

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



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PRESIDENT'S MALARIA INITIATIVE



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Angola

Malaria Operational Plan FY 2015

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ABBREVIATIONS

ACTs	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal clinic
AS/AQ	Artesunate-amodiaquine
BCC	Behavior change communication
CDC	Centers for Disease Control and Prevention
CDCS	Country Development Cooperation Strategy
CECOMA	Central Unit for Procurement and Provision of Medicines and Medical Supplies (<i>Central de Compras de Medicamentos de Angola</i>)
DHP	Dihydroartemisinin-piperaquine
DNME	National Directorate of Medicines and Equipment (<i>Direcção Nacional de Medicamentos e Equipamentos</i>)
DPS	Provincial Health Directorate (<i>Direcção Provincial da Saúde</i>)
EPI	Expanded program on immunization
EPR	Epidemic preparedness and response
FBO	Faith-based organization
FELTP	Field Epidemiology and Laboratory Training Program
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GHI	Global Health Initiative
GRA	Government of Angola
HMIS	Health information management system
iCCM	Integrated community case management
IMCI	Integrated management of childhood illness
IPTp	Intermittent preventive treatment for pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
JICA	Japan International Cooperation Agency
M&E	Monitoring and evaluation
MIS	Malaria Indicator Survey
MOH	Ministry of Health
MOP	Malaria Operational Plan
NGOs	Nongovernmental organizations
NMCP	National Malaria Control Program
PMI	President's Malaria Initiative
PNDS	National Health Development Plan (<i>Plano Nacional de Desenvolvimento Sanitário</i>)
RDT	Rapid diagnostic test
SP	Sulfadoxine-pyrimethamine
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

I. EXECUTIVE SUMMARY

Malaria prevention and control are major foreign assistance objectives of the U.S. Government. 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 was extended and, as part of GHI, the goal of PMI was adjusted to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by continuing to scale up coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

Angola was selected as one of the first three countries in PMI in June 2005. Given the almost three-decade-long civil war, which ended in 2002, implementation of large-scale malaria control activities in Angola has faced serious challenges. The country's health infrastructure was severely damaged during the war, and it is estimated that only about 40% of the population has access to government health facilities. Significant progress has been made in malaria control, including a decrease in malaria parasitemia from 21.1% in the 2006/7 Malaria Indicator Survey (MIS) to 13.5% in the 2011 MIS, a reduction of almost 40%. However, malaria continues to be a major health problem, accounting for an estimated 35% of the overall mortality in children under five years of age, 25% of maternal mortality, and 60% of hospital admissions for children under five years of age. Malaria transmission is highest in northern Angola, while the southern provinces have highly seasonal malaria.

In February 2009, Angola signed a five-year, \$78-million Round 7 malaria grant from the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund). Angola was also successful in a Global Fund Round 10 grant for malaria for \$111 million. The grants were consolidated and after some delays, were signed on June 15, 2012. The United Nations Children's Fund (UNICEF) and the World Health Organization (WHO) have been partners of the National Malaria Control Program (NMCP) in scaling up interventions. An effective partnership with ExxonMobil Foundation has resulted in donations of \$5.5 million to the United States Agency for International Development (USAID) over the last eight years to further PMI and Government of the Republic of Angola's (GRA) efforts in the fight against malaria.

PMI is in discussion with the NMCP on different transition strategies and programmatic scenarios that adapt to Angola's growing prosperity. The GRA is increasing its commitment to health through yearly increases in funding and is focusing specifically on reducing maternal and

child morbidity and mortality, as well as strengthening cross-border malaria control and elimination efforts.

This PMI Malaria Operational Plan for fiscal year (FY) 2015 for Angola was developed during a planning visit carried out in April 2014 by representatives from USAID, the Centers for Disease Control and Prevention (CDC), and the Angolan NMCP, with participation of other major partners working on malaria in country. PMI's proposed FY 2015 activities are based on experiences and progress during the last eight years, the NMCP's 2011-2015 National Malaria Control Strategy, and the strategic planning process that the USAID/Angola mission is currently developing. PMI activities are designed to complement activities supported by other partners.

With the proposed FY 2015 PMI funding of \$27,000,000, the following activities will be supported:

Insecticide-treated nets: In early 2013, the GRA and partners launched a nationwide universal distribution campaign to provide one long-lasting insecticide-treated net (ITN) to every two people. Distribution has been conducted in a phased approach across the country, accompanied by a strong communications campaign. The campaign is anticipated to conclude by early 2015, at which time routine distribution of ITNs will resume.

With FY 2015 funds, PMI plans to procure 1.45 million ITNs for distribution to help maintain universal coverage through routine channels including ANC and EPI clinics in nine provinces. This quantity is expected to cover the needs of pregnant women and children under five years of age attending ANC and EPI clinics, respectively, in the public sector. While it is expected that net use will significantly increase after the mass campaign, Angola is still developing a net culture, thus continued support for behavior change is crucial.

Indoor residual spraying (IRS): PMI has supported IRS in selected provinces since 2006. In 2013, PMI and the GRA continued to conduct IRS in selected municipalities in Cunene, Huila, and Huambo, where PMI sprayed 141,782 structures, protecting a total population of 676,090 residents. The spray campaign was successful, with coverage of 92%, and several innovations were introduced to improve efficiency. In agreement with the NMCP, this was the final round of IRS in Cunene and Huila, while in Huambo, the municipality of Bailundo was sprayed for the first time. Two communities in Bailundo municipality presented significant challenges and due to these issues, these two communities will not be sprayed in 2014, but will be provided ITNs. Significant progress has been made in routine entomologic monitoring due to the opening of Angola's first insectary.

Looking ahead, PMI will decrease its direct implementation and financing of IRS and will focus on providing technical assistance to provinces or municipalities interested in financing and implementing IRS, starting with FY 2014 funding. Depending on the level of progress in the coming year, FY 2015 funding will be used for technical assistance, to include micro planning, budgeting and procurement support, training on IRS, and entomologic and environmental monitoring. PMI will continue entomologic surveillance in former IRS areas as well as establish reference centers in other parts of the country to monitor vector susceptibility, and longitudinal vector behavior monitoring to identify active vectors in Angola.

Malaria in pregnancy: PMI continues to work with the NMCP and the Reproductive Health Department to update manuals and training tools in accordance with the new WHO policy adopted by Angola in 2013, and will assist with the roll-out. PMI continued to support NGOs and FBOs in nine provinces to improve access to malaria prevention and treatment services for pregnant women. The 2011 MIS showed that 18% of pregnant women received two doses of IPTp, and NMCP data from 2013 showed that 38% of pregnant women received two doses. In 2014, PMI will perform an assessment of ANC use by pregnant women and IPTp administration to provide information on how the low rates of ANC use and barriers to IPTp administration could be addressed.

With FY 2015 funding, PMI will continue to collaborate with the NMCP and Reproductive Health Division to strengthen prevention, diagnosis, and treatment of malaria in pregnancy at all levels of the healthcare system. Specifically, PMI plans to continue to support NGOs and FBOs in IPTp implementation and effective case management of malaria by conducting training and supervision of health workers; ensuring sulfadoxine-pyrimethamine is available; supporting routine ITN distribution through ANCs; and supporting BCC on malaria in pregnancy.

Case management: PMI continues to support improved parasitological diagnosis of malaria with rapid diagnostic tests (RDTs) and microscopy through procurement of equipment and supplies and training and supervision of laboratory workers. PMI plans to hold strategic dialogues with the NMCP and the MOH to influence malaria commodities policy and to help them develop a plan to continuously increase their procurement of RDTs, ACTs, and other relevant commodities. As the GRA increases its procurement of malaria commodities, PMI plans to reduce the quantities it procures, with the future vision being that the GRA will procure the full quantities needed for the public sector. With FY 2015 funds, PMI plans to procure 1,500,000 multi-species RDTs. In terms of treatment, PMI plans to gradually decrease the quantities of ACTs it procures for the public sector (590,000 treatments with FY 2015 funds) to complement the GRA contribution. In addition, PMI plans to procure 600,000 ACTs for social marketing activities and an integrated community case management (iCCM) pilot.

PMI plans to continue to support strengthening of the existing human resources for health to appropriately diagnose and manage malaria and to support pre-service training. PMI plans to continue to provide training and supportive supervision to health care workers in nine provinces through PMI-supported NGOs. PMI's implementing partner will exit Huambo Province and start operations in Bié and Bengo Provinces.

PMI has invested significantly in improving pharmaceutical management in Angola. In 2015, PMI will begin to assess the readiness of the system to re-absorb malaria commodities by warehousing a portion of PMI-procured RDTs and microscopy kits in the Central Unit for Procurement and Provision of Medicines and Medical Supplies (*Central de Compras de Medicamentos de Angola*) and using its distribution system to the provinces, while maintaining direct distribution of the remaining RDTs and the entire supply of ACTs. Furthermore, PMI plans to continue to strengthen the supply chain system at all levels as well as the regulatory and quality control system for medicines to ensure quality products are procured and to minimize

substandard or counterfeit drugs entering the market. The activities for quality assurance will focus on strengthening the national level regulatory system.

Monitoring and evaluation: In May 2014, the Government of Angola conducted the country's first census since 1970. It is expected to show a significant increase in population over the projected figures. A Malaria Indicator Survey (MIS) was planned for 2013, but all community-based surveys were prohibited until the census was undertaken. The next MIS is now planned for 2015, and will be co-funded with the Global Fund. Currently, the NMCP is conducting a convenience sample survey using mobile health teams to test and treat all presenting patients of all ages by RDT; the teams operate in approximately 90 municipalities. This will also provide data to reanalyze the malaria burden in the country and help focus intervention efforts.

PMI plans to continue to support strengthening of the HMIS system and routine malaria monitoring activities. With FY 2015 funds, PMI will continue routine end-use verification/monitoring of the availability of key antimalarial commodities at the facility level; support the second round of ITN durability monitoring; continue to support HMIS strengthening at national, provincial, and health-facility level; and continue enhanced surveillance in former areas of IRS implementation and other areas across the country.

Behavior Change Communication: Since only 60% of Angola's population has access to public health facilities, awareness of malaria and appropriate actions at the household level is an especially important element of its malaria control strategy. With the launch of the universal coverage campaign in 2013, PMI has supported the NMCP and partners to develop and implement a specific BCC effort focused on improving net use. Overall, malaria BCC activities included municipal days, community outreach using face-to-face discussions, drama shows on malaria, and mobile videos; training of health and community workers; radio spots; and printed messages in addition to those that accompany packaged ITNs and ACTs. These activities were designed to ensure that messages about the importance of using ITNs, getting tested before treatment, and prevention of malaria during pregnancy reach as many people as possible to complement the NMCP's malaria control efforts.

With FY 2015 funds, PMI plans to work with the NMCP to focus on the development of communications materials for mass media and community-based activities, interpersonal communication, pre-season transmission malaria prevention activities, and case management of malaria. Evidence-based messages focused on a target audience will be used and support will be provided to the NMCP to begin to evaluate specific interventions and actual behavior change. With the launch of pilot iCCM in 2015, PMI will support the NMCP in developing a BCC toolkit for iCCM.

Health systems strengthening and integration: Support to the health system is crucial for the long-term sustainability of PMI investments, and systems strengthening activities, such as training and supply chain management, have been implemented since the launch of PMI in Angola. USAID's overall approach to health systems strengthening is through the provision of technical assistance to various levels in the government in the areas of budget and finance, HMIS, human capacity building, and logistics and supply chain management. After the approval of the National Health Development Plan (PNDS) by the Angolan government, USAID and PMI

provided significant technical assistance to cost the plan and capacity building to develop a monitoring and evaluation plan. In addition, PMI-funded projects are supporting the PNDS decentralization plan, which involves the development of municipal health plans and associated budgets. The GRA expects to have approved plans for all municipalities by the end of 2014.

With FY 2015 funds, PMI plans to continue to focus on improving the human resource capacity at all levels of the health system and strengthening the system as a whole by: continuing to support pre-service curriculum revision and implementation as well as in-service training on malaria diagnosis and treatment and health systems strengthening activities; strengthening provincial-level supportive supervision by the NMCP for malaria activities including technical assistance on effective supervision tools and timely and supportive follow-up; supporting two students from the Field Epidemiology and Laboratory Training Program to focus on malaria activities; and providing technical assistance to the PNDS Secretariat, MOH, and Ministry of Finance in budget planning and monitoring of the PNDS.

II. STRATEGY

INTRODUCTION

The President's Malaria Initiative (PMI) is a core component of the Global Health Initiative (GHI), along with other U.S. Government activities to combat HIV/AIDS, and tuberculosis. PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended. 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 selected as a PMI country in FY 2005. Large-scale implementation of ACTs and IPTp began in Angola in 2006 and has progressed rapidly with support from PMI and other partners. Rapid diagnostic tests (RDTs), ACTs, and IPTp are now available and being used in public health facilities nationwide, and millions of long-lasting ITNs have been distributed.

This FY 2015 Malaria Operational Plan presents a detailed implementation plan for Angola, based on the USG malaria strategy and the National Malaria Control Program's (NMCP's) strategy. It was developed in consultation with the NMCP and with the participation of national and international partners involved in malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the National Malaria Control Strategy and Plan and build on investments made by PMI and other partners to improve and expand malaria-related services, including the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) malaria grants and the ExxonMobil Foundation. This document briefly reviews the current status of malaria control policies and interventions in Angola, describes progress to date, identifies challenges and unmet needs to achieving the targets of the NMCP and PMI, and provides a description of planned FY 2015 activities.

MALARIA SITUATION IN ANGOLA

The National Institute of Statistics of Angola estimates the population in 2015 will be 22,675,168. However, in May 2014, the country conducted its first census since 1970; it is widely thought that the actual population figures will be much higher than the estimate. The entire Angolan population is at risk for malaria, but there is significant heterogeneity in transmission, with hyperendemicity in the northeast, including Cabinda Province, an enclave 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-November.

Significant progress has been made in the fight against malaria in Angola, and data from the 2011 Malaria Indicator Survey (MIS) show an almost 40% decline in parasitemia among

children under five years of age from the 2006/7 MIS (from 21% to 13.5%). The largest declines in parasitemia among children were in the unstable transmission zones of the south, where the change represents a nearly 60% drop (from 21% to 9%); and in the capital, where a 70% decline (from 6% to 1.8%) was observed when data from MIS 2006/7 and MIS 2011 were compared. According to the 2011 MIS, the mortality rate for children under five years of age has fallen by 23% over the last five years, and it is currently estimated at 91 deaths per 1,000 live births.

In 2013, there were 3,144,100 reported cases (confirmed and suspected) of malaria reported in the public sector in Angola, with 7,300 deaths (NMCP 2014). The majority of cases of malaria are caused by *Plasmodium falciparum* (87%); *P. vivax*, *P. malariae*, and *P. ovale* represented 7%, 3%, and 3% of cases, respectively (NMCP 2012 data). It is believed that the primary vectors in high transmission areas are *Anopheles gambiae s.s.* and *An. funestus*, which are endophilic and endophagic; in coastal areas, *An. melas* may be an important vector, and *An. arabiensis* and *An. pharaoensis* can be a secondary vector where present¹; however, there have not been many entomology studies to confirm the vector species in the country.

While the southern part of the country is considered epidemic-prone, and the southern province of Cuando Cubango did experience an outbreak in early 2013, the northern, hyperendemic areas (Lunda Norte, Uige, Zaire Provinces) of the country also experienced increased malaria incidence in 2012 and early 2013. A PMI-supported study carried out in 2008 showed that malaria transmission in the city of Luanda was very low, except in the outlying municipalities of Cacuaco, Viana, and Samba.² However, these same municipalities also experienced an increase in reported malaria cases in 2012 and early 2013.

¹ Cuamba N, Choi KS, Townson H 2006. Malaria vectors in Angola: distribution of species and molecular forms of the *Anopheles gambiae* complex, their pyrethroid insecticide knockdown resistance (*kdr*) status and *Plasmodium falciparum* sporozoite rates. *Malaria Journal* 2006, 5:2. And personal communication, Dr. Filomeno Fortes, NMCP 2013.

² Thwing J, Mihigo J, Pataca Fernandes A, Saute F, Ferreira C, Fortes F, Macedo de Oliveira A, Newman RD 2009. How Much Malaria Occurs in Urban Luanda, Angola? A Health Facility-Based Assessment. *Am. J. Trop. Med. Hyg.*, 80(3), pp. 487–491

Figure 1: Malaria Transmission in Angola



HEALTH SERVICE DELIVERY SYSTEM AND ORGANIZATION OF THE MINISTRY OF HEALTH

The Angolan Ministry of Health (MOH) currently estimates that 60% of the Angolan population uses the public sector for healthcare in Angola (NMCP 2014); this is based on the assumption that the heavy investment in health infrastructure over the last decade has increased access. However, there is notable disparity between urban and rural inhabitants' access to care.³ Similar to other countries in Africa, the Angolan National Health System has three levels of care: primary care, in which basic care is provided through health posts, health centers, and municipal hospitals; secondary care, in which care is provided through general (provincial) hospitals; and tertiary care, in which specialized care is provided through central hospitals in the capital city of Luanda.

Because the country is still recovering from nearly three decades of war, the GRA has focused significant resources on rebuilding infrastructure, including health infrastructure, which was severely damaged during the conflict. As a result of these efforts, the number of health facilities increased from 952 in 2003 to 2,356 in 2011.⁴ In addition, the GRA has prioritized increasing human resources for health (the number of doctors tripled from 2005 to 2009⁵), but there is still a

³ Connor, Catherine, Denise Averbug, and Maria Miralles. 2010. *Angola Health System Assessment 2010*. Bethesda, MD: Health Systems 20/20, Abt Associates Inc.

⁴ Angola Health System Assessment 2010 and NMCP 2014.

⁵ Angola Health System Assessment 2010.

critical shortage and inequitable distribution of health workers; for example, in 2009 there were an estimated 18 doctors per 100,000 population and 85% of health workers worked in urban areas.⁶

Since the late 1990s, the GRA has embarked upon various degrees of administrative and more recently, fiscal, decentralization. The law now grants municipal governments authorities for budgeting, managing, and implementing their own pool of funds. In an attempt to drastically improve public services, in 2012 the GRA transferred over \$400 million dollars to municipal governments, mostly to carry out health services. Next to be decentralized are water and education services, where funds will be allocated directly to the municipalities. In 2013, 33.5% of the overall GRA budget went to the social sector, with 5.3% for health.⁷

The MOH has four levels of administration: the national, provincial, municipal, and health facility. The central level includes the National Directorate of Public Health of the Ministry of Health (where the NMCP is located), where national guidelines and norms are elaborated, adapted, or adopted, and the national technical direction is set. The provincial level, which includes the Provincial Health Directorate (DPS), is responsible for coordinating all health activities in the province and providing oversight to the general (provincial) hospitals. The municipal level provides technical and operational directives to municipal hospitals, local health centers, and posts. The administration of each health facility provides direct supervision for the day-to-day operation of the health unit and health staff, but each facility depends on the municipality for budget and procurement. In 2008, the MOH initiated a process of revitalization of municipal health services to improve provision of the essential package of health services. The vision is to decentralize administration and to increasingly empower municipal administrative levels with the responsibility and the resources to ensure access to quality health services. In 2013, the GRA approved a National Health Development Plan (PNDS), which outlines the strategy to improve the health system from 2012-2025. The PNDS, prepared by a Multisectoral Commission which was created by a presidential initiative, is a strategic and operational tool for the materialization of the guidelines laid down in the *Long Term Development of Angola 2025* document and the National Health Policy strategy. This strategy has been costed with technical support from PMI. All municipalities are currently in the process of developing municipal health development strategies and will fund them through direct funds (annually, \$2 million) they receive from the Ministry of Finance, making them able to plan health activities independently of the provincial level.

The NMCP has 60 staff members, 52 of which are currently supported through grants from the Global Fund. However, the support for these program officers will cease at the end of the current grant (December 2014); the MOH is expected to assume responsibility for these positions. The NMCP is headed by a director, who is supported by a central team responsible for epidemiology, entomology, case management, monitoring and evaluation (M&E), behavior change communication (BCC), finance, and administration, as well as a provincial team. The NMCP collaborates with related programs of the National Directorate of Public Health, namely Reproductive Health, Integrated Management of Childhood Illnesses (IMCI), Epidemiology, as

⁶ Angola Health System Assessment 2010; data for the estimation of number of doctors per 100,000 population uses number of doctors cited from the Angola Health System Assessment and the estimated population cited in the FY 2009 MOP.

⁷ Presentation from the 22nd Advisory Council of the Ministry of Health, Benguela 2013.

well as the National Essential Drugs Program, National Institute for the Fight against HIV/AIDS, the National Institute of Public Health, and other services and directorates of the MOH as necessary. The NMCP has tried to strengthen its health infrastructure by retraining staff and placing provincial malaria officers in all 18 provinces. Every province now has a provincial malaria focal person paid by the Ministry, and a provincial malaria officer, supported by the Global Fund. Together they coordinate all malaria activities, engage in joint supervision of commodities and case management practices with the DPS staff, and provide training to all health providers in the province. At the municipal level, municipal malaria focal persons are responsible for M&E of malaria program activities, and work in collaboration with provincial malaria officers. Provincial malaria officers at provincial level are embedded within the DPS and are under the direct supervision of the provincial health director, whereas the officers at the central level supported by the Global Fund work directly with the NMCP central-level team within the National Institute of Public Health and report to the NMCP director.

UPDATES IN MOP STRATEGY

Major changes to the strategy section since last year include:

- Finalization of new Malaria Control Strategic Plan (2014-2017)
- Population census conducted in 2014, which is expected to show a significant increase in population over projected figures
- Universal ITN campaign expected to conclude in 2015 (later than anticipated)
- Angola's commitment to work towards pre-elimination of malaria by 2017 in the southern provinces (Cunene, Namibe, Huila, and Cuando Cubanda), through the Trans-Zambezi (Zambia) and Trans-Cunene (Namibia) border initiatives.

MALARIA CONTROL STRATEGY FOR ANGOLA

The GRA has made firm commitments to reduce mortality and morbidity due to malaria in the country. To achieve its goals, the NMCP has adopted the following operational strategies, as stated in the current Malaria Control Strategic Plan (2014-2017):

- Decentralization of malaria control interventions in accordance with current efforts to decentralize health and other government services to municipal levels;
- Early diagnosis of all suspected malaria cases using microscopy or RDT;
- Prompt and effective treatment of uncomplicated malaria cases with ACTs and timely treatment of severe cases;
- Increased uptake of IPTp with sulfadoxine-pyrimethamine (SP) through improved antenatal care (ANC) services;
- Integrated vector management comprising bed net distribution, IRS, and larviciding;
- Enhanced surveillance and rapid epidemic detection in southern provinces at risk of epidemics;
- Improved BCC on malaria prevention at the community level;
- Strengthened partnerships (public and private) and supporting cross-border initiatives.

Malaria diagnosis: In the past, malaria was diagnosed in most facilities based on clinical signs and symptoms. Malaria microscopy was only available in hospitals and larger health centers and the quality of diagnosis varied considerably between sites. RDTs were introduced in Angola in

2006 and used whenever available. In accordance with the change in WHO guidance related to malaria laboratory diagnosis in 2010, Angola updated its strategic plan (2012-2017) to align 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 communications and trainings, but problems still exist in terms of scaling up high-quality parasitologic diagnosis of malaria. These include shortages of RDTs, a 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.

Malaria treatment: Artemether-lumefantrine (AL) is first-line therapy for malaria, but since May 2006, AL and artesunate-amodiaquine (AS/AQ) have been used as alternative first-line drugs for the treatment of uncomplicated malaria. The NMCP decided to introduce AS/AQ as an alternative first-line drug because fixed-dose combination AS/AQ therapy includes fewer tablets than AL in an adult treatment, thereby facilitating improved adherence. In addition, AL was not recommended for children under five kilograms; as of 2010, the NMCP procures the co-formulated AS/AQ, Co-Arsucam[®]. The NMCP also engaged in a large multicenter drug efficacy study of a fix-dosed formulation of dihydroartemisinin-piperazine (DHP) and now includes it as another first-line treatment. The Chinese government has provided continuous donations of DHP. The NMCP and PMI conducted a therapeutic efficacy study in Zaire and Uige Provinces in 2013 that showed both DHP and AL are still efficacious, however in Zaire, the performance of AL was slightly reduced. For severe malaria, parenteral artesunate, artemether, and quinine are all approved for use and the MOH procures these commodities.

Malaria in Pregnancy: The NMCP's policy on malaria in pregnancy consists of a three-pronged approach made up of use of ITNs, monthly doses of IPTp (the NMCP updated its policy in 2013 in accordance with WHO recommendations, but the change in dosage of folic acid for pregnant women has not yet been adopted), and prompt and effective case management of acute malaria. IPTp 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 Department, routine site visits conducted by representatives from the department, provincial malaria supervisors, and provincial malaria officers indicate the policy is being implemented. Supervision is conducted at all health facilities that provide the essential health package, which includes ANC. Supervision is not conducted at health *posts*, however, as they do not provide ANC services. Nonetheless, the 2011 MIS found that only 18% of women reported taking at least two IPTp doses during their last pregnancy.

Vector management: The NMCP Malaria Strategic Plan 2014-2017 promotes an integrated vector management strategy that includes increased ownership and use of ITNs, IRS in epidemic-prone areas, and larviciding. The GRA's goal is to provide one ITN to every two people. The country is in the midst of a universal coverage ITN campaign in order to achieve that goal. Previously the government distributed nets through mass campaigns, routine distribution channels, and subsidized sales. The NMCP also supports the use of IRS for malaria prevention in epidemic-prone areas and elsewhere in the country, however IRS is not a major intervention employed in Angola. Synthetic pyrethroids are the current insecticides of choice based on

susceptibility and cost-effectiveness. The MOH policy is not to use DDT for IRS in Angola; however it may be used on the border since Namibia is using DDT for its control efforts there.

As part of the NMCP's program for integrated vector control, it also employs larviciding, which is fully funded by the GRA. In 2001, Angola conducted a trial of antilarval products in three provinces (Luanda, Cabinda, and Namibe), using two kinds of biological larvicides. Since 2008, all 164 municipalities of the country have conducted antilarval activities supported by the GRA and carried out with technical assistance from Cuban entomologists. As part of this activity, larval densities are analyzed, larvicides applied, and densities are re-evaluated post-application to determine larviciding efficacy. Since 2009, this program has applied larvicide to over 4 million square kilometers in all 18 provinces, with efficacy ranging from a 96.7% to 99.7% reduction in mosquito larvae in targeted areas. With technical input from multiple partners, the NMCP is currently conducting an extensive evaluation of the larviciding program. The goals are to inform the GRA program and to provide WHO with additional data on the effectiveness of larviciding in sub-Saharan Africa. This evaluation is expected to be completed in 2016. PMI does not support larviciding activities; while PMI Angola has been informed about the evaluation, the team has not participated or provided technical input.

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 Cuando Cubango. 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 detecting and containing malaria epidemics.

INTEGRATION, COLLABORATION, AND COORDINATION

The NMCP is responsible for planning, organizing, and supervising all malaria control activities in the country. It works in close collaboration with other departments at the directorate, such as Reproductive Health and Maternal and Child Health, on implementation of malaria in pregnancy and IMCI. There is a continued effort to strengthen working relationships within these departments to coordinate efforts and maximize resources.

Communication and coordination among partners involved in malaria prevention and control in Angola continue to improve, with increased communication from the NMCP to partners. 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 the PMI resident advisors in the NMCP offices, together with the move of several Global Fund-supported national malaria program officers to the NMCP offices. However, the support for these program officers will cease at the end of the current grant (December 2014) and the MOH is supposed to assume responsibility for these positions.

While there are still many weaknesses in coordination of malaria control activities at the central level, the NMCP holds a national meeting at least once a year with donors, partners both at national and provincial level, and all provincial malaria coordinators. These meetings provide an environment where NMCP can work together with malaria provincial representatives to find solutions to challenges faced during the implementation of malaria interventions. During these

meetings, the NMCP presents its strategic plan and objectives; provincial supervisors present malaria data by province; and NGOs and other implementing partners also present their activities. Donors have the opportunity to present their budget for the year and outline which program area is supported with their funds; and NGOs and implementing partners in the province also share progress and challenges in malaria control at provincial level.

The Malaria Partners Forum, made up of civil society and other interested partners focused on malaria, was created in 2007 with the objective of assisting the NMCP in coordinating partners' activities at all levels and minimizing duplication of efforts and resources. The forum was originally under the leadership of PSI, the founding president. After two years, PSI's mandate as president ended, activities under the forum lost some momentum and it was inactive for several years. However, an election was held in 2012 to select new executive leadership, comprised of *Ajuda de Desenvolvimento de Povo para Povo* as president, Chevron and a network of journalists as vice presidents, and technical advisory members. There are about 70 members, including the NMCP, PMI, WHO, UNICEF, local and international NGOs and FBOs, bilateral and multilateral organizations, Angolan military forces, and private sector companies. The Malaria Partners Forum is also present in some provinces, but coordination of malaria activities at provincial level varies from province to province. PMI has historically provided the bulk of the support to operate the forum, but in 2013, the forum was able to double its funding from PMI by leveraging resources from the ExxonMobil Foundation and others.

Funding of malaria control activities:

Funding of malaria control in Angola is provided by the GRA, with major contributions from PMI, the Global Fund, WHO, UNICEF, Japan International Cooperation Agency (JICA), and private partners, such as the ExxonMobil Foundation and Chevron, which support specific projects. The overall budget for health in 2013 was approximately \$350 million. While the NMCP received approximately \$14 million, the overall budget for malaria is unclear as municipalities now prioritize the health areas on which they will spend their funding. These funds are used for commodity procurement, larviciding, training and capacity building of health personnel, and general operational costs. National hospitals in Luanda, the provincial hospitals, and some municipal and provincial governments receive budgets directly from the GRA, which also contribute to malaria prevention and treatment. In addition, the GRA has made available \$2 million per year to each municipal government for health programs, including malaria.

In 2007, Angola was awarded a \$78 million Global Fund Round 7 malaria grant. The MOH is the principal recipient, with WHO, UNICEF, and Population Services International (PSI) as sub-recipients. The grant was signed in February 2009, and Phase 1 of implementation was completed in October 2010. 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 BCC, over five years.

In 2010, Angola successfully submitted a \$111 million Round 10 Global Fund proposal. This proposal, which builds on the accomplishments of Phase 1 of the Round 7 grant and other partner contributions (including PMI), 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 BCC, and \$7.8 million for program management,

over five years. The total funding for Year 1 is \$21.0 million and for Year 2 is \$19.4 million. The NMCP and the Global Fund decided to consolidate the Round 7 and Round 10 grants, which were signed in June 2012, and disbursement of funds began in November 2012, with final disbursement for Phase 1 completed in March 2013. There have been some implementation challenges in executing these grants, which have caused delays in the distribution of malaria commodities as well as the payment of salaries for Global Fund-employed staff.

Recently Angola has embarked on a revitalization of municipal health systems within the context of decentralizing health services. This is intended to improve infant and maternal health, as well as increase overall access to primary health care by the Angolan people. The program 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.

Private sector

Since the launch of PMI in Angola in 2006, the ExxonMobil Foundation has contributed \$5.5 million to PMI to support the scale up of ACTs, IPTp, and malaria diagnostics, as well as capacity building and health systems strengthening at health facility, municipal, and provincial levels through the PMI-supported USAID Angola NGO-strengthening project. This project provides sub-grants to five non-governmental organizations (NGOs) and faith-based organizations (FBOs).

Within USG

PMI contributes more than 70% of the budget for health activities within the USAID Angola Mission and contributes to a number of integrated programs. PMI continues to support the NMCP in the revitalization and decentralization process, mainly through the USAID integrated health systems strengthening project and the NGO strengthening project. Both projects work with the NMCP to develop or adopt guidelines and with the municipal leadership to develop administrative, financial, and technical capacity to ensure improved access and quality of all health services, including malaria.

GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

The goal of PMI is to reduce malaria-associated mortality by 70% compared to pre-Initiative levels in the 15 original PMI countries and to reduce malaria-associated mortality by 50% in new countries added to PMI in FY 2010 and later. By the end of 2015, PMI will assist Angola to achieve the following targets in populations at risk for malaria:

- >90% of households with a pregnant woman and/or children under five will own at least one ITN;
- 85% of children under five will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses in geographic areas targeted for IRS will have been sprayed;
- 85% of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been protected by IRS;
- 85% of women who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy;

- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria; and
- 85% of children under five with suspected or confirmed malaria will have received treatment with ACTs within 24 hours of onset of their symptoms.

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.

At the time the first MIS was conducted in 2006, ACT and IPTp implementation had only just begun, so the figures reported for proportion of children under five years of age 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 bed nets and an adjustment was made in the calculations to take campaign nets into account in estimating the baseline ownership of ITNs.

In 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. Another MIS was supposed to be conducted in 2013, but was postponed due to the planning for a national census in 2014, and is now planned for 2015. Thus the results for the major indicators used by PMI include the baseline MIS of 2006/7 and the 2011 MIS outlined in the table below:

Indicator	2006–2007 MIS	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	3%	18%
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	2%	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 2011 MIS, and demonstrates an almost 40% reduction in parasitemia from 21% to 13.5%.

Malaria Transmission Zones	% Parasitemia 2006/2007*	% Parasitemia 2011
Hyperendemic	31%	25%
Mesoendemic stable	26%	15%
Mesoendemic unstable	21%	9%
Luanda (city)	6%	2%
Total (nationally)	21%	14%

*The 2006/7 figures listed here are from the 2011 MIS report and are different than those published in the 2006/7 MIS (erroneous denominator used in 2006/7 report).

The table below shows that all-cause under-five mortality decreased from 118 deaths per 1,000 live births in 2001-2006 to 91 deaths per 1,000 live births in 2011. This represents a reduction of under-five mortality by 23%.

Mortality rates for three five-year periods preceding the survey (2011 MIS)						
Years prior to survey	Calendar years	Neonatal mortality (%)	Post-neonatal mortality (%)	Infant mortality (%)	Child mortality (%)	Under 5 mortality (per 1,000)
10-14	1996-2001	29	37	65	56	117
5-9	2001-2006	32	34	67	55	118
0-4	2006-2011	23	26	50	43	91

CHALLENGES, OPPORTUNITIES, AND THREATS

The GRA has financial resources to contribute to malaria control and prevention, as well as other important health priorities. Within the framework of the new PNDS, the GRA is costing out program areas and allocating more resources to disease prevention. These resources, in conjunction with the process of decentralization, afford an opportunity for the government, especially at the municipal levels, to assume more ownership and financial responsibility for its malaria control program. That said, human resource capacity has proven to be a major constraint and challenge in Angola. In order to help prepare the GRA for USAID's transformational strategy, continued training and technical assistance, accompanied by gradual, measured steps toward transition, are in order.

PMI SUPPORT STRATEGY

PMI's strategy for Angola supports the NMCP's strategic goals and priorities and complements the efforts of the GRA and other partners. PMI prioritizes the key intervention areas and supports capacity building at all levels of the health system. With FY 2015 funding, PMI will shift the focus of high-impact malaria treatment and prevention activities to areas with high malaria transmission, while continuing health systems strengthening and surveillance activities in the areas of lower transmission in the southern part of the country and Luanda. Specifically, PMI-

supported NGOs work in nine provinces (Zaire, Uige, Malange, Kwanza Norte, Kwanza Sul, Benguela, Huila, Bengo, and Bié). PMI will transition its support out of Huambo Province, but will continue to support discrete activities, such as surveillance. In addition, PMI will start implementing the USAID Angola Country Development Cooperation Strategy (CDCS), which focuses on providing demand-driven technical assistance; for example, PMI will provide assistance to provinces interested in financing and implementing IRS rather than the direct spraying activities that PMI has supported to date.

With FY 2015 funding, PMI plans to leverage USAID's CDCS to strengthen and improve service delivery through continuing to build capacity of the NMCP while:

- Ensuring correct and consistent use of ITNs and nurturing a net culture after the 2013/14 universal net campaign by supporting continuous distribution and BCC;
- Supporting GRA-funded IRS and scaling up entomologic monitoring to inform IRS and ITN strategies;
- Improving quality of malaria diagnosis and treatment;
- Increasing access to and demand for parasite-based malaria diagnosis and treatment based on results in the public, private, and community arenas;
- Strengthening national-, provincial-, municipal-, and health facility-level technical capacity, as well as strengthening local NGO and FBO capacity;
- Improving malaria disease surveillance to provide evidence-based data to inform the malaria control strategy; and
- Focusing on PMI-supported program implementation monitoring to ensure investments are delivering expected results.

The GRA has been progressively increasing its budget for the social sector with a substantial increase in resources for the health sector and for the malaria program. With this potential increase in resources, combined with the new USAID Angola CDCS, PMI and the NMCP are engaged in discussions about a transition strategy: evaluating what resources exist for malaria commodities versus the projected needs and the technical capacity and assistance needed to ensure the country continues to progress in controlling malaria.

III. OPERATIONAL PLAN

PREVENTION ACTIVITIES

Insecticide-Treated Mosquito Nets

Background

Routine distribution to pregnant women and children under five years of age of ITNs through ANC and Expanded Program on Immunization (EPI) clinics and municipal health days (such as World Malaria Day), began in 2001. Historically, due to decentralization, the NMCP has not supported routine distribution with its own nets; rather provinces and municipalities have bought and distributed nets with their own funds.

For several years, the GRA was not supportive of mass distribution campaigns due to concerns that they would distract from this routine distribution. When mass campaigns started in 2006, they were still targeted to vulnerable populations. The first campaign was integrated with polio and measles vaccinations, vitamin A supplementation, and deworming campaign and distributed over 800,000 ITNs to households with children under five years in seven provinces (Cabinda, Uige, Malange, Lunda Norte, Zaire, Moxico, and Lunda Sul).

In 2010, the NMCP modified the ITN strategy to universal coverage, defined as one net for every two people. In 2011, PMI supported the distribution of 630,000 ITNs through mass coverage campaigns in select municipalities in eight provinces (Benguela, Huambo, Kwanza Sul, Kwanza Norte, Zaire, Malange, Uige, and Huila). A survey conducted with PMI support two months after distribution showed that 85% of households had at least one ITN and 56% had at least one ITN for every two people in the household.⁸

In early 2013, the GRA and partners launched a nationwide universal distribution campaign to provide one ITN to every two people. The NMCP temporarily suspended routine distribution during the campaign, and requested that partners focus all resources on the mass distribution. Accordingly, PMI re-allocated ITNs originally intended for routine distribution and support for subsidized sales to the campaign instead. The GRA, PMI, Global Fund and JICA, through UNICEF, have procured approximately 6.3 million nets to support the campaign. The GRA has said it will help cover the gap with 4 million nets, but procurement has been slow. Distribution is conducted in a phased approach across the country and is accompanied by a strong communications campaign.

The GRA plans to restore the routine “keep-up” strategy of providing nets free of charge to pregnant women and infants after the universal coverage campaign, to ensure new families and children continue to be covered. However, the NMCP has not yet clearly defined its “keep-up” strategy after achieving universal coverage. Nonetheless, the draft National Malaria Control

⁸ Rivas, Jorge, Caveya, Elsa. 2011. *ANGOLA (2011): Measuring the scope of the first Universal Coverage campaign of Long-lasting insecticide-treated nets (ITNs) in Benguela, Huambo, Huila, Kwanza Norte, Kwanza Sul, Malange and Zaire*. Arlington, Va.: USAID/DELIVER PROJECT, Task Order 3.

Strategy 2014-2017 includes language on ensuring pregnant women and children under five years of age have and use nets, and expanding the subsidized and full-cost commercial sector for nets.

Since 2006, over 11.5 million nets have been distributed in the country through various partners. Multiple partners including the GRA, PMI, Global Fund, UNICEF, UNITAID, JICA, Malaria No More, the ExxonMobil Foundation, and PSI have supported procurement and distribution of ITNs. In addition, there are nets available in the commercial sector for full price. PMI has procured and/or distributed 6 million ITNs (PMI has supported the distribution of over 1 million ITNs procured by other partners). Distribution has been accompanied by strong BCC messaging to build and support a growing net culture in Angola.

Net ownership has increased from 11% in 2006 to 35% in 2011 and there is considerable usage among vulnerable populations:

- 26% of all children under five years slept under an ITN the previous night;
- 61% of all children under five years slept under an ITN, among households with at least one ITN;
- 26% of all pregnant women slept under an ITN the night prior to the survey;
- 68% of pregnant women in households with an ITN slept under an ITN.

The relatively high usage rates among households that have nets signifies that a net culture is growing and that lack of access to nets is a large contributor to the overall low usage rates in the total population.

The NMCP has incorporated routine monitoring of the durability of ITNs in their national strategy and have requested for the national NMCP entomologists to participate in the fieldwork for the next evaluation in order to gain more experience. There are now two entomologists at the NMCP, which will allow them to expand their activities. Durability evaluations of ITNs began in Angola in early 2011 in Uige and Kwanza Sul Provinces. After the first 12 months of the durability study, preliminary results indicate that the ITNs included in the study may not be surviving as long as anticipated by international standards (e.g. 50% net survivorship at month 36). There is a significant range of mean net survivorship amongst the three study sites as well as an initial indication that there may be challenges with insecticide retention. PMI will continue to closely monitor the study sites and track the status of the ITNs through months 24 and 36 to document actual ITN performance at the community level and to compare that with expected performance levels in order to understand when ITNs need to be replaced in Angola. Results of the evaluations of physical integrity and bioassays and insecticide content are expected by end of 2014.

Progress during the last 12 months

PMI's implementing partner, with its substantial experience with community and household distribution in Angola, has provided support to the NMCP, conducting training of national and provincial MOH staff on the distribution process. In 2013, PMI distributed 484,577 GRA-purchased nets and 798,000 PMI-procured nets in two additional provinces; universal coverage

was reached in Malange Province and in four municipalities in Uige Province (the ExxonMobil Foundation supported implementation of the Uige activities).

In January 2013, PMI supported the procurement and distribution of 423,000 nets in Kwanza Norte and Zaire Provinces. Also in 2013, an additional 890,000 PMI-procured ITNs arrived in-country and are currently being distributed in Bié Province with PMI support; later in the year additional nets will be distributed in the high transmission municipalities as well as in areas where PMI has ended IRS activities in Huambo Province (with the expectation that the GRA will cover the rest of the province). By the end of the campaign, PMI will have contributed to universal net ownership in 6 of the 18 provinces in Angola. These six provinces are the areas with the highest malaria prevalence in the country.

The second year of data collection for the ITN durability study was conducted early in 2013 in two municipalities in Uige Province and one in Kwanza Sul Province. Household surveys on net care and use, rapid hole assessments in the field, and hole counting and measurement on-site were conducted. Net samples were collected for WHO cone bioassays and chemical analysis for residual insecticide content at CDC headquarters in Atlanta. Results are expected at the end of 2014 as the chemical analysis has taken longer than expected due to a backlog in processing. This study will help inform Angola of the timing of future keep-up distribution of nets. This ITN durability evaluation will end in 2014. The location for the second round will be selected based on discussion with NMCP; it will be within a logistically feasible province that has been covered by the mass distribution campaign. The new round will follow PMI's current standardized monitoring approach.

The following table shows a gap analysis revised in accordance with the NMCP's decision last year to discount all nets that were distributed prior to 2012 for the campaign. While the FY 2014 MOP describes procurement and distribution of more than 1.4 million nets through routine distribution, PMI may consider using these nets to cover high transmission areas that may remain after this year's distribution if the GRA is unable to procure and distribute the full 4 million ITNs needed to cover the gap; otherwise PMI will target the most vulnerable populations through routine channels.

Gap Analysis for ITNs for Universal Coverage

Calendar Year	2014	2015	2016
Total Population	21,955,773	22,675,168	23,305,538
Mass Distribution Needs (based on one net per 1.8 people)			
2013-2014 campaign (rolling distribution)	11,815,167	12,197,652	12,597,316
Continuous Distribution Needs			
Pregnant women (5.2 % of total population)	1,141,700	1,179,109	1,211,888
Babies attending ANC for 9 month vaccine (4.8%)	1,053,877	1,088,408	1,118,666
Estimated ANC/EPI needs	2,195,577	2,267,517	2,330,554
Total Calculated Need (Campaign + Continuous Distribution)			
	14,010,744	14,465,169	14,927,870
Partner Contributions			
Angolan Government	1,150,000	1,000,000	
GF Consolidation Round (R7 Ph2 + R10 Ph1)		2,810,812	
PMI	798,000 <i>(campaign)</i>	950,000 <i>(campaign)</i>	1,450,000 <i>(CD)</i>
UNICEF (JICA)		455,000	
Subtotal ITNs planned for the year	1,948,000	5,215,812	1,450,000
Subtotal remaining available from previous years (est. valid for 3	669,484	2,374,320	7,217,597

years)			
TOTAL ITNs AVAILABLE	2,617,484	7,590,132	8,667,597
GAP TO ACHIEVE UNIVERSAL COVERAGE	11,393,260	6,875,037	6,260,273

In April 2014, PMI supported a continuous distribution workshop to support the NMCP in planning continuous distribution channels for ITN keep-up after the campaign. According to the report from the workshop, the GRA needs to complete its planned mass ITN distributions in 2014 before initiating proposed channels for continuous distribution in order to sustain high ITN coverage over time. The team participating in the workshop determined that to maintain high levels of coverage (the NMCP chose to maintain at a rate of 90%), ANC, EPI, and school-based distribution would be needed. The overall need for target populations (pregnant women and children under five years of age) for 2016 is approximately 2.3 million nets.

Proposed activities with FY 2015 funding: (\$9,860,000)

At the time of writing this document, PMI Angola assumes that the universal coverage campaign will be completed by the end of 2014 and plans to focus FY 2015 resources on maintaining high coverage in the high transmission areas of the country (the northern two-thirds that is dominated by hyperendemic and mesoendemic stable transmission) while also ensuring coverage of the most vulnerable populations (pregnant women and children) in the lower transmission areas. Therefore, PMI plans to contribute to maintaining universal coverage or covering the most vulnerable (pregnant women and children under five years of age) in provinces that have not achieved universal coverage with provision of ITNs through routine channels (ANC and EPI clinics).

PMI will support the GRA in implementing recommendations from the workshop held in April 2014, namely to use a number of channels to sustain ITN coverage over time at the agreed rate of 90%. Health facility-based (ANC and EPI) distribution of ITNs is planned to recommence in 2016. However school-based distribution—which entails planning and coordination on the part of the ministries and authorities of the health and education sectors—is planned to start in 2017; PMI will consider including school-based distribution in next year’s MOP.

Based on population growth, fertility rate, and increased access to public health facilities for these target populations expected in 2016 (80% ANC coverage from 69% and 50% EPI coverage from 29% currently⁹), the estimated need will be approximately 1.45 million ITNs. While it is expected that net use will significantly increase after the campaign, Angola is still developing a net culture, thus support for behavior change is crucial. PMI will continue to focus on proper and consistent use of nets through campaigns that promote behavior change.

⁹ National Statistics Institute, Integrated Survey on the Well-being of the Population of Angola. 2011

1. Procure 1.45 million ITNs for distribution through routine channels including ANC and EPI clinics in nine provinces with PMI-supported NGOs (Zaire, Uige, Malange, Kwanza Norte, Kwanza Sul, Benguela, Huila, Bié and Bengo); this quantity is expected to cover the needs of pregnant women and children under five years of age attending ANC and EPI clinics respectively in the public sector. This includes distribution cost to provincial warehouses (\$7,975,000).
2. Transfer ITNs from the provincial warehouses to the health facilities in the nine provinces with PMI-supported NGOs. This includes training and supervision of health staff (\$1,885,000).
3. BCC activities at national and local levels to strengthen usage of nets distributed through the universal coverage campaign and through routine channels. Local-level activities will focus primarily on interpersonal communication (costs covered under the BCC section).
4. ITN durability monitoring (activity and funding is covered under the M&E section).

Indoor Residual Spraying

Background

In Angola, indoor residual spraying predates PMI, having been initiated by the GRA in Benguela and Cabinda Provinces in 2004. PMI has been supporting large-scale IRS campaigns since 2005, when resources were also leveraged from WHO to spray selected municipalities in Cunene and Huila Provinces (labeled as mesoendemic unstable), which covered nearly half a million people. Namibe Province was added in 2006, but by 2008, both Namibe and Cunene were dropped and Huambo Province (previously a province with high transmission) was added.

At the request of the NMCP in 2010, Cunene Province, which borders Namibia, was once again added as a PMI IRS target province in support of Namibia's malaria pre-elimination efforts and part of the Southern African Development Community plans for the elimination of malaria in the 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. The table below summarizes the spray rounds supported by PMI in the last five years (and plans for 2014, expected to be the final year of PMI-funded spraying in Angola).

Calendar Year	# Provinces sprayed*	Insecticide used	# Structures sprayed	Coverage rate	Population protected
2009	Huambo and Huila	Pyrethroid (ICON CS, plus remaining stock of ICON WP)	102,371	95.7%	485,974
2010	Huambo, Huila, and Cunene	Pyrethroid (ICON CS)	135,856	96%	649,842
2011	Huambo, Huila, and Cunene	Pyrethroid (Deltamethrin)	145,264	98%	689,668
2012	Huambo, Huila and Cunene	Pyrethroid (Deltamethrin)	141,782	97.7%	676,090
2013	Huambo, Huila and Cunene	Pyrethroid (Deltamethrin)	98,136	92.1%	419,353
2014	Huambo (Bailundo municipality only)	Pyrethroid (Deltamethrin)	20,000 (estimated)	85%	65,000 (estimated)

*In each province, only selected municipalities have been sprayed, thus the whole province has not received IRS.

IRS is recognized as an effective intervention and remains part of the national strategy for malaria prevention. Nonetheless, the 2011 MIS showed that IRS was utilized by only 7% of the Angolan population. Furthermore, the NMCP has been clear that IRS is not a GRA funding priority, other than spraying the border areas of Namibia and Zambia (which the GRA intends to spray with funding from other sources, including its own). The NMCP plans to spray DDT on the borders, since Namibia is using DDT in its border spraying (otherwise the MOH has prohibited use of DDT in the country). A few provinces have, of their own initiative and funding, implemented IRS. PMI has withdrawn from Cunene and Huila and plans to spray one last round in Huambo Province in 2014. This last round follows the 2013 spraying in a new municipality that had been prioritized by the NMCP and DPS as one of the remaining higher burden municipalities in Huambo Province.

Since 2005, pyrethroids have been used in all spray campaigns, based on insecticide susceptibility testing, which has been conducted annually with PMI support. For continued quality assurance of the IRS program, WHO cone bioassay tests are carried out to determine the quality of spraying activities and insecticide decay rates. In the absence of entomological support in Huila and Cunene, the bioassays have only been conducted in Huambo Province on IRS-treated surfaces. Adult mosquitoes reared from field-collected larvae were used since there is no access to a susceptible mosquito colony in Angola as the Minister of Health currently prohibits the importation of mosquito eggs for fear of introducing new diseases or vectors. In 2012, in Huambo municipality where IRS was conducted, after three months, the observed mortality was

52%; in 2013, in Bailundo municipality, observed mortality had already decreased to 54% after two months of spraying and was 43% after three months. In both years, quality of IRS was verified with observed mortality at 98% and 97% respectively. Further analyses were conducted to investigate the faster than expected decline in effectiveness after the 2013 spray round: observed mortality was not significantly different between cement and mud surfaces (observed mortality of 48% and 58% respectively two months after IRS), resistance testing using wild type mosquitoes three months after IRS showed possible resistance (CDC bottle assay conducted twice with results of 89% and 90%), and the insecticide potency was verified in the CDC Atlanta entomologic laboratory. These results highlight the need for a strong entomology program as well as susceptible colony for use in Angola.

Progress during the last 12 months

In 2013, PMI and the GRA continued to conduct IRS in selected municipalities in Cunene, Huila, and Huambo, where PMI sprayed 141,782 structures, protecting a total population of 676,090 residents. In agreement with the NMCP, this was the final round of IRS in Cunene and Huila, while in Huambo, the municipality of Bailundo was sprayed for the first time. Bailundo was chosen as the NMCP wanted IRS to remain in Huambo and this municipality had one of the highest malaria burdens in the province. Huambo municipality in Huambo Province received its final round of IRS in 2012. PMI planned to distribute ITNs in Huambo municipality in mid-2014, but has been asked by the DPS to prioritize other areas in the province that have a higher burden of malaria. PMI continues to support case management, BCC, and health systems strengthening and epidemiological surveillance in Huambo municipality and the municipalities in Huila that received IRS. The municipalities that received IRS in Cunene were supposed to be covered in this year with ITNs from the Global Fund, but these ITNs have since been prioritized to the northern, hyperendemic provinces. However the Cunene provincial MOH has asked PMI to provide technical assistance to continue IRS, using its own funds, in 2014. PMI continues to support epidemiologic surveillance. Huila Province is being partially covered with ITNs this year during the universal coverage campaign with ITNs procured by JICA; thus it is expected that the rest of Huila Province will be covered when the next consignment of GRA-procured nets arrive to complete the whole province.

The 2013 spray campaign was very successful (coverage was 98%); and several innovations were introduced to improve efficiency. Spray personnel in Bailundo municipality also served as community mobilizers, and smartphones were piloted for data collection, which improved efficiency and accuracy. Two communities in this municipality presented significant challenges due to difficult access, farming practices that limited household availability, cultural norms that prohibit strangers from entering houses and misconceptions about IRS having a political mandate. Due to these issues, these two communities will not be sprayed in 2014, but will be provided with ITNs.

To support IRS, PMI trained 870 people (government and private citizens) in the various components of IRS, including 691 for direct implementation (586 spray operators/IEC community mobilizers, 105 enumerators), 24 health technicians, and 14 data entry clerks. However, a capacity assessment conducted by PMI's implementing partner still outlines significant gaps in capacity at all levels despite several years of IRS operations in the same areas.

Results from entomological monitoring, insecticide resistance monitoring, and residual insecticidal activity following IRS are presented in the Monitoring and Evaluation section.

Proposed activities with FY 2015 funding: (\$1,055,000)

In 2014, PMI plans to decrease its direct implementation and financing of IRS and will focus on providing technical assistance to provinces or municipalities that are interested in financing and implementing IRS. The NMCP has asked for PMI to support the development of a manual that would help provincial and municipal governments decide when and where IRS is appropriate, its effectiveness, and how to get further support if they are interested in implementing it. The October 2014 IRS round supported by PMI will cover Bailundo municipality in Huambo Province and this will be the last round. PMI plans to pilot simultaneous distribution of ITNs during this spray campaign (and will provide only ITNs to the two communities with difficult access previously mentioned). Contingent upon successful execution of FY 2014-funded activities (e.g., IRS sensitization and training workshops, identification of participating municipalities, etc.), FY 2015 funding will be used for technical assistance that will include microplanning and budgeting support, training on IRS, and entomologic and environmental monitoring. PMI's implementing partner is already using this model in Cunene Province at the request of the Cunene MOH. Two other provinces (Malange and Uige) have also expressed interest.

PMI's implementing partner started surveillance activities in 2014, collecting data from health facilities in areas that had been sprayed in 2013 and in Huambo Sede; baseline data should be soon available. The purpose for this surveillance was not to monitor the impact of IRS, but to establish a system to monitor for potential effects of withdrawal of IRS. PMI will continue to support epidemiological surveillance in these same areas at selected health facilities. The epidemiologic surveillance will encompass the epidemic preparedness and response (EPR) activities, as several of the former IRS areas overlap. This includes retrospective and prospective data collection and capacity building for proper diagnosis and management of malaria and data collection and analysis.

1. Provide technical assistance (micro-planning, budgeting, training on IRS, entomologic and environmental monitoring, technical, operational and management functions to implement an IRS program) in provinces or municipalities interested in financing and implementing IRS; if these funds are not fully utilized for this activity, they will be used for improving in-country capacity to conduct PCR and ELISA on entomologic samples (\$400,000).
2. Establish a Memorandum of Understanding (MoU) with the Ministry of Health of Angola (MOH) to provide technical assistance to Provincial Directorates of Health (PDHs) that have secured their own funding for IRS (initiating development in 2014; costs covered under Activity 1).
3. PMI will increase entomologic monitoring in four to five sites in three of the five provinces that previously have had Epidemic Preparedness and Response (i.e. Huila, Cunene, and Huambo). Epidemiologic monitoring will be conducted in selected health

facilities within former IRS municipalities in the three provinces, and to establish a surveillance system that will be used to identify outbreaks of malaria in areas where IRS has been withdrawn. Data will include number of febrile cases, number of suspected cases receiving parasite-based diagnosis, number of confirmed malaria cases and if possible, treatment practices (\$400,000).

4. As part of comprehensive technical assistance to the GRA in undertaking IRS, PMI will support third party environmental compliance technical assistance to the provinces and municipalities, to help ensure compliance through training and field visits (\$50,000).
5. As there is still limited capacity to process mosquitoes collected during insecticide resistance testing and routine monitoring, the materials will still be sent to CDC headquarters for PCR testing for mosquito species identification, insecticide resistance mechanism testing (*kdr* genotyping), and ELISA for determination of sporozoite rates. Using FY 2015 funds, CDC headquarters will continue to provide assistance in this area until there is capacity within Angola to conduct this analysis; it is estimated that 3,000 samples will be collected and processing will cost approximately \$47 per sample (\$140,000).
6. Technical assistance visits for entomologic monitoring and resistance testing; support for specific reagents and other laboratory diagnostic materials for species identification in-country. This amount includes cost of equipment supplies and materials to support the expanded entomologic surveillance and the insectary in Huambo Province (\$65,000 total—Supplies: \$10,000, TDYs: \$55,000 (estimated 2 TDYs of 3-4 weeks each)).

Malaria in Pregnancy

Background

The NMCP's policy on malaria in pregnancy consists of a three-pronged approach, which includes the use of ITNs, IPTp, and prompt and effective case management of acute malaria. Treatment of severe malaria is in line with WHO recommendations. The first-line treatment is artesunate IV, with artemether IM as second line, and quinine IV as last preference. The NMCP began implementation of IPTp in 2006. As of October 2012, WHO updated its policy recommendation that IPTp be given to all pregnant women in areas of moderate to high malaria transmission at each scheduled ANC visit, except during the first trimester. Each SP dose should be given at least one month apart and the last dose can be administered up to the time of delivery, without safety concerns provided that the doses are given one month apart. It is recommended that IPTp be administered as directly observed therapy (DOT). The NMCP adopted this policy in 2013. This policy will be applied countrywide, including in areas of low malaria transmission. As stated by WHO, folic acid at a daily dose equal or above 5mg should not be given together with SP as this counteracts its efficacy as an antimalarial. Hence WHO recommends the administration of folic acid at a dose of 0.4mg daily. However, in Angola folic acid is procured by the National Directorate of Medicines and Equipment as part of the essential medicine kit. The directorate faces a challenge in procuring the recommended dose by WHO and continues to

procure 5mg of folic acid. The NMCP is still in discussions with the Reproductive Health Department about the dosage of folic acid.

In the NMCP Strategic Plan 2014-2017, the target is that 100% of pregnant women who are eligible for IPTp and have access to prenatal appointments will receive IPTp with SP. To date, insufficient progress has been made with IPTp coverage. Data from the 2011 MIS showed that only 18% of pregnant women received two doses of IPTp and only 26% slept under an ITN the night prior to the survey (data from the MIS is old and information on the percent of women who make 2, 3 or more ANC visits is not available). Reasons for the low rate are multiple including overall limited ANC services, weak implementation of IPTp policy, lack of appropriate policy guidelines, and lack of needed ANC staff training and supervision materials. In Angola, the National Directorate of Medicines and Equipment (DNME) supplies SP as part of essential medicines to health facilities. Occasional stockouts are seen at the health facility level due to lack of a proper distribution plan and poor management of drug supply to health facilities; but there has always been sufficient stock of SP in the country.

Treatment of malaria in pregnancy consists of quinine for the first trimester and ACTs for the second and third trimesters. There is a sufficient stock of quinine, but there are sporadic stockouts of ACTs in different provinces. The number of cases of malaria in pregnant women in 2013 was 213,007 with 70 deaths (NMCP 2014). Priorities of the MOH include improving availability of SP at health facilities and increasing ANC coverage, which, when coupled with systems strengthening activities, can result in more pregnant women having access to malaria prevention and treatment. Currently, in the provinces receiving PMI support through the NGO strengthening project, only 42% of facilities offer ANC services. This significantly limits the opportunities for pregnant women to receive services to prevent malaria in pregnancy.

Progress during the last 12 months

PMI partners continue to work with the NMCP and the Reproductive Health Department to update the manuals and training tools in accordance with the new policy and will assist with the roll-out. PMI continued to support NGOs and FBOs in nine provinces to improve access to malaria prevention and treatment services for pregnant women (eight through the NGO strengthening project and one additional province through the USAID integrated health systems strengthening project). Although many health workers have been trained to prevent, manage, and treat malaria during pregnancy, implementation of malaria in pregnancy prevention efforts is being led by the NMCP instead of the Reproductive Health Department, resulting in missed opportunities in ANC clinics. PMI continued to advocate for closer collaboration between the NMCP and the Reproductive Health Department and for sharing and better use of data for management decisions. NMCP data from 2013 showed that 38% of pregnant women attending ANC clinics in the public sector received two doses of IPTp; data from the provinces where the NGO strengthening project works showed 37%.

Table 1. Health workers trained in malaria in pregnancy (FY 2013) and future targets

Provinces	#ANC	ANC Coverage	#ANC Health Workers	Trained (3 days training of MIP)	Plan to train up to end of FY 2014	Remain to be trained FY 2015
K. Norte	26	21%	61	20	25	16
K. Sul	80	33%	180	54	24	102
Benguela	99	44%	346	100	150	96
Huambo	196	93%	501	0*	0*	501
Zaire	35	36%	35	33	0	2
Malange	44	33%	71	59	0	12
Uige	48	17%	114	40	50	24
Huila	52	21%	104	95	0	9
Luanda	154	72%	466	0	100	TBD
TOTAL	734		1,878	401	349	762

* The implementing partner working in Huambo Province conducts integrated trainings on malaria prevention and treatment, which includes MIP. The number of health workers they trained in FY 2013 is 192 in Huambo and 430 in Luanda.

In 2014, PMI's implementing partner will perform an assessment of ANC use by pregnant women and IPTp administration to provide information on how the low rates of use of ANC and barriers to IPTp administration could be addressed. It is expected that the results of this study will inform programming going forward, to help improve MIP coverage indicators.

With the current estimated ANC attendance of 69% (2011) and growth to 80% by 2016, it is estimated that the number of pregnant women eligible for IPTp will be nearly 700,000, thus requiring 2.1 million tablets of SP. PMI anticipates that the GRA will still be able to procure sufficient amounts and PMI will continue to work with all levels of the supply chain to ensure that there are not ruptures at health facility level. PMI does not procure SP in Angola and existing quantification data is weak; therefore, a SP commodity gap analysis table has not been included.

At the national level, PMI supported its implementing partner to participate in the national technical review group for Malaria in Pregnancy and to help develop the manual, *National Protocol for Malaria in Pregnancy*, which was produced by NMCP in March 2014 and reflects new WHO guidelines. PMI Angola works with the Reproductive Health Division and the NMCP to try to foster collaboration and partnership, and to establish a working group. In Angola, IPTp is currently implemented throughout the country, even in the areas with mesoendemic unstable transmission. PMI is exploring the potential for a focused approach for IPTp to concentrate efforts to achieve higher uptake and greater impact.

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

PMI will continue to collaborate with the NMCP and Reproductive Health Division to strengthen prevention, diagnosis, and treatment of malaria in pregnancy at all levels of the healthcare system.

1. Continue to support NGOs and FBOs in IPTp implementation and effective case management of malaria by conducting training and supervision in eight provinces at the facility level to improve: health facility workers' understanding and compliance in administering IPTp, diagnosis and treatment of malaria in pregnancy, LLIN use by pregnant women, and provision of tools to accurately track MIP services and help ensure SP is available (\$200,000).
2. Support routine ITN distribution through ANCs (further description and costs covered under the ITN section).
3. Support BCC on malaria in pregnancy (including IPTp, ITNs, and case management of malaria in pregnancy), which could include utilizing community health workers (further description and costs covered under the BCC section).

CASE MANAGEMENT

Malaria Diagnosis

Background

Laboratory diagnostic capacity in Angola is still extremely limited. In the provinces where PMI-supported NGOs are active (excluding Luanda), approximately 18% of health facilities have functional laboratories. To date, access to RDTs has been limited and in 2013, there was a prolonged national stockout. Despite this context, the NMCP reports that 64% of cases were parasitologically confirmed in 2013; and the Ministry of Health data from the provinces where the PMI NGO strengthening project works reported 80% confirmed. These figures point to the continued weakness of the HMIS, but on a positive note, could signify that health workers are aware that they should be confirming every suspected malaria case.

PMI has invested heavily in improving access to quality laboratory diagnostics, providing microscopes and laboratory supplies. In addition, since 2007, PMI has supported the training and mentorship of 11 national level laboratory trainers and supervisors that make up the lead team to train and supervise the provinces. PMI continues to support training of laboratory staff in nine provinces through NGOs (reaching eight provinces through the PMI-supported NGO strengthening project and a ninth through the USAID integrated health systems strengthening project).

The NMCP continues to use multispecies SD Bioline® as the RDT of choice to identify *P. falciparum* and *P. vivax*. This decision was made in 2011 based on findings from two studies that showed the previously used single-species Paracheck® test had lower sensitivity compared with SD Bioline® and the prevalence of *P. vivax* in the country (estimated at 7%).

Progress during the last 12 months

Since 2007, PMI has procured and delivered to all provinces over 6 million RDTs and over 260 microscopes and malaria microscopy kits. In FY 2013, PMI procured more than 2.9 million RDTs. PMI, the GRA, and the Global Fund have been procuring RDTs; however, there have been limited quantities procured for the last several years leading to frequent stockouts. While there has never been a sufficient stock of RDTs in the country to cover the expected needs, for the past few years there has been only approximately one-third to one half of the supply needed. In 2013, there was a significant stockout of RDTs due to delays in the Global Fund RDT procurement. PMI adjusted its RDT procurement to try to cover some of this gap, while the NMCP advocated for the MOH to buy 2 million RDTs; unfortunately, the MOH only procured 150,000. The GRA, Global Fund, and PMI reanalyzed the gap analysis and procurement plans and have ensured that the 2014 stock is sufficient to cover the expected needs.

As the current Global Fund grant ends in 2014, and the future support of the Global Fund to Angola is unclear, PMI will continue to procure significant quantities of RDTs using FY 2014 and FY 2015 funds to ensure access to parasite-based diagnosis, especially in the areas PMI supports. PMI is supporting the NMCP to improve quantification and procurement planning for laboratory supplies and RDTs and expects increased procurement by the GRA in the coming years.

In 2013, PMI, with supplementary support from the ExxonMobil Foundation, supported a workshop to assess the proficiency of the 11 senior laboratory technicians who have been trained and mentored by the NMCP and PMI since 2007. These laboratorians represented eight provinces of Angola (Benguela, Cabinda, Huambo, Kwanza Norte, Luanda, Malange, Moxico, and Uige). The trainers evaluated technicians' skills in advanced identification of *Plasmodium* spp., performance of RDT techniques, and quantification of parasites in thick blood smears. They also evaluated the group in the use of the training tools and methods to conduct training workshops at national level.

The pre-test assessment of this group showed that the average of correct identification of the microscopic challenges was 80.4 %. In the post-test after training, the same group was able to identify on average 93.4% of the microscopic fields. In general, the use of the training tools was adequate and adjustments in their teaching practices were made as needed. The results from the pre-test indicated that this group had retained the skills in the identification of *Plasmodium* spp. over the last five years' activities. It seems that this group is well prepared to continue a sustainable training program for Angolan laboratorians at the national level.

A second workshop was designed to train a group of 23 laboratorians from 12 provinces. These laboratorians are involved in malaria diagnosis and studies to evaluate the level of treatment failure associated with *Plasmodium falciparum* infections in three Angola provinces. These technicians will form the core training team for the country (with the former already utilized as national trainers). In this group, the average score in the pre-test was 50% (range: 20%-75%). However, after the training, scores substantially improved, with the average identification of *Plasmodium* spp. increasing to 80.4% in the post-test.

In addition, PMI supported in-service trainings on malaria microscopy and RDTs. During these in-service trainings, supervisors spend two days in the laboratory focusing on weakness identified in the initial training or during supervision visits. PMI supported the standardization of training materials, job aids, and quality assurance guidelines for malaria diagnostics. In the nine provinces with PMI-supported capacity building activities, there are over 1,000 laboratory technicians, 386 received laboratory training last year (target for the year was 382). PMI expects to have all laboratory staff trained in these provinces by the end of 2015. Furthermore, the project conducted 211 laboratory supervisions and nearly 200 on-the-job trainings of laboratory staff. The integrated health systems strengthening project conducted in-service refresher trainings for laboratory technicians on malaria diagnosis by microscopy in four Luanda municipalities.

Table 2. Laboratory training of health workers (FY 2013)

Province*	# HW working in Labs	# Trained	% trained in formal classroom training (10 days)
Benguela	207	57	28%
Huambo	271	53	20%
Huíla	145	51	35%
Kwanza Norte	54	72	133%
Kwanza Sul	123	58	47%
Malange	41	31	76%
Uíge	100	20	20%
Zaire	59	44	75%
Total	1,000	386	39%

* In addition to the eight provinces listed in this table, PMI supports capacity building in Luanda Province through another implementing partner.

In FY 2013, the NGO strengthening project conducted 157 out of a target of 214 laboratory assessments in eight provinces to evaluate the performance of the health facility laboratories and identify gaps which could be addressed through their support. Results showed significant gaps in multiple areas: few laboratory technicians and limited capacity; lack of functioning microscopes; insufficient supplies and reagents; lack of registration books and poor registration. In addition, they implemented quality control through slide rechecking in seven of the eight provinces. The quality control exercise evaluated 3,892 slides (target for FY 2013 was 4,180), and showed an average accuracy of 84% across the provinces (range 75% to 98%); sensitivity of 93% (range 61% to 100%); and specificity of 77% (range 41% to 97%). The number of slides analyzed increased significantly from the previous year (1,308 slides in FY 2012), but the results are similar to the previous year, which demonstrates strong, consistent performance. However, the project is now focusing on changing the slides submitted so that, for instance, not only high parasitemia slides are submitted for review, to ensure that laboratory technicians can correctly read the more difficult samples. This is important because laboratory training pre- and post-tests have demonstrated challenges in correctly reading slides with low parasitemia levels. The project

maintains a database to ensure that all relevant personnel at health facilities receive training and trainings are not repeated unnecessarily.

Table 3. Percentage of suspected malaria cases confirming malaria diagnosis according to national policy

Province	Number of suspected malaria cases that received parasite based examination for malaria (microscopy or RDT).	Number of suspected malaria cases of all ages.	%
Benguela	362,985	377,689	96%
Huambo	297,880	319,428	93%
Huíla	313,810	406,639	77%
Kwanza Norte	156,996	217,345	72%
Kwanza Sul	175,766	254,190	69%
Malange	227,402	266,625	85%
Uíge	283,370	421,650	67%
Zaire	167,366	230,043	73%
Total	1,985,575	2,493,609	80%

The table below is the gap analysis for RDTs through 2016. The RDTs procured by the Global Fund were supposed to arrive in installments starting in 2013, however these were delayed and the entire amount arrived all at once. This unfortunately coincided with the arrival of the PMI-procured RDTs, thus Angola has an overstock of RDTs for 2014. The Global Fund, PMI and other partners are working closely with the NMCP, DNME, CECOMA, and lower level warehouses to ensure appropriate management of this supply.

Gap Analysis for RDTs

	2013	2014	2015	2016
Expected FEVER cases in public sector	5,602,636	5,258,188	5,431,726	4,395,102
Expected cases diagnosed clinically (%)	35%	20%	15%	10%
Expected cases diagnosed by microscopy	1,400,659	1,577,456	814,676	439,510
Expected cases diagnosed by RDT	2,241,054	2,629,094	4,617,050	3,955,592
Prevention of stockouts (10% buffer)	224,105	262,909	461,705	395,559
Total RDT needs	2,465,160	2,892,003	5,078,755	4,351,151
EXPECTED PROCUREMENT				
Angolan Government	150,000	0	500,000	800,000
GF Consolidation Round (R7 Ph2 + R10 Ph1)		4,762,375		
PMI	900,000	2,000,250	2,500,000	1,500,000
Total Available	1,050,000	6,762,625	3,000,000	2,300,000
Gap (Surplus)	1,415,160	(3,870,622)	2,078,755	2,051,151

Proposed activities with FY 2015 funding: (\$1,925,000)

Given that the majority of health facilities do not have laboratory capacity and in rural areas malaria diagnosis is conducted using RDTs, the NMCP and PMI Angola agreed that PMI would increase its focus on RDTs. PMI plans to continue some support for capacity building on malaria microscopy at health facility and supervisory levels. PMI is exploring the possibility of developing a slide bank for training purposes. Currently, lot testing is undertaken at the municipal and provincial levels. These efforts, combined with those outlined in the Malaria Treatment section, will help ensure quality care for patients presenting with fever.

1. PMI will support slides, reagents, and repairs for the microscopes that are already in country while the GRA will be responsible for procuring additional new microscopes, and quantifying its own needs. PMI will provide modest support for registration books to ensure the books are updated appropriately to include lines for RDT results; moving forward, the GRA will assume responsibility for these as well. Procurement of laboratory supplies for microscopy kits (slides and reagents) and limited equipment for minor microscopy repairs will also be covered by PMI. Distribution costs are covered under the Pharmaceutical Management section and distribution location is determined in collaboration with the NMCP (\$100,000).
2. As the GRA increases its procurement of RDTs, PMI will slowly reduce the quantity of RDTs it procures, while ensuring sufficient supply in the provinces PMI supports. PMI proposes to procure 1,500,000 RDTs (multi-species SD Bioline®) (\$900,000).
3. Continue to support training, both workshops and in-service (this includes trainers, training materials, job aids), supportive supervision, and quality assurance for parasite-based diagnosis. Activities include cross-checking of random samples of slides at the municipal level and tracking results (accuracy, sensitivity, and specificity). Additional training on basic microscopy maintenance will also be provided to extend the life of existing microscopes. However, the primary focus of trainings will be on RDTs. This will be done in 10 provinces with PMI-supported NGOs (Zaire, Uige, Malange, Kwanza Norte, Kwanza Sul, Benguela, Huila, Bengo, Bié, and Luanda) (\$900,000).
4. Two TDYs from CDC headquarters to support diagnostic training and quality control (\$25,000).

Malaria Treatment

Background

While the 2011 MIS shows that only 12% of children under five years of age with fever in the two weeks preceding the survey received an ACT the same or the next day after the onset of the fever, PMI expects this percentage has since significantly increased with the increased focus on capacity building, BCC, and sufficient supplies of ACTs.

Currently, there are three first-line ACTs: AL, AS/AQ, and DHP. The NMCP standard training manuals on treatment of malaria were updated in April 2013 to reflect these three regimens. Oral monotherapies, including chloroquine, are still widely available in both the public and private sector. Availability of monotherapies is due to multiple factors: no approved medicines list, no enforcement at the borders and ports, and multiple levels of the public system with the authority to procure health commodities (more detail in the Pharmaceutical Management section).

PMI continues to support training of health care workers in the appropriate diagnosis and management of malaria, but significant supervision is necessary to ensure adherence to malaria case management and the continued rational use of antimalarials. The policy for the treatment of severe malaria includes parenteral artesunate, artemether, and quinine, with quinine still the most widely available drug. However, the MOH plans to procure an increased supply of parenteral artesunate this year to facilitate its use. Rectal artesunate is included in the new NMCP national strategy. Since the DNME procures commodities for the treatment of severe malaria, PMI has not been requested to procure rectal artesunate.

With decentralization of the government system, municipalities are free to buy the health commodities they want. This presents a great opportunity (and a significant challenge) for PMI to reinforce, at the municipality level, the importance of procuring only those treatments that are approved by the NMCP and are of known quality, approved through the WHO Prequalification Program. The MOH currently procures AL from Novartis, AS/AQ from Sanofi and DHP from Holley-Cotec. The MOH is developing a policy on procurement that will delineate what level of the government system is allowed to buy health commodities and the process and procedures that need to be followed for lower level procurements.

As part of PMI's commitment to ensuring that all persons with malaria are promptly diagnosed and treated with a safe and efficacious antimalarial drug, PMI-financed ACTs have been procured and distributed in all 18 provinces of Angola through the public sector since 2006. PMI has historically provided the majority of the ACT needs for the country, but is reducing its procurement as the GRA has increased theirs and the Global Fund's investments. It is anticipated that there is more than sufficient supply for 2014.

The GRA has built an impressive number of health facilities over the last several years and the numbers of doctors and nurses have also significantly increased. However, human resources for health are still critically low and the distribution of these resources is heavily concentrated in urban areas, despite malaria's devastating impact in the rural and hard-to-reach areas of the country. In addition, there are many foreign doctors working in the health sector with limited experience in diagnosis and treatment of tropical diseases, including malaria. The integrated health systems strengthening project was designed to address some of these critical gaps that affect all aspects of healthcare.

Angola does not yet employ integrated community case management (iCCM). However, the MOH held a meeting in June 2014 with a WHO consultant, an MOH consultant, and the NMCP to finalize the draft strategy for presentation to the Ministry of Administration and Territory (MAT). Subsequently, MAT has agreed to pay the community agents who will be recognized as

community health workers and received a fixed salary. MAT and MOH have a deadline of September 2014 to finalize the strategy, which will be presented during the Ministers Council meeting for final approval.

UNICEF started a pilot project of iCCM in two municipalities in Luanda Province in early 2014. Once the policy is approved, the NMCP will promote iCCM in hard-to-reach areas and also plans to pilot intermittent preventive treatment in children in hot spots in provinces with historically low transmission (for example, Namibe Province). PMI plans to complement the NMCP's efforts by piloting iCCM in one or two municipalities in hyperendemic Uige Province. The pilot will entail planning, tool development, training, and support for supervision, as well as procurement of RDTs and ACTs; the MOH will provide commodities for treating pneumonia and diarrhea.

Progress during the last 12 months

PMI supported capacity building of the health workers for diagnosis and treatment of uncomplicated and severe malaria as well as malaria in pregnancy (including IPTp) in the public sector and to a limited extent in the private sector (through a program providing subsidized ACTs in the private sector in Huambo Province). In the nine provinces supported by PMI, there are over 1,500 health facilities and 13,000 health workers, of whom nearly 2,500 received training in FY 2013 (target was 2,000). Combined with the trainings conducted in FY 2012, nearly 40% of the workforce has been trained with PMI support. This was done through formal training and in-service training. Training on case management is combined with training on malaria in pregnancy (including IPTp), pharmaceutical management, and record-keeping/data management. In addition, differential diagnosis of fever is taught as many health workers are not comfortable evaluating other diagnoses once malaria is excluded.

There are four types of support supervision: provincial teams (with PMI NGOs) to municipal health department or health facilities; municipal health department teams (with PMI NGOs) to health facilities; PMI NGO technical support visits to the municipal health departments; and PMI NGO support visits to health facilities. PMI-supported NGOs aim for 90% of health facilities to receive at least one supervisory visit every quarter from the municipal health department by 2016. Over 2,300 supervisions have been carried out in the last year and a half.

The total need of ACTs for 2014 has already been procured and delivered to Angola: PMI – 1.36 million, Global Fund – 1 million, and GRA – 900,000. The GRA procures treatment for severe malaria and is prioritizing parenteral artesunate in line with the new national treatment policy and WHO recommendations. The DNME procures commodities for treatment of severe malaria as part of the essential medicine kit and CECOMA procures for uncomplicated malaria; the NMCP has not requested PMI's support in the procurement of parenteral artesunate.

The gap analysis for ACTs below provides the actual procurements for 2013 and 2014 and NMCP data from 2013 on clinical cases and positivity rate; due to delays in procurement of the Global Fund supply, there may be an oversupply in 2014. The NMCP and partners are aware of the potential oversupply and are working to ensure ACTs with a short expiry date are used first

as well as ensuring timely consumption information is available. As the GRA has been increasing its procurements of ACTs, PMI anticipates that the GRA will be able to procure the full quantities needed for the public sector, if all assumptions remain valid.

Gap Analysis for ACTs

	2013	2014	2015	2016
Suspected FEVER cases (Public Sector)	5,602,636	5,258,188	5,431,523	4,395,102
Expected cases diagnosed clinically (%)	35%	20%	15%	10%
Positivity rate in the Public Sector (includes microscopy and RDT)	48%	40%	40%	30%
Number of MALARIA cases in the Public Sector (based on the positivity rate and clinical diagnosis)	3,708,945	2,734,258	2,987,449	1,758,041
Prevention of stockouts (10% buffer)	370,895	273,426	298,744	175,804
Total Need ACTs	4,079,840	3,007,684	3,136,822	1,933,845
EXPECTED PROCUREMENT				
Angolan Government (AL, AS/AQ, DHP)	400,000	900,000	1,886,822	1,343,845
GF Consolidation Round (R7 Ph2 + R10 Ph1)		1,000,050		
PMI	3,829,800	1,366,950	1,250,000	590,000
Total Available ACTs	4,229,800	3,267,000	3,136,822	1,933,845
Surplus	+149,960	+259,316	0	0

Proposed activities with FY 2015 funding: (\$7,790,000)

PMI plans to continue to support strengthening of the existing human resources for health to appropriately diagnose and manage malaria and to support pre-service training to ensure the upcoming generations of health workers can properly assess and treat malaria. PMI plans to hold strategic dialogues with the NMCP and the MOH to influence malaria commodities policy and to help them develop a plan to continuously increase their procurement of ACTs and other relevant commodities. In addition, PMI plans to procure a limited supply of ACTs to complement the GRA contribution.

1. Considering the current malaria burden, and the scale up in prevention and diagnostic activities, it is anticipated that the number of cases will significantly reduce. With the current gap analysis and the demonstrated procurements of the GRA in 2013 and 2014, it is anticipated that the GRA will sustain its procurement of ACTs. Based on the revised gap analysis above and the increased planned procurements by the GRA,

PMI will procure 590,000 ACTs for the public sector. At the same time, PMI will continue to procure ACTs for the social marketing activities (see Private Sector section) and the iCCM pilot; the estimated ACT needs are 600,000 for these latter activities (\$1,190,000).

2. Pilot iCCM in one or two municipalities in hyperendemic Uige Province; PMI will support planning, tool development, training, and support for supervision, as well as RDTs and ACTs; the MOH will provide commodities for pneumonia and diarrhea (\$300,000).
3. Continue to provide training and supportive supervision to health care workers in nine provinces with PMI-supported NGOs. PMI's implementing partner will exit Huambo Province and start operations in two new provinces Bié and Bengo; this decision is based on the significant decline in malaria in Huambo and PMI's increased focus on areas with higher malaria burdens. These funds would not only include the costs for training (trainers, training materials, job aids), but also BCC for prompt diagnosis and treatment of fever, capacity building of the NGOs, health systems strengthening (including monitoring and evaluation), and pharmaceutical management outlined in the respective sections. (\$4,500,000).

Pharmaceutical Management

Background

The National Directorate of Medicines and Equipment (DNME) is currently still a directorate within the MOH, but there are plans for it to become an autonomous body to serve as the national regulatory authority in 2015. Pharmaceutical products entering the country are supposed to be registered through the DNME before entry and distribution, and the Licensing Unit within the DNME is responsible for licensing all private retail pharmacies. There is also a Department of Pharmaceutical Inspection within the MOH established to conduct border and post-marketing inspections. At present, all products that need to be tested are sent to laboratories in Portugal or Brazil as there is no in-country capacity for in-depth quality assurance testing. The DNME also has a Department of Pharmacovigilance established to track adverse events from medications.

A PMI and USAID-supported assessment of the medicines regulatory system identified several key issues affecting the supply chain:

1. There is a national pharmaceutical policy, but the law to regulate medical supplies is still in draft. Although there are legal provisions for all pharmaceutical products to be registered, registration is not occurring routinely, allowing products that are substandard or of questionable quality to enter into the public and private sectors.
2. Licensing of private pharmacies is required, but there are insufficient human resources to evaluate and provide licenses to these facilities.
3. Inspection of private sector pharmacies and pharmacovigilance are also weak.
4. The quality control system remains underdeveloped. While semi-quantitative quality control measures such as Minilabs[®] are used at ports and border crossings, the

capacity for rigorous analytical testing of drugs at the central level with a national testing laboratory does not exist. Samples of medicines are sent to Portugal or Brazil for independent testing.

5. An assessment of the supply chain system also identified key weaknesses: limited human resource capacity and lack of written guidelines and standard operating procedures.

The InterAgency Coordination Committee for Municipal Revitalization Logistics sub-committee is one of the few coordination and technical committees that is functional in the MOH. This has been partly due to the support from the USAID integrated supply chain system partner and increased dedication from the DNME and other MOH bodies. This sub-committee is responsible for establishing and ensuring implementation of national norms, standards and procedures for supply chain management and logistics.

PMI has supported an augmented supply chain system for PMI-procured commodities since 2009; all commodities are delivered directly to the provincial warehouses and bypass the parastatal central medical stores, Central Unit for Procurement and Provision of Medicines and Medical Supplies (*Central de Compras de Medicamentos de Angola* - CECOMA). This was due in part as a response to significant thefts of PMI- and MOH-financed commodities from the central medical stores (then called Angomedica) and airport in 2008 and 2009. The provinces then assume responsibility for the ultimate delivery to health facility level. Delivery from provinces to health facilities remains weak with some provincial warehouses with expiring stocks, while health facilities have stockouts.

Significant investments have been made by the GRA in infrastructure and equipment to improve the supply chain. CECOMA is building new warehouses and will decentralize to four regional warehouses: Luanda, Huila, Malange, and Benguela. The Luanda warehouse will also serve as the national warehouse. Commodities will be transported directly to the regional warehouses rather than passing through the central stores. It is estimated that all four warehouses will be operational by 2015. PMI supports an integrated USAID supply chain system strengthening project which has been working closely with CECOMA to develop an operational strategy, standard operating procedures, terms of reference for staff, and a logistic management information system. Once these are in place for the current warehouse, they will be used in all of the regional warehouses to ensure uniformity.

At lower levels, several PMI-supported partners are supporting improved stock management at provincial and health facility level. This includes training on stock management, provision of tools and job aids, and support supervision. All tools used are uniform and approved by the MOH.

Proper quantification and forecasting of malaria commodities have been challenges due to lack of consumption data, poor population estimates as there has been no census since the 1970s, and a weak logistics management information system.

As in many other parts of sub-Saharan Africa and Southeast Asia, drug quality is also a significant concern in Angola. In late 2012, the DNME seized a large shipment of counterfeit

ACTs at the port in Luanda. It alerted all public facilities and private pharmacies that an additional shipment had infiltrated the market and took measures to confiscate these products. As noted, the GRA does not yet have a qualified central level laboratory or an adequate surveillance system to systematically evaluate the quality of pharmaceutical commodities coming into Angola, but it is working on developing these systems. The USAID integrated supply chain strengthening project is working with the DNME and the Inspector General for Health to improve the regulatory functions at the central level to ensure that only quality malaria products approved by the NMCP are brought into the country for use in both the public and private sector.

Progress during the last 12 months

The process of delivering PMI-procured commodities directly to the provincial warehouses has been functioning well and is very efficient. PMI-procured supplies are usually delivered to all provincial warehouses within two weeks of arrival in the country. PMI recognizes the need to engage in capacity building and the development of sustainable systems and therefore continues to support supply chain strengthening through multiple channels: the USAID integrated supply chain strengthening project; the USAID integrated health systems strengthening project that works with municipalities in Huambo and Luanda Provinces for budgeting, planning and M&E; and the NGO strengthening project in eight provinces that supports activities at the health facility level.

This past year, the USAID integrated supply chain strengthening project provided significant technical support to CECOMA to develop standard operating procedures and tools for storage and distribution, performance indicators, and tools for operations management. In addition, they assisted in redesigning the warehouse layout and established a new numbering and unique product coding system. The project has continuously highlighted the challenge with human resources in supply chain management and is working at all levels to improve capacity; at CECOMA they have helped reconfigure the organogram. PMI plans to test reentry to CECOMA by establishing a monitoring team composed of the NMCP, DNME, PMI, and NGOs and running a trial with selected PMI-procured commodities in 2015. The monitoring team will routinely visit the CECOMA warehouse to support proper management of the PMI and GRA-procured malaria commodities. This has proven successful for reproductive health commodities procured by USAID and the United Nations Development Program.

In late 2012, a PMI implementing partner assisted the NMCP to quantify and forecast malaria commodity needs for 2013 through 2015; this is currently being updated and validated. In addition, to build capacity for the NMCP to conduct quantification routinely and independently, a five-day workshop was conducted to strengthen the understanding of quantification methods and develop terms of reference for the national quantification technical working group. Finally, they conducted supportive supervision in four provinces (Huambo, Bié, Cunene, and Huila) to improve reporting on consumption.

In addition, the supply chain strengthening project routinely conducts quarterly procurement planning and monitoring report for all malaria commodities in the public sector and the End-Use Verification Survey (a tool that assesses the availability of key malaria commodities at health facility level). Most recently, this latter survey was conducted in 51 health facilities across 6

provinces in late 2013. The survey showed that the majority of health facilities visited in Lunda Norte and Lunda Sul (two provinces in the hyperendemic region of the country and that are difficult to access) reported stockouts of both RDTs and ACTs and most cases were being diagnosed clinically.

The NGO strengthening project also provided training of warehouse managers and pharmacy technicians, in-service training on stock management, and reporting and support supervision to provincial and municipal warehouses in the eight provinces where they are active.

Last year, significant attention has been given to quality assurance of key medical commodities including antiretrovirals and antimalarials. The Global Fund is supporting strengthening the public system to monitor the quality of medicines at all levels of the system and PMI is supporting an assessment of the quality of antimalarials in the private sector to identify the extent of substandard and counterfeit products as well as the variety of products on sale. This survey combined with the information from the public sector will guide the MOH and PMI-supported efforts to ensure quality antimalarials are available in both the public and private sectors.

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

As PMI reduces commodity procurement (based on increased GRA procurement and presumed reduced malaria transmission), continuing the augmented distribution system becomes less cost effective. In addition, the significant investment the GRA, USAID, and PMI made in strengthening the national system is bearing fruit and should be recognized. In 2015, PMI plans to warehouse a portion of PMI-procured RDTs and microscopy kits in CECOMA and use its distribution system to the provinces, while maintaining direct distribution of the remaining RDTs and the entire supply of ACTs. **A memorandum of understanding will be drafted that will articulate responsibilities and safeguards.** A committee of partners will monitor the safety and management of these supplies while in the central warehouse. If successful, PMI will put all procured RDTs and microscopy kits in CECOMA in 2016.

PMI plans to continue to strengthen the supply chain system at all levels as well as strengthening the regulatory and quality control system for medicines to ensure quality products are procured and minimize substandard or counterfeit drugs entering the market. The activities for quality assurance will focus on strengthening the national level regulatory system and will be guided by the findings of the assessment conducted in 2014.

1. Provide support for import/clearance, distribution, and management of PMI-funded ACT treatments and RDTs in order to overcome the complex clearance process, and initial distribution from port of entry to the provincial level (if CECOMA manages PMI-procured stocks sufficiently and securely in 2015, and PMI decides to use CECOMA to warehouse all PMI-procured stocks for 2016, this activity may not be required.) (\$200,000).
2. Provide support for supply chain strengthening at all levels of the system. This will include support for quantification of malaria commodities; strengthening of CECOMA, including support for a logistics management information system;

- supporting improvements in the regulatory system through advocacy for policy approval; and enforcement and assistance with developing a monitoring strategy and tools. In addition, PMI will provide support for training, supervision job aids and reproduction and distribution of supply chain tools at provincial, municipal, and health facility levels, prioritizing Luanda and Huambo (\$600,000).
3. Continue to strengthen the provincial and municipal pharmaceutical systems through training, support supervision, and provision of job aids and tools in the eight provinces with PMI-supported NGOs (costs included in the Malaria Treatment section).
 4. Support the Inspector General, DNME, and NMCP to improve the regulatory system and quality assurance strategy for antimalarials by supporting development and implementation of regulations, guidelines, tools, and monitoring materials (\$200,000).

Private Sector

Background

The private sector in Angola, which includes private clinics, pharmacies, drug shops, and street vendors, provides treatment for about 40% of malaria cases. Lack of availability of ACTs and poor regulation in the private sector encourage treatment of fever cases with monotherapies by untrained drug vendors, which can lead to misdiagnosis and antimalarial resistance.

In 2008, PMI assisted the NMCP to implement a pilot project in selected municipalities in Huambo Province to improve accessibility and effective use of ACTs in pharmacies through subsidized sales of Coartem®. This project was launched in July 2009 and since then Coartem® has been sold at private pharmacies registered by the Huambo DPS. The project has improved prescription practices in the participating pharmacies and has reduced prescription of monotherapy by approximately 20%. As the WHO recommendation and NMCP policy is to treat only confirmed cases of malaria, the project was supposed to introduce RDT sales in early 2013. However, because the Ministry of Health policy does not permit blood prick to be performed by anyone other than a qualified health worker, it has been a huge challenge getting this part of the project launched.

Concerted efforts of the GRA and the USG have led to a significant decrease in the number of malaria cases in Huambo Province. Recent data have shown that the province currently has the second lowest malaria prevalence in the country. Most of the recorded malaria cases are now coming from neighboring provinces, and the NMCP is encouraging efforts to help reduce malaria transmission in these other provinces. With the Global Fund consolidated Rounds 7 and 10 grants, sales of ACT and RDTs in the private sector were supposed to expand to include Huila and Benguela Provinces. However, insurmountable challenges led to the withdrawal of the

grant's sub-recipient responsible for this component and the private sector activities have not yet expanded beyond Huambo Province.

Progress during the last 12 months

Prior to the introduction of RDTs in the private sector, PMI continued to support capacity building of the pharmacists participating in the subsidized sales of ACTs. In FY 2013, the project aimed to train 800 pharmacists and successfully trained 665. In addition, nearly 110,000 ACT treatments were sold (target was 240,000).

Finally, in April 2014, the new pilot project was launched in Huambo Province for sales of RDTs. The provincial Health Director for Huambo Province was granted a waiver by MOH to implement this project, which allowed pharmacy workers to perform blood pricks. This is the first time diagnostic services are offered outside of health facility. In this pilot, patients pay a subsidized fee for the test and receive free treatment if positive. Negative cases are referred to health facilities or municipal hospitals who offer differential diagnosis.

PMI, NMCP, and DPS staff trained a total of 100 pharmacists participating in this new pilot. These pharmacists are trained on signs and symptoms of simple as well as severe malaria, dangers signs for immediate referral, and data compilation. Pharmacists are appropriately trained in blood safety and appropriate use of RDTs as a tool to diagnose malaria.

The launch of RDT sales in private pharmacies to rationalize sales of ACTs is a notable achievement in Angola, with its large urban and sub-urban populations. This project is implemented in all 11 municipalities in Huambo Province. The first phase of the pilot was for six months and based on results the pilot will be continued for another six months. Introduction of the adult dosages of AL were delayed until the launch of RDTs. Pharmacists are now trained and equipped to test and treat all age groups. Another positive result of the project is the observed strong commitment to participate by private pharmacists and their adherence to established guidelines for testing with RDTs and dispensing ACTs. The project is monitored by the DPS and project staff through routine supervision and visits by mystery shoppers.

This project has a strong IEC/BCC component to increase demand, awareness, and change behavior. Thus far, 50 sets of point-of-sale materials have been distributed to promote availability of RDTs/ACTs in pharmacies, 456 IEC/BCC sessions were realized, and 182 radio spots were aired to promote malaria diagnosis and treatment.

Building on the success of this pilot of RDT sales in private pharmacies in Huambo Province, the project will be expanded to Uige Province with FY 2014 funding. The implementing partner will build on lessons learned from the challenges of initiating this activity in Huambo; discussions have been underway with the DPS in Uige to facilitate an MOH waiver to allow pharmacy workers to perform blood pricks there. Given the success seen in Huambo Province, the NMCP director has assured the DPS in Uige of a waiver from the Minister to implement this project.

Proposed activities with FY 2015 funding: (\$800,000)

PMI will continue to support the private sector activities in Huambo, but focus on technical support to the NMCP and DPS of this province, who will assume the primary responsibility and funding for this work. Particular attention will be paid to improving monitoring and data reporting. A post-pilot survey is planned with FY 2014 funding in Huambo to evaluate its impact and feasibility of rolling out similar activities in a new province. Results from this survey will be used to inform activities in Uige Province with FY 2014 funds and for the NMCP to use for further scale up in other provinces.

1. Provide technical assistance to the NMCP and Huambo DPS on implementing the subsidized sales of RDTs with a focus on monitoring and reporting (\$300,000).
2. Strengthen malaria case management in the private sector in select areas of Uige Province and increase access to quality and affordable RDTs and malaria treatment through social franchising in Uige. Create demand for malaria related services in *Tem Mais* pharmacies in Uige and create opportunities for the private sector to promote quality diagnosis and treatment, including data collection. Introduce and integrate mHealth in service provision in Angola through the use of mobile devices for community outreach, collect and analyze data from *Tem Mais* members (\$500,000).

MONITORING AND EVALUATION

Background

In May 2014, the Government of Angola began conducting the first census since 1970. It is expected that the results will show a significant increase in population over the projected figures, as was indicated by household registration for the universal coverage campaign.

The NMCP has invested heavily – mostly through the Global Fund grants and support from PMI – in malaria data collection and monitoring and evaluation. The Global Fund supports the provincial malaria focal points who are responsible for collecting malaria data in a parallel manner to the HMIS. This information is sent directly to the M&E focal person in the NMCP. However, this system is still weak, data are unreliable, and often conflict with the routine HMIS data on malaria. The HMIS still suffers from incompleteness, inaccuracy, and delayed reporting. Health staff at provincial and lower levels have limited knowledge of data collection, its importance, and its use for decision-making; some also appear to have limited numeracy skills. The NMCP recognizes the importance of a strong M&E system and has made it a key priority in the 2014-2017 national strategy.

PMI partners provide training, supervision, data quality checks, and reporting tools to the health facilities, municipal and provincial supervisors where they work and are looking into ways to facilitate data transmission. The Global Fund also supports strengthening of the HMIS system and provides support for the national NMCP M&E focal person and the provincial malaria focal points. However, Global Fund support for these personnel will end in December 2014, when the MOH is supposed to assume responsibility for the funding for their positions and reinstate them within the Ministry system.

An MIS was planned for 2013, but due to the census, all community-based surveys were prohibited by the GRA. PMI supported the two prior MISs: 2006/7 and 2011; both were powered to provide accurate estimates at transmission zone level, however, the next survey will be powered to provincial level to assess the validity of the current zone division. The methodology and sampling time frame will be similar to the last MIS, to avoid comparability problems. This will also help PMI evaluate its programs as most are at provincial level. The Global Fund has agreed to co-fund this survey. Under-five mortality estimates will also be included.

Currently, the NMCP is conducting a convenience sample survey using mobile health teams to conduct a mass testing campaign, testing and treating all presenting patients of all ages. The impetus for this survey was the arrival of 2 million RDTs which were donated to the NMCP by UNICEF-Somalia (this is a one-time survey). NMCP is leveraging the DPS health teams and the Cubans working across approximately 90 municipalities. Municipalities were selected based on the current epidemiological strata: hyperendemic, mesoendemic stable, and mesoendemic unstable. Results are expected by the end of the year. This survey should provide significant data to reanalyze the malaria burden in the country and redraw the epidemiological profile of the country in order to better focus intervention efforts.

In 2012, PMI and the NMCP supported an impact evaluation of the scale-up of malaria activities since 2006 on all-cause mortality in children under five years of age. The draft report is being reviewed and will be finalized before the end of 2014. The main challenge of the evaluation was the lack of data; the main evaluation was limited to the 2006/7 and 2011 MIS, and mortality estimates came from the 2011 survey only. In addition, the sampling for each survey was done at a scale much larger than that at which malaria prevention activities are implemented, making correlating morbidity and mortality from these surveys with scale-up of interventions difficult.

PMI continued to support entomologic monitoring in IRS areas which includes yearly insecticide resistance monitoring, quality control for IRS, and longitudinal entomologic surveillance. The NMCP vector control strategy currently employs three interventions: IRS, LLINs, and larviciding, with the largest portion of the NMCP budget supporting larviciding. Although IRS remains deprioritized, it has been, and continues to be, conducted piecemeal by different provinces and the NMCP plans to scale it up on the southern borders. The universal LLIN coverage campaign is ongoing and LLINs will continue to be a strong part of the prevention strategy. Although LLINs are not targeted based on entomologic data, LLINs is an insecticide-based vector control strategy and with universal coverage reached, coverage with LLINs will be far greater than coverage with IRS. Therefore the impact of LLINs on vector populations (e.g., insecticide resistance, shifts in vector species, and behavior) could potentially be greater than IRS. Thus, PMI plans to increase focus on entomologic monitoring of the effectiveness of LLINs. This will assist in guiding vector control strategies that aims at maximizing the effect of both these interventions. For example, if LLINs should fail in the future due the insecticide resistance to pyrethroids, other complementary vector control strategies may have to be considered. There is a lack of knowledge about mosquito vectors in Angola and lack of access to the entomology data from the larviciding program. Currently, there are two Angolan entomologists for public health. Therefore, increasing entomologic surveillance can help the NMCP and PMI better target prevention strategies and may allow the NMCP to advocate more

strongly for GRA support for additional LLINs or IRS. In addition, additional entomologic surveillance provides opportunities for capacity building for vector monitoring/entomology that will be needed as the country moves along the epidemiologic spectrum.

The table below summarizes the M&E activities that have been carried out in Angola since 2006.

M&E activities in Angola since 2006

Data Source	Survey Activities	Year									
		2006/7	2008/9	2010	2011	2012	2013	2014	2015	2016	2017
Household surveys	Demographic Health Survey (DHS)*										
	Malaria Indicator Survey (MIS)	X			X				(X) planned		
	EPI survey*		X* Integrated Survey on the Welfare of the Population (combined with MICS)								
Health Facility and Other Surveys	School-based malaria survey										
	Rapid Urban Malaria Assessment, Luanda	X									
	Health facility survey	X									
	SPA survey*										
	EUV survey	X	X	X	X	X	X	X	X	X	X
Malaria Surveillance and Routine System Support	Support to malaria surveillance system	X	X	X	X	X	X	X	X	X	X
	Support to HMIS	X	X	X	X	X	X	X	X	X	X
Therapeutic	In vivo efficacy testing				X*		X		X		X
Entomology	Entomological surveillance and resistance monitoring		X	X		X	X	X	X	X	X

	Net durability monitoring				X	X	X	X		X	
Other Data Sources	Malaria Impact Evaluation					X					

*Not PMI funded.

Progress during the last 12 months

PMI continued to support the maintenance and use of a training database for municipalities to track staff who have been given training, by topic, in an effort to minimize duplication and ensure that staff are provided with the requisite skill sets. In addition, a supervision database was introduced to track supportive supervision from both the health facility and the municipalities. PMI's NGO strengthening project continues to place great emphasis on M&E for the NGOs and conducts trainings and data quality assessments for all of the operating NGOs.

PMI also continued to support the End Use Verification Survey to track malaria commodities; more details can be found in the Pharmaceutical Management section.

In 2013, the NMCP and PMI (led by a CDC Atlanta Epidemic Intelligence Service Officer and the NGO strengthening project) conducted a therapeutic efficacy study of two of the three first-line antimalarials for uncomplicated malaria (AL and DHP) in Zaire (mesoendemic stable transmission) and Uige (hyperendemic transmission) Provinces. Results showed high efficacy for both drugs in Uige Province, but the corrected efficacy for AL in Zaire Province was found to be 88%, mostly due to late treatment failures; *mdr1* haplotypes suggestive of lumefantrine resistance were found in 100% of recrudescences and 85% of reinfections and *k13* markers for artemisinin resistance are still being analyzed. Based on these results, the NMCP wanted to conduct a follow-up study in 2014, but due to logistics constraints decided to postpone it and combine resources with PMI to conduct a study in 2015. All first-line antimalarials will be tested and Zaire and Uige Provinces will continue to be reference sites. The NMCP laboratory focal person, who led the study on behalf of the NMCP, spent six weeks working with the CDC Atlanta molecular laboratory learning techniques to identify resistance markers.

Entomologic monitoring

Significant progress has been made in routine entomologic monitoring for IRS this year due to the opening of the first ever insectary in Angola, based in Huambo Province and currently supported and run by PMI's implementing partner. However, there is still a critical shortage of entomologists and vector control technicians in the country (excluding the large Cuban team that is dedicated to larviciding). In addition, there is continued difficulty in finding and identifying the local vectors for routine susceptibility testing and IRS monitoring. PMI is advocating for the establishment of a susceptible colony to improve entomologic monitoring.

In February 2013, insecticide resistance testing was carried out using mosquitoes from sprayed areas in Huambo and Huila. *An. gambiae s.l.* from Huila was fully susceptible to bendiocarb but showed signs of possible emerging resistance to deltamethrin with 95% mortality. *An. coustani*

from Huambo were fully susceptible to deltamethrin, fenitrothion and bendiocarb. Since there were insufficient *An. gambiae s.l.* collected in Huambo to complete the testing, several species of mosquitoes, *An. gambiae s.l.*, *An. d'thali*, *An. theileri* and *An. pretoriensis*, were combined for testing against deltamethrin and bendiocarb. This mix of vectors showed 100% susceptibility to deltamethrin and bendiocarb but since *An. pretoriensis* contributed 66% and 86% of the mix for each respective insecticide, these test results are more indicative of the susceptibility of *An. pretoriensis* to these two insecticides.

Mosquito collections in Huambo Province during the baseline (April/May 2013) using CDC light traps next to persons sleeping under untreated nets showed that of 306 mosquitoes, 76% were Culicines, 6% were *Aedes aegypti*, 1% were *An. coustani*, and 17% were *An. gambiae s.l.* within the ten sampled villages. From October 2013 through January 2014 using the same method in IRS areas showed that of 1,422 mosquitoes, 94% were Culicines, 0.1% were *Aedes aegypti*, 1% were *An. coustani*, and 5% were *An. gambiae s.l.* In the non-IRS areas, 76% of 252 mosquitoes collected were Culicines, 3% *Aedes aegypti*, 3% were *An. coustani*, and 19% were *An. gambiae s.l.* The presences of various local vectors poses challenges for susceptibility testing, monitoring, and species identification.

As currently there is no in-country capacity to process samples, CDC Atlanta is supporting analysis of the mosquitoes collected for insecticide resistance testing and other entomologic monitoring activities for species identification. PMI is advocating for the NMCP to establish a reference laboratory to be able to analyze entomologic and possibly human parasitological samples. In the meantime, to build capacity for entomology, PMI continues to train the local provincial health personnel in entomologic techniques in all provinces where IRS is employed.

PMI will continue entomologic surveillance in former IRS areas as well as establish reference centers for example in Malange and Uige (areas of hyperendemic malaria) to monitor vector susceptibility (for IRS and ITNs), and longitudinal vector behavior monitoring to identify the true vectors active in Angola to help appropriately target vector control interventions. Entomologic identification and molecular markers for insecticide resistance will continue to be supported by the CDC entomology laboratory in Atlanta until in-country capacity is built.

Proposed activities with FY 2015 funding: (\$910,000)

PMI plans to continue to support strengthening of the HMIS system and routine malaria monitoring activities. As the malaria M&E system is closely linked to health systems strengthening and case management capacity building activities, portions of M&E funding are included under activities described in those sections.

1. Continue routine end-use verification/monitoring of the availability of key antimalarial commodities at the facility level every six months (\$150,000).
2. Two TDYs to support M&E; this will primarily focus on the enhanced epidemiologic surveillance outlined in the IRS section (\$25,000).

3. Support the second round of ITN durability monitoring; this will evaluate the nets distributed during the 2013/2014 universal coverage campaign; site selection will be chosen in collaboration with the NMCP and take into consideration when the distribution took place in the respective area (\$160,000).
4. Conduct a health facility survey to determine how well health workers are following their training in diagnosing and treating patients according to national policy. It will occur in a different province than Huambo, where the health facility survey was performed in 2007—most likely in Uige Province, in a high transmission zone with sufficient infrastructure and capable implementing partners. PMI will use this second survey to assess the progress made in case management and to help guide PMI's and the NMCP's future investments in capacity building (\$175,000).
5. Increase entomologic monitoring in four to five sites in areas where PMI has previously implemented spraying (i.e., Huambo, Huila, and Cunene). Furthermore, PMI will include routine entomologic monitoring for both IRS and ITNs and longitudinal vector identification and behavior in Malange and Uige. The following factors will be considered in the selection of resistance testing sentinel sites: current ITN coverage; geographical location and representativeness; level of pesticide use for agriculture and household pests; malaria transmission intensity/malaria eco-epidemiological type, and physical access and mosquito productivity. Entomologic indicators that will be monitored include mosquito vector species and density, and insecticide resistance (annually). The Huambo insectary will continue to serve as a facility for training and capacity building of the personnel in the provinces involved with entomologic monitoring of IRS (\$400,000).
6. Continue to support HMIS strengthening at national, provincial, and health-facility level. At the national level, PMI's implementing partner will help with coordination and creation of a strategic plan for HMIS, work with the MOH's department of planning at the MOH, and identify focal people responsible for data entry (Costs covered under Capacity Building and Coordination, \$300,000). At the municipal level, HMIS support activities include: supporting the roll-out of the M&E plan for the NMCP, which includes training on the indicators and the tools to track the data required to report on these indicators; creating a data bank and assessing data quality within municipalities; and working with provincial and municipal health teams to help identify problems and suggest solutions. (Costs are included in the NGO budgets under the Case Management section: the budget for HMIS is \$100,000 per province x 10 municipalities per province = \$1,000,000.) PMI works with implementing partners at the central and municipal levels to ensure collaboration, coordination, and consistent use of tools.

EPIDEMIC SURVEILLANCE AND RESPONSE

Background

In 2013, about 3 million cases were recorded in Angola with approximately 7,000 deaths compared with over 12,000 deaths over the past 2 years. With the gains made in malaria control

in the country, conducting epidemic surveillance and mounting a robust response in the face of potential outbreaks will become increasingly important. Angola is divided into three epidemiological regions of malaria transmission: hyperendemic, mesoendemic stable, and mesoendemic unstable. There is a national malaria surveillance system (NMSS), and each health facility in the country is expected to submit monthly reports to NMSS. The Malaria Early Warning System (MEWS) is an extension of the NMSS and intended to improve malaria epidemic detection and control. It has been implemented in the four provinces of the mesoendemic unstable region (Huila, Namibe, Cunene, and Cuando Cubango); Cuando Cubango Province was the last province to be included in the MEWS system (in May 2012). In late 2008, PMI supported the provincial health teams in southern Angola to develop plans for epidemic detection and containment, and WHO helped establish the EPR system based on collection and analysis of routine health facility data. Training and support supervision of provincial and municipal supervisors and of health facility staff for EPR has been done with Global Fund Round 7 and PMI support through WHO and the NMCP in four southern provinces (Namibe, Cunene, Huila, and Cuando Cubango).

However, effectively responding to outbreaks has been difficult. Usually the outbreak is identified late, limiting intervention options. In 2012, this system was able to detect an upsurge in malaria cases in Namibe Province, but in 2013, an upsurge in cases was not detected in Cuando Cubango province. In the 2012, outbreaks occurred in areas of high transmission (Lunda Norte and Uige provinces). The GRA responded by conducting rapid refresher trainings for clinicians and distributing ITNs, RDTs, and ACTs. They also set up mobile clinics and conducted BCC campaigns to alert the population. PMI and the ExxonMobil Foundation also reprogrammed funds to support ITN distribution in Uige Province. In addition, there was an outbreak in the city of Luanda, which historically has had very low transmission.

Progress during the last 12 months

In collaboration with the NMCP, PMI continues to provide training and support supervision to strengthen capacity of health facilities, municipalities, and provinces on EPR. In 2013, a team from CDC Atlanta assisted the PMI Angola team to conduct an evaluation of the MEWS in Cuando Cubango Province. Findings from this evaluation showed:

- insufficient stocks of RDTs at selected MEWS sentinel sites;
- MEWS data analyses use aggregated data from all health facilities rather than those designated as epidemic surveillance sites;
- poor quality data for epidemic detection;
- lack of laboratory confirmation of malaria cases due to inconsistent availability of diagnostic supplies;
- lack of timely reporting at the facility level;
- lack of capable human resources at the municipal and facility levels; and
- no collection of meteorological data.

The team made recommendations to PMI Angola, WHO, and the NMCP on how the system could be improved. These recommendations included expanding the number of sites per province, increased focus on training of involved staff, increasing supervision, limiting analysis

of data to higher levels of the health system, ensuring a consistent supply of diagnostic and treatment commodities and more regular review of the data at all levels of the system.

Proposed activities with FY 2015 funding:

There is still a significant need to strengthen and even expand the EPR system in Angola. However, the malaria partners in Angola need to critically evaluate the existing system and develop a plan to ensure timely outbreak detection and response. As an EPR system has been established in most of the provinces where PMI supports IRS and can conduct enhanced surveillance, PMI will combine these activities where appropriate. Support for this activity is included in the enhanced surveillance outlined in the IRS section.

OPERATIONAL RESEARCH

Background

Angola does not have a national operational research strategy for malaria and efforts to establish a high-quality research community in the country are limited. Only a few malaria-related papers from Angola have been published internationally in peer-reviewed journals. Despite this, the NMCP has conducted a significant amount of operational research on various aspects of its program. Currently, it is conducting a large study on the effectiveness of the Angolan-Cuban larviciding program that includes entomologic, epidemiologic, and parasitic markers. Furthermore, the research activities supported by PMI have directly contributed to the evaluation of current practices and the formulation of relevant programmatic improvements. PMI intends to work with NMCP to develop a national malaria operational research strategy, which would include a research agenda for the next five years.

In 2012 and 2013, the FELTP students participated in multiple suspected and confirmed malaria outbreaks across the county. In response to the outbreak of malaria in Lunda Norte Province in 2012, for example, PMI promptly supported the development of a study protocol on epidemic investigation and students in the malaria track have focused their theses on identification of risk factors associated with the malaria outbreak; the evaluation of the malaria surveillance system in Luanda Province; associated factors of severe anemia in children hospitalized in Uige Provincial Hospital during an upsurge of malaria in 2013; and the coverage of intermittent treatment of malaria during pregnancy in Luanda Province. In addition, one FELTP student played a critical role in the supervision of the therapeutic efficacy study of first-line antimalarials in Uige Province.

Below is a table summarizing the PMI-supported operational research studies conducted or in process.

Completed OR Studies			
Title	Start date	End date	Budget
Quality of malaria case management at outpatient health facilities in Angola	2007	2007	\$175,000
Ongoing OR Studies			
Title	Start date (est.)	End date (est.)	Budget
Barriers to IPTp uptake (funded by Exxon Mobile Foundation)	August 2014	December 2014	\$300,000
Planned OR Studies FY15			
None			

Progress during the last 12 months

PMI prepared for a qualitative study to evaluate the barriers to IPTp uptake, to be undertaken in 2014. This will involve health workers and pregnant women and their spouses to determine what factors limit uptake and how best to address them. Results from this study will be used to modify PMI and NMCP's efforts on malaria in pregnancy to improve outcomes.

Proposed activities with FY 2015 funding: (\$0)

No OR is currently planned with FY 2015 funding.

BEHAVIOR CHANGE COMMUNICATION

Background

The NMCP, with support from PMI, has finalized a revision of the National Malaria Communication Strategy (2013-2018), which provides a framework to guide and coordinate behavior change communication activities for malaria in Angola. The strategy's main goals are to: define roles and responsibilities of all key actors; identify priority issues and gaps; and provide basis for multi- and bilateral assistance and intersectoral coordination. Overall, the strategy also addresses misconceptions about malaria in Angola and seeks to improve knowledge in key behaviors essential to achieve sustained malaria control. The strategy covers four main malaria interventions: vector control (IRS, ITNs, and larviciding), case management, IPTp, and epidemic preparedness and response.

With the launch of the universal coverage campaign in 2013, NMCP and partners developed a specific BCC effort focused on improving net use. The BCC activities include municipal days, house-to-house visits, and radio programs and are designed to ensure that messages about ITN ownership and use are reaching as many people as possible in order to complement NMCP's universal ITN coverage efforts. Angola does not yet have a strong net culture hence much work still is needed to promote consistent net use. Similar efforts are needed for case management and MIP.

It is estimated that only 60% of the Angolan population has access to public health facilities. This makes improvement of awareness of malaria and appropriate actions at the household level an especially important element of the malaria control strategy. A key component of this strategy is the implementation of iCCM, which is aimed at reaching the portion of the population who has no access to a health facility. An IEC/BCC tool kit focused on iCCM is currently under development with support of PMI and other NMCP partners.

With support from PMI and the Global Fund consolidated Rounds 7 and 10 grants, BCC activities have been coordinated and targeted to the appropriate provinces, given the variation of malaria transmission in Angola. Key messages at the community level, via radio and television, include promotion of correct net use, importance of malaria prevention during pregnancy, and the importance of prompt diagnosis and treatment of malaria with ACTs. Efforts during outbreaks include multiple channels of communication (radio, TV, personal communication, local drama activities) which are targeted to the areas affected. PMI supports coordination of BCC activities through the Malaria Partners Forum, which meets regularly.

Progress during the past 12 months

A malaria BCC campaign was launched in April 2012 and continued through 2013, with the purpose of increasing knowledge of malaria risk factors and to change individual and community behaviors. Activities included community outreach using face-to-face discussions, drama shows on malaria, and mobile videos; training of health and community workers; radio spots; and printed messages together with those that accompany packaged ITNs and ACTs. Implementation of these activities occurs at various locations, including clinics, homes, religious institutions, schools, and community events. During the universal coverage campaign activities in FY 2013, nearly 120,500 people were reached through theater and community education sessions on net use and 730 radio messages were aired.

In FY 2012, the NGO strengthening project supported the NMCP to develop various communication tools which were deployed in FY 2013. The project continued to support both mass and interpersonal communication to improve knowledge and change behavior on malaria prevention and care-seeking. In FY 2013, nearly 62,500 group education sessions were conducted at health facilities (of a target of 41,850); 62,750 individuals were reached through outreach campaigns (of a target of 61,333); 12,700 posters were distributed (of a target of 6,605); and 431 radio spots were aired (of a target of 262).

The NMCP's capacity to coordinate and monitor all malaria-related BCC activities carried out by the NMCP, provincial governments, Global Fund, PMI implementing partners, and other in-country stakeholders in Angola remains a major challenge. No standardized method of estimating or counting the number of people reached through BCC activities exists, and reporting is addressed on an activity-by-activity basis. PMI will continue to support the implementation of the newly developed Communications Strategy to appropriately develop indicators and a tracking system. With FY 2014 funds, PMI continues to support the National Malaria Partners Forum to ensure effective implementation and coordination of malaria control interventions including BCC focused on the community level and on capacity building at the central level.

With the approval of the Malaria Control Strategic Plan (2014-2017) which includes a specific section on iCCM, PMI will support the implementation of a BCC strategy targeted at the community level. This will require mobilization and sensitization of traditional leaders (*sobas*). IEC/BCC messaging will be channeled through community health workers in the provinces where they exist and through PMI partners working in 9 provinces.

Proposed activities with FY 2015 funding: (\$1,300,000)

Under NMCP guidance, PMI plans to focus on the development of communications materials for mass media and community-based activities, interpersonal communication, preseason transmission malaria prevention activities, and case management of malaria. Evidence-based messages focused on a target audience will be used and support will be provided to the NMCP to begin to evaluate specific interventions and actual behavior change.

With the launch of the iCCM pilot in 2015, PMI will support the NMCP in developing a BCC tool kit for iCCM. Overall, the following BCC activities will be supported with FY 2015 funds:

1. Support the national BCC campaign (e.g., municipal days, house-to-house visits, and radio programs), develop and revise existing materials, reproduce and disseminate materials to target audiences, and conduct and evaluate BCC materials for malaria communications. The BCC activities will continue to focus on increasing ITN use and care by the general population, particularly among vulnerable groups including pregnant women and children under five; improving adherence to results of laboratory diagnosis for prescribing treatment by health care providers; and public and private sector facilities providing prompt, appropriate treatment with ACTs. The funds will also be used to support the development of a communication strategy for iCCM under the leadership of the NMCP. PMI-supported BCC activities will be closely coordinated with other partners to maximize the best use of malaria BCC resources (\$800,000).
2. Support specific community-based BCC efforts in nine provinces covered by PMI to improve ITN use by the general population, focusing on vulnerable groups including pregnant women and children under five; improving adherence to results of laboratory diagnosis for prescribing treatment by health care providers; and providing prompt, appropriate treatment with ACTs (\$500,000).
3. Implement IEC/BCC in different program areas (budget incorporated in IRS, MIP, ITN section).

CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING

Background

Support to the health system is crucial for the long-term sustainability of PMI investments, and systems strengthening activities, such as training and supply chain management, have been

implemented since the launch of PMI in Angola. USAID's overall approach to health systems strengthening is through the provision of technical assistance to various levels of the government in the areas of budget and finance, HMIS, human capacity building, and logistics and supply chain management.

USAID Angola's major project for health systems strengthening has been implemented since October 2011 and focuses primarily on strengthening human resources capacity and HMIS in the provinces of Huambo and Luanda, with funding from the President's Emergency Plan for AIDS Relief (PEPFAR), family planning, and PMI. This integrated project works closely with the MOH at the national, provincial, and municipal levels with the goal of improving capacity for service delivery, leadership, management, and supervision skills of health workers to deliver quality care and services. At the central level, the project provides support to the MOH with technical assistance in the decentralization process, whereby municipalities are responsible for a significant portion of planning, budgeting, and financial management of health resources. Furthermore, the project now supports municipalities to develop their strategies in line with the PNDS. The project also supports the implementation of the National Health System Strategic Information Plan and works to improve effectiveness and efficiency of human resources at the municipal level. To improve service delivery, the project uses a quality improvement approach that supports standards-based clinical practices and strengthened capacity of health workers to provide family planning, HIV, and malaria services through pre-service training of trainers and nursing school teachers.

The critical lack of human resources outlined previously affects the ability of the GRA and civil society to provide essential services to the Angolan population. The NGO strengthening project supports capacity building of local NGOs with the goal that these organizations will eventually provide services for the GRA with GRA or other donor funding. This project provides training and mentoring of the involved NGOs in all areas of organization (administration, finance, logistics, operations, technical capacity, and M&E).

The Field Epidemiology and Laboratory Training Program (FELTP) began its first cohort in Angola in FY 2012. It is a collaboration between CDC, the *Agostino Neto* University, and the MOH. This program trains health personnel in field epidemiology. Participants acquire skills in data analysis, epidemiologic methods, and use of strategic information to make appropriate health decisions. Annually, PMI supports two students who focus on malaria for their field work; however, in Angola, all of the FELTP students in the program have participated in multiple investigations and responses to malaria outbreaks in different provinces across the country.

Progress during the last 12 months

After the approval of the PNDS by the Angolan government, USAID and PMI provided significant technical assistance to cost the plan and capacity building to develop an M&E plan and indicators. This support was provided in response to a direct request by the Ministry of Health to USAID and represents a model of implementation planned to be rolled out through the USAID Angola CDCS. In addition, PMI-funded projects who have historically supported municipalities in nine provinces (Luanda, Zaire, Uige, Malange, Kwanza Norte, Kwanza Sul, Benguela, Huila, and Huambo) to develop health plans and budgets have now adapted their

support to the PNDS decentralization plan which involves the development of municipal health plans and associated budgets. The plans are in standardized formats requiring streamlined data; municipalities then prioritize the health interventions based on the data analysis and develop implementation plans and budgets accordingly. The GRA expects to have all municipalities with approved plans by the end of 2014.

PMI partners also continue to develop a cadre of national, provincial, and municipal supervisors to conduct support supervision at health facilities. Support provided by partners includes supervision planning and tool development, health facility malaria report verification, and municipal and provincial level malaria reports and database management. In addition, PMI projects promoted active review and discussion of monthly reports with municipal and provincial supervisors to foster analysis for problem identification and explore possible solutions. The focus has been on improving documentation in patient record books so that the quality of the data available for analysis improves.

During the past year, the USAID health systems strengthening project has developed a tool to evaluate the standards of clinical performance on malaria and has seen some slow, but steady improvements in performance in Luanda Province, where it is being implemented. The tool has been used in 40 health facilities and looks at a single patient encounter at each implementation. Success is defined as demonstration of competency in 80% of treatment standards. In FY 2013, 7 facilities achieved these goals, 27 facilities showed improvement, and 6 had decreased scores at the last testing visit (this can be due to staff turnover, competing priorities on that particular visit, etc.). With funding from PMI, the project has also supported the updating of the pre-service curriculum for malaria in nursing schools in Huambo Province and provided nearly 250 in-service trainings on malaria diagnosis and case management in Luanda Province.

PMI supported the NMCP, CECOMA, and the Pharmacy Division in a five-day workshop on quantification of medical commodities to provide a foundation for routine data collection, analysis and planning on malaria commodities.

The FELTP program has started with a second class of students. In 2012 and 2013, the FELTP students participated in multiple suspected and confirmed malaria outbreaks across the county. In response to these outbreaks, the program has developed a “short course” on epidemic investigation and control that is provided at the regional level. Five short courses were conducted last year; all participants are from the MOH and the DPS nominates and provides all financial support except for the training facilitators and materials. The course focuses on timely outbreak detection and response and includes training on the Epi Info® software package. All participants conducted an investigation as a practical exercise in the course and malaria was often the subject chosen. These investigations included diagnosis and treatment of febrile illness in the outpatient service in a Luanda Hospital and health center: this study showed that more than 80% of febrile patients with negative microscopy or RDT testing were still given an antimalarial; another study on malaria prevention in pregnant women in a Luanda health clinic showed that 85% of pregnant women knew the risks of malaria in pregnancy and how to prevent it, 62% of women had bought their own nets in the private sector, but only 50% of those used the net.

The FELTP program has been very active in malaria activities this past year. The FELTP students in the malaria track have focused their theses on identification of risk factors associated with the malaria outbreak in Lunda Norte Province in 2012; the evaluation of the malaria surveillance system in Luanda Province; associated factors of severe anemia in children hospitalized in Uige Provincial Hospital during an upsurge of malaria in 2013; and the IPTp coverage in Luanda Province. In addition, one FELTP student played a critical role in the supervision of the therapeutic efficacy study of first-line antimalarials in Uige Province. Three of the ten members from the first class have taken prominent positions in the MOH. Nonetheless, the FELTP program has struggled with student retention; most students cannot afford the cost of living in Luanda on the stipend currently paid by the program.

PMI continues to support the Malaria Partners Forum to assist the NMCP in coordinating all malaria partners and stakeholders in the country and is currently compiling information from all partners to develop a comprehensive inventory of all malaria activities. The Forum has concentrated its efforts this year on gathering geographic and programmatic information from all partners to develop an up-to-date mapping of partners as well as creating provincial-level forums to improve coordination amongst partners at lower levels. They have also successfully doubled the funds that PMI provides for operations, demonstrating expanded support for the Forum's mandate and performance.

As part of capacity building of the NMCP, the PMI Resident Advisors are embedded at the NMCP to provide technical assistance and support all coordination and implementation of malaria activities in the country. These advisors spend about 50% of their time working with NMCP staff and participating in technical meetings providing inputs on NMCP's strategies, protocols and guidelines on all aspects of malaria prevention and control. This year, the PMI advisors have continued to support the universal coverage campaign, the updating of the malaria in pregnancy guidelines and the national strategy.

Proposed activities with FY 2015 funding: (\$1,300,000)

PMI will continue to focus on improving the human resource capacity at all levels of the health system and strengthening the system as a whole.

1. Support human resources capacity building by continuing to support pre-service curriculum revision and implementation as well as in-service training on malaria diagnosis and treatment and health systems strengthening activities in Huambo and Luanda Provinces (\$300,000).
2. Continue to strengthen provincial-level supportive supervision by the NMCP for malaria activities including technical assistance on effective supervision tools and timely and supportive follow-up (\$300,000).
3. Continue to support two students from the FELTP program to focus on malaria activities; additional support for recruitment and retention of students, provision of the epidemiology short course to staff in epidemiologic monitoring sites outlined in the IRS section, and outbreak investigation (\$200,000).

4. Provide technical assistance to the PNDS Secretariat, MOH, and Ministry of Finance in budget planning and monitoring of the PNDS. This will include cost analyses, bottleneck analyses (overall and specifically for the NMCP), and monitoring of the plan's implementation (\$200,000).
5. Support the Malaria Partner's Forum to assist the NMCP and provinces to coordinate malaria partners. This includes maintenance of the partner database with geographic coverage and scope of activities; quarterly meetings; compilation and collation of partner quarterly reports; website maintenance to ensure resources are used efficiently, minimize duplication, and facilitate sharing of best practices (\$50,000).
6. Continue to support strengthening of local NGOs in selected provinces (Bié, Bengo, Zaire, Uige, Malange, Kwanza Norte, Kwanza Sul, Benguela, and Huila) (costs covered under the Case Management section).
7. PMI will help support a holistic, comprehensive workforce assessment led by the MOH and planned for 2015/16. This is a joint assessment funded by the World Bank. PMI's implementing partner is already providing technical support to the MOH to prepare to conduct this assessment. PMI's main goal in the assessment will be focused on determining the biggest challenges faced by health professionals in malaria case management. In particular, PMI plans to advocate for a literacy/numeracy expert to participate on the assessment team in order to support the GRA in identifying opportunities to address low literacy in its workforce. (\$250,000)

PUBLIC PRIVATE PARTNERSHIPS

Background

Since the launch of PMI in Angola, ExxonMobil Foundation has worked in partnership with the USG and has provided \$5.5 million to date to support case management and human capacity building efforts through PMI partner NGOs who work in eight provinces, namely Benguela, Huambo, Kwanza Sul, Kwanza Norte, Uige, Huila, Malange, and Zaire. These NGOs work closely with DPSs and coordinate all malaria control activities with local authorities.

Progress during the last 12 months

Under this public-private partnership with ExxonMobil, nearly 2,000 health workers have been trained. This partnership has also supported development of training manuals and tools, standard operating procedures, and the training of a cadre of laboratory trainers. With additional funding in FY 2013, PMI supported the scale up of training and capacity building of laboratory technicians across the 18 provinces (see Diagnosis section for further details). In addition, through the partnership with ExxonMobil, approximately 150,000 GRA-procured nets were distributed in Uige Province by one of PMI's implementing partners. All key stakeholders value

this partnership. Given the influx of private companies that work in Angola's oil and mining sector, a great potential exists for private partnerships to augment PMI's efforts in Angola. Recognizing this, the USAID Mission has decided to develop a more robust plan for building public-private partnerships to harness private funding and capacity of the private sector needed to further development goals. The Mission facilitated the training of two staff members in October and November 2012 and will be drafting a Mission strategy for securing and managing public-private partnerships by the end of 2014. PMI will continue to be a strategic player in the Mission's public-private partnership strategy, as PMI accounts for about 70% of the health funding for the Angolan Mission.

The NMCP has sought PMI's technical assistance in writing a proposal to the ExxonMobil Foundation to fund a reference laboratory to monitor all entomological and vector management activities in the country. The ExxonMobil Foundation is willing to partner with NMCP through PMI's support.

Proposed activities with FY 2015 funding:

The activities conducted with the ExxonMobil Foundation are always co-funded by PMI and thus prioritize and build on activities already planned in the MOP. All projects funded by private partners will continue to be implemented in close coordination and collaboration with the NMCP. For example, PMI is negotiating additional funding from the ExxonMobil Foundation to support FELTP students, who currently have a very restricted budget.

In addition, PMI resident advisors plan to be actively involved in supporting the implementation of the Mission's strategy for public-private partnerships, specifically in identifying ways that PMI funding and activities can be leveraged in scope and scale by private funding.

INTEGRATION WITH OTHER GHI PROGRAMS

Background

Angola has embarked on a revitalization of municipal health systems within the context of decentralizing health services. This is intended to improve infant and maternal health, as well as increase overall access to primary health care by the Angolan people. The program, 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 microplanning to strengthen integration of service delivery, including IMCI and BCC.

The 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 ITNs, vaccinations, deworming medications, 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 allocates \$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.

In 2013, the GRA approved the PNDS outlining the strategy to improve the health system from 2012-2025. This includes all sectors of health, including malaria. PMI, through the USAID health financing project, supported the budget development of this plan, recognizing the importance of costing the strategy to ensure sufficient resources are allocated to malaria and the health system. This support continues with provision of technical assistance to develop a monitoring and evaluation plan for the PNDS and developing tools to implement the costing exercise in all municipalities.

PMI continues to support the NMCP in the revitalization and decentralization process, mainly through the USAID integrated health systems strengthening project and the NGO strengthening project. Both projects work with the NMCP to develop or adopt guidelines and with the municipal leadership to develop administrative, financial, and technical capacity to ensure improved access and quality of all health services including malaria.

Progress during last 12 months

The NMCP, via its cross-sectoral technical working group, continues to integrate its work with other health programs, such as IMCI, Well Child and Vaccinations, Nutrition, Reproductive Health, and EPI, under the new framework of the PNDS. The NCMP has been working closely with other national implementation bodies including the National HIV/AIDS Prevention Commission, Interagency Committee for Immunization, Country Coordinating Mechanism for the Global Fund, various UN organizations including WHO, UNICEF, and United Nations Development Program, multi- and bilateral organizations, such as USAID, JICA, and others.

Proposed activities with FY 2015 funding:

PMI plans to continue to support the NMCP's cross-sectoral technical working group to integrate work with other health programs, such as revitalization, IMCI, Well Child and Vaccinations, Nutrition, Reproductive Health, under the PNDS framework. In addition, PMI will continue to provide technical assistance to support the budget monitoring of the PNDS and municipal strategies. *(Costs are included in the sections of Prevention, Case Management, Capacity Building, and M&E)*

STAFFING AND ADMINISTRATION

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

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

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

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

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

Proposed activities with FY 2015 funding: (\$2,660,000)

PMI will continue to support staffing and administrative costs for both USAID and CDC.

1. Staffing and administrative costs for the USAID and CDC resident advisors, one full-time program management specialist for malaria, headquarter backstops, and in-country support staff and associated administrative costs (\$2,660,000).

**Table 1. FY 2015 Funding by Mechanism
President's Malaria Initiative – Angola**

Partner	Geographical Area	Activity	Activity Budget (\$)	Project Subtotal (\$)
TBD (commodity/supply chain project)	Nationwide	Procurement of ITNs	7,975,000	10,365,000
		Procurement of laboratory supplies for microscopy	100,000	
		Procurement of RDTs	900,000	
		Procurement of ACTs	1,190,000	
		Technical assistance and support for import, clearance, storage, distribution and management of RDT and ACT commodities	200,000	
MSH (SIAPS)	Nationwide	Strengthen Ministry of Health antimalarial drug management system	600,000	750,000
		Survey of availability of malaria commodities at the health facility level (End-use verification)	150,000	
PSI	Huambo and Uige	Build the capacity of the private sector to manage malaria	800,000	1,600,000
	Nationwide	National BCC campaign to promote net use and care and repair	800,000	
IRS 2 TO6	TBD	TA to provinces implementing IRS	400,000	800,000
	Huila, Cunene, and Huambo	Entomological surveillance	400,000	
GEMS II	Nationwide	External environmental compliance	50,000	50,000
World Learning (Eye Kutoloka)	Uige, Zaire, Benguela, Kwanze Norte, Kwanza Sul, Malange, Huila, Bié, and Bengo	Transport of ITNs from provincial warehouse to health facilities	1,885,000	8,585,000
		BCC to promote net use and care and repair in 9 provinces	500,000	
		Strengthen malaria case management	4,500,000	

		Strengthen malaria in pregnancy services at health facilities in 8 provinces	200,000	
	Nationwide	Provincial level supervision with the NMCP	300,000	
		Training and TA on diagnosis (RDT and microscopy) and quality control	900,000	
	Uige	Pilot iCCM	300,000	
JHPIEGO (SASH/ ForcaSaude)	Luanda and Huambo	Facilitate malaria program implementation and health systems strengthening in collaboration with the NMCP	300,000	300,000
CDC	Nationwide	Entomological marker testing (mosquito and LLIN processing using PCR) in Atlanta	140,000	455,000
		Entomologic monitoring and insecticide resistance testing	65,000	
		Technical support for laboratory training	25,000	
		Technical support for M&E	25,000	
		FELTP	200,000	
PQM/U.S. Pharmacopoeia	Nationwide	Support DNME, Inspector General, and the NMCP to improve regulation and monitoring of drug quality for antimalarials	200,000	200,000
Abt Associates/Ampla Saude	Nationwide	Support MOH and Ministry of Finance with budget and budget monitoring of the National Plan for the Development of the Health Sector	200,000	200,000
TBD	Nationwide	LLIN durability monitoring	160,000	160,000
TBD	Nationwide	Health facility survey	175,000	175,000
TBD	Huila, Cunene, Huambo, Uige, and Malange	Epidemiologic surveillance	400,000	400,000
TBD	Nationwide	Support the MOH-led workforce assessment	250,000	250,000
TBD	Nationwide	Support to Malaria Partners Forum secretariat	50,000	50,000
Total*			\$24,340,000	

*Does not include budget for staffing/administration of \$2,660,000.

**Table 2. FY 2015 Planned Obligations
President's Malaria Initiative – Angola**

Proposed Activity	Mechanism	Budget		Geographical area	Description
		Total \$	Commodity \$		
PREVENTIVE ACTIVITIES					
Insecticide Treated Nets					
Procurement of ITNs	TBD (commodity/supply chain project)	7,975,000	7,250,000	Uige, Zaire, Benguela, Kwanze Norte, Kwanza Sul, Malange, Huila, Bié, and Bengo	Purchase approximately 1.45 million nets with distribution to provincial level. Provinces will include those where PMI-supported NGOs are active
Transport of ITNs from provincial warehouse to health facilities	World Learning	1,885,000		Uige, Zaire, Benguela, Kwanze Norte, Kwanza Sul, Malange, Huila, Bié, and Bengo	Transport of ITNs through ANC for pregnant women and EPI for children under five years of age using NGOs, where they are present - includes monitoring of distribution to end users
SUBTOTAL - ITNs		9,860,000	7,250,000		
Indoor Residual Spraying					
Provide technical assistance for implementation of IRS financed by provincial/municipal GRA	IRS 2 TO6	400,000		TBD	Technical assistance for microplanning, training, budgeting, environmental compliance, and entomologic monitoring

Epidemiologic surveillance	TBD	400,000		Huila, Cunene, Huambo	Epidemiologic monitoring sites in former IRS areas and selected areas across the country to monitor epidemiologic markers in health facilities
External environmental compliance	GEMS II	50,000		Nationwide	Field visit to observe and monitor environmental compliance
Entomological marker testing (mosquito and LLIN processing using PCR) in Atlanta	CDC	140,000		Nationwide	PCR processing of mosquitoes and LLINs from Angola until the capacity in Angola is sufficient for local processing
Technical assistance for entomologic monitoring and insecticide resistance testing	CDC	65,000		Nationwide	Technical assistance visits for entomologic monitoring and resistance testing in NMCP; support for specific reagents and other laboratory diagnostic materials
SUBTOTAL - IRS		1,055,000	0		
Malaria in Pregnancy					
IEC/BCC for malaria in pregnancy in NGO supported provinces	World Learning	Costs covered under IEC/BCC for net distribution		Uige, Zaire, Benguela, Kwanze Norte and Sul, Malange, Huila, Bié, and Bengo	IEC/BCC for IPTp and care seeking for malaria in pregnancy in 8 provinces. This could include using community health workers for messaging

Strengthen malaria in pregnancy services at health facilities in 8 provinces	World Learning	200,000		Uige, Zaire, Benguela, Kwanze Norte and Sul, Malange, Huila, Bié, and Bengo	In eight provinces, improve health facility workers' understanding and compliance in administering IPTp, diagnosing and treating malaria in pregnancy, LLIN use in pregnant women and provision of tools to accurately track MIP services
SUBTOTAL - MIP		200,000	0		
SUBTOTAL PREVENTIVE		11,115,000	7,250,000		
Case Management					
Diagnosis					
Procurement of laboratory supplies for microscopy	TBD (commodity/supply chain project)	100,000	100,000	Nationwide	Procurement of laboratory diagnostic reagents and supplies and limited supplies for basic microscope repairs
Procurement of RDTs	TBD (commodity/supply chain project)	900,000	900,000	Nationwide	Procurement of 1,500,000 RDTs (\$0.60 per SD Bioline® test), for the public and private sectors as well as the iCCM pilot
Training and TA on diagnosis (RDT and microscopy) and quality control	World Learning	900,000		Uige, Zaire, Benguela, Kwanze Norte and Sul, Malange, Huila, Bié, Bengo, and Luanda	Diagnostic quality control - this will include training on microscope basic use and maintenance
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		1,925,000	1,000,000		
Treatment & Pharmaceutical Management					

Procurement of ACTs	TBD (commodity/supply chain project)	1,190,000	1,190,000	Nationwide	Procurement of approximately 590,000 treatments for the public sector and 600,000 for the private sector and iCCM pilot (estimated average cost of ACT = \$1).
Pilot iCCM	World Learning	300,000		Uige	Pilot iCCM with community health workers in selected municipalities in Uige. The MOH will provide commodities for the other diseases included in the care package (ex. pneumonia, diarrhea)
Strengthen malaria case management	World Learning	4,500,000		Uige, Zaire, Benguela, Kwanze Norte and Sul, Malange, Huila, Bié, and Bengo	Training and support supervision for provincial and health facility health workers to improve malaria case management (transition out of Huambo and add Bié and Bengo Provinces)
Technical assistance and support for import, clearance, storage, distribution and management of RDT and ACT commodities	TBD (commodity/supply chain project)	200,000		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	Management Sciences for Health	600,000		Nationwide	Strengthen pharmaceutical management related to antimalarial drugs including regular supervision, provincial training of pharmacist, help with printing of supply chain management forms
Support DNME, Inspector General, and the NMCP to improve regulation and monitoring of drug quality for antimalarials	U.S. Pharmacopoeia	200,000		Nationwide	Strengthen the regulatory and monitoring systems for quality assurance of antimalarials through development of standard tools, operating procedures, laboratory strengthening, and advocacy for regulations

Build the capacity of the private sector to manage malaria	Population Services International	800,000		Huambo and Uige	Strengthen malaria case management in the private sector in select areas of Uige and Huambo Provinces and create opportunities for the private sector to promote quality diagnosis and treatment, including data collection
SUBTOTAL - Treatment & Pharmaceutical Management		7,790,000	1,190,000		
SUBTOTAL CASE MANAGEMENT		9,715,000	2,190,000		
Monitoring and Evaluation					
Survey of availability of malaria commodities at the health facility level (End-use verification)	Management Sciences for Health	150,000		Nationwide	At least biannual monitoring of commodity availability and use at health facility level
Technical support for strengthening M&E	CDC	25,000		Nationwide	Two TDY visits to provide assistance to in-country partners for M&E
LLIN durability monitoring	TBD	160,000		Nationwide	Routine monitoring of LLIN durability
Health facility survey	TBD	175,000		Uige	Monitoring of the quality of malaria case management
Entomological surveillance	IRS 2 TO6	400,000		Huila, Cunene, Huambo	Entomological monitoring sites in former IRS areas and selected areas across the country to monitor mosquito vector species and density, and insecticide resistance.
SUBTOTAL M & E		910,000	0		
Behavior Change Communication					

National BCC campaign to promote net use and care and repair	Population Services International	800,000		Nationwide	Continuation of promotion of net use and building a net culture
BCC to promote net use and care and repair in 9 provinces	World Learning	500,000		Uige, Zaire, Benguela, Kwanze Norte and Sul, Malange, Huila, Bié, and Bengo	BCC for net use; this will complement the BCC the partner is already doing for other aspects of malaria control and prevention
SUBTOTAL BCC		1,300,000	0		
Capacity Building and Coordination					
Facilitate malaria program implementation and health systems strengthening in collaboration with NMCP	JHPEIGO	300,000		Luanda and Huambo	Contribute to malaria program implementation as part of larger health systems strengthening initiative within MOH.
Provincial level supervision with NMCP	World Learning	300,000		Nationwide	Strengthen provincial-level supervision by the NMCP for malaria activities. Provide technical assistance to the NMCP to visit each province at least twice a year.
Field Epidemiology and Laboratory Training Program	CDC	200,000		Nationwide	Support two students in the field epidemiology and laboratory training program to focus on malaria; additional funds to ensure recruitment/retention and supporting training in the epidemiologic monitoring sites (short course in epidemiology training)

Support MOH and Ministry of Finance with budget and budget monitoring of the National Plan for the Development of the Health Sector	Abt Associates	200,000		Nationwide	Technical assistance for cost analyses, bottleneck analyses, and monitoring of the PNDS and NMCP strategy
Support to Malaria Partners' Forum secretariat	TBD	50,000		Nationwide	Continued support to National Malaria Partners' Forum
Support the MOH-led workforce assessment	TBD	250,000		Nationwide	Support to the assessment will focus on determining the biggest challenges faced by health professionals in malaria case management.
SUBTOTAL Capacity Building		1,300,000	0		
In-country Staffing and Administration					
Staffing and administration	USAID and CDC IAA	2,660,000		Nationwide	Support to salaries and benefits of Resident Advisors and support staff (CDC IAA \$1,160,000 and \$1,500,000 for USAID)
SUBTOTAL - In-Country Staffing		2,660,000	0		
GRAND TOTAL		27,000,000	9,440,000		

