTs, including supervision for appropriate use of RDTs	SanteNet2 (sub-grants to NGOs/FBOs)	\$500,000	\$0	Within the 800 communes covered by SN2	Provide support for training/refresher training and routine supervision of community health workers for appropriate use of RDTs and treatment with ACTs. Support ACT supply chain and reporting of cases from the community level. Includes sub-grants to NGOs/FBOs.
TA to support diagnostic activities	CDC/IAA	\$12,000	\$0	Nationwide	One TDY for CDC to provide technical support for diagnostics (RDTs) at the community level.
<i>Subtotal</i>		<i>\$1,512,000</i>	<i>\$1,000,000</i>		
Pharmaceutical and Commodity Management					
Strengthen supply chain for products for delivery at community level through CHWs.	Social marketing follow on	\$300,000	\$0	Nationwide	Ensure the continuous supply of products to the communities through CHWs. To be co-funded with other USAID funding streams.
<i>Subtotal</i>		<i>\$300,000</i>	<i>\$0</i>		

Treatment					
TA to support community case management of malaria	USAID	\$0	\$0	Nationwide	One USAID TDY to provide technical support for community case management of malaria.
TA to support community case management of malaria	CDC IAA	\$12,000	\$0	Nationwide	One CDC TDY to provide technical support for community case management of malaria.
<i>Subtotal</i>		\$12,000	\$0		
Subtotal: Case Management		\$1,824,000	\$1,000,000		
IEC/BCC					
Implementation of national and targeted mass media and community focused IEC/BCC campaigns	Social marketing follow on	\$400,000	\$0	Nationwide	Production and placement of IEC/BCC materials for national mass media campaigns and distribution of materials for use at the community level. Based on the national strategy and complementary to campaigns run by the government; target community case management as well as specific malaria activities including promotion of ownership and use of LLINs, uptake of IPTp, case management with RDTs and ACTs, and promotion of IRS.
Implementation of community-based malaria activities through integrated CCM interventions through NGOs/FBOs	SanteNet2 (sub-grants to NGOs/FBOs)	\$75,000	\$0	Within the 800 communes covered by SN2	Support for NGO/FBO grants to expand the implementation of community-based IEC/BCC interventions.
Expansion of implementation of community-based malaria activities to the West and North of the country	New RFA (sub-grants to NGOs/FBOs)	\$100,000	\$0	In approx. 200 hard-to-reach communes in the west and north of Madagascar	Support expansion of community-based malaria activities implementation, through integrated CCM interventions with NGOs/FBOs. These activities will target the north and west of Madagascar, and will build upon CHW's IEC/BCC activities.

Support to malaria Peace Corps Volunteers (housing/equipment)	Peace Corps (SPA)	\$40,000	\$0	Nationwide	The Peace Corps/PMI initiative “Stomping Out Malaria” was launched in 2011. With FY 2012 funds, PMI will continue to support recruitment and training of third-year volunteers and response volunteers to promote malaria prevention and case management. Funding will support 4 PCVs to promote malaria prevention and treatment seeking behaviors at the community level, and will include housing, transport and equipment.
Subtotal: IEC/BCC		\$615,000	\$0		
Capacity Building					
Subtotal: Capacity Building		\$0	\$0		
Epidemic Preparedness and Response					
<i>Subtotal</i>		<i>\$0</i>	<i>\$0</i>		
M&E					
Continue support for 15 fever sentinel sites of the fever surveillance system	CDC/IAA (sub-grant to IPM)	\$300,000	\$0	Nationwide	Support 15 fever sites to monitor impact of program interventions on severe malaria. Begin transition to MOH/IPM.
Support for RBM/PMI IMPACT evaluation	MACRO	\$100,000	\$0	Nationwide	Local support to work with MACRO (centrally-funded) on PMI IMPACT evaluation.
Support to large national household survey (either MIS or DHS)	MACRO/ DHS	\$800,000	\$0	Nationwide	For preliminary activities/planning for the next large national household survey, either the 2013 MIS or 2014 DHS. To be funded by USAID health streams and other donors.
TA for M&E strengthening	CDC IAA	\$12,000	\$0	Nationwide	One CDC TDY to provide technical support for the MIS and sentinel sites.

<i>Subtotal</i>		\$1,212,000	\$0		
Subtotal: M&E		\$1,212,000	\$0		
Staffing and Administration					
In country staffing and administration costs	USAID/CDC	\$1,044,776	\$0	Nationwide	Support for USAID and CDC annual staffing and administration costs.
Subtotal: Staffing and Administration		\$1,044,776	\$0		
GRAND TOTAL		\$25,920,000	\$16,520,224		

Table 2: Year 4 (FY2011) Budget Breakdown by Partner

Partner Organization	Geographic Area	Activity	Activity Budget	Total Budget, by Partner
IRS IQC 2 Task Order 4	13 districts	IRS in 13 health districts as part of the National IRS campaign and strategy towards elimination	\$920,000	\$920,000
	8 sites	Entomological surveillance and monitoring	\$0	
DELIVER	72 districts	Procure LLINs for the rolling campaign to reach the national goal of 2 LLINs per household	\$15,520,224	\$16,520,224
	Nationwide	Procure RDTs for malaria case management for community level and for private sector/NGOs/FBOs	\$1,000,000	
Social marketing follow on	19 districts	Campaign logistics -- distribution activities for the 2012 campaign	\$1,800,000	\$5,000,000
	72 districts	Campaign pre-logistics for the 2013 campaign	\$2,500,000	
	Nationwide	Strengthen supply chain for products for delivery at community level through CHWs.	\$300,000	
	Nationwide	Implementation of national and targeted mass media and community focused IEC/BCC campaigns	\$400,000	
SanteNet2	SanteNet2 Districts	Community based promotion of MIP uptake	\$50,000	\$50,000
New RFA	SanteNet2 Districts	Community based promotion of MIP uptake	\$250,000	\$250,000
SanteNet2 (sub-grants to NGOs/FBOs)	Within the 800 communes covered by SN2	Implementation and on-going supervision of community case management of malaria with ACTs, including supervision for appropriate use of RDTs	\$500,000	\$575,000
	Within the 800 communes covered by SN2	Implementation of community-based malaria activities through integrated CCM interventions through NGOs/FBOs	\$75,000	
MACRO/ DHS	Nationwide	Support to large national household survey (either MIS or DHS)	\$800,000	\$900,000
MACRO	Nationwide	Support for RBM/PMI IMPACT evaluation	\$100,000	
Peace Corps (SPA)	Nationwide	Support to malaria Peace Corps Volunteers (housing/equipment)	\$40,000	\$40,000
CDC/IAA (sub-grant to IPM)	Nationwide	Continue support for 15 fever sentinel sites of the fever surveillance system	\$300,000	

	6 districts	School-based parasitemia survey to prioritize districts for targeted IRS.	\$80,000	
	8 sties	Entomological inoculation rate and vector survival rate indicators	\$80,000	
CDC IAA	53 IRS Target Districts	Technical assistance to PMI IRS activities	\$12,000	
	Nationwide	Technical assistance to PMI LLIN activities	\$12,000	
	Nationwide	TA to support community case management of malaria	\$12,000	
	Nationwide	TA to support diagnostic activities	\$12,000	
	Nationwide	TA for M&E strengthening	\$12,000	\$520,000
New RFA (sub-grants to NGOs/FBOs)	In approx. 200 hard-to-reach communes in the west and north of Madagascar	Expansion of implementation of community-based malaria activities to the West and North of the country	\$100,000	\$100,000
USAID/CDC	Nationwide	Support for USAID and CDC annual staffing and administration costs.	\$1,044,776	\$1,044,776
TOTAL				\$25,920,000