

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 2013 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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Angola

Malaria Operational Plan FY 2013

Table of Contents

ABBREVIATIONS	3
EXECUTIVE SUMMARY	4
INTRODUCTION	8
Global Health Initiative.....	8
President’s Malaria Initiative.....	8
MALARIA SITUATION IN ANGOLA	9
Angolan Health System	10
National Malaria Control Program Strategy and Activities.....	11
CURRENT STATUS OF MALARIA INDICATORS.....	14
GOAL AND TARGETS OF THE PRESIDENT’S MALARIA INITIATIVE.....	16
EXPECTED RESULTS — YEAR EIGHT	16
PREVENTION ACTIVITIES	18
Insecticide Treated Nets.....	18
Indoor Residual Spraying	21
Intermittent Preventive Treatment of Pregnant Women.....	25
CASE MANAGEMENT	26
Malaria Diagnosis	26
Pharmaceutical management	28
Malaria treatment	30
Private Sector ACTs	34
EPIDEMIC SURVEILLANCE AND RESPONSE.....	36
INTEGRATION WITH OTHER GHI PROGRAMS	38
CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING	39
COMMUNICATION AND COORDINATION WITH OTHER PARTNERS	40
PUBLIC-PRIVATE PARTNERSHIPS	41
BEHAVIOR CHANGE COMMUNICATION	42
MONITORING AND EVALUATION	43
STAFFING AND ADMINISTRATION	46
ANNEXES	48

ABBREVIATIONS

ACT	artemisinin-based combination therapy
AL	artemether-lumefantrine
ANC	antenatal clinic
CDC	Centers for Disease Control and Prevention
FBO	faith-based organization
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GHI	Global Health Initiative
GRA	Government of the Republic of Angola
IEC	information, education, communication
IPTp	intermittent preventive treatment for pregnant women
IRS	indoor residual spraying
ITN	insecticide-treated net
LLIN	long-lasting insecticide-treated net
MICS	Multiple Indicator Cluster Survey
MIS	Malaria Indicator Survey
MOH	Ministry of Health
NEDP	National Essential Drug Program
NMCP	National Malaria Control Program
NGO	non-governmental organization
PMI	President's Malaria Initiative
PSI	Population Services International
RBM	Roll Back Malaria
RDT	rapid diagnostic test
SP	sulfadoxine-pyrimethamine
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

EXECUTIVE SUMMARY

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

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS and tuberculosis. 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 has now been extended through FY 2014. Programming of PMI activities follows the core principles of GHI: encouraging country ownership and investing in country-led plans and health systems; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; implementing a woman- and girl-centered approach; improving monitoring and evaluation; and promoting research and innovation.

Angola was selected as one of the first three countries in PMI in June 2005. Implementation of large-scale malaria control activities in Angola faces serious challenges. The country's health infrastructure was severely damaged during the civil war and it is estimated that only about 40% of the population has access to government health facilities. Malaria is a major health problem, accounting for an estimated 35% of the overall mortality in children under five, 25% of maternal mortality, and 60% of hospital admissions for children under five. Malaria transmission is highest in northern Angola, while the southern provinces have highly seasonal or epidemic malaria.

In February 2009, Angola signed a five-year, \$78 million Round 7 Global Fund malaria grant. Angola was also successful in a Global Fund Round 10 grant, and subsequently Angola was also successful in a \$111 million Global Fund Round 10 grant. The Principal Recipient of the Round 10 grants is the Ministry of Health (MOH). However, there have been delays in disbursement of Global Fund grants. Consolidated Rounds 7 and 10 grants were finally signed June 15, 2012. The United Nations Children's Fund (UNICEF) and the World Health Organization (WHO) have been major partners with the National Malaria Control Program (NMCP) in scaling up interventions. An effective partnership with ExxonMobil has resulted in donations of \$4.5 million to the United States Agency for International Development (USAID) over the last six years to further PMI and Government of the Republic of Angola (GRA) objectives in Angola.

This FY 2013 PMI Malaria Operational Plan for Angola was developed during a planning visit carried out in May 2012 by representatives from USAID, the Centers for Disease Control and Prevention (CDC), and the Angolan National Malaria Control Program (NMCP), with participation of other major partners working on malaria in country. The proposed FY 2013 PMI activities are based on progress and experiences during the last six years and the NMCP's 2011-

2015 National Malaria Control Strategy. PMI activities are designed to complement activities supported by other partners.

With the proposed FY 2013 PMI funding of \$27,000,000, the following activities will be supported:

Insecticide-treated nets (ITNs): When PMI began, only about 11% of households owned one or more ITNs. During the last seven years, however, more than six million ITNs have been procured and distributed by all partners, including approximately three million of PMI's procured nets. In FY 2011, PMI supported UNICEF in the procurement of 304,200 LLINs and distribution to 39 municipalities in six provinces (Cunene, Bie, Kuando Kubango, Moxico, Bengo and Zaire). The LLINs were distributed to the municipal level health authorities. Population Services International (PSI) procured and distributed 630,000 LLINs through non-governmental organizations (NGOs) working in eight provinces (Benguela, Huambo, Huila, Kwanza Norte, Kwanza Sul, Malange, Uige and Zaire). In addition, 300,000 LLINs were distributed via social marketing.

For the past several years, the GRA has not been supportive of mass distribution campaigns due to concerns that they distract from routine distribution. The GRA's approach has been to incorporate LLIN distribution into Municipal Health Days and conduct keep-up activities. At the municipal level, routine LLIN distribution is to children under five and pregnant women through routine immunization and ANC clinics.

However, in July 2012, the NMCP announced to malaria donors and stakeholders that they are planning a nationwide universal campaign to be conducted February - April 2013. The NMCP has requested support from all donors to ensure that this will be a well-planned and successful campaign, including sufficient quantities of LLINs, micro-planning, net tracking and evaluation. They will use the WHO-recommended ratio 1 net to 1.8 people for planning. Net tracking will be critical in order to take into account where nets have been distributed prior to the nationwide campaign in 2013; accurate lists must be maintained to avoid re-distributing to areas that have already been covered.

The routine "keep-up" strategy of distribution to pregnant women and infants using FY 2013 funding will continue after the universal coverage campaign, to ensure new families and children continue to be covered. With many residents unable to afford the cost of an LLIN, PMI will continue to support the existing MOH strategy of providing nets free of charge. With FY 2013 funding, it is expected that about 600,000 LLINs will be procured and distributed free, to pregnant women and children under five through routine clinic services together with behavior change communications (BCC) activities to increase demand for and correct use of nets.

In addition, a PMI-supported multi-country study to assess the longevity and durability of LLINs under field conditions is underway to guide future net replacement strategies.

Indoor residual spraying (IRS): IRS activities supported by PMI during the past 12 months include spraying of 145,264 structures, protecting a total population of more than 689,668 residents in the provinces of Huila, Huambo, and Cunene. More than 96% of the houses targeted

were sprayed. With FY 2013 funding, PMI will continue to assist the NMCP with IRS in Huila and Cunene Provinces. Huambo municipality is receiving last round of spraying in 2012, after which PMI will move to Bié Province, and the municipalities will be determined by findings from data collection and surveillance. Spraying will take place between August and December 2013. The exact numbers of structures sprayed will be determined based on the epidemiology data and consultations with the NMCP and local Provincial Health Directorate (DPS). However, it can be estimated that a total of 136,000 houses will be sprayed, of which 60,000 houses will be in Huila, 16,000 in Cunene, and 60,000 in Bié. Geographical reconnaissance and a logistics needs assessment will be carried out prior to the move of IRS from Huambo to Bié Province. These activities will also include routine environmental monitoring to ensure all IRS activities are compliant with environmental regulations and requirements.

To date, PMI has used pyrethroids in Angola, and will continue to spray with pyrethroids for the 2012 spray season. Over the course of 2012-2013, the team will collect more data to determine if there is a need to modify PMI's IRS approach in Angola, such as switching to carbamates or other insecticides, moving toward more targeted spraying, and transitioning out of Huambo municipality into another area.

Intermittent preventive treatment of malaria in pregnancy (IPTp): According to the 2011 Integrated Survey of Population Welfare (IBEP), 69% of women in Angola attend antenatal clinics at least once during their pregnancy (and 47% attend all four recommended visits). Nonetheless, IPTp rates remain low at 17.5%, according to the 2011 MIS. PMI has supported the Angolan NMCP scale-up of IPTp through health worker training and BCC activities to promote early and regular attendance at ANCs. Together with other partners, IPTp is now being implemented in all 161 municipalities nationwide.

With FY 2013 funding, efforts will be continued to promote early antenatal clinic attendance, raise levels of two doses of IPTp coverage, and distribute free ITNs to pregnant women through antenatal care (ANC) clinics. PMI will continue its support for health worker training and supervision and ensure a steady supply of commodities for the prevention and treatment of malaria in pregnancy.

Case management: For the past five years, PMI has been supporting improved parasitologic diagnosis of malaria with rapid diagnostic tests (RDTs) and microscopy through procurement of equipment and supplies and training and supervision of laboratory workers. In collaboration with other partners and support from PMI, artemether-lumefantrine (AL) treatment of malaria has now been implemented in all health facilities nationwide. In FY 2012, PMI procured approximately 3.8 million AL treatments.

With FY 2013 funding, PMI will procure about 750,000 multispecies RDTs, together with supplies for microscopy, and will continue to support the training and supervision of laboratory workers in laboratory diagnosis of malaria. PMI will also procure approximately 3 million additional AL treatments to help cover the remaining ACT gap after Global Fund procurements. PMI will continue to assist with ACT implementation at the provincial level through local and international NGOs, and will provide technical assistance to promote good supply chain management and commodities security through the central medical stores. With completion of

the successful PMI-supported pilot study of private sector sales of ACTs in Huambo Province, PMI worked with the NMCP to include funding for an expansion of private sector sales of subsidized ACTs to two new provinces. Together with the NMCP, European Union, and other partners, PMI will continue to provide technical assistance to the NMCP and National Essential Drugs Program at the central, provincial, and district levels in pharmaceutical management. PMI will facilitate provincial level supervision by the NMCP. For the capital, Luanda, where malaria transmission is virtually non-existent, PMI will promote correct use of laboratory diagnostic test results and rational administration of antimalarial drugs to patients with a positive malaria test result.

Health systems strengthening and integration: In line with GHI principles, PMI has reinforced its efforts to build capacity and integrate across programs. Because of the limited access of the population to government health facilities in the rural areas of most provinces, PMI has focused its efforts on the rollout of IPTp, correct diagnosis and prompt treatment of malaria, and distribution of LLINs through NGOs and faith-based organizations (FBOs) that have a presence at the provincial level and work closely with provincial health authorities. These NGOs assist with training and supervision of health workers on malaria as part of Integrated Management of Childhood Illnesses, supply chain management at the provincial level and below, and BCC activities to ensure correct usage of LLINs, IPTp, and ACTs. National or international NGOs are being supported in nine of the country's 18 provinces with a combination of PMI funding and an annual donation to USAID/Angola from the ExxonMobil Foundation. This scale-up has been accompanied by joint PMI and PEPFAR-supported technical assistance to the National Essential Drugs Program to strengthen the pharmaceutical management system at national, provincial, and health facility levels. During the past year, more than 400 health workers were trained in malaria case management and malaria in pregnancy, while nearly 600 were trained in IRS.

Monitoring and evaluation (M&E): According to the 2011 MIS, Angola is making significant progress in some areas. Specifically, parasitemia rates have decreased by 50%, from 19.5% in 2006/2007 to 9.6%, and all-cause under five mortality decreased from 118 deaths per 1,000 live births in the 2001-2006 Malaria Indicator Survey (MIS) to 91 deaths per 1,000 live births in the 2010-2011 MIS. This represents a reduction of 23% in under-five deaths between 2006 and 2011. Nonetheless, coverage with ITN, IPTp, and ACTs remains low.

With FY 2013 funds, PMI will support strengthening of the national health management information system (HMIS) based on a new HMIS strategy under development. PMI will also support quarterly surveys of health facilities and provincial medical stores to monitor the availability of key malaria commodities including those procured by PMI and will be conducting enhanced surveillance in IRS districts to help guide more effective application of future IRS activities. With FY 2013 funds, PMI will also be supporting, with the help of the Global Fund, the next Malaria Indicator Survey, which is expected to take place in 2014. In 2013, using FY 2011 funds, PMI will provide technical assistance for the therapeutic efficacy survey (TES) evaluation of Angola's first line antimalarial therapy.

INTRODUCTION

Global Health Initiative

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

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

President's Malaria Initiative

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, and tuberculosis. 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 has now been extended through FY 2014 and, as part of the GHI, the goal of PMI has been adjusted to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by continuing to scale up coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

Angola was one of the first three countries selected for PMI. Large-scale implementation of ACTs and IPTp began in Angola in mid-2006 and has progressed rapidly with support from PMI and other partners, despite the country's weak health infrastructure. Artemisinin-based combination therapies and IPTp are now available and being used in all public health facilities nationwide and more than 6 million long-lasting ITNs have been distributed in the last six years.

This FY 2013 Malaria Operational Plan presents a detailed implementation plan for the eighth year of PMI in Angola, based on PMI Multi-Year Strategy and Plan and the National Malaria Control Program's (NMCP's) five-year strategy. It was developed in consultation with the Angolan NMCP, with participation of national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing to complement the 2011-2015 Angolan 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) Round 10 malaria grant (which has been consolidated with Round 7 Phase 2). This document briefly reviews the current status of malaria control policies and interventions in Angola, describes progress to date, identifies challenges and unmet needs if the targets of the NMCP and PMI are to be achieved, and provides a description of planned FY 2013 activities.

MALARIA SITUATION IN ANGOLA

According to 2011 Malaria Indicator Survey (MIS), the mortality rate for children under five has fallen by 23% over the last five years, and it is currently estimated at 91 deaths per 1,000 live births. WHO's Trends in Maternal Mortality (2000-2008) indicate a maternal mortality ratio for Angola at 610 per 100,000 live births.

According to the 2011 MIS, the prevalence of malaria in Angola has dropped by 50% over the last five years. Nonetheless, malaria is still estimated to account for about one-third of the overall mortality in children under five and one-quarter of overall maternal mortality. It is also the cause of 60% of hospital admissions among children under five and 10% among pregnant women.

Malaria is hyperendemic in northeastern Angola, including Cabinda Province, a non-contiguous province in the north of the country. The central and coastal areas are largely mesoendemic with stable transmission. The four southern provinces bordering Namibia have highly seasonal transmission and are prone to epidemics. In the north, the peak malaria transmission season extends from March to May, with a secondary peak in October to November.

Plasmodium falciparum is responsible for more than 90% of all infections. The primary vectors in the high transmission areas are *Anopheles gambiae ss* and *An. funestus*, which prefer to bite humans and feed and rest indoors. *An. melas*, which favors a brackish water habitat, can be an important vector in coastal areas. *An. pharoensis* can be a secondary vector where present. The behavior of *An. arabiensis*, which prefers to feed on animals and outdoors, limits its role in malaria transmission. A PMI-supported study carried out in 2008 has shown that malaria transmission in Luanda City is very low, except in the outlying areas of Cachuaco, Viana, and Samba.

Malaria Transmission in Angola



Angolan Health System

In 2002, Angola emerged from almost three decades of civil war that left the country's health infrastructure severely damaged. Currently, Angola has a population of approximately 18 million people who live in 18 provinces and 161 municipalities (Angola reduced its municipalities from 164 to 161 last year). It is estimated that 80% of the health facilities were damaged or destroyed during the war and that the existing health system covers only 45% of the Angolan population. Although a major health facility building program is underway, the existing health infrastructure is limited by a lack of qualified and motivated health staff outside the capital, weak drug and medical supply and management systems, poor data quality and analysis, and a feeble primary health care network.

The Ministry of Health (MOH) comprises three levels of health administration: central, provincial, and municipal levels. The central level includes the Directorate of the Ministry, the provincial level includes the Provincial Health Directorate (DPS), and the municipal level includes local health departments (RMS). In 2007, the MOH initiated a process of revitalization of municipal health services in order to improve provision of an essential package of care and health services. The process of revitalization aims to foster greater accountability of municipal and provincial levels, by using the county as a unit of health planning and training local teams to implement activities.

Angola's national health system is made up of more than 2,300 health facilities, which include: 11 national hospitals (central), centered in and around Luanda or other provincial capitals; 45 provincial (general) hospitals; 140 hospitals (almost one for each of the 161 municipalities); 359

health centers; and 1,841 health posts. Historically, health sector resources went to the more central tertiary and secondary levels, leaving fewer resources available to the more rural facilities. For example, 85% of doctors are in Luanda and the provincial capitals while only 15% work in the rest of the country. The movement towards a decentralized health system has created a growing gap in the availability of trained health care workers and infrastructure where it is most needed. Compounding this problem is the weak health management information system.

National Malaria Control Program Strategy and Activities

The NMCP is led by a coordinator who is supported by a central team responsible for epidemiology, entomology, case management, monitoring and evaluation, information, education and communication/behavior change communication (IEC/BCC), and finance and administration. The NMCP collaborates with related programs of the Nation Directorate of Public Health, namely Reproductive Health, Integrated Management of Childhood Illness (IMCI), Epidemiology, as well as the National Essential Drugs, National Institute for fight against HIV/AIDs (INLS), National Institute of Public Health (INSP) and other Services and Directorates of the MOH.

The NMCP has tried to strengthen its health infrastructure by reinvigorating its staff through training and by placing national program officers (NPOs), hired under the Global Fund, in all 18 provinces. Due to delays in disbursement and payment of salaries, which were finally paid in June 2012, retention of some of these malaria program officers has been problematic. At the municipal level, municipal focal persons are responsible for monitoring and evaluation of malaria program activities. The NMCP is now in the process of recruiting new provincial malaria officials to coordinate all malaria activities in each of the 18 provinces.

Malaria diagnosis and treatment: The treatment of malaria in most MOH facilities in Angola is based on clinical diagnosis. Malaria microscopy is only available in hospitals and larger health centers and the quality of diagnosis varies considerably between sites. Rapid diagnostic tests (RDTs) are used in all health facilities whenever available. Historically, PMI and Global Fund have been the major suppliers of RDTs; however the NMCP is planning to procure RDTs with \$5.56 of the \$18 million it expects to receive from GRA. With the change in WHO guidance related to malaria laboratory diagnosis, Angola has updated its strategic plan (2011 - 2015) to be in line with international standards, which recommends that all suspected cases of malaria be diagnosed parasitologically, using either microscopy or RDTs. The policy has been widely disseminated in the form of NMCP circulars, but problems still exist in terms of scaling up high quality parasitologic diagnosis of malaria. These include shortages of RDTs, limited laboratory network, inadequate quality control procedures, and perhaps the greatest challenge – failure of health workers to appropriately follow the results of laboratory and RDT testing when prescribing treatment. Health workers generally do follow laboratory testing protocols, but may not treat appropriately due to a lack of confidence in laboratory results. This seems to be a particular problem in the capital, Luanda, where malaria prevalence is actually quite low, but malaria is still perceived as a major problem due to an urban legend. In addition, the RDTs have not yet been incorporated into the integrated management of childhood illness (IMCI) algorithm.

In October 2004, artemether-lumefantrine (AL) and artesunate-amodiaquine (AS/AQ) were approved by the NMCP as alternative first-line drugs for the treatment of malaria, and

implementation of that new policy began in public facilities in May 2006. NMCP decided to introduce alternative first-line drugs because they include fewer tablets in an adult treatment (making them easier to ingest) and because Coartem is not recommended for children under nine months of age. Although most partners (including PMI) were not entirely convinced of the need for so many “first-line” drugs (and this point was raised to the NMCP Director on several occasions), nonetheless the NMCP has been adamant about having them.

During the fourth quarter of 2008, the NMCP made the decision to move to AL as the only first-line drug for the treatment of uncomplicated malaria. In April 2010, NMCP launched Co-Arsucam[®], a co-formulated AS/AQ, as an alternative drug for the treatment of malaria. The NMCP is also engaged in a large multi-center drug efficacy study of another ACT, a fix-dosed formulation of dihydroartemisinin and piperazine (DHP). The NMCP may include DHP as another alternative treatment if the ongoing drug efficacy survey confirms the DHP product to be effective and safe in the Angolan population and the drug is approved by an international stringent review board or the WHO Prequalification of Medicines Program.

Intermittent preventive treatment of pregnant women: The intermittent preventive treatment for pregnant women (IPTp) with two doses of sulfadoxine-pyrimethamine (SP) was adopted as national policy in 2004. This policy currently applies to the entire country, including the epidemic-prone areas in the south. According to reports from the Reproductive Health (RH) Department, routine site visits indicate that the policy is being implemented in all functioning antenatal clinics. These visits are conducted on routine basis by representative from RH, Provincial Malaria Supervisors, and Malaria Provincial Officers. Supervision is conducted at all health facilities that provide the essential health package, but not at health posts as they do not have the capacity for ANC clinics. However, even if the policy is being implemented at facilities, it is estimated that 69% of pregnant women in Angola will visit the ANC at least once, with the proportion tending to be lower in rural areas. The 2011 MIS found that only 17.5% of women reported taking at least two IPTp doses during their last pregnancy.

Insecticide-treated nets (ITN): The NMCP ITN strategy supports a market segmentation approach, consisting of free distribution of nets to pregnant women and children under five and commercial sector distribution in urban areas. The NMCP Strategy (2011-2015) adopted a universal ITN coverage strategy defined as one ITN for every two residents. Because of very low re-treatment rates for conventional nets, the GRA encourages the distribution of long-lasting insecticide-treated nets (LLINs). Nets are classified as luxury goods and are subject to a tariff of up to 50%; however, the United Nations Children’s Fund (UNICEF), DELIVER Task Order 7 Project and Population Services International (PSI) have waivers and are therefore not required to pay tariffs.

Indoor residual spraying (IRS): Limited IRS was being carried out by some NGOs in Huambo and Zaire Provinces before PMI and Global Fund began spraying in December 2005 and January 2006. The National Malaria Control Strategy for 2011-2015 supports the use of IRS for malaria prevention in epidemic-prone areas and elsewhere in the country. Synthetic pyrethroids have been the insecticides of choice to date. The GRA has banned the use of dichloro-diphenyl-trichloroethane (DDT) and there seems to be no intention in lifting the ban in the near future.

Epidemic detection and response: The National Epidemiological Surveillance System collects weekly reports on clinically-diagnosed cases of malaria from the four epidemic-prone provinces in the south: Namibe, Huila, Cunene, and Kuando Kubango. Since not all districts report on a regular basis and there are delays in releasing reports to the NMCP, these weekly data are currently of limited value for the detecting and containing malaria epidemics. With PMI support through the World Health Organization (WHO) and RTI, malaria epidemic threshold systems have been established in some municipal hospitals of three southern provinces (Huila, Namibe and Cunene). Efforts are now focused on leveraging the existing polio surveillance system to improve the weekly reporting system for malaria.

Larviciding

In 2001, Angola conducted a trial of anti-larval products in three provinces (Luanda, Cabinda and Namibe), using two kinds of biological larvicide (Griselesf and Bactivec). Since 2008, all municipalities of the country have anti-larval activities as part of their integrated vector control programs that are being supported by the Government of Angola and carried out with technical assistance from Cuban entomologists. As part of this activity, larval densities are analyzed, larvicides are applied, and densities are re-evaluated post-application to determine larviciding efficacy. Since 2009, this program has applied larvicide to over four million square kilometers in all 18 provinces, with efficacy ranging from 96.7% to 99.7% reduction in mosquito larvae.

Funding of malaria control activities

Funding of malaria control in Angola is provided primarily by the GRA, with contributions from PMI, the Global Fund, WHO, UNICEF, World Bank, European Union and Japan International Cooperation Agency (JICA). Some private partners, such as Exxon Mobil and Chevron, also support specific projects.

NMCP's budget is about \$3.5 million per year. National hospitals in Luanda, the provincial hospitals and some municipal and provincial governments receive budgets directly from the GRA which also contributes to malaria prevention and treatment. In addition, the GRA has made available \$2 million per year to each municipal government for health programs. Municipal governments can access these funds through a formal application process to the Ministry of Health.

In 2007, Angola was awarded a \$78 million Global Fund Round 7 malaria grant. The MOH is the Principal Recipient, with WHO, UNICEF, and PSI as sub-recipients. A Program Management Unit for the Global Fund grant has been established within the MOH. This grant includes approximately \$36 million for ITNs, \$17 million for ACTs and case management, \$19 million for general health systems strengthening, and \$6 million for IEC, all over five years. The total funding for Year 1 was \$17.9 million and for Year 2 was \$14.5 million. The grant was signed in February 2009 and phase one of implementation was completed in October 2010.

In 2010, Angola successfully submitted a \$111 million Round 10 Global Fund proposal. This proposal includes approximately \$42.5 million for ITNs, \$17.0 million for ACTs and case management, \$21.7 million for diagnosis, \$20.7 million for general health systems strengthening, \$1.3 million for IEC and \$7.8 million for overhead and program management, all over five years. The total funding for Year 1 is \$21.0 million and for Year 2 is \$19.4 million. It was decided to

consolidate the Round 7 and Round 10 grants; the official start date for this grant is April 1, 2012, although, at the time of writing, funds had not been disbursed.

In an effort to fill some of the commodity gaps created by the delays in approval of the Round 7 Phase 2 and Round 10 Global Fund grants, the GRA has agreed to provide a total of \$65 million in funding to the HIV/AIDS, Tuberculosis, and Malaria Programs. This funding has already been approved by the GRA. The NMCP will receive a total of \$18 million, which includes \$5.56 million for RDTs.

To date, Exxon Mobil has contributed \$4.5 million to PMI to support the scale up of ACTs IPTp, and RDTs through sub-grants under the World Learning Civil Society Strengthening Project to five NGOs/FBOs that are working in eight provinces.

CURRENT STATUS OF MALARIA INDICATORS

When PMI began work in Angola in December 2005, no accurate, up-to-date information on nationwide coverage of key malaria prevention and control measures was available. To provide the NMCP with information on the status of their control efforts and to establish a baseline for PMI in Angola, a nationwide MIS was conducted between November 2006 and April 2007 with PMI and Global Fund support. This was the first nationwide health survey in more than 20 years in Angola.

Although the MIS was carried out approximately nine months after PMI-supported IRS began in southern Angola and three to four months after the large-scale measles-ITN campaign, this survey represents the only available information on baseline coverage for the four major areas of intervention as of early 2006. At the time the survey was conducted, ACT and IPTp implementation had only just begun, so the figures reported for proportion of children under five receiving an ACT and proportion of pregnant women receiving two doses of IPTp can be considered accurate baselines for PMI. In the case of ITNs, where a large-scale campaign in seven provinces had occurred several months prior to the survey, families interviewed were asked specifically when they had received their bednets and an adjustment was made in the calculations to take campaign nets into account in estimating the baseline ownership of ITNs.

In May 2008, the National Institute of Statistics carried out a third Multiple Indicator Cluster Survey (MICS) as part of a much larger World Bank Household Income and Expenditure Survey. Based on PMI review of the final results, it appears that there may have been significant flaws in either the collection and/or analysis of the data, raising serious question about their validity.

In 2010/2011 PMI contributed to a second nationwide MIS with an expanded sample size, to provide up-to-date information on progress in malaria prevention and treatment activities.

The following table shows the baseline and follow-up results for the major indicators being used by PMI:

PMI Baseline Information		
Indicator	2006–2007 MIS	2010 – 2011 MIS
Households with at least one ITN	28%*	35%
Children under five years old who slept under an ITN the previous night	18%	26%
Pregnant women who slept under an ITN the previous night	22%	26%
Women who received two or more doses of IPTp during their last pregnancy in the last two years	2.5%	17.5%
Children under five years old with fever in the last two weeks who received treatment with an ACT within 24 hours of onset of fever	1.5%	12%

***The estimated PMI baseline before the 2006 measles-ITN mass campaign was 11%**

The table below shows parasitemia at baseline in 2006/2007 MIS compared with 2010/2011 MIS, and demonstrates a 50% reduction in parasitemia from 19.5% to 9.6%.

Malaria Transmission Zones	% Parasitemia 2006/2007	% Parasitemia 2010/2011 (preliminary data)
Hyperendemic	28.8	14.5
Mesoendemic stable	25.3	12.2
Mesoendemic -instable	18.7	7.2
Luanda City	5.5	1.7
Total (nationally)	19.5	9.6

Mortality rates for three five-year periods preceding 2006 MIS survey*						
Years prior to survey	Calendar years	Neonatal mortality (%)	Post-neonatal mortality (%)	Infant mortality (%)	Child mortality (%)	Under 5 mortality (per 1,000)
0-4	2006-2011	23.4	26.4	49.9	42.8	90.6
5-9	2001-2006	32.2	34.4	66.7	55.5	118.4
10-14	1996-2001	28.5	36.8	65.3	55.7	117.4

**Preliminary data*

The table above shows that all-cause under five mortality decreased from 118 deaths per 1000 live births in 2001-2006 MIS to 91 deaths per 1000 live births in 2010/2011 MIS. This represents a reduction of under-five deaths by 23%.

GOAL AND TARGETS OF THE PRESIDENT’S MALARIA INITIATIVE

Although it is historically accepted that 100% of Angola’s population is at risk of malaria, transmission has been shown to be either absent or very low in the most heavily urbanized areas of the capital, Luanda, where 20-25% of the country’s population resides. Thus, it is reasonable to assume that only about 85% of the population of approximately 18 million (or around 15 million people) are at risk of malaria. PMI goal is to reduce the burden of malaria (illnesses and deaths) by 70% compared with pre-PMI levels by the end of 2015.

PMI will assist the GRA to achieve the following targets in populations at risk of malaria:

1. More than 90% of households with a pregnant woman and/or child under five will own one or more ITNs;
2. 85% of children under five will have slept under a
3. n ITN the previous night;
4. 85% of pregnant women will have slept under an ITN the previous night;
5. 85% of houses in geographic areas targeted for IRS will have been sprayed;
6. 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 IRS¹;
7. 85% of women (in areas determined to be appropriate for IPTp use) who have completed a pregnancy in the last two years will have received two or more doses of sulfadoxine-pyrimethamine (SP) for IPTp during that pregnancy;
8. 85% of government health facilities will have ACTs available for the treatment of uncomplicated malaria; and

EXPECTED RESULTS — YEAR EIGHT

By the end of Year 8 of PMI in Angola, the following targets will have been met:

Prevention:

- The Universal Campaign to provide LLINs to all sleeping spaces in Angola will have been successful (with support by the GRA, Global Fund and PMI).
- PMI will contribute 515,000 nets to continue to provide free LLINs to children under five and pregnant women through antenatal and child health clinics and municipal- and province-wide campaigns in order to keep up the coverage rates required to control malaria.
- At least 85% of houses targeted for IRS in Huila, Cunene, and Bié Provinces will have been sprayed. A total of approximately 136,000 households will be sprayed, benefiting more than 680,000 residents.

¹ Since transmission in southern Angola is highly seasonal, spraying will be done within three months before the malaria transmission season.

Treatment:

- A total of 750,000 RDTs will have been procured together with diagnostic reagents and supplies to improve the proportion of patients with suspected malaria who receive a laboratory diagnostic test.
- A total of 3 million AL treatments will have been procured by PMI to ensure appropriate treatment for all patients diagnosed with malaria. This will contribute to the scale up of ACTs to all government hospitals and health centers in all 18 provinces and is expected to increase ACT coverage to 99% of all children under five nationwide.

PREVENTION ACTIVITIES

Insecticide Treated Nets

Background

Long-lasting insecticide treated nets (LLINs) are a major component of the NMCP's malaria control strategy. The National Malaria Control Strategic Plan 2011-2015 has a target of universal coverage (or one LLIN for every two people), with a particular focus on high-risk groups (such as pregnant women and children under five years of age). Since 2005, almost six million LLINs have been procured and distributed throughout the county, with multi-partner support from Global Fund Rounds 3 and 7 grants, the GRA, PMI, UNICEF, PSI, JICA, UNITAID, ExxonMobil and Malaria No More. According to the 2006 MIS, only about 11% of households owned one or more ITNs; the 2011 MIS showed an improvement to 35% but still well below PMI target of 85% coverage.

In 2006, the Angolan government requested that health campaigns be organized at the municipal level to avoid interference with routine health service delivery. Free net distribution is currently carried out as part of Municipal Health Days. The majority of PMI nets are distributed free-of-charge in the eight provinces where PMI-supported NGOs are operating. These NGOs distribute the nets to the communities and child health clinics targeting pregnant women and children under five years of age.

Social marketing is another component of the GRA's LLIN strategy. PMI supports social marketing to improve target populations' access to essential health commodities and services, such as LLINs. Social marketing in Luanda helps to ensure that nets are available to those who can afford them, and avoids allocation of nets intended for the nationwide distribution campaign being absorbed by Luanda (where the MIS recorded very little malaria). Product distribution of LLINs focuses on urban and peri-urban areas, where most Angolans live. Clients are able to choose from a variety of nets, which are sold for Kz 250 – Kz 800 (US \$2.50 – US \$8.00), depending on the type and quality of net.

The costs of LLIN distribution in Angola are higher than in most other PMI countries. According to UNICEF, the cost for net distribution activities to the household level is approximately \$10-11 per net. This cost includes: LLIN delivery to Luanda; port clearance, warehousing, and transportation to the district level; and training, IEC/BCC, and monitoring and evaluation.

Progress during last 12 months

In FY 2011, PMI procured a total 1,011,800 LLINs. PMI supported UNICEF to procure 304,200 LLINs and distribute to 39 municipalities in six provinces (Bengo, Bié, Cunene, Kuando Kubango, Moxico, and Zaire). The LLINs were distributed to the level of the municipal health authorities. However, distribution of LLINs from the municipal warehouses to health centers and communities was programmed with municipal funds, with UNICEF providing technical assistance to the MOH in terms of micro-planning and logistics. Although progress in distributing LLINs to the facility level has been slow, the nets are being distributed (see table

below).

Quantities of LLINs Currently Stored at Provincial Warehouses (as of August 2012)			
Province	Received	Distributed	Balance
Bengo	11,500	4,200	7,300
Bié	127,300	0	127,300
Cunene	43,300	17,200	26,100
Kuando Kubango	39,200	37,290	1,910
Moxico	58,200	17,229	26,371
Zaire	24,700	23,400	1,300
TOTAL	304,200	99,319	204,881

UNICEF is supporting the integration of malaria control in the MoH program of the revitalization of municipal health services. In the six provinces where PMI LLINs were distributed, as well as in Huila Province, UNICEF supports NMCP’s provincial micro-planning for the distribution of LLINs to communities. These nets listed in the table above have been distributed to the municipal authorities and funds have been provided for training and distribution to end users. UNICEF supports routine distribution of LLINs at health centers during routine immunization and ANC clinics targeting children under five and pregnant women.

PMI funded the procurement and campaign distribution of 630,000 LLINs through non-governmental organizations (NGOs) working in eight provinces (Benguela, Huambo, Huila, Kwanza Norte, Kwanza Sul, Malange, Uige and Zaire). These NGOs, working with the local provincial and municipal health authorities, selected municipalities that could be completely covered with their nets under the universal coverage strategy. The distribution was initiated by household registration during which households received vouchers equivalent to one bed net for every two persons. Household members later redeemed the vouchers at a central location. None of the nets procured by PMI were distributed to the capital, Luanda, where a PMI-supported study demonstrated very low malaria transmission.

In addition, 300,000 LLINs were allocated for social marketing. The scope of the social marketing activities is national, with focus on urban and peri-urban centers, particularly hyper-endemic areas of Cabinda, Uige, Malange, Kwanza Norte, Lunda Norte, Lunda Sul, and Huambo. Outlets are established in and around schools, churches and community centers.

To date, the NMCP and PMI’s strategy of limited LLIN distribution has been focused on reducing mortality by the most vulnerable population, pregnant women and children. Since initial coverage of LLINs was low, this strategy would never result in coverage levels required to control and eventually eliminate malaria in Angola. PMI had been encouraging the GRA to revise its strategy to include a universal campaign. The recent (July 2012) decision of the NMCP to conduct a national universal LLIN campaign will use all nets remaining in municipal warehouses as well as any other nets available. The universal campaign will include a door-to-door canvassing of all households in Angola to determine the number of functional nets in use and required. The campaign will be accompanied by a strong IEC/BCC effort to promote net ownership and correct use. By conducting this “catch-up campaign” PMI’s strategy of a “keep-

up” campaign will be more effective.

Angola is expecting to use funds from their consolidated Global Fund grant to procure LLINs for its mass distribution campaign, which is planned for February-April 2013. In addition, PMI will contribute LLINs to this campaign. In order to cover the LLIN gap, the GRA is planning to procure 2,000,000 nets in 2012. Please see gap analysis below (note that the WHO recommended approach of using 1:1.8 ratio for quantification was used to calculate the needs for achieving 1:2 coverage).

LLIN Gap Analysis (based on Global Fund gap analysis 2011-2016, May 2012)						
	2012		2013		2014	
Total Population						
Target Population	20,609,294		21,267,300		21,955,773	
Total UC Needs	11,449,608		11,815,167		12,197,652	
IRS	361,111		361,111		361,111	
Total ITN needs	11,088,497		11,454,056		11,836,541	
	Available	ITN GAP	Available	ITN GAP	Available	ITN GAP
Angolan Government	3,100,000		500,000		500,000	
GF Consolidation Round (R7 Ph2 + R10 Ph1)	2,973,312		212,500			
PMI	900,000		900,000		600,000	
Angolan Army	250,000		250,000		250,000	
Angolan Police	50,000		50,000		50,000	
Exxon						
UNICEF			100,000		100,000	
PSI						
<i>Sub - Total ITNs planned for the year</i>	7,273,312		2,012,500		1,500,000	
<i>Sub-Total Remaining Available from the previous years (WHOPES 1 LLIN valid for 3 years)</i>	3,646,601		8,284,942		8,530,519	
TOTAL UC ALL DONORS	11,281,024	168,584	10,658,554	1,156,613	10,351,630	1,806,022
Universal Access Coverage (UC)		99%		90%		85%

With PMI-support and in collaboration with the NMCP, PSI and two PMI-supported NGOs (Episcopal Relief and Development and Africare), conducted a study to assess the longevity and durability of LLINs under field conditions which began in February 2011. A total of 3,000 LLINs were distributed in two municipalities in each of the provinces of Kwanza Sul and Uige. In March 2012, a sample of Year 1 nets were collected from each province and an assessment of net integrity and residual insecticide is currently underway.

The TDY for the LLIN durability evaluation is for CDC personnel to travel to the field to support with yearly field assessment of nets (household survey related to net use and care, rapid hole assessment in the field using the finger/fist method, net collection, followed by on-site qualitative hole counting and measurement). Once the LLINs are collected, they are brought to the CDC for the cone bioassays (because there is no insectary in Angola) and for chemical analysis of the nets. The CDC Entomology Branch does not have core funding for the laboratory analysis of the nets. The results will help guide future net replacement strategies.

Planned activities with FY 2013 funding are as follows: (\$6,810,000)

1. Procure 600,000 LLINs to be distributed via routine distribution (e.g. under five clinics and ANC); costs include IEC/BCC and tracking of nets (\$6,310,000);
2. Support the procurement of about 45,000 LLINs and related IEC/BCC for social marketing to urban populations in Luanda and other provinces at full-cost or subsidized prices (\$450,000); and
3. Continue LLIN durability study. Collect and analyze LLINs for the third year of the durability study. The baseline for this study was conducted in 2011, the first year of net collection was in 2012, and two more years of net collection are planned for 2012 and 2013. LLINs collected in 2013 will be analyzed with the cone bioassay and chemical analysis will be carried out at the CDC with FY 2013 funds, through the implementation year 2014. (\$50,000).

PREVENTION ACTIVITIES

Indoor Residual Spraying

Background

In December 2005, PMI began to support large-scale indoor residual spraying (IRS) operations in the three southern provinces of Huila, Cunene and Namibe, areas that are characterized by meso-endemic, unstable malaria. Given the low levels of malaria in Namibe Province, PMI IRS activities were re-focused on Huila and Huambo Provinces in 2007. Cunene was added to the IRS target provinces in 2010 in support of Namibia's malaria pre-elimination efforts as part of the Southern African Development Community (SADC) plans for the elimination of malaria in the sub-region. In Cunene, IRS was targeted in Kwanhama and Namakunde municipalities, including Santa Clara locality, where the population movement between Namibia and Angola is greatest.

Entomologic monitoring of IRS in Huambo, Huila, and Cunene was conducted with short-term technical assistance from Kenya and with personnel from the local Provincial Directorate of Health who are trained basic entomology monitoring techniques. An entomologic survey in Huambo Province in 2009 showed relatively low numbers of *Anopheles* mosquitoes but susceptibility of 94% to lambda-cyhalothrin, the insecticide being used. In October 2010, pre-IRS insecticide resistance evaluation carried out in Huambo and Huila, using *An. coustani*, indicated 100% and 95% susceptibility to deltamethrin and bendiocarb respectively. Pyrethrum

spray catches did not collect any *Anopheles* mosquitoes inside the 52 houses sampled in Huambo nor in the 17 houses in Huila.

Several other vector control efforts are underway in Angola. Local provincial health authorities in Luanda, Kwanza Norte, Benguela, and Cabinda carry out sporadic IRS and thermal fogging activities in certain municipalities within those provinces using their own funds. The Angolan-Cuba larviciding program, which started in 2009, continues nationwide and has been extended until 2014. Cuban technical personnel in each of the 138 municipalities where larviciding is being done trained local Angolan personnel to carry out larviciding and entomologic monitoring. Through collaboration between the NMCP, Sonamet, and Vestergaard Frandsen Inc., the ZeroVector® Durable Lining is being evaluated in Lobito municipality, Benguela Province. This product—a thin sheet of woven shade cloth impregnated with the insecticide deltamethrin and installed on inside walls of houses—is designed as a long-lasting substitute for IRS.

As part of SADC’s malaria elimination efforts, the GRA is preparing for pre-elimination in Namibe Province. The NMCP is collaborating with the Community of Lusophone Countries to assist in the building capacity in Namibe Province for pre-elimination.

PMI envisions some transfer of IRS components to the GRA and is encouraging the NMCP and DPS to share responsibility for elements such as training of IRS spray operators, M&E, and IEC/BCC of IRS activities. This is an important step to promote sustainability of IRS in the GRA.

Progress during last 12 months

In August 2011, PMI awarded a new contract for IRS in Angola. Between October-December 2011, a three-person team was deployed to Angola in October to initiate the transition between contracting mechanisms and oversee the 2011-12 spray campaign.

Based on entomologic susceptibility evaluations and wall bioassays conducted after the 2010 IRS, the pyrethroid deltamethrin (Bayer) was selected for the 2011 IRS campaign. From September - November 2011, the seventh round of IRS was carried out in Lubango and Chiba municipalities of Huila Province and a fifth round of spraying was carried out in the urban and peri-urban areas of Huambo municipality, capital of Huambo Province. In Cunene, IRS was targeted at Kwanhama and Namacunde municipalities including Santa Clara locality, on the Namibia border, where the population mobility between Namibia and Angola is highest. A total of 148,725 structures were identified and of these, 145,264 were sprayed, providing 98% coverage. This included 70,157 structures in Huambo, 62,388 in Huila, and 12,719 in Cunene. This IRS campaign protected a total of 689,668 residents: 335,065 in Huambo, 296,411 in Huila, and 58,192 in Cunene. This included 131,144 children under five years old and 88,160 pregnant women.

As in the past, provincial health department staff participated actively in the 2011 IRS campaign. A total of 834 spray personnel were trained with PMI support. A pre-spray environmental compliance inspection was carried out to ensure that preparations for the spray round were in full compliance with USAID, WHO, and Angolan environmental compliance regulations and to

ensure that the recommendations of the 2010 inspection were implemented. Another environmental compliance inspection was carried out part way through the IRS campaign. End-of-spray and close-out activities included inventorying of equipment remaining from the IRS operations and storing in warehouses established at the provincial capitals of Huambo, Huila and Cunene Provinces. In May 2011, a company in Luanda with an incinerator suitable for the disposal of empty insecticide sachets and protective gears incinerated all solid waste from the 2011 IRS campaign.

Entomological collections in IRS areas in 2011 continued to fail to collect *Anopheles gambiae* mosquitoes. No indoor resting adult *Anopheles* mosquitoes were collected from six IRS villages in Huambo or three villages in Huila and Cunene. One *An. gambiae* mosquito was collected from two villages sampled in Cunene. Monthly entomologic monitoring was performed in the three provinces from June 2011 - January 2012 by an entomological short-term technical assistant and with two local entomology technicians. Pyrethrum spray collections collected one *An. gambiae* s.l. in Huambo and two in Cunene, indicating that IRS have reduced the indoor numbers of *An. gambiae* s.l. to very low levels. After the conclusion of IRS in November, a limited evaluation of the quality of the IRS was performed in Huambo, using WHO wall bioassays. Testing was performed at three sites in a total of seven houses using *An. coustani* collected from the field. There was 100% mortality of the mosquitoes after 24 hours, indicating that the application of the insecticide was satisfactory.

In May 2011, WHO insecticide resistance testing in Huambo with *An. coustani* showed 92.2% susceptibility to deltamethrin and 95.7% to bendiocarb. *An. coustani* were used for testing because the team was unable to collect a sufficient quantity of adult *An. gambiae* s. In Huila, there was 100% mortality with deltamethrin, using *An. coustani*, however a possible resistance to bendiocarb with 88.5% mortality using *An. gambiae* s.l. In Cunene Province a mortality of 93.3% to deltamethrin was seen in *An. gambiae* s.l. Although the numbers of mosquitoes used in these tests were low, the results suggest an emerging resistance to pyrethroids and carbamates in *An. gambiae* s.l and *An. coustani*.

Given the MOH policy of universal coverage with LLINs, the high cost of IRS, the development of insecticide resistance, and the reduction of malaria cases in Huambo, PMI proposed to support enhanced epidemiologic surveillance at health facilities in the IRS areas in Huambo, Huila and Cunene. This will include retrospective data collection to provide historical epidemiological trends as well as periodic data collection. The aim is to provide critical information to support future decisions about withdrawal or transitioning of IRS in certain areas in 2013. PMI will work with the NMCP, the local DPS, and PMI partners to ensure adequate supplies of RDTs and ACTs are available. In addition PMI, through NGO partners, will assist in strengthening the local DPS municipality capacity for monitoring and reporting malaria cases. This will assist the NMCP strategy in maintaining low levels of transmission in the southern provinces and expand and consolidate gains in the central provinces.

During the 2012 spray season, Angola will continue to spray with pyrethroids. Subsequently, the team will collect more data through enhanced surveillance to help establish “baseline” or pre-withdraw rates and determine whether PMI needs to modify its IRS approach in Angola, such as transitioning out of provinces, switching insecticides, and moving toward more targeted

spraying.

In 2006, PMI agreed to assist the NMCP by constructing an insectary and entomology laboratory to support all malaria vector control programs in Angola. The construction was repeatedly delayed due to multiple changes in the site for the insectary. In 2011, the site proposed was changed to the campus of the Instituto de Combate e Control de Trypanosomiasis in Viana (ICCT) Municipality, about 25km outside the capital, Luanda. In early 2012, issues between the NMCP and the Instituto de Combate e Control de Trypanosomiasis surrounding the management of the insectary facility remained unresolved and the plans for the insectary and laboratory were withdrawn.

It appears unlikely that the issues between the NMCP and the ICCT will be resolved. The NMCP has continued its request for an insectary; however it is unclear where the insectary could be located. Small insectaries/entomology laboratories will be needed in the provinces to carry out insecticide resistance testing and entomologic surveillance. Typically either larvae are collected from breeding sites and then raised to adults for insecticide resistance testing or adults are collected from indoor resting collections held for 24-48 hours and then tested. Mosquito collections from surveillance will also need to be identified, recorded and packed for further laboratory testing. Ideally the small insectary/laboratory should be located such that it is accessible to both local DPS and Abt Associates personnel. Since these insectaries will not be supporting a permanent susceptible mosquito colony, these insectaries/ laboratories can be moved if necessary. Funds left from the Integrated Vector Management (IVM) project will be used to equip the needs for each “temporary” insectary/laboratory. Abt Associates has hired an entomology technician and PMI will work with Abt Associates and the local DPS to improve capacity in each province where PMI is supporting IRS operations.

Planned activities with FY 2013 funding are as follows: (\$4,765,000)

1. Continue to assist the NMCP with IRS in Huila and Cunene Provinces. At the request of the NMCP, the spray operations in Huambo Province will be moved to a third province, Bié. Spraying will take place between August and December 2013. An estimated total of 136,000 houses will be sprayed, of which 60,000 houses will be in Huila, 16,000 in Cunene and the remainder in Bié. Geographical reconnaissance and a logistic needs assessment will be carried out prior to the move of IRS from Huambo to Bié Province. These activities will also include routine environmental monitoring to ensure all IRS activities are compliant with environmental regulations and requirements. Furthermore, FY 2013 funds will be used in part to procure IRS-related commodities and support planning activities for the 2014 spray round (\$4,700,000);
2. Technical assistance visits for entomologic monitoring and resistance testing; support for specific reagents and other laboratory diagnostic materials. This amount includes cost of equipment and supplies as well as funding for two four-week CDC TDYs (\$25,000 each) and laboratory diagnostic materials (\$15,000). (\$65,000).

Intermittent Preventive Treatment of Pregnant Women

Background

The Angolan NMCP's policy on malaria in pregnancy consists of a three-pronged approach made up of prompt and effective case management of malaria; use of LLINs; and intermittent preventive treatment of pregnant women (IPTp) with at least two doses of SP during pregnancy, after quickening. This policy is applied countrywide including areas of low malaria transmission. The target of its 2011-2015 strategic plan is that 100% of pregnant women who are eligible for IPTp and have access to prenatal appointments, will receive IPTp with sulfadoxine pyrimethamine (SP).

According to the 2011 MIS, only 17.5% of pregnant women received two doses of IPTp (IPTp2) and only 26% used an ITN. Part of the challenge in increasing IPTp uptake in Angola lies in access to health facilities—only 40% of Angolans access health services.

Although Angola has specialized health centers which provide comprehensive antenatal services, including IPTp, pregnant women who attend other health facilities can also receive SP. SP is on the Essential Medicines list and is supposed to be procured by the GRA. There are occasionally stock outs; according to the NMCP, improving availability of SP is a priority on its action plan. Furthermore, collaboration between the Reproductive Health Division of the MoH and the NMCP in implementing measures to control malaria in pregnancy remains limited.

Progress during last 12 months

PMI continues to support NGOs and FBOs in nine of the 18 provinces nationwide to improve access to scale up malaria prevention and treatment activities in pregnant women. Malaria in pregnancy interventions need to better link with the antenatal care (ANC) service delivery system, thereby enabling pregnant women to benefit from a complete package of antenatal interventions. Although many health workers have been trained in Malaria in Pregnancy, the implementation is being led by the NMCP instead of the Reproductive Health Division. PMI continues to advocate for closer collaboration between the NMCP and the Reproductive Health Division and for better use of data for management decisions.

Planned activities with FY 2013 funding are as follows: (\$100,000)

1. Continue to support NGOs/FBOs in IPTp implementation by conducting training and supervision of health workers, and ensuring the necessary commodities are available (i.e., SP), as well as the routine LLIN distribution through ANCs, and effective case management of malaria in pregnant women. (\$100,000)

CASE MANAGEMENT

Malaria Diagnosis

Background

The treatment of malaria in MOH facilities in Angola is still based largely on clinical diagnosis, with microscopy available only in hospitals and larger health centers. The quality of microscopic diagnoses varies considerably from one facility to the next. The Angolan Instituto Nacional de Saúde Pública is responsible for training in laboratory diagnosis and has an experienced team of trainers in Luanda with adequate training facilities.

The NMCP is planning to decentralize laboratory training and supervision through three regional laboratories and provincial health institutes, to ensure more sustained pre- and in-service training and quality control of malaria microscopy. For the past several years, PMI has been working with the Instituto Nacional de Saude Publica to conduct training workshops for senior provincial-level malaria laboratory technicians. Standardized laboratory training materials and laboratory aids have been adapted to the Angolan context and translated into Portuguese, however, these need to be updated for the new multispecies rapid diagnostic test (RDT).

With the change in WHO guidance related to malaria laboratory diagnosis, Angola has updated its strategic plan and now recommends that all suspected cases of malaria be diagnosed parasitologically, using either microscopy or RDTs. The new policy has been widely disseminated in the form of NMCP circulars, but problems still exist in scaling up high quality malaria laboratory diagnosis. These include shortages of RDTs, limited laboratory capacity, inadequate quality control procedures, and the failure of health workers to prescribe treatment according to test results. In addition, the RDTs have not yet been incorporated into the integrated management of childhood illnesses (IMCI) algorithm.

In 2010, an NMCP-led parasitological survey comparing the Parachek brand RDT, a single species test that identifies *P. falciparum* alone, and the SD Bioline Pf/Pv[®] RDT, a multi-species test, showed a much lower sensitivity with the Parachek test. MIS surveys showed that about 10% of all malaria infections in Angola are caused by non-falciparum species, the NMCP decided to change to a multi-species RDT. The findings from the NMCP-supported survey showing a lower sensitivity of Parachek were corroborated by WHO/FIND panel testing. Based on the findings from these two studies, the NMCP decided to change from Parachek to SD Bioline.

PMI team recognizes very well the increased cost of multi-species RDTs and has brought up this issue with the NMCP Director on several occasions, and he is adamant about wanting a multispecies test. The change to a multispecies test was made when Parachek was tested in the WHO/FIND panel system and showed that it was not performing well. More recently, improved quality control of the Parachek RDT has resulted in a much improved rating in the WHO-led evaluation and it is now unclear whether the increased cost of approximately \$1.00 per test for each SD Bioline Pf/Pv RDT versus \$0.65 for single species can be justified. Nonetheless, the

team is not convinced it is worth the cost to retrain once again all laboratory staff on the Paracheck test.

Progress during last 12 months

To support the decentralization of laboratory training and supervision, laboratory trainers underwent a two-week training conducted by Brazilian experts in Luanda, in June 2011. This training was aimed at providing the trainers with the required teaching skills so that they can serve as focal points for the training and supervision of provincial health institutes personnel. Funding for this initial training came from a lusophone network for health research and development. The NMCP has requested that PMI/Angola use this mechanism in future microscopy trainings in the participating provinces.

Currently, a cadre of 14 senior-level malaria laboratory technicians conducts refresher trainings and supervision across the country. In Huambo and Benguela Provinces, PMI-supported NGOs have established an embryonic microscopy quality control system within the respective provincial directorates of health and they are starting to yield some useful information for planning of training and supervision activities. The scale-up of malaria microscopy in Angola is likely to take several years, though, as laboratory services are not yet institutionalized as an integral part of primary health care services.

During 2011, all PMI-funded NGOs hired or collaborated with a local malaria microscopy expert to help with on-the-job coaching and on-site quality control of malaria microscopy in the eight target provinces. To complement this effort, all PMI-funded NGOs included specific training targets on differential diagnosis of fever in their work plans. As part of these efforts, quarterly advocacy meetings on differential diagnosis of fever were planned with provincial directors of health, heads of public health departments, clinical directors of health facilities, and heads of the local health teaching institutes.

Please see RDT gap analysis below:

RDT Gap Analysis (based on Global Fund gap analysis 2011-2016, May 2012)						
	2012		2013		2014	
Expected Malaria Cases in Public Sector	6,458,180		6,137,424		5,760,097	
Microscope	1,291,636		1,534,356		1,728,029	
Total Need RDTs	6,199,853		5,523,681		4,838,482	
	Available	GAP	Available	GAP	Available	GAP
Angolan Government	500,000		500,000		600,000	
GF Consolidation Round (R7 Ph2 + R10 Ph1)	4,762,353		4,086,181			
PMI	900,000		900,000		750,000	
Total Available	6,162,353	37,500	5,486,181	37,500	1,350,000	3,488,482

Proposed Activities with FY 2013 Funding: (\$1,075,000)

Since malaria laboratory diagnosis is a critical component of good case management, PMI will continue to support the strengthening of malaria diagnosis (both microscopy and RDTs) in MOH facilities. As prevention measures begin to take effect and malaria cases fall, high quality laboratory diagnosis of malaria will become even more important, including efforts to improve the rational use of ACTs. With FY 2013 funding, PMI plans to support the following activities:

1. Procure 100 microscopy kits (including slides, lancets, cotton, etc.) for those laboratories strengthened with PMI support over the past several years (\$100,000). The microscopy kits are to replace those that are determined to be beyond repair by the INS at sites in all 18 provinces. The Angola team does not have knowledge about whether *all* microscopes are being used or not, but they are in the eight provinces where PMI-supported NGOs are working. The malaria microscopy kits are distributed to the busiest laboratories around the country based on information from the INS.;
2. Procure approximately 750,000 multispecies RDTs (\$750,000);
3. Continue support to supervision and quality control of malaria laboratory diagnosis including facilitation of provincial-level training workshops and regular supervision of provincial- and municipal-level laboratory staff on the correct use of RDTs and microscopy for malaria diagnosis in collaboration with the Instituto Nacional de Saúde Pública (and a limited number provincial health institutes). Particular emphasis will be placed on training clinical workers to adhere to the results of laboratory tests when administering treatment (\$200,000); and
4. Two TDY trips for CDC technical assistance in malaria laboratory diagnosis to provide technical assistance to the MOH and in-country partners in the performance and quality control of malaria laboratory diagnostic tests (\$25,000).

Pharmaceutical management

Background

The 2011 – 2016 Angola Health Sector Strategy places significant emphasis on both the sub-national and national health systems to better integrate service delivery at the facility level. In 2001, the GRA began a process of political and administrative decentralization where more responsibility, management and accountability were placed on the 161 districts. In line with this process, the 2011 – 2016 Strategy will focus the majority of non-malaria activities in more highly populated provinces along the Cunene-Lunda Norte corridor, but malaria-related activities will be supported across all 18 provinces.

Accurate forecasting and quantification of malaria commodities, such as ACTs and RDTs, are dependent upon a functional logistics management information system (LMIS). Like other parts of the health care system, the lack of trained professionals, including pharmacists and logisticians has hindered progress in supply chain management in Angola. Furthermore, the

absence of even basic consumption data impairs the ability of donors and the GRA to provide an uninterrupted supply of ACTs and other malaria drugs. Routine supervision of health workers remains weak and verification of the availability of antimalarial drugs is primarily dependent on donor-supported implementing partners. To help address this problem and, as part of on-going pharmaceutical management strengthening efforts, PMI continues to support pharmaceutical management training program implemented together with the MOH and National Directorate of Medicines and Equipment.

As a result of several thefts of ACTs from Angola airports and central medical stores in 2008 and 2009, PMI began supporting in 2010 an alternate supply chain for all PMI-financed commodities, including RDTs, ACTs and laboratory equipment, as a temporary measure until the central-level supply chain management system can be strengthened. Commodities are packed in Europe by province and are then flown into Luanda where they are immediately distributed to each of the 18 provincial warehouses using private sector distributors. At that level, the national supply chain has the capacity to manage malaria commodities, which are distributed to the district level. To date, several consignments of commodities have been delivered successfully into Angola and transported down through to the provincial level.

During the six years PMI has supported malaria control efforts in Angola, significant levels of funding have been directed toward strengthening pharmaceutical management capabilities within the MOH and some progress has been made, particularly in the areas of supervision, forecasting, and overall supply chain management.

As mandated by the Department of National Medicines and Equipment, the National Essential Drugs Program (NEDP) bears responsibility for procurement and distribution of malaria commodities (in addition to all other non-HIV/AIDS essential medicines and equipment). Lists are submitted to the NEDP and the requisite commodities are procured. For the NMCP, the NEDP procures only WHO-prequalified products, but occasional, small donations from international donors are accepted by the GRA, some of which may include antimalarial drugs that have not been approved through the prequalification program. A recent restructuring of the health supply chain management system in Angola closed the former central medical stores, Angomédica, and moved responsibilities for procurement, storage, and distribution of health commodities to a new parastatal organization, *Central de Compras e Aproveitamento de Medicamentos e Meios Médicos* (CECOMA; Central Unit for Procurement and Provision of Medicines and Medical Supplies).

Progress during last 12 months

To collect information on the availability and use of malaria commodities at the health facility and warehouse levels, the first round of the end-use verification survey was implemented in Bengo and Luanda Provinces in early 2011. Data were collected from a non-random sample of 38 health facilities in eight provinces using mobile phone technology, and in collaboration with the PNME and NMCP as well as provincial health offices from the two provinces. A second survey was carried out during the fall of 2011 and a third survey in the first quarter of 2012. These surveys showed stock outs or very low levels of malaria commodities, including both

ACTs and RDTs at provincial warehouses and in many health facilities. These surveys will be carried out twice a year in the future.

While PMI commodities are managed through the alternate supply chain distribution system that circumvents central-level involvement, PMI has continued to support warehousing capacity at the provincial level, building on inventory management best practices training provided by PMI. Pharmaceutical management training has been provided for staff from all 18 provinces, including an integrated (malaria, HIV/AIDS, tuberculosis, and reproductive health) training for a core group of staff specifically for drug management at the lower health unit. Basic logistics management processes, such as conducting distribution records reviews at the central level and then corroborating that with information collected at the provincial and municipal levels with subsequent follow-up corrective actions are relatively quick and simple ways to strengthen basic pharmaceutical management. The trainings incorporate these basic components of pharmaceutical management to provide a relevant set of guidelines to lower-level health facilities. The training materials and the revised standard operating procedures have been finalized in preparation for country-wide dissemination to peripheral health units. These standard operating procedures have been validated and approved by the GRA and are now in place in most NEDP drug stores and their application is monitored through periodic review of stock cards, stock levels and audits of delivery/receipt procedures by PMI implementing partners. PMI has also supplied patient registers, prescription pads, and stock record forms.

Following on earlier efforts to develop standardized, national supervision checklists for both ACTs and essential medicines, implementing partners in Angola continue their work with the MOH, DNME, and the NMCP to provide technical assistance in support of supervisory visits for all commodities and programs, including malaria.

Planned Activities with FY 2013 Funding: (Costs covered under “Malaria Treatment” section)

PMI will continue to provide supply chain security, including technical assistance, when necessary, to ensure the successful delivery of all PMI commodities. At the same time, PMI will help build capacity at the provincial level by strengthening warehousing and pharmaceutical management activities, in collaboration with PMI-supported NGOs. Increased efforts will also be made to monitor the antimalarial drug supply chain, through end-use verification surveys and the pharmaceutical management tool at the warehouse and health facility levels. PMI will continue to support implementation of a joint national supervision plan for supply chain management using the national supervision tool, through relevant local partners and in collaboration with the National Directorate of Medicines and Equipment, PNCM, PMI-supported NGOs, and other relevant stakeholders. Technical assistance will focus on issues related to pharmaceutical policy development/strengthening, drug selection, and quantification.

Malaria treatment

Background

Treatment of malaria in Angola faces multiple challenges. Currently, the NMCP recommends artemether-lumefantrine (AL; Coartem[®]) as the first-line drug for the treatment of uncomplicated

malaria but also includes AS-AQ as an alternative. The rationale for including AS-AQ as a treatment option is that it can be used in children under six months of age. If ongoing drug efficacy trials, which are being carried out by the NMCP with their own funds, confirm that dihydroartemisinin-piperazine (DHA-Pip) is equally effective and has a similar safety profile to AL and AS-AQ, and the drug is approved by an international stringent regulatory authority, the NMCP may modify its policy to add DHA-Pip as another option for treatment. The rationale given for adding DHA-Pip as an alternative first-line drug is the smaller number of tablets required to complete a full course of treatment (nine tablets), compared with 24 tablets for an adult treatment with AL. It is unclear whether the relatively small advantages offered by AS-AQ and DHA-Pip can justify the additional cost of training health workers and educating patients about these alternative treatments, the logistic complications of dealing with three alternative recommended antimalarial drugs, each with different age-specific blister packs, and the potential confusion three different ACTs may cause among health workers and patients.

Another challenge to the scale-up of ACTs has been the presence of many foreign physicians serving in rural areas of Angola with little or no first-hand experience in malaria case management. Although the former Vice Minister has required that all physicians receive training in the new malaria treatment policy, this requirement is not systematically implemented.

Although the pharmaceutical management system in Angola is quite weak, monitoring of the roll out of ACTs (and IPTp) has been greatly strengthened during the past several years. Global Fund-supported provincial Malaria Program Officers have been reporting on a monthly basis to the NMCP the number of ACT and IPTp treatments administered. This is being reinforced through M&E officers in each municipality who are government employees but receive a monthly financial incentive through the Round 7 Global Fund malaria grant. Unfortunately, this effort has been adversely affected over the past 12 to 18 months by delays of six months or more in salary payments for the Provincial Malaria Program Officers, the Municipal M&E Officers, as well as some key malaria staff at the central level.

As of July 2011, all of Angola's 161 municipalities and 2,209 out of the 2,261 functioning health facilities in the country were using ACTs. Over the past three to four years, the GRA has increased its contribution to the procurement of antimalarial drugs. While PMI only purchases Coartem[®], the GRA has been purchasing generic formulation of AL and fixed-dose combination (FDC) therapy AS-AQ, with the latter intended for distribution in hospitals alone. No ACTs were procured in 2011 by the GRA. The GRA also covers all needs for intravenous quinine and intravenous artesunate for the treatment of severe malaria in public health facilities. Due to delays around signing the Global Fund Round 7 Phase 2 and Round 10 grants and problems with procurement of health commodities by the MOH, frequent stock outs of both ACTs and drugs for severe malaria have occurred over the past 18 months. A donation of about 175,000 DHA-Pip treatments from the Chinese Government has arrived in country but has not yet been distributed.

A variety of antimalarial drugs, including chloroquine, artemisinin monotherapies, and generic formulations of ACTs, continue to circulate in the private sector in Angola. The National Directorate of Drugs has issued an official document banning the importation of antimalarial monotherapies. The MOH is in the process of transmitting the document to Parliament for approval.

National malaria treatment guidelines recommend parenteral quinine for the treatment for severe malaria with parenteral artemether or artesunate as alternatives. With the recent WHO recommendation of parenteral artesunate over parenteral quinine for both children and adults in the treatment of severe malaria, the NMCP has indicated they will follow the new WHO guidelines. NMCP treatment guidelines also include pre-referral treatment with rectal artesunate, although this has not yet been implemented. For the treatment of uncomplicated malaria in pregnant women, oral quinine is recommended during the first trimester and AL or quinine during the second and third trimesters.

Progress during last 12 months

Since 2008, PMI has been supporting five national and international NGOs to assist the MOH in the delivery of malaria prevention and treatment services at the provincial level in eight provinces (Benguela, Huambo, Luanda, Kwanza Norte, Kwanza Sul, Malange, Uige, and Zaire). These NGOs coordinate closely with the provincial health staff, including the provincial Malaria Program Officer and Malaria Supervisor. Training has been provided to health workers on malaria diagnosis (including use of RDTs), malaria case management with ACTs, malaria in pregnancy and IPTp, and pharmaceutical management. This work has been made possible by combining PMI funding and the ExxonMobil Foundation donation to PMI. In FY 2011, more than 230 health-workers were trained in case management with AL across these eight provinces.

In updating the 2008 – 2012 National Malaria Strategic Plan and its accompanying gap analysis, a refined ACT quantification and budgeting was carried out using the following assumptions: total population of 16 million residents, a malaria prevalence of 50%, health system coverage of 60% for Luanda and 40% for other provinces, and an average number of malaria episodes per age group varying according to endemicity level. This exercise led to the calculation of a total annual need of approximately 6.3 million ACT treatments for the whole country (See Table below). With the ongoing scale-up of malaria prevention activities, it is expected that the annual ACT consumption will remain stable for the next several years, but will then gradually decline as the differential malaria diagnosis of fever improves and the number of malaria episodes falls.

Please see ACT gap analysis table below:

ACT Gap analysis (based on Global Fund gap analysis 2011-2016, May 2012)						
	2012		2013		2014	
Suspected Malaria Cases Angola	15,019,023		13,948,690		12,800,216	
Suspected Malaria Cases (Public Sector)	6,458,180		6,137,424		5,760,097	
Suspected Malaria Cases (Private Sector/Community)	8,560,843		7,811,267		7,040,119	
Positivity Rate Dx	9,311,794	62%	8,648,188	55%	3,840,065	30%
Prevention of Stock Outs (5% buffer)	465,590		432,409		192,003	
Total Need ACTs	9,777,384		9,080,597		4,032,068	
	Available	GAP	Available	GAP	Available	GAP
Angolan Government	400,000		400,000		400,000	
GF Consolidation Round (R7 Ph2 + R10 Ph1)	1,100,000		1,515,816			
PMI	4,600,000		3,760,000		3,000,000	
Angolan Army	250,000		250,000		250,000	
Total	6,350,000	3,427,384	5,925,816	3,154,781	3,650,000	382,068

With FY 2012 funding, PMI procured more than 3.7 million AL treatments and with FY 2013 funding, PMI plans to procure three million treatments.

The second phase of Round 7 Global Fund grant has a total of \$2.5 million programmed over three years for procurement of 2 million AL treatments. Phase 1 of the Global fund Round 10 proposal does not consider AL procurement for the public sector. Instead, more than 600,000 AL treatments are planned to be procured for distribution at a subsidized price through the private sector in two target provinces (Huila and Benguela). The Phase 2 Global Fund Round 10 plans to procure a total of about 1.5 million and 260,000 AL treatments for the public and private sectors respectively, over the three-year period. The Global Fund Round 7 grant has no funding for training in case management and only very limited funds for supervision, but Round 10 does have substantial funds for both training and supervision. Global Fund ACTs are being distributed through the MOH's distribution chain. A pharmacist has been hired for the MOH's Project Management Unit and a logistician placed at the NMCP to oversee the distribution of all NMCP's commodities. Unfortunately, with the delays in approval of the Round 7 Phase 2 grant, no Global Fund ACTs have entered Angola since 2010.

In 2012, the GRA is proposing to fund procurement of \$2.1 million in ACTs to help fill the gaps due to delay of approval of the Round 7 Phase 2 and Round 10 Global Fund grants, however this funding has not yet been incorporated in the gap analysis table.

As part of the Global Fund Round 7 grant, funds are available for monitoring the efficacy of antimalarial drugs. Currently, drug efficacy studies to assess the efficacy and safety of DHA-Pip are ongoing in three provinces.

Private Sector ACTs

Background

Throughout Africa, more than half of all patients with suspected malaria first seek treatment from the private sector. Since it is clear that the Angolan NMCP will be unable to achieve their RBM treatment coverage targets for ACTs without involving the private sector, they requested that PMI fund a pilot field trial of subsidized AL delivery through private drug shops. With FY 2008 funding, PMI funded a pilot in the municipalities of Huambo and Cáala of Huambo Province, the two most populous municipalities in the province. The pilot was conducted in close collaboration with the Provincial Health Directorate and the Private Sector Pharmaceutical Association. A total of 95 licensed private pharmacies were trained and registered, by both the Provincial Health Department and an association of private pharmacists. These pharmacies provided a competitively priced, over-branded AL product selling for about 75 Kwanza (\$0.75) per treatment in conjunction with training on clinical assessment, accurate diagnosis (based on clinical history) and rational use of ACTs, and followed up with routine supervisory visits from project staff. All costs recovered from the over-branded AL were recycled back into the program to help manage overhead costs as well as support various related projects and other on-going activities, including the re-packaging of the AL.

Progress during last 12 months

The original pilot was considered a major success. Pharmacies followed guidelines that had been established for dispensing AL and prices were held at the agreed-upon level. In addition, the sales of artemisinin monotherapies and other antimalarial drugs in the project pharmacies fell over the course of the pilot. With FY 2011 funds, the ACT pilot project will be expanded. The geographic coverage of the pilot will be expanded beyond the two most heavily populated municipalities in Huambo Province to include all municipalities and up to 210 pharmacies throughout the province. The expanded pilot will target all age groups (rather than just children under five) and RDTs will be included to improve case management. Direct supervisory visits will be complemented by ‘mystery shopper’ visits to help verify AL usage and adherence to sales guidelines (i.e., if the pharmacy is adhering to their contractual agreement with the project and the NMCP to sell only AL to only children under five in the absence of confirmatory testing). A post-pilot survey will be conducted to evaluate the impact of the pilot, and its feasibility in rolling out to other areas. Results of the expanded pilot will be communicated to the NMCP so that they can make a decision about rolling out this approach to two additional provinces (Huila and Benguela), which would be supported with Global Fund Round 10 funding.

Although the original plan was to turn the pilot over to the NMCP for expansion with Global Fund support, with PMI providing technical assistance to that expansion, the long delay in signing the Global Fund Round 10 grant caused PMI team to revise this plan and propose funding a continuation of the original project in Huambo Province and evaluate: (1) how the system would work in rural districts (the rationale for expansion from 2 to 11 districts); (2) how it would work in older age groups; and (3) how RDTs could be incorporated into the system. These are all issues that any expansion of the private sector pilot in Angola would need to address, and the team testing these approaches in Huambo Province first could expedite the eventual expansion process.

A final decision still needs to be made around the pricing of the AL for older children and adults. It is proposed to evaluate three different approaches to RDT pricing: (1) subsidizing the cost of the RDTs and testing free of charge; (2) charging only for RDTs that have a positive result; and (3) charging for all RDT testing but at a subsidized price. It now appears, however, that the launch of the expanded pilot will be delayed as problems have arisen around authorization of pharmacy staff to take fingerprick blood samples and use RDTs. In Angola, only trained health staff are allowed to take blood samples. Unless a special waiver can be obtained for the purposes of this pilot, pharmacy staff would need to undergo special training and obtain certification in a laboratory training school. This would greatly increase costs and would not be practical for a nationwide scale up of subsidized ACTs in the private sector.

Planned Activities with FY 2013 Funding: (\$9,485,000)

Ensuring prompt, effective, and safe ACT treatment to a high percentage of patients with confirmed or suspected malaria in Angola represents the single greatest challenge for the NMCP and PMI, given the weaknesses in the country's pharmaceutical management system, continued poor access to health services by a large number of Angolans, and the lack of accurate diagnostic capabilities. As the Global Fund and PMI remain the two primary sources of ACTs for Angola, a collaborative approach between the two organizations to work with the MOH/NEDP is critical. It is also important that weaknesses in the supply system be promptly addressed. Given the poor access to health care in Angola, PMI is supporting NGOs/FBOs to facilitate ACT implementation in areas that are currently underserved by the MOH. This will be coordinated with efforts to improve case management and malaria prevention of pregnant women in ANCs, and will include assistance with training and supportive supervision of health care workers, IEC, and monitoring and evaluation. In addition, the results of the private sector pilot of ACT distribution will help inform future expansion of that approach.

Activities planned with FY 2013 funding are as follows:

1. Procure approximately three million AL treatments (\$3,000,000);
2. Provide support for import/clearance, distribution and management of PMI-funded AL treatments in order to overcome the complex clearance process and initial distribution from port of entry through central warehouses and down to the municipal level (\$400,000);

3. Together with the MOH and other partners, continue to provide technical assistance to the MOH and NEDP at the central, provincial, and municipal levels to strengthen pharmaceutical management and implementation of ACTs that will address:
 - a. Importing, quality control, storage, and inventory management;
 - b. Coordination with the MOH on quantification and distribution;
 - c. Quality improvement in the context of a multi-donor and decentralized procurement system at all levels;
 - d. Appropriate use;
 - e. Training and supportive supervision of health workers at provincial, district, and lower levels to ensure good ACT prescribing and dispensing practices;
 - f. IEC for patients;
 - g. Surveillance for adverse drug reactions and rapid response to reports/rumors of severe reactions;
 - h. Monitoring of implementation/evaluation of coverage; and
 - i. Promotion of correct use of ACTs in the private sector through IEC efforts.

This will be provided by experts in pharmaceutical management based in country, as well as through short-term technical assistance visits (\$450,000);

4. Continue to support ACT implementation (together with IPTp distribution of LLINs, and BCC related to malaria prevention and treatment, with malaria diagnostics and supply chain management strengthening), through national and international NGO working in the eight original provinces (Huambo, Kwanza Sul, Kwanza Norte, Malange, Benguela, Huila, Uige and Zaire) plus Bié Province which will be added with FY 2013 funding (\$4,200,000);
5. Expand the ongoing private sector subsidized ACT program to include all 11 municipalities in Huambo Province, all age groups, and the use of RDTs (\$635,000); and
6. Support health system strengthening related to malaria, tuberculosis, HIV/AIDS, and family planning as part of a larger USAID bilateral health project, which will focus on Luanda and Huambo Provinces. This will include similar activities to those described above for the five NGOs working in nine provinces. This will be done in the provinces of Huambo and Luanda (PMI contribution: \$800,000).

EPIDEMIC SURVEILLANCE AND RESPONSE

Background

Angola's four southern provinces, Namibe, Cunene, Huila, and Cuando Cubango, have low levels of malaria transmission but are prone to malaria epidemics. One of the objectives of the NMCP 2008-2012 Strategy is the establishment of a system for early detection and containment of malaria epidemics in these provinces.

In late 2008, a PMI-supported consultant worked with provincial health teams in southern Angola to develop plans for epidemic detection and containment. Funding from WHO was used to establish and operationalize a malaria detection system based on collection and analysis of routine health facility data. With Global Fund Round 7 support, the WHO provided training to 214 provincial and municipal supervisors on monitoring and evaluation. This includes 73 technicians from the four provinces at risk for malaria epidemics. Since IRS has been carried out in Huambo Province for the past five years, a cadre of trained spray personnel exists at the provincial level that could respond rapidly in the case of an upsurge in malaria. As an emergency stock for possible future epidemics, a supply of spray pumps, protective gear, and insecticide has been stored securely in a 40-foot container in Lubango, the capital of Huila Province. These materials could be used to conduct IRS in response to sudden increases in malaria cases. A rotating stock of ACTs is also kept at the provincial level. PMI is also working with WHO and the NMCP in the development of an early warning system for malaria epidemics.

Progress during last 12 months

Since 2010, PMI has worked toward implementation of a Malaria Early Warning System (MEWS) in Huila, Namibe, Cuando Cubango, and Cunene Provinces. The implementation was done at provincial and municipal hospitals, health posts, health centers, and faith-based hospitals; it also includes six sentinel sites: two each in Huila, Namibe, and Cunene Provinces. A total of 73 MOH staff have been trained in the MEWS, including 11 provincial focal points, 49 municipal focal points, and 13 sentinel site focal points. In 2011, two supervisory visits were performed by WHO and NMCP team members to the above provinces to see if the recommendations which were included in the MEWS training are being followed. The re-visits showed that implementation of the MEWS was complete in all six sentinel sites, though due to lack of supervision; implementation had yet to take place at the health unit level in all provinces. The visits also showed that the municipalities Lubango and Chipindo, in Huila Province, should be used as examples for the other municipalities.

Because this system has relied in part on municipal and provincial level National Program Officers paid through the Global Fund, performance has been affected by the delay in disbursement of Round 7 Phase 2 funds to Angola. In particular, the delay has resulted in the loss of some employees, as well as a general decrease in productivity. This, in combination with the fact that FY 2012 represented the last year of PMI's support for WHO personnel, means PMI will need to work with the NMPC to ensure the appropriate personnel are on the ground in the MEWS provinces and municipalities after funding ends in mid-2013.

Planned Activities with FY 2013 funding are as follows: (\$200,000)

1. PMI will continue support the NMCP to strengthen epidemiological surveillance and timely reporting on malaria as part of an early warning system in Huila, Cunene, Namibe and Kwando Kubango. PMI will also help NMCP to maintain an epidemic response stockpile of antimalarial drugs, insecticides, spray pumps, and protective IRS gear at two provincial level sites in the four southern epidemic-prone provinces in Lubango, the capital of Huila Province. WHO contributed personnel and technical leadership for the past three years, though the hope is that the NMCP

will assume greater leadership and ownership in the future. It is unknown at this point whether WHO will continue to have a staffed position working on this project, or if funding will be provided by the NMCP to employ someone dedicated to this project. PMI will also support the NMCP in the SADC malaria surveillance system preparedness. This will include strengthening laboratory diagnosis of malaria in the four provinces, weekly reporting of cases, and the development of district-level epidemic response plans (\$200,000).

INTEGRATION WITH OTHER GHI PROGRAMS

Background

Under the aegis of national decentralization of health services, Angola has embarked on a revitalization of Municipal Health Systems. This is intended to improve infant and maternal health, as well as overall access to primary health care by the Angolan people. The program, which is led by the MOH with the support of several donors, including UNICEF, the World Bank, USAID, the Cuban Government, the Spanish Cooperation, and the GAVI Alliance, has the following components:

- Capacity development of the local public health network for the provision of an essential integrated health package;
- Fixed and outreach strategies to deliver services in health units and hard-to-reach communities; and
- Training and micro-planning to strengthen integration of service delivery, including IMCI and BCC.

The Municipal Health Systems revitalization process is intended to improve the quality of existing services, staff training and supervision, availability of essential medicines, diagnosis of communicable diseases and integration of service delivery. Community outreach is planned through Municipal Health Days to provide communities with an integrated package of health interventions including LLIN distribution, vaccination, de-worming and other essential services. The decentralization process has placed planning and coordination of the Municipal Health Days with the provincial and municipal health authorities and the GRA allocating \$2 million per municipality to support this effort each year. MOH estimates that Municipal Health Days will reach at least 80% of the population in targeted areas. These efforts are consistent with GHI's business model of increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; encouraging country ownership and investing in country-led plans and health systems; improving metrics and monitoring and evaluation; and promoting research and innovation.

Progress during last 12 months

In the past year, the NMCP, via its cross-sectorial technical working group, has continued to integrate its work with other health programs, such as revitalization, IMCI, vaccination, nutrition, reproductive health, and EPI, under the framework of the Angolan health sector development plan. The NCMP has been working closely with the principal policy and

implementation bodies including the National HIV/AIDS Prevention Commission, Inter-agency Committee for Immunization, Country Coordinating Mechanism for Tuberculosis, Malaria and HIV/AIDS, various UN organizations including WHO, UNICEF, and UNDP, multi- and bi-lateral organizations such as USAID, PMI, and other Government Ministries.

Planned activities with FY 2013 funding:

Building on the activities implemented in 2012, PMI will continue to support NMCP's cross-sectorial technical working group to integrate work with other health programs, such as revitalization, IMCI, vaccination, nutrition, reproductive Health, and EPI, under the framework of the Angolan health sector development plan. (*Costs are included in the section of prevention, case management, capacity building and Monitoring and Evaluation*)

CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING

Background

In early 2008 the Angola PMI team worked with NMCP to respond to Global Fund Round 7 queries and helped develop the Global Fund Procurement, Supply and Management Plan and the Monitoring and Evaluation Plans. After approval of the Round 7 grant, where the MOH was proposed as the new Principal Recipient, PMI provided technical assistance to the MOH in setting up a new Global Fund grant management unit that could accept and manage the grant. In 2010, PMI advisors helped update the National Malaria Strategic Plan for 2011– 2015, and with the writing of the successful \$111 million Global Fund Round 10 proposal. PMI Resident Advisors have also played major roles in the conduct of a malariometric survey in Luanda and a health facility survey in Huambo, field supervision of malaria prevention and control activities, and working with the NMCP on developing technical guidelines on monitoring and evaluation, RDTs, ACTs, LLINs and IPTp.

The NMCP faces multiple challenges in scaling up malaria prevention and control interventions nationwide. Global Fund resources have allowed the NMCP to recruit five National Program Officers (NPOs), based in Luanda. These NPOs provide technical support in the areas of monitoring and evaluation, finance, logistics, data management, and IPTp/IMCI. To strengthen capacity at the provincial level, an additional 18 NPOs, one for each province, have been recruited with Global Fund support to enhance management and coordination of malaria control by working within the Provincial Health Directorates. Provincial NPOs provide technical support on planning, capacity building, implementation, supervision, and monitoring and evaluation of the malaria control activities in their provinces. However, there has been a long delay in the disbursement of Round 7 and 10 funds and these staff have not been paid. Nonetheless, most of them continue to provide critical technical support to provinces with supplementary allowances from NMCP and PMI partners. Efforts are underway to resolve the bottlenecks in the Global Fund grants. In addition to the NPO, in each of the 161 municipalities, an existing staff member has been designated as the malaria focal point and trained to collect and report routine malaria surveillance data, with a monthly incentive to be paid by the Round 7 Global Fund grant.

Despite these contributions, a gap still exists in terms of human resources, particularly for case management, increasing diagnostic capacity and covering the needs of Luanda Province which is now expanded to include more areas in the east and south, where a single staff member per facility is disproportionately expected to manage the most densely populated area in the country. In addition, capacity within the Provincial Health Directorates is unevenly distributed and in some cases insufficient to meet the demands. The provincial Malaria Partner's Fora reinforce the central level Malaria Partner's Forum and create an important opportunity for the systematic engagement of NGOs, CBOs, and FBOs at the provincial level to broaden capacity for implementation of the national strategic objectives. However, there are currently only four provincial Malaria Partners' Fora across Angola's 18 provinces and vitality and participation has been waning over the years; further external support is needed.

Progress during last 12 months

The in-country partnership has helped to energize malaria control activities in Angola. Despite the absence of the two PMI advisors for much of 2012, through the USAID Mission staff and support from PMI Atlanta and Washington, PMI continues to interact regularly with the NMCP.

Two of the FELTP students in the Angolan program have completed an evaluation of local surveillance system for malaria, one in Luanda and the other in Huambo Province. The students are working with the FELTP Resident Advisor to improve the quality of these evaluations so they can be used to help plan public health interventions in these areas.

Planned activities with FY 2013 funding are as follows: (\$350,000)

1. Facilitate provincial-level supervision by the NMCP in order to strengthen NMCP capacity to supervise malaria activities at provincial level. With these funds, the central level NMCP staff will visit each of the 18 provinces at least twice a year. The follow-up supervision visits will focus on previously identified problems (\$200,000);
2. PMI resident advisors will continue to provide technical assistance to the NMCP in all areas of malaria prevention and treatment (no additional cost); and
3. Build capacity in malaria control through support to the CDC Field Epidemiology and Laboratory Training Program (FELTP) in Angola. (\$150,000).

COMMUNICATION AND COORDINATION WITH OTHER PARTNERS

Communication and coordination among partners involved in malaria prevention and control in Angola continue to improve due to increasingly strong leadership from the NMCP with greater willingness to ask for and accept assistance and advice. Other contributing factors include a growing sense of partnership among key international and national organizations and groups supporting the NMCP; greater transparency in terms of funding and activities by all partners; and the catalytic effects of placing PMI Malaria Advisors in the NMCP offices together with the move of several Global Fund-supported National Malaria Program Officers to the NMCP offices.

While much still remains to be done, the successful Global Fund Round 7 and 10 proposals prepared by the NMCP and its partners are examples of what can be accomplished by a strong and effective NMCP supported by a coalition of partners.

Progress during last 12 months

The National Malaria Partners' Forum, which integrates more than 40 partners including national and international NGOs, churches, professional associations, community organizations, and private sector companies, has been less active recently. The same is true of the Provincial Malaria Partners' Fora, currently rolled out to the provinces of Malange (11 partners), Benguela (30 partners), Huambo (14 partners), and Huila (7 partners). PMI has supported the National Partners' Forum for the past five years.

Planned activities with FY 2013 funding are as follows: (\$30,000)

1. Continue to support Partners' Forum meetings and salary for an administrative assistant, facilitating improved communication between partners, dissemination of minutes, etc. (\$30,000); and
2. In-country PMI staff will continue to provide administrative support to the NMCP in the monthly meetings of the Malaria Partners' Forum to strengthen communication and coordination among malaria partners (no additional cost to PMI).

PUBLIC-PRIVATE PARTNERSHIPS

To date, Exxon Mobil has contributed \$4.5 million to PMI. From 2006 through 2009, ExxonMobil contributed \$1 million each year to support PMI objectives in Angola. In 2010, 2011 and 2012, ExxonMobil donated \$500,000 each year. ExxonMobil funds are being used, together with PMI funds, to support the scale up of ACTs IPTp, and RDTs through subgrants under the World Learning Civil Society Strengthening Project to five NGOs/FBOs that are working in Benguela, Huambo, Kwanza Sul, Kwanza Norte, Uige, Huila, Malange, and Zaire Provinces, as well as through a USAID bilateral working in Lunda Norte where the government health infrastructure is weak. The results of this effort have been very positive. The NGOs are coordinating closely with provincial authorities and provincial NPOs and Malaria Supervisors.

Planned activities with FY 2013 funding are as follows: (No additional cost to PMI)

The activities funded through Exxon Mobil donation will continue with close coordination with the NMCP, PMI, and will take into account the results of a recent PMI-funded evaluation of the NGOs. In 2013, Exxon Mobil funding will allow PMI to expand its support of NGOs/FBOs to a ninth province. Additional technical support in pharmaceutical management, laboratory diagnosis, rational use of ACTs, malaria in pregnancy and IPTp, ITNs, and IEC related to malaria prevention and treatment will be provided by other PMI partners.

BEHAVIOR CHANGE COMMUNICATION

Background

The main focus of the NMCP's BCC strategy is to address misconceptions and improve knowledge and key behaviors that are essential to achieve sustained malaria control. With support from PMI and the Global Fund Round 7 phase 1 grant, communication campaigns for health education have greatly increased. To date, three campaigns using radio and television have been launched promoting the importance of owning and using a net on a daily basis. Additional radio spots have also promoted the importance of antenatal care for women to receive IPTp and LLINs and announced the recent availability of soluble ACTs for children. More intensive community-level BCC such as community theatre and mass media messages are also an integral part of the national IEC strategy. Posters to promote awareness within communities of their right to receive an LLIN are available in public health facilities and other community gathering places and mosquito net use promotion material are also provided with each LLIN distributed. These activities are complemented by educational school programs, and health fairs with churches. All campaigns are developed with the NMCP, the Malaria Forum, and the Cabinet of Health Promotion within the Ministry of Health to ensure clarity of messaging and coordinated efforts.

In the approved GF Round 10 malaria grant, there is provision for a behavioral study to be conducted prior to roll-out of RDTs in each province to determine knowledge, attitudes and practices around malaria treatment. The results of this study will guide communication activities and will be measured again at the end of the project to determine any behavior change due to project activities. BCC materials for caretakers of children less than five years related to treatment of malaria with ACTs have been developed for the Huambo Province pilot project and will be adapted for use province-wide as well as in the new provinces funded through Global Fund Round 10 grant. Acceptance of confirmatory diagnosis before taking or providing ACTs as well as application of confirmatory diagnosis to all age groups will continue to require behavior change strategies and capacity building at all levels. To complement PMI efforts in FY 2013, multi-prong BCC activities are planned under Global Fund Round 10 to inform communities of the availability of private sector subsidized RDTs and ACTs and the importance of prompt (i.e., within 24 hours of onset of symptoms) and effective malaria treatment (requesting an ACT and not a monotherapy).

Progress during last 12 months

This is covered under each of the specific intervention sections above.

Planned activities with FY 2013 funding: (\$100,000; other intervention-specific BCC-related activities are covered under the specific interventions sections above)

1. With most of PMI partners providing BCC in different provinces, and with less than optimal results for some of malaria indicators such as use of LLINs and IPTp, with FY 2013 funds, PMI proposes to support external evaluation of BCC across all interventions through an external consultant. The aim is to provide critical information that will help to improve the design and

implementation of BCC activities and support future decisions about PMI-BCC funding (\$100,000).

MONITORING AND EVALUATION

Background

In Angola, rapid scale-up of malaria prevention and control interventions, and high coverage rates with ACTs, ITNs, IPTp, and IRS are common goals of the NMCP, PMI, Global Fund, and other national and international partners working on malaria. PMI evaluation framework is based on the goal of reducing malaria deaths by 70% and achieving 85% coverage targets with specific interventions over the course of the program (2009-2014). This framework is aligned with the standard methodology for malaria program evaluation that is being promoted by the Roll Back Malaria Partnership. Program evaluation will be based on coverage outcomes that will be measured at baseline, midpoint, and the end of the Initiative, and impact on mortality, which will be measured at baseline and the end of the Initiative. Information used to evaluate program outcomes and impact will be collected primarily through nationwide household surveys. All-cause mortality will be interpreted together with data on anemia, parasitemia, available information on malaria cases and external factors (e.g., rainfall), and coverage indicators to estimate the changes in mortality at the population level that can be attributed to reductions in malaria over the course of PMI.

PMI monitoring framework aims to complement and support the existing NMCP monitoring and evaluation efforts. The collection of the information needed for program monitoring and evaluation is done by PMI implementing partners, to avoid an additional burden on NMCP staff. Activities within the four main intervention areas, ITNs, IRS, IPTp, and case management with ACTs, are tracked through periodic reports from groups providing and distributing commodities, from health facilities, and from international and local partners. Types of activities that are monitored include procurement and distribution of commodities, availability of commodities for prevention, diagnosis and treatment of malaria, health worker performance, IEC efforts, and supervision and training for healthcare workers. To supplement this information, targeted operational evaluations and record reviews may be required to answer specific questions or identify problems with program implementation.

Progress during last 12 months

The 2011 Malaria Indicator Survey (MIS) showed an increase of ITN coverage from 11% to 35% but usage remains low at only 16% for children under five and 20% for pregnant women. The coverage of IPTp2 increased from 2.5% in 2006 to 17.5% in 2011. The 2011 MIS showed a reduction in parasitemia of 50%., from 19.5% in 2006 to 9.6% in 2011, as well as a reduction in all-cause under five childhood mortality from 118 deaths per 1000 live births in 2006 to 91 deaths per 1000 live births in 2011, which represents a reduction by 23% of under-five death between 2006 and 2011.

In late 2011, work began on an evaluation of all malaria control efforts in Angola over the past five years and the impact these efforts have had on all-cause under five childhood morbidity and

mortality. This impact evaluation, which is a key component of PMI's strategy for evaluating the progress of malaria control efforts in PMI-supported countries, will utilize the above data collected through the 2006 and 2011 MIS to determine if any documented scale-up in malaria prevention activities could be plausibly linked to a decrease in all-cause under five childhood mortality. The analysis of the data is currently ongoing, with the final report expected to be released late 2012.

The data management capacity of the NMCP continues to improve with the presence of a full time M&E officer and data manager at the NMCP hired with Global Fund support. To take advantage of this, PMI, through WHO, has supported the implementation of a new National Health Information System (NHIS), as well as the NMCP's M&E plan. These activities have focused on providing technical assistance, as well as working with stakeholders to define a list of core indicators for malaria to be used in the NHIS. Additionally, as part of the MEWS implementation, 73 technicians from the provinces at risk of malaria epidemics (Huila, Cunene, Namibe and Cuando Cubango) were trained on the system.

Unfortunately, data from MEWS has been scarce, and we cannot say that the system has been functional thus far. Funding to date has been used for implementation and for site visits to conduct assessments, which have revealed the need for on-site surveillance officers to ensure reporting quality and timeliness, as well as to provide technical assistance in calculating baselines. Additionally RDT stocks have not been consistent enough to allow the proper collection of data. This system was not originally envisioned to be part of the HMIS, though if the HMIS is functioning appropriately then this would obviate the need for the enhanced supervision associated with MEWS sites.

With PMI support, technical assistance has been provided to the Angola MOH's National Directorate of Medicines and Equipment, National Essential Medicines Program and NMCP to conduct a pilot survey of the availability (and use) of malaria and other key MOH program commodities. Using PMI-funded End Use Verification tool, bi-annual data are collected on the availability of commodities in provincial and municipal warehouses, as well as health facilities, in 38 health facilities in 8 of the 18 provinces. Both surveys showed significant stock outs at the municipal and facility level, despite commodities often being present at the provincial level. PMI also provides technical assistance to the MOH through quarterly reports of the Procurement Planning, Monitoring, and Reporting for malaria tool; the Q1 report was for this activity was submitted in January 2012.

PMI funds five NGOs in eight provinces to conduct case management and laboratory diagnosis training. Progress is evaluated through standardized indicators such as percent of totals suspected cases tested for malaria, percent of cases tested through microscopy and/or RDTs that receive ACTs, and percent of false-positive slides. These data inform provincial and national governments about the quality of malaria activities, as well as the effectiveness of the case management and laboratory diagnostic training occurring in these areas.

Due to the risk of development of insecticide resistance, PMI is supporting enhanced epidemiologic and entomologic surveillance in order to evaluate the vector control strategies in Huambo, Huila and Cunene. The aim is to provide critical information to support a decision to

shift spraying from Huambo, where the 2011 MIS describes zero *Anopheles* mosquitoes and zero parasitemia, to another province with higher levels of transmission. Information collected through this surveillance will also be critical in enabling PMI and the NMCP to detect and respond to any resurgences of disease in Huambo after IRS operations have been discontinued.

In 2011, PSI, with PMI support, conducted a quantitative study of LLIN coverage in seven provinces (Benguela, Huambo, Huila, Kwanza Norte, Kwanza Sul, Malanje and Zaire) following a universal coverage campaign that distributed 630,000 nets. Results of the study showed net ownership to be 80% in areas where the campaign was conducted, compared with the 35% ownership seen nationwide in the 2011 MIS. These results have been used by PMI and the NMCP to decide to continue with similar universal distribution campaigns, rather than municipal health day distributions of nets, due to the successes the former had in increasing net ownership.

Planned activities with FY 2013 funding are as follows: (\$2,675,000)

1. End-use verification/monitoring of the availability of key antimalarial commodities at the facility level every six months. This will entail regular supervisory/monitoring visits to a random sample of health facilities and regional warehouses to better identify overt malaria commodities supply chain weaknesses, focusing on malaria drugs availability, ACT use, and general stock management, including quantifications/consumption capability (\$150,000);
2. Strengthening the HMIS through partner support. WHO has recently conducted an assessment of the performance of HMIS in Angola and the results are encouraging. According to this assessment, HMIS continues to provide useful information for the MoH and its partners. This activity will support data collection, analyses of data collected and reporting and will include the number and treatment outcome of malaria cases from each of Angola's province. The activities will focus on technical assistance from the WHO to continue to improve the NHIS based on evaluations performed by WHO using PMI money from previous MOPs. The activities will also include the implementation and improvement of the NMCP's M&E plan, as well as defining a list of core indicators to be used in the NHIS. Although the monitoring of these activities was previously limited to evaluations performed by the WHO, the Angola team will work with WHO as well as FELTP Angola and the NMCP to perform more formal evaluations of the NHIS after implementation is complete. Future funding for these activities will be based on these evaluations. (\$100,000);
3. Enhanced epidemiologic monitoring in current and former IRS Provinces. In response to universal coverage with LLINs, the high cost of IRS, and the reduction of malaria cases in Huambo, PMI has decided to move IRS activities from Huambo to Bié Province. In order to 1) enable municipal and provincial health offices to detect and respond to malaria epidemics, and 2) continue to provide data on the performance of IRS activities, PMI will support enhanced epidemiologic and entomologic surveillance in Huambo, Huila and Cunene (\$200,000);
4. Refresher training and supervision as part of continued support to WHO for an early warning system and resources mobilization to detect and respond to epidemics (\$200,000);

5. Two TDY visits to provide assistance to in-country partners on monitoring and evaluation (\$25,000); and
6. Support to an MIS in 2014 which will provide information on both all-cause mortality and malaria related mortality for children under-five (\$2,000,000). Although further discussions with NCMP and Global Fund are required, at this point the team assumes that the level of stratification will be the same as the 2011 MIS. PMI will be co-sponsoring the MIS with the GF and GRA, and will be responsible for two-thirds of the cost of the survey.

PMI will provide technical assistance for the therapeutic efficacy survey (TES) evaluation of Angola's first line antimalarial therapy, Coartem, in the first quarter of 2013. This activity is supported with FY 2011 Angola MOP funds (\$50,000). With local health officials and implementing partners, PMI will look at the efficacy of Coartem in the various malaria transmission regions. The protocol used for this evaluation follows the WHO guidance to evaluate antimalarial therapies. Health facilities in one holoendemic and one mesoendemic province will be selected for this evaluation, with a possible third province chosen in a province with epidemic transmission. This evaluation is expected to take several months to complete and will involve Angolan laboratory facilities to process the samples as well as those of partner laboratories and CDC for further validation. Through this TES, PMI will promote capacity building with provincial health officials as well as Angolan Field Epidemiology and Laboratory Training Program residents who will participate in the evaluation. PMI will continue to promote this critical evaluation every 24 months; the next scheduled evaluation is for 2015 (using FY 2014 funds, hence no FY 2013 funds have been allocated for this activity).

STAFFING AND ADMINISTRATION

Planned Activities with FY 2013 Funding: (\$2,360,000)

The previous USAID and CDC in-country Malaria Advisors left Angola in 2011. Both of them were provided space within the NMCP offices and spent much of each work day there. This greatly improved communication and coordination between PMI and NMCP, and they came to be regarded as valued advisors to the NMCP. In the afternoons both advisors worked out of the USAID Mission. The new USAID Malaria Advisor assumed her post in May 2012, and PMI anticipates filling the CDC Malaria Advisor position by the end of 2012.

Both PMI staff members will remain as part of a single inter-agency team led by the USAID Health Team Lead. PMI team shares responsibility for the development and implementation of PMI strategies and work plans, coordination with national authorities, management of collaborating agencies, and supervision of day-to-day activities. Both staff members will continue to report to the USAID Health Team Lead. The CDC staff member will be supervised by CDC, both technically and administratively. All technical activities will be undertaken in close coordination with the MOH/NMCP and other national and international partners, including the WHO, UNICEF, Global Fund, World Bank, and the private sector.

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

ANNEXES

Table 1
Year 8 (FY 2013) Budget Breakdown by Partner*

Partner (Project)	Geographical Area	Activity	Activity Budget (\$)	Project Subtotal (\$)
JSI (DELIVER Task Order 7)	Nationwide	Purchase and distribution of LLINs	6,310,000	11,010,000
		Procurement of laboratory supplies for microscopy	100,000	
		Procurement of RDTs	750,000	
		Procurement of Coartem	3,000,000	
		Technical assistance and support for import, clearance, storage, distribution and management of RDT and ACT commodities	400,000	
PSI (Integrated Social Marketing - OAKULA)	Nationwide	Commercial sales for LLINs in urban/peri-urban areas	450,000	
MSH (SIAPS)	Nationwide	Strengthen Ministry of Health antimalarial drug management system	450,000	600,000
		Survey of availability of malaria commodities at the health facility level (End-use verification)	150,000	
PSI (Mentor)	Huambo	Continue ACT private sector pilot	635,000	635,000
Abt Associates (IRS IQC 2 Global Task Order 4)	Huila, Cunene and Bie Provinces	Indoor residual spraying	3,950,000	4,150,000
	Huambo, Huila, Cunene and Luanda Provinces	Enhanced integrated surveillance for Huambo, Huila, Cunene, and Luanda	200,000	
World Learning (Eye Kutoloka)	TBD	Support to five NGOs/FBOs in malaria service delivery in eight provinces	4,200,000	4,700,000
	Nationwide	Support to five NGOs/FBOs in IPTp in eight provinces	100,000	

		Provincial level supervision with NMCP	200,000	
		Facilitate training, supervision and quality control of malaria laboratory diagnosis	200,000	
Jhpiego (SASH/ ForcaSaude)	Luanda and Huambo	Facilitate malaria program implementation and health systems strengthening in collaboration with NMCP	800,000	800,000
CDC	Uige & Kwanza Sul Provinces	LLIN durability study	50,000	315,000
	Huila, Cunene and Bie Provinces	Entomologic monitoring and insecticide resistance testing	65,000	
	Nationwide	Technical support for laboratory training	25,000	
	Nationwide	Technical support for M&E	25,000	
	Nationwide	FELTP	150,000	
WHO	Huila, Cunene, Namibe, Cuando Cubango	Epidemic preparedness and response	200,000	300,000
	Nationwide	Strengthening HMIS	100,000	
TBD	Nationwide	Malaria Indicator Survey 2014	2,000,000	2,000,000
TBD	Nationwide	Support to Malaria Partners' Forum secretariat	30,000	30,000
TBD	Nationwide	Review and strengthening of IEC/BCC activities across partners	100,000	100,000
Total			\$24,640,000	

*Does not include budget for staffing/administration of \$2,360,000.

Table 2
President's Malaria Initiative — Angola Planned Obligations for FY 2013 (\$)

Proposed Activity	Mechanism	Budget		Geographical area	Description
		Total \$	Commodity \$		
PREVENTIVE ACTIVITIES					
Insecticide Treated Nets					
Procurement and distribution of LLINs through mass campaigns	JSI (DELIVER Task Order 7/NGOs)	5,560,000	5,560,000	Nationwide	Purchase and distribution of approximately 600,000 LLINs via mass campaigns and keep-up strategies, including BCC/IEC and tracking.
Commercial sales for LLINs in urban/peri-urban areas	PSI (OAKULA)	450,000	450,000	Nationwide	Procurement and integrated IEC/BCC related to ITNs
LLIN durability study	CDC	50,000		Uige & Kwanza Sul Provinces	In FY 2013, a third year of net collection and analysis will be undertaken.
SUBTOTAL - ITNs		6,060,000	6,010,000		
Indoor Residual Spraying					
Indoor residual spraying	Abt Associates (IRS IQC 2 Global Task Order 4)	4,700,000	400,000	Huila, Cunene and Bie Provinces	Procurement of insecticide, spray equipment/supplies to spray approximately 136,000 households; entomologic monitoring
Entomologic monitoring and insecticide resistance testing	CDC	65,000		Huila, Cunene and Bie Provinces	Technical assistance visits for entomologic monitoring and resistance testing in NMCP; support for specific reagents and other laboratory diagnostic materials
SUBTOTAL - IRS		4,015,000	400,000		

Intermittent Preventive Treatment in Pregnancy					
Support to five NGOs/FBOs in malaria service delivery in eight provinces	World Learning (Eye Kutoloka)	100,000		TBD	In eight province, improve health facility workers' understanding and compliance in administering IPTp to ensure IPTp/SP is administered through directly observed therapy at each scheduled ANC visit
SUBTOTAL - IPTp		100,000	0		
SUBTOTAL PREVENTIVE		10,925,000	7,160,000		
Case Management					
Diagnosis					
Procurement of laboratory supplies for microscopy	JSI (DELIVER Task Order 7)	100,000	100,000	Nationwide	Procurement of laboratory diagnostic reagents and supplies
Procurement of RDTs	JSI (DELIVER Task Order 7)	750,000	750,000	Nationwide	Procurement of 750,000 RDTs (SD Bioline)
Facilitate training, supervision and quality control of malaria laboratory diagnosis	World Learning (Eye Kutoloka)	200,000		Nationwide	Technical assistance on quality control of laboratory diagnosis (microscopy and RDTs)
Technical support for laboratory training	CDC	25,000		Nationwide	Two TDY visits to provide assistance to in-country partners in the correct use of laboratory diagnostic test results
SUBTOTAL - Diagnosis		1,075,000	850,000		
Treatment & Pharmaceutical Management					
Procurement of Coartem	JSI (DELIVER Task Order 7)	3,000,000	3,000,000	Nationwide	Purchase of approximately 3 million treatments of Coartem
Technical assistance and support for import, clearance, storage, distribution and management of RDT and ACT commodities	JSI (DELIVER Task Order 7)	400,000		Nationwide	Provide assistance in the distribution from port, and storage through customs, and down through provincial level

Strengthen Ministry of Health antimalarial drug management system	MSH (SIAPS)	450,000		Nationwide	Strengthen pharmaceutical mgmt. related to antimalarial drugs including regular supervision, provincial training of pharmacist, help with printing of SCM forms
Support to five NGOs/FBOs in malaria service delivery in eight provinces	World Learning (Eye Kutoloka)	4,200,000		TBD	Implement ACT treatment of malaria in areas not currently served by the MoH and include IEC/BCC related to ACTs, and ITNs in eight provinces
Continue ACT private sector pilot	PSI (Mentor)	635,000		Huambo	Expand pilot in terms of geographic focus, age groups, and incorporate RDTs
Facilitate malaria program implementation and health systems strengthening in collaboration with NMCP	Jhpiego (SASH/ ForcaSaude)	800,000		Luanda and Huambo	Contribute to malaria program implementation as part of larger health systems strengthening initiative within MoH.
SUBTOTAL - Treatment & Pharmaceutical Management		9,485,000	3,000,000		
SUBTOTAL CASE MANAGEMENT		10,560,000	3,850,000		
Capacity Building and Coordination					
Provincial level supervision with NMCP	World Learning (Eye Kutoloka)	200,000		Nationwide	Strengthen provincial-level supervision by the NMCP for malaria activities. Provide technical assistance to NMCP to visit each province at least twice a year.

FELTP	CDC	150,000		Nationwide	The Agostino Neto University, the Ministry of Health with CDC are collaborating to establish a program to train health personnel in field epidemiology where participants will acquire skills in data analysis, epidemiologic methods and use of strategic information to make appropriate health decisions.
Support to Malaria Partners' Forum secretariat	TBD	30,000		Nationwide	Continued support to National Malaria Partners' Forum
Review and strengthening of IEC/BCC activities across partners	TBD	100,000		Nationwide	External consultant to assess BCC activities in malaria and to provide recommendations for improved approaches (especially re. ITN use)
SUBTOTAL Capacity Building		480,000	0		
Monitoring and Evaluation					
Epidemic preparedness and response	WHO	200,000		Huila, Cunene, Namibe, Cuando Cubango	Refresher training and supervision as part of continued support to WHO for an early warning system and resources mobilization to detect and respond to epidemics
Survey of availability of malaria commodities at the health facility level (End-use verification)	MSH (SIAPS)	150,000		Nationwide	At least biannual monitoring of commodity availability and use at health facility level
Strengthening HMIS	WHO	100,000		Nationwide	Support to strengthening HMIS based on results of WHO assessment

Enhanced integrated surveillance for Huambo, Huila, Cunene, and Luanda	Abt Associates (IRS IQC 2 Global Task Order 4)	200,000		Huambo, Huila, Cunene and Luanda Provinces	Enhanced case and entomologic surveillance by external consultant, for evaluation of vector control strategies for Huambo, Huila and Cunene Provinces; continue to monitor malaria transmission in Luanda Province
Technical support for strengthening M&E	CDC	25,000		Nationwide	Two TDY visits to provide assistance to in-country partners for M&E
Malaria Indicator Survey 2014	TBD	2,000,000		Nationwide	Co-share (2/3 of \$3,000,000 budget) cost of conducting an MIS in 2014 with Global Fund and GRA.
SUBTOTAL M & E		2,675,000	0		
In-country Staffing and Administration					
Staffing and administration	USAID and CDC IAA	2,360,000		Nationwide	Support to salaries and benefits of Resident Advisors and support staff (1,060,000 for CDC IAA and 1,300,000 for USAID)
SUBTOTAL - In-Country Staffing		2,360,000	0		
GRAND TOTAL		27,000,000	11,010,000		