

This Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. The final funding available to support the plan outlined here is pending final FY 2015 appropriation. If any further changes are made to this plan it will be reflected in a revised posting.



PRESIDENT'S MALARIA INITIATIVE



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Mozambique

Malaria Operational Plan FY 2015

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ABBREVIATIONS

ACT	Artemisinin-based combination therapy
AIDS	Acquired immune deficiency syndrome
AL	Artemether-lumefantrine
ANC	Antenatal clinic
APE	<i>Agentes Polivalentes Elementares da Saúde</i> (Community-based healthcare worker)
AS/AQ	Artesunate-amodiaquine
BCC	Behavior change communications
BES	<i>Boletim Epidemiológico Semanal</i> (Weekly Epidemiologic Bulletin)
CDC	Centers for Disease Control and Prevention
CISM	<i>Centro de Investigação em Saúde da Manhica</i> (Research Center for Health of Manhica)
CMAM	<i>Central de Medicamentos e Artigos Médicos</i> (Central Medical Stores)
DEPROS	<i>Departamento de Promoção de Saúde</i> (Health Promotion Department)
DHIS-2	District Health Information System-2
DHS	Demographic and Health Survey
DPS	<i>Direcção Provincial de Saúde</i> (Provincial Health Department)
EPI	Expanded Program on Immunization
EUV	End-use verification survey
FELTP	Field Epidemiology & Laboratory Training Program
FY	Fiscal year
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GHI	Global Health Initiative
GRM	Government of the Republic of Mozambique
IMVCS	Integrated Malaria Vector Control Strategy
HIV	Human immunodeficiency virus
IPTp	Intermittent preventive treatment of pregnant women
INS	<i>Instituto Nacional de Saúde</i> (National Institute of Health)
INSIDA	<i>Inquérito de Indicadores de SIDA</i> (AIDS Indicator Survey)
IRS	Indoor residual spraying
ITN	Insecticide-treated bed net
LLIN	Long-lasting insecticide-treated bed net
LMIS	Logistics Management Information Systems
MACEPA	Malaria Control and Evaluation Partnerships in Africa
M&E	Monitoring and evaluation
MCH	Maternal and Child Health
MICS	Multiple Indicator Cluster Survey
MIP	Malaria in pregnancy
MIS	Malaria Indicator Survey
MOH	Ministry of Health
MOP	Malaria Operational Plan
NFM	New Funding Model (Global Fund New Funding Model)
NHS	National Health Service
NMCP	<i>Programa Nacional de Controlo da Malária</i> (National Malaria Control Program)

OGAC	Office of the Global AIDS Coordinator
OR	Operational research
PCV	Peace Corps Volunteer
PEPFAR	President's Emergency Plan for AIDS Relief
PIRCOM	<i>Programa Inter-Religioso contra a Malária</i> (Inter-Religious Campaign Against Malaria)
PMI	President's Malaria Initiative
PROSAUDE	(Health Sector Common Fund Project)
QA/QC	Quality assurance/quality control
RDT	Rapid diagnostic test
SP	Sulfadoxine pyrimethamine
TDY	Temporary duty
TES	Therapeutic efficacy study
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	U.S. 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 six-year, comprehensive effort to reduce the burden of disease and promote healthy communities and families throughout the world. Through 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. PMI was launched in June 2005 as a five-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 was extended and, as part of GHI, the goal of PMI was adjusted to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. Programming of PMI activities follows the core principles of GHI.

Mozambique was selected as a PMI country in fiscal year (FY) 2007. PMI's primary goal in Mozambique is to assist the Government of the Republic of Mozambique (GRM), in collaboration with other partners, to reduce malaria mortality by 50% by rapidly scaling up coverage of vulnerable groups with four highly effective interventions: artemisinin-based combination therapy (ACT), intermittent preventive treatment of pregnant women (IPTp), insecticide-treated bed nets (ITNs), and indoor residual spraying (IRS).

Mozambique carried out a Demographic and Health Survey (DHS) in calendar year 2011. While the data from this survey did show a reduction in all cause under-five mortality from 138/1000 in the 2008 Multiple Indicator Cluster Survey (MICS) to 97/1000 in the 2011 DHS, there were only minimal improvements in major malaria indicators compared to the 2007 Malaria Indicator Survey (MIS), highlighting the multitude of challenges the country still faces in reducing the burden of malaria. The most significant improvement from the 2007 MIS to the 2011 DHS was the increase in net coverage: the proportion of households with at least one ITN increased from 15.8% in 2007 to 51.4% in 2011. A joint MIS and National HIV/AIDS Indicator Survey (INSIDA) will take place in September 2014 and the next DHS is planned for calendar year 2016.

Mozambique has received several rounds of funding from the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund). Mozambique was most recently awarded a Global Fund Round 9 grant to scale up universal access to malaria prevention and control services. Phase 2 of this grant will run from July 2013 through June 2016 and will be directed towards procurement and distribution of nets to achieve universal coverage, procurement of insecticide for the national IRS program, procurement of rapid diagnostic tests (RDTs) and ACTs, behavior change communication (BCC) activities, monitoring and evaluation (M&E) support, and refresher training for community health workers. Currently, PMI is actively working with the GRM and partners to develop a Global Fund concept note for the new funding model (NFM), to be submitted in October 2014. This collaboration will ensure synergies with PMI-supported activities in Mozambique. Under the NFM, Mozambique is eligible for \$48.3 million in additional malaria funding on top of the \$92.4 million of existing funding approved through Round 9 phase 2. Additional incentive funding is also possible for malaria through the NFM.

This FY 2015 PMI Malaria Operational Plan (MOP) for Mozambique was developed during a planning visit in May 2014 by representatives from the U.S. Agency for International Development (USAID), the Centers for Disease Control and Prevention (CDC), and the National Malaria Control Program (NMCP), with participation from other major partners working on malaria in Mozambique. The proposed PMI activities with FY 2015 funding are based on progress and experiences during the last eight years and the NMCP's 2012-2016 National Malaria Control Strategy. The majority of activities outlined in this FY 2015 MOP are based on strategic shifts in PMI activities that were begun with FY 2013 reprogramming and the FY 2014 MOP and pending FY 2014 reprogramming. These strategic shifts include a decentralization of many activities down to the provincial and district levels in order to achieve the greatest impact at the lowest levels of the health system. In addition, PMI will deepen our strategic focus on four of the highest burden and population-dense provinces: Zambézia, Nampula, Tete and Cabo Delgado in order to have the greatest impact on malaria. Deepening our technical assistance and coverage in these key provinces, which represent 57 percent of the overall population in Mozambique, is essential to achieving national-level coverage and impact.

With FY 2015 funding, PMI will begin to expand into a few key strategic areas, including support to the national IRS program to ensure a high quality of spraying nationwide, as well as piloting routine long-lasting insecticide-treated bed net (LLIN) distribution through the Expanded Program on Immunization (EPI) in Cabo Delgado, for potential expansion in future years to this important population. To ensure nets reach their intended recipients through the routine distribution system, PMI set up a temporary, semi-parallel system while providing support to strengthen the government's system, allowing for an eventual transfer of responsibilities. PMI activities are designed to complement activities supported by other partners.

Over the past two years, the GRM has made significant progress, with support from PMI and other partners, in the finalization and dissemination of key strategic documents, including the 2012-2016 National Malaria Control Strategy, the National M&E Plan, the National Communication Strategic Plan for Malaria, the National Strategy for Improving and Sustaining LLIN Coverage, and the Integrated Malaria Vector Control Strategy (IMVCS). Other key documents, including an updated National Strategic Plan, are under development.

The total amount of PMI funding requested for Mozambique is \$29 million for FY 2015 and the following activities are planned:

Insecticide-treated nets: Since its launch in Mozambique in FY 2007, PMI has supported free ITN distribution through antenatal clinics (ANCs), while the Global Fund and other partners supported mass campaigns. As in previous years, with FY 2012 funds, PMI procured enough ITNs to cover the needs for routine ANC distribution (1.3 million ITNs) nationwide and will do so again with FY 2013 and FY 2014 funds. With FY 2015 funding, PMI will continue to support routine net distribution through ANCs (1.4 million ITNs) and will pilot a program to reach children under five in Cabo Delgado Province through EPI clinics (350,000 ITNs). PMI's support for net distribution through ANCs starts with the port of entry and continues through the provincial level nationwide through a temporary, semi-parallel system. In addition, PMI will support net distribution to the district level in select provinces for ANC and for the EPI pilot in Cabo Delgado. This will ensure increased accountability for the LLINs procured with PMI funding. By the end of calendar year 2014, Mozambique is expected to have reached universal coverage with nets through mass

campaigns over the past 3-4 years. PMI's coverage of ANC and EPI net needs will complement the mass universal coverage campaigns that are expected to continue in all areas not targeted for IRS in calendar year 2016. PMI will provide support for post-campaign surveys and a subset of nets will be tagged for monitoring of attrition, physical durability, and insecticide retention. In addition, technical assistance will be provided to help the NMCP plan for better-organized, timelier mass campaigns and to help finalize a multi-channel continuous distribution strategy to maintain coverage after mass campaigns.

Indoor residual spraying: Indoor residual spraying remains a high-priority vector control intervention for the GRM. The newly developed IMVCS provides guidance on implementation of malaria vector control interventions (LLINs, IRS, and larviciding) in a complementary manner. During the development of the Global Fund Round 9 Phase 2 proposal, the criteria outlined in this strategy was used to develop a list of 34 districts nationwide that will receive targeted IRS beginning in calendar year 2014/2015 (four of which are in Zambézia Province); the remainder of the country will rely on universal coverage with LLINs.

PMI has been supporting IRS in Zambézia Province since calendar year 2007. With FY 2013 funds, PMI implemented blanket spraying in four districts in Zambézia, achieving an 89% coverage rate, covering 415,000 houses and protecting 2.2 million people. With FY 2014 funds, PMI's IRS program will provide blanket coverage to five districts in Zambézia that are not expected to receive nets before the transmission season.

PMI's support to IRS with FY 2015 funding is in line with the draft vector control strategy. PMI aims to implement targeted spraying in the four districts selected for IRS in Zambézia Province, which continues to have the highest prevalence of malaria in Mozambique, necessitating continued investment in this province. PMI's support will include procurement of IRS supplies, environmental monitoring, training, and supervision. PMI's IRS campaign will target covering approximately 270,000 houses; a reduction from previous years due to the switch from blanket to targeted spraying. PMI will again rely on the GRM to provide insecticide for the spray campaign. In addition, PMI will support ongoing entomologic monitoring in PMI districts as well as national insecticide resistance monitoring and quality assurance tests for the national IRS campaign. Enhanced epidemiological surveillance will continue in eight districts in an effort to support data-driven decision-making for vector control interventions.

With FY 2015 funds, PMI will begin to decrease its operational footprint for IRS in Zambézia, covering significantly less structures through targeted spraying, while at the same time expanding its IRS support outside of the province. Given the widespread geographic coverage of the national IRS program implemented by Ministry of Health (MOH) and concerns surrounding its quality, PMI, with FY 2015 funding, will assist the GRM in strengthening the national spray program through cascade trainings, supervision of spray operations and environmental compliance support.

Malaria in pregnancy (MIP): According to data from the 2011 DHS, Mozambique has made relatively little progress on scaling up IPTp, with only 18.6% of women having received two or more doses of IPTp during their last pregnancy, compared to 16.2% in the 2007 MIS. The reasons for Mozambique's low coverage have not been confirmed, but are thought to be due to a combination of factors, including inconsistent stocks of sulfadoxine pyrimethamine (SP), lack of clearly-articulated guidelines on the administration of IPTp, and lack of supervision, together with

poor reporting practices. Mozambique recently adopted the new World Health Organization (WHO) IPTp guidelines, which, once rolled out, are expected to increase the national SP needs and improve IPTp coverage.

In the past 12 months, PMI contributed to the development of new registers for the Maternal & Child Health Program, which reflect the new IPTp guidelines and contain malaria-specific indicators. In addition, PMI has continued to support provision of ANC services to pregnant women through training and supervision, focusing on 102 health facilities involved in the Model Maternities Initiative. With FY 2013 funds, PMI supported the procurement of 5.1 million tablets of SP, and together with additional doses funded through United Nation's Children Fund (UNICEF), will cover the heightened nationwide need for IPTp. PMI also supports the procurement and distribution of nets through ANCs, which contributes to PMI's MIP goals.

With FY 2015 funding, PMI will support trainings for ANC health workers on implementation of the new guidelines and the rollout of new ANC registers that will collect malaria-specific indicators. PMI will continue to provide focused support for provincial-level supervision of ANC workers in all districts in four targeted provinces, where PMI has a provincial-level supervision platform for a multitude of malaria interventions. In addition, promotion of interventions to address MIP will continue to be emphasized in BCC activities through various platforms. PMI expects that all SP needs will be covered by the GRM in calendar year 2016. We will negotiate with the MOH to encourage the inclusion of SP into the calendar year 2016 health sector budget. Increasing domestic resources for financing the malaria response is an important component of encouraging country ownership; covering SP with domestic resources is a modest way to begin encouraging the GRM to increase its own financing for malaria control.

Malaria diagnosis: Rapid diagnostic tests (RDTs) for malaria were introduced in Mozambique in calendar year 2007 and rolled out nationally in 2010; however, chronic issues, including lack of consumption-based distribution plans, poor warehousing and storage practices and inadequate logistics management, have hampered efforts to improve the quality and consistency of RDT use at the health facility level.

Over the past 12 months, PMI procured approximately 14 million RDTs, along with other laboratory supplies. The RDTs procured by PMI are distributed to all levels of the health system, including to community health workers (*Agentes Polivalentes Elementares da Saúde* or APEs). Provincial level activities in Nampula and Zambézia are being scaled up, and laboratory support in the form of supervisory checklists, workshops following supervisory visits, and trainings will begin this year.

With FY 2015 funding, PMI will continue to strengthen the National Institute of Health (INS) capacity at the central level to implement quality assurance activities for malaria microscopy and RDTs. PMI will also continue its decentralized support through supervision of malaria diagnosis and case management activities at the provincial level in four targeted provinces. In addition, bi-annual refresher trainings on microscopy and RDT use will take place for laboratorians and supervisors in these provinces, and workshops to share lessons learned from supervisory visits will be conducted in all districts.

Included among PMI's activities will be the procurement of approximately 8 million RDTs to help fill the nationwide gap and provide a sufficient buffer. PMI will also continue to support the kitting of RDTs and ACTs for use by APEs, strong program coordination at the central level, and strengthened data collection, training, and supervision aspects of the APE system.

Malaria treatment: Artemether-lumefantrine (AL) has been the first-line treatment for uncomplicated malaria in Mozambique since calendar year 2009. PMI has contributed significantly to covering Mozambique's national annual AL needs since PMI began and this will continue in calendar year 2014 with the procurement of approximately 11.3 million treatments.

The APE program is an important component of Mozambique's malaria case management plan. APEs serve as the first line of defense against malaria for people living in rural Mozambique, and for many people are the only opportunity to receive proper diagnosis and treatment for malaria. PMI's support for the APE program has focused on the provision of RDTs and ACTs for the kits used by APEs for community case management. PMI has provided limited central level support to continue the expansion and training of APEs throughout the country, which complements significant non-PMI USAID health funds.

With FY 2015 funds, PMI will procure approximately 2.8 million ACTs, which in addition to contributions from the Global Fund, is expected to meet the national needs for calendar year 2016 with a six month buffer stock. PMI, along with the President's Emergency Plan for AIDS Relief (PEPFAR) will support regional, provincial, and district level technical support to improve warehouse management, supervision of the Logistics Management Information System (LMIS), and transportation of medicines to strengthen peripheral-level capacity in selected provinces. PMI will also support the supervision of clinical staff in malaria case management at the central level, as well as at the provincial level, districts, health facilities and community level in four target provinces through the decentralized supervisory platform. Lastly, PMI will continue to provide central support to the APE program.

Behavior change communication: The objective of the NMCP's BCC activities is to ensure that by calendar year 2016, 100% of the population is covered by key messages related to malaria prevention, diagnosis, and treatment. PMI has traditionally supported malaria BCC activities largely through the Inter-Religious Campaign Against Malaria (PIRCOM), a consortium of religious groups working in Zambézia, Nampula, Sofala, Inhambane and Gaza Provinces, in addition to limited central-level support. Beginning in calendar year 2014, PMI began disseminating malaria messages through integrated provincial-level platforms in Nampula and Zambézia, with expansion into Tete this year.

With FY2015 funding, PMI will significantly increase its support to malaria BCC activities, ensuring that messages are state of the art, delivered through proven channels, reaching key populations, and are effective. PMI will increase its support at the provincial level in four target provinces to implement both facility-based and community-based BCC activities in all districts. PMI will align PIRCOM's activities (dissemination of key malaria messages through religious leaders and volunteers) in PMI's four target provinces, complementary to the provincial-level activities. Finally, PMI will continue to support coordination of malaria BCC activities, dissemination of the malaria BCC implementation guidance, and strengthening DEPROS (Health Promotion Department) in the development, implementation, and coordination of BCC strategies and approaches at the central level, in addition to limited national BCC messaging.

Monitoring and evaluation: In calendar year 2012, the NMCP finalized its 2012-2016 M&E Plan, which is aimed at integrating a variety of M&E needs of priority health programs. In an effort to help strengthen Mozambique's M&E system, PMI supported the establishment of a temporary routine malaria data collection database from outpatient registers to allow for the routine collection of key malaria indicators until a more permanent District Health Information System-2 (DHIS-2) system is rolled out in calendar year 2015. PMI's support for M&E activities over the past 12 months has been comprehensive and includes training NMCP staff on the new DHIS-2 system, support for health facility surveys of malaria commodity availability, and provincial-level support for M&E supervision. In addition, PMI will complete a joint MIS/National HIV/AIDS Indicator Survey by the end of calendar year 2014. PMI's M&E support is complementary to other partners, including Village Reach and the United Nations Children's Fund (UNICEF), which are gathering critical data from APEs on malaria treatment, diagnosis, and commodity usage with support from USAID's non-PMI health funds.

Many of these critical M&E activities will be continued with FY 2015 funds, including support for the implementation of quarterly commodity surveys; M&E supervision from the provincial level to health facilities; central level support for the DHIS-2 system; and the Field Epidemiology & Laboratory Training Program (FELTP). In addition, PMI will support a therapeutic efficacy study (TES) in six sites, in-depth data quality audits at all levels of the health system in two provinces, and an SMS-based system for reporting of data on malaria case management and commodity consumption at the community and health facility level.

Operational research: With FY 2015 funding, PMI plans to continue one operational research activity that is expected to be initiated with FY 2014 funds. This activity is in line with one of the NMCP's identified priority operational research (OR) areas: collecting data to improve decision making for vector control. PMI will conduct a two-year anemia and parasitemia study in Zambézia Province, beginning with FY 2014 funding, which will build off the enhanced surveillance activities at health facilities in current and former IRS districts. This survey will couple health facility and entomological data with data on the community prevalence of disease to evaluate the impact of different combinations of vector control methods.

Capacity building and health system strengthening: PMI is committed to implementing the core GHI principle of health systems strengthening through support to capacity building efforts at all levels in Mozambique. Over the past 12 months, PMI continued to build capacity for malaria control by providing technical and implementation support to the NMCP, the Central Medical Stores (CMAM), the INS, and the provinces. PMI is also supporting the hiring of a senior technical officer who will be seconded to the NMCP, with a focus on M&E.

With FY 2015 funding, PMI will continue to decentralize its health systems strengthening support to provincial, district, and sub-district levels to improve the quality of activities and to achieve greater impact, particularly with respect to LLIN distribution to ANCs and EPI, case management supervision, BCC implementation, and M&E supervision through provincial platforms.

STRATEGY

INTRODUCTION

PRESIDENT'S MALARIA INITIATIVE

The President's Malaria Initiative (PMI) is a core component of the Global Health Initiative (GHI), along with HIV/AIDS, and tuberculosis. 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 was extended and, as part of GHI, the goal of PMI was 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).

Mozambique was selected as a PMI country in fiscal year (FY) 2007. This FY 2015 Malaria Operational Plan (MOP) presents a detailed implementation plan for Mozambique, based on the PMI Multi-Year Strategy and Plan and the National Malaria Control Program's (NMCP's) 5-Year Strategy. It was developed in consultation with the 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 National Malaria Control Strategy and Plan and build on investments made by PMI and other partners to improve and expand malaria-related services, including the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) malaria grants. This document briefly reviews the current status of malaria control policies and interventions in Mozambique, 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 activities with FY 2015 funding.

MALARIA SITUATION IN MOZAMBIQUE

Malaria is endemic throughout Mozambique, and its entire estimated population of 26 million people is at risk of malaria. Most of the country has year-round malaria transmission with a seasonal peak during the rainy season, from December to April. In addition, Mozambique is prone to natural disasters such as drought, cyclones, and floods, which may have contributed to increases in malaria transmission in recent years, particularly in low-lying coastal areas and along major rivers.

Malaria is considered the most important public health problem in Mozambique and accounts for 29% of all deaths, followed closely by AIDS at 27% (2008 Post-Census Mortality Survey). Among children less than five years old, malaria accounts for 42% of the deaths, followed by AIDS at 13%. *Plasmodium falciparum* accounts for 90% of all malaria infections, with *P. malariae* and *P. ovale* responsible for about 9% and 1%, respectively.

The 2011 Demographic and Health Survey (DHS) data showed that malaria prevalence, using rapid diagnostic tests (RDTs), varies from 1.5% in the capital, Maputo, to 54.8% in Zambézia Province. Prevalence rates are generally higher in the northern region, varying from 43.3% to 52.1%, and lower in the southern region, varying from 1.5% to 36.8%. In the central region, the prevalence varies from 30% to 37%, except for Zambézia with 54.8%. The prevalence in rural areas is almost three times as high as the prevalence in urban areas (46% versus 16%, respectively). Due to microscopy issues during the 2011 DHS, this MOP presents RDT rates as they are believed to be a more accurate representation of the malaria prevalence. The major vectors in Mozambique are *Anopheles gambiae* s.s., *A. arabiensis*, *A. funestus* s.l., and *A. funestus* s.s. Of the major subspecies of the *A. gambiae* complex, *A. arabiensis* is more prevalent in the south and *A. gambiae* s.s. in the north.

HEALTH SYSTEM DELIVERY

In Mozambique, the public sector—the National Health Service (NHS)—dominates health service delivery. Although there is a growing private sector, it is largely limited to major cities. The public sector reaches an estimated 60% of the population.

The NHS consists of four levels. Level I includes both rural and urban health centers and health posts. These health facilities provide a package of primary health care services, have very limited laboratory capacity, and usually have a maternity ward but do not provide inpatient services. According to a 2004 World Bank Report, Level I facilities represent at least 40% of all health services and are typically the first (and often only) point of contact with the health system for a large portion of the population. Level II includes district and rural hospitals that offer diagnostic, surgical, and obstetric services and have general medical doctors on their staff. Level III consists of provincial hospitals, which offer curative services, have diagnostic services/equipment, and are training centers. Finally, Level IV is made of the country's three referral hospitals in Maputo, Beira, and Nampula, serving the southern, central, and northern regions, respectively.

Recognizing the limitations of the NHS and the lack of professionally trained health workers, the country, with USG support, has begun revitalizing the community health worker program, which employs health workers known as *Agentes Polivalentes Elementares da Saúde* (APEs). The APEs provide preventive and basic curative services, including malaria diagnosis (using RDTs) and treatment (with ACTs). A number of national and international nongovernmental organizations also work within the NHS to assist in the provision of health services.

Malaria control in the public health system consists of three administrative levels: central, provincial, and district. At the central level is an NMCP, which is chronically understaffed, and some of the existing staff lack the technical skills to adequately manage the program. Each province has a provincial malaria focal point who coordinates the implementation of malaria control activities at that level. Recently, district malaria focal points were created as a way to improve data management and reporting for malaria at that level.

NATIONAL MALARIA CONTROL PROGRAM STRATEGY AND ACTIVITIES

The NMCP is responsible for developing policy; establishing norms; and planning, organizing, and coordinating all malaria control activities in the country. Additional responsibilities include periodic assessment of the impact of malaria control activities, development of training materials on malaria case management for health workers at all levels, mobilization of domestic and external funds for malaria control activities, promotion of malaria awareness and advocacy, and leading operational research.

In calendar year 2012, the NMCP finalized the National Malaria Policy and the 2012-2016 National Malaria Prevention and Control Strategic Plan. The strategic plan focuses on continuing national-level scale-up of five objectives for malaria prevention and control:

1. Decentralization of malaria control activities, with 100% of districts in 2014 having malaria management capacity in place.
2. Access to at least one prevention method for 100% of the population by 2014.
3. Confirmatory laboratory testing on 100% of suspected cases of malaria throughout the entire health system, including APEs by 2014.
4. Malaria prevention messaging reaching 100% of the population by 2016.
5. Strengthened monitoring and evaluation (M&E) system so that by 2014 all districts are capable of reporting key malaria-related indicators.

INTEGRATION, COLLABORATION, AND COORDINATION

Integrated health activities

Within the USG, the U.S. Agency for International Development (USAID) Mozambique Health Team is merged into one Integrated Health Office, maximizing the programmatic synergies among the President's Emergency Plan for AIDS Relief (PEPFAR), PMI, and other health programs. This organizational structure encourages technical synergies and avoids duplication of efforts, as well as facilitates a broader health systems approach across all USG programs, including maternal and child health (MCH), reproductive health/family planning, tuberculosis, HIV, malaria, and nutrition. An example of integration of USAID's health projects is a project PMI has been supporting jointly with funds from MCH, reproductive health, family planning, and PEPFAR: integrated MCH services. This project, in line with Mozambique's GHI strategy, aims to strengthen antenatal clinic (ANC) services nationwide through support at the central level for guideline and training material development and quality of care improvement through "Model Maternities" and supervision. PMI supports the malaria in pregnancy (MIP) component of the project, which also receives MCH and PEPFAR funds.

Other examples of integration are in strengthening the supply chain management and supporting the rollout of the District Health Information System-2 (DHIS-2) system. PMI, PEPFAR, and family planning staff leverage their resources to strengthen the capacity of the Ministry of Health's

(MOH's) supply chain management system through Central Medical Stores (CMAM) and improve the supply chain at different levels. In addition, PMI and PEPFAR funds complement each other to support the development and rollout of the new DHIS-2 system, which will be a crucial step towards receiving timely, quality data on malaria indicators among others.

Collaboration and Coordination

The Global Fund Round 9 Phase 2 proposal was written with direct input from PMI, and PMI has been actively supporting the development of the Global Fund's New Funding Model (NFM) concept note for finalization this fall; activities and funding were tailored so that an activity not funded by one donor was supported by the other. An example of this distribution of activities is long-lasting insecticide-treated net (LLIN) coverage: PMI supports procurement and distribution of LLINs through ANCs for pregnant women, and Global Fund supports the procurement and distribution of the LLINs for universal coverage. In addition, because of its flexibility, PMI has been able to schedule the arrival of its shipments of ACTs and RDTs based on the expected arrival of Global Fund-supported commodities. A malaria commodities working group now meets every month to discuss quantification, procurement, stock levels, and shipments of all malaria commodities.

In recent years, the private sector in Mozambique, especially the extractive industries, has rapidly expanded. MOH is in discussion with a number of companies to explore the potential of public-private partnerships, including a malaria bond initiative. Specifically, there is strong interest by the government and other partners in revitalizing the Lubombo Spatial Development Initiative, which was a successful tri-party (South Africa, Mozambique, and Swaziland) malaria control initiative implemented in Southern Mozambique between 2000 and 2009. The PMI team is working with NMCP and other departments of MOH to support the engagement with the private sector. PMI has engaged with private companies such as Vale, Rio Tinto, and Anadarko to identify areas of collaboration and determine how the USG can support the private sector as they engage with MOH at various levels. By the end of FY 2015, PMI hopes to have identified concrete activities to be implemented jointly with the private sector and MOH.

PMI GOALS, TARGETS AND INDICATORS

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 new countries added to PMI in FY 2010 and later. By the end of calendar year 2016, PMI will assist Mozambique 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 protected by IRS in the last 6 months;

- 85% of women who have completed a pregnancy in the last two years will have received two or more doses of intermittent preventive treatment (IPTp) during that pregnancy; and
- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria.

PROGRESS ON COVERAGE

Data from the 2011 DHS provide the most up-to-date information on key malaria indicators nationwide. Data from this survey are compared with results from PMI's 2007 baseline Malaria Indicator Survey (MIS), the 2008 Multiple Indicator Cluster Survey (MICS), and the 2009 AIDS Indicator Survey (INSIDA) in the table below. Overall, ITN coverage rates improved significantly from 2007 through 2011. However, other indicators increased only slightly between the 2007 and 2011 surveys and for many indicators, coverage decreased between the 2008 MICS and the 2011 DHS.

The 2011 DHS data show the most significant improvement in ITN coverage when compared with the 2007 MIS. Specifically, the proportion of households with at least one ITN increased from 15.8% in 2007 to 51.4% in 2011; similarly the proportion of children under five and pregnant women who slept under an ITN the previous night increased from 6.7% and 15.7% in 2007, respectively, to 35.7% and 38.9%, in 2011. Given that the 2011 DHS captured only part of a nationwide universal coverage campaign for ITNs, these coverage rates are expected to have increased significantly by the next national survey planned for the fall 2014. More modest gains were seen with the proportion of children less than five years old with fever in the last two weeks who received treatment with an ACT within 24 hours of onset of fever, which increased from 4.5% in 2007 to only 15.3% in 2011.

Despite the improvements in some indicators, all still remain well below target levels, and many indicators have shown relatively little progress. For example, the proportion of women who received two or more doses of IPTp during their last pregnancy during the last two years increased from 16.2% to only 18.6%. IPTp and use of ITNs by pregnant women continue to provide challenges in Mozambique, where a more targeted focus is necessary.

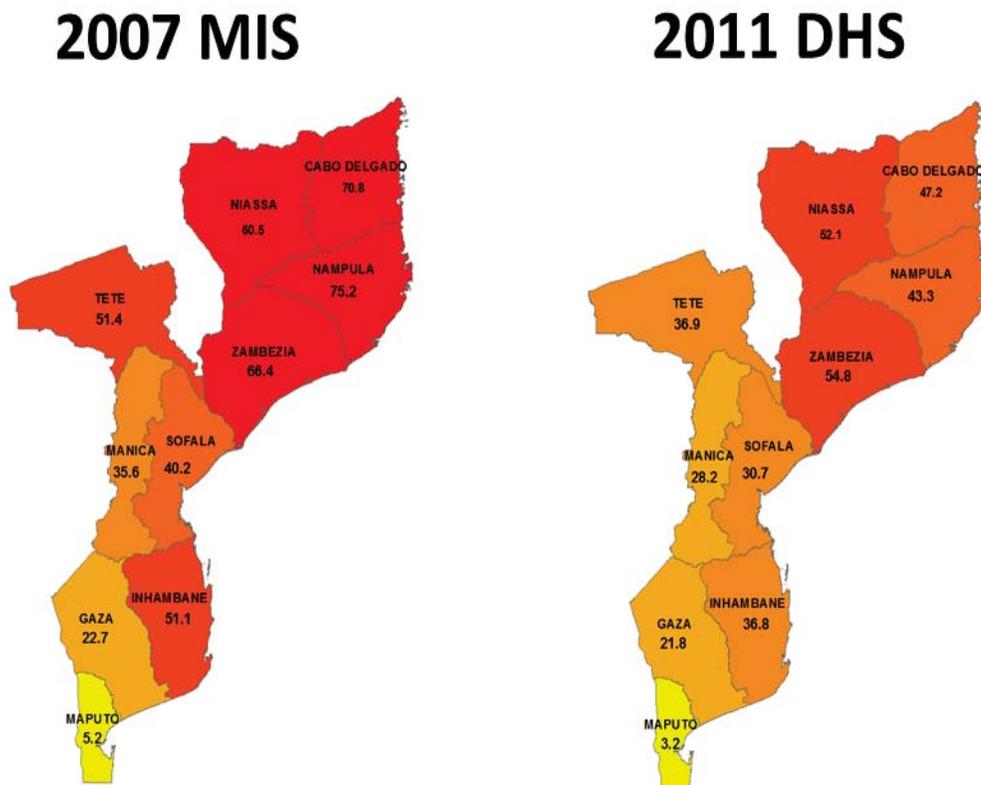
Malaria Indicators in Mozambique*

Malaria Indicators	2007 MIS (%)	2008 MICS (%)	2009 INSIDA (%)	2011 DHS (%)
Proportion of households with at least one ITN	15.8	30.7	NA	51.4
Proportion of children less than five years old who slept under an ITN the previous night	6.7	22.8	NA	35.7
Proportion of children less than five years old who slept under a bed net the previous night	15.7	42.1	48.7	38.9
Proportion of pregnant women who slept under an ITN the previous night	7.3	NA	NA	34.3
Proportion of pregnant women who slept under a bed net the previous night	19.3	NA	42.1	36.5
Proportion of women who received two or more doses of IPTp during their last pregnancy in the last two years	16.2	43.1	33.0	18.6
Proportion of children less than five years old with fever in the last two weeks who received treatment with an antimalarial within 24 hours of onset of fever	17.6	22.7	NA	22.2
Proportion of children less than five years old with fever in the last two weeks who received treatment with an ACT within 24 hours of onset of fever	4.5	NA	NA	15.3

*Years are shown as calendar years

Parasite prevalence estimates for each province, based on RDT positivity, are compared between the 2007 MIS and the 2011 DHS in *Figure 1*. Overall, prevalence decreased in all provinces, with the largest decreases occurring in Nampula (31.9% decrease) and Cabo Delgado (23.6% decrease). In total, 5 of the 11 provinces had a greater than 10% decrease in parasite prevalence between 2007 and 2011, and only three provinces had decreases less than 5%. The substantial decreases in parasite prevalence suggest that more substantial gains in disease reduction can be seen as the coverage of key indicators improve.

Figure 1. Provincial level parasite prevalence estimates, based on RDTs



OTHER RELEVANT EVIDENCE ON PROGRESS

The results of two PMI-supported operational research projects have been submitted for publication in peer-reviewed journals after preliminary data were presented at scientific conferences. These projects focused on aspects related to the durability of LLINs and the mass distribution of LLINs through a universal coverage model developed in Mozambique.

The results of a prospective three-year follow-up evaluation of the LLINs distributed in Nampula Province in calendar year 2008 demonstrated a significant difference between polyethylene and polyester nets. The latter were found to perform better in terms of physical durability, measured by holes in the LLINs, over the three years of follow-up. The results of this local evaluation may be used to inform planning for LLIN programs, in accordance with recent World Health Organization (WHO) guidance.

The results of a study of a universal LLIN coverage campaign conducted in Sofala Province in calendar year 2010, demonstrated high levels of coverage of household sleeping spaces and access to LLINs (80% and 85%, respectively), which were maintained for a year after the campaign. A significant reduction in parasitemia (32%) among children under the age of five was also documented after one year. However, data from two post-campaign surveys in Nampula conducted by PMI in calendar year 2013 indicated that one month after the campaign, only 80% and 54% of

households in Nacala-a-Velha and Mecubúri, respectively, received at least one net, and only 58% and 34% of households received enough LLINs to cover everyone in the household.

PMI launched the Roll Back Malaria impact evaluation process in collaboration with the NMCP in June 2013. Initial drafts of the impact evaluation have been developed and it is expected to be finalized by the end of calendar year 2014.

CHALLENGES, OPPORTUNITIES, AND THREATS

Challenges

The 2011 DHS results showed a slow pace of progress in scaling up malaria prevention and treatment interventions in Mozambique. Some problems that may have contributed to this slow progress include the frequent turnover of NMCP directors (six different directors in seven years) and the lack of continuity in leadership and commitment from the NMCP and MOH. Other challenges include shortages of appropriately educated and trained health professionals within malaria programs at the central, provincial, and district levels and high staff turnover.

Three major problem areas for malaria control in Mozambique are the optimal balance between ITNs and IRS for malaria vector control, the poor performance of the supply chain management system, and behavior change communication (BCC). Supply chain issues are an ongoing challenge for all malaria commodities, but particularly for LLINs, as the country does not have a formal system for routine distribution. Leakage of commodities from the system in some provinces, particularly LLINs, has been reported. Mozambique is a large country with many remote areas and poor road conditions; many districts are not accessible during the rainy season. Information management systems to detect shortages and stockouts of malaria commodities need strengthening.

To address these challenges, PMI, in collaboration with other partners, is providing support at the central, provincial, and district levels to strengthen the supply chain and to improve M&E. In order to ensure an increased accountability for the LLINs procured with USG funding, PMI is supporting a temporary, semi-parallel system, for net distribution from the port of entry to the provincial level nationwide and down to the districts in target provinces. PMI recently supported the development of a vector control strategy and an insecticide resistance monitoring plan to guide vector control efforts in a coordinated, evidence-based manner. With FY 2013 funds, PMI started to complement its focus on national level support with a deeper support for certain malaria control efforts at the provincial level and below in four target provinces (Nampula, Zambézia, Cabo Delgado, and Tete) to achieve greater impact. These provinces were selected due to their high burden of malaria and population density, among other factors. In fact, the population of these four provinces represents 55% of the population of the entire country; achieving an impact in these provinces will likely influence the national averages.

Implementation of BCC activities is also facing challenges. PMI faced problems of poor performance of its implementing partner in this area, which was aggravated by the NMCP's weak technical capacity in BCC and poor coordination between the NMCP and the Health Promotion Department (DEPROS). The challenge of NMCP's coordination with DEPROS is not unique; other MOH programs such as HIV/AIDS, tuberculosis, and MCH face the same challenges. One

reason for this may be the lack of a clear mandate of DEPROS. However, PMI is now directing increased resources for targeted BCC activities to speed progress in this area.

Opportunities

The Government of the Republic of Mozambique (GRM) has reaffirmed its commitment to malaria prevention and control on several occasions, including during high-level visits from the Global Fund and PMI. Although President Guebuza is currently chair of the African Leaders Malaria Alliance, he has not yet assumed an active role this year as hoped. The new NMCP director, who began in March 2014, has proved willing to seek advice, discuss issues, and consider different viewpoints, allowing for a fruitful collaboration with PMI.

The relatively recent private sector boom in the extractive sector presents a strong opportunity for PMI to engage with the private sector to support malaria control goals. Among the private sector, Anadarko has made a strong commitment to support health activities, including malaria, in Cabo Delgado Province, for which PMI has already begun to provide technical assistance and coordination of activities.

The draft Integrated Malaria Vector Control Strategy (IMVCS) also presents a tremendous opportunity, as it lays out for the first time a clear vision of how various malaria control strategies will be employed in a complementary fashion. However, operational realities in the current plan need to be addressed and the strategy will likely be revised over the upcoming months. Finalizing this strategy and securing high-level approval will be essential in the coming year.

The approval of the strategic plan for malaria BCC offers an opportunity to boost the implementation of BCC activities at the central, provincial, district, and community levels. PMI is leveraging the vast network of community-based organizations funded through PEPFAR and other sources to include malaria BCC messages to increase the reach of these activities.

Threats

A major threat to malaria control is the uncertainty of funding. A Global Fund audit in December 2011 found that approximately \$3.3 million in expenditures could not be accounted for. For this reason, Global Fund support was limited to commodity procurement and all direct funding to MOH was stopped. The Global Fund required that the GRM reinvest this amount into the health sector as an additive investment to resolve the issue and allow Global Fund support to resume, which it did. The Global Fund has now resumed direct support to MOH through the Round 8 Health Systems Strengthening grant. However, other donors to PROSAUDE, Mozambique's common fund to support the health sector, are stopping disbursements to this fund and several PROSAUDE donors have withdrawn entirely. It is likely that some of these donors will consider direct support to provinces or project support, but it is uncertain whether malaria control will be their major priority. In addition, through the NFM, the Global Fund indicated only \$48 million additional funds will be available for Mozambique, excluding any incentive funding approved. PMI remains actively engaged in the concept note's development to ensure that Global Fund and PMI activities are complementary and the combined resources are used in the most effective manner possible.

Other threats are the possible emergence of resistance to insecticides and medicines. Insecticide resistance to pyrethroids has been well-documented in southern Mozambique and in other sub-Saharan African countries; it can have a devastating impact on the effectiveness of both IRS and LLINs. PMI will continue to support national insecticide resistance monitoring to track this issue. Antimalarial drug resistance to artemether-lumefantrine (AL) for *P. falciparum* infections has been well-documented in Southeast Asia. This may be aggravated by the problem of sub-standard drugs infiltrating the market—a growing problem in some African countries. PMI will be supporting therapeutic efficacy studies (TES) in calendar year 2014 and 2016 to monitor this issue.

PMI SUPPORT STRATEGY

PMI support to Mozambique is in line with the GRM's 2012-2016 National Malaria Control Strategy. PMI funding is considered in conjunction with that of the other primary donor, Global Fund, as well as the NMCP and other partners, so that all resources can be allocated in an efficient and non-overlapping manner, according to disease burden and the added value of each organization. Based on this perspective, it was decided that PMI's added value is to scale up interventions nationally where possible, and to focus sub-national support in high burden areas.

As a consequence, PMI-supported activities will continue to focus on achieving and maintaining high coverage of LLINs nationally, particularly among the vulnerable populations of pregnant women and children under five. In addition, targeted IRS will be used to complement national universal coverage campaigns, and strengthening MIP services, improving case management, and supportive activities such as BCC, strengthening supply chain management, and M&E, will be done primarily in high burden target provinces.

After working with the NMCP and other partners to ensure sufficient coverage of other provinces, PMI began targeting some of its support to the provinces and districts with the highest malaria burden, beginning with FY 2013 funding. The objective of this approach is to improve implementation of malaria-related activities through the facilitation of supervision, distribution of commodities, and M&E. PMI has established a provincial-level platform for BCC, MIP, M&E, and case management beginning with FY 2013 funding in three provinces (Nampula, Zambézia, and Tete) and will be establishing a fourth in Cabo Delgado. PMI will focus a significant portion of its activities in these four provinces, thus allowing the activities to have more impact than if they were spread more thinly across a greater geographic area. In provinces where the USG has existing partners, efforts will be made to use these existing mechanisms, thereby following the GHI mandate and avoiding duplication of efforts. The activities that will fall under this effort to decentralize PMI support are the following: LLIN distribution to ANCs, IRS, case management supervision, BCC implementation, and M&E supervision.

OPERATIONAL PLAN

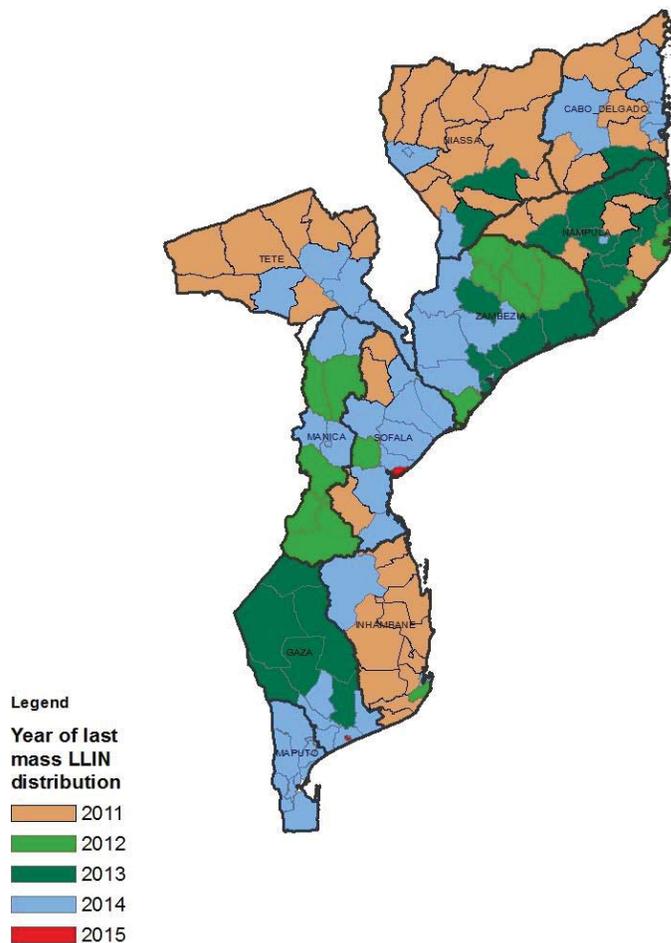
PREVENTION ACTIVITIES

Insecticide-Treated Nets

NMCP/PMI Objectives

The 2012–2016 National Malaria Control Strategic Plan set the ambitious target of covering 90% of the population with LLINs or IRS by 2014. Both the Malaria Acceleration Plan 2014–2016, which is a multi-year operational plan of the malaria control strategy, and the Global Fund Round 9 Phase 2 grant call for a scale-up of LLIN distribution and a more targeted approach for IRS. As a result, by the end of calendar year 2014, it is expected that more than 90% of the districts nationwide will have implemented a mass universal LLIN coverage campaign at least once since 2011, covering about 85% of the total population. These will include some districts that were targeted for IRS in the past.

Map of Mozambique districts and years of universal LLIN coverage campaigns



In keeping with the goals set forth in the Malaria Strategic Plan and the IMVCS, PMI aims to:

1. Support MOH's implementation of the IMVCS in a way that results in more than 90% of districts being covered with mass LLIN distribution campaigns;
2. Implement a temporary, semi-parallel supply chain to ensure routine distribution of LLINs to ANCs and through Expanded Program on Immunization (EPI) clinics to help maintain coverage of LLINs;
3. Support post-campaign surveys to ensure successful implementation and impact of mass distribution campaigns; and
4. Support the development and implementation of a national strategy for improving and sustaining LLIN coverage through both mass campaigns and routine distribution channels.

Progress since PMI was launched

Mozambique introduced free distribution of ITNs to children less than five years old and pregnant women as a national policy in calendar year 2006. Children less than five years old are reached through mass campaigns, while LLINs are delivered free of charge during ANC visits to pregnant women. In calendar year 2009, the country adopted the policy of universal coverage, defined as one LLIN for every two persons. Since late 2009, PMI has focused its support on the purchase of LLINs for ANCs and their distribution to provincial warehouses throughout Mozambique. Although routine distribution of LLINs to pregnant women at ANC visits has been national policy since 2006, the system to support this activity has not been formalized; furthermore, PMI at present is the only donor providing funding for distribution of LLINs through routine systems.

The implementation of mass universal coverage campaigns started in calendar year 2010 in 11 (out of a total of 151) districts; in 2011 universal coverage campaigns were carried out in 45 districts. During calendar year 2012, MOH carried out Global Fund and World Bank-supported mass universal coverage campaigns in 21 districts. In calendar year 2013, more than 2.2 million nets were distributed in 23 districts. By the end of calendar year 2014, MOH plans to distribute an additional 5.2 million nets, completing coverage of all districts and beginning net replacement, which was originally scheduled for every three years.

From the 2007 MIS to the 2011 DHS, the proportion of households with at least one ITN increased from 15.8% to 51.4%. Correspondingly, the proportion of children less than five years old and pregnant women who slept under an ITN the previous night rose from 6.7% and 7.3% to 35.7% and 34.3% respectively. A joint MIS and INSIDA planned for late calendar year 2014 will assess LLIN coverage after the completion of mass campaigns covering all districts in Mozambique.

Progress in the past 12 months

During the past year, PMI continued its support to routine distribution of LLINs to pregnant women, procuring approximately 1.3 million nets to meet the national needs through the ANC system. According to NMCP data, a total of 1,102,075 LLINs were distributed to pregnant women during calendar year 2013, representing about 80% of the estimated needs of this group.

To ensure that all pregnant women attending at least one ANC visit receive an LLIN, PMI continued to support a semi-parallel distribution system for LLINs, from port of entry to the provincial level nationwide and to the district level in select provinces. Based on the last EUV

report, bed nets were available in two of the three health facilities visited; they were also available in the only warehouse visited. In the previous EUV report, three of the five warehouses visited had experienced stockouts of bed nets in the previous three months; no stockouts were reported at health facility level.

A major challenge with the Global Fund-supported mass campaigns in Mozambique has been delays in both the procurement and distribution of nets. For example, 2.2 million LLINs that were earmarked for calendar year 2013 distribution did not arrive in Mozambique until January 2014, and 5.2 million LLINs targeted for calendar year 2014 distribution are currently expected to arrive in July 2014. It is important to note that the 2.2 million nets that arrived in January 2014 have all been distributed. Further complicating distribution has been the scattered nature of districts targeted for campaigns, necessitating nets to be shipped to multiple ports and complicating distribution logistics.

It is also unclear how effective the national mass campaigns have been. Data from two post-campaign surveys in Nampula conducted by PMI in calendar year 2013 indicated that one month after the campaign only 80% and 54% of households in Nacala-a-Velha and Mecubúri, respectively, received at least one net, and only 58% and 34% of households received enough LLINs to cover everyone in the household.

Commodity gap analysis

The table below describes the LLIN gap analysis. In order to expand routine distribution of LLINs, PMI will pilot EPI distribution in one province in calendar year 2016.

Gap Analysis for LLINs, Calendar Year 2014-2016

Need	2014	2015	2016
Estimated population	25,041,922	25,718,054	26,412,441
Campaign target population ¹	8,347,307	8,572,676	8,804,138
Campaign replacement ²	4,637,393	4,762,598	4,891,188
Routine ANC ³	1,377,306	1,414,493	1,452,684
Routine EPI ⁴			346,188
Total need	6,014,699	6,177,091	6,690,060
PMI (for ANC and EPI needs)	1,300,000	1,400,000	1,750,000
Global Fund	5,200,000	2,400,000	TBD
Others	27,508	512,809	TBD
Total nets distributed or committed	6,527,508	4,312,809	1,750,000
Gap	-512,809	1,864,282	4,940,060

¹ Calculation based on 1/3 of total population per year.

² Calculation based on 1:1.8 net ratio.

³ Based on assumption of 5.5% pregnancy rate.

⁴ Based on existing population data for children under five years in Cabo Delgado.

Plans and Justification

With FY 2015 funding, PMI will support routine ANC LLIN distribution nationwide and a pilot of EPI distribution of LLINs in Cabo Delgado using a semi-parallel supply chain system. The United Nations Children's Fund (UNICEF) will support ANC distribution to the district level in Zambézia, Tete, and Gaza. The expansion to include net distribution through EPI clinics was recommended to the team by the interagency PMI headquarters team that discussed Mozambique's net strategy in March of 2013 as a way to ensure that all vulnerable populations are reached with nets. The original plans were to begin EPI distribution in calendar year 2014; however, it was decided that more efforts should first be placed on strengthening the government's supply chain system for nets. Nets, unlike RDTs and ACTs, do not currently fall under the essential medicines system managed by CMAM, which has benefited from significant supply chain strengthening efforts by USG donors in recent years. However, there have been recent strong indications from the government that nets will be transitioned to the existing CMAM system in the near future. If this comes to fruition, PMI will provide technical assistance through our net distribution partner to support this transition and strengthen the system further as needed. In addition, PMI will work with NMCP and other stakeholders to finalize a more efficient strategy for LLIN distribution. The current method of conducting mass campaigns needs to be re-thought to improve both timing and logistics. In addition, PMI will help the NMCP plan for and sustain LLIN coverage after mass campaigns through routine distribution channels.

To help ensure coverage for the LLIN gap projected for calendar years 2015 and 2016, the PMI team will support the NMCP in the preparation of its application to the Global Fund for the NFM. PMI will also continue to advocate with other donors such as the U.K.'s Department for International Development to help cover the projected gap for calendar year 2015 and beyond to ensure universal coverage.

Proposed Activities with FY 2015 funding: (\$9,200,000)

1. LLIN procurement: Approximately 1.4 million LLINs will be procured to cover the country's needs for distribution through ANC clinics. In addition, about 350,000 nets will be procured to pilot EPI distribution in Cabo Delgado (\$7,000,000);
2. Support ANC & EPI LLIN distribution: Distribution will be from port of entry to the provincial level nationwide and from the provincial level to the district level in two provinces (Nampula & Cabo Delgado) for ANC nets. Distribution will be from port of entry to the district level in Cabo Delgado for the EPI net pilot. Support includes transportation, warehousing, quantification of needs, and support to information systems that will allow collection of data on LLIN rationing, consumption, and stock levels. (\$1,950,000);
3. Post-campaign surveys and LLIN durability monitoring: Currently, after LLIN mass campaigns supported by the Global Fund, MOH is not supporting post-campaign surveys. PMI will adapt the protocol used in Nampula in a way that will be scalable to monitor the effectiveness of the distribution campaigns, the retention of campaign LLINs, and household LLIN coverage, etc. The surveys will also potentially include a durability component, including attrition, physical durability, and insecticide retention. (\$200,000); and

4. Net distribution technical assistance: Technical assistance will be continued (started with FY 2014 funds) to help the NMCP plan for better-organized, timelier mass campaigns. In addition, PMI will assist the NMCP in finalizing a multi-channel continuous distribution strategy to maintain coverage after mass campaigns (\$50,000).

Indoor Residual Spraying

NMCP/PMI Objectives

One of the objectives of the 2012-2016 Malaria Strategic Plan is to ensure that 90% of the population of Mozambique has access to at least one method of malaria vector control prevention (IRS or LLINs) by calendar year 2014. An IMVCS was developed to reorient and better coordinate vector control interventions. The IMVCS calls for a more targeted approach to IRS and lays out a number of criteria for selecting IRS areas (areas of high malaria burden, high economic interest, high population but not highly urbanized centers, etc.). Using these criteria, the NMCP developed a list of 34 districts nationwide that will be prioritized for targeted or blanket IRS beginning in calendar year 2014, while the remaining areas will receive LLINs. The specific areas and number of houses to be sprayed will be reviewed every three years, based on available epidemiologic and entomologic data. However, the current draft of the IMVCS does not take into consideration the operational and cost inefficiencies associated with targeted IRS, as well as the logistical difficulty of implementing targeted nets and targeted IRS in the same district. Therefore, the IMVCS will likely be revised in conjunction with the updating of the National Strategic Plan to address some of these issues.

As part of the insecticide resistance management plan, the IMVCS also outlines a plan for the preemptive rotation of insecticides in a logistically and financially feasible manner for Mozambique. Insecticides are to be rotated every two years, beginning in 2016, and the specific selection of insecticides for a rotation cycle will be determined based on insecticide susceptibility data. Both insecticide choice and rotation cycle may vary based on the results of annual resistance testing.

In keeping with the goals set forth in the Malaria Strategic Plan and the IMVCS, PMI aims to:

1. Support an integrated, evidence-based approach to IRS that results in a more cost-effective and efficient targeted strategy for the entire country.
2. Support implementation and improvement of the IMVCS based on continually collected data, in a way that results in an integrated approach to vector control in Mozambique.
3. Strengthen the MOH-led IRS program.

Progress since PMI was launched

PMI has supported IRS in as few as four and as many as eight districts in Zambézia since FY 2007, achieving high coverage levels of above 85%. Currently, there are three groups supporting IRS in Mozambique: PMI, MOH, and Global Fund. PMI focuses on high burden districts within

Zambézia Province, and MOH sprays the remaining target districts in the provinces outside of Zambézia. The Global Fund provides funds for insecticide procurement for both spray campaigns.

PMI-Supported IRS Campaigns, Zambézia Province, Calendar Year 2012-2015

Year	No of Districts sprayed	Insecticide used	Number of Structures Sprayed	Coverage Rate	Population Protected
2012	6	PYR	536,558	92%	2,716,176
2013	4	PYR	464,295	89.2%	2,181,896
2014*	5	PYR	495,498	TBD	TBD
2015**	4	PYR	270,000	TBD	TBD

*Represents targets based on 2014 IRS work plan. **Represents expected targets

PMI has provided a significant amount of support to build Mozambique's entomological capacity both at the central level and regionally. The PMI-supported central entomology laboratory and insectary at the National Institute of Health (INS) in Maputo is operational and serves as the reference laboratory for in-country processing of mosquito material, such as polymerase chain reaction (PCR)-based species identification of mosquito complexes, enzyme-linked immunosorbent assays to test for malaria-infected mosquitoes, and monitoring for insecticide resistance and its mechanisms. The INS laboratory also provides both technical and laboratory support for NMCP national insecticide efficacy monitoring for IRS and LLINs nationwide as part of the IMVCS strategy.

The PMI-supported entomology laboratory and insectary in Quelimane, Zambézia Province, serves as a regional center for entomologic monitoring and surveillance for IRS and LLIN activities in the central provinces of Mozambique. In a collaborative effort between PMI and the Provincial Health Department (DPS) in Zambézia, the Quelimane entomology laboratory has been staffed by four DPS personnel trained in basic entomologic field techniques, as well as insectary maintenance. Similarly, PMI supported the entomology laboratory in Pemba, Cabo Delgado Province, which serves as a regional center for entomological monitoring and surveillance in the Northern provinces. It is currently staffed by a DPS biologist who was trained in a WHO/PMI supported workshop in calendar year 2008, and by three technicians from the DPS. Due to the lack of entomologists at the central level, PMI in calendar year 2009 also hired an entomologist to provide two years of technical assistance to the NMCP on national entomology surveys and IRS surveillance in Zambézia and this staff member has now been hired by the NMCP.

Progress in the past 12 months

Due to continuing PMI budget constraints, IRS operations in calendar year 2013 were scaled back from six to four districts (Milange, Morrumbala, Mocuba and Quelimane). Universal coverage

with LLINs of the former PMI-supported IRS districts of Maganja da Costa, Namacurra and Nicoadala was achieved in calendar year 2013/2014.

The calendar year 2013 spray campaign, carried out from October 7 through December 10, used the pyrethroid deltamethrin (wetttable granules), which was procured by MOH through the Global Fund. A total of 1,264 men and women were hired and trained as spray operators, team leaders, locality and district supervisors, coordinators, and warehouse keepers. Of the 464,295 targeted structures in the four districts, 414,232 were sprayed, representing 89.2% coverage of eligible structures. The total number of persons protected was estimated at 2,181,896, including 139,499 pregnant women and 379,982 children less than five years of age.

In February 2014, insecticide resistance testing was carried out in Morrumbala, Milange and Mocuba districts, which had IRS for the past seven years. *An. gambiae* s.l. and *An. funestus* s.l. were tested for at least one insecticide in each insecticide class using the WHO assay. No insecticide resistance was detected to any of the compounds for *An. gambiae* s.l. and *An. funestus* s.l. except in Morrumbala where the mortality of *An. funestus* s.l. to deltamethrin was 92.39%, indicating potential resistance.

WHO wall bioassays were conducted to determine the quality of the calendar year 2013 PMI spray and the insecticide residual efficacy in three villages, one in each of the districts of Mocuba, Milange and Morrumbala. Bioassays using susceptible *An. arabiensis* mosquitoes, from a colony in Quelimane, were conducted immediately after spraying and at monthly intervals thereafter. There was approximately 100% mortality of mosquitoes exposed to deltamethrin-sprayed walls in all three tested districts 24 hours post-IRS, indicating that the quality of spray was adequate. Control mortality was less than 5%. Mortality is currently at 85%, 93% and 91% five months post-spray in Mocuba, Morrumbala and Milange respectively. Monitoring of residual efficacy is continuing.

For monitoring vector behavior, density, composition, and seasonality, four sentinel sites were selected. Three sites in intervention districts of Milange, Morrumbala and Mocuba were selected, and one site, Maganja da Costa, was selected as a comparable non-intervention district. Pyrethrum spray collections from July-November 2013 revealed an indoor resting density of 3.1 *Anopheles* mosquitoes in intervention sites compared to 7.1 *Anopheles* per house in the non-intervention site. Overall lower densities of mosquitoes were collected in the intervention sites pre- and post-IRS compared to the non-intervention sites. For full calendar year 2013 entomology results, please see the Mozambique 2013 End of Spray Report on pmi.gov.

PMI continued to provide entomological support to the DPS and the IRS entomological activities in Zambézia with an entomologist and an entomology technician based in Quelimane. In February 2014, a third entomology technician was contracted to increase the capacity and support the expansion of the entomological activities. In addition, PMI continued to support entomologic activities at the central and provincial levels with training, supervision, and standardization of entomology techniques. To expand the INS capacity at the national reference entomology laboratory, three new entomology personnel were recruited by the INS. This will increase the capacity of the INS to provide consistent support to the NMCP in processing the mosquitoes from the national entomology surveillance activities, including mosquito material from the Zambézia IRS activities.

The PMI-supported NMCP national entomologic monitoring activities that had been scheduled for April 2013 did not take place, as the IMVCS had not been approved. In April 2014 the entomologic activities were initiated for 11 provinces with insecticide resistance monitoring and mosquito species and density monitoring. In calendar year 2013, the INS processed approximately 1,000 mosquito samples collected by the NMCP PMI-supported activities. The INS and NMCP are continuing their collaboration in the molecular speciation of the mosquitoes collected for insecticide resistance testing.

In an effort to support data-driven decision-making for vector control interventions, PMI has been supporting enhanced surveillance in eight districts in Zambézia Province since calendar year 2012. PMI began conducting enhanced surveillance in Mopeia and Maganja da Costa in preparation for their expected transition from IRS to LLINs, as well as in all six districts with continued IRS operations in calendar year 2012. This activity supports the new reporting system rolled out in mid-2012, by utilizing PMI staff at the provincial level in Zambézia to ensure that the health facilities in the enhanced surveillance districts have the necessary tools (data collection tools as well as RDTs and ACTs) to conduct the surveillance. PMI is also ensuring the flow of the data from the health facilities to the district malaria focal points is occurring as expected, as well as assisting the malaria focal points in the oversight of data quality. Not enough data is currently available to use for decision-making purposes. Once more data are available, it will inform targeting of IRS, decisions on the allocation of IRS and LLINs, as well as provide important data on the outcome of switching from one vector control intervention to another.

PMI's support to IRS with FY 2014 funding was to align with the draft IMVCS and implement targeted spraying in the four districts selected for Zambézia Province (Mocuba, Quelimane, Nicosadala and Mopeia). Global Fund was to support the distribution of LLINs in certain areas within each of these districts, which would allow PMI to target smaller geographical areas within each of these districts per the IMVCS. Maganja da Costa, Nicosadala and Namacurra, which are former PMI IRS districts, will have transitioned to LLINs as the primary vector control intervention before the 2014 transmission season; however, there are growing concerns that the LLIN distribution may not take place in Mopeia before the start of the malaria season. Therefore, PMI is revising the 2014 IRS plans to do blanket IRS coverage of a total of five districts: Mocuba, Quelimane, Nicosadala and Namacurra per the IMVCS strategy and Mopeia, which may otherwise not be covered by any vector control intervention in 2014 to ensure that there is at least one method of malaria prevention in these districts.

Plans and Justifications

With FY 2015 funding, PMI plans to support the ninth round of IRS in Zambézia, in alignment with the current IMVCS plan. Of the 34 districts identified as target districts for IRS based on the IMVCS criteria, four districts are in Zambézia Province (Quelimane, Mocuba, Nicosadala and Mopeia). PMI will target smaller geographical areas within each of these districts based on population density and malaria prevalence per the IMVCS, with the exclusion of urban areas. The rest of the former PMI IRS districts in Zambézia Province (Milange, Morrumbala, Maganja da Costa, and Namacurra) and areas within the PMI IRS districts not covered by IRS will have received universal LLIN coverage by calendar year 2015. It is expected that improved epidemiologic and entomologic data collected in 2013 and 2014, as well as close collaboration with the NMCP, will guide targeted spraying for the calendar year 2015 campaign to maximize the

limited funding to achieve greatest impact. PMI will again use the insecticides procured by MOH through the Global Fund. A cost comparison of blanket vs. targeted IRS is expected to be undertaken to inform PMI's strategy.

Epidemiologic and entomologic surveillance will be undertaken in current and former IRS districts. Enhanced epidemiologic monitoring will be based on health facility surveillance and PMI will continue support to ensure the availability of tools to conduct the surveillance (e.g., reporting tools as well as a consistent supply of RDTs and ACTs from existing national stocks) and oversight to ensure the flow of quality data from health facilities to the district level and from there to the provincial level, where the data will be entered into a malaria database (*see Monitoring and Evaluation Section*).

PMI will also provide support to the MOH in their national IRS program in PMI's target provinces (*see Strategy section*) by conducting an IRS training of trainers in a cascade approach for the central level NMCP team, provincial malaria managers, and key malaria staff. PMI will also provide support for the supervision of the MOH-led national campaign to help improve the quality of spray operations, as well as limited support to environmental compliance-related activities. PMI is seeking guidance from environmental officers to guide the technical assistance we provide to the government, particularly in areas where DDT is being sprayed, to assure appropriate protection of human and environmental health.

The NMCP's National Entomology Monitoring and Evaluation Plan for 2012–2016 includes insecticide resistance and residual efficacy testing for the IRS and LLIN programs and vector bionomics at sentinel entomologic sites. The number of entomologic sentinel sites and activities in the provinces will be scaled up from calendar year 2012 through 2016. PMI will also support an additional entomologist for the NMCP to improve capacity for its national entomological surveillance activities. This senior-level entomologist will help to build the capacity of junior staff through training, mentoring and technical assistance for approximately two years, at which time it's expected that sufficient capacity will be built to enable the staff to run the entomology program independently.

Proposed Activities with FY 2015 funding: (\$4,935,000)

1. IRS implementation in Zambézia Province: Support targeted IRS operations in alignment with the IMVCS in four districts (Quelimane, Mocuba, Nioadala and Mopeia), covering approximately 270,000 houses. The number of structures and population to be covered in the four districts for the FY 2015 IRS operations will be refined at a later date. PMI-supported activities for FY 2015 IRS operations will include purchasing equipment and supplies, training, supervision, and enhanced epidemiologic surveillance in current and former IRS districts (\$4,000,000);

2. Support ongoing entomologic monitoring activities in the PMI IRS districts of Quelimane, Mocuba, Nioadala, and Mopeia. In addition, PMI will support entomologic monitoring (such as insecticide resistance tests and vector species monitoring) in the four former IRS districts as these districts transition to LLIN universal coverage (\$150,000).

3. Entomologic monitoring for MOH vector control activities. Support expanded entomologic monitoring nationwide in as many as 20 sentinel entomological sites (two in each province, one in

an area of IRS and the other where LLINs are used) and processing of samples in reference lab (\$250,000);

4. Support of NMCP IRS activities for training of trainers through a cascade approach, supervision of IRS activities, and environmental compliance activities (\$400,000);

5. Support the secondment of an entomology coordinator to the NMCP to increase capacity to coordinate and conduct expanded entomological monitoring in nationwide sentinel sites and to strengthen capacity to analyze entomological data, provide reports and training to the NMCP entomology team (\$100,000); and

6. Provide entomological technical assistance through two TDYs, including reagents and laboratory diagnostics materials (\$35,000).

Malaria in Pregnancy

NMCP/PMI Objectives

Prevention of malaria in pregnant women, through the use of sulfadoxine pyrimethamine (SP) for IPTp and ITN distribution, has been promoted in Mozambique since calendar year 2006. The country has recently adopted the new WHO guidelines on IPTp, which recommend monthly doses of SP during pregnancy at the beginning of the second trimester. The national guidelines also recommend supplementation with iron and folic acid during pregnancy; the available tablets in Mozambique contain 90 mg of ferrous sulfate and 1 mg of folic acid. Treatment of malaria during pregnancy is done with oral quinine in the first trimester and ACTs in the second and third trimesters.

Although procurement of SP and LLINs for distribution through ANCs is supported by the NMCP and its partners, the implementation of MCH programs is managed by MOH's MCH department, which is under the same National Directorate as the NMCP. Both entities have identified focal persons for MIP and these individuals work very closely together. The priority for the MOH MCH program is the implementation of an "Integrated Reproductive Health/Maternal-Neonatal-Child Services Package." A key objective of both the NMCP and the MCH Department is to ensure that 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. However, this indicator is likely to be updated to reflect the adoption of the new WHO guidelines for IPTp.

In alignment with GRM objectives, PMI aims to achieve the following objectives:

1. Ensure point-of-care delivery of MCH services through provincial and district support of supervision and training of ANC health workers;
2. Support simplification of the delivery and reporting of SP uptake by pregnant women through the rollout of the new WHO guidelines and training in their implementation.

Progress since PMI was launched

IPTp coverage in Mozambique has remained almost stagnant over the past seven years. The percentage of women who receive at least two doses of SP during pregnancy increased slightly from 16.2% in 2007 (2007 MIS) to 18.6% in 2011 (2011 DHS). MOH is paying considerable attention to improve the coverage of this indicator. The primary vehicle for delivering this support has been the “Integrated Reproductive Health/Maternal-Neonatal-Child Services Package” which was launched in calendar year 2012. PMI has contributed to this effort, along with other USAID funding sources, since FY 2009. The USG has supported the development of national policies, norms, and guidelines; conducted training on the integrated in-service training package; provided support for the improvement of the quality of care; and coordinated MCH partners under the leadership of MOH. As a result of this effort, the routine data is showing an improvement of IPTp coverage from around 20% in 2011 to 36% in 2013, nationwide.

The reasons for the low coverage of IPTp are complex, but are thought to result primarily from lack of supervision of case management practices at ANC facilities, inconsistent stocks of SP resulting from national stockouts and poor management of the supply chain, and lack of clearly articulated guidelines on the administration of IPTp. In addition, it is thought that a high percentage of women that receive both IPTp and ITNs are not recorded, making the coverage of these interventions artificially low and emphasizing the need for better monitoring and reporting of MIP indicators at the health facility level. In the past two years, the MCH department at MOH has undergone an internal reorganization, and changes in personnel have resulted in increased collaboration with the NMCP.

Progress in the past 12 months

After the revision of the ANC registers in calendar year 2012 to include provision of IPTp and bed nets, the MCH program and the NMCP, with PMI support, have carried out a second revision of the ANC registers to reflect the new WHO IPTp guidelines which were recently adopted, as well as to incorporate malaria biomarker indicators. The new registers have been tested and are expected to be finalized by July 2014. All training manuals needed for the roll out of these registers have been completed. The introduction of the new register is schedule for early calendar year 2015.

PMI has continued to support provision of ANC services to pregnant women through training and supervision. PMI support focused on

Data from the health facilities receiving USAID and PMI support in the context of the Model Maternity Initiative indicate that, in the second quarter of FY 2014, 37% of pregnant women attended the four ANC visits recommended by national guidelines; 45% received at least two doses of IPTp and 75% received bed nets during ANC visits. The high IPTp coverage reported in these health facilities (45%) is much higher than the national average of 36%, suggesting that the Model Maternity Initiative is having an impact in improving coverage of MIP interventions.

In anticipation of increased consumption of SP as a result of the new WHO guidelines, an updated quantification and the procurement of additional SP was carried out with support from UNICEF.

This additional SP, which will supplement the 5.1 million SP tablets procured by PMI with FY 2013 funds, is scheduled to arrive in September 2014. Upon its arrival, MOH will send a letter to all provinces, districts and health facilities instructing them to start the implementation of the new IPTp guidelines.

Plans and justification

With FY 2015 funding, PMI plans to expand MIP activities at the provincial and district level by ensuring coverage of all districts of the four target provinces of Zambézia, Nampula, Tete and Cabo Delgado. This will be achieved through placement of PMI-supported personnel who will provide on-the-ground mentoring, supervision, and support to DPS staff to ensure proper supervision and training is provided to ANC clinicians on case management of MIP, as well as on the collection and reporting of key MIP indicators, in addition to integrated maternal and child health activities. BCC related to MIP will also be implemented at both the provincial level in these target provinces, as well as limited national-level support. We expect that the BCC activities will contribute to increasing the uptake of IPTp by promoting early attendance of ANC services by pregnant women; by increasing awareness of pregnant women in relation to the dangers of MIP and the benefits of IPTp; and by addressing some of the cultural norms and beliefs that may act as barriers for IPTp uptake.

PMI will also continue to provide support at the central level to the integrated supervision of health workers at ANCs. In addition, PMI will continue to support the rollout of the new WHO guidelines for SP, trainings for ANC health workers on implementation of the guidelines, and the rollout of new ANC registers that will collect malaria-specific indicators.

Please note that for calendar year 2016, PMI expects that all SP needs will be covered by the GRM.

Gap Analysis for SP, Calendar Year 2014-2016*

	2014	2015	2016
National SP needs (tablets)	7,409,263	8,248,557	9,125,615
Opening stock on hand	2,264,918	7,583,655	7,600,098
UNICEF	6,000,000	-	-
GRM	1,622,000	-	1,525,517
PMI	5,106,000	8,265,000	0
Gap	-7,583,655	-7,600,098	0

Proposed Activities with FY 2015 funding: (\$950,000)

1. Support technical assistance for development or update of policies and training and supervision materials in MIP. Central level support for integrated supervision of health care workers at ANC clinics (\$250,000); and
2. Provincial-level support for training and supervision of ANC staff in MIP. Decentralized support for integrated in-service training and supervision of ANC health workers on prevention of

MIP in all districts of four targeted provinces (Cabo Delgado, Nampula, Zambézia, and Tete) (\$700,000).

CASE MANAGEMENT

Malaria Diagnosis

NMCP/PMI Objectives

According to Mozambique's updated national treatment guidelines, all patients suspected of having malaria must have a confirmatory diagnostic test before receiving treatment with an ACT. Due to difficulties involved in implementing and ensuring the presence of high-quality microscopy, RDTs are the preferred test for primary diagnosis of malaria, and were rolled out nationally in calendar year 2011. Microscopy is reserved for suspected treatment failures, severe febrile illness, and cases referred from lower levels of care. The NMCP and PMI prioritize the scaling up of quality-assured diagnostic testing at both the facility and community level through procurement of microscopes, laboratory supplies, and reagents; scaling up quality assurance systems for malaria microscopy and RDTs; and procurement of RDTs to be used at the facility and community level.

In line with the GRM objectives, PMI aims to achieve the following objectives:

1. Strengthen supervision and training of malaria diagnosis at the provincial level and below through the implementation of provincial focal points for malaria case management.
2. Improve the forecasting, allocation, distribution, stock management, and use of RDTs in the country.
3. Implement a quality control/quality assurance program for both microscopy and RDTs.

Progress since PMI was launched

In support of the NMCP objectives, the National Reference Laboratory for Blood Parasites was refurbished, quality assurance testing practices have been developed, and supervision guidelines for malaria diagnosis have been completed. In addition, central and regional level training of microscopy trainers was performed, followed by the subsequent training of 95% of the existing laboratory staff in the country by these trainers.

PMI has historically supported the procurement of laboratory consumables used for quality control activities and training of staff. PMI supported the training of eight reference laboratory staff on malaria microscopy, including preparation of slides, slide reading, parasite density and standard operating procedures. The training was carried out at *Centro de Investigação em Saúde da Manhica* (CISM), which has a laboratory with International Organization for Standardization (ISO) certification for malaria. Despite the progress in trainings, poor supervision and lack of quality assurance measures have resulted in the overall poor quality of microscopic diagnosis of malaria, particularly below the provincial level. Moreover, stockouts of microscopy reagents continue to occur, further hampering sustained progress in diagnostic capacity.

PMI has historically procured at least one third of the nation's annual RDT needs to help ensure the provision of appropriate case management, though the roll out of RDTs continues to face several challenges, including limited consumption data and distribution plans, poor warehousing and storage practices, and poor logistics management. Stockouts continue to occur at the peripheral (health facility) level, though stocks at the district and provincial level have been improving. Due to the lack of quality data on consumption and performance of RDTs, forecasting efforts have been hampered, which in turn affect stocks of commodities at all levels.

Progress in the past 12 months

With FY 2013 funds, PMI procured approximately 15 million RDTs, and while challenges in distribution still exist, progress is being made, in particular at the provincial and district level. Based on the last EUV report from January to April 2014, only two of the 22 warehouses visited and three of the 25 health facilities visited had stockouts on the day of the visit, though at the same time many health facilities continue to report stockouts. PMI provided technical assistance to the NMCP and INS to review the quality assurance/quality control (QA/QC) guidelines, and issued recommendations that are expected to be implemented in the coming months. A quantitative study on RDT use at five clinics in four provinces is currently being undertaken by CISM, and is expected to be completed in the coming months. This study will provide valuable data on the factors influencing adherence to RDT testing guidelines that the NMCP will use to improve their case management trainings. It is also hoped that this study will provide justification for the country to provide more specific guidance on which RDTs should be used in the country, thus reducing the confusion coming from having too many brands circulating at the same time. Provincial level case management activities in Nampula and Zambézia are being scaled up, and laboratory support in the form of supervisory checklists, workshops following supervisory visits, and trainings will begin this year. Similar activities will begin in the other two PMI target provinces (Tete and Cabo Delgado), when the provincial level platforms are finalized.

Plans and Justification

With FY 2015 funding, PMI will continue to strengthen INS capacity to implement quality assurance activities for malaria microscopy and RDTs. PMI will continue to support the implementation and scale-up of the national QA/QC system, both in terms of building the capacity of the INS central diagnostic lab and increasing the ability of the INS to include more health facilities in the QA/QC system.

During discussions on the gap analysis for RDTs, PMI learned that previous years' gap analyses had been done using old quantification data. This, combined with lower than expected reporting rates, poor data on actual consumption rates, and fluctuation in the price of RDTs, led to a significant surplus of RDTs in the country. As a consequence, PMI reduced the number of RDTs it will purchase with FY 2014 funds, and will procure approximately 8 million RDTs with FY 2015 funds. These 8 million RDTs, when combined with those being purchased through the Global Fund Round 9 Phase 2 and NFM grants, will provide the country with nine months of buffer stock at the end of calendar year 2016. This buffer has been recommended by supply chain experts for the end of the year as that time period coincides with Mozambique's peak transmission season, and will allow flexibility in responding to procurement delays with Global Fund commodities, as well as any unexpected increases in consumption. PMI expects quantification data to continue to

improve as we strategically invest in strengthening both data quantity and quality nationwide. RDTs will be delivered through various systems, including the APE kits. For additional information on PMI's case management-related support to the APE program, please see the *Treatment* section.

In the past two years, efforts have focused on training of both clinical and laboratory staff at the provincial and district level in Nampula and Zambézia. With FY 2015 funds, PMI will support eight supervision visits by central level staff to four provinces (Cabo Delgado, Nampula, Zambézia, and Tete); PMI will also ensure all districts in the above-mentioned provinces receive quarterly supervision visits. In addition, biannual refresher training on microscopy and RDT use will take place for laboratorians and supervisors in the above provinces, and lessons learned workshops based on supervisory visits will be conducted in all districts of these provinces.

Gap Analysis for RDTs, Calendar Year 2014-2016

	2014	2015	2016
Forecasted consumption	18,155,095	19,390,684	19,947,435
Opening stock on hand	14,541,177	20,211,407	15,240,678
Global Fund	9,375,325	10,007,684	5,787,251*
PMI	14,450,000	4,412,271	8,000,000
<i>Closing stock on hand (surplus)</i>	<i>20,211,407</i>	<i>15,240,678</i>	<i>9,080,494</i>

**Numbers based on Global Fund Round 9 Phase 2 funds only; NFM funds are expected to be in place by late 2015*

Proposed Activities with FY 2015 funding: (\$3,852,100)

PMI will support the continued strengthening of diagnostic laboratories at all levels through procurement of necessary commodities, refresher training, supervision, and quality control of diagnostic testing. The proposed activities are as follows:

1. Procure RDTs: Support will be provided to procure approximately 8 million single species RDTs (\$2,390,000);
2. Support supervision of laboratory diagnosis at the provincial and district levels: Provide supervision of laboratory staff in malaria laboratory diagnosis, use of RDTs and quality assurance (\$1,150,000);
3. Support to National Reference Laboratory for rollout of QA/QC system: Continue support to the INS National Reference Laboratory with the rollout and scale up of the national QA/QC system (\$100,000);
4. Support to reference laboratory technicians in INS, MOH. Recruit and hire laboratory

technicians to conduct assays in entomological surveillance, diagnostic and immunology labs for entomological monitoring, and diagnostic quality assurance (\$200,000);

5. Provide technical assistance for laboratory strengthening: Support of laboratory strengthening activities to NMCP and quality control system support (\$12,100).

Malaria Treatment

NMCP/PMI Objectives

Mozambique's national guidelines for malaria treatment were last updated in calendar year 2011. Artemether-lumefantrine (AL) remains the first-line treatment for uncomplicated malaria, and artesunate-amodiaquine (AS/AQ) is the recommended alternative antimalarial. Quinine is the recommended treatment for pregnant women during their first trimester, as AL is contraindicated in this population, and is also recommended for treatment failures with AL. Rectal artesunate is recommended for pre-referral treatment of severe malaria, and parenteral artesunate is the recommended treatment for severe malaria.

The NHS covers approximately 60% of the population. In calendar year 2011, Mozambique launched a revitalization of the APE program with the intent that this cadre of trained health workers would extend the reach of the NHS and provide health-related care to the remaining 40% of the population. Currently, APEs provide 80% and 20% of rural communities' preventive and curative care, respectively, for illnesses such as upper respiratory tract infections, diarrheal diseases, and malaria. APEs serve as the first-line of defense against malaria for people living in rural Mozambique and are trained to diagnose malaria with RDTs and provide ACTs to those with positive test results. The APE program is an important component of Mozambique's malaria case management plan, and for many residents, they are the only option for appropriate malaria diagnosis and treatment.

In calendar year 2013, the GRM decided to decentralize its approach to health care and prevention, which is now beginning to be implemented. While previously many of the health-related responsibilities including oversight and training of health care workers, behavioral communication, and distribution of commodities were managed at the central level, they now fall under the purview of the Provincial governments. Despite this shift, the goal of the NMCP remains to ensure that the entire population of the country has access to proper malaria diagnostics and treatment. In alignment with the GRM, PMI aims to achieve the following objectives:

1. Strengthen malaria case management supervision and training at the provincial and district levels;
2. Support and expand community case management of malaria; and,
3. Strengthen warehousing, management, and supply chain for antimalarials.

Progress since PMI was launched

Since calendar year 2007, significant progress has been made to simplify and streamline national standards of care for malaria treatment. In calendar year 2011, national case management guidelines were finalized in line with WHO treatment guidelines for uncomplicated and severe

malaria. Clinicians at all levels of the health system have been trained on the implementation of these guidelines in all 11 provinces. Support for these programs has historically been provided at the central level, but with the policy shift towards decentralization with FY 2013 funds, there is a larger emphasis on building capacity at the provincial level.

Progress in the past 12 months

PMI continued to support the development of the Integrated Health Package, which includes activities related to prevention and treatment of malaria during pregnancy and management of malaria in children under five. This package is currently being tested and is expected to be finalized by the end of FY 2014. In line with its goals, PMI has refocused its support for case management from the central level to the provincial and district levels.

The APE program has been progressively scaled up since calendar year 2011. A total of 1,057 APEs were recruited and trained in calendar year 2013, and an additional 474 have been recruited and trained to this point in 2014. Only 45 APEs have left their positions since calendar year 2011, bringing the current number trained and practicing APEs to 2,699 across the 11 provinces of Mozambique, achieving MOH's original plan to have 2,500 APEs trained by calendar year 2013. MOH, USAID, and other donors continue to discuss the necessary number of APEs needed to provide sufficient coverage for the rural areas that extend beyond the reach of the NHS. Partners, including Village Reach and UNICEF, are gathering critical data from APEs on malaria treatment, diagnosis, and commodity usage. Specifically, preliminary UNICEF data from calendar year 2013 showed that 84% of APEs reported consultation data, and performed 804,979 consultations. APEs identified 354,327 cases of malaria, 84.5% of which were confirmed with RDT and 89.7% received an antimalarial treatment. Children under five years of age represented 52.3% of the cases of malaria diagnosed by APEs. Although PMI did not support the training of APEs, PMI has provided central level support to continue the expansion and training of APEs throughout the country, and all of the RDTs and ACTs used in this program are purchased by either PMI or the Global Fund.

PMI and the Global Fund together purchase all of the ACT treatments needed in Mozambique each year. At the end of calendar year 2013 there was a surplus of over 5.2 million doses of AL. In order to create a buffer stock to avoid potential stockouts due to the uncertainty of Global Fund deliveries, and as a result of prior conservative estimates of consumption and costs, a significant amount of FY 2014 funds were originally allotted to the procurement of AL. As district reporting rates of ACT consumption have improved, as demonstrated by an increase from 73% in November of 2013 to 91% in February of 2014, country-wide estimates of ACT consumption have become more accurate. These improved data on consumption, as well as costing, have demonstrated that previous estimates were overly conservative and have allowed PMI to purchase fewer treatments than originally planned while maintaining significant buffer stock in-country to avoid stockouts.

In previous years the procurement of parenteral artesunate for the treatment of severe malaria was covered by PROSAUDE, donors, and the Global Fund. A portion of the current stock of parenteral artesunate will expire in calendar year 2015, and FY 2014 funds are being reprogrammed to purchase 350,000 vials to cover the potential stockout while plans are made for Global Fund to cover the expenses in the future.

PMI has worked with partners to support warehousing and drug management at the central and provincial levels. Stockout data from the EUVs carried out in Zambézia, Nampula, Manica, Gaza, Maputo, Sofala, and Tete Provinces between January and April of 2014 were encouraging. None of the 25 health facilities were found to have complete AL stockouts at the time of the EUV visits. However, though 91% of the provincial warehouses had two or more presentations of AL, 9% were without any AL. Additionally, only 50% of the health facilities and only 62% of the warehouses had appropriate storage conditions for AL. Of the malaria case records reviewed during the EUVs, 100% of children under five were treated appropriately with AL, while 97% of people older than five years were treated appropriately with an ACT.

Plans and Justification

PMI will continue its efforts to strengthen the supply chain at all levels, but with the shift towards decentralization, there will be a larger focus at the provincial and district levels.

Due to the improved data used for forecasting and the surplus of ACTs at the end of calendar year 2014, PMI will procure significantly less ACTs than were originally anticipated. PMI will purchase approximately 2.8 million ACTs in calendar year 2016, which will leave a six month buffer at the end of calendar year 2016. This heightened buffer has been recommended by supply chain experts for the end of the year as that time period coincides with Mozambique's peak transmission season. ACTs will continue to be distributed through various platforms including APE kits.

PMI will continue to support clinical oversight of case management activities through supervision at the provincial level, and will increase support for these activities to cover all districts within Nampula, Zambézia, Tete, and Cabo Delgado Provinces, at the health facility and community level. Building on efforts that began in late calendar year 2013, this support will be provided through nongovernmental organizations operating at the provincial level and expand to cover all districts within these provinces, at the district level.

In an attempt to alleviate some of the delays and inefficiencies associated with Global Fund-procured commodities, PMI will provide technical assistance to the MOH's Global Fund unit. The goal of this technical assistance will be to improve the unit's ability to receive and disburse funds from Global Fund grants, and to use these funds more effectively and efficiently to purchase and distribute commodities in a timely manner.

Gap Analysis for ACTs, Calendar Year 2014-2016

	2014	2015	2016
AL National Needs	10,647,071	10,433,668	9,791,378
Opening Stock on Hand	4,843,926	10,926,651	9,744,777
Global Fund Round 9 Phase 2	5,414,320	6,403,794	2,843,809
PMI	11,315,476	2,848,000	2,848,000
Surplus	10,926,651	9,744,777	5,645,208

Proposed Activities with FY 2015 funding: (\$4,738,300)

1. Procure ACTs: PMI will procure approximately 2.8 million ACTs for the treatment of uncomplicated malaria (\$2,288,300);
2. Strengthen the antimalarial supply chain and overall pharmaceutical management system of MOH: Continue to support strengthening CMAM’s capacity to forecast and manage antimalarial drugs through improved logistics management capacity, with particular support for AL distribution at the health facility and community levels. PMI will also support ongoing assessments of warehousing inventory management, as well as strengthening storage and distribution capability at the central level (\$300,000);
3. Support warehousing and drug management at the regional, provincial and district levels: Building on achievements already made at the central level warehousing facilities (*see Pharmaceutical Management section*), and working to support the decentralization of the system, PMI, along with PEPFAR, will support regional, provincial, and district level technical support to improve warehouse management, supervision of the Logistics Management Information System (LMIS), and transportation of medicines to strengthen peripheral-level capacity in selected provinces (\$600,000);
4. Central level supervision support: Facilitate and assist with planning and implementation of supervisory visits from the central level to the provincial level, as well as technical support for malaria case management (\$350,000);
5. Decentralized support of case management supervision and training: PMI will focus efforts to improve supervisory capacity for malaria case management in all districts within Nampula, Zambézia, Tete, and Cabo Delgado Provinces from the district level to the health facilities and the community level through trainings, facilitation of the logistics aspects of supervision, and assistance in supervisory planning (\$750,000);
6. Central level support to the MOH Global Fund Unit: PMI will support technical assistance to the MOH Global Fund unit to strengthen the capacity to procure and receive Global Fund shipments of commodities, and to distribute funds and commodities from Global Fund grants in a timely manner (\$200,000); and

7. Central support to APE coordination: PMI will provide technical assistance to improve the efficiency of the APE program's coordination, increase the overall quality of the program, and improve the existing M&E systems. PMI will continue to support MOH's Training Department in the development and updating of training and supervision materials and will support provincial supervision visits to at least four provinces, twice yearly (\$250,000).

Pharmaceutical Management

NMCP/PMI Objectives

Both MOH and its partners have recognized the need to strengthen MOH's supply chain system, in order to support service delivery. CMAM is the national entity with primary responsibility within MOH for all central-level supply chain functions, including procurement of all pharmaceuticals and related health supplies. In collaboration with the NMCP, CMAM continues to manage forecasting needs and supervises the procurement, storage, and distribution of all malaria commodities, except ITNs, from the central level to the provincial warehouses.

Malaria medicines and RDTs are delivered through two parallel logistic systems, one known as the kit system and a second known as the Via Clássica. The kit system is supported by PMI and it was developed in response to the bulkier Coartem® packaging, which makes it difficult to fit in the essential medicine kit. Currently, PMI supports this system, which runs together with the essential medicines kit. These malaria kits are distributed to both health facilities and APEs through a push system.

The second logistics system, the Via Clássica, distributes medicines and RDTs on a quarterly basis. The products are delivered to warehouses in Maputo, Beira and Nacala, which in turn supply the three existing central hospitals and ten provincial warehouses. Each of the ten provincial warehouses supply the district warehouses, rural hospitals, general hospitals, and provincial hospitals. Malaria drugs, including AL, are managed within this system, which requires health facilities to report consumption data.

In alignment with the GRM, PMI aims to achieve the following objectives:

1. Develop more effective public sector medical supplies/commodity procurement capacity.
2. Improve public sector warehousing and distribution at all levels.
3. Improve the use of medicines and develop more effective pharmaceutical services.
4. Strengthen the MOH/Pharmacy Department's strategic planning and management capacity.
5. Strengthen overall regulatory capacity.

Progress since PMI was launched

The USG has made significant contributions toward supply chain strengthening and improvement of pharmaceutical management in efforts to ensure access to good quality commodities. PMI funds complemented significant PEPFAR resources to strengthen central-level warehousing, by refurbishing the main central warehouse, Zimpeto, located in the outskirts of Maputo, and the Beira regional warehouse in Sofala Province. Together with another Maputo-based warehousing complex, Adil, these warehouses were to be linked to the Beira and Nacala warehouses to form a

centrally managed, national system with accurate information on stock status for all essential commodities. However, this process continues to be delayed and the warehousing management information system is not yet operational in each of the regional warehouses. Despite these delays, both CMAM and the NMCP are supportive and recognize the need for a ‘real-time’ functional warehousing management system.

In the last seven years, there have been three changes to the first-line treatment of uncomplicated malaria; a new first-line severe malaria treatment; the finalization of diagnostic guidelines; the roll-out of malaria RDTs on a national level; and the development of a supply chain master plan. Despite the problem with Mozambique’s pharmaceutical management and supply chain system, good quality first-line ACTs are reaching the health facilities, and RDTs are being pushed out to the 11 provinces.

Through significant efforts on the part of CMAM, the NMCP, and USG donors, a computerized LMIS is now operational nationally in all provincial capitals and in 68 out of 151 districts. This computer-based, real-time LMIS, called SIMAM, is an Access-based program and relatively easy to use; warehouse staff in all provinces, and centrally, have been trained. The plan is to continue the roll out of the SIMAM system to all districts with USG and Global Fund support.

Progress in the past 12 months

During the past year, PMI continued to provide support to CMAM through provision of technical assistance, procurement of commodities and support to the ACT and RDT kitting system. PMI also continued to support supervision of health facilities through the implementation of the EUV tool.

PMI continued its support to the Medicines Technical Working Group (*Grupo Técnico de Medicamentos*), which was established several years ago through a collaborative effort of various USG implementing partners and other donors. This working group supports the management and oversight of health commodities through the regular update of the quarterly supply plans. This working group is also responsible for coordinating the quantification and gap analyses and to track consumption data of malaria commodities. The number of districts reporting consumption of ACTs and RDTs has increased considerably from 17% in calendar year 2012 to 93% in calendar year 2014. In terms of product distributed, 67% of what was distributed in calendar year 2013/2014 was reported as consumed. In spite of these improvements in the reporting rates, additional work is needed to ensure that all health facilities within a given district report consistently.

Most of PMI’s and other donors’ support has been concentrated on strengthening the supply chain system at the central and provincial levels. PMI has recognized that in order to improve the management of the supply chain it is important to decentralize its support to districts. In order to achieve this, PMI is placing logistic advisors in targeted provinces. An advisor has been recruited to support Zambézia Province. In the coming months PMI will recruit two more advisors, one based in Nampula to cover the Northern Provinces of Nampula and Cabo Delgado, and the other based in Sofala to cover the Central Provinces of Sofala, Manica, and Tete. These advisors will work closely with the provincial and district authorities to ensure that health facilities report consumption data routinely and experience fewer stockouts.

Other activities implemented in the past year include the provincial quarterly supply chain meetings, which took place in 10 of the 11 provinces; preparation and dissemination of monthly

stock on hand reports; printing of manuals and forms; and rental payments at the Adil warehouse in Maputo. In addition, PMI continued to support the preparation and transport of ACTs and RDTs kits. It is estimated that in the past year, almost 3.5 million ACT treatments and 7.2 million RDTs were distributed down to both APEs and health facilities through the kit system.

USG has been the major partner providing technical assistance to CMAM. Most of the support has been provided through PEPFAR. However, PEPFAR funding to health system strengthening activities is reducing because of reinterpretation of the care and treatment earmark, which will jeopardize the continuation of many of the activities described above.

Plans and justification

With the anticipated reduction of PEPFAR contribution to strengthening the supply chain and with the continuing challenges and delays of the Global Fund Round 8 Phase 2 health systems strengthening grant, PMI will have to increase its share of technical assistance to CMAM in order to continue to support improvements in key areas such as warehousing, supervision, and logistics management information systems. PMI will also provide technical assistance to CMAM to improve its capacity to better liaise and strengthen communication and information exchange with the NMCP, continue to build-up human resources within CMAM, and improve warehousing management and logistics capabilities. PMI will continue to support the expansion of the SIMAM LMIS and will continue to support the ACT/RDT kitting system. Additionally, the EUV tool (see *Monitoring & Evaluation* section), together with the placement of the regional and provincial-level technical advisors will help information collection, aggregation, and timely delivery to CMAM to better inform all warehousing and procurement activities.

It is expected that the support from USG will be complemented by the Global Fund Round 8 health systems strengthening grant. This grant includes provision of technical assistance to CMAM to increase its capacity for generating, tracking, and monitoring of warehousing documentation. This will improve data collection for the LMIS and will help mitigate the potential for leakage of commodities. Additionally, CMAM's ability to conduct monthly periodic stock reconciliation and other routine QA/QC activities for basic warehouse management practices will be strengthened via technical assistance.

Proposed Activities with FY 2015 funding: (activities and costs covered in other sections).

BEHAVIOR CHANGE COMMUNICATION

NMCP/PMI Objectives

The objective of the NMCP's BCC activities is to ensure that by calendar year 2016, 100% of the population is covered by key messages related to malaria prevention, diagnosis, and treatment. PMI supports a range of BCC activities aimed at promoting correct and consistent use of LLINs, increasing acceptance of IRS, and increasing adherence to treatment and prevention therapies, all of which are key to achieving and maintaining the NMCP's goals for malaria prevention and control. To coordinate all malaria communications activities, the MOH has created a malaria communication group. This group includes representatives from the NMCP, the Communications

Department of MOH, donors, United Nations agencies, and from implementing partners. This working group is chaired by NMCP and is supposed to meet once a month.

In alignment with the GRM, PMI aims to achieve the following objectives:

1. Strengthen the capacity of MOH/DEPROS to effectively develop, implement, and coordinate malaria BCC strategies and approaches.
2. Build the capacity of local organizations to train religious leaders in BCC and community mobilization to reduce malaria prevalence.
3. Develop in-country capacity, within the NMCP and PMI implementing partners, to effectively monitor and evaluate the quality of BCC activities and their impact on desired behavioral outcomes.

Progress since PMI was launched

Since calendar year 2007, PMI has supported malaria BCC through a consortium of religious groups called the Inter-Religious Campaign Against Malaria (PIRCOM), a local organization in Mozambique that provides malaria messages to communities during religious sermons as well as door-to-door malaria BCC activities outside of the religious sphere through community volunteers.

PMI has also provided central level capacity building support for BCC to the NMCP, and more recently DEPROS, to develop the overall malaria communication strategy as well as implement and coordinate malaria BCC activities in Mozambique. However, there remains limited technical capacity for BCC at the NMCP, and the coordination between the malaria program and DEPROS is weak.

PMI is the main donor supporting malaria BCC activities in Mozambique. Global Fund provides limited support to community-based BCC activities in the context of large-scale universal coverage campaigns of LLINs. Although there has been progress in some areas, including the development of a national malaria BCC strategy in calendar year 2013, BCC related to malaria prevention and control continues to be a notable weakness in Mozambique.

Progress in the past 12 months

With the recent approval of the strategic plan for malaria BCC, which provides a framework for the implementation of all malaria BCC activities in Mozambique, PMI has now begun assisting DEPROS with disseminating the strategy and translating it into a concrete implementation plan, which is expected to be completed over the next several months.

One of PMI's main avenues of disseminating malaria messages is through PIRCOM, which is working in targeted districts in Zambézia, Nampula, Sofala, Inhambane, and Gaza Provinces. During the past year, PIRCOM experienced a prolonged lapse in funding due mainly to the late arrival of FY 2013 funds. As a consequence, PIRCOM only trained approximately 15 new religious leaders and 67 volunteers on key malaria prevention and treatment messages to supplement the existing cadre of 556 religious leaders and 1,102 volunteers that were trained in previous years and continue to operate within the PIRCOM framework. PIRCOM's malaria BCC messages reached nearly 75,000 people through religious sermons, in addition to more than 32,000 families who were reached through door-to-door mobilization by community volunteers. In

addition, PIRCOM has trained 76 supervisors to monitor the effectiveness of the sermons and door-to-door visits by volunteers. PIRCOM also trained two dozen Peace Corps Volunteers (PCVs) on malaria BCC to enable them to be advocates in their communities nationwide.

PIRCOM's main challenge has been to develop a good M&E plan for their BCC activities. PIRCOM received substantial support through PMI to improve its M&E operations. Additionally, an organizational capacity assessment for PIRCOM was conducted by external partners at the end of last year. This resulted in development of an institutional strengthening plan which identified organizational strengths and challenges, but more importantly set strategies and plans for PIRCOM to effectively carry out activities. Areas highlighted for capacity development included developing key messages for BCC and M&E of BCC interventions. Resource mobilization was another area highlighted in the institutional strengthening plan as an opportunity for capacity development. Potential actions included developing and applying a resource mobilization plan and raising non-restricted resources. Over the next several months, PMI will initiate an external assessment of PIRCOM's messages and effectiveness to inform future PIRCOM activities.

PMI has also disseminated malaria messages through integrated provincial-level platforms in Nampula and Zambézia. These platforms, which receive funding from multiple health elements, are able to maximize resources and ensure BCC is comprehensively addressed. These platforms have a significant reach within PMI's targeted provinces and utilize various proven BCC channels, including door-to-door mobilization, community radio, theater groups, and training of health workers, among other channels to influence malaria-related behaviors at the community and health facility level using approved messages. Over the past 12 months, PMI's provincial-level partner in Nampula has trained 22,000 volunteers and 289 community leaders on the causes, symptoms, prevention and treatment of malaria, in addition to promoting IPTp and correct and consistent use of nets among pregnant women. PMI has also visited nearly 200,000 houses a minimum of four times to deliver malaria-related messages door-to-door in Nampula, in addition to the wide dissemination of messages through community radio and theater sessions, which reached hundreds of thousands of individuals. In Zambézia, the provincial-level partner has disseminated malaria messages through drama targeting 2,763 people; however, this was not with PMI funding. Quarterly provincial malaria coordination meetings have also been established to ensure that the work of various partners (including BCC) within the province is harmonized and complementary. PMI's provincial-level malaria BCC work in Tete is just beginning and a partner remains to be identified in Cabo Delgado; results from these provinces will be reported in subsequent MOPs.

PMI also implemented community mobilization activities in Zambézia Province to increase acceptance of the PMI-supported IRS program, which took place in four districts. The community sensitization activities were based on messages approved by the NMCP and included the involvement of local leaders in all steps of the campaign and the training of these leaders to mobilize their communities. Where available, APEs are involved in malaria BCC activities within their communities; however, few communities are covered by APEs.

Lastly, PMI supported one third-year Malaria PCV in Maputo to coordinate malaria-related activities by the nearly 200 PCVs nationwide in Mozambique. In addition, Peace Corps is establishing regional malaria representatives to help promote and coordinate malaria-related activities among PCVs in their region. All PCVs are trained on malaria three times within their period of service and have been catalysts for the uptake of positive malaria prevention and

treatment behaviors within their communities. PMI-funded small project assistance grants have allowed PCVs to promote malaria messages through trainings and workshops, music videos, murals and blogs.

The focus of BCC activities thus far in Mozambique has been on increasing the number of people with access to interventions, rather than identifying the behavioral barriers to accessing these interventions. As the interventions are scaled up, identifying these barriers will become a high priority. For example, support for APEs is being scaled up to increase access to diagnosis and treatment for those who do not seek care at health facilities. As these activities progress, the team may implement studies to identify reasons why those who do not access health facilities or are not reached by APEs are not seeking care. Results of post-universal ITN distribution surveys being conducted should help guide the implementation of BCC activities in areas with low net coverage and use.

Other PMI-supported BCC achievements to date include regular support for the Malaria Communication Group, including advising on the universal net coverage campaign and World Malaria Day 2014 commemoration with MOH and PMI partners.

Plans and Justification

With FY 2015 funding, PMI will significantly increase its support to malaria BCC activities, ensuring that messages are state of the art, delivered through proven channels, reaching key populations, and effective. Malaria BCC was recently highlighted by the new NMCP Director as a major area of weakness within Mozambique, and PMI will direct heightened attention to this area at the central and provincial levels to strengthen the uptake of malaria prevention and treatment behaviors. PMI will soon identify prioritized BCC activities based on proven, state-of-the-art methods that have been proven effective within the Mozambican context. PMI will also begin developing materials to be used for malaria BCC activities over the next several months in coordination with DEPROS. As BCC interventions are scaled up, PMI will work closely with the PMI HQ BCC team to identify appropriate indicators that can be collected from the outset in order to properly monitor the progress and impact of BCC programs.

PMI will provide direct support to PIRCOM to vastly increase coverage of its malaria BCC activities within PMI's four target provinces through religious sermons and door-to-door mobilization using community volunteers. The upcoming assessment of PIRCOM's messages and effectiveness will result in positive improvements that ensure PIRCOM's activities are impactful, reaching their intended targets, and harmonized with other malaria BCC activities. Support for PIRCOM includes per diems and transportation for supervisors, hiring of provincial-level coordinators and a regional office.

PMI will also increase its support to nongovernmental organizations based at the provincial level in four target provinces to implement both facility-based and community-based BCC activities in all districts. Where possible, PMI will integrate provincial BCC activities with PEPFAR or other mechanisms, in order to leverage funds and increase the efficiency of the interventions. BCC activities will include training of health workers and APEs, door-to-door mobilization using community volunteers, community meetings, community radio and debates, and theater groups and will be well coordinated with other malaria BCC activities occurring within these provinces.

PMI will continue to provide technical assistance to the NMCP and DEPROS to support MOH efforts in BCC and strengthen coordination between DEPROS and the NMCP. Special focus will be given to the rollout of the planned implementation guidance, as well as updating and rolling out state of the art malaria messages. This support will include limited national level BCC activities through radio and other channels.

PMI will maintain its support to Peace Corps and the STOMP partnership through the placement of a third-year Malaria PCV based in Maputo. This volunteer will strengthen coordination of malaria BCC activities among PCVs. Funding through small project assistance grants will also be provided to PCVs to ensure malaria messages are reaching communities in innovative and impactful ways nationwide.

Proposed Activities with FY 2015 funding: (\$1,612,500)

1. Support community mobilization activities: PMI will support religious leaders and volunteers to disseminate key malaria messages related to malaria prevention and treatment to communities in PMI's four target provinces (Zambézia, Nampula, Tete, and Cabo Delgado) through PIRCOM (\$500,000);
2. Support provincial BCC activities: PMI will support four provincial-based organizations that will work through existing community networks and in close collaboration with the provincial health directorates to disseminate malaria-related messages in all districts within PMI's four target provinces. These activities will be closely coordinated with PIRCOM to ensure they are harmonized and to prevent overlap (\$700,000);
3. Support MOH's malaria BCC activities: PMI will continue to support coordination of malaria BCC activities, dissemination of the malaria BCC implementation guidance, and strengthening DEPROS in the development, implementation, and coordination of BCC strategies and approaches. This support will also allow for the development and dissemination of malaria messages nationally (\$375,000); and
4. Peace Corps collaboration: Continue to provide support to at least one third-year Malaria PCV to coordinate malaria activities among volunteers, including the development and dissemination of radio spots with key malaria messages (\$37,500).

MONITORING AND EVALUATION

NMCP/PMI Objectives

A sound M&E plan is a key component of the NMCP's goal of delivering data-driven malaria interventions throughout the country. Collecting and reporting quality data in a consistent and reliable manner is necessary to ensure that malaria interventions are applied in an efficient and effective manner and that they target the appropriate populations. Toward this goal, the NMCP finalized the 2012–2016 Monitoring and Evaluation Plan in calendar year 2012. Current sources of data that have and will continue to help guide programmatic decisions and evaluations of malaria programs in Mozambique are listed below.

Primary data sources for program evaluation and impact evaluation in Mozambique

	Calendar Year							
	2009	2010	2011	2012	2013	2014	2015	2016
HMIS	x	x	x	x	x	x	x	x
Sentinel sites	x	x						
Enhanced surveillance in IRS areas				x	x	x	x	x
DHS			x					x
MICS								
INSIDA	x							
Joint INSIDA/MIS						x		
End-Use Verification Tool			x	x	x	x	x	x
LLIN universal coverage survey			x	x	x	x	x	x
LLIN durability study	x	x	x	x			x	x
Entomological monitoring in PMI IRS areas	x	x	x	x	x	x	x	x
Nationwide entomological sentinel sites					x	x	x	x

Historically, clinical and laboratory-confirmed malaria cases have been included in the reporting bulletin for notifiable diseases, BES (*Boletim Epidemiológico Semanal, or Weekly Epidemiologic Bulletin*) managed by the Department of Epidemiology. All public health facilities are expected to use this system to report the number of “confirmed” malaria cases on a weekly basis; however, even with the rollout of RDTs and updated case management guidelines, confirmed and clinical cases are not separately reported on a routine basis, limiting the quality of these data. Malaria morbidity data are also reported through the *Módulo Básico*, which is a routine health information system that flows directly to the *Departamento da Informacao da Saúde* (Department of Health Information), via the *Sistema de Informacao da Saúde* (Health Information System). Currently, *Módulo Básico* data are sent from health facilities to the district level where they are collated and transmitted to the provincial and national level. The system is intended to provide monthly data on malaria morbidity and mortality. It is also intended to capture indicators such as percentage of

suspected cases receiving laboratory diagnosis and percentage of laboratory-confirmed cases receiving ACT treatment, which are important for program evaluation. To date, this system has not provided sufficient quality data for the NMCP programs, and it is expected to be replaced by a DHIS-2-based system called SIS-MA in the next year.

In alignment with the GRM, PMI aims to achieve the following objectives:

1. Provide support for provincial and district-level supervision and training of health workers and district and provincial M&E personnel on the collection and reporting of malaria indicators.
2. Support district, provincial, and central level strengthening of the malaria M&E system to enable the implementation of scientifically data-driven malaria interventions by the NMCP.
3. Support the transition from *Módulo Básico* to SIS-MA on a national scale.

Progress since PMI was launched

M&E System Strengthening: Multiple attempts have been made to strengthen the M&E system in Mozambique since PMI was launched in FY 2007. However, because the routine health information system, the *Módulo Básico*, collects indicators for tuberculosis, HIV, MCH, and malaria programs, efforts to improve or modify the system have proved to be complicated and time-consuming. The most recent update of the system, which occurred in calendar year 2012, is not expected to result in updated outpatient registers for several years. A consultant hired through support of the Southern African Development Community/Southern Africa Roll Back Malaria Network visited Mozambique in mid-2012 and created an interim malaria database to collect data from existing outpatient registers and new MCH registers, the pharmacy, and laboratory. This database is expected to be used until the SIS-MA can be fully rolled out.

In early calendar year 2011, Malaria Control and Evaluation Partnerships in Africa (MACEPA) placed an M&E advisor in Mozambique to assist the NMCP and partners to better coordinate M&E activities, focusing mostly on the strategic and policy level activities (such as finalizing the draft M&E strategic plan as well as defining indicators). The M&E advisor played a central role in guiding the process of finalizing the M&E strategic document, as well as the National Malaria Policy and National Strategic Plan, however, this position no longer exists. The ongoing M&E coordination among stakeholders is critically important for the NMCP to have appropriate information to manage the program. To this end, PMI has identified a two-year advisor to be placed at the NMCP with funds from the Office of the Global AIDS Coordinator (OGAC).

End-Use Verification Surveys: PMI-supported EUVs have been taking place since late calendar year 2011. This tool is used to assess the malaria-related commodities supply chain and availability of malaria-related commodities at the health facility level. Province and site selection is done in collaboration with the NMCP; approximately three provinces, including the provincial warehouse and two randomly selected district-level warehouses, are covered each quarter. Within each district, one urban health unit (health center or hospital), one rural health center, and one APE are also included. These assessments are seen as a way of identifying bottlenecks in the supply chain and addressing them in a timely manner, not a tool to assess national distribution performance. In addition, at the request of the NMCP, these surveys have been broadened to include a range of malaria activities. This includes laboratory, pharmacy, and case management components, where a

sample of medical records from previous months are pulled and data are extracted to calculate various indicators on case management.

Field Epidemiology & Laboratory Training Program (FELTP): The Centers for Disease Control and Prevention (CDC)-led FELTP activities in Mozambique are continuing with success. The two-year Master's level program in field and laboratory epidemiology started in August of 2010 with a cohort of five epidemiologists and six laboratorians, one of whom was mentored by the CDC PMI Resident Advisor and graduated in August of 2012. One of the candidates for the second cohort was also being mentored by the CDC and USAID PMI Resident Advisors and was assigned to the NMCP for her long-term project. Mentorship by both the CDC and USAID Resident Advisors is expected to continue, creating the opportunity for PMI to support two malaria-specific fellows.

Progress in the past 12 months

M&E System Strengthening: Given the enormous pressure the NMCP is under to respond to donors on basic malaria indicators that should be collected through the routine health information system, the NMCP implemented an interim national data collection system to replace the *Módulo Básico*. The interim system was to be a temporary system that could provide data until a more permanent, DHIS2-based system could be implemented. The temporary system relies on extracting malaria-specific data from existing registers and compiling these data into newly designed malaria data reporting forms. These forms are completed by health workers at the health facility level and sent to malaria focal points at the district level (*see Capacity Building section*). The district focal point then compiles the data and sends them to the provincial level where data from all districts will be entered into a newly created malaria database. Trainings for the new outpatient registers have taken place in 10 of the 11 provinces, though they have yet to result in a cascade of this information to the health facility and sometimes district level. As a consequence, this system is still experiencing problems with consistency and quality of data collection and reporting, as well as sufficient staffing at the district and provincial levels to collect and enter the data and send it to the appropriate levels.

In early calendar year 2014, PMI supported training of three NMCP M&E staff on the DHIS-2 platform. At the end of the training the staff had created a malaria-specific module to be included in the new system by digitizing the existing data reporting forms. This has the added advantage of obviating the need for additional training on data reporting forms at the health facility level, and should minimize the amount of additional training needed at the district and provincial level, as they should be effectively the same forms with a digital interface. The new system, with the malaria module, has been approved by the MOH and is expected to be rolled out nationally beginning in late calendar year 2014. Once fully implemented, the system will provide one digital database for all malaria indicators (including case management and consumption data) that is accessible at each district and provincial health office, as well as by the NMCP at the central level. The system will require a comprehensive evaluation once implemented, and through its provincial level M&E assistance PMI will support trainings on using the system as well as data validation and use.

End-Use Verification Surveys: The EUV tool has been implemented quarterly in Mozambique over the past 12 months. Data from the assessments performed in calendar year 2013 and early calendar year 2014 showed that overall stocks of AL from at least one of the four presentations

were always found at the health facility level during the assessment. Examples of some of the case management indicators observed were these: 95% of malaria cases were diagnosed by either RDTs (90%) or microscopy (5%), and 100% of cases in children under five years of age and 97% of cases in persons older than five years of age were treated with an ACT, respectively. Data from the most recent EUV done in January-April of 2014 in Zambézia, Manica, Nampula, Gaza, Maputo, Sofala, and Tete Provinces demonstrated the presence of at least one ACT presentation in 100% of all health facilities evaluated (n=47) and 91% of all warehouses evaluated (n=22).

Field Epidemiology & Laboratory Training Program: PMI is currently providing technical assistance to two FELTP-led studies. The first is an evaluation of MOH's mass distribution campaigns for LLINs, the first year of which took place in the fall of 2013; the second year of data collection will occur in the fall of 2014. The study mirrors a similar one done in Sofala in calendar year 2010 (mentioned earlier), and the first year of data collection provided critical information about the performance of mass distribution campaigns in Nampula. It is expected that an FELTP student will lead the second round of data collection, and that others will help out with the data collection. The next FELTP student seconded to the NMCP is expected to work on a project associated with the use of geographic information systems to aid programmatic decision-making for malaria control.

National level survey: PMI has contributed funds towards the implementation of an MIS/INSIDA which will collect nationally representative data on malaria prevalence, and prevention measures, including ITN coverage and use. This study is to begin in July 2014. Additionally, FY 2014 funds will support a malaria component in the DHS survey that is to be conducted in calendar year 2016.

Plans and Justification

M&E System Strengthening: PMI will be providing long-term M&E technical assistance to the NMCP through the hiring of a full-time staff member who will be located within the NMCP and supervise the program's M&E activities through funding from the Office of the Global AIDS Coordinator. With FY 2015 funding, PMI will increase its provincial-level funding to expand the provincial-level support for the M&E supervision that was initiated with reprogrammed FY 2013 funds. This support will be focused in four targeted provinces (Cabo Delgado, Zambézia, Nampula, and Tete) with the aim of ensuring that indicators vital to inform the NMCP's decisions on malaria interventions are being collected and reported with sufficient quality, consistency, and completeness. Additionally, funds will be provided to support a fellow to create malaria-specific risk maps utilizing geographic information systems technology, which can be used to evaluate areas for malaria intervention targeting. This fellow will also aid in developing capacity for these activities amongst personnel within the NMCP and INS.

End-Use Verification Tool: With FY 2015 funds, PMI will continue to support implementation of the tool on a quarterly basis.

DHIS-2 Support: PMI began supporting the development of malaria-specific modules to be used in the new DHIS-2 data reporting system with FY13 funds, and began supporting the maintenance and rollout of the new system with FY14 funds. With FY15 funds PMI will continue to build capacity at the central level for the maintenance and use of the DHIS-2 software, development of

new modules, continued district-and provincial level training for the rollout and use of the software, and evaluations of the system's performance.

Therapeutic efficacy study: With reprogrammed FY 2013 funds, PMI will support a TES to evaluate the performance of the currently recommended antimalarials, AL and AS/AQ. The WHO recommends that these studies are carried out for both antimalarials either every two years or to alternate between drugs each year. The last TES in Mozambique was performed in calendar year 2011. With FY 2015 funds, PMI will support a TES in six sites in 2016.

Data quality audits: PMI will support in-depth data quality audits at all levels of the health system in Zambézia and Tete, with the goal of determining the accuracy of all malaria data collected, as well as how the data is used at each level. Particular focus will be placed on the quality of malaria case data being collected, stored, and used at the district and provincial level, and ensuring it is of the highest quality possible before being sent to the central level.

Field Epidemiology & Laboratory Training Program: PMI will continue supporting two students from the FELTP program to work with the NMCP with FY 2015 funds.

SMS Data Reporting: PMI will support the use of SMS for data reporting from the community and health facility level. To build off the expected improvement of data quality resulting from implementation of the DHIS-2 system, APEs and data reporting personnel at health facilities will be provided with cell phones or minutes for personal cell phones to submit monthly data on malaria cases and commodity consumption. Data will be sent to district malaria focal persons, who will then enter data into the DHIS-2 database for submission to the provincial and central level. This activity is expected to be piloted in at least one of the focus provinces. PMI plans to build off lessons learned from a tablet-based reporting system for APEs that was implemented in Inhambane Province (activity has now stopped). Although the activity was considered very successful in its ability to provide timely, high quality data from APEs it was an expensive activity that is not considered scalable. Thus PMI plans on testing SMS-based reporting methods that are more cost-effective and scalable.

Proposed Activities with FY 2015 funding: (\$2,200,000)

1. Support for M&E supervision at the provincial level. Support for M&E supervision in four targeted provinces (Nampula, Zambézia, Cabo Delgado, and Tete), to ensure proper data collection and reporting practices from the facility to the central level (\$800,000);
2. End-use verification survey. Support the implementation of the quarterly EUV surveys in a sample of health facilities and medical stores (\$100,000);
3. Central level support for DHIS-2. Continued support for improving the routine health information system, including development of new modules, and support for district and provincial level trainings (\$400,000);
4. Support a TES in six sites to occur in 2016 (\$300,000);
5. Malaria data quality audits: Support for data audits at all levels in Zambézia & Tete

(\$200,000);

6. Support FELTP program with the participation of two NMCP staff (\$150,000);
7. SMS data reporting: Using SMS for reporting of data on malaria case management and commodity consumption at the community and health facility level (\$200,000);
8. Technical assistance for DHIS-2. Temporary duty (TDY) to support DHIS2 activities listed above, including support for a formal evaluation of the system (\$25,000); and
9. M&E technical assistance. TDY to provide training to the NMCP on general analysis, interpretation, and use of routine health data (\$25,000).

OPERATIONAL RESEARCH

NMCP/PMI Objectives

Operational research (OR) has been identified as a priority for MOH. Although specific guidelines for OR do not exist at the national level, general priority questions to be targeted for OR for each priority disease have been identified. The NMCP has the goal of first defining specific research priorities within each of its programmatic areas, and then secondly to define roles and responsibilities for the NMCP, INS, CISM, the operational research center in Beira, and external partners, for each of these research areas.

In line with the GRM objectives, PMI aims to achieve the following objectives:

1. Support the development of an OR agenda for the NMCP;
2. Work with MOH to define roles and responsibilities for malaria research in Mozambique; and
3. Support implementation of OR activities that focus on the NMCP's identified priority areas.

Progress since PMI was launched

Operational research on malaria in Mozambique since calendar year 2007 has been disjointed and unorganized. The two primary local organizations conducting research are CISM and the INS, though there has been no shared agenda of priority research areas, and results of studies are often not widely shared within MOH or among donors and implementing partners. In addition to the local organizations conducting research, external partners such as PMI have conducted operational research studies that have had varying degrees of success in integrating this work with local organizations. Examples of success include conducting a post-LLIN distribution campaign evaluation in Sofala Province with CISM, and an LLIN durability study with the NMCP, INS, Faculty of Medicine and the FELTP program.

Progress in the past 12 months

In late 2013, the MOH conducted an exercise to identify high level OR priorities for each program within the Ministry. A meeting was held in February 2014 with the MOH to discuss the 22 identified priority areas for the malaria program, and how to implement a national OR agenda. Discussions have begun on having an OR meeting hosted by the NMCP and INS, to identify key priority questions that need to be addressed to help the NMCP better implement their activities. Although this priority list has not yet been created, improving data quality and vector control were identified by MOH as key areas for OR that will help the NMCP with program implementation. To this end, PMI and Global Fund supported a workshop aimed at identifying the most cost-effective mix of vector control interventions. The workshop brought together mathematical disease and economic modelers from Johns Hopkins University, the London School of Economics, and the Swiss Tropical and Public Health Institute, with the goal of helping to quantify which mix of IRS and LLINs should be targeted while writing the Global Fund NFM Concept Note. Results are expected before the October 15 submission deadline for the Concept Note.

Plans and Justification

With FY 2015 funds, PMI plans to continue funding one operational research activity that is expected to be initiated with reprogrammed FY 2014 funds, pending approval by the OR Committee. This activity is a two year anemia and parasitemia study in Zambézia Province that will build off the enhanced surveillance activities at health facilities in current and former IRS districts. The goal of this project is to couple health facility and entomological data with data on the community prevalence of disease to evaluate the impact of different combinations of vector control methods. Biannual community prevalence data will be collected before and after the transmission season in two groups of districts: districts transitioning from blanket IRS coverage to targeted IRS and LLIN coverage, and districts transitioning from blanket IRS to blanket LLINs. These data will be combined with entomological and disease incidence data collected in these districts to inform the NMCP on the effectiveness of the existing vector control strategy. This activity is in line with the NMCP's identified priority OR area of collecting data to improve decision making ability on vector control.

OR Studies in Mozambique

Ongoing OR studies FY14			
Title	Start date	End date	Budget
A&P survey in Zambézia, Year 1	June 2015	June 2016	\$500,000
Ongoing OR studies FY15			
Title	Start date	End date	Budget
A&P survey in Zambezia, Year 2	June 2016	June 2017	\$500,000

Proposed Activities with FY 2015 funding: (\$512,100)

1. Anemia and Parasitemia survey in IRS districts in Zambézia: Year 2 of a community prevalence survey to analyze the impact and effectiveness of the existing vector control strategy, pending OR Committee approval (\$500,000); and

2. TDY to support implementation of OR studies: Technical assistance to help facilitate implementation of the above OR activities (\$12,100).

CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING

NMCP/PMI Objectives

The NMCP is responsible for developing policy, establishing norms, and the planning, organization, and coordination of all malaria control activities in the country. Additional responsibilities include periodic assessment of the impact of malaria control, development of training materials on malaria case management for health workers at all levels, mobilization of domestic and external funds for malaria control activities, promotion of malaria awareness and advocacy, and coordinating operational research in collaboration with INS. However, the NMCP faces many challenges related to human resources at the central, provincial, and district levels. There are shortages of skilled health workers, a high turnover rate, and a lack of retention of health professionals at all levels.

Progress since PMI was launched

PMI is building capacity for malaria control at a number of levels. PMI Resident Advisors and implementing partners have provided technical and implementation support to the NMCP on a range of issues including development of strategic and operational plans, preparation of Global Fund applications and other key policy documents. PMI is also providing considerable support to strengthen the supply chain system (see *Pharmaceutical Management* section).

PMI supported the development of the Malaria Acceleration Plan and the Global Fund Round 9 Phase 2 proposal. The Malaria Acceleration Plan is a multiyear operational plan of the malaria control strategy, covering the period of 2014 to 2016, which gives guidance on the timing for implementation for specific activities, on the parties responsible for implementation, and on funding availability.

PMI supported an entomologist at the NMCP to coordinate all vector control activities outside of Zambézia Province (where PMI provides direct support for IRS activities). In Zambézia Province, PMI has been strengthening the capacity of the DPS to implement IRS activities and conduct entomologic monitoring through the establishment of a regional entomology laboratory and insectary, which is staffed by DPS personnel who work with PMI's partner on these activities. The regional entomology capacity to do entomologic monitoring/surveillance has also been supported by PMI through the establishment of an entomology lab in Pemba, Cabo Delgado. This lab is managed by the Provincial Malaria Chief from Cabo Delgado Province through support from the DPS, although more training and support for the maintenance of the laboratory is needed. The training was carried out during the second quarter of calendar year 2013 through the entomology support provided by a CDC entomologist and included insecticide resistance bioassays.

The National Reference Laboratory, the entomology laboratory, and an insectary at INS were refurbished and re-equipped with support from PMI. Three regional "training of trainers" for malaria microscopy were held in calendar year 2011 to establish a cadre of highly qualified master

trainers. These trainings were led by CDC reference laboratorians and were very successful. Several technicians were chosen from among these master trainers to lead the national refresher training on malaria microscopic diagnosis. Moreover, PMI supported a needs assessment for the establishment of a quality control system for diagnostics in Mozambique; a draft guideline for such a system is awaiting approval. To complement this, two of the technicians working in the National Reference Laboratory traveled to Atlanta for a six-week training in molecular biology and other techniques that are seen as key activities of a diagnostic reference laboratory. In addition, PMI also supported the FELTP program and in-service training and supervision of health workers at several levels in MIP and case management (see individual sections for more details).

At the provincial level, the implementation and coordination of health services are the responsibility of the DPS, specifically the provincial medical chief. Each province has a provincial malaria chief, selected among a cadre of biologists trained by NMCP in calendar year 2008 and seconded to the provinces. In calendar year 2012, the NMCP identified focal points among existing personnel at the district level to be responsible for malaria activities, mainly in the area of reporting of malaria indicator data. This is an important step for improving the oversight of malaria-related activities as this identifies a person to be accountable for malaria-related activities.

Given the lack of professionally trained health workers, USG is contributing, along with other partners, to the “revitalization” of the APE system. The new APE system consists of community health workers who have been selected by their communities to undergo intensive four-month training on the prevention and treatment of common diseases, including malaria. Support for the APE revitalization comes from many partners, including UNICEF, USAID, World Bank, Irish Embassy, Malaria Consortium, Save the Children, and World Vision. The rollout of the APE trainings was divided into several rounds. Since the process began in calendar year 2011, 2,744 new APEs have been trained, and 2,699 of them are working. In addition, for the first time, data from the revitalized APE program (via UNICEF support with non-PMI funds) on malaria diagnosis and treatment at community level are available.

Progress in the past 12 months

During the past fiscal year, PMI Resident Advisors and implementing partners continued to build capacity for malaria control by providing technical and implementation support to the NMCP, the Central Medical Stores, the INS and the provinces.

PMI continued to provide support for the establishment of a quality control system for diagnostics in Mozambique through technical assistance provided by Atlanta-based CDC staff to review existing results and performance and to draft a new implementation strategy document. In addition, PMI supported a training in entomology with the objective of increasing capacity of INS and NMCP staff to perform the CDC bottle assay technique, to detect mechanisms of insecticide resistance and to analyze, interpret and use entomological data.

Recognizing the need to improve NMCP capacity in M&E, PMI supported the participation of two NMCP staff at an M&E training led by MEASURE Evaluation, in partnership with the School of Public Health, University of Ghana. The workshop was designed to provide participants with knowledge of M&E fundamentals as they specifically relate to malaria programs and provide hands-on experience in designing M&E plans.

As part of the preparation for the development of the Global Fund New Funding Mechanism concept note, PMI is providing technical assistance to the elaboration of a comprehensive situational analysis document. Global Fund in partnership with NMCP and PMI organized a workshop to launch the discussion on the optimization of malaria interventions in Mozambique. As described in the OR section, the goal of this workshop was to identify the most cost-effective mix of vector control interventions in the country using principles from mathematical disease and economic modeling. This activity is ongoing, with results expected by mid-October.

The MOH with support of USAID (using MCH funds), other donors, and other partners continued the expansion of the APE program, and 474 new APEs were trained nationwide. Data from the revitalized APE program (via UNICEF support with non-PMI funds) on malaria diagnosis and treatment at community level is becoming more available, although it is not yet integrated in the health information system.

PMI continued its support to strengthen the supply chain system and supported in-service training and supervision of health workers at several levels in MIP, case management, laboratory diagnosis, and entomologic monitoring (see individual sections for more details).

Plans and Justification

Strong and effective leadership by the NMCP will be critical to the success of Mozambique's malaria control efforts. As the number one killer of Mozambicans, malaria should be elevated within MOH to a higher status. This will require strong leadership at the highest MOH levels. To reach the NMCP targets, continued support along with close coordination with other partners and donors will be needed. This will be critical to strengthening the NMCP's capacity and that of other collaborating departments at the central, provincial, and district levels to plan, conduct, supervise, monitor, and evaluate malaria prevention and control activities.

To this end, PMI will continue to decentralize support to the provincial and district level. The objective of this approach is to improve implementation of malaria-related activities through the facilitation of supervision, training, distribution of commodities, and M&E. Exclusively supporting the central level limits PMI's ability to ensure that the activities implemented at the lowest level are done with any level of quality. This decentralization will be done through partners, especially local partners where they exist, and if possible directly to the DPS. In provinces where the USG has existing partners, efforts will be made to use these existing mechanisms, thereby avoiding duplication of efforts. The following activities will fall under this effort to decentralize PMI support: LLIN distribution to ANCs, IRS, case management supervision, BCC implementation, and M&E supervision. In addition, PMI will continue to support the kitting for APE commodities, entomology, data management and M&E activities for the NMCP and the National Directorate of Public Health, laboratory capacity building, and the FELTP program.

PMI is also supporting the hiring of a senior technical officer who will be seconded to the NMCP (through OGAC funding) with a focus on M&E, as well as a senior level entomologist to provide mentorship to the NMCP's entomology team. It is expected that the M&E person will provide overall technical support to the program and serve as a liaison between the NMCP and the Global Fund Unit, while the entomologist will provide oversight and supervision for both the INS and NMCP entomology groups.

Proposed Activities with FY 2015 funding: (activity and costs covered in other sections)

STAFFING AND ADMINISTRATION

Two health professionals serve as Resident Advisors to oversee PMI in Mozambique, one representing CDC and one representing USAID. In addition, one FSN works as part of the PMI team, and the Mission is in the process of hiring an additional FSN to support the program. All PMI staff members are part of a single interagency team led by the USAID Mission Director or his/her designee in country. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, managing collaborating agencies and supervising day-to-day activities. Candidates for Resident Advisor positions (whether initial hires or replacements) will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

The PMI professional staff work together to oversee all technical and administrative aspects of PMI, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, reporting of results, and providing guidance to PMI partners.

The PMI lead in-country is the USAID Mission Director. The two PMI resident advisors, one from USAID and one from CDC, report to the Senior USAID Health Officer for day-to-day leadership, and work together as a part of a single interagency team. The technical expertise housed in Atlanta and Washington guides PMI programmatic efforts and thus overall technical guidance for both RAs falls to the PMI staff in Atlanta and Washington. Since CDC resident advisors are CDC employees (CDC USDD-38), responsibility for completing official performance reviews lies with the CDC Country Director, who is expected to rely upon input from PMI staff across the two agencies that work closely day in and day out with the CDC RA and thus best positioned to comment on the RA's performance.

The two PMI resident advisors are based within the USAID health office and are expected to spend approximately half their time sitting with and providing technical assistance to the national malaria control programs and partners.

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

Proposed Activities with FY 2015 funding: (\$1,000,000)

1. Management of PMI: Support to four staff members, including two senior Resident Advisors (one USAID and one CDC) based at the USAID Mission in Maputo, one senior Foreign Service National (project management specialist), and one mid-level Foreign Service National (project management assistant). The support includes all work-related expenses (e.g., salaries, travel, supplies, etc.), and mission-based expenditures, including USAID mission expenses incurred in the direct implementation of PMI activities. The

amount allocated for each agency (USAID and CDC) was based on an estimation of the anticipated costs and on existing pipeline (\$1,000,000).

ANNEXES

Table 1

President's Malaria Initiative — Mozambique

Year 9 (FY 2015) Budget Breakdown by Partner (\$)

Partner Organization	Geographic Area	Activity	Budget (\$)
TBD/New commodity/supply chain project	Nationwide	Procurement of 1.75 million LLINs for ANCs and EPI; Support for ANC and EPI net distribution; Procurement of 8 million RDTs; Procurement of 4.4 million AL treatments; Strengthening of CMAM's capacity to forecast and manage antimalarial drugs and support distribution of ACTs through the kit system; Support warehousing and management logistics at regional/provincial/district levels; and Support the implementation of the End-Use Verification Tool	14,628,300
FORSSAS	Nationwide	Central level support to the MOH Global Fund Unit	200,000
TBD/New malaria vector control project	Nationwide	Support for post-campaign survey and net durability monitoring; and Net distribution technical assistance	250,000
IRS 2 TO 6	Zambézia	Support targeted IRS in four districts; Support for entomologic monitoring in PMI IRS districts; Support for entomologic monitoring for MOH vector control activities; Support to NMCP IRS activities; and A&P survey in Zambézia	5,300,000
TBD	Zambézia, Nampula & Cabo Delgado	Support for provincial level supervision of ANC staff in MIP, malaria case management, BCC activities, and M&E in three provinces	2,212,500
WHO	Nationwide	Secondment of an entomological coordinator at NMCP	100,000
CDC	Nationwide	Support for entomologic technical assistance; Provide technical assistance for laboratory strengthening; Field	759,200

		Epidemiology & Laboratory Training Program (FELTP); M&E TA; DHIS-2 TA; OR TA; and Support for CDC Resident Advisor	
RMNCH	Nationwide	Support central level technical assistance for policy development, coordination	250,000
Danida	Tete	Support for provincial level supervision of ANC staff in MIP, malaria case management, BCC activities, and M&E.	737,500
MalariaCare	Nationwide	Support supervision of laboratory diagnosis of malaria; Support supervision of clinical staff in malaria case management; and Provide technical assistance to the INS for the rollout of the QA/QC system	1,600,000
PIRCOM	Nampula, Zambézia, Cabo Delgado, Tete	Support PIRCOM to disseminate key malaria messages in target provinces	500,000
TBD	Nationwide	Support MOH's malaria BCC activities	375,000
Peace Corps	Nationwide	Continue to provide support to at least one PCV to assist with net logistics, to develop and disseminate radio spots with key malaria messages, etc.	37,500
HAI	Zambézia & Tete	Malaria data quality assessment	200,000
JEMBI/MOA SIS	Target provinces	Central level support for DHIS-2 and SMS pilot of health facility and community level reporting	600,000
TBD	Nationwide	APE central level support; Support to reference laboratory technicians in INS, MOH; TES	750,000
USAID Staffing & Admin		Support in-country administrative expenses for USAID	500,000
Total			\$29,000,000

Table 2
President's Malaria Initiative - Mozambique
Planned Obligations for FY 2015 (\$ 29,000,000)

Proposed Activity	Mechanism	Budget	Commodities	Geographical area	Description
Procure LLINs	TBD/ New commodity/supply chain project	7,000,000	7,000,000	Nationwide	Procurement of 1.75 million LLINs @ \$4.00 per net targeting pregnant women nationwide via ANC (1.4 million nets) and a pilot for children under five in Cabo Delgado Province via EPI (350,000 nets)
Support ANC & EPI LLIN distribution	TBD/New commodity/supply chain project	1,950,000		Nationwide	Support for ANC LLIN distribution to the province nationwide and to the district level in Cabo Delgado & Nampula. Support for EPI LLIN distribution to all districts in Cabo Delgado
Post-campaign net survey & net durability monitoring	TBD/New malaria vector control project	200,000		Nationwide	Support for post-campaign survey and net durability monitoring.
Net distribution technical assistance	TBD/New malaria vector control project	50,000		Nationwide	Technical assistance for planning and implementation of mass campaigns and routine distribution
SUBTOTAL ITNs		9,200,000	7,000,000		
Support targeted IRS in four districts	IRS 2 TO 6	4,000,000	200,000	Zambézia	IRS targeted campaign in four districts of Zambézia per the IVM strategy (including commodities)
Support for entomologic monitoring in PMI IRS	IRS 2 TO 6	150,000		Zambézia	Support ongoing entomologic monitoring in four IRS districts

districts								
Support for entomologic monitoring for MOH vector control activities	IRS 2 TO 6	250,000			Nationwide	Support expanded entomologic monitoring nationwide in sentinel entomological sites and quality assurance of national campaign		
Support to NMCP IRS activities	IRS 2 TO 6	400,000			Nationwide	Support supervision of MOH IRS activities		
Secondment of an entomological coordinator at NMCP	WHO	100,000			Nationwide	To coordinate entomological activities nationwide		
Support for entomologic technical assistance	CDC	35,000			Nationwide	Support for entomologic monitoring and training activities to include two TDYs and specific reagents and laboratory diagnostic materials		
SUBTOTAL IRS		4,935,000	200,000					
Support central level technical assistance for policy development, coordination	RMNCH	250,000			Central level	Central level TA for MIP policy development, coordination, etc.		
Provincial level support for training and supervision of ANC staff in MIP	DANIDA (Tete) +TBD (Nampula) +TBD (Zambézia) +TBD (Cabo Delgado)	700,000			Nampula, Zambézia, Cabo Delgado, Tete	Integrated in service training and supervision of ANC health workers in prevention of MIP		
SUBTOTAL MIP		950,000	0					
Procure RDTs	TBD/New commodity/supply chain project	2,390,000	2,390,000		Nationwide	Purchase approximately 8 million RDTs at \$0.30/RDT		

Support supervision of laboratory diagnosis of malaria	MALARIACARE	1,150,000		Nampula, Zambezia, Cabo Delgado, Tete	Provide supervision of laboratory staff in malaria laboratory diagnosis, use of RDTs and including quality assurance
Provide technical assistance to the INS for the rollout of the QA/QC system	MALARIACARE	100,000		Nationwide	Provide technical assistance to the INS for the rollout of the QA/QC system
Support to reference laboratory technicians in INS, MOH	TBD	200,000		INS	Recruit and hire laboratory technicians to conduct assays in ento, diagnostic and immunology labs for ento monitoring, and diagnostic quality assurance
Provide technical assistance for laboratory strengthening	CDC	12,100		Nationwide	TDY for support of laboratory strengthening activities to NMCP, & quality control system support
SUBTOTAL Diagnosis		3,852,100	2,390,000		
Procure artemether-lumefantrine	TBD/New commodity/supply chain project	2,288,300	2,288,300	Nationwide	Procurement and shipment of about 2.8 million AL treatments, including distribution to provinces
Strengthen MOH antimalarial drug management system	TBD/New commodity/supply chain project	300,000		Nationwide	Strengthen CMAM's capacity to forecast and manage antimalarial drugs and support distribution of ACTs through the kit system
Support warehousing and drug management at regional/provincial/district level	TBD/New commodity/supply chain project	600,000		Nationwide	Support warehousing and management logistics at regional/provincial/district levels
Support supervision of clinical staff	MALARIACARE	350,000		Nampula, Zambezia, Cabo Delgado, Tete	Central level support supervision in malaria case management to provincial level

Provincial case management (in health facilities and community level)	DANIDA (Tete) +TBD (Nampula) +TBD (Zambézia) +TBD (Cabo Delgado)	750,000		Nampula, Zambézia, Cabo Delgado, Tete	Provincial level supervisory activities for malaria case management in four targeted provinces, including training, supervision, logistics, etc.
Support to the MOH Global Fund Unit	FORSSAS	200,000		Nationwide	Central level support to the MOH Global Fund Unit
APE central level support	TBD	250,000		Nationwide	Technical assistance to improve the efficiency of the APE program's coordination, increase the overall quality of the program, and improve the existing M&E systems.
SUBTOTAL Treatment		4,738,300	2,288,300		
Support community mobilization activities through interfaith religious groups	PIRCOM	500,000		Nampula, Zambézia, Cabo Delgado, Tete	Support PIRCOM to disseminate key malaria messages in target provinces
BCC provincial support	DANIDA (Tete) +TBD (Nampula) +TBD (Zambézia) +TBD (C Dgdo)	700,000		Nampula, Zambézia, Cabo Delgado, Tete	Provincial level BCC activities for malaria messaging in four targeted provinces
Support MOH's malaria BCC activities	TBD	375,000		Nationwide	Support coordination of malaria BCC activities, strengthen the DEPROS in the development, implementation and coordination of BCC strategies and approaches

Collaboration with Peace Corps	Peace Corps	37,500		Nationwide	Continue to provide support to at least one PCV to assist with net logistics, to develop and disseminate radio spots with key malaria messages, etc.
SUBTOTAL BCC		1,612,500	0		
Provincial support for M&E supervision	DANIDA (Tete) +TBD (Nampula) +TBD (Zambézia) +TBD (Cabo Delgado)	800,000		Nampula, Zambézia, Cabo Delgado, Tete	Support for M&E supervision from provincial level down in four target provinces
End-use verification	TBD/New commodity/supply chain project	100,000		Nationwide	Support the implementation of the End-Use Verification Tool in a sample of health facilities and medical stores
Central level support for DHIS-2	Jembi/MOASIS	400,000		Nationwide	Continued support for improving the routine health information system
Therapeutic efficacy study	TBD	300,000		Nationwide	Support TES in six sites nationwide
Malaria data quality assessment	HAI	200,000		Zambézia & Tete	Support for data audits at all levels in Zambézia & Tete
Field Epidemiology & Laboratory Training Program (FELTP)	CDC	150,000		Nationwide	Support two FELTPs
SMS for health facility and community level reporting	JEMBI/MOASIS	200,000		Target provinces	Usage of SMS for health facility and community level reporting (commodities & case management)

Technical assistance for DHIS-2	CDC	25,000		Nationwide	TDY to support DHIS-2 related activities, including support for a formal evaluation of the system
M&E TA	CDC	25,000		Nationwide	Support for M&E activities, including general analysis, interpretation, and use of routine health data
SUBTOTAL M&E		2,200,000	0		
A&P survey in Zambézia in areas that are receiving different types of vector control to guide malaria control	IRS 2 TO 6	500,000		Zambézia	To assess new IVM strategy and guide future malaria control activities
Technical assistance for operational research	CDC	12,100		Nationwide	To provide technical assistance for the new OR activities
SUBTOTAL OR		512,100	0		
Support in-country administrative expenses	USAID	500,000		Nationwide	Staffing and general administrative support for PMI
Support in-country administrative expenses	CDC	500,000		Nationwide	Staffing and general administrative support for PMI
TOTAL		29,000,000	11,878,300		