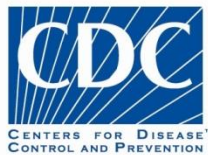


This Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. The final funding available to support the plan outlined here is pending final FY 2015 appropriation. If any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



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PRESIDENT'S MALARIA INITIATIVE



PRESIDENT'S MALARIA INITIATIVE

Uganda

Malaria Operational Plan FY 2015

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ABBREVIATIONS AND ACRONYMS

ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
AMFm	Affordable Medicines Facility for Malaria
ANC	Antenatal care
BCC	Behavior change communication
CDC	U.S. Centers for Disease Control and Prevention
DFID	United Kingdom Department for International Development
DHMT	District Health Management Teams
DHS	Demographic and Health Survey
DO3	Development Objective 3
DOT	Directly observed treatment
EPI	Expanded Program on Immunization
FANC	Focused antenatal care
FELTP	Field Epidemiology and Laboratory Training Program
FY	Fiscal year
GHI	Global Health Initiative
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GOU	Government of Uganda
Hgb	Hemoglobin
HMIS	Health management information system
HRH	Human Resources for Health
iCCM	Integrated community case management
IPTp	Intermittent preventive treatment for pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
LLIN	Long-lasting insecticide-treated mosquito net
MIP	Malaria in pregnancy
MIS	Malaria Indicator Survey
M&E	Monitoring and evaluation
MOH	Ministry of Health
MOP	Malaria Operational Plan
MTR	Midterm review
MTRAC	WHO Malaria Tracking System
NDA	National Drug Authority
NFM	New Funding Model
NGO	Non-governmental organizations
NHS	National Health System
NMCP	National Malaria Control Program
NMS	National Medical Stores
OP	Organophosphate insecticide
OR	Operational research
PEPFAR	President's Emergency Plan for HIV/AIDS Relief
PMI	President's Malaria Initiative
PPF	Private for-profit health facilities
PMTCT	Prevention of mother-to-child transmission
PNFP	Private not-for-profit health facilities

QA/QC	Quality assurance/quality control
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RHD	Reproductive Health Division
SP	Sulfadoxine-pyrimethamine
TCMPs	Traditional and complementary medicine practitioners
UBCC	Universal bed net coverage campaign
UMC	Uganda Malaria Commission
UMSN	Uganda Malaria Surveillance Network
UMRS	Uganda Malaria Reduction Strategy
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
VHT	Village Health Team
WHO	World Health Organization

I. EXECUTIVE SUMMARY

Malaria prevention and control are major foreign assistance objectives of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a comprehensive effort to reduce the burden of diseases 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, tuberculosis, maternal and child health, and nutrition. 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 the passage of the Lantos-Hyde Act, PMI's goal was adjusted to halve the burden of malaria in 70% of the at-risk populations of sub-Saharan Africa, thereby removing malaria as a major public health problem. Uganda is one of the first three PMI countries, and PMI activities were initiated in 2006.

Malaria is Uganda's leading cause of morbidity and mortality. According to the Ministry of Health (MOH), malaria accounts for 25–40% of outpatient visits to health facilities and is responsible for nearly half of inpatient pediatric deaths. Results of the 2011 Demographic and Health Survey (DHS) show an improvement over the 2009 Malaria Indicator Survey (MIS) with 60% of households nationwide owning at least one insecticide-treated net (ITN) up from 47% in 2009; 47% of pregnant women and 43% of children under the age of five having slept under an ITN the night before the survey up from 44% and 33%, respectively, in 2009. In addition, the 2009 DHS showed that 43% of children under the age of five had been treated with an antimalarial drug on the same day or the next day after the onset of fever, while the proportion receiving an artemisinin-based combination therapy (ACT) was 30%. However, the DHS report showed a decrease in the number of women receiving intermittent preventive treatment during pregnancy (IPTp2) from 32% to 25% during the same period. Overall, there was a 34% decrease in under-five mortality from 2006 to 2011 in Uganda.¹

PMI, the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund), and the United Kingdom's Department for International Development (DFID) are the three major contributors to malaria control in Uganda, with additional support from a range of other donors. Uganda currently has three active grants from the Global Fund that run until December 2014. Through the New Funding Model (NFM), the National Malaria Control Program (NMCP) has submitted a concept note for a new malaria grant that would cover the period of 2015 through 2017.

PMI/Uganda's fiscal year (FY) 2015 Malaria Operational Plan (MOP) was developed in close collaboration with the NMCP and other major partners during a team-planning visit carried out in March 2014. The planned PMI activities are aligned with the newly developed Uganda Malaria Reduction Strategy (UMRS) 2014–2020 and complement the contributions of other donors. The proposed FY 2015 PMI budget for Uganda is \$33 million. The planned activities with FY 2015 funding are:

¹ DHS 2011.

Insecticide-treated nets (ITNs): With FY 2014 funds, PMI will procure and distribute 1 million ITNs. Approximately 920,000 will be distributed for free to pregnant women through antenatal care (ANC); and 80,000 ITNs will be distributed through 27 selected schools in the central, mid-west, north-west, and other high burden districts. With FY 2015 funds, PMI will procure 1,096,429 ITNs and distribute 908,776 ITNs through ANC/EPI clinics (83%), and 187,653 (17%) ITNs through primary school outlets. To ensure proper net usage, PMI will use mass media and community mobilization strategies to increase knowledge and promote proper and consistent use of ITNs. This effort, combined with Global Fund grants through the NFM, is expected to maintain high national ITN coverage and ownership that was achieved through the universal bed net coverage campaign (UBCC) of 2013/2014.

Indoor residual spraying (IRS): PMI supported spraying in ten northern districts with historically high malaria prevalence (Kitgum, Lamwo, Pader, Agago, Apac, Kole, Oyam, Gulu, Amuru, and Nwoya) during the 2014 calendar year, reaching over 850,000 households and protecting approximately 2.6 million people. With FY 2015 funds, PMI will continue the strategic shift started in FY 2014, changing the areas of IRS coverage based on the latest entomologic and malaria prevalence data from health management information system (HMIS) which show a lowered burden of vectors and disease in IRS areas. PMI will support implementation of IRS in nine eastern districts in Uganda which have not previously received IRS, protecting approximately 3 million residents. PMI will continue to monitor insecticide resistance and will use organophosphate insecticide (OP) to ensure insecticidal effectiveness. Additional focus on behavioral change communication (BCC) and malaria surveillance in former and new districts help ensure that there are no negative impacts from the changes.

Malaria in Pregnancy (MIP): With PMI technical support, coordination of MIP-related efforts has been improved between the Reproductive Health Division (RHD) and the NMCP, with the establishment of a national MIP working group. With FY 2015 funds, PMI will continue to support prevention of malaria through distribution of 908,776 ITNs, intermittent preventive treatment for pregnant women (IPTp), and early diagnosis and prompt treatment of MIP. PMI will also strengthen the coordination of ANC workers and continue to provide on-site training and supportive supervision related to MIP in the public and private sector. To increase uptake of IPTp, PMI will work through integrated projects that leverage resources available through the President's Emergency Plan for AIDS Relief (PEPFAR), that support scale up of prevention of mother-to-child HIV transmission (PMTCT). PMI will continue to provide clean water and drinking cups so that health workers can administer sulfadoxine-pyrimethamine (SP) at the clinic.

Case management: In the past year, PMI has worked to improve diagnostic capacity for malaria and effective case management of febrile illness in 49 districts through training of health care workers in malaria diagnosis and treatment. With FY 2015 funds, PMI will continue to support case management in the public and private sectors. PMI will also support integrated community case management (iCCM) in two districts through training, supervision, and commodities procurement. PMI, in collaboration with its partners, will promote the correct use of intravenous artesunate as the first-line of treatment for severe malaria. Additionally, with FY 2015 funds, PMI will continue to support the roll-out and use of rapid diagnostic tests (RDTs), strengthen quality assurance, and enhance supportive supervision within health centers. With additional resources from other USAID health programs and PEPFAR, PMI will continue to support strengthening the national pharmaceutical management system.

Monitoring and evaluation (M&E): Since 2005, PMI has supported the collection of high quality malaria surveillance data from sentinel sites. These sites have now been developed into a network of high quality data facilities known as the Uganda malaria surveillance network (UMSN). In FY 2015, PMI will continue to support malaria surveillance to cover a larger geographical area, including districts with changing malaria intervention strategies. UMSN consists of existing sentinel sites (three of six sentinel sites) as well as new malaria reference centers, which replaced the remaining sentinel sites, and expand to other districts. It is expected that three malaria reference centers can be supported for the cost of a single sentinel site while still maintaining data quality. Larger geographical coverage of high quality malaria surveillance data will assist PMI and the NMCP to evaluate the effect of interventions and better inform future strategy. PMI will continue leveraging the USG integrated health regional platform for health systems strengthening, and focus on improving the quality and NMCP use of malaria data. PMI will continue to support the national, regional, district, and health facility level health management information system (HMIS) activities including training health workers on the new HMIS tools and supportive supervision. PMI will continue capacity building in the NMCP M&E unit. In addition, PMI will support the dissemination of 2014 MIS.

Cross-cutting behavior change communication (BCC): With FY 2014 funds, PMI activities reached 4 million Ugandans with key malaria messages on the importance of net use, malaria testing, timely treatment, and prevention of malaria during pregnancy. The communication approaches included radio talk shows and radio spots, interpersonal communication, and educational activities in 610 schools. With FY 2015 funds, PMI will continue to support targeted and evidence-based BCC at the national, district, and community levels. PMI's BCC activities will encourage consistent and proper usage of ITNs, the importance of IPTp, timely testing of all fevers, and appropriate malaria treatment for confirmed cases. In addition, PMI will support communication on iCCM in districts where iCCM is being added. PMI will also enhance BCC activities in areas no longer receiving IRS to explain the rationale for the withdrawal and emphasize the need to sleep under nets.

Health systems strengthening and integration: In 2012, the Uganda parliament passed the Wage Bill as result of the efforts of USAID/Uganda's Human Resources for Health strengthening (HRH) activities, which are supported in part through PMI. This has increased the recruitment of staff with relevant professional backgrounds, especially at the health center III and IV levels. As a result, the retention rate of critical staff members at these facilities has increased from 53% in 2011 to 70% in 2013. However, these facilities still face low productivity among health workers and poor attendance. Furthermore, the challenge still remains to motivate recruited health workers who are posted in hard-to-reach areas. With FY 2015 funds, PMI, in collaboration with PEPFAR and other USAID health programs, will continue to support regions and districts to improve performance management, planning, staff training (pre-service and in-service), and service quality. It will also provide technical assistance to strengthen the national pharmaceutical supply chain system, financial management, and pharmaceutical policy in order to establish a transparent, well-performing logistics management system. PMI will also expand its support to ensure that private for-profit (PFP) facilities receive supportive supervision to strengthen licensing and services through drug shops.

II. STRATEGY

INTRODUCTION

Launched in 2005, the President's Malaria Initiative (PMI) began as a 5-year, \$1.2 billion expansion of United States Government's (USG) resources to reduce the intolerable burden of malaria and help relieve poverty on the African continent. A goal of PMI has been to reduce malaria-related deaths by 50% in 15 countries in Africa that have a high burden of malaria by expanding coverage of four highly effective malaria prevention and treatment measures. These interventions include insecticide-treated mosquito nets (ITNs), indoor residual spraying (IRS) with insecticides, intermittent preventive treatment for pregnant women (IPTp), and prompt use of artemisinin-based combination therapies (ACTs) for the treatment of malaria.

The 2008 Lantos-Hyde Act authorized an expanded PMI program for 2009-2013. As a result, PMI's strategy was revised to achieve Africa-wide impact by halving the burden of malaria in 70% of at-risk populations in sub-Saharan Africa – or approximately 450 million people.

Through the Global Health Initiative (GHI) and PMI, the USG is committed to working closely with host governments and within existing national malaria control plans. Efforts are coordinated with other national and international partners, including the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), Roll Back Malaria (RBM), the World Bank Malaria Booster Program, and the non-governmental and private sectors, to ensure that investments are complementary and that RBM and Millennium Development Goals are achieved.

The FY 2015 Malaria Operational Plan (MOP) presents a detailed implementation strategy for the tenth year of PMI in Uganda, based on PMI's multi-year approach and the draft six-year Uganda Malaria Reduction Strategy (UMRS). It was developed in consultation with the Uganda National Malaria Control Program (NMCP) and stakeholders supporting Uganda malaria prevention and control activities. The activities included in the FY 2015 MOP support the 2014-2020 UMRs, and build on investments made by PMI and other partners to improve and expand malaria-related services and capacity. This document briefly reviews the current status of malaria control policies and interventions in Uganda, describes progress to date, identifies challenges and unmet needs, and provides a description of planned FY 2015 activities. The total amount requested for PMI in Uganda in FY 2015 is \$33 million.

USAID/Uganda's Country Development Cooperation Strategy reflects President Obama's new U.S. Global Development Policy. The strategy coordinates other USG activities within the context of host country and other donor activities. The Presidential Initiatives currently underway in Uganda are: PMI, President's Emergency Plan for AIDS Relief (PEPFAR), GHI, the Global Climate Change Initiative, and Feed the Future.

All Presidential Initiatives and other health and education programs under USAID Uganda Development Objective 3 (DO3) —“*improved health and nutrition status in focus areas and population groups*” — are linked by the common goal of transitioning Uganda to a modern and prosperous country. While each of the Presidential Initiatives, including PMI, has critical goals and objectives that the USAID Mission in Uganda is committed to achieving, DO3 also prioritizes the cross-cutting goals of the Mission: strategic integration of health services, strengthening health systems, supporting decentralized social sector services, engaging the private sector and civil society, and increased civic engagement and advocacy at

the community level. Implemented activities aimed at reaching these goals will help the government and private sector tackle the heavy disease burden, malnutrition, and unmet family planning needs by improving health service delivery systems. These USAID Mission priorities carried out by DO3 seek to ensure a contextually appropriate approach to health and development in Uganda. Collective and collaborative engagement of five Presidential Initiatives under the GHI framework will accelerate the achievement of specific PMI goals and objectives. A large part of the strategy will rely on strengthening the health systems that underlie service delivery with the overall aim of achieving the public health objective of morbidity and mortality reduction among the Ugandan population.

MALARIA SITUATION IN UGANDA

Uganda has the third highest number of deaths from malaria in Africa, and some of the highest reported malaria transmission rates in the world^{2,3}. Malaria accounts for 30%-50% of outpatient visits and 15%-20% of hospital admissions^{4,5}.

Uganda has stable, perennial malaria transmission in 90–95% of the country. In the rest of the country, particularly in the highland areas, there is low and unstable transmission with potential for epidemics. The areas of transmission are divided into four malaria risk zones based on the *Plasmodium falciparum* parasite rate in children 2-10 years of age (*PfPR*₂₋₁₀) and the Malaria Atlas Project (MAP) 2010 data as a proxy measure of relative malaria risk. The *PfPR*₂₋₁₀ values for Uganda range from 2.1% to 67.4% with a mean of 40%. These data are consistent with the malaria prevalence in the 2009 Uganda Malaria Indicator Survey (MIS). The four risk zones are: areas with *PfPR*₂₋₁₀ values below 2.0% are classified as having little to no malaria, areas with *PfPR*₂₋₁₀ values ranging from 2% to 25.0% are lower risk, *PfPR*₂₋₁₀ values from 25.1% to 50.0% are medium risk zone, while values greater than 50% are higher risk zones.

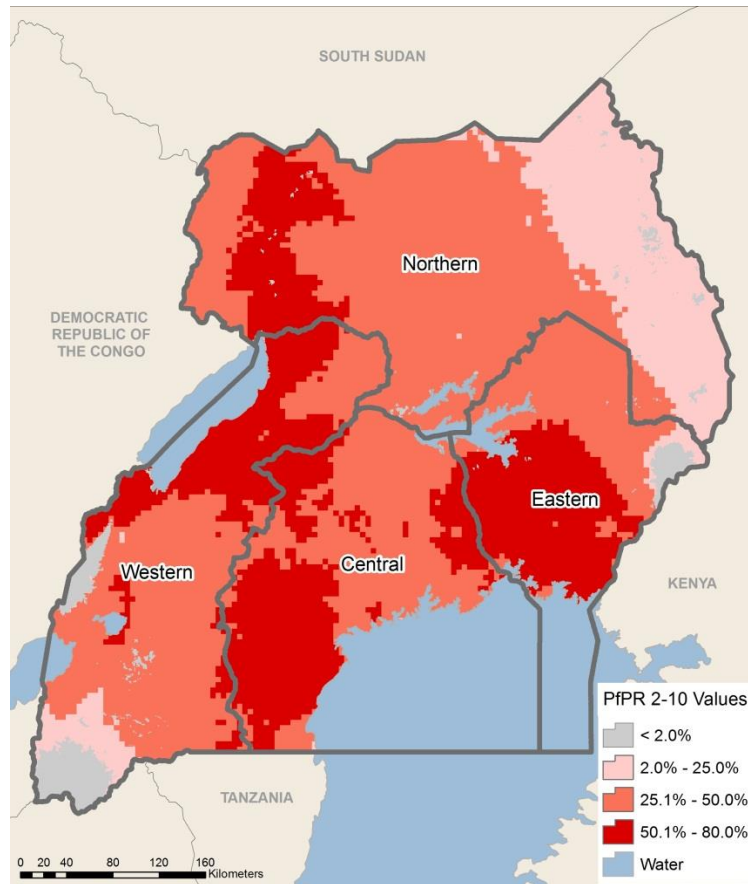
² World Health Organization (2013): World Malaria Report. Geneva: WHO.

³ Okello PE, Van Bortel W, Byaruhanga AM, Correwyn A, Roelants P, et al. (2006) Variation in malaria transmission intensity in seven sites throughout Uganda. *Am J Trop Med Hyg* 75: 219-225.

⁴ Yeka A, Gasasira A, Mpimbaza A, Achan J, Nankabirwa J, et al. (2012) Malaria in Uganda: challenges to control on the long road to elimination: I. Epidemiology and current control efforts. *Acta Trop* 121: 184-195.

⁵ Ministry of health /health management information system, 2012

Figure 1: Malaria Endemicity in Uganda, 2010



Source: Malaria Atlas Project 2010

The most common malaria vectors are *Anopheles gambiae s.l.* and *An. funestus*. *Anopheles gambiae s.l.* is the dominant species in most places, while *An. funestus* is generally found at sites having permanent water bodies with emergent vegetation and during the short dry seasons. In some areas of Northern Uganda, such as Apac and Oyam, *An. funestus* is the most common vector that feeds primarily on humans and also takes blood meals from domestic animals. *Anopheles gambiae* and *An. funestus* feed and rest indoors, making ITNs and IRS viable vector control strategies. Recently, *An. arabiensis* has been found in northern and eastern Uganda, having been identified from *An. gambiae s.l.* samples^{6,7}. *Anopheles arabiensis* tends to bite earlier in the evening than *An. gambiae*, feeds on domestic animals, and remains outdoors more often than *An. gambiae*.

The Uganda MIS, conducted in late 2009, showed that *Plasmodium falciparum* is the species responsible for 99% of malaria cases. *Plasmodium malariae* accounts for 0.2% of cases as a single-infection, but is more commonly found as a mixed infection with *P. falciparum* (up to 2.7% of childhood infections in highly endemic areas). Both *P. vivax* and *P. ovale* are rare and do not exceed 2% of malaria cases in Uganda.

⁶ Mawejje et. al (2012). Insecticide resistance monitoring of field-collected *Anopheles gambiae s.l.* populations from Jinja, eastern Uganda, identifies high levels of pyrethroid resistance. Med Vet Entomol 27:276-283.

⁷ Hoel, Okia, unpublished findings from Apac District, 2012.

Malaria prevalence among children 0 to 59 months of age by microscopy in the 2009 MIS was 42%. Prevalence was higher in rural areas than in urban areas (47% vs. 15% by microscopy) and ranged from 63% in the mid-northern region to 5% in Kampala. Survey data indicated that anemia is also a significant public health problem in Uganda. Sixty percent of Ugandan children 0 to 59 months of age are anemic (hemoglobin < 11 g/dL): 21% are mildly anemic (10.0–10.9 g/dL), 30% are moderately anemic (8.0–9.9 g/dL), and 10% are severely anemic (< 8.0 g/dL). Figure 1 shows the percentage of children 0–59 months of age testing positive for malaria with microscopy (with anemia rates in parentheses). This will be updated when the results of MIS 2014 are available in June 2015.

COUNTRY HEALTH SYSTEM DELIVERY STRUCTURE AND MINISTRY OF HEALTH (MOH) ORGANIZATION

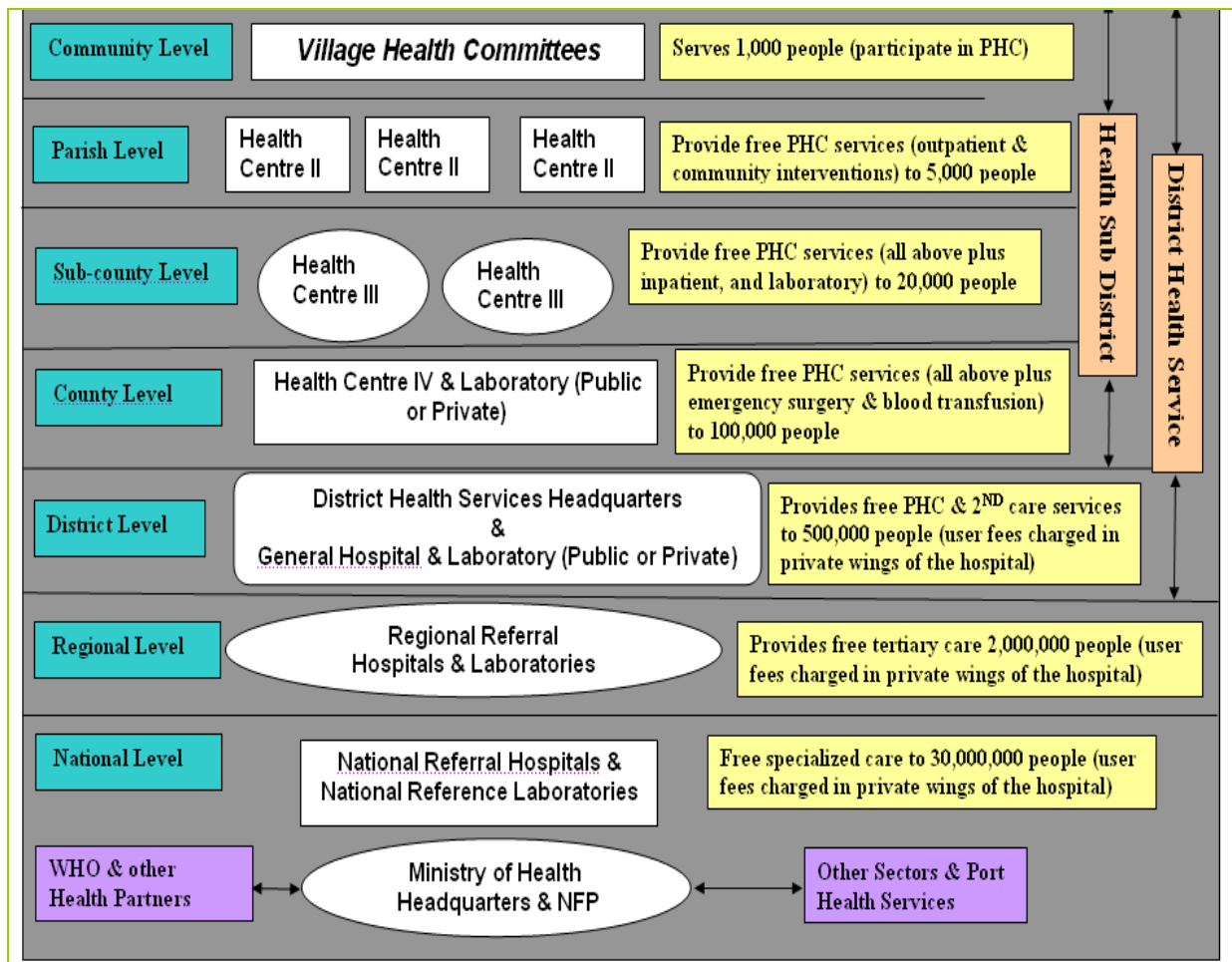
The National Health System (NHS) in Uganda is made up of the public and the private sectors. The public sector includes all Government health facilities under the Ministry of Health (MOH), health services of the Ministries of Defence (Army), Internal Affairs (police and prisons) and Ministry of Local Government. The private health delivery system consists of private health practitioners (PHPs), private-not-for-profit (PNFPs) providers and the traditional and complementary medicine practitioners (TCMPs). The MOH has four levels of administration: the national, regional, district, and county levels. The central level includes the National Directorate of Public Health of the Ministry of Health (which houses the NMCP), where national guidelines and norms are promulgated.

The MOH provides leadership for the health sector and is responsible for overseeing the delivery of curative, preventive, palliative, and rehabilitative services to the people of Uganda. The provision of health services in Uganda has been decentralised with districts and health sub-districts (HSDs) playing a key role in the delivery and management of health services at district and health sub-district levels, respectively. Unlike other countries, Uganda does not have an intermediate administrative level (e.g., provincial or regional). The health services are structured into National Referral Hospitals (NRHs) and Regional Referral Hospitals (RRHs), general hospitals, and health centres (HC) IVs, IIIs and IIs. The HC I does not have a physical structure but rather consists of a team of people—Village Health Teams (VHT) —that links health facilities with the community. These VHT networks facilitate health promotion, service delivery, and community participation in access and utilization of health services.

HC IIIs provide basic preventive and curative care while also providing supportive supervision to the community and HC IIs under their jurisdiction. There are provisions for laboratory services for diagnosis, maternity care, and first referral cover with inpatient capacity for the sub-county. The HC IIs provide the first level of interaction between the formal health sector and the communities. HC IIs only provide outpatient care and community outreach services, and nurses are key to the provision of comprehensive services and linkages with the VHT.

Although VHTs are playing an important role in health care promotion and provision, VHT coverage is still limited. VHTs have been established in 75% of the districts in Uganda but only 31% of the districts have trained VHTs in all the villages. Attrition is high among VHTs.

Figure 2: The organization of health services in Uganda



UPDATES IN MOP STRATEGY

Over the past year, major changes to the Uganda MOP Strategy included:

- The new Uganda Malaria Reduction Strategy (UMRS) 2014-2020
- Completion of universal bed net coverage campaign (UBCC), and
- The proposed elevation of Uganda's NMCP division to the Uganda Malaria Commission (UMC) within the MOH.

MALARIA CONTROL STRATEGY FOR UGANDA

The Uganda NMCP recently carried out a midterm review of the 2010–2015 national malaria control strategic plan and subsequently prepared a six-year UMRS (2014–2020). The UMRS calls for a rapid and synchronized nationwide scale-up of cost effective interventions to achieve universal coverage of malaria prevention and treatment. The UMRS was developed by a government-led consortium of major donors including PMI and implementing partners.

The UMRS will be funded by the Government of Uganda (GOU) with assistance from donors. As part of the proposed UMRS, the current NMCP division within the MOH will be elevated to the level of a commission and will be known as the Uganda Malaria Commission (UMC). The role of the NMCP at the central level will continue to support the implementation of the UMRS through policy formulation, setting standards and quality assurance, resource mobilization, capacity development and technical support, malaria epidemic identification and response, coordination of malaria research, and monitoring and evaluation (M&E). The UMRS calls for vector control through IRS, ITNs, and larviciding according to the WHO guidelines, prevention of malaria in pregnancy (MIP) through ITNs and IPTp, effective case management including parasite-based diagnosis and treatment with ACTs, and M&E of all components of the program.

INTEGRATION, COLLABORATION, AND COORDINATION

Over the years, as the malaria control activities in Uganda have been successfully implemented and the NMCP has benefited from increasing support from various partners. These include:

- The Global Fund, which currently focuses its resources for Uganda on the procurement of malaria commodities. Global Fund funding supported the procurement and distribution of 15.5 million long-lasting insecticide-treated nets (LLINs), ACTs, and rapid diagnostic tests (RDTs) for treatment and diagnosis of malaria in 2013/2014. In addition, Uganda has had three active Global Fund grants which are due to expire in December 2014 that provided ACTs to the public and PNFP sector, support for integrated community case management (iCCM), procurement of microscopes and scale-up of RDTs, routine distribution of ITNs through antenatal care (ANC) and Expanded Program on Immunization (EPI) clinics, behavior change communication activities (BCC), support for strengthening the health management information system (HMIS), drug and insecticide resistance monitoring, health facility surveys, and basic program support to the NMCP.
- The United Kingdom's Department for International Development (DFID) made a commitment in 2010 to significantly increase support for health and malaria control specifically in Uganda. DFID funds supported the procurement and distribution of ITNs for the 2013/14 universal coverage campaign and commodity surveillance program through PMI's implementing partners. In 2014, a special arrangement on between USAID and DFID allowed the use of PMI's funding mechanisms and implementing partners to scale-up its contribution to malaria control program in Uganda.
- World Health Organization (WHO)/Uganda provides M&E technical assistance.
- United Nations Children's Fund (UNICEF)/Uganda is supporting activities related to iCCM in 40 districts and strongly advocates for scaling up at the national level.
- Clinton Health Access Initiative (CHAI) had provided technical support to the Affordable Medicine Facility for Malaria (AMFm) to expand access to malaria treatment by increasing the market penetration of ACTs. Currently, CHAI is providing technical assistance to the NMCP to develop a strategy for effective case management including diagnosis and appropriate treatment with an ACT in both the public and private sectors in Uganda.

PMI GOALS, TARGETS, AND INDICATORS

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

- >90% of households with a pregnant woman and/or children under five years of age will own at least one ITN;
- 85% of children under five years of age 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 years of age will have slept under an ITN the previous night or in a household 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.

PROGRESS ON COVERAGE AND IMPACT INDICATORS

Table 1 shows coverage and impact data from the 2011 Uganda Demographic and Health Survey (DHS) and the 2009 MIS. The next MIS is planned for November 2014.

Table 1: Coverage and Impact from DHS (2011) and MIS (2009)

Indicator	Baseline (2006 DHS)	MIS (2009)	DHS (2011)
Percentage of households that own at least one ITN	16%	47%	60%
Proportion of children under five years of age sleeping under an ITN the previous night	10%	33%	43%
Proportion of pregnant women sleeping under an ITN the previous night	10%	44%	47%
Proportion of pregnant women who received at least two doses of IPTp during ANC	16%	32%	25%
Prevalence of parasitemia (by microscopy) in children 0–59 months	N/A	42%	N/A
Prevalence of anemia in children 0–59 months (Hgb <10.9g/dl) ^{8,9}	N/A	62%	50%
Prevalence of severe anemia in children 0–59 months (Hgb < 8 g/dl)	N/A	10%	3%

OTHER RELEVANT EVIDENCE ON PROGRESS

Northern Region Community Surveys

In 2010/2011, small-scale community-based surveys were conducted in northern Uganda with support from PMI. The surveys assessed the incremental benefit of IRS (carbamates) on prevalence of anemia and parasitemia. The data from two districts that received IRS (Apac and Pader) were compared to a district that has not received IRS (Lira). All three districts received a similar level of support for the distribution of ITNs and for implementing malaria case management. The results of these surveys showed that among children under five years of age, prevalence of anemia (Hgb <11.0 g/dL) was 39% in Apac (IRS), 37% in Pader (IRS), versus 53% in Lira districts (no IRS). Similar differences were found in parasite prevalence with 37% in Apac, 17% in Pader, versus 50% in Lira.¹⁰

A northern region ITN survey showed an increase in household ownership of least one ITN from 24% in 2009 to 63% in 2013 and usage among children under five years of age from 11% to 43%. DHS results from 2011 also supported these findings, as household ownership of at least one ITN at the national level was 60% and ITN use in children under the age of five the previous night among households with at least one ITN was 43%.

⁸ Roll Back Malaria, MEASURE Evaluation, USAID, UNICEF, World Health Organization, MACEPA, CDC. Guidelines for Core Population-Based Indicators. MEASURE Evaluation: Calverton, MD.

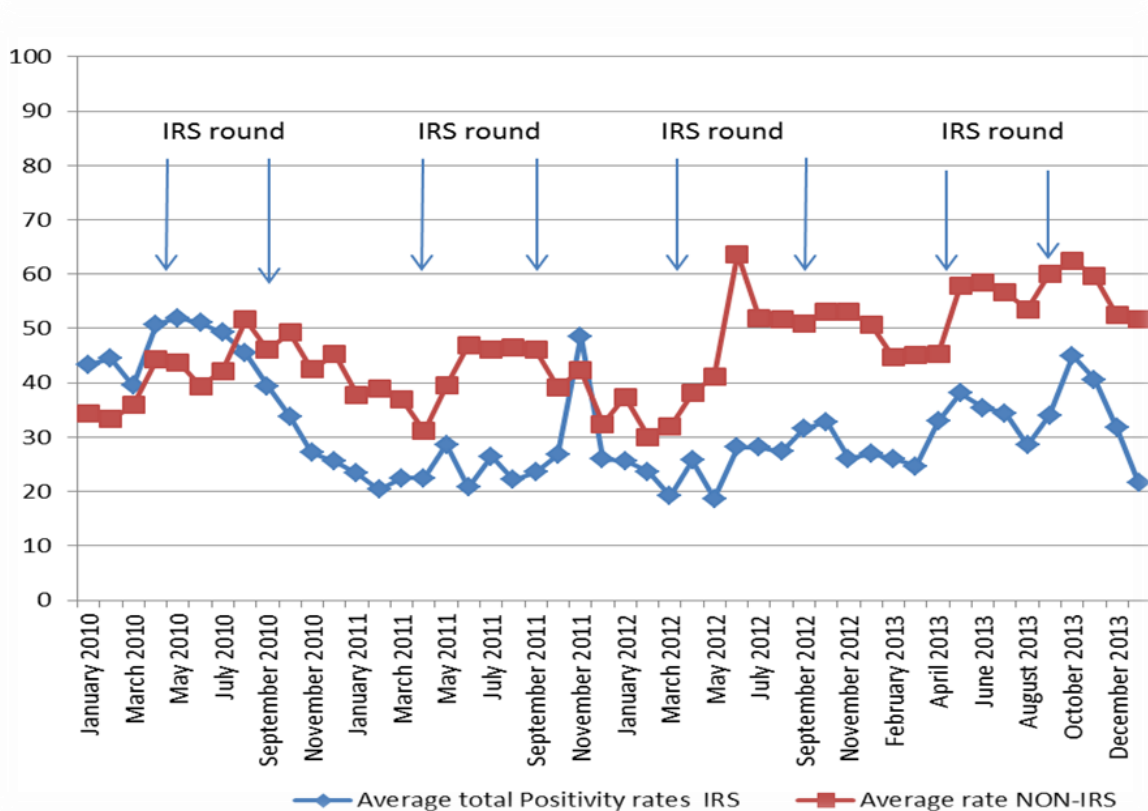
⁹ The 5th percentile from the third National Health and Nutrition Examination Survey for a healthy population (CDC, 1998) prevalence of anemia, based on hemoglobin levels, Women and children with <7.0g/dl of hemoglobin have severe anemia, women and children with 7.0 – 9.9g/dl have moderate anemia, and non-pregnant women with 10.0– 11.9g/dl and children and pregnant women with 10.0 – 10.9g/dl have mild anemia

¹⁰ Steinhardt LC, Adoke Y, Nasr S, Wiegand RE, Rubahika D, Serwanga A, Wanzira H, Lavoy G, Kanya M, Dorsey G, Filler S: The effect of indoor residual spraying on malaria and anaemia in a high transmission area of Northern Uganda. *Am Trop Med Hyg* 2013, 88:855-861 doi:10.4269/ajtmh.12-0747.

Sentinel Sites in Apac District

Data from sentinel surveillance sites in Apac District, where some of the highest rates of malaria transmission have been recorded, shows that IRS in combination with support for case management and ITN use have contributed to lower rates of slide positivity among patients presenting to the sentinel site health facility compared to the non-IRS district Lira (see Figure 3).

Figure 3: Malaria Test Positivity Rate in IRS & Non-IRS Districts, Jan 2010–Dec 2013



Based on these findings as well as more recent data (see IRS section), the FY 2015 MOP proposes a shift in IRS coverage away from the ten previous northern IRS districts to new districts in the eastern and central eastern regions. In the districts where IRS is ending, additional emphasis on ITN ownership (over 80%), correct use of nets, and proper case management will be made along with enhanced malaria surveillance.

Pyrethroid Resistance Management Study

The Pyrethroid Resistance Management Study is a retrospective cohort study on pyrethroid resistance in three different pyrethroid use zones across nine districts in Uganda. The aim of the study is to support the NMCP to gain an in-depth understanding of the threat posed by insecticide resistance, its impact, and factors that contribute to its spread as well as its management. This information will be used by the NMCP to develop practical approaches to counter the insecticide resistance problem in order to prolong the useful life of effective vector control interventions such as IRS and LLINs. Data analysis for this study is underway and final results are expected in May 2014.

Beyond Garki Project

The Beyond Garki Project is monitoring changes in malaria epidemiology in relation to available interventions in western and northern Uganda. The purpose of this study is to support the MOH and the District Health Management Teams (DHMTs) in Kyankwanzi and Apac Districts to monitor the changing malaria epidemiology within the context of multiple interventions and assess the conditions necessary to reduce transmission below the critical level. This study is an analytical cross-sectional survey, conducted repeatedly through continuous, longitudinal collection of climatic data, morbidity data at health facilities, household, malariometric and serological data, therapeutic efficacy studies, and entomological data. Data collection, entry and cleaning for the first three rounds are complete. Data analysis for these rounds is underway but at different stages and results are expected in July 2014.

Malaria RDT Study

In collaboration with Foundation for Innovative New Diagnostics Project and with support from Malaria Consortium's Pioneer Project, Malaria Consortium is evaluating the use, utility, and acceptability of positive control wells for malaria RDTs in two malaria-endemic districts (Kiboga and Kyankwanzi). The study will guide the implementation strategies for positive control wells and results of this trial are expected in May 2014.

IPTp2 Study

In light of the low uptake of two doses of IPTp (IPTp2) observed nationally, Malaria Consortium is conducting a study to assess the barriers to IPTp2 uptake. The project aims to: 1) identify barriers to IPTp uptake in Uganda; and 2) develop a set of recommendations, including a potential intervention, which will improve uptake of IPTp2 and enable the Uganda NMCP to meet the goal of 85% coverage of IPTp2. This study is in early stages

UGANDA IMPACT EVALUATION

The Uganda Impact Evaluation covering the period from 2000 to 2011 showed a substantial decrease in the proportion of children 6-59 months old with severe anemia (16.7% to 4.7%) All-cause under-five mortality declined from 137/1,000 (DHS 2006) to 90/1,000 (DHS 2011) The evaluation concluded that since substantial increase in malaria intervention coverage occurred during this time, malaria interventions could have contributed to the observed decline in under-five mortality, taking into account other factors that could also have contributed to the observed reduction: vitamin A supplementation for both mothers and children, increased deliveries in health facility, and increase in measles vaccination.

CHALLENGES, OPPORTUNITIES, AND THREATS

Over the past decade, there has been a deliberate effort by the NMCP to improve their approach to malaria control and reduce the disease's impact on the Ugandan population. While a lot has been achieved, there are notable weaknesses in the implementation of the current malaria strategies which, if unaddressed, would impede progress in reducing the malaria burden in Uganda. These challenges include:

- **Vector resistance to insecticide:** Vector resistance to insecticides is recognized as an issue in Uganda and may compromise the overall vector control program if not carefully addressed. Unfortunately, the NMCP has no established capacity for entomologic surveillance, including insecticide susceptibility. The NMCP also has limited capacity to oversee and coordinate large-scale IRS operations.
- **Low IPTp uptake:** Although the IPTp policy has been in place for more than ten years, the MIS indicates that only 45% of pregnant women received one dose of sulfadoxine-pyrimethamine (SP) and only 33% received two or more doses. Given that ANC attendance is high with 94% of women making at least one visit, IPTp rates should be much higher. Contributing to the low IPTp uptake is the high staff attrition rate, late attendance at ANC, and the perception by some women that the medications can harm the fetus. Additionally, a lack of clean water and drinking cups limit the provision of directly observed treatment (DOT) for IPTp.
- **Poor case management and delayed treatment:** Uganda's case management strategy is to confirm all suspected cases of malaria with RDTs or microscopy and to treat confirmed malaria cases with ACTs while further diagnosing negative malaria cases for other possible causes of fever. However, in many instances, malaria cases that have been confirmed not to be malaria are still treated with antimalarials. Additionally, there have been some instances where there have been significant delays in treating confirmed malaria cases.
- **Low position of the NMCP in the MOH structure:** The Program Manager is four steps below the Technical Head of the Ministry and five steps below the Accounting Officer, resulting in restricted decisionmaking authority on all matters including policy, technical direction, and resource allocation.
- **Inadequate space and staffing of the NMCP.**
- **Inadequate NMCP budget allocation and over-reliance on partners:** The NMCP is under-funded by the GOU and is therefore over-reliant on the funding and technical assistance from partners to implement malaria activities.
- **Anti-homosexual Act (AHA):** The 2014 passage and signing of the Anti-Homosexuality Bill in Uganda has led to a reexamination of the USG's relationship with the GOU, including the MOH. While the review is ongoing, PMI continues to comply with the USG's current interim measures. PMI will ensure that FY 2015 MOP activities are adjusted and comply with the USG's final assessment following the completion of the review.

- **Security Challenges:** The recent security challenges in neighboring countries have prompted security alerts among security personnel in Kampala.

PMI SUPPORT STRATEGY

PMI supports the implementation of the NMCP strategy at national level, while focusing its support on the district strategic plans.

In FY 2015 PMI will leverage the USG's regional integration strategy in Uganda to strengthen and improve service delivery through continuing to build capacity of NMCP by:

- Strengthening regional/district level technical capacity;
- Ensuring that correct and consistent use of net and net culture improves after the 2013/2014 UBCC, through support to routine and continuous ITN distribution via ANC/EPI and school outlets, social marketing of nets at a subsidized price, and promoting correct use of ITNs at household level;
- Refocusing IRS strategy to reflect the current risk of malaria by targeting higher transmission districts. After reducing the prevalence of malaria in ten high burden northern districts, there will be strategic shift toward high burden eastern and east central districts with persistently high malaria prevalence rates (Figures 3, 4, and 5);
- Building on initial experience to support one additional iCCM district with an increased emphasis on BCC, supportive supervision, and monitoring and evaluation;
- Implementing additional monitoring and BCC activities in areas where PMI's intervention strategy is changing;
- Improving malaria disease surveillance to provide evidence for malaria control strategy;
- Increasing the geographical scope of improved malaria surveillance by transitioning select existing sentinel surveillance sites to malaria reference centers;
- Supporting operations research activities to identify gaps in the intervention strategy and to monitor the effectiveness of the changes to the strategy;
- Engaging the newly instituted regional performance monitoring teams to improve supportive supervision and QA/QC; and
- Focusing on USG program implementation monitoring to ensure investments are delivering expected results.

III. OPERATIONAL PLAN

INSECTICIDE-TREATED NETS

NMCP/PMI Objectives

One of the key objectives of the new UMRS 2015-2020 is to ensure that at least 80% of the Uganda population consistently uses at least one malaria intervention. This includes achieving and sustaining universal net coverage, which is defined as one net per two people, and a strong, multi-pronged BCC approach to increase usage. This policy aligns with PMI's targets of achieving 85% of all households owning at least one ITN and 85% of children under five years of age and pregnant women sleeping under an ITN every night.

Progress since PMI launch

Since 2006, PMI has procured and distributed more than 108 million ITNs, mainly to pregnant women and children under five years of age through mass net distribution campaigns, ANC clinics, non-governmental organizations (NGO), and civil society organizations. Simultaneously with the Global Fund's mass net campaign, PMI has funded routine net distribution through ANC clinics to ensure ITN coverage in the most vulnerable populations. PMI has also supported behavior change and communication (BCC) efforts to increase demand for and promote correct use of ITNs. This effort, combined with ITNs supported by the Global Fund and DFID, is expected to increase national household ownership of ITNs to over 80% in 2014.

Progress during the last 12 months

In the past year, Uganda has seen significant improvements in ITN ownership. The UBCC, which started in October 2013, successfully distributed 21 million LLINs and was completed in May 2014. Numerous donors contributed nets to the UBCC including the Global Fund with 15.5 million, DFID with 4.45 million, PMI with 550,000, and World Vision with 500,000. The GOU also contributed to the UBCC by providing paid military staff and police to ensure the nets reached their intended distribution sites from the central warehouses.

In FY 2013/2014, PMI procured 6.2 million ITNs, of which 5.2 million were funded by DFID through existing PMI implementing partners. At the request of the NMCP/MOH and donors (Global Fund, DFID, WHO, and World Vision), PMI managed all ITN distribution and operational costs of the campaign. As lead partner in the campaign, PMI has mobilized 890 district leaders, 5,933 sub-county leaders, and 16,415 community leaders to provide support for the net distribution. PMI also trained 488 district task force members, 804 sub-county supervisors, and 32,830 VHTs to oversee and undertake the distribution activities.

The door-to-door approach that was used during the campaign significantly increased net ownership throughout Uganda. The 2014 MIS is expected to provide updated data on net ownership and use in Uganda. The Uganda national census planned for August 2014 has included questions on net ownership and is expected to complement the 2014 MIS findings.

With the UBCC completed, the NMCP's goal is to maintain high net coverage and proper net use. This will be accomplished by implementing a continuous distribution system that employs different approaches and a range of delivery channels including: 1) free LLIN distribution through ANC and EPI clinics; 2) free LLIN distribution through selected schools;

3) sale of subsidized LLINs through the private sector (social marketing); and 4) commercial sale of LLINs at full cost.

PMI and other donors will be providing technical assistance to the NMCP as well as additional financial and material resources to support the post ITN campaign monitoring. The surveillance systems will monitor for net attrition/survivorship, physical integrity, and insecticidal activity at 6, 12, 24, and 36-month intervals.

Table 2: ITNs Gap Analysis

Year	2014	2015	2016	2017
Total Estimated Population	35,764,560	37,016,320	38,311,891	39,461,248
Coverage of net through ANC/EPI	100%	100%	100%	100%
Required ITNs-				
Number of ITNs required through ANC	1,788,228	1,850,816	1,915,595	1,973,062
Number of ITNs required through EPI	1,430,528	1,480,653	1,532,475	1,578,445
Number of ITNs required through Schools (2014-17)	80,000	187,653	350,000	600,000
Total ITNs required for 2013/14 universal net coverage (mass campaign)	23,400,000	-	-	-
A-Total ITNs required both for routine and campaign	26,698,756	3,519,122	3,798,070	4,151,507
Available ITNs through partners' contributions				
Total ITNs funded for 2013/14 universal net coverage by 1. PMI/DFID (5 million), 2. GF (15.5 million), and 3. World Vision (0.5 million)	21,000,000	-	-	-
ITNs funded by PMI/DFID through ANC/EPI and schools (available for FY 2014 and projected for FY 2014-2017)	1,200,000	1,096,429	1,000,000	1,000,000
ITNs funded by Global Fund GF ANC/EPI	980,400	500,000	500,000	500,000
B-Total ITNs Available funded by donors and for universal coverage (2014), ANC/EPI and schools (2014-2017)	23,180,400	1,596,429	1,500,000	1,500,000
Gap A-B	3,518,356	1,922,693	2,298,070	2,651,507

Note: Coverage of net through schools (2014-2017).

- 1) 27 schools (3000 ITNs/school) in 2014
- 2) 63 schools (3000 ITNs /school) in 2015
- 3) 117 schools (3000 ITNs /school) in 2016
- 4) 200 schools (3000 ITNs /school) in 2017

Plans and Justification

Efforts to maintain universal coverage will be supported by PMI through routine distributions at ANC/EPI clinics, which will complement routine distribution planned through the Global Fund Round 10 grant. PMI will also continue to pilot a school-based continuous distribution strategy in a limited number of hard-to-reach and very remote districts in the eastern region and provide guidance to the NMCP on potential alternative distribution channels. The approach will be defined in collaboration with the NMCP to ensure that the pilot will provide useful information for the development of an overall continuous distribution strategy. To date, PMI has been the only partner providing nets to ANC clinics. In the Global Fund Round 10 application, there is a plan to distribute nets through both ANC and EPI. PMI will continue its efforts to increase net usage through BCC at the community, school, and health facility levels.

Proposed PMI activities with FY 2015 funding: (\$7,172,500)

PMI will support the efforts to maintain the high net ownership through continuous distribution systems. These efforts will complement the planned ITN distribution through the Global Fund's New Funding Model (NFM). PMI will also continue to support BCC to increase correct and consistent net usage through various communication channels including community meetings held at schools and local health facilities. In addition, the findings from two evaluations on the culture of net use, care, and repair will be incorporated into the BCC activities to improve net usage and longevity. The results will be available in mid-2014.

PMI and DFID will procure at least one third of the gap (see Table 2) each year until 2017 for routine and continuous distribution of nets to maintain high ITN ownership.

Planned activities with FY 2015 funding will include:

- **Procurement of ITNs:** PMI will procure approximately 1,096,429 ITNs for distribution through ANC/EPI services (83%), and schools (17%). Costs include the procurement, transportation, country clearances, and warehousing. (\$5,372,500)
- **Distribution of free ITNs through ANC/EPI clinics:** PMI will target pregnant women by distributing 908,776 free ITNs via ANC/EPI clinics in over 60 districts. (\$1,408,050)
- **Distribution of free ITNs through 63 primary schools:** 187,653 ITNs will be available through schools in hard to reach remote areas of PMI districts where there are NOT health centers in proximity. One school staff member will be assigned at each school to manage the distribution of the ITNs according to specific guidelines. The policy has not been finalized but it will consider distribution strategies such as providing nets: 1) via schools as distribution sites in hard to-reach areas without a nearby health center ; 2) to those who have a newborn at home and new residents in the community; and 3) to pregnant women who cannot access health centers due to distance and other factors. Each target school will distribute 3,000 ITNs per year. The schools will serve as distribution points of ITNs for continuous distribution and for promotion of consistent and correct use of ITNs. (\$391,950)

- **BCC on net utilization:** Upon completing the UBCC, robust BCC efforts are necessary to ensure appropriate and increased net usage. In addition, the results from the two ongoing culture studies on net use, care, and repair will be available in July 2014 and will be incorporated into new BCC activities. With FY 2015 funds, PMI will support community, school, and health facility level BCC activities. (see BCC section for details on activities and funding)
- **Monitoring net durability after mass distribution** (see M&E section for details on activities and funding)

INDOOR RESIDUAL SPRAYING

NMCP/PMI Objectives

The GOU is revising its vector control strategy and the NMCP is urging the GOU to support IRS in 50 districts in the coming years. IRS is a central intervention in the NMCP's efforts to combat malaria in Uganda, as evidenced by GOU's contribution of approximately 3 billion Ugandan Shillings (\$1.2 million USD) to IRS in 2012. The NMCP has committed to spraying two districts in FY 2014 along with the spraying of nine districts supported by PMI and another five supported by DFID. The NMCP has urged PMI to shift IRS coverage from northern Uganda to the eastern and east central districts that have high parasitemia rates and have never received IRS.

Progress since PMI launch

IRS is a proven intervention and a key component of the NMCP's malaria control strategy. In Uganda, pilot IRS projects began in urban areas, particularly Kampala in the 1940s with dramatic reduction of disease transmission.¹¹ However, IRS was only sporadically used through the 1960s. In 2006, PMI supported a large-scale IRS program in the epidemic-prone southwestern highland district of Kabale and achieved good coverage and impact results. The following year, PMI shifted operations to Kabale's high-risk sub-counties and extended support to the neighboring district of Kanungu and four northern districts (Kitgum, Pader, Gulu, and Amuru Districts) to protect large populations of internally displaced persons.

Since 2009, PMI has concentrated its support for IRS in ten northern districts: Kitgum, Agago, Lamwo, Pader, Amuru, Nwoya, Gulu, Oyam, Kole, and Apac (Table 3). Targeted household coverage has been consistently high (above 90%). IRS transitioned to carbamate insecticides in 2010 due to the emergence of widespread pyrethroid resistance. Resistance to carbamate insecticides was detected in three of six survey sites during the 2011 and 2013 national surveys, prompting a change to an organophosphate (OP) insecticide for the 2015 spray season.

¹¹ WHO for Africa. 2007. Implementation of Indoor Residual Spraying of Insecticides for Malaria Control in the WHO African Region Report. Vector Biology and Control Unit Division of Healthy Environments and Sustainable Development.

Malaria data from PMI-supported sentinel sites and other government facilities have also shown downward trends of malaria cases. As further evidence of the impact of IRS in Uganda, the 2011 anemia and parasitemia survey comparing IRS to non-IRS districts showed significant improvements in both parasitemia (45% reduction) and anemia (32% reduction) in the IRS districts.¹⁰

Table 3: Uganda IRS Activities, Districts, and Insecticide Class

Year	Number of Districts Sprayed	Insecticide Used	Number of Structures Sprayed	Coverage Rate	Population Protected
2006	1	Pyrethroid	103,329	96%	488,500
2007	5	Pyrethroid	446,117	98%	1,866,000
2008	6	DDT, Pyrethroid	416,452	93%	1,545,100
2009	10	Pyrethroid	850,000	95%	3,000,000
2010	10	Pyrethroid, Carbamate	890,000	95%	3,000,000
2011	10	Carbamate	850,000	95%	3,000,000
2012	10	Carbamate	850,000	95%	3,000,000
2013	10	Carbamate	850,000	90%	2,600,000
2014*	9	Carbamate/OP	850,000	90%+	3,000,000
2015**	9	Organophosphate		95%+	3,000,000

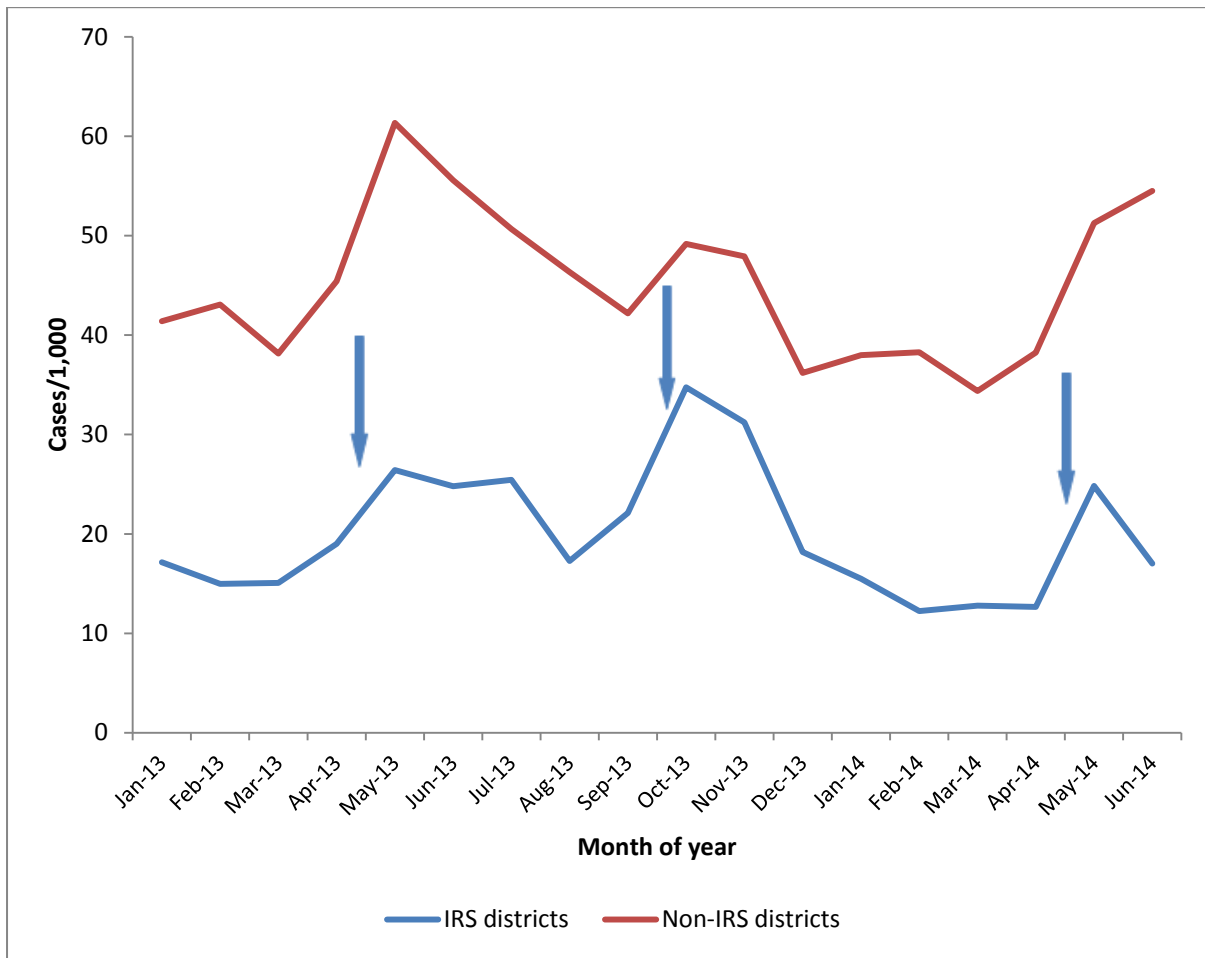
*Represents targets based on the draft 2014 IRS work plan.

** Represents projected targets

Progress during the last 12 months

In 2013, all ten IRS districts in northern Uganda were sprayed twice for a total of nine cycles in Kitgum, Pader, Agago, Apac, Oyam, Lamwo, and Kole Districts and eight cycles in Amuru, Nwoya, and Gulu Districts. A summary of PMI-supported IRS activity is shown in Table 3. A carbamate insecticide was sprayed in all the target districts during the last 12 months, achieving a coverage rate of over 90% of the 850,000 targeted households and protecting approximately 2.6 million people in each spray round. IRS has proven to be successful, as evidenced by persistently low vector populations since 2010, as well as drastic reductions in malaria cases in health facilities. Comparison of malaria cases per 1,000 population between IRS and non-IRS districts in northern and eastern Uganda are shown in Figure 4 (HMIS 2013/14). Although the data show a mix of confirmed and unconfirmed cases, the number of malaria cases per 1,000 population in IRS districts are less than half that of non-IRS districts suggesting the high impact of IRS. Comparison of malaria test positivity rates in health facilities in those same districts shows 36% for IRS districts and 55% for non-IRS districts.

Figure 4: Malaria cases per 1,000 people per month, showing current IRS districts and proposed IRS districts, with arrows showing time of spraying in IRS districts, January 2013—June 2014



The PMI-funded insectary in Gulu is used to rear field-caught mosquito larvae for adult identification, as a training space for mosquito identification, and for testing field-caught mosquitoes for insecticide susceptibility testing by the implementing partner and university collaborators. The Gulu insectary supports the Centers for Disease Control and Prevention (CDC) bottle bioassay and WHO tube assay testing for resistance. A MENTOR Initiative-supported insectary in Tororo District will be provided with Kisumu strain *An. gambiae* from the Vector Control Division to support eastern district IRS operations reducing the logistical burden of providing susceptible mosquitoes from Gulu or Kampala.

PMI supports comprehensive vector resistance monitoring in the six different eco-epidemiological zones of Uganda biennially, work on which first began in 2009. Below are the most recent results to two insecticides tested at all six sites (Table 4 and Figure 5).

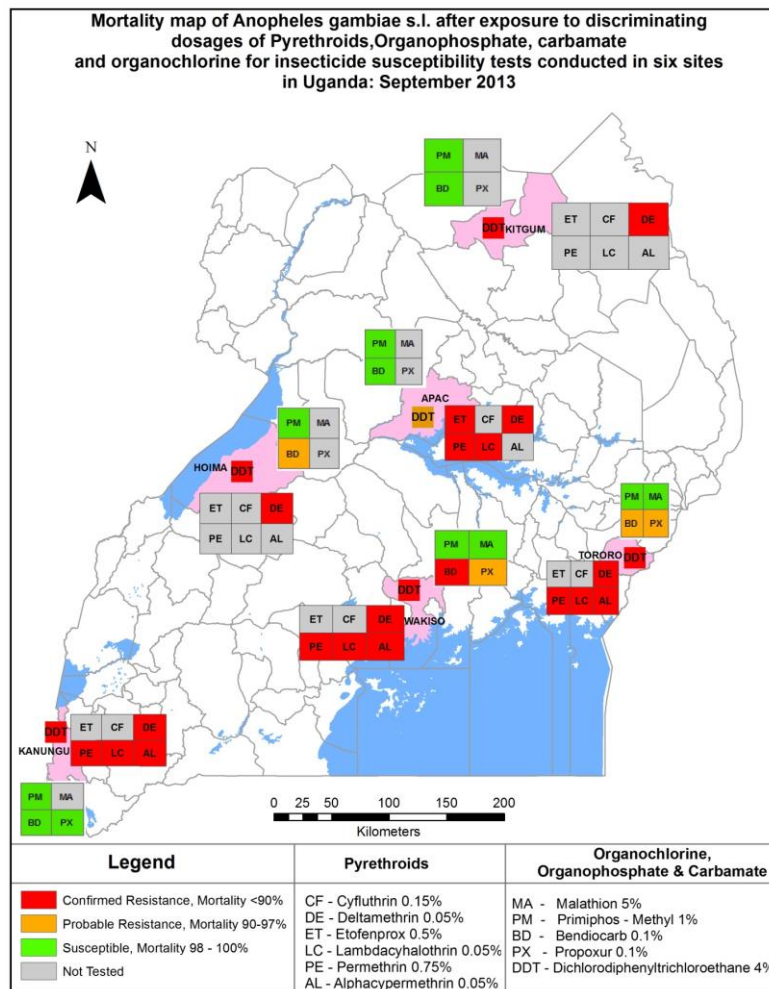
Table 4: Summary of 2013 Susceptibility Studies on *Anopheles gambiae* s.l. against two insecticides in six districts around Uganda*

Month	District	Insecticide tested	Number tested	Number dead	Test Mortality
September	Apac	Deltamethrin	100	82	82%
September	Apac	Pirimiphos-methyl	100	100	100%
September	Kitgum	Deltamethrin	100	58	58%
September	Kitgum	Pirimiphos-methyl	100	100	100%
September	Hoima	Deltamethrin	100	18	18%
September	Hoima	Pirimiphos-methyl	100	100	100%
September	Wakiso	Deltamethrin	100	44	44%
September	Wakiso	Pirimiphos-methyl	100	100	100%
September	Tororo	Deltamethrin	100	35	35%
September	Tororo	Pirimiphos-methyl	109	109	100%
September	Kanungu	Deltamethrin	100	53	53%
September	Kanungu	Pirimiphos-methyl	100	100	100%

*Includes larval testing

Greater than 98% mortality in tube bioassays indicates full susceptibility, 90-97% mortality indicates probable resistance, and less than 90% mortality indicates resistance to the insecticide being tested.

Figure 5: Mortality Map *Anopheles gambiae* s.l. After Exposure, September 2013



Challenges, opportunities, and threats

Implementation of IRS in Uganda continues to face many challenges. Malaria transmission is intense and perennial in nearly every region of Uganda. Interrupting transmission when the transmission season lasts for ten months of the year requires multiple rounds of spraying per year or the use of insecticides with a long residual action. Until recently, the NMCP did not have a clear, prioritized strategy for implementing vector control interventions. The GOU recently received funding to launch IRS operations in Kumi and Ngora Districts and operators are expected to begin in 2014 using carbamate insecticides. The UMRS now provides clear guidelines on how the activities funded by GOU augment PMI-supported IRS and routine distribution of LLINs through ANC facilities, as well as the mass distribution of LLINs with Global Fund resources and how these interventions will be monitored and how the outcomes will be evaluated.

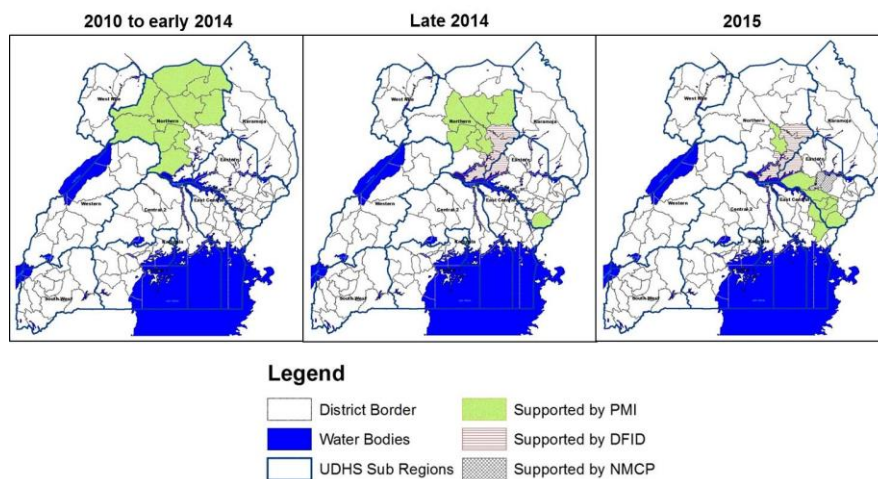
Based on emerging carbamate tolerance in *An. gambiae* s.l., Uganda will change to a long-lasting organophosphate (OP) insecticide in 2015. Although OP is more expensive than other carbamate insecticides, needing only one spray round versus two per year will reduce labor costs to the point where total cost are likely to be slightly less for OP. The FY 2015 plan will

continue to use long-lasting OPs to mitigate pyrethroid and carbamate resistance in malaria vectors.

Plans and justification

With successful completion of the UBCC, PMI will support the NMCP to implement IRS in nine eastern districts in Uganda, protecting approximately three million residents. These districts have not yet received any IRS (Figure 7). IRS operations will commence in Lira and Tororo Districts (added in late 2014, population 941,700). New districts to be sprayed include Butaleja, Namutumba, Kibuku, Budaka, Pallisa, Bugiri, and Serere (estimated population: 2,035,200). DFID will provide additional funding for IRS in five districts contiguous with former and new PMI IRS districts. These DFID districts are Alebtong, Dokolo, Amolatar, Kaberamaido, and Otuke (added late 2014, estimated population: 879,600). As previously mentioned, NMCP will fund spraying of Ngora and Kumi districts with an estimated population of 450,500 people, bringing the total to 16 districts supported with over 4 million people protected by PMI-, DFID-, and NMCP-funded IRS operations. Geographically, the DFID-funded districts and the new districts (including the NMCP-funded districts) will connect Lira and Tororo which will make up the northwestern and southeastern borders respectively in the new IRS area.

Figure 6: Areas Targeted for IRS in Uganda, 2010—2015



Build local capacity to expand and sustain IRS

Under the Uganda Indoor Residual Spraying (IRS) project, two private sector pest control trainings on IRS have been conducted so far, one in 2011 and another in 2013. In 2011, the IRS project trained 22 private pest control companies. In 2013, the project trained 27 companies during a one-week course. The primary purpose of the training was to build the capacity of the private sector pest controllers to enable them to carry out quality IRS. After the training in 2011, a number private sector pest control companies came together to form and register an association, the Uganda Pest Controllers' Association (UPCA), which brings together private pest control operators to share ideas and promote their profession. The UPCA secretariat provides guidance to other members and endeavors to keep the members updated on vector control developments, policies and guidelines.

PMI/Uganda will adopt best practices where the private sector has initiated, funded and managed many successful IRS programs, most frequently led by the mining and agricultural

industries and often in partnership with National Malaria Control Programs (NMCPs) in West Africa. The AngloGold Ashanti program in Ghana is a good example of this kind of a partnership that could be applicable in Uganda.

Proposed PMI activities with FY 2015 funding: (\$12,392,500)

With FY 2015 funding, PMI will:

- **Support for IRS:** Given the success of the UBCC, reduced malaria burden in the north, and continued high burden in the east, PMI will transition IRS coverage from the Northern Region to nine districts primarily in the Eastern Region. Northern districts that will no longer receive IRS will have enhanced case surveillance, robust case management, and BCC to promote ITN use, and universal net coverage. PMI will continue a second year with a long-lasting OP insecticide to which *An. gambiae* s.l. is completely susceptible in all areas of Uganda, reducing the yearly spray cycle from two to one. The cost includes all components of IRS: insecticide procurement of long-lasting insecticide, spray pumps and other required equipment, logistics, environmental assessments, monitoring, and BCC activities specific to IRS. (\$12,000,000)
- **Build local capacity to expand and sustain IRS:** In FY 2015, PMI will use the available private sector opportunities in Uganda to increase the IRS coverage through effective partnership with senior corporate agriculture executives and managers from the pharmaceutical, energy, food and beverage industries in collaboration with Ministry of Health/NMCP. PMI will assist NMCP to promote and increase private sector engagement and investment in IRS through improving their technical expertise and knowledge of IRS best practices so that their employees (settled in their large tea, coffee, and cotton plantations/estates) and the surrounding communities are protected. PMI will support NMCP to: 1) continue regular meetings of its national vector control TWG to harmonize IRS programs across stakeholders (including the private sector); 2) update NMCP's guidelines for corporate involvement and facilitate the private sector's contribution in IRS; 3) identify potential agriculture corporations; 4) enhance corporate engagement on IRS programs through increased advocacy for companies to protect their workers and communities through leveraging corporate strengths including logistics, distribution, and communication; and 5) provide critical technical expertise in organizing, implementing, and monitoring and evaluating the IRS program. For private sector trainings, PMI will specifically target large companies working in rural, high-burden areas. Also, companies that benefit from PMI-supported technical assistance will be asked to report on the outcomes and impact of their spray programs. (\$300,000)
- **External environmental compliance visit** (conducted every two years). (\$40,000)
- **Entomology equipment and supplies:** Insecticide resistance monitoring, laboratory supplies, minor equipment purchases for the Tororo insectary, and polymerase chain reaction reagents as needed by IRS implementing partners, CDC, and NMCP. (\$15,000)
- **Three TDYs from CDC-Atlanta:** CDC entomological staff will provide technical support for planning and monitoring IRS activities. This technical support covers testing for resistance mechanisms in *An. gambiae* s.l., review of insectary

maintenance and support for the PMI-funded insectary in Gulu and the MENTOR Initiative insectary in Tororo, identification of *An. gambiae* s.l. sibling species in IRS districts by polymerase chain reaction testing in Atlanta, and mosquito surveillance and resistance training to MOH personnel. (\$37,500)

MALARIA IN PREGNANCY

NMCP/PMI Objectives

The 2012 MOH National Malaria Control Policy states that pregnant women should be treated with the most effective antimalarial medicine under medical supervision. Pregnant women who present with a fever are tested for malaria using either microscopy or RDT, and treated for malaria if the test results are positive or if the cause of fever cannot be determined. Oral quinine is used for treatment of uncomplicated MIP in the first trimester, and ACTs are recommended for use in the second and third trimesters. Parenteral artesunate or quinine is used to treat severe MIP during all stages. The objectives of the National Malaria Control Policy for the prevention of MIP are to:

- Ensure every pregnant woman sleeps under an ITN throughout her pregnancy and thereafter.
- Ensure pregnant women receive IPTp with an appropriate antimalarial drug and receive early diagnosis and prompt management of malaria episodes.

Uganda's policy will soon be aligned to the new WHO guidance that IPTp should be given at every scheduled ANC visit beginning with the second trimester, if not administered in the prior four weeks.¹² The Reproductive Health Division (RHD) is also responsible for operationalizing IPTp by integrating within the Focused Antenatal Care (FANC) policy, which recommends that women with a normal pregnancy make four visits to an ANC clinic prior to delivery.

According to the NMCP's current MIP guidelines, pregnant women are given Iron 200mg and folic acid 5mg daily. Uganda's guidelines need to be brought into alignment with the most recent WHO guidelines which advise that SP should be administered with 0.4 mg of folic acid per day, and that folic acid at a daily dose equal or above 5 mg should not be given concurrently with SP as this counteracts with its efficacy as an antimalarial.

The 2011 Uganda Malaria Program Review reported the need for full integration of the IPTp program within the RHD, leaving the NMCP responsible for providing technical assistance to the RHD. The NMCP will train health workers on IPTp, ensure that the delivery of IPTp services at health facilities follows direct observed treatment (DOT), provide supportive supervision, and implement M&E, operational research, and BCC campaigns at the community level. The RHD is now the focal point for IPTp implementation and activities are integrated within the FANC policy and procedures.

Progress since PMI launch

¹² Updated WHO Policy Recommendation (October 2012); Intermittent Preventive Treatment of malaria in pregnancy using Sulfadoxine-Pyrimethamine (IPTp-SP)

To increase the proportion of pregnant women receiving two doses of IPTp, PMI's support has resulted in the development of a comprehensive malaria in pregnancy training module that was incorporated into the FANC training. Additionally, PMI has also supported the training and on-the-job supervision of over 4,088 health workers on IPTp. Additionally, it has provided job aids such as pregnancy wall charts and gestational wheels in all facilities providing antenatal care, and has supported the adoption of an MOH nationwide advocacy plan for IPTp. In addition, PMI has purchased over 130,000 treatments for IPTp in the last three years for use in the private sector. In collaboration with PEPFAR, PMI has focused on integrating IPTp services with PMTCT and extended this support to private health facilities. PMI continued to provide safe water and drinking cups for direct observation of treatment. As a result of these efforts, the percentage of pregnant women receiving two doses of IPTp has increased to 60% by 2012 in the regions covered by PMI, according to HMIS data and implementing partner's final report. Antenatal attendance by pregnant women in Uganda remains high, with 2011 DHS results showing that 94% of pregnant women made at least one ANC visit, and 48% made four or more visits. However, only 21% of women made their first ANC visit before the fourth month of pregnancy and the IPTp2 uptake was low at 25% despite the various efforts undertaken by PMI and other partners. Multiple hypotheses have been used to explain the low coverage rates of IPTp including unwillingness of some pregnant women to take SP because they are not aware of the need for malaria prevention in pregnancy. Some women also fear SP could have side effects on the fetus, a fear sometimes fostered by health workers.¹³ Low IPTp uptake may also be attributed to negligence of midwives not giving SP to pregnant women, SP stockouts, and irregular ANC attendance by pregnant women.¹⁴

Malaria Consortium's 2014 study to assess the barriers of IPTp uptake has revealed a range of barriers to IPTp uptake on both the demand and the supply side. On the demand side, the factors most likely to affect ANC attendance and IPTp uptake related to awareness of the importance of prevention of malaria in pregnancy, accessibility, and acceptability of the service. A key reason for not receiving IPTp was that it was not offered proactively by ANC staff. Pregnant women are more likely to take SP for IPTp when given appropriate counselling. Confidence in health workers' knowledge and advice is likely to play a decisive role in this context.

From the supply side, many of the health workers lack adequate knowledge of the up-to-date IPTp guidelines, particularly with regard to the correct timing and frequency of the treatments. Additionally, a lack of clarity and consistency in the existing guidelines, as well as a lack of access to training and job aids have led to missed opportunities to maximize the protection of pregnant women and their unborn children from the adverse effects of MIP.

Progress during the last 12 months

Over the course of this year, PMI supported the process to revitalize the focus on the prevention and control of MIP programs in Uganda. Within the MOH, the RHD leads the

¹³Barker J, Payes R, (2007). "Overview of Programmatic Interventions for Communication for Indoor Residual Spraying (IRS), Insecticide-treated Nets (ITNs), Case Management and Malaria in Pregnancy." USAID.

¹⁴Ndyomugenyi R and Katamanywa J. 2010. Intermittent preventive treatment of malaria in pregnancy (IPTp): do frequent antenatal care visits ensure access and compliance to IPTp in Ugandan rural communities? *Trans R Soc Trop Med Hyg*.

coordination of MIP efforts with the NMCP providing technical support to all MIP-focused activities. With PMI technical support, a national MIP working group has been established. Through the efforts of this working group, the RHD and NMCP policies are being updated to align with the most recent WHO guidance. Key MIP stakeholders have been briefed on the policy changes and the roles they will play in implementing the new changes.

During the past year, PMI has supported monitoring SP stock levels in health facilities to maintain adequate supplies for IPTp. Stock results were shared with the NMCP to encourage the replenishment of low stocks at the National Medical Stores (NMS). PMI supported on-the-job mentorship of health workers and direct observation treatment to help increase IPTp2 uptake. PMI continued to help make available clean drinking water for IPTp use in 34 target districts. Approximately 4,612 packets of water purification tablets (each packet contained 80 tablets) were distributed to health facilities. There were no procurement of jerry cans and cups since most health facilities already had adequate stock of these commodities.

In collaboration with PEPFAR, PMI has supported integrating IPTp within other HIV prevention efforts such as PMTCT services. This support has also been extended to PNFP health facilities. PMI also supported the integration of MIP activities within district-based efforts aimed at strengthening FANC.

PMI also supported strengthening the capacity of the private health sector by incorporating MIP interventions according to national guidelines. These activities were targeted at providers working in “Good Life Clinics” (GLC) and “Good Life Shops,” which are components of a private sector franchise model of health care delivery. PMI has made significant progress in MIP service delivery in the private sector. IPTp uptake in these private clinics has increased by 24% in 2011/2012 to 54% in 2012/2013. It has also trained 29 GLC health workers on MIP.

Table 5. SP Gap Analysis for MIP

Fiscal Year	2014	2015	2016
Estimated Pregnant women	1,788,228	1,850,816	1,915,595
Estimated SP doses required for pregnant women attending ANC	3,544,195	6,377,377	6,581,453
SP from GOU	3,544,195	6,377,377	6,581,453
Gap*	0	0	0

*The Government of Uganda is committed to procuring and distributing the total amount of SP doses required for each year (2014-2016).

Proposed PMI activities with FY 2015 funding: (\$652,500)

In FY 2015 PMI will continue to provide assistance in strengthening the MOH's capacity to coordinate and implement MIP programs, including supporting the roll out of the revised MIP policies. There will also be a renewed focus on strengthening health worker performance related to MIP as a comprehensive component of FANC services. This includes making trainings more geographically accessible for health workers, providing supportive supervision specifically for MIP, and integrating trainings on other infectious diseases such as HIV. As more MIP services become available, members of the community will begin utilizing these services thus allowing health care workers the opportunity to practice newly acquired skills

and techniques. With FY 2015 funds, PMI will continue strengthening the delivery of MIP services thus increasing IPTp uptake in both the public and private sector. Based on results from the 2014 IPTp barriers study evaluating factors contributing to low IPTp uptake, PMI will work with the NMCP and partners to implement the findings and recommendations.

The MOH will procure and distribute the required quantity of SP for FY 2014, 2015, and 2016 in the amount of 3,544,195; 6,377,377; and 6,581,453 doses of IPTp respectively (Table 5). Iron and folate are also included in the MOH's supply of essential medicines.

Specifically, PMI FY 2015 funding will:

- **Strengthen delivery of comprehensive IPTp services as part of an integrated FANC approach at public ANC clinics:** PMI will continue to support NMCP and DHMTs in the implementation of the new IPTp policy; address factors contributing to low IPTp uptake; train newly recruited health workers; distribute clean water and cups to facilitate DOT of IPTp; enhance BCC to ensure pregnant women understand that taking three or more doses of IPTp is safe; and encourage pregnant women to utilize the ANC services available to them. PMI will support the distribution of ITNs and IPTp, as well as early diagnosis and prompt treatment of MIP. PMI will also assist with integrated supportive supervision for ANC health workers with an emphasis on IPTp, ITNs, and case management of pregnant women. PMI will continue supporting professional associations to improve the level of communication between ANC providers (midwives, nurses, and doctors) and their clients during ANC visits. PMI will also support integrating service delivery for other treatments such as PMTCT. Furthermore, PMI will support NMCP to: 1) update the MIP guidelines according WHO recommendations, 2) procure and distribute 0.4mg folic acid, and 30-60mg iron, and 3) introduce the new doses of 30-60 mg iron and 0.4mg folic acid for daily use for pregnant women in at ANC services. (\$552,500)
- **Support for comprehensive IPTp services for ANC in private-for-profit (PFP) health facilities:** Although PMI primarily supports the public sector, a considerable number of pregnant women use PFPs due to better service delivery and geographic location. PMI will continue to promote IPTp by training of health workers in small- to medium-sized PFPs in order to promote a comprehensive package of IPTp services. These services would include DOT and early detection of MIP. These funds will also support BCC for ANC clients seeking care at PFPs and allow PMI to leverage on-going support from PEPFAR and MCH funds for private sector. (\$100,000)
- **BCC:** See Cross-cutting BCC section for details on activities and funding

CASE MANAGEMENT

MALARIA DIAGNOSIS

NMCP/PMI Objectives

The current National Malaria Control Policy, adopted in 2012, recommends parasite-based diagnosis with microscopy or RDTs as part of malaria case management in all health facilities and at the community level for all age groups. The policy states that:

- Suspected malaria cases will be subjected to parasite-based diagnosis.
- Microscopy remains the "reference or gold standard" for malaria diagnosis in case management and shall be the diagnostic method of choice for all level III health centers (that have microscopes) and above.
- RDTs will be used at HC III's that do not have microscopes, all HC II's, within the community, and to fill the gaps at higher level health facilities where microscopy is not possible (see Table 6).
- The type of RDTs to be deployed in the country will be guided by evidence on sensitivity, specificity, ease of use, and stability in the field, as determined by the performance evaluation and pre-qualification schemes of the WHO coupled with in-country testing.

This is consistent with WHO guidance on the need for parasitological confirmation of fevers in all groups before treatment with antimalarial drugs.¹⁵ However, adherence to the policy is suboptimal with most malaria diagnosis still based on clinical symptoms. PMI observed during site visits, meetings, and facility record reviews that there is limited awareness and/or willingness from either health workers or patients to request testing prior to treatment or to adhere to testing results, respectively. Health workers should also be aware of possible differential diagnoses of fever when the malaria laboratory test is negative. This challenge has been further exacerbated by the lack of adequate laboratory diagnostic capacity, especially laboratory technicians in many health facilities. The 2009 MIS found that only 17% of children with a fever were tested for malaria before receiving treatment. Some progress was made by 2011, as the DHS showed an increase to 25% for children with fever that were tested for malaria before receiving treatment. The UMRS 2014–2020 aims to achieve 90% testing of all fever cases by 2015. However, to date there is no way in the national surveillance system to capture suspected malaria or fever cases. As a proxy to determine testing of fever cases, there is a "testing ratio" which is the number of malaria diagnostic tests over the number of malaria cases (which remains a mixture of confirmed plus unconfirmed malaria); this often leads to confusion and unsubstantiated testing ratios of 95%. The MOH recently updated their outpatient form to capture suspected malaria, malaria diagnostic testing, testing result, and treatment. When this form is rolled out (by 2015), PMI will have a much more accurate understanding about malaria testing practices. Data from this form can be used to better target training and supportive supervision for both diagnostics and treatment. Future efforts will require sustained education of health workers and other cadre of health staff to base treatment on the test results and to educate communities to demand a malaria test before receiving antimalarial treatment.

The Central Public Health Laboratory is mandated to coordinate, monitor, and supervise all health center III and IV laboratories, but is grossly understaffed and supervision is irregular. PMI and PEPFAR will continue their collaboration in laboratory strengthening by supporting Central Public Health Laboratory and NMCP to conduct regular supervision of facilities for sustained quality diagnostic services.

¹⁵ WHO. 2010. Guidelines for the treatment of malaria -- 2nd edition.

Progress since PMI launch

PMI has invested in the training and supervision of health workers, procurement of RDTs, and drug quality testing to improve malaria case management in Uganda. Over the last six years, PMI has supported the training of over 50,000 health workers on integrated malaria activities. During the past three years, training on malaria case management, which included treatment of severe malaria and supportive supervision, was provided to health workers in 34 districts (including almost 3,000 workers from the private sector). More than 350 health workers in northern Uganda received training on logistics management. PMI has continued to support the training of health workers on RDTs and microscopy to improve parasitological-based diagnosis at all levels of the health system. In FY 2012, PMI supported the roll-out and use of RDTs in health facilities without laboratory services, microscopy training at health facilities with laboratory services, and both types of training to facilities with limited laboratory services. In the last six years, PMI has purchased over 3.9 million RDTs, of which 1.7 million RDTs were for PNFP facilities.

Progress during the last 12 months

Beginning in January 2012, a PMI partner conducted an assessment of the quality and validity of the malaria slides stained and read at the sentinel sites. Based on the findings, last year this resulted in a shift of the malaria staining technique from the Field stain to the Giemsa stain at all surveillance sites. A monthly slide rechecking program was also introduced at all of the sites to help monitor the quality of preparation and accuracy of reading smears. A majority of the sites scored above 85% for sensitivity, specificity, and percentage agreement. Based on these results, PMI supported the NMCP to update the country's guidelines for diagnosis with microscopy and RDTs. Most importantly, these guidelines specifically recognize the necessity of supporting both the public and private sector, in order to increase the proportion of suspected malaria cases receiving testing prior to treatment. The guidelines also recommend that the use of the Giemsa stain for staining malaria smears be adopted in all facilities. These national parasite-based diagnosis implementation guidelines are currently being reviewed at the senior management level for approval.

With support from PMI, a quality assurance manual that outlines the plan for implementing a district level malaria microscopy quality assurance program in Uganda was developed in October 2013. It encompasses retraining, validation, and the development of competency standards designed to ensure the quality of diagnosis necessary for a successful malaria program, while remaining within the expected financial and personnel resource constraints. The national manual is now being used to scale-up malaria microscopy quality assurance in 21 districts in Uganda.

In total, PMI partners have trained 1,347 health workers in malaria diagnostic testing. The results of the PMI supported trainings showed that there was a significant increase in knowledge and skills among the healthcare workers after the trainings. Subsequent supervision visits were used to reassess diagnostic competence, provide on-the-job training, and allow PMI partners to collect data on how the trainings affected the overall management of fever cases. In addition to capacity building on diagnostics, PMI procured 525,000 RDTs in FY 2013 to improve access to diagnostics.

Commodity Gap Analysis

To date, RDTs have been procured primarily with support from PMI and the Global Fund Round(s) 2 and 7 grant, which ended December 2013. No further funding for RDT procurement is planned under the Global Fund Round 9 Phase 2 grant. However, the NMCP does plan to include RDT procurement and distribution in the Global Fund New Funding Model grant proposal, which was recently submitted. Given limited resources, PMI will procure RDTs for use in public and PNFH health facilities, as well as for community case management, where collectively about half of the population seeks care. Commodities channeled through this sector are easier to manage and monitor compared to the private sector. The procurement estimates below have incorporated anticipated changes in fever cases due to the recently completed universal coverage of LLINs and the scale-up of malaria diagnostics.

Table 6: Gap Analysis for RDTs in Public Sector

Calendar Year	2015	2016	2017
Total population at risk	37,916,400	39,228,700	40,578,700
RDT Needs			
Projected fever cases ^a	60,944,905	63,054,230	65,224,152
Reduction in cases due to vector control interventions ^b	6,094,491	12,610,846	19,567,246
Number of suspected malaria cases ^b	54,850,415	50,443,384	45,656,906
Diagnosis coverage by public sector	47%	48%	52%
Diagnosis coverage by RDT in public sector ^c	75%	76%	81%
Target number of cases for diagnosis by RDT	19,334,771	18,401,746	19,230,689
Partner contributions			
Global Fund, MOH, and other donors ^d	16,662,296	17,403,420	TBD
PMI	1,476,000	TBD	TBD
Total projected partner contributions	18,138,296	TBD	TBD
Gap for RDTs in public sector	1,196,475	998,326	19,230,689

^a Data extrapolated from the HMIS , adjusted for reporting rates and coverage

^b Assumes a 10%, 20%, and 30% reduction in malaria cases in 2015, 2016, and 2017, respectively following the 2014 universal distribution campaign.

^c Assumptions: Target diagnostic coverage of 47%, 48%, and 52% based on NMCP assumptions in Concept Note. Diagnostic coverage by RDT estimated at 75%, 76%, and 81% in successive years.

^d Per Concept Note projections

Proposed PMI activities with FY 2015 funding: (\$2,472,500)

With FY 2015 funds, PMI will support QA/QC and provide supportive supervision to health workers to improve parasite-based diagnosis at all levels of the health system and in both public and private facilities. PMI and the NMCP will work closely with the WHO to support the roll out of an appropriate QA/QC system. PMI support will complement Global Fund and PEPFAR funding for general laboratory and microscopy strengthening and PMI will work with PEPFAR to improve coordination of USG efforts to improve the laboratory system in Uganda. Specifically, with FY 2015 funds PMI will support:

- **Diagnostic supplies procurement:** PMI will continue to procure RDTs and other malaria-related supplies targeted at filling gaps in the national coverage for diagnostics (\$610,000). In addition, PMI will also procure RDTs for use in two iCCM districts. The RDTs for iCCM will be distributed through Joint Medical Store (JMS). (\$250,000) (Total \$860,000)
- **Support QA/QC and supportive supervision for diagnostics at health centers:** Together with a new malaria-specific mechanism (TBD), the Mission's integrated regional programs will increase the geographical coverage of health services, including malaria services, in the public sector. PMI will support case management trainings that focus on appropriate diagnosis, QA/QC (including slide bank development, regular slide rechecking, and consideration for RDT QA/QC using new technology as it becomes standardized and approved), and supportive supervision for diagnostics. (\$1,500,000)
- **Support improved diagnostics in the for-profit private sector:** PMI will support training on the use of RDTs, supervision, and quality assurance (for both RDTs and microscopy) in the for profit corporate private sector through existing partnerships with 55 companies through the 1:1 matching contribution program for malaria (15 participating companies currently). (\$100,000)
- **TDY from CDC-Atlanta:** CDC staff will provide technical support to laboratory diagnostics scale-up and QA/QC policy implementation. (\$12,500)

MALARIA TREATMENT

NMCP/PMI Objectives

The NMCP's primary objectives for case management are to ensure uninterrupted access of artemisinin based combination therapy (ACTs) through all public and private-not-for-profit (PNFP) health facilities. Additionally, the NMCP aims at expanding community level access through integrated community case management (iCCM). Refresher trainings in case management and diagnostics are also provided by the NMCP with support from PMI and clinical audit approaches have been adopted to promote high quality and operational efficiency at all levels of health service provisions.

Since 2004, arthemether-lumefantrine (AL) has been the first-line treatment for uncomplicated malaria in Uganda. The second-line treatments are dihydroartemisinin-piperazine (DP) and quinine. Artesunate suppositories are recommended for pre-referral treatment of severe malaria at the community level where parenteral therapy is not possible. The National Malaria Control Policy continues to recommend AL as first-line treatment (with

artesunate/amodiaquine as an alternative first-line), and in 2012 adopted WHO guidance to introduce parenteral artesunate for treatment of severe malaria.

The supply of ACTs at health facilities has improved over time with the increase in commodity availability and changes in the national system of supplying the facilities. Some facilities are still benefitting from the “push-kit” system of drug supplies whereby national medical stores (NMS) provides a specified quantity of drugs to HC II and III every two months. The improved supply of ACTs through these efforts has greatly reduced ACT stockouts at health facilities. The push-kit, however, does not take into account the actual needs of individual health facilities, thus some facilities do end up with stockouts, while others are overstocked. Efforts by the district MOH and PMI partners have been made to redistribute supplies in these cases as well as document the under- and over-supply to assist NMS in revising the contents of the kits. The improved supply of ACTs in public facilities has been evidenced by 44% of children with fever reporting use of ACTs in the results of the 2011 DHS, a substantial increase from the 14% of children reported by the 2009 MIS.

Although intravenous (IV) artesunate is recommended for treatment of severe malaria and some health facilities have received it, due to the added expense and limited available quantities, the MOH will transition from IV quinine to IV artesunate over the next several years. There are also plans to use rectal artesunate at the community level for pre-referral treatment.

Progress since PMI launch

Delivery of healthcare services in Uganda is predominantly through the private sector. An assessment found that there are 5,500 health facilities in Uganda: 49% are private-for-profit (PFP clinics, 13% are PNFP, and 38% are public facilities - all levels). Care seeking is heavily focused in the private sector, with up to 82% of household’s first seeking care from small drug shops, private clinics, and PNFP providers.¹⁶ Results from the 2009 MIS also highlight the importance of the private sector in the provision of care; 55% of children with fever received care at private facilities. In the last several years, PMI has extended its support to the PNFP facilities. Over 5.4 million ACT treatments were purchased and a controlled system of distribution of ACTs to PNFP facilities is currently underway through the Joint Medical Store (JMS). PMI supported training of private health practitioners in the new antimalarial drug policy. This training is often integrated with sessions on HIV/AIDS, family planning, and child survival. To date, nearly 10,000 health practitioners have received training in malaria treatment and prevention. In addition, PMI has supported small-to-medium sized private clinics and has worked with large private corporations to leverage additional funds for malaria prevention through their Corporate Social Responsibility programs. These corporations provide free or subsidized health services to their employees and the surrounding communities. PMI works with these businesses on a cost-sharing basis for ITNs, IPTp, and laboratory diagnostics.

Quality of care in both public and private health facilities needs additional support and improvement. A PMI-supported health facility assessment showed that the clinical evaluation of patients presenting with fever is sub-optimal as evidenced by poor history taking and incomplete examination of sick children, with few health workers looking for danger signs.

¹⁷ Mandelli, Andrea, Lennie Bazira Kyomuhangi, and Susan Scribner. September 2005. *Survey of Private Health Facilities in Uganda*. Bethesda, MD: The Partners for Health Reformplus Project, Abt Associates Inc.

In addition the health workers often did not provide an explanation of the diagnosis, treatment, and follow up.¹⁷ Another evaluation on treatment practices for severe malaria in east and mid-western Uganda showed delays in prompt care (received in only 29% of patients); correct diagnosis of severe malaria in only 27% of patients; and appropriate administration of quinine in the correct volume of 5% dextrose in 18% of patients, with 80% of patients receiving more than one dose of quinine in one single bottle of dextrose.¹⁸ There is still a considerable amount of work to be done to improve quality of care for patients with malaria. PMI has been addressing these aspects of quality care through implementation of supportive supervision, clinical audits, and training.

Progress during the last 12 months

PMI is supporting training in 38 of 112 districts in Uganda with the remaining districts covered under the Round 10 of the Global Fund grant. The integrated malaria clinical audit manual adapted from the existing severe malaria clinical audit manual will be used for training and to assess the management of severe and uncomplicated malaria in each health facility. Currently, 44% of the districts in Uganda have VHTs established in all of the villages. In 18 of these villages, VHTs receive iCCM training and support with funding from CIDA for the period 2010-2012. With FY 2014 PMI funds, two additional districts with existing VHTs will receive training on ICCM and will be equipped with ACTs and RDTs to treat children at the community level. On a national scale (112 districts), all 7,000-10,000 health workers and VHTs recruited over the last year would need adequate training and supervision in FY 2015.

During the past year, PMI has procured 1.37 million ACT treatments and trained nearly 800 health facility workers in case management of malaria with ACTs. A controlled system of distribution of ACTs to PNFP facilities is currently underway through the JMS. This is a critical intervention, given that the previous arrangement in which NMS provided 20% of the public supply of ACTs to PNFP facilities through JMS has ceased. In addition, PMI supported the NMCP in the continued development of the training curriculum for integrated management of malaria which included: 1) management of both uncomplicated and severe malaria (with proper administration of IV artesunate); 2) management of MIP; and 3) parasite-based diagnosis with RDTs (including how to manage a patient with a negative RDT and fever). Health workers who are either new to the system, practice in high burdened areas, or show poor performance will be prioritized with this funding.

To ensure adherence to the new policy changes and appropriate management of patients with malaria, the MOH is building the capacity of health workers in diagnosis (clinical and laboratory), treatment, and prevention of malaria. The MOH is implementing the training in integrated malaria management and is in the process of dissemination of comprehensive, up-to-date information regarding facility-based management of malaria. The integrated malaria management training course seeks to promote proper management of patients with fever by advocating for improved evaluation and treatment of patients with fever. This course also aims at creating team spirit among health facility staff for effective management of patients

¹⁷ STOP Malaria Project, September 2011. *Health Facility Assessment Survey Report* (unpublished).

¹⁸ Achan J, Tibenderana J, Kyabayinze D, Mawejje H, Mugizi R, et al. (2011) *Case Management of Severe Malaria - A Forgotten Practice: Experiences from Health Facilities in Uganda*. PLoS ONE 6(3): e17053. doi:10.1371/journal.pone.0017053

with fever. Emphasis is also put on educating patients so that they adopt malaria preventive practices.

Commodity Gap Analysis

To date, ACTs have been procured primarily with support from PMI and the Global Fund Round(s) 2 and 7 grant, which ended December 2013. No further funding for ACT procurement is planned under the Global Fund Round 9 Phase 2 grant. However, the NMCP does plan to include ACT procurement and distribution in the Global Fund New Funding Model grant proposal, which was recently submitted. Although, public and PNFP Health Facilities, and community case management sectors only target about half of malaria cases for treatment, PMI will procure ACTs for distribution and use in this sector, as the limited supply of commodities are easier to manage and monitor through this channel. The procurement estimates below have incorporated anticipated changes in treatment rates due to the recently completed universal coverage of LLINs and the scale up of malaria diagnostics. Artesunate is being scaled up (and quinine scaled down) for the treatment of severe malaria. The MOH is planning on the remaining gaps for malaria treatment to be filled by additional support from the Ministry of Finance, Global Fund, and other donors.

Table 7: Gap Analyses for ACTs in the Public Sector

Calendar Year	2015	2016	2017
Total population at risk	37,916,400	39,228,700	40,578,700
ACT Needs			
Projected fever cases ^a	60,944,905	63,054,230	65,224,152
Reduction in cases due to vector control interventions ^b	6,094,491	12,610,846	19,567,246
Number of suspected malaria cases ^b	54,850,415	50,443,384	45,656,906
Coverage by public sector ^c	47%	48%	52%
Target number of AL courses needed	25,779,695	24,212,824	23,741,591
Partner contributions			
Global Fund, MOH, and other donors ^d	12,066,726	10,336,060	1,571,885
PMI	941,546	TBD	TBD
Total projected partner contributions	13,008,272	TBD	TBD
Gap for AL courses in public sector	12,771,423	13,876,764	22,169,706

^a Data extrapolated from the HMIS, adjusted for reporting rates and coverage

^b Assumes a 10%, 20%, and 30% reduction in malaria cases in 2015, 2016, and 2017, respectively following the 2014 universal distribution campaign.

^c Assumptions: Target diagnostic coverage of 47%, 48%, and 52% based on NMCP assumptions in Concept Note

^d Assumptions: Per Concept Note projections

Gap Analyses for Artesunate in the Public Sector

Calendar Year	2015	2016	2017
Total population at risk	37,916,400	39,228,700	40,578,700
Total number of malaria in-patients attending Public and PNFP Facilities ^a	1,064,725	1,098,796	1,133,957
Artesunate needs^b			
Estimated IV Artesunate 60mg needed (including warehouse buffer & provision upsurges, outbreaks & wastage)	4,794,102	3,713,689	3,529,959
Estimated Rectal Artesunate 50mg needed (including warehouse buffer & provision upsurges, outbreaks & wastage)	225,176	165,249	149,220
Rectal Artesunate 200mg needed (including warehouse buffer & provision upsurges, outbreaks & wastage)	102,261	75,046	67,766
Partner contributions – IV Artesunate			
Chinese Donation	240,000	0	0
PMI	157,343	TBD	TBD
Government of Uganda	175,200	175,200	208,007
UNITAID	1,311,278	1,311,278	0
Global Fund	TBD	TBD	TBD
Malaria Consortium	0	0	0
Total partner contributions	1,883,821	TBD	TBD
Gap for IV Artesunate	2,910,281	2,227,211	3,321,953
Partner contributions – Rectal Artesunate			
PMI	0	0	0
Government of Uganda	0	0	0
UNITAID	0	0	0
Global Fund	0	0	0
Malaria Consortium	0	0	0
Total partner contributions	0	0	0
Gap for Rectal Artesunate (50 mg)	225,176	165,249	149,220
Gap for Rectal Artesunate (200 mg)	102,261	75,046	67,766

^a Projection based on DHIS2 Jan-Sep 2013 data, adjusted to 100% by level of care and Month, Extrapolated to end of year by 77% and grown annually at a rate of 3.2% population growth rate throughout the years.

^b Estimated after considering reductions by vector control, treatment needs at level of health facility (II, III, or IV) and Case Management Technical Working Group (May 2012) and NMCP discussions. Includes upsurges, outbreaks, wastage, and warehouse buffer (25% [3Months of Stock] agreed warehouse buffer applied in 2015 only)

Proposed PMI activities with FY 2015 funding: (\$3,995,000)

With FY 2015 funds, PMI will continue to support strengthening case management for uncomplicated and severe malaria including procuring commodities that will be distributed to PNFP facilities through JMS. Given the positive results of the iCCM pilot project, the improved supply of ACTs in health facilities, and the finding that approximately 75% of Ugandans live within five kilometers of a health facility,¹⁹ PMI will prioritize strengthening clinical services at health facility levels, while supporting implementation of iCCM in two central districts.

Planned activities with FY 2015 funds are as follows:

- **Procure antimalarial drugs:** PMI will support the procurement of drugs including ACTs (AL) and severe malaria drugs (IV artesunate) for the treatment of malaria both at facility (\$1,500,000) and community levels (\$150,000). (Total \$1,650,000)
- **Strengthen case management in health facilities:** PMI will provide funds for strengthening case management, including parasitological diagnosis of uncomplicated and severe malaria in public, and PNFP (faith-based) health facilities in most of parts of Uganda. This support includes clinical audits, supportive supervision, in-service training and iCCM in two districts, enhancing collaboration between NMCP and the national professional councils (doctors, nurses, midwives, laboratory technologist/technicians, and pharmacists), in order to strengthen case management. PMI will also provide funds for strengthening collaboration between district health teams and district-level professional associations to promote correct diagnosis, and early and prompt treatment. PMI will support pre and in-service training, supportive supervision, and provision of job-aids to health care workers. Health care workers who are new to the system, practice in areas with a high burden of malaria, and/or who have shown poor performance will be prioritized. (\$2,082,500)

Support private sector providers and their networks to strengthen malaria case management and increase the role of district health officials in providing support and supervision: PMI will continue supporting private clinics and drug shops that are the closest sources of care for children with fever in many communities. This support includes enhancing collaboration between the public sector district health teams with the private sector associations to ensure that health workers and drug owners receive routine supportive supervision for proper clinical care of children with fever, including treatment based on parasitological diagnosis, and support improvements in record keeping and HMIS reporting to the national level. (\$250,000)

¹⁹ Ministry of Health (MOH) [Uganda] and Macro International Inc. 2008. *Uganda Service Provision Assessment Survey 2007*. Kampala, Uganda: Ministry of Health and Macro International Inc.

- **TDY from CDC-Atlanta:** CDC staff will provide technical support to quality of care issues for the management of severe and uncomplicated malaria within PMI and NMCP programs. (\$12,500)

INTEGRATED COMMUNITY CASE MANAGEMENT (iCCM)

NMCP/PMI Objectives

A number of studies have demonstrated that malaria diagnosis and treatment can be provided to children less than five years of age through community-based agents. The WHO and UNICEF now recommend that countries implement iCCM to sick children less than five years of age as an essential method for improving access to malaria diagnosis and treatment. The iCCM approach provides diagnosis and treatment of pneumonia, diarrhea, and malaria (including the use of RDTs) through VHTs using standard algorithms. Such iCCM also provides a platform for facilitating referral of severe illness, including the use of pre-referral rectal artesunate.

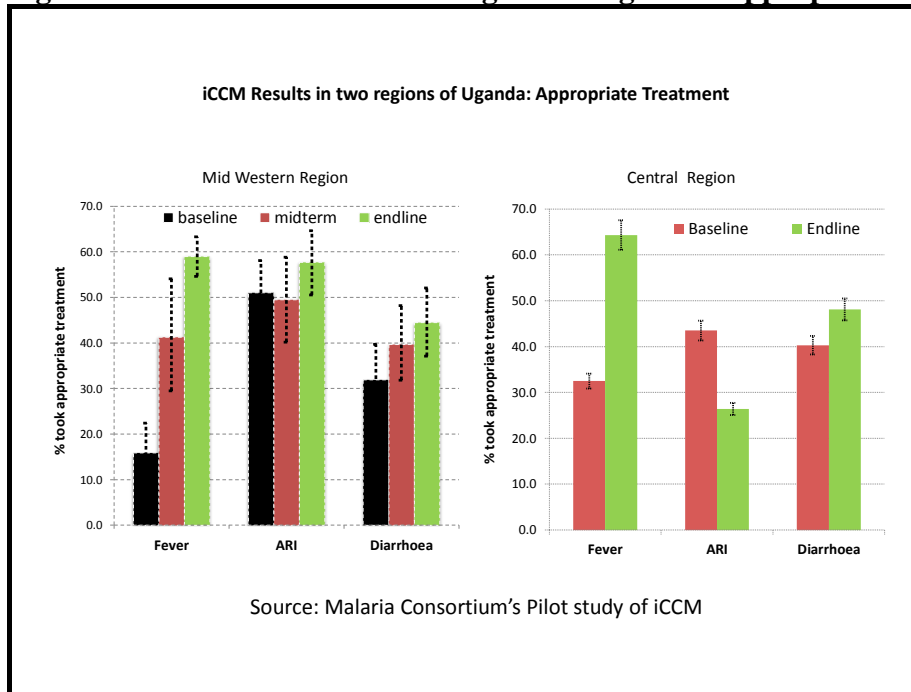
Progress since PMI launch

Uganda has developed considerable experience in using iCCM to improve access to diagnosis and treatment of malaria. With funds from the Canadian International Development Agency (CIDA), Uganda has been able to demonstrate the feasibility of iCCM in the mid-west and central regions with an estimated population of about 5 million people. However, and despite the great promise shown by iCCM in increasing health coverage especially for children living in remote areas (see Figure 4), Uganda has yet to scale-up its iCCM programs in other regions. This is partly due to the uncertainty of funds. The NMCP has applied for iCCM funding in 34 remote districts through Uganda's 2014 Global Fund concept note under the NFM.

Progress during the last 12 months

Recent results from pilot programs show significant progress in improving health seeking behavior of febrile children and timely treatment of fever in children. The median number of cases seen per VHT per month was 12.5 with a range of (9.9-15.6) in the mid-west region. The median of the central region was 15 cases with a range of 9-23 cases per VHT per month.

Figure 7: iCCM Results in Two Regions in Uganda- Appropriate Treatment



With FY 2014 funding, PMI will support the implementation of iCCM in Kyankwanzi district by training 400 VHTs and providing ACTs and RDTs. PMI will also support the NMCP to update its national iCCM policy and training materials and develop guidelines for the rollout of iCCM in other regions. The policy and the training materials are expected to be available by September 2015.

Proposed PMI activities with FY 2015 funding

With FY 2015 funding, PMI will:

- Support trainings in the diagnosis and treatment of malaria and routine supportive supervision of 400-600 VHTs to provide iCCM in two central districts, Kiboga and Kyankwanzi, with a population of 108,897 and 120,575, respectively. The number of children under five years of age is estimated to be 19,602 in Kiboga and 21,704 in Kyankwanzi. Both districts were selected in consultation with NMCP. Logistical challenges, availability previously trained and committed VHTs, and access to functional health facilities were among the factors that were considered during the selection of the two districts. PMI will procure and distribute RDTs and ACTs for trained VHTs in Kiboga and Kyankwanzi (see Diagnosis [\$250,000] and Treatment [\$150,000] for iCCM funding).

DRUG RESISTANCE MONITORING

NMCP/PMI Objectives

Recent studies in Cambodia have shown increased resistance of parasite isolates and reduced efficacy to different artemisinin derivatives. As resistance to ACTs emerges from Southeast Asia, monitoring drug resistance in Uganda is critical. Studies on the development of

resistance to ACTs and the spread of ACT-resistant parasite strains in the population are therefore critical for successful case management and malaria control.

Progress since PMI launch

Uganda has monitored first-line antimalarials since 2001, and PMI has supported this work since 2006. As of 2009, evidence showed that all formulations of ACTs tested were still highly efficacious in Uganda.^{20 21} Studies conducted in 2006 and 2009 have compared AL, amodiaquine, artesunate, and dihydroartemisinin-piperaquine. PMI, together with WHO, is currently supporting a round of drug efficacy monitoring studies evaluating the efficacy and safety of two ACTs, amodiaquine-artesunate (AQ+AS), and AL for treatment of uncomplicated malaria in children in Uganda.

Progress during the last 12 months

PMI has supported antimalarial treatment efficacy monitoring of the first-line antimalarials in Uganda. A randomized, single-blinded trial comparing the efficacy and safety of AS+AQ and AL for the treatment of uncomplicated malaria in children between 6 and 59 months in Uganda is ongoing with final results expected in late 2014.

The study began in May 2013 and is being carried out at three sentinel sites of historically varying malaria transmission: Aduku Health Center, Apac District (high, prior to implementation of IRS); Kasambya Health Center, Mubende District (moderate); and Kihihi Health Center, Kanungu District (low). A total of 600 children, 200 per site, were randomized to receive either AL or AQ+AS. The primary outcome for the study is risk of treatment failure unadjusted and adjusted for genotyping at day 28.

As of December 2013, two sites (Aduku and Kasambya) have completed recruitment and follow-up, while enrollment at Kihihi was initiated in February 2014 and is currently ongoing. Preliminary results from Aduku indicate that after adjusting for genotyping results, the risk of treatment failure was 0% and 2% for AS+AQ and AL, respectively, and the difference was not statistically significant ($p=0.16$). Additional data and results from the other two sites will provide more comprehensive information on the status of drug efficacy in Uganda.

- **Proposed PMI activities with FY 2015 funding: Monitor drug resistance (efficacy) of antimalarial drugs:** Drug efficacy studies have traditionally been conducted every two years but will shift to alternating four sites every year. Funds from PMI FY 2013 supported the last drug efficacy studies; PMI funding in FY 2015 will be allocated for the next round of drug resistance monitoring. (\$200,000)

²⁰ The Four Artemisinin-Based Combinations (4ABC) Study Group (2011) *A Head-to-Head Comparison of Four Artemisinin-Based Combinations for Treating Uncomplicated Malaria in African Children: A Randomized Trial*. PLoS Med 8(11): e1001119. doi:10.1371/journal.pmed.1001119

²¹ Emmanuel Arinaitwe, Taylor G. Sandison Humphrey Wanzira, Abel Kakuru, Jaco Homsy, Julius Kalamya, Moses R. Kanya, Neil Vora, Bryan Greenhouse, Philip J. Rosenthal, Jordan Tappero, and Grant Dorsey. "Artemether-Lumefantrine versus Dihydroartemisinin-Piperaquine for *Falciparum* Malaria: A Longitudinal, Randomized Trial in Young Ugandan Children," *Clinical Infectious Diseases* 2009; 49:1629–37

PHARMACEUTICAL MANAGEMENT

NMCP/PMI Objectives

National Medical Stores (NMS) manage the procurement and distribution of essential medicines and health supplies for the public sector while Joint Management Stores manage similar activities for the PNFP sector.

While the pharmaceutical management system in Uganda remains weak, there have been significant improvements in recent years; especially in the supply of ACTs which has been more stable due to procurements from the Global Fund, DFID, and the GOU. The “push kit” introduced by the MOH and NMS three years ago has improved supply at all lower level public health facilities. More than a year ago, NMS also began direct “last-mile” distribution to the health facilities using private sector third party logistics providers.

The quality of antimalarial drugs is a growing concern worldwide, and Uganda, through the National Drug Authority, conducts quality control at ports of entry and also post-marketing surveillance. Multiple partners provide support for these processes including PMI, through a wider USAID partnership, and the Global Fund.

Progress since PMI launch

Together with PEPFAR and other USAID health programs, PMI has strengthened the national pharmaceutical management system by improving performance and financial management, clarifying pharmaceutical policy, and establishing a transparent logistics management information system. However, improvements are still needed especially in the supply of ACTs and other commodities to district and lower level health facilities.

The central commodity store is responsible for procuring and supplying commodities to the public sector, while the JMS is the officially recognized supplier for PNFP facilities (faith-based NGO facilities). National ACT supplies have been more stable in the last three years due to procurements from the Global Fund, DFID, and the GOU, while the “push kit” introduced by the MOH and the central commodity store two years ago has helped to ensure that there is at least some stocks of ACTs routinely available at all lower level public health facilities. The push-kit, however, does not take into account the actual needs of individual health facilities, thus some facilities do end up with stockouts, while others have an overstock. Efforts have been made by the districts, MOH and PMI partners to redistribute supplies in these cases as well as document the under- and over-supply of ACTs to assist the central commodity store in revising the contents of the kits.

Quality of antimalarial drugs is a concern worldwide and Uganda, and the NDA, conducts quality control at ports of entry as well as post-marketing surveillance. Multiple partners provide support including PMI, through a wider USAID partnership and the Global Fund.

Progress during the last 12 months

PMI continues to provide technical assistance at national and peripheral health facility levels to support the central commodity store, the NMCP, and district health programs to improve their supply chain management and develop accurate stock inventories of AL, RDTs, SP, and severe malaria drugs. Great progress has been seen in the past 12 months in ensuring stable supplies of malaria commodities at health facility levels and improving stock management and reporting. With FY 2013 funds, PMI supported an end-use verification survey (EUV) in

75 randomly selected health facilities in 15 districts to assess the performance of the public health supply chain, focusing on malaria commodities. The activity provided information regarding the availability of malaria commodities, as well as insight into how malaria is being managed at the health facility level. The findings are being analyzed and will be used to make programmatic improvements and address problems with product availability. Results from the EUV survey will be available in late 2014.

The work in the public and PNFP facilities continued to be done through a larger USAID Uganda partner to build capacity and improve performance of the national health supply chain system. Opportunities exist for strengthening national commodity procurement, quantification, supply chain management, and documentation.

PMI supports strengthening the NDA through an integrated health sector program that focuses on improving their strategy and capability in information management as well as their quality control and inspection programs. PMI continues to support post-market surveillance, and testing of medicines already in the market as well as entry points.

Proposed PMI activities with FY 2015 funding: (\$600,000)

- **Strengthen pharmaceutical supply chain management and monitor drug quality of antimalarials:** PMI will continue to provide technical assistance to the NMCP/MOH to forecast national requirements for essential medicines and coordinate national supply planning among the various suppliers. Malaria specific activities will include: forecasting and quantification of malaria commodity needs including ACTs, SP, RDTs, and other antimalarial medicines; reporting on these commodities when provided to the PNFP sector; and supporting monitoring of ACT stockouts in all facilities. PMI will work with JMS to continue monitoring and improving the ordering and distribution system for PMI-procured ACTs and RDTs. In addition, assistance will be provided to the district and health facility levels to strengthen the lower level supply chain system. Support to the NDA will continue to improve their quality control activities of priority and high risk medicines, including antimalarial drugs, supplied to the country. The PMI investment in supply chain management leverages more than \$5 million from other health funding streams (including PEPFAR) to strengthen the entire supply chain system. (\$600,000)

MONITORING AND EVALUATION

NMCP/PMI Objectives

Uganda's M&E Plan for the National Malaria Control Strategic Plan 2010/2011–2014/2015 calls for “sound monitoring and evaluation of performance and associated impact on malaria burden” and states that M&E is “essential to guide the interventions carried out within the RBM partnership.” The broad objective is “to provide a joint framework for a well-coordinated, systematic and holistic tracking of progress in malaria control, informing refinement and guiding decision-making for program improvement.”

Uganda has been in a “scaling up for impact” phase of malaria control since PMI started activities in 2006. However, with successful completion of UBCC in 2014, improvements in access to RDTs and ACTs in health facilities, and with IRS continuing to scale-up and shift areas of focus, the GOU's new UMRS 2014–2020 will transition from scale-up to sustained control. As the malaria burden decreases in Uganda, there will be districts shifting from endemic to epidemic-prone status. Measuring these changes and using the evidence to target

future programming decisions and malaria control policy will require an increasing emphasis on robust monitoring, evaluation, and surveillance. This will allow GOU and PMI to maximize the impact of available malaria control resources.

Progress since PMI launched

PMI Uganda has supported the use the following tools to measure the impact of malaria control efforts:

- **2010 Anemia and Parasitemia Survey:** This survey provides information on anemia and parasitemia in children under five years of age and district-level coverage data in two districts with and without IRS in northern Uganda, with similar distribution of ITNs and support for case management.
- **2011 ITN Coverage Survey:** This survey provides information on net coverage and other malaria intervention coverage at district levels in the central region of Uganda after the targeted mass ITN distribution campaign in early 2010.
- **2011 Uganda DHS:** The DHS provides data comparable to the 2006 UDHS data as well as anemia levels in children under five years of age.
- **Evaluation of parasite prevalence in 2004 and 2011 AIDS Indicator Survey:** This survey will provide baseline and midterm parasite prevalence information for PMI activities using polymerase chain reaction (PCR) technology. A reprogramming request has been submitted to use FY 2012 funds to conduct this work. The protocol is under review by CDC country support team before it is submitted to the full operational research committee.

Surveillance

The malaria sentinel surveillance sites that were established at the beginning of PMI activities in Uganda continue to provide high-quality longitudinal data from 12 health facilities – six outpatients and six inpatients – located in different malaria transmission zones. The NMCP and partners, including PMI, use the data to understand the burden of malaria in the catchment areas served by these facilities and how the burden is changing with intervention scale-up. Cases reported from the surveillance system are laboratory confirmed and can be considered to be valid and reliable. The data is used at multiple levels of the health system and by malaria partners for planning and tracking progress of interventions towards malaria control. It has also been used for the ongoing impact evaluation. Over the last 12 months, seven malaria reference centers (health center IVs) have been added to the malaria surveillance network. These malaria reference centers use an updated version of the HMIS tool – patient registers with space for capturing diagnostic results – to record malaria data. This information is crucial for interpreting the malaria case numbers from facilities. Other partners have recognized the improved quality of data provided by the reference centers, and have started similar surveillance activities in additional districts. The data from surveillance sites have positively impacted case management practices by health workers at health center IVs and hospitals through data dissemination workshops. A robust quality control system for microscopists has been initiated and the results indicate excellent performance in accuracy of blood slide readings across all sites.

2014 Malaria Indicator Survey (MIS)

PMI has worked with the NMCP and other partners to organize stakeholder meetings, determine methodology, and raise additional funds for the next MIS scheduled to start in November 2014. Efforts have been made to ensure comparability with the previous MIS (2009) and the DHS (2011). The MIS will provide data to assess the impact of the UBCC, and to better elucidate the impact of IRS in the northern districts. The results will be used to help guide future policy and programming decisions.

Impact Evaluation

From 2006 to 2011, the under-five mortality dropped by 34% in Uganda. During the same time period, Uganda has made substantial progress towards implementing malaria control interventions particularly distribution of ITNs, IRS, and IPTp for prevention and ACTs for case management. The Uganda RBM impact evaluation aims to measure changes in malaria morbidity and mortality following scale-up of malaria control interventions, particularly for the 10 year period (2001–2011) taking into account the implementation of other child survival programs. The results should be finalized and disseminated by 2015.

Strengthening HMIS and NMCP data management

When HMIS was updated in 2010, USG support to the system was also reorganized to ensure that a comprehensive and uniform support is provided for the entire country. The USG implementing partners provide support for printing tools, follow-up supportive supervision, training, data transmission (weekly surveillance and routine monthly data), and data dissemination to the MOH Resource Center (responsible for HMIS). PMI continues to support basic equipment at the district level to improve data collection and reporting (e.g. internet connection and internet technology maintenance), and has introduced data quality assessments in select districts. PMI assisted the NMCP and Resource Center to update HMIS data collection forms to include malaria test results; this will greatly improve the system to collect malaria-related data once the forms are disseminated. Data from private facilities remains largely absent from the HMIS, and efforts by PMI partners to include private facilities in data quality support activities to the district will continue in the coming year.

Following the roll-out of the WHO malaria tracking system (mTRAC), the MOH's mobile phone based tool to collect surveillance and malaria stock data at the health facility level, PMI implementing partners began to support DHMTs to improve reporting rates, and to act on the data being reported, especially around reported stockouts of ACTs. However, the quality of the data in mTRAC remains poor, and thus the system has not reached its full potential. The emphasis in the coming year will be to support UNICEF/WHO's existing work with the districts to improve the quality of the data reported through mTRAC.

PMI continues to support the M&E unit of the NMCP; the focus in FY 2013 was to revive the Quarterly Bulletin, collect and disseminate data necessary for the Midterm Review of the current Strategic Plan and for the new Reduction Strategy, to monitor the UBCC, and to analyze data to needed to make informed choices for MIS methodology and shifting IRS strategy. Since FY 2013, four Malaria Bulletins have been published and disseminated to key stakeholders. The Malaria Bulletin is a useful tool for reviewing malaria data reported through HMIS and surveillance network and has been well received.

Implementing partner monitoring and evaluation

PMI contributes to a USAID/Uganda Mission-wide data collection mechanism for all implementing partners. This project assists partners in developing performance management plans, collecting data and conducting data quality assessments.

Challenges, opportunities and threats

Improvements have been made in Uganda in the monitoring, evaluation, and surveillance of malaria over the past several years. However, challenges remain. These challenges can be categorized into either gaps in human capacity or gaps in appropriate and functional tools. The NMCP's M&E unit continues to be weak and understaffed. Recent addition of a fellow in the Field Epidemiology and Laboratory Training Program (FELTP) to assist with data review and publication of the quarterly bulletin has helped the NMCP with key M&E activities. However, additional staff is needed to make better use of improved malaria surveillance data for programmatic decision making as well as donor reporting. Malaria database, if working properly, could help the NMCP store, analyze, and make use of malaria data from HMIS, supply chain systems, intervention activities, and partners. Over the years, attempts have been made to address the problem, but lack of technical expertise and a clear strategy by the NMCP has hampered progress.

With increased availability of diagnostic supplies, the quality of health facility-based malaria data should continue to improve. In addition, with PMI's support for the Uganda Malaria Surveillance Network using a mix of sentinel surveillance sites and malaria reference centers, the NMCP should be in a better position to use data with increased confidence. The NMCP should continue to focus on improving the quality of facility-based malaria data while ensuring that the DHIS2 meets the current and future needs of malaria surveillance and monitoring activities in Uganda.

A potential threat for the NMCP is loss of staff positions and turnover. A recently hired staff position to manage, analyze and report on malaria surveillance data should be continued to ensure that NMCP's surveillance and M&E capacity continues to be built.

Table 8: Data Source Table

Data Source	Survey Activities	Year								
		2009	2010	2011	2012	2013	2014	2015	2016	2017
Household surveys	Demographic Health Survey (DHS)*			X					X	
	Malaria Indicator Survey (MIS)	X					X			
	Northern Uganda Anemia & Parasitemia study					X				
Health Facility and Other Surveys	School-based malaria survey									
	Health facility survey									
	SPA survey*									
	EUV survey		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
	Support to HMIS	X	X	X	X	X	X	X	X	X
Therapeutic	In vivo efficacy testing			X		X	X		X	X
Entomology	Entomological surveillance and resistance monitoring	X		X	X	X	X	X	X	X
Other Data Sources	Malaria Impact Evaluation					X	X			
Household observation and lab testing	LLINs durability monitoring study						X	X	X	X

*Not PMI funded

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Proposed PMI activities with FY 2015 funding: (\$2,375 000)

Uganda's M&E plan for FY 2015 will focus on:

- continuing support to build malaria surveillance capacity using a mix of health facilities – sentinel sites, malaria reference centers and existing health facilities
- ensuring all surveillance efforts are coordinated and data are fed into the NMCP's M&E unit
- utilizing malaria surveillance capacity to monitor changes in malaria burden as intervention strategies are changed
- monitoring the effectiveness of existing interventions through
 - net durability monitoring
 - insecticide resistance monitoring

The Uganda NMCP has successfully completed universal net coverage campaign in 2014, providing an important opportunity to rethink the current vector control strategy. In addition, increased malaria surveillance capacity built up over the years through continued support of sentinel surveillance sites, can now be leveraged to monitor changes in malaria burden as interventions are changed. This will provide NMCP with ability to monitor the changes in impact of malaria interventions over time.

PMI FY 2015 funds will:

- **Support malaria surveillance network:** PMI has supported malaria surveillance since 2006. In order to leverage the lessons learned and consistent with the recommendations from the PMI external evaluation, Uganda will move towards establishing a malaria surveillance network that includes a mix of sentinel sites and malaria reference centers. Malaria reference centers are designed to capture and report laboratory confirmed malaria data, but not require as high level of resources as sentinel sites. Malaria reference centers use revised HMIS patient registers (with appropriate space to capture malaria test results) for data capture and reporting and cost approximately a third of sentinel sites. The new outpatient register will be rolled out nationally by the MOH by 2015 and reference centers will play an important role in optimizing the rollout. As a part of the malaria surveillance network strategy, all six of the existing malaria outpatient sentinel sites will evolve into malaria reference centers with a corresponding increase in the number of sites and increased geographical coverage. The six inpatient sentinel sites will continue to collect high quality, in-depth data on malaria cases and case management practice and continue to share the data with the NMCP. New reference centers will be strategically located to monitor the malaria burden in districts that are targeted for change in intervention coverage – specifically, this will include health centers in current sentinel sites and reference centers not in IRS districts, and reference centers in districts likely to be future IRS or iCCM locations. PMI will continue to encourage non-malaria stakeholders to leverage reference centers for their own surveillance and studies. (\$450,000)
- **Support enhanced surveillance in previous IRS districts and iCCM districts:** As IRS is removed from districts in northern Uganda after the completion of the UBCC, it will be important to monitor for increases in malaria cases. Enhancing the existing outpatient HMIS system with high levels of parasitological diagnosis and better quality data will allow for an accurate understanding of malaria burden in districts with good ITN coverage but no longer IRS. Also, as PMI supports

district scale-up of iCCM, enhancing surveillance not only at high level health centers (IIIs and IVs), but also at lower levels (health center IIs and in the community) will be vital to monitor iCCM's success. (\$150,000)

- **Program monitoring and tracking system development at subnational level:** PMI will continue to support the HMIS at district and health facility levels, in coordination with the overall USG support from USAID, PEPFAR, and CDC. With FY 2015 funding, PMI support will focus on collecting high quality, complete, and timely malaria data using HMIS. PMI funds will also support training of the persons involved in collecting and analysis of malaria data at the district and health-facility levels. (\$690,000)
- **PMI data collection and reporting:** PMI will continue to support the USAID/Uganda Mission-wide M&E Project to serve as the central data collection point for all implementing partners. (\$100,000)
- **Program monitoring and tracking system development - NMCP:** PMI will continue to support the M&E unit at the NMCP to improve their capacity for data collection, analysis, and reporting. PMI will also continue to support and actively participate in NMCP's M&E TWG to ensure coordination of data collection across partners. (\$100,000)
- **Entomologic surveillance and case monitoring:** PMI will continue to build local entomologic capacity by assisting the NMCP/Vector Control Division at central and district levels including Gulu University to conduct comprehensive vector surveillance, including the nation-wide biennial six sentinel site resistance surveys; monthly insecticide decay rate monitoring; vector taxonomy on a small scale, and density and behavior studies done during entomological activities in bionomic studies to determine resistance mechanisms. Indicators will be measured in four IRS districts. In addition, we support an ongoing vector bionomics study being carried out monthly in two IRS districts and one non-IRS district where each district has two sentinel sites. The CDC bottle bioassay will be run in two IRS districts, one withdrawn IRS district, and one district never sprayed to compare the effects of IRS on malaria mosquito susceptibility to IRS insecticides. Malaria case surveillance will be enhanced in at least one health center in every IRS district. FY 2015 funds will support training, field costs, procurement of equipment, supplies, laboratory maintenance, and sample analysis. PMI will also support maintenance of three insectaries in collaboration with the Vector Control Division (Kampala), MENTOR Initiative (Tororo), and Gulu University. (\$600,000)
- **LLIN longevity:** With FY 2015 fund PMI will support the second year of the prospective ITN monitoring study that includes: 1) estimations of net survivorship/attrition and physical integrity in two sites, 2) measuring bioefficacy using cone bioassays, and 3) measuring hole development through time. (\$160,000)
- **End-use verification:** PMI will continue to conduct EUV surveys annually in 75 randomly selected health facilities in ten districts to determine the availability of antimalarials at the end user level and how effective supply chain systems are used in managing malaria commodities. The EUV surveys provide useful data on

supply chain management and malaria case management, which can be used to strengthen the health care system through informed decision making. (\$100,000)

- **Two TDYs from CDC-Atlanta:** CDC staff will provide technical support for M&E activities including the HMIS, malaria reference centers, and operations research projects. Two visits are planned to ensure adequate follow up of planned activities as one visit would not adequately cover all on-going activities. (\$25,000)

OPERATIONAL RESEARCH

Uganda malaria epidemiology is undergoing rapid changes as effective interventions are scaled up. Progress in case management and the recent completion of the UBCC provide an opportunity to further refine and refocus Uganda's IRS strategy in the geographical areas with historically high malaria transmission. Uganda's resources do not allow for full implementation of all chosen vector control interventions, but partial implementation has so far still proven successful.²² Reducing the rate of malaria transmission through vector control may not have an impact on the parasite prevalence in the community until it is reduced to a very low level. However, recent analysis by the Uganda Malaria Surveillance Project has shown that an incremental reduction in malaria transmission or the entomological inoculation rate reduces severe disease (especially severe anemia) and mortality, particularly for children under one year of age.

The proposed OR study assesses the impact of withdrawing IRS from northern Uganda (see IRS section) where it has been used to successfully drive down transmission. The study will assess malaria epidemiology in the areas currently and previously sprayed, and identify whether withdrawing IRS from low transmission areas to focus on higher burden areas is an effective and cost-effective way of providing vector control interventions. Upsurges in malaria cases after IRS is removed, especially in districts with universal coverage of ITNs, will be of particular interest. The study will use health facility data from existing surveillance, and collect additional data on ITN use and barriers to use (in both current and previous IRS districts), and additional data on direct and indirect costs associated with malaria. The additional data collected for this study will be gathered from household surveys, and may include measurements of anemia and parasitemia. This study will serve to answer one of the priority OR questions for PMI, namely "Evaluate whether ITNs and/or other interventions can effectively provide an "exit strategy" for IRS in areas that are to stop routine IRS." (\$150,000)

²² PMI Impact Evaluation, 2014

Table 9: Completed OR Studies

Completed OR Studies			
Title	Start date	End date	Budget
Home-based management of fever	2007	2007	\$100,000
Validation of verbal autopsies	2007	2007	\$300,000
Effectiveness of post-campaign door-to-door hang-up and communication interventions to increase LLIN utilization	12/2010	07/2011	\$230,000
Ongoing OR Studies			
Title	Start date (est.)	End date (est.)	Budget
Net Care and Repair Behaviors: Formative Research in Uganda	03/2013	04/2014	\$175,000
Planned OR Studies FY15			
Title	Start date (est.)	End date (est.)	Budget
IRS withdrawal monitoring and response ²³	2015	2016	150,000

CROSS-CUTTING BEHAVIOR CHANGE AND COMMUNICATION (BCC)

NMCP/PMI Objectives

The new UMRS provides a revised framework for rapid and synchronized nationwide scale-up of cost effective malaria interventions to achieve universal coverage of malaria prevention and treatment. Strategic objective four of the UMRS proposes that at least 85% of the population should undertake correct practices in malaria prevention and treatment by 2017. Through this objective, the NMCP will increase BCC investment and advocacy for malaria prevention and control at all levels, increase involvement of the private sector/business community in malaria prevention and control, strengthen community mobilization to increase skills around malaria prevention as well as uptake of all key malaria interventions. The NMCP continues to maintain BCC focal persons at the national and district levels, and a senior health educator to coordinate advocacy and social mobilization activities at the national level. These individuals create opportunities for national and district level support for malaria BCC interventions. At the district level, these health educators coordinate BCC programs in collaboration with the Malaria Focal Person (MFP).

Additionally, Uganda has a BCC technical working group (TWG) that was established in 2008 to coordinate activities across partners. The TWG meets whenever the need arises, with the primary function being to develop and review communication strategies. The TWG is also responsible for reviewing the technical content of all BCC messages pertaining to malaria to ensure accuracy and harmonization of messages.

PMI will continue to support Uganda's national BCC strategy and its implementation as envisaged in the UMRS based on the available technical evidence and in response to the findings of the midterm review. BCC will be carried out through various channels of communication, based on specific attributes of the target audiences, such as literacy levels, access to television or radio, and other social and economic characteristics. In general,

²³ To assess the impact of withdrawing IRS in the northern Uganda and identify the gaps in knowledge and practices that can answer key questions about how the proposed changes to IRS areas will impact the malaria

households and families will be reached through various approaches including interpersonal communication, interactive performance media, group communication, education with entertainment, information broadcasting and print media using avenues such as radio, community drama, printed materials, community and religious leaders, community support groups, and household visits.

Progress since PMI launch

PMI's efforts to date have focused on national, district, health facility, and community levels. PMI has focused on changing attitudes and modifying behaviors of targeted audiences through well managed BCC programs. The main audiences for focused PMI BCC programs have been communities at large, community leaders, pregnant women, children, caretakers, health workers, and drug dispensers.

Progress in the last 12 months

PMI continued supporting BCC as a cross-cutting activity focusing on all interventions: case management including diagnostics, ITNs, and IPTp. The current IRS contract also incorporates a BCC component. PMI activities continued to focus on key behaviors that need to be emphasized, i.e. regular use of bed nets and prompt diagnosis and treatment with ACTs for patients with fever. In the last 12 months, PMI implementing partner reports indicate that activities reached four million Ugandans with key messages around net use, care seeking, and IPTp treatment through radio talk shows, school activities, and community mobilization through village health workers. Their outreach included 610 schools and approximately 484,000 school children.

PMI continues to support two BCC studies in Uganda. The first study is intended to provide information on social behavior regarding net washing, how households/communities value nets, magnitudes of misuse of nets as well as types of net misuse. The second study is addressing the aspect of care and repair of ITNs after the universal coverage distribution in four Eastern districts that was carried out in August 2012. It is a prospective study to assess what happens to a net from the point of distribution to the point of wear and tear. A strong BCC program has been part of one arm of this study to document differences in household behaviors in regard to the care and repair of nets. A midterm qualitative assessment of the net care and repair study presented in late 2013 indicated that the campaign message recall and the associated care and repair behaviors in the intervention district seemed to be stronger in the intervention as compared to the control district, further suggesting that targeted BCC is effective. Following universal net coverage in both the intervention and control districts, the timelines for the two studies were revised, and study results will now be available in late 2014. The results, when ready, will be used to improve BCC activities funded through PMI.

Challenges, opportunities and threats

The midterm review identified a number of challenges that must be addressed for malaria BCC to be effective. They include an inadequate mix of BCC channels of communication, missed opportunities for integration of BCC within the different components of the NMCP activities, and uncoordinated BCC which hinders behavior change and adoption. However, opportunities exist to address these gaps, including opportunities for improved coordination among stakeholders and within different NMCP components, and the expansion and strengthening of the partnership among institutions that provide funds for BCC. There are also opportunities for leveraging resources from the private sector; improving integration of BCC activities across interventions and building on critical competences existing among core

BCC staff. Additionally, there are opportunities for the institutionalization of quarterly and annual planning and review meetings among stakeholders to monitor progress of BCC activities at the national and lower levels.

Plans and justification

In the coming year, PMI will enhance BCC efforts in areas from where IRS will be shifted by ensuring that there is good net usage as IRS is withdrawn; communicating an effective message of iCCM in districts where iCCM is being added; increasing the focus on interpersonal communication; encouraging malaria messaging in PEPFAR programs; and ensuring a strong BCC technical working group at national level whose main focus is on BCC being used to drive down malaria prevalence in Uganda.

In order to increase focus and effectiveness of BCC messages, PMI Uganda's larger effort will be on interpersonal communication. To achieve this, PMI will emphasize and strengthen the role of health workers, health assistants, and community volunteers including VHTs, peer-to-peer outreaches, non-government organization staff, and Peace Corps Volunteers. Interpersonal communication will be especially important in northern Uganda as a critical/targeted intervention to cover the areas that are moving away from IRS. PMI Uganda will also emphasize interpersonal communication in areas of high transmission and will consider areas where sentinel sites already exist to monitor any changes. Overall, the PMI Uganda BCC approach will be focused and targeted in order to achieve the highest impact in terms of reach and the resulting behavior change.

PMI will continue using a BCC tracking tool to assess the impact of previous BCC efforts with FY 2014 funds to provide guidance on how to prioritize FY 2015 activities, including actions necessary to improve poor IPTp2 uptake. The assessment will also provide useful background information for the plans to address the importance of diagnosis as well adherence to test results. Effective approaches will be identified and adopted for continuation in FY 2015. Based on this assessment, and in alignment with the MTR and UMRS, PMI will continue to provide support for all types of BCC at national, district, and community level, with emphasis on interpersonal communication.

Proposed PMI activities with FY 2015 funding: (900,000)

PMI BCC activities in FY 2015 will continue to focus on increasing awareness, demand, and usage of malaria prevention and control interventions. BCC will be implemented through the following activities:

- **Continue supporting targeted and evidence-based BCC at national, district, and community level to encourage consistent and proper use of ITNs.** PMI will continue to promote ITN usage through community mobilization and mass media activities including integrated health outreaches, television, radio talk shows, radio spots, billboards, and community meetings. (\$200,000)
- **Continue supporting activities that focus on increased usage of IPTp by pregnant women.** PMI will continue supporting community outreach through health workers and VHTs by printing/distributing IPTp job aides and informational materials to increase demand and utilization of IPTp. (\$150,000)

- **Promotion of prompt care seeking behaviors for suspected malaria and parasitological-based diagnosis and appropriate treatment for those with confirmed malaria.** A major focus will be placed on creating demand for diagnostics by health workers and patients, appropriate treatment, and adherence to prescribed treatment by health care providers. PMI will also continue to support the test, treat, and track campaign to increase demand for testing for malaria followed by appropriate treatment. In addition, PMI will support effective communication on iCCM in districts where iCCM is being added. This activity will also leverage resources from the private sector. (\$400,000)
- **Enhance BCC efforts in areas where IRS has been removed.**In areas from where IRS is shifted, PMI through its Mission health partners , will explain the rationale for withdrawing IRS and emphasize the need to sleep under nets through community mobilization and mass media activities. (150,000)

HEALTH SYSTEMS STRENGTHENING/CAPACITY BUILDING

NMCP/PMI Objectives

Uganda continues to struggle to provide high-quality services in all parts of the country, especially the hard-to-reach rural areas. While USAID programs support technical assistance to improve Uganda's Human Resources for Health (HRH) in the country, the systemic challenges in recruitment, retention, and effective human resource management remain at all service delivery levels.

Building NMCP and MOH capacity to implement effective malaria control activities continue to be a priority for USG support in Uganda and is an integral part of PMI's contribution to strengthening the national health system. Wherever practical, PMI has implemented malaria control activities together with other major health programs, particularly those for maternal and child health (MCH), routine immunization, HIV/AIDS, tuberculosis, and other vector-borne diseases. PMI focuses on the following areas:

- Strengthening health information systems
- Building leadership and technical capacity in the NMCP
- Linking and integrating malaria and MCH health services
- Supporting pharmaceutical and supply chain management
- Improving laboratory diagnostic services

Progress since PMI launch

The President's Malaria Initiative, USAID/Uganda, PEPFAR, and the GOU have increased the emphasis on health system strengthening. PMI provided support to health system strengthening through its implementing partners and the integrated USAID/Uganda's health system approach. In collaboration with PEPFAR and other USAID health programs, PMI supported improving workforce policy and planning through: 1) strengthening human resource units within MOH and its information systems; 2) development and implementation of evidence-based human resources strategies; 3) advocating for policies that increased workforce retention and productivity; and 4) developing in-service and pre-service training plans aligned to the actual needs.

Since 2008, PMI has supported NMCP to recruit two fellows under the Field Epidemiology and Laboratory Training Program (FELTP). The two fellows are being trained in epidemiology and disease outbreak investigation.

Capacity-building of the NMCP has been continuously supported by the two PMI Senior Technical Advisors and two Malaria Program Management Specialists on all aspects of malaria control activities and programming. These advisors have played key roles in the country's malaria technical working groups, RBM partners' forums, and coordination taskforces. Since 2008, PMI has also equipped the NMCP with computers and accessories, scanners and photocopiers.

As part of the wider health system, the private sector continues to play an important role in the delivery of health services in Uganda, with more than 60% of the population seeking care from the private sector as their first point of entry into the health system.²⁴ PMI has been supporting the private sector and increased private sector involvement in malaria control and has engaged at least 15 major corporations that invested their own funds to provide malaria services to both their workers and surrounding communities. PMI has been also providing malaria commodities to PNFPs.

Progress in the last 12 months

With support from PMI in FY 2013/2014, HRH strengthening efforts have resulted in an increase in the GOU's wage bill, and recruitment of additional staff in key cadres, especially at the health center IV level. Consequently the number of staff positions filled has improved to approximately 70 %. The 2011 and 2013 Health Facility Assessments conducted by PMI's implementing partner, show changes in staffing related to malaria show an increase in the number of doctors and nurses. However, these changes are mainly at hospitals and health center IV's, with no changes in lower level facilities.

Additionally, the 2013 World Bank Service Delivery Indicator survey showed absenteeism rates still over 50% (61% in public facilities). This suggests the need for PMI to support new performance-based approaches to increase health worker productivity. Such approaches will be addressed in coordination with all USAID/Uganda's health partners.

With PMI funds, NMCP received support to develop the new NMCP's Malaria Strategic Reduction Plan 2014-2020.

During the last 12 months, PMI support to the private sector has led to increased private sector involvement in malaria control through ongoing support to the PNFP health facilities through PMI's implementing partners.

Proposed PMI activities with FY 2015 funding: (\$880,000)

With FY 2015 funds, PMI will continue to support workforce planning and training; strengthen human resource information systems; support development and implementation of evidence-based human resources strategies; strengthen human resource units within MOH, local government, and NMCP; advocate for policies that increase workforce retention and productivity; and develop in-service and pre-service training plans aligned to the actual needs. New areas of focus will be using implementing partners to strengthen licensing and

²⁴ Uganda National Household Survey 2006, Ministry of Health

services through drug shops, and to ensure that PFP facilities receive supportive supervision and assistance with HMIS reporting. Specific activities include:

- **Capacity building support to NMCP:** PMI will continue to support the NMCP to strengthen coordination with malaria stakeholders through RBM coordination meetings, and supportive supervision for district-level program implementation. PMI will also continue targeted support to NMCP to improve its ability to carry out its managerial and operational responsibilities. (\$100,000)
- **Support to pre-service training:** Though this activity has been delayed, it is critical. So PMI will support updating the curriculum for malaria case management in key institutions that train clinical staff. This will include each cadre of health workers potentially addressing malaria (doctors, clinical officers, different levels of nurses, midwives). Once the curriculum is developed, it will be rolled out to the schools across Uganda. (\$100,000)
- **Field Epidemiology and Laboratory Training Program:** PMI will support strengthening of national capacity for program planning, management, and monitoring through practical field placements of recent graduates in well-performing malaria programs where they can be mentored by experienced program managers (both GOU and NGO). Through these placements, the graduates will receive on-the-job training. This initiative will fund at least two students to follow the malaria track in CDC's two-year Field Epidemiology and Laboratory Training Program (FELTP). (\$150,000)
- **Human resources for health:** PMI will continue supporting the USAID/Uganda sector-wide initiative to address human resource shortages and develop the capacity of the health workforce at national and district level. The evaluation of this project pointed to the need for productivity-enhancing approaches. Therefore, the proposed HRH project will pilot new performance-based approaches. This support will help prioritize the recruitment, retention, and performance of health workers who will address health issues with the greatest burden on Ugandans, including malaria. USAID/Uganda's district-based programs will implement the HRH support package (including leadership capacity development, performance management) developed by the USAID/Uganda HRH technical assistance program. PMI's investment leverages over \$2 million of PEPFAR and other USG health investments for this area of health system strengthening. This activity will also include support for central /national MOH leadership training. (\$500,000)
- **Peace Corps / PMI collaboration** PMI will support placement, training, and small scale malaria projects through third-year Peace Corps Volunteers, and their counterparts to prevent, control, and treat malaria at community level. (\$30,000)

STAFFING AND ADMINISTRATION

Two health professionals serve as Resident Advisors to oversee the PMI in Uganda, one representing CDC and one representing USAID. In addition, one or more Foreign Service Nationals (FSNs) work as part of the PMI team. All PMI staff members are part of a single inter-agency 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.

Budget:

The proposed budget for staffing and administration in FY 2015 is \$1,210,000.

PMI UGANDA MOP FY 2015

TABLE 1

Partner Organization	Geographic Area	Activity	Total Budget (\$)
Abt/IRS II project	Eastern, East Central	One round of OP spraying in nine Eastern and East Central districts.	12,915,000
JSI/DELIVER	National	Procure LLINs, ACTs, IV artesunate, SPs and RDTs.	7,882,500
TBD/Malaria Project	Central, Mid-West, North West	Distribution of free LLINs to pregnant women through ANC/EPI and rural based school distribution, promote correct and consistent use of LLINs, IPTp uptake, correct diagnosis and prompt treatment. Strengthen IPTp, case management, and routine data systems at district level. Promote all forms of BCC for malaria interventions with particular focus on creating demand for diagnostics and appropriate treatment. Support pre-service training and strengthen the capacity of NMCP and DHMTs.	4,542,000
Plan/NU-HITES project	Northern Uganda	NU-HITES will promote consistent and proper use of LLINs, support distribution of free LLINs to pregnant women, strengthen correct diagnosis and prompt treatment in the public sector, promote all forms of BCC for the malaria interventions with particular focus on creating demand for diagnostics and proper treatment, promote interpersonal communication, and support routine data systems at the facility and district levels.	864,000
TBD/regional health projects	East, East Central, South West Uganda	Regional health projects will support distribution of free LLINs to pregnant women, promote use of LLINs, increase IPTp uptake, strengthen correct diagnosis and prompt treatment in public sector, promote all forms of BCC for malaria interventions with particular focus on creating demand for diagnostics and appropriate treatment, and support routine data systems at facility and district levels.	2,029,000

TBD/social marketing project	National	Promote IPTp in small to medium private sector health clinics in order to increase IPTp uptake through DOT, early detection of MIP, and build capacity of private sector health care provision. Support to improve networking, quality of services, and supervision for case management. Strengthen the national BCC campaign to reinforce the roles of small and medium private health providers for improved malaria prevention and treatment services.	450,000
Cardno/Private Health Sector (PHS) project	Central, Mid West	Strategic improvement of diagnostics (1:1 matching) in selected large private companies.	100,000
TBD/commodity project	National	Pharmaceutical supply chain strengthening at central, regional, and district levels.	600,000
FHI 360/Communication for Healthy Communities (CHC)	National	Support nationwide BCC activities to increase the adoption of all malaria interventions.	600,000
Peace Corps	National	Malaria awareness training and small project assistance for PCVs/PCRVs and community counterparts.	30,000
GEMS/CADMUS		Environmental compliance	40,000
TBD/end user verification	National	Technical assistance to MOH to determine extent to which antimalarials are available at the end user level and how effectively supply chain systems are used to manage malaria commodities.	100,000
UMSP	National	Support national malaria surveillance centers and diagnostic training.	800,000
QED/M&E learning program	National	PMI data collection, dissemination, reporting, DQAs and partner meetings.	100,000
FELTP	National	Support two FELTP students for program planning, management, and monitoring in the M&E unit of the NMCP.	150,000
TBD/HRH project	National	Strengthening HRH system for improved health care quality and health workforce management practices at NMCP, DHMTs and facility levels.	500,000
TDYs	National	Seven CDC TDY technical assistance visits for planning and monitoring entomological, vector control activities, and supervision of IRS activities; strengthen diagnostics and quality of case management for severe and uncomplicated malaria; sentinel	87,500

		site surveillance and in dissemination of Uganda MIS2014.	
CDC	National	Staffing and administration.	550,000
USAID	National	Staffing and administration.	660,000
Total			33,000,000

PMI UGANDA MOP FY 2015

TABLE 2

Proposed Activity	Mechanism	FY 2015 Total	FY 2015 commodities	Description of Activity	Geographic Area
PREVENTION					
ITNs					
Procurement of LLINs	DELIVER	5,372,500	5,372,500	Procure 1,096,429 LLINs at \$4.90/net	National
Mixed distribution of LLINs through multiple outlets	TBD/malaria project	1,200,000	0	Routine distribution of free LLINs to pregnant women and care givers at ANC and EPI visits respectively; and continuous distribution through 63 rural based primary school outlets in hard-to-reach remote areas..	Central, Mid-West, North West
Routine LLINs distribution through ANC/EPI services	NU-HITES	142,000	0	Routine distribution of free LLINs to pregnant women and caregivers at ANC and EPI visits respectively.	Northern
Routine LLINs distribution through ANC/EPI services	TBD/regional health projects	458,000	0	Routine distribution of free LLINs to pregnant women and caregivers at ANC and EPI visits, respectively.	East, East Central, South West
Subtotal		7,172,500	5,372,500		
IRS					
Support for IRS	Abt Associates	12,000,000	8,550,000	One round of spraying with OP in nine high burden districts to protect approximately three million people in the Eastern and East Central regions.	Eastern, East Central
Develop local capacity to plan, manage and oversee quality IRS	Abt Associates	300,000	0	Capacity building of GOU/MOH/NMCP, NEMA, and district government to plan, manage, and oversee technical quality, environmental monitoring, and accountability of IRS programs in Uganda; support environmental monitoring in Kumi and Ngora Districts to be sprayed by the GOU/NMCP. Support NMCP to identify potential senior agriculture corporations; enhance corporate engagement on IRS programs through increased advocacy for companies to protect their workers and communities through leveraging corporate strengths including logistics, distribution and	National

				communication; and provide critical technical expertise in organizing, implementing, and monitoring and evaluating the IRS programs.	
Environmental compliance	GEMS/CADMUS	40,000		External environmental compliance visit	National
Entomology equipment and supplies	Abt Associates	15,000	15,000	Procure entomology equipment, supplies, and reagents in support of NMCP and districts.	National
3 TDYs	CDC	37,500	0	Technical assistance visits for planning and monitoring entomological, vector control activities, and supervision of IRS activities.	National
Subtotal		12,392,500	8,565,000		
MIP					
IPTp strengthening in public sector	TBD/malaria project	419,500	0	Support NMCP and DHTs in the implementation of the new IPTp policy guidelines; training of newly recruited health workers in MIP as there is a high turnover of staff; support NMCP and DHTs to address the barriers identified in the low IPTp uptake; continuing IPTp focused supportive supervisions, and provision of safe water, and cups to aid with DOT.	Central, Mid West, North West
IPTp strengthening in public sector	NU-HITES	32,000	0	As an integrated project, NU-HITES will leverage funds from PEPFAR for training of newly recruited health workers in MIP as there is a high turnover of staff; support NMCP and DHTs to address the barriers identified in the low IPTp uptake; continuing IPTp focused supportive supervision; provision of safe water and cups to aid with DOT.	Northern
IPTp strengthening in public sector	TBD/regional health projects	101,000	0	As an integrated project, TBD/regional health project will leverage funds from PEPFAR for training of newly recruited health workers in MIP as there is a high turnover of staff; support NMCP and DHTs to address the barriers identified in the low IPTp uptake; continuing IPTp focused supportive supervision; and provision of	East, East Central, South West

				safe water and cups to aid with DOT.	
IPTp strengthening in private sector (private clinics/pharmacies)	TBD/social marketing project	100,000	0	Strengthen private health sector capacity in implementing the national malaria reduction strategy in the management of MIP. Support BCC for ANC clients seeking care at private facilities and allow PMI to leverage ongoing support from PEPFAR and MCH funds for private sector.	Central, Mid West, North West
Subtotal		652,500			
Subtotal: Prevention		20,247,502			
Case Management					
Diagnosis					
Procurement of malaria diagnostics and supplies	DELIVER	610,000	610,000	Procurement of malaria diagnostics and supplies.	National
Procurement of RDTs for strengthening iCCM in two TBD districts	DELIVER (Procurement)	250,000	250,000	Procurement of RDTs through DELIVER to Joint Medical Store (JMS) for two integrated community case management (iCCM) districts.	Central
Strengthen malaria diagnostic capacity in the public sector	TBD/Malaria project	800,000	0	Support case management trainings that focus on appropriate diagnosis, QA/QC, and supportive supervision for diagnostics.	Central, Mid West, North West
Strengthen malaria diagnostic capacity in the public sector	NU-HITES	190,000	0	Support case management trainings that focus on appropriate diagnosis, QA/QC, and supportive supervision for diagnostics.	Northern
Strengthen malaria diagnostic capacity in the public sector	TBD/regional health projects	510,000	0	Support case management trainings that focus on appropriate diagnosis, QA/QC, and supportive supervision for diagnostics.	East, East Central, South West
Strengthen malaria diagnostic capacity in the private sector (large companies)	PHS project	100,000	0	Strategic improvement of diagnostics (1:1 matching) to selected large private companies.	Central, Mid West,

1 TDY	CDC	12,500	0	Technical assistance to strengthen diagnostics.	National
Subtotal		2,472,500	860,000		
Treatment					
Procurement of malaria drugs	DELIVER	1,500,000	1,500,000	Support procurement of drugs including ACTs, SP, severe malaria medicines and supplies for the treatment of malaria.	National
Procurement of ACTs for strengthening iCCM in two TBD districts	DELIVER	150,000	150,000	Procurement of ACTs through DELIVER to JMS for iCCM districts.	Central
Strengthening case management in public sector	TBD/malaria project	1,082,500		Strengthening case management, including parasitological diagnosis of uncomplicated and severe malaria in public, and private not-for-profit health facilities. Provide supportive supervision, in collaboration with the NMCP and DHMTs, for case management, including in-service training in the TBD districts.	Central, Mid West, North West
Strengthening case management in public sector	NU-HITES	300,000		Strengthening case management, including parasitological diagnosis of uncomplicated and severe malaria in public, and private not-for-profit health facilities. Provide supportive supervision, in collaboration with the NMCP and DHMTs, for case management, including in-service training in the 15 NUHITES districts.	Northern
Strengthening case management in public sector	TBD/regional health projects	700,000		Strengthening case management, including parasitological diagnosis of uncomplicated and severe malaria in public, and private not-for-profit health facilities. Provide supportive supervision, in collaboration with the NMCP and DHMTs, for case management, including in-service training in the RHITES regional projects.	East, East Central, South West

Strengthening case management in private sector	TBD/social marketing project	250,000		Build capacity of small to medium clinics in the private sector in health care provision including technical assistant, networking, quality improvement and supportive supervision for case management, and reporting of high quality data.	Central, Mid West, North West
1 TDY	CDC	12,500		Technical assistance to strengthen quality of case management for severe and uncomplicated malaria.	National
Subtotal		3,995,000	1,650,000		
Drug Resistance Monitoring					
Therapeutic efficacy studies (TES)	UMSP	200,000		Conduct TES in four sites alternating every year.	TBD
Subtotal		200,000			
Pharmaceutical management					
Pharmaceutical supply chain management	TBDcommodity/supply chain project	600,000		TA to JMS for improved quantification and forecasting, procurement, warehousing, distribution, logistic management information system (LMIS) and reporting plus expansion to district level including iCCM districts. Provide support at national level for quality assurance of antimalarials, RDTs, and post-marketing surveillance.	National
Subtotal		600,000			
Subtotal: Case management		7,267,500			
Monitoring and Evaluation					
Strengthen national malaria surveillance	UMSP	450,000		Strengthen national malaria surveillance by: 1) improving data quality at health facilities, 2) improve timeliness and completeness of reported data, 3) use of data for decision making at health facilities, district, regional performance monitoring teams and at national level. Geographical area will expand beyond original sentinel sites and will include new IRS districts.	National

Surveillance in former IRS districts and new iCCM districts	UMSP	150,000		Strengthen malaria surveillance by linking village health teams (VHTs) reporting to the health facility's reporting system in the two iCCM districts. Monitor potential changes in malaria burden in former IRS districts.	Central
Support to routine data systems at district levels	TBD/malaria project	330,000		Support M&E of malaria activities in the TBD districts specifically data analysis at facility and district levels.	Central, Mid West, North West
Support to routine data systems at district levels	NU-HITES	100,000		Support M&E of malaria activities in the 15 NU-HITES districts; specifically data analysis at facility and district levels.	Northern
Support to routine data systems at district levels	TBD/regional health projects	260,000		Support M&E of malaria activities in the TBD/regional projects; specifically data analysis at facility and district levels.	East, East Central, South West
Continued support to USG M&E systems	QED/M&E learning program	100,000		PMI data collection, dissemination, reporting, DQAs and partner meetings, and track IEC/BCC implementation status in the country.	National
Strengthen NMCP M&E unit	TBD/malaria project	100,000		Supportive supervision, sustain databases for NMCP to track programmatic progress in key malaria intervention areas.	National
Entomological surveillance and monitoring	Abt Associates	600,000	75,000	Maintain six sites for entomological surveillance and monitoring; national resistance monitoring and vector bionomics; molecular analysis of resistance mechanisms in three sites, case monitoring in IRS areas.	National
Monitoring for net attrition, survival, physical integrity and bio-efficacy	TBD/malaria project	160,000		Monitoring with special emphasis on the areas where IRS will be withdrawn and net use and efficacy must be maintained.	National
End-use verification	TBD	100,000		Conduct health facility surveys to monitor the availability of key malaria commodities at end user level. Review available data from existing health facility survey (SPARS) to rationalize the data collected by various implementing partners. Explore the potential for harmonizing the data collection tools and avoid duplicated efforts.	National

2 TDYs	CDC	25,000		Technical assistance visits for national malaria surveillance and PMI intervention.	National
Subtotal: M&E		2,375,000	75,000		
Operational Research					
Identifying emerging issues in post-IRS areas	TBD/malaria project	150,000		OR will be used to assess the impact of withdrawing IRS from area where it has been used to decrease transmission and adding IRS to high burden areas. The study will also identify barriers to effective interventions such as ITNs and/or any other emerging issues that may develop in the former and current IRS districts. Results will help further inform PMI's IRS strategy in Uganda.	National
Subtotal: OR		150,000			
Cross-cutting BCC					
IEC/BCC	TBD/malaria project	100,000		Support comprehensive BCC in correct and consistent use, care, and repair of INTs, increasing IPTp uptake, improving early and accurate diagnosis of malaria at facility and community levels.	Central, Mid West, North West
IEC/BCC	NU-HITES	100,000		Support comprehensive BCC in correct and consistency use, care and repair of INTs, increasing IPTp uptake, improving early and correct diagnosis of malaria at facility and community levels with particular focus in areas where PMI Uganda is withdrawing IRS.	Northern
IEC/BCC	TBD/social marketing project	100,000		Support national BCC campaign to reinforce the role of small and medium private health providers; work through mass media and interpersonal communication to create demand for malaria prevention and treatment services; social marketing in private sector; improving net use, and case management for providers in the iCCM districts.	Central, Mid West, North West
IEC/BCC	Communication for Health Commodities (CHC)	600,000		Increase adoption of health behaviors for malaria prevention and treatment through strengthened health communication at national level.	National
Subtotal IEC/BCC		900,000			

Health systems strengthening/capacity Building					
Capacity building support to NMCP	TBD/malaria project	200,000		Capacity building to NMCP, RBM partnership support, coordination of partners meetings and support to pre-service training through updating pre-service training curriculum to ensure that it reflects the updated malaria treatment guidelines and policies.	National
Field Epidemiology and Laboratory Training Program (FELTP)	CDC	150,000		Two FELTP students to support the NMCP's program planning, management and M&E unit.	National
Human Resources for Health (HRH) strengthening through improved health workforce management practices	TBD/HRH project	500,000		Strengthening HRH systems for improved health care quality and health workforce management practices at NMCP, DHMTs and facility levels.	National
Peace Corps malaria program	Peace Corps	30,000		Support placement, training, and small scale malaria projects through Peace Corps Volunteers and Peace Corps Response Volunteers and their counterparts at community level.	National
Subtotal: Health systems strengthening/capacity building		880,000			
Staffing and Administration					
CDC Management	CDC	550,000		Management, CDC Resident Advisers (RA)'s salary	National
USAID Management	USAID	660,000		Includes management, CDC RA's ICASS costs	National
Subtotal: Staffing and administration		1,210,000			
GRAND TOTAL		33,000,000	16,522,500		