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PRESIDENT'S MALARIA INITIATIVE

UGANDA

Malaria Operational Plan for FY 2011

FINAL

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ABBREVIATIONS

ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal care
BCC	Behavior change communication
CDC	Centers for Disease Control and Prevention
CMD	Community medicine distributors
CSO	Civil society organizations
DHS	Demographic and Health Survey
DOT	Directly observed treatment
EPI	Expanded Program on Immunization
FANC	Focused Antenatal Care
FY	Fiscal year
GHI	Global Health Initiative
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GOU	Government of Uganda
HBMF	Home-based management of fever
HMIS	Health management information system
IEC	Information, education and communication
IPTp	Intermittent preventive treatment in pregnancy
IRS	Indoor residual spraying
ITN	Insecticide-treated net
LLIN	Long-lasting insecticide-treated net
M&E	Monitoring and evaluation
MOH	Ministry of Health
NDA	National Drug Authority
NGO	Non-governmental organization
NMCP	National Malaria Control Program
NMS	National Medical Stores
PEPFAR	President's Emergency Plan for HIV/AIDS Relief
PMI	President's Malaria Initiative
PMTCT	Prevention of mother to child transmission (of HIV)
QA	Quality assurance
QC	Quality control
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
SP	Sulfadoxine-pyrimethamine
UMIS	Uganda Malaria Indicator Survey
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
USh	Ugandan Shillings
VCD	Vector Control Division
VHT	Village Health Team
WHO	World Health Organization

EXECUTIVE SUMMARY

Malaria prevention and control is a major foreign assistance objective of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a six-year, comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the United States will invest \$63 billion over six years to help partner countries improve health outcomes, with a particular focus on improving the health of women, newborns and children.

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

Uganda was selected as one of the first three countries to benefit from PMI. Malaria is Uganda's leading cause of morbidity and mortality and is endemic in 95% of the country. 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.

Preliminary results from the 2009 Uganda Malaria Indicator Survey (UMIS) show that 47% of households nationwide owned one or more insecticide-treated nets (ITNs) and 44% of pregnant women and 33% of children under five had slept under an ITN the night before the survey. The proportion of children under five treated with an antimalarial drug on the same or the next day after onset of fever was 36%, although the proportion receiving an ACT was only 13.7%. The proportion of women receiving two doses of intermittent preventive treatment in pregnancy (IPTp) was 32%.

PMI and the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) are the two main contributors to malaria control in Uganda, with a range of additional support from other donors. Two grants from the Global Fund are active: Round 4 Phase 2, which will provide ACTs for six months nationwide, and Round 7 Phase 1, which will provide 7.2 million long-lasting ITNs (LLINs). The Round 4 Phase 2 grant expires in November 2010, but Round 7 Phase 2 will provide an additional 10.5 million LLINs to achieve universal coverage.

PMI/Uganda's FY 2011 Malaria Operational Plan was developed in close collaboration with the National Malaria Control Program (NMCP) and other major partners during a team planning visit carried out in May 2010. The proposed activities fit in well with the Uganda 2010/11-2014/15 National Malaria Control Strategy and complement the contributions of other donors. The proposed FY 2011 PMI budget for Uganda is \$35 million. The FY 2011 planned activities are:

Indoor Residual Spraying (IRS) and Vector Control: PMI has supported IRS in Uganda since 2006, expanding from one district sprayed in 2006 to six districts in 2010. During the past year, more than 800,000 houses have been sprayed, protecting nearly 3 million people from malaria. Acceptance of IRS is consistently high with more than 85% coverage, although insecticide resistance to two (of four) insecticide classes has necessitated twice yearly spraying, nearly doubling the costs of IRS.

PMI FY 2011 funds will support IRS campaigns in the districts of Kitgum, Pader, Apac, Oyam, Gulu, and Amuru, which have the highest malaria transmission rates in Uganda. PMI will closely monitor vector resistance and potential environmental impacts of IRS, and support capacity-building within the MOH to conduct and oversee IRS. With FY 2011 funds, approximately 800,000 houses will be sprayed and more than three million people will be protected.

Insecticide-treated nets: Since 2006, PMI has procured and distributed nearly four million ITNs, mainly to pregnant women and children under five years of age through mass campaigns, antenatal care (ANC) clinics, non-governmental organizations, and civil society organizations. During the past year, PMI supported distribution in the Central Region of more than 1.4 million ITNs procured by the Global Fund. On completion of this grant, 17.7 million nets will have been distributed, which will be sufficient to ensure universal coverage nationwide. PMI has also supported behavior change and communication (BCC) efforts to increase demand for and promote correct use of ITNs.

PMI FY 2011 funds will procure and distribute 650,000 free ITNs through antenatal care (ANC) clinics to sustain high net ownership following the mass campaign. 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. Through these efforts, household ownership of ITNs is expected to increase to at least 85%.

Intermittent preventive treatment of pregnant women: To increase the proportion of pregnant women receiving two doses of IPTp, PMI developed and distributed malaria in pregnancy wall charts and gestational wheels to more than 4,000 health centers as job-aids. More than 2,300 health workers were trained in IPTp and received regular supportive supervision. PMI also provided cups and safe drinking water to ensure that directly observed IPTp dosing was possible in 32 districts.

With FY 2011 funding, PMI will provide on-site training and supportive supervision related to malaria in pregnancy to ANC workers in the public and private sector. PMI will procure sulfadoxine-pyrimethamine and continue 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 is expected to increase to 60% by 2012.

Case management: PMI has invested in training, supervision of health workers, technical support for home-based management of fever (HBMF), and artemisinin-based combination therapy (ACT) procurement and quality testing to improve malaria case management. During the past year, training on malaria case management, including severe malaria and supportive supervision, was provided to health workers in 32 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 supported laboratory training of more than 1,000 health workers in improved diagnostics. PMI also

provides technical assistance to the NMCP, National Medical Stores, and National Drug Authority on pharmaceutical management, quality control, and logistics.

The Global Fund Round 4 Phase 2 grant will cover all needs for ACTs, drugs for the treatment of severe malaria, and rapid diagnostic tests (RDTs) until the grant expires in November 2010. To supplement this grant, the Government of Uganda (GOU) has procured eight million ACT treatments with its own funds and PMI is procuring two million ACT treatments with FY 2010 funds. After these stocks are consumed, a significant gap in malaria case management commodities is expected. PMI FY 2011 funds will be used to procure an additional two million ACT treatments, leaving a gap of nearly 50% of ACTs to meet the national need. PMI continues to work with the NMCP, Global Fund, and other development partners to address this gap.

PMI will also support the improvement of case management for uncomplicated and complicated malaria in the public and private sector. Together with other USAID health programs and the President's Emergency Plan for HIV/AIDS Relief (PEPFAR), PMI will strengthen the national pharmaceutical management system by improving performance and financial management, clarifying pharmaceutical policy, and establishing a transparent logistics management information system. Finally, PMI will continue to support training of health workers on RDTs and microscopy to improve parasitological-based diagnosis at all levels of the health system. In FY 2011, PMI will support 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.

Epidemic Response and Surveillance: As 15 of Uganda's 112 districts are prone to malaria epidemics, PMI has supported the World Health Organization (WHO) in developing malaria-specific guidelines and algorithms to detect and respond to malaria epidemics. Health centers in seven districts have been trained to establish facility-specific malaria thresholds and analyze case data to allow for a rapid response to outbreaks. With FY 2011 funding, PMI will continue to support WHO efforts to strengthen the NMCP's and district health teams' ability to detect and respond to epidemics in these 15 districts.

Monitoring and Evaluation (M&E): PMI supports M&E to measure the progress of malaria control in Uganda and provide data for decision-makers to utilize this data. Six PMI-supported sentinel sites are active in collecting regular data on malaria morbidity and mortality. Since 2009, PMI has supported an M&E Advisor seconded to the NMCP, to provide on-the-job training for NMCP staff on malaria M&E and work with NMCP staff to collect and analyze malaria data and design and implement supportive supervision of M&E activities at the district level. In 2010, PMI is supporting anemia and parasitemia surveys in three northern districts to assess the impact of IRS with carbamates, and household surveys in the central region to assess coverage following a targeted LLIN campaign. With FY 2011 funding, PMI will continue to support improved data collection and analysis of sentinel sites and strengthening of the NMCP and district M&E units, and participate in the PMI/Roll Back Malaria Impact Evaluation. PMI will also provide support to the 2011 Demographic Health Survey.

Health Systems Strengthening and Integration: Weaknesses in the health system directly impair the ability to deliver effective malaria control efforts. As a result and in response to the GHI, PMI supports capacity building for the NMCP, district and health facility staff; supply chain

strengthening; human resource mobilization; and quality improvement approaches. As the effects of a weak health system are not unique to malaria, USAID/Uganda has leveraged PMI, PEPFAR, and other health funds to jointly address health systems and capacity issues for maximum impact. With FY 2011 funding, PMI will focus on strengthening of pharmaceutical management, human resources and capacity building, and quality improvement of service delivery. Additionally, PMI, together with USAID health programs and PEPFAR, will strengthen the national pharmaceutical supply chain system through technical assistance to strengthen performance and financial management, clarify pharmaceutical policy, and establish a transparent logistics management information system.

INTRODUCTION

Global Health Initiative

Malaria prevention and control is a major foreign assistance objective of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a six-year, comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the United States will invest \$63 billion over six years to help partner countries improve health outcomes, with a particular focus on improving the health of women, newborns and children. The GHI is a global commitment to invest in healthy and productive lives, building upon and expanding the USG's successes in addressing specific diseases and issues.

The GHI aims to maximize the impact the United States achieves for every health dollar it invests, in a sustainable way. The GHI's business model is based on: implementing a woman- and girl-centered approach; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; encouraging country ownership and investing in country-led plans and health systems; improving metrics and monitoring and evaluation; and promoting research and innovation. The GHI will build on the USG's accomplishments in global health, accelerating progress in health delivery and investing in a more lasting and shared approach through the strengthening of health systems.

President's Malaria Initiative

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS and tuberculosis. The PMI was launched in June 2005 as a five-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. Uganda became a PMI focus country in 2005.

With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through FY 2014 and, as part of the GHI, the goal of the PMI has been adjusted to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by reaching 85% coverage of the most vulnerable groups - children under five years of age and pregnant women - with proven preventive and therapeutic interventions, including ACTs, ITNs, IPTp, and IRS.

This FY2011 Malaria Operational Plan presents a detailed implementation plan for the sixth year of PMI in Uganda, based on the PMI Multi-Year Strategy and Plan and the National Malaria Control Program's (NMCP's) 5-Year Strategy. It was developed in consultation with the Uganda NMCP, with participation of national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the 2010-2015 National Malaria Control Strategy and Plan and build on investments made by PMI and other partners to improve and expand malaria-related services. This document briefly reviews the current status of malaria control policies and interventions in Uganda, describes progress to date, identifies challenges and unmet needs if the targets of the NMCP and PMI are to be achieved, and provides a

description of planned FY 2011 activities. The total amount requested for the PMI in Uganda in FY 2011 is \$35 million.

U.S. Mission in Uganda Priorities

Within the U.S. Mission in Uganda, four presidential health initiatives are underway: PMI, PEPFAR, GHI, and Feed the Future. All presidential initiatives and traditional health and education programs under Strategic Objective 8 (SO8) are united under the common objective of improving the health and education status of Ugandans through sustainable development approaches. While each of the presidential initiatives, including PMI, have critical goals and objectives that the U.S. Mission in Uganda is committed to achieving, SO8 also prioritizes the cross-cutting goals of the Mission: strategic integration of health services, health systems strengthening, supporting decentralized social sector services, engagement of the private sector and civil society, and increased civic engagement and advocacy at the community level. These Mission priorities carried out by SO8 seek to ensure a contextually appropriate approach to health and development in Uganda. Collective and collaborative engagement of the four presidential initiatives under the GHI framework will accelerate the achievement of specific PMI goals and objectives.

BACKGROUND

Malaria Situation in Uganda

Malaria is a major public health problem and the most frequently reported disease at both public and private health facilities in Uganda. Clinically-diagnosed malaria is the leading cause of morbidity and mortality, accounting for 25-40% of outpatient visits at health facilities, 15-20% of all hospital admissions, and 9-14% of all hospital deaths. Nearly half of inpatient deaths among children under five years of age are attributed to clinical malaria. A significant percentage of deaths occur at home and are not reported by the facility-based Health Management Information System (HMIS). The current estimated annual number of deaths from malaria ranges from 70,000 to 110,000.¹

In most parts of Uganda, temperature and rainfall allow intense, perennial malaria transmission. Malaria is highly endemic in 95% of the country, covering approximately 90% of the population of 31 million. The remaining 5% of the country consists of unstable and epidemic-prone transmission areas in the highlands of the south- and mid-west, along the eastern border with Kenya, and the northeastern border with Sudan. In some areas of northern Uganda, the entomological inoculation rates (infective biting rates by the mosquitoes that transmit malaria) are among the highest recorded in the world.

The most common malaria vectors are *Anopheles gambiae s.l.* and *Anopheles funestus*. *A. gambiae* is the dominant species in most places, while *A. funestus* is generally found at higher altitudes and during the short dry seasons (September through November), when permanent water bodies are the most common breeding sites. In some areas of northern Uganda, such as Apac and Oyam, *A. funestus* is the most common vector. *Anopheles gambiae s.l.* and *A. funestus* feed and rest indoors, making ITNs and IRS viable vector control strategies.

¹ Uganda Malaria Control Strategic Plan 2005/6-2009/10.

Since 2000, the Health Sector Wide Approach (SwAP) has served as a main coordinating mechanism for development partners, and includes both project and direct budget support via contributions through the Ministry of Finance. Most development partners channel a large portion of their assistance into budget support. USAID and the USG continue to provide project support rather than direct budget support. The USG coordinates with other health donors through the Health Development Partners (HDP) group. USAID was the co-chair of the group for 2009-2010, and is the chair of the HDPs for 2010-2011.

The International Health Partnership (IHP+) seeks to achieve better health results by mobilizing development partners around a single country-led national health strategy, guided by the principles of the Paris Declaration on Aid Effectiveness and the Accra Agenda for Action. An IHP+ Compact is in development in Uganda, with the intention to replace the current SwAP Memorandum of Understanding (MOU). This IHP+ Compact is timed to align with the finalization of the Health Sector Strategic Plan III (HSSP III), covering the years 2010-2015, currently in draft by the MOH with assistance from development partners. USAID is participating in development of the HSSP III and the IHP+ Compact with the expectation that it will be a signatory to the new Compact.

Health financing is grossly inadequate in Uganda with 50% out-of-pocket annual household expenditures spent on household health care. Donor funds for malaria control have, however, been on the rise in the last five years. PMI funding has grown from \$9 million in 2005 to \$35 million in 2010. The other major donor is the Global Fund, while UNICEF, the Bill and Melinda Gates Foundation and a host of NGOs cover specific geographical areas across the country.

Three Global Fund grants (Rounds 2, 4 and 7), totaling \$212,100,635 over five years, have supported malaria control in Uganda. Despite the success in grant applications, implementing of planned activities has faced many challenges. To date, only Phases 1 of Rounds 2 and 4 have been completed. Round 2 Phase 1 (\$23 million) was designed to support implementation of HBMF nationwide, one round of subsidized ITN distribution to children under five and pregnant women through a voucher scheme and free net re-treatment, and an IRS program in eleven epidemic-prone districts. Of these activities, nationwide HBMF was implemented and over 980,000 nets were retreated, but the other activities were not completed.² Due to poor performance, the request for Phase 2 funding was not approved. Round 4 Phase 1 (\$66 million) was completed in February 2008; over 19 million treatments of ACT were procured and distributed and all districts received training in the use of ACT, supply chain management, and pharmacovigilance. In addition, six districts piloted the use of RDTs and over 1,000 community medicine distributors (CMDs) were trained in the use of ACTs for HBMF.³

Only recently did funding resume from the Global Fund to implement the remainder of the Round 4 grant and Round 7 Phase 1. Over half of Round 4 Phase 2 grant's \$71 million was programmed for ACT procurement, enough to cover the public sector in its entirety (including the HBMF program) until 2011 and 7.5% of private sector needs. The grant planned to provide RDTs and training of health workers in 21 districts. However, due to delayed implementation, only \$24,781,064 was

² Grant Performance Report for Uganda UGD-202-G02-M-00, August 21, 2007. The Global Fund.
http://www.theglobalfund.org/grantdocuments/2UGDM_287_218_gpr.pdf

³ Grant Performance Report for Uganda UGD-405-G05-M, March 13, 2008. The Global Fund.
http://www.theglobalfund.org/grantdocuments/4UGDM_828_370_gpr.pdf

disbursed, which will provide a six month supply of ACTs and RDTs and supplies to train and support the CMDs providing HBMF. The grant expires in November 2010.

The Round 7 grant was signed in August 2008 for \$125 million to purchase and distribute 17.7 million LLINs over five years through mass campaigns and routine distribution to pregnant women and children under five years. However, due to administrative delays, the GOU requested to revise the grant to provide these nets through mass campaigns alone: first to pregnant women and children under five years of age and then a fill-in campaign to provide universal coverage (defined in Uganda as one net per two people). Phase 1 started in late 2009 with the procurement of 7.2 million nets through the Global Fund's Voluntary Pooled Procurement program and nets started arriving in-country in March 2010. However, because of a budget gap (due to inflation, under-calculation of the population, and other reasons) and a delay in the funds for distribution, PMI decided to provide technical assistance to distribute the first wave of nets to the Central Region of Uganda. PMI supported the delivery of 1,418,050 nets in April 2010. The remaining nets from Phase 1 should be distributed by the end of September 2010. The GOU will then commence Phase 2 to provide universal coverage with 10.5 million nets.

The GOU is applying for Global Fund Round 10 funding. Even if successful in its bid, there will be a substantial gap in funding for malaria activities starting in 2011. The GOU recognizes the urgency of this matter and has increased its contributions towards malaria control through provision of funds for approximately 8 million ACT treatments, \$1.5 million for IRS and \$1 million for larviciding. However, these funds are grossly insufficient to cover the country's needs. The Ministry submitted a malaria proposal with total cost of \$156 million to the Global Fund Round 10 requesting support for procurement and distribution of 52.2 million ACTs and 50.5 million RDTs for malaria case management and 7.3 million LLINs for delivery through routine ANCs and immunization services to pregnant women and infants to maintain LLIN ownership at 100% in the country over 5 years. This application is currently under review in Geneva.

Uganda Malaria Control Strategic Plan 2010/11 – 2014/15

The Uganda National Malaria Control Strategic Plan is based on the principles and aims of the global RBM partnership, the Abuja Declaration, and the Millennium Development Goals and serves as a framework for a broad partnership between the MOH, line ministries, civil society, non-governmental organizations, development partners and the private sector in order to achieve the set objectives and targets. The Plan complements the broader five-year HSSP II that features malaria as a high priority health and poverty issue. A new Strategic Plan has been drafted for 2010/11 to 2014/15 to align with the HSSP III. The NMCP's goals are to eliminate malaria as the major cause of illness and death in Uganda, ensure families receive universal access to malaria prevention and treatment, and reduce all-cause mortality for children under five years of age.

To accomplish these goals, the core malaria interventions include vector control (high coverage of LLINs and IRS), prevention of malaria in pregnancy, case management (including universal access to ACTs, HBMF, and high quality parasitological diagnosis), forecasting epidemics, social mobilization and information, education and communication (IEC) campaigns, health systems strengthening, and M&E strengthening.

CURRENT STATUS OF MALARIA INDICATORS

In 2009, the NMCP and the Uganda Bureau of Statistics, with PMI support, completed the first UMIS. Prior to this survey, the 2006 Demographic Health Survey provided the most current information on the status of malaria control efforts. Based on the 2009 UMIS results, there have been some improvements in coverage of malaria control interventions, but the prevalence of parasitemia (45%) and anemia (62%) remain unexpectedly high.

Baseline Malaria Indicators

Indicator	Baseline (2006 DHS) ⁴	Preliminary results from 2009 MIS
Percentage of households that own at least one ITN	16%	47%
Proportion of children under five years of age sleeping under an ITN the previous night	10 %	33%
Proportion of pregnant women sleeping under an ITN the previous night	10%	44%
Percentage of houses targeted for IRS that have been sprayed	N/A	97% ⁵
Proportion of pregnant women who receive at least two doses of IPTp during antenatal care	16%	32%
Prevalence of parasitemia (by blood slide) in children 6-59 months	N/A	45%
Prevalence of anemia in children 6-59 months (Hg <10.9 g/dL) ⁶	N/A	62%
Prevalence of severe anemia in children 6-59 months (Hg <8 g/dL)	N/A	9.7%

GOALS AND TARGETS OF PRESIDENT'S MALARIA INITIATIVE

The PMI goal is to reduce the burden of malaria (illnesses and deaths) by 70% compared with pre-PMI levels by the end of 2015. Working with development partners, PMI will assist the GOU to achieve the following targets:

- 85% of households will own at least one ITN;
- 85% of households with a pregnant woman and/or children under five will own at least one ITN;
- 85% of children under five will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses targeted for IRS will have been sprayed;
- 85% of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been sprayed with IRS in the last six months;

⁴ Uganda Demographic Health Survey, 2006.

⁵ This figure is from final IRS reports from PMI's implementing partner in 2010. The UMIS found that 6% of households, nationwide, received IRS in the last 12 months.

⁶ Roll Back Malaria, MEASURE Evaluation, USAID, UNICEF, World Health Organization, MACEPA, CDC. Guidelines for Core Population-Based Indicators. MEASURE Evaluation: Calverton, MD.

- 60% of pregnant women will have received two or more doses of IPTp during their pregnancies; and
- 60% of children under five with suspected malaria will have received treatment with an antimalarial drug in accordance with national malaria treatment policies within 24 hours of the onset of their symptoms;

PLANNED ACTIVITIES AND EXPECTED RESULTS – YEAR SIX

Prevention:

- Approximately 650,000 LLINs will be procured and distributed in highly endemic areas targeting pregnant women through ANC clinics; this effort, combined with 17.7 million LLINs programmed from Global Fund Round 7, is expected to increase national household ownership of ITNs from 47% to 85%.
- Continue support for a mass media and community-based IEC/behavior change communication (BCC) campaign to promote correct and consistent bed net usage.
- At least 85% of houses in six districts targeted in northern Uganda for IRS during Year 6 will be sprayed and over 85% of people living in those areas (three million residents in 800,000 houses) will be protected.
- Focused antenatal care (FANC) will be strengthened to increase the proportion of women receiving two or more doses of IPTp. IPTp services will be expanded by integrating them with child survival and prevention of mother to child transmission of HIV (PMTCT) services in public and private sector facilities.

Case Management:

- PMI will support the use of ACTs in health facilities with improved diagnostics, supportive supervision, and capacity development of the NMS and Joint Medical Stores (JMS) for better forecasting, quantification, distribution, and quality assurance. To supplement the inputs from Global Fund and GOU, PMI will procure 30% of the ACTs required for malaria case management at health facility level. These efforts are expected to increase the number of health facilities using ACTs to 100% nationwide.

INTERVENTION - PREVENTION

Indoor Residual Spraying

Background

The Uganda National Malaria Control Strategic Plan recognizes IRS as one of the major malaria prevention and control interventions in the country and prioritizes use of IRS in epidemic-prone areas, high transmission settings, and high-risk situations (e.g., internally displaced persons camps). Prior to PMI, the NMCP had not conducted any large-scale spray campaigns since the 1960s. In 2006, PMI supported a large-scale IRS program in the epidemic-prone southwestern district of Kabale and achieved impressive results both in terms of coverage and impact. In 2007, PMI targeted its support to high-risk sub-counties of Kabale and extended support to the neighboring district of Kanungu and four northern districts (Kitgum, Pader, Gulu, and Amuru), protecting large

populations of internally displaced persons. After consultation with the NMCP, PMI then scaled-back support of IRS in Kabale and Kanungu and prioritized resources on the highest transmission areas of northern Uganda: Kitgum, Pader, Apac, and Oyam.

Since 2006, continual engagement of central and district level health workers, particularly the vector control officers and health assistants, has increased the NMCP's capacity to oversee and coordinate IRS operations to standardize high-quality, safe IRS. As a result of this increased capacity, in 2008 with PMI-procured insecticide, the MOH carried out an additional round of IRS in selected sub-counties of Kabale and Kanungu. In addition, the NMCP continues to pursue a scale up of the IRS program in Uganda, as evidenced by its intentions to spray 24 highly endemic districts in the current NMCP Strategic Plan (2010/11 – 2014/15), and the planned GOU contribution of approximately 3 billion US\$ to IRS in 2011.

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 conditions are suitable for 10 months of the year requires multiple rounds of spraying per year or use of insecticides with a long residual action. In 2008, PMI piloted use of DDT in Apac and Oyam; however, its use was subsequently banned by a court injunction launched by organic farmers. Though the court injunction was lifted, insecticide resistance monitoring studies revealed high levels of vector resistance to DDT. PMI supported comprehensive vector resistance monitoring in six different eco-epidemiological zones from August to October 2009. In all sites, *Anopheles gambiae* was susceptible to the carbamate and organophosphate classes of insecticides tested and resistant to DDT. The resistance patterns of *A. gambiae* against the various pyrethroids fluctuated between full susceptibility (only for deltamethrin and cyfluthrin in Apac and Wakiso) to reduced susceptibility and resistance to the other pyrethroids tested.

The development and spread of vector resistance to insecticides has increased the costs of IRS. Additional resources from the GOU as well as other donors will be needed to scale up beyond the northern region.

Progress to Date

In Years 4 and 5, PMI renewed IRS in northern Uganda with a new bilateral contract and sprayed Kitgum and Pader (fourth round), and Apac, Oyam, Amuru and Gulu districts (second round) using a pyrethroid. At the time of writing this document the program protected over 2.7 million people as follows, with additional coverage data from Kitgum and Pader (fifth round) expected in August 2010:

District (Round)	Period of operation	Total houses sprayed (% coverage)	Total population protected (% protected)	Number protected	
				Children <5	Pregnant women
Kitgum (R4)	Nov-Dec '09	157,982 (97%)	578,867 (97%)	128,542	20,920
Pader (R4)	Nov-Dec '09	172,681 (99%)	664,787 (99%)	162,980	30,093
Oyam (R2)	Feb-Mar '10	110,985 (99.9%)	314,554 (99.8%)	61,191	9,467
Apac (R2)	Feb-Mar '10	151,179 (99.5%)	439,702 (98.9%)	85,521	10,573

Gulu (R2)	Apr-May '10	111,976 (97.1%)	379,873 (97.61%)	71,248	11,452
Amuru (R2)	Apr-May '10	107,719 (99.8%)	359,874 (99.88%)	80,988	13,502
Total		812,522	2,737,657	590,470	96,007

Large-scale community sensitization and education drives are conducted before, during, and after each spray round. These include district leader sensitizations, sub-county leader awareness programs, parish level community meetings, cinema programs, radio announcements, radio spots and radio talk shows. “Frequently Asked Questions” facts sheets on IRS for spray personnel and community leaders are also distributed.

Based on the findings of the PMI-supported insecticide resistance monitoring in 2009 and consultations with the MOH/NMCP and other in-country technical bodies, PMI has moved to use carbamate insecticides. Because insecticide rotation will be critical in managing resistance, a supplementary environmental assessment for use of carbamate and organophosphate insecticides was developed and approved by the USAID Mission in early 2010.

PMI invests in building Uganda’s capacity to provide supervision and oversight of IRS activities, including technical quality, entomological and environmental monitoring, and accountability. Current IRS operations are managed by a PMI implementing partner with technical support from the NMCP, National Environmental Management Authority, and district governments. Before other donor funds can be effectively utilized to expand IRS, the GOU’s capacity to oversee these operations needs strengthening. Focused, integrated training on IRS will be provided to district health officers, environmental officers, vector control officers, and NMCP staff. PMI is currently supporting the development of entomological monitoring capacity and insectory support to have strong entomological monitoring capacity within the MOH.

Proposed PMI FY 2011 activities: (\$14,525,000):

PMI will support the NMCP to implement biannual IRS in six districts in northern Uganda, covering approximately 800,000 households and protecting more than three million residents in the same six districts. A detailed spraying schedule from August 2010 through May 2011 is provided below:

District	Spray Cycle	Spray Date	Spray Cycle	Spray Date
Oyam	Round 3	Aug-Sep 2010	Round 4	Feb-Mar 2011
Apac	Round 3	Aug-Sep 2010	Round 4	Feb-Mar 2011
Amuru	Round 3	Oct-Nov 2010	Round 4	Apr-May 2011
Gulu	Round 3	Oct-Nov 2010	Round 4	Apr-May 2011
Kitgum	Round 6	Nov-Dec 2010	Round 7	May-June 2011
Pader	Round 6	Nov-Dec 2010	Round 7	May-June 2011

Planned activities with FY 2011 funds are as follows:

- **Support for IRS in northern Uganda districts:** PMI will support two cycles of IRS in Pader, Kitgum, Apac, Oyam, Amuru, and Gulu districts. The cost includes all components of IRS: insecticide procurement, spray pumps and other required logistics; environmental assessments; monitoring; and IEC/BCC activities specific to IRS (\$14,000,000);
- **Entomologic surveillance and monitoring:** PMI will continue to build local entomological capacity by assisting the NMCP/ Vector Control Division (VCD) at central and district levels to conduct comprehensive vector surveillance, including annual resistance surveys, vector taxonomy and density, vector behavior, vector infection rates, and monthly insecticide decay rates. Indicators will be measured in six locations targeted for IRS/ITN campaigns. The cost will be approximately \$50,000 per district, which includes training, field costs, procurement of equipment, and sample analysis. PMI will also support maintenance of a field insectory in collaboration with the VCD and Gulu University (\$350,000);
- **Develop local capacity to expand and sustain IRS:** PMI will continue to build the technical skills and capacity of the public sector as well as private sector to oversee quality IRS programs, focusing on technical quality and accountability, in anticipation of future funding for IRS through other stakeholders. Support will be given to the School of Entomology and Parasitology and Gulu University to develop and conduct an IRS training course for Vector Control Officers/Health Assistants aiming to create a workforce required for conducting IRS in the future(\$150,000); and
- **2 TDYs from CDC-Atlanta:** CDC staff will provide technical support to planning and monitoring IRS activities (\$25,000).

Insecticide-Treated Nets

Background

LLINs remain one of the NMCP's key prevention interventions in malaria control. Uganda has a four-pronged strategy for LLIN distribution: (1) commercial sale of LLINs at full cost; (2) sale of subsidized LLINs through the private sector; (3) free distribution to vulnerable groups through mass campaigns (targeting pregnant women and children under five years of age; HIV positive individuals usually receive nets through routine distribution through HIV treatment centers); and (4) free distribution through ANC/Expanded Program of Immunization (EPI) clinics. Major partners in LLIN procurement and distribution include PMI, Programme for Accessible Health Communication and Education (PACE), the Global Fund, UNICEF, and Comic Relief.

Since 2006, more than 6.7 million LLINs have been distributed by all partners nationwide, and an additional 4.82 million Global Fund nets were recently distributed. While most nets have been distributed to vulnerable populations (pregnant women and children under five), the GOU changed its policy in 2008 to universal coverage (defined as one net per two people) and since then, there have been several small campaigns to provide universal coverage to entire sub-counties and districts. Upon completion of the Global Fund Round 7 grant, Uganda will have universal coverage of bednets by 2011.

The 2009 UMIS indicates an increase in ITN ownership from 16%⁷ to 47% of households with at least one ITN. The survey continues to show a wide geographic variance in ownership, with the lowest ownership found in Central 2⁸ region (24%) and the highest in the North East⁹ region (77%). These disparities should be rectified through the Global Fund-supported campaigns.

Results of the 2009 UMIS indicate that net utilization is still suboptimal. Thirty-three percent of children under five and 44% of pregnant women slept under an ITN the previous night. Among households who owned a net, 77% of pregnant women and 59% of children under five slept under a net the previous night. The reasons cited for not using the net were that the net was not hung, it was too hot, the net was too old, there were no mosquitoes, or they do not like the smell. While there is a noticeable change in Uganda's "net culture," and an increase in IEC/ BCC efforts by partners, there is a continued need to increase and improve efforts to maximize usage. Research is being conducted globally by the Alliance for Malaria Prevention and a USAID/Global Health partner (which includes Uganda), to evaluate the utility and cost-effectiveness of hang up campaigns, but additional work is necessary to understand the gap between ownership and usage. Although they are still in planning stages, the United Kingdom's Department for International Development (DfID) has indicated that this work may be a focus of their contributions to malaria in Uganda. PMI will continue to coordinate with DfID as they determine their course of action.

Progress to Date

PMI has focused on net distribution via mass campaigns and routine distribution through ANC clinics. PMI has supported the distribution of almost 1.7 million LLINs through mass campaigns, independent of its support of the Round 7 Global Fund distribution. In 2007, PMI (in partnership with Malaria No More) distributed 592,000 LLINs to children under five and pregnant women in 26 districts. A second campaign in 2008-2009 distributed another 560,000 LLINs to households with children under five and pregnant women, focusing on the eastern region. In partnership with Comic Relief, 201,290 nets were distributed in Kiboga District in 2009. This campaign piloted the LLIN implementation strategy planned for the Global Fund distribution and provided hands-on training to the CSOs that won bids to distribute the Round 7 nets across the country. In 2010, PMI supported the distribution of over 1.48 million LLINs procured by the Global Fund.

To ensure coverage of the most vulnerable populations, the NMCP maintains routine distribution of LLINs to pregnant women through ANC clinics. Since 2005, PMI has supported routine distribution of more than 1.1 million LLINs through ANC clinics in 24 districts in northern Uganda. ANC workers are trained to provide education on the proper care and use of the net and the benefits of using a net. FY 2010 PMI funds are supporting the procurement of 670,000 LLINs for routine ANC distribution in northern Uganda and other selected districts.

PMI supports comprehensive IEC/BCC campaigns for ITNs and will continue to develop and adapt the IEC tools to ensure they are appropriate and effective. Efforts have included the development of IEC materials tailored to CMDs on the correct and consistent use of ITNs, a series of radio spots

⁷ Uganda Demographic Health Survey, 2006.

⁸ Central 2 region includes the districts of Kayunga, Kiboga, Luwero, Nakaseke, Mubende, Mityana, Mukono and Nakasonbola.

⁹ North East region includes the districts of Kotido, Abim, Kaabong, Moroto, Nakapiripirit, Katakwi, Amuria, Bukedea, Soroti, Kumi and Kaberamaido.

discussing ITNs, and distribution of the “Everyday Health Matters” newsletter on malaria. PMI also supports a marketing strategy for private sector ITNs that include the popular “Squito” cartoon strip, road shows, mobile promotion units and brand specific campaigns to promote use of ITNs.

Proposed PMI FY 2011 activities (\$6,100,000):

17.7 million LLINs will be distributed from 2010-2011, to provide one net for every two residents through the Global Fund Round 7 grant. PMI will maintain this coverage by providing replacement LLINs through established ANC distribution systems in highly endemic districts nationally and will strengthen efforts to improve net usage.

LLIN Gap Analysis

Total Pop.	Beneficiary Group	% of Pop	Est. Pop	Est. Current Coverage	Deficit	Estimated LLIN Need	Nets from other sources*	Gap	PMI Target (85%)
31M	Pregnant mothers	5%	1,550,000	25%	75%	1,162,500	250,000	912, 500	670,000

* UNICEF: 250,000; PMI FY10: 750,000; Global Fund: 7,200,000

The following activities are planned for 2011:

- **Procurement of LLINs:** PMI will procure approximately 650,000 LLINs for distribution through ANC clinics (\$3,900,000).
- **Distribution of free LLINs through ANC clinics:** PMI will target pregnant women for free distribution of 650,000 LLINs via ANC clinics in northern Uganda and other selected high disease burden areas in southern and central Uganda (\$1,300,000); and
- **IEC/BCC on net utilization:** PMI will increase support for IEC/BCC to encourage consistent and proper use of bednets to ensure that nets distributed through the Global Fund mass distribution and routine ANC visits are utilized (\$900,000).

Intermittent Preventive Treatment

Background

Since 1998, MOH policy on malaria in pregnancy has advised women with a normal pregnancy to make four visits to an ANC clinic to receive FANC services prior to delivery. The 2006 DHS showed that approximately 96% of women attended an ANC at least once during their pregnancies and 90% attended at least twice; 79% of women visited an ANC for the first time during their second or third trimester (median months pregnant at first visit was 5.5 months).

The original IPTp policy, which recommends at least two doses of IPTp after quickening, was adopted in 1998 and is included in the Reproductive Health Unit (RHU)’s FANC policy and within the NMCP strategy. Both the NMCP and the RHU are responsible for training, provision of IPTp

services at health facilities, supportive supervision, M&E, operational research, and IEC campaigns at the community level.

Although the policy has been in place for twelve years, the 2009 UMIS found that only 45% of pregnant women took SP during an ANC visit and only 32% received two or more doses of SP during their pregnancy, with regional variation ranging from 21% to 49%. Given that 90% of women make at least two visits to the ANC and the median first ANC visit is at 5.5 months, IPTp rates should be higher. Low coverage is caused in part by the demonstrated unwillingness of many pregnant women to take SP because they fear its effect on the fetus (a fear sometimes fostered by health workers).¹⁰ Other reasons cited are pregnant women not given SP by the midwife, SP stock-outs, and irregular ANC attendance by pregnant women.¹¹ Over the last year, efforts to increase IPTp2 uptake have been hampered by stock-outs of SP due to limited funding available from GOU to health facilities for purchase of all drugs and an increase in the price of SP in Uganda. Currently GOU funds for malaria drugs are totally allocated for ACT procurement through Quality Chemical Limited. As a result future GOU funds may not be available for SP procurement.

Progress to Date

Since 2006, PMI's support of IPTp has resulted in the development and provision of FANC training manuals, training and on-the-job supervision of over 2,362 health workers on IPTp in over 130 health facilities, provision of 4,185 malaria in pregnancy wall charts and gestational wheels as job-aids, and adoption of an MOH nationwide advocacy plan for IPTp. PMI has supported the distribution of over 13,930 IEC materials to communities, supported 180 radio spots and talk-shows on IPTp, in addition to conducting over 40,000 health talks at community and facility level specific to IPTp. Support has also focused on integrating IPTp services with PMTCT and extension of this support to private health facilities. The USAID/Uganda Mission district-based maternal and child health programs also support FANC, including IPTp.

Proposed PMI FY 2011 activities (\$1,600,000):

- **Provide comprehensive IPTp services at public ANC clinics:** Building on the trainings conducted with PMI support, PMI will support a package of services including: provision of clean water and cups to facilitate direct observed therapy of IPTp; provision of ANC registers for medical records; enhanced IEC/BCC to support district health education units; and community-level advocacy to encourage pregnant women to attend ANCs and complete their IPTp doses. PMI will also assist with integrated supervision for ANC health workers (with emphasis on IPTp, ITNs, and case management of pregnant women). PMI will support integration of service delivery with PMTCT in facilities where this service is provided and continue to strengthen integrated programs for maternal and child health (\$1,150,000);

¹⁰ Barker 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.

¹¹ Ndyomugenyi 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.*

- **Provide comprehensive IPTp services at ANC clinics in the private sector:**
 - PMI will support trainings and service delivery of comprehensive IPTp services and case management using matching funds with larger private companies¹² under their Corporate Social Responsibility programs (\$50,000);
 - PMI will promote IPTp through training of health workers in small to medium private sector health clinics in order to enable them to promote a comprehensive package for IPTp, early detection of malaria during pregnancy, and offer directly-observed treatment (\$200,000); and
- **Procure SP for distribution to ANC clinics:** PMI will support accurate quantification, forecasting and procurement of an adequate supply of SP drugs for ANC clinics nationwide. These drugs will be distributed both through the public and private not for profit systems, namely through NMS and JMS (\$200,000).

INTERVENTION - TREATMENT

Malaria Diagnosis

Background:

The March 2009 draft Uganda National Malaria Control Policy states that parasitological diagnosis with either microscopy or an RDT should be part of malaria case management at all health facilities. This is consistent with WHO guidance on the need for parasitological confirmation of fevers in all groups before treatment with antimalarial drugs.¹³ The choice between microscopy and RDTs depends on the level of health care and availability of trained staff with necessary equipment and supplies. Hospitals and health centers IV (sub-district level) and III (sub-county level) that have a microscope and a microscopist should use microscopy for malaria diagnosis, and HCs III and II (parish level) that do not have microscopes or microscopists should use RDTs (policy guidance is to use HRP-2 type RDTs).

In spite of these policies, most malaria diagnosis is still based on clinical symptoms as many facilities lack laboratory diagnostic capacity. Even in facilities with malaria microscopy, many clinicians doubt the results and may disregard them when making a diagnosis. Among older children and adults, and among all age groups in areas of low-to-moderate transmission, improper diagnosis based on symptoms alone often results in fevers being presumptively treated for malaria, resulting in the overuse of ACTs. As malaria prevention activities are scaled up, appropriate diagnosis and treatment will become even more critical because many fevers may not be due to malaria and health workers will need to look for and treat other causes of fevers.

¹² Larger private companies such as HIMA and Tororo cement, Kikira and Kinyara Sugar works, James Finlay's Tea and Nile Breweries etc.

¹³ WHO. 2010. Guidelines for the treatment of malaria -- 2nd edition. 1.Malaria – drug therapy. 2.Malaria – diagnosis. 3.Antimalarials – administration and dosage. 4. Drug therapy, Combination. 5.Guidelines. I.World Health Organization. ISBN 978 92 4 154792 5 (NLM classification: WC 770)

The 2007 Uganda Service Provision Assessment (SPA), a nationwide health facility survey, showed that laboratory diagnostic capacity for malaria (by microscopy and, to a much smaller extent, RDTs) exists in only 26% of all health facilities. Approximately 80% of hospitals and HCs IV have laboratory malaria diagnostic capacity, compared with 36% and 11% of HCs III and II, respectively. Fifty percent of private facilities have malaria laboratory capacity as compared to just 18% of public facilities. The 2009 UMIS found that only 17% of children with a fever had a blood sample tested for malaria before receiving treatment.

The Central Public Health Laboratory (CPHL) is mandated to coordinate, monitor, and supervise all HCs III and IV laboratories, but is grossly understaffed and supervision is irregular. PEPFAR is supporting the renovation of the Central Public Health Laboratory and procured enough microscopes in 2006 to meet 35% of the national requirements. Global Fund Round 4 Phase 2 included the purchase of 350 microscopes and a three-year supply of reagents; however, these resources are yet to be made available and are not likely to arrive as the grant ends in November 2010.

A quality assurance (QA)/ quality control (QC) system for diagnostics is being developed by the NMCP with support from the Foundation for Innovative New Diagnostics. Currently, they are piloting a QA program in six districts. PMI's partners conducting diagnostic training will use this QA/QC system and are contributing to the development of the national system.

Progress to Date

In FYs 2007 and 2008, PMI funded the Joint Uganda Malaria Training Program (JUMP), initially supported by Exxon-Mobil. The JUMP model was an integrated, comprehensive malaria training targeting all relevant personnel in a health facility. JUMP implemented nine training courses in 2007/2008 with 272 health care workers trained. In 2008, the laboratory technical working group (chaired by the CPHL and NMCP) with PMI support, revised the JUMP model to a three-day, on-site refresher training curriculum for microscopy and RDT course for implementation at the health facility level. For the past two years, PMI has supported this three-day on-site training on microscopy and RDTs for laboratory staff and clinicians. Recently the technical working group also developed a two-day stand alone RDT training course for health workers to roll out with Global Fund and PMI support. To date, 1,026 laboratory staff have been trained under this model in 26 districts. Improving communication between different cadres of health professionals at facilities is now done through supportive supervision and in-service training using a performance improvement model that allows supervisors and supervisees to jointly identify problems and agree on specific quality improvement activities.

According to the technical working group guidance, all diagnostic training partners follow two approaches to measure the impact of the training. First, they conduct pre- and post training evaluations as a part of the training course to measure the improvement of diagnostic skills and competency of laboratory personnel. Training reports received by PMI demonstrated that trainees' knowledge and skills increased significantly after the training. In a recently concluded training in Rukungiri district, pre- and post test results showed that the mean marks obtained in pre test significantly increased from 83% to 94% ($p < 0.005$). Secondly, trainers conduct joint follow-up support supervision visits 6 weeks after completion of the training. These visits are conducted together with NMCP and district laboratory focal persons to evaluate the performance of trained

laboratory personnel, and training impact on the overall case management in health facilities. In these visits, the team assesses HW's competence in performing and interpreting test results, treatment for negative or positive patients, and records management. Supervision team members also identify and address challenges of laboratory logistics and supply management and provide on-the-job training for the aspects that were performed poorly and collect data to assess the effects of the training on the overall management of fever cases. Review of training reports showed improved management of patients with fever in many health facilities. Clinical malaria cases recorded in the OPD registers have reduced and there are now more fever patients referred for laboratory diagnostics. Reports also showed increased interest in definitive diagnostics among health workers, and appropriate use of ACT for confirmed cases.

In order for Uganda to roll out use of RDTs across the entire country (65%) in the public sector, it would require more than 11.7 million RDTs annually to cover all health facilities without microscopes. However, as a step wise approach, NMCP is planning to use RDTs only in health center II and IIIs in 21 districts with low to moderate endemicity. It is estimated that nearly 4 million RDTs will be required annually for these districts. In September 2010, a six-month supply of RDTs (for 21 districts) will arrive, funded by the Global Fund Round 4 Phase 2 grant. PMI will also procure an additional 850,000 RDTs to be used in an additional 21 districts that will be agreed upon with the NMCP. RDT commodities will be provided first to districts that have already received training on RDT use (including six districts trained through PMI support) and the remaining districts will receive training on RDT use (and commodities), starting with HCs II and III in low to moderate transmission, epidemic-prone areas and later at HCs II and III with no microscopy capability in 21 districts.

RDT Gap Analysis

Total Population	31 Million
Total No. of estimated fever cases	40,999,142
Total No. of malaria outpatients attending Public & PNFP health facilities	18,039,622
Percentage of current parasitological diagnosis	10%
Expected increase in % parasitological diagnosis	20%
No. of parasitological diagnoses required for 20 % increase	7,789,837
Total RDT requirement for 20% increase	3,894,918
GF- R10 request	2,894,918
Gap	1,000,000
PMI target	850,000

Proposed PMI FY 2011 Activities (\$1,562,500):

FY 2011 PMI funds will support training of health workers on RDTs and microscopy to improve parasitological-based diagnosis at all levels of the health system. The timing of future RDT trainings will depend on the availability of this commodity. PMI support will complement Global Fund and PEPFAR support for general laboratory and microscopy strengthening. PMI will work with PEPFAR to improve coordination in USG efforts to support the laboratory system in Uganda. PMI will also support the development of a QA/QC policy for diagnostics that will be used by all NMCP partners.

- **Support integrated malaria diagnostic trainings and roll-out of RDTs at Health Centers II and III:** PMI will support the roll-out and use of RDTs at HCs II and III and microscopy training at HCs III and IV and referral hospitals. All trainings will be offered to public and private sector health facilities to provide district-wide coverage (\$1,100,000);
- **Support improved diagnostics in the private sector:**
 - PMI will support training on the use of RDTs in the private sector through existing partnerships with companies providing health care for their employees and surrounding communities. Eleven participating companies agreed to provide matching contributions under HIPS project targeted for this training (\$50,000);
 - While the district-based training mentioned above will target public and private sector, PMI will further focus its private sector support through training of laboratory staff in the private clinics (not associated with large companies) on RDTs and microscopy (\$225,000);
- **IEC/BCC:** PMI will support the use of existing communication channels to increase awareness about the need for proper diagnosis before initiating treatment for malaria. Patients will be encouraged to ask for laboratory testing before accepting ACTs or being asked to purchase expensive ACTs (\$175,000); and
- **TDY from CDC-Atlanta:** CDC staff will provide technical support to laboratory diagnostics (\$12,500).

Pharmaceutical Management

Background

The pharmaceutical management system in Uganda is weak and coordination of efforts to support strengthening of this system is poor. NMS is responsible for the procurement and distribution of all essential medicines and health supplies for the public sector, while JMS caters for the private-not-for-profit facilities. In the past four years, due primarily to bottlenecks in Global Fund grants, there have been several major national stock-outs of the first-line drug, artemether-lumefantrine (AL) for the treatment of uncomplicated malaria. The 2007 SPA revealed that about 80% of health facilities experienced stock-outs of AL at some time during the six months preceding the survey. In December 2008, PMI made an emergency procurement of AL to fill the gap by re-programming funds meant for severe malaria drugs. Supplies of National Drug Authority approved ACTs procured from Quality Chemicals (a Ugandan pharmaceutical company) with GOU funds have been available since last year but stocks are limited. Such ACTs are in the process of becoming WHO-prequalified. The current stock of ACTs, a combination of GOU-purchased AL from Quality Chemicals (approximately eight million treatments) and a supply expected from remaining funds of Global Fund Round 4 Phase 2, is expected to last through November 2010. It is not clear, however, if these supplies will cover both public and private-not-for-profit facilities because of a recent policy shift by the GOU to prioritize MOH health facilities when supplies are limited. Even when stocks of ACTs are available, districts and health facilities cannot rely on their orders being filled and they are unaware of the quantities they will receive until they are delivered.

In early 2010, the NMS and MOH changed the national policy to partially reintroduce the "push" system where lower level health facilities (HCs II and III) will receive a standard kit of set quantities of essential drugs, including ACTs, and other health supplies. Hospitals and HCs IV will continue to be able to order based upon their determined needs. The change from a pull to a modified push system will present challenges as there are limited quantities of available essential drugs and quantification has been historically inaccurate, which may lead to more stock-outs or even overstocks at the health-facility level.

Progress to Date

In Years 2 through 4, PMI provided technical assistance to help the NMS, the NMCP, and district health programs to improve their quantification of AL, RDTs, SP for IPTp and severe malaria drugs. To date, over 350 health workers in Northern Uganda have been trained on logistics, drug quantification, ordering and storage. Even with support from PMI, USAID/Uganda, and other donors who have provided technical assistance in logistics management over the last ten years, significant challenges remain in the drug supply system.

As these challenges affect multiple programs supported by USG health funds, USAID/Uganda has consolidated its technical assistance under a single mechanism to address the problems of pharmaceutical management through a system-wide approach. This support aims to improve the availability and accessibility of essential medicines and health supplies by tackling each link in the supply chain at all levels of the system including financial management, procurement, storage and distribution and information management. The program aims to strengthen both NMS and JMS systems, and aims to work in 45 districts to increase district level capacity in quantification, ordering and stock management.

Proposed PMI FY 2011 Activities (\$800,000):

- **Strengthen pharmaceutical supply chain management:** PMI will provide technical assistance to help the NMCP/MOH quantify the national requirements for ACTs, RDTs and other antimalarial drugs and establish a central Quantification and Procurement Planning Unit and integrated Logistics Management Information System (LMIS) at the MOH. PMI will support improved pharmaceutical management systems in district health offices and health facilities, beginning in nine districts in the central region. The PMI investment in supply chain management leverages more than \$5 million from other health funding streams (including PEPFAR) to provide a robust response to the challenges in pharmaceutical management (\$800,000).

Case Management

Background

Since 2004, AL has been the first-line treatment for uncomplicated malaria. Quinine is recommended for patients with uncomplicated malaria who have failed AL and parenteral quinine is recommended for the treatment of severe malaria. Artesunate suppositories are recommended for pre-referral treatment of severe malaria at the community level where parenteral therapy is not

possible. Due to the frequent ACT stock-outs, many facilities administer monotherapy for treatment of malaria with artemether only or with chloroquine and SP, either singly or in combination; neither of the latter two drugs are efficacious. The management of severe malaria is also problematic: supervisory reports from quarterly visits by NMCP and district officials to health facilities indicate that health workers administer three doses of IV quinine in only one unit of 5% dextrose in water to save the limited supply of intravenous fluids. The risk of overdose with quinine and mismanagement of malaria is high.

Stock-outs of ACTs remain the major challenge for proper case management of malaria at the facility and community level. The 2009 UMIS established that 36% of children with fever took any antimalarial drugs on the same or next day, however only 13.7% took an ACT within 24 hours of the fever. Although Uganda was one of the first countries in Africa to actively promote HBMF through volunteer CMDs, its implementation has been chronically impaired by repeated shortages of AL and the HBMF program has effectively been abandoned. The 2009 UMIS indicated that only 18% of households reported knowledge of a community worker or CMD within their community, and only 9% reported that the CMD had malaria medicines available.

While the NMCP intends to launch a new HBMF program nationwide (through the Global Fund Round 4 Phase 2 grant which provides funding and drugs for a maximum period of one year), there is an ongoing policy debate within the MOH surrounding the implementation strategy. Integrated community case management (ICCM), which provides care for children under five for malaria, diarrhea, pneumonia and care for neonates through voluntary village health teams (VHTs), has been introduced as national policy in 2010. However, there are different funding streams for HBMF and ICCM: the HBMF strategy is funded through Global Fund and ICCM through the Canadian International Development Agency (CIDA) and the Gates Foundation. The ICCM funding is for a two-year pilot in 20 districts and provides funding for training on case management and drug supplies to the VHTs only (i.e. there is no provision of drugs to health facilities who are the referral and supervisory points of contact for the VHTs). Hence, it appears that neither strategy is sustainable with current funding commitments and the way forward for community level health care remains unclear.

A 2006 USAID study in collaboration with the Public-Private Partnership for Health Desk of the MOH found that 46% of health facilities in Uganda are private.¹⁴ Up to 82% of households first seek care from small drug shops, private clinics, and private-not-for-profit providers. The 2009 UMIS found that 55% of children with fever received care at private facilities. Most private providers in low-income countries do not receive guidance on diagnosis and treatment from the MOH, instead relying on information from pharmaceutical companies.¹⁵ However, studies have shown that training medicine sellers on approved drugs increases the number of patients receiving an effective and correctly dosed drug.¹⁶ In Luwero District, after participating in training, the

¹⁴ 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.

¹⁵ Mills, A., Brugh, R., Hanson, K., McPake, B. What can be done about the private health sector in low-income countries? *Bulletin of the World Health Organization*, 2002, 80(4)

¹⁶ Goodman, C., Brieger, W., Unwin, A., Mills, A., Meek, S., Greer, G. Medicine sellers and malaria treatment in sub-Saharan Africa. *Am J Trop Med Hyg.* 2007 Dec; 77(6 Suppl): 203-218.

proportion of sellers providing appropriate drugs increased from 2% to 73% and correct dosing increased from 0% to 50%.¹⁷

Medicines for Malaria Venture conducted a study in nine districts in Uganda in 2007 to better understand the market for antimalarials. They found that only 50% of public health facilities had any first-line antimalarials; AL was found to be up to sixty times as expensive as other non-artemisinin based medicines in the private sector and only 50% of patients purchased a full course of any antimalarial treatment at one time.¹⁸ Initially, there was optimism that Uganda’s application for the Affordable Medicines Facility for Malaria (AMFm) venture would increase access to ACTs; however, the GOU is now reluctant to sign the AMFm if its own factory, Quality Chemicals, is not a pre-qualified supplier. Though Quality Chemicals has WHO Good Manufacturing Practices qualification, it is still assembling its dossier of ACTs for WHO prequalification, making it unlikely that Uganda will sign the AMFm agreement.

Progress to Date

PMI supports integrated training and supportive supervision at the health facility level in more than thirty districts across the country. This includes management of severe and uncomplicated malaria, IEC/BCC, and malaria in pregnancy interventions. In FY 2009 and the first two quarters of FY 2010 alone, more than 3,300 health care workers were trained on integrated malaria activities. Over 1,300 were trained during the same period on management of uncomplicated malaria with ACTs and over 1,500 job aides were distributed.

During the past year, due to the repeated stock-outs of ACTs, PMI’s support to HBMF activities has focused primarily on supporting IEC/BCC functions of the CMDs rather than on treatment. Until ACTs are more readily available, PMI will not support malaria treatment at the community level, but will continue to support integrated IEC/BCC at all levels of the health system, including the Village Health Team. All partners working at community level provide malaria prevention and management messages that have been developed by the IEC/BCC technical working group headed by the NMCP. While the country consumes over 19 million doses of ACTs annually at facility level alone (excluding HBMF need), the GoU resources are only able to provide 8 million doses leaving a gap of 11 million doses. PMI will procure 2 million doses using FY 10 funds. Even with this support, the country will still experience an ACT gap of 9 million doses nationwide.

ACT Gap

Product	Avg Monthly Consumption (in doses)	12 month Requirement (in doses)	12 month Requirement (in packs of 30)
AL, 6X1	550,000	6,600,000	220,000
AL, 6X2	250,000	3,000,000	100,000
AL, 6X3	175,000	2,100,000	70,000
AL, 6X4	625,000	7,500,000	250,000
Total	1,600,000	19,200,000	640,000

¹⁷ Tawfik Y, Nsungwa-Sabitii J, Greer G, Owor J, Kesande R, Prysor-Jones S. Negotiating improved case management of childhood illness with formal and informal private practitioners in Uganda. *Trop Med Int Health*. 2006;11:967–73.

¹⁸ Medicines for Malaria Venture. August 2008. *Understanding the Antimalarials Market: Uganda 2007 – an overview of the supply side. A study by Medicines for Malaria Venture, in collaboration with Ministry of Health Uganda, HEPS and WHO.*

The NMCP is working to improve the treatment of severe malaria and has recently developed new treatment guidelines. In FY 2007, PMI supported development of a training manual for health workers on the management of severe malaria and funded training of 329 health workers. The following year, PMI helped the NMCP quantify needs for severe and pre-referral malaria drugs. In 2009, PMI continued to support improved case management for malaria through supportive supervision and provision of job aides. To date, 1,426 health workers have been trained in severe malaria management and 320 job aids on severe malaria have been provided to health facilities in 23 districts. The Round 4 Phase 2 Global Fund grant will fund the purchase of drugs for severe malaria and further on-job training of health workers.

After the declassification of all ACTs to an over-the-counter drug in 2008, ACT supplies have become more available in the private sector. 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 4,650 private health practitioners have received training in malaria treatment and prevention. In addition, PMI has supported small-to-medium sized private clinics under Uganda Health Marketing project 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 LLINs, IPTp, and laboratory diagnostics.

Proposed PMI FY 2011 Activities (\$6,307,500):

PMI will support case management activities on uncomplicated and severe malaria including commodities. Given the uncertainty about the future of ICCM beyond the planned pilot project, the urgent need to first establish consistent supplies of ACTs to 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. PMI will support the following:

- **Procure malaria commodities:** PMI will support the procurement of drugs including ACTs and severe malaria drugs, diagnostics and supplies for the treatment of malaria. This will supplement the 8 million doses of ACTs to be purchased by the GOU through Quality Chemicals. PMI will channel the drugs it procures through JMS nationwide, as the GOU purchased ACTs will be channeled through NMS. PMI will coordinate its procurement with PEPFAR and the USAID family planning programs through the USG supply chain management contract to maximize the efficiency of USG procurements and appropriate distribution. A gap of nearly 50% of ACTs will still remain even with current commitments from the GOU and other donors (\$3,607,500);
- **Mobilize private sector networks and increase the role of district health officials in providing support and supervision:** PMI will support professional associations, such as the Uganda Private Medical Practitioners Association, Uganda Private Midwives Association and Drug Shop Owners Association, to network among their members and to

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.

provide them with training, supervision, and regulation. District level task forces will be organized to support regulation, supportive supervision, and data collection (\$150,000);

- **Strengthen case management in health facilities:** PMI will provide funds for strengthening case management for uncomplicated and severe malaria in public and private health facilities. This will include in-service trainings, supportive supervision and provision of job-aids to health care workers (\$2,250,000);
- **Support integration of malaria case management in maternal and child health programs:** PMI will support integration of malaria case management and IPTp into USAID supported maternal and child health programs. Currently MCH programs are working to improve clinical care related to the major causes of maternal and child mortality at health facility and community level. As malaria is a major cause of morbidity and mortality in these groups, the MCH programs have been focusing on improving malaria case management and PMI support will further strengthen this component of the broader MCH platform. This integrated program will expand malaria control to an additional 15 districts, and will leverage nearly \$3 million of USG investment in the delivery of comprehensive MCH services and \$5 million of family planning services (\$300,000); and
- **Support to large corporations:** PMI will increase the number of large companies providing malaria services from 25 to 40 companies and will increase the number of beneficiaries reached by companies from 200,000 to 500,000 people in 50 districts (including 50,000 pregnant women and 450,000 children under five). PMI funds will be leveraged on a 1:1 basis with private sector funds for malaria commodities, training and IEC/BCC activities (costs included under the ITNs, IPTp, Diagnosis and in this Case Management section).

Drug Resistance Monitoring and Drug Quality

Background

In 2009, PMI supported a WHO-led multi-country study on drug quality which included Uganda. Results showed that of the drugs sampled in Uganda (predominantly ACTs and SP), 26% failed standard confirmatory quality control tests.²⁰ While only a fraction of the drugs on the market were sampled and thus no national estimates are possible, the results indicate the importance of monitoring the quality of antimalarial drugs. The NDA monitors drug quality through registration of pre-marketed medicines, inspection of factories that manufacture antimalarial drugs, licensing of drug outlets, and post-marketing surveillance.

With reports of ACT resistance in Southeast Asia, monitoring drug efficacy must be routine and thorough. The NMCP traditionally relies upon the Uganda Malaria Surveillance Project (UMSP) for drug efficacy surveillance of antimalarials. A recent analysis of 10 randomized, clinical trials with at least 28 days follow up showed that the average risk of recrudescence for artesunate/amodiaquine, AL, and dihydroartemesinin-piperaquine was 7%, 4%, and 1%,

²⁰ U.S. Pharmacopeia, USAID. "Survey of the Quality of Selected Antimalarial Medicines Circulating in Madagascar, Senegal and Uganda," November 2009.

respectively.²¹ While these figures are comforting, surveillance for the early identification of the emergence of resistance to first and second line antimalarials remains critical to ensure that the current treatment policy is effective.

Progress to Date

PMI has provided the NDA with equipment (e.g., a high performance liquid chromatography machine, gas chromatography and mini-labs), technical assistance, training, and other support to improve the pre-market inspection of antimalarials and to help establish post-marketing surveillance sites. From 2007-2009, PMI supported the provision of 10 mini-labs and training of technicians to conduct post-marketing surveillance. In 2009, 217 samples of antimalarials were tested, of which only 14 samples failed, resulting in a success rate of 93.5%. The NDA followed up failed test results to identify the pharmacies involved in the sale of fraudulent drugs, seized the procurement, and may order closure of these businesses. In 2010, PMI procured two additional minilabs and supplies for routine testing in all sentinel sites. As the NDA receives funding from multiple sources (including the Global Fund) to strengthen its capacity to monitor drug and insecticide quality, PMI will no longer provide support to NDA.

PMI has supported biannual monitoring of drug resistance of first-line antimalarials. As UMSP is completing studies on first-line antimalarials with separate funding in 2010, PMI is considering reprogramming FY 10 funds to support the evaluation of first-line antimalarials for severe malaria as there was an unpublished study demonstrating poor effectiveness of quinine but there has not been a study on quinine's efficacy in Uganda to date. This study would assess intravenous artesunate followed by oral AL, intravenous quinine followed by oral AL and intravenous quinine followed by oral quinine.

Proposed PMI FY 2011 Activities: (\$100,000)

- **Monitor drug resistance (efficacy) of antimalarial drugs:** To ensure effectiveness of first line antimalarials for uncomplicated malaria (artemether-lumefantrine), PMI will support drug efficacy testing in two sites across the country to inform policy decisions. (\$100,000).

INTERVENTION – EPIDEMIC PREPAREDNESS AND RESPONSE

Background

Approximately 15 districts in the southwest and eastern regions of Uganda are considered epidemic-prone; however, in the last year, four districts had epidemics, only one of which was in an epidemic-prone region. The NMCP includes early detection and rapid containment of malaria epidemics as one of its key strategic objectives and has adapted WHO epidemic preparedness and response guidelines to the Ugandan context. The Epidemic Surveillance Department of the MOH provides weekly updates on district-reported cases of epidemic-prone diseases, including malaria; however, even if an epidemic is detected, districts are often ill-equipped to implement epidemic

²¹ Adoke Y, Mpimbaza A, Bukirwa H, Staedke S, D'Allesandro U, Talisuna A, Rosenthal P, Wabwire-Mangen F, Dorsey G, Kanya M. "Comparing Different Artemisinin based Combination Therapies in Uganda: Implication for Policy." (presentation at 5th MIM Conference, Kenya).

control recommendations due to lack of funds for fuel, personnel, diagnostic capacity and stocks of commodities.

Elements of the NMCP's epidemic preparedness that require strengthening include: ensuring the surveillance system is based on timely recording and reporting and data are analyzed and interpreted promptly; improving malaria diagnosis in targeted hospitals and HCs IV in epidemic-prone districts; ensuring adequate supplies at all treatment facilities so prompt care can be provided during an outbreak; and ensuring preventive measures can be put in place once an outbreak is identified.

Progress to Date

With support from PMI in FYs 2007 and 2008, the malaria-specific guidelines and algorithms for the epidemic detection and surveillance guidelines and procedures were revised and updated. Using these guidelines and procedures, staff at health centers in seven districts have been trained, and through subsequent supportive supervision visits have been shown to apply training skills to establish center-specific malaria thresholds and manage data and its use for decision-making and rapid response. These health centers have also been provided with the necessary tools to track malaria cases in their facility.

In addition, in 2009 with support from PMI, Epidemic Preparedness and Response (EPR) guidelines were drafted and are pending approval by the MOH senior management. The EPR guidelines will facilitate the establishment of EPR plans at national, district, health sub-district and health facility level. It is anticipated that this will lead to a reduction in malaria morbidity and mortality in epidemic-prone areas by detecting epidemics early using a Malaria Early Warning System (MEWS) and Epidemic Early Detection System (MEDS) appropriate for each level.

Proposed PMI FY 2011 Activities (\$100,000):

- **Epidemic preparedness and response:** PMI will continue to support the training of staff of health facilities located in epidemic-prone regions and support the National Task Force and district task forces to meet regularly, evaluate data in a timely manner and respond to suspected/confirmed outbreaks. This may include commodities, transportation, diagnostic support through RDTs or microscopy, supplies and equipment for malaria epidemic containment and IEC materials required for rapid community response. (\$100,000).

MONITORING AND EVALUATION

Background

The NMCP has strengthened its capacity for M&E of malaria activities through the development of a national malaria M&E plan in 2009, recruitment of staff, and successful implementation of the 2009 UMIS. However, challenges in data collection at all levels remain as understaffing and poor motivation affect the timeliness and quality of data collection and compilation at health facility, district and national levels. The limitations of the Ugandan HMIS system notwithstanding, some partners do not routinely provide data to the NMCP and therefore, the NMCP is unable to fully track malaria activities.

Primarily, the NMCP obtains malaria related data from HMIS, partners and surveys. The NMCP recently modified the standard WHO global malaria database and is tracking all aspects of malaria prevention and control. This includes malaria morbidity and mortality data from HMIS; coverage data on various malaria interventions coming from HMIS and partners; commodity tracking (LLINs, ACTs, and RDTs); trainings conducted and other information important for monitoring the NMCP's progress. Malaria focal persons use this information to track progress of their specific malaria indicators and for planning purposes such as resource allocation, and commodity quantification, policy guidance and proposal development. This information is also shared with MOH senior management and different partners, including donors.

PMI Uganda relies on the following tools to measure the impact of malaria control efforts:

- The 2006 Uganda DHS: Provided baseline information for PMI activities.
- The 2007 Uganda Service Provision Assessment Health Facility Survey: Provided information on the availability and quality of health services.
- The 2009 Uganda Malaria Indicator Survey: Provided national and regional-level coverage and impact data on the four major malaria interventions as well as biomarkers for anemia and parasite prevalence in children under five years of age.
- Sentinel Surveillance Sites: Six outpatient surveillance sites in different transmission settings across Uganda provide accurate and timely data on malaria indicators at health facility level. Inpatient surveillance is being piloted at one site.
- The 2011 Uganda DHS: Will provide data comparable to the 2006 UDHS data as well as anemia levels in children under five.
- The 2011 Uganda RBM MERG Impact Evaluation: Will provide an analysis of malaria activities for the past ten years and their impact on key malaria indicators and overall child mortality.

The 2009 UMIS indicated high regional rates of anemia (62%) and parasitemia (74%) in the mid-north, a region with one of the highest infective biting rates in the world. PMI Uganda will conduct follow-up household surveys with malaria biomarkers in three northern districts, two of which are targeted for IRS in 2010, to measure the impact of IRS on malaria transmission intensity. In addition, PMI Uganda will conduct household surveys in 2010 in two central districts to ascertain LLIN coverage following the targeted Global Fund LLIN campaign and to monitor programmatic scale up in this region of intense PMI investment. The UMIS data will provide a baseline for the follow-up household surveys in both the north and central districts. The UDHS will provide data on

LLIN coverage after the fill-in campaign supported by the Global Fund and therefore, a second household survey in the central districts will not be necessary.

Progress to Date

Sentinel site surveillance activities

Sentinel sites were first established by UMSP and the MOH in 2001. With PMI support there are now six sentinel sites in districts representing different malaria transmission zones. In FY 2010, a pilot inpatient surveillance site started in Tororo district and will add an additional pilot site. The focus of the sentinel sites in 2007-2010 has been to increase the quality of data management and analysis, ensure high quality laboratory diagnosis, and improve health worker performance. This data is increasingly relied upon by the NMCP to track malaria indicators and quality of care (for example, provision of ACTs for patients with negative test results, provision of quinine for uncomplicated malaria) provided in the health facilities. In 2009, the site in Kabale alerted the district and central MOH to a suspected epidemic that was later confirmed and timely interventions were put in place.

Verbal autopsy validation study

PMI supported a prospective study to evaluate the diagnostic accuracy of verbal autopsy (VA) for determining deaths due to malaria in children under five in different epidemiological settings. The cause of death was compared using the results of the VA questionnaire and the “gold standard” of health facility medical records. Preliminary results show the sensitivity of VA procedures was 63% (95% CI: 46-80) in Tororo (a high transmission setting) and 57% (95% CI: 43-71) in Kampala (a medium transmission setting); and specificity was high at both sites (89% in Tororo, 90% in Kampala). As expected (due to differences in malaria endemicity), the positive predictive value for VA was very different in Tororo and Kampala (83% vs. 34%; difference 49% [95% CI 31-67], $p < 0.001$). In the third study site, Kisoro (low transmission setting), no deaths were attributable to malaria on review of the medical records. The results indicate that VA procedures for malaria may not be useful in all settings.

Strengthening data management

The MOH, including the NMCP, uses the HMIS to monitor the performance of the HSSP, provide routine morbidity and mortality data from health facilities across the country, and monitor program performance. Broader USG health investments contribute to HMIS strengthening. The HMIS is currently under revision and the NMCP, after consultation with malaria partners, has proposed several additional indicators to better track malaria interventions. PMI has seconded an M&E specialist to the NMCP through STOP Malaria Project who provides management support for the HMIS and the MOH Resource Center (which is the repository for HMIS data), as well as technical assistance to the NMCP in developing national databases to track key malaria interventions and program indicators. The main purpose of this secondment is to enhance the ability of the NMCP to

monitor its program progress to improve program efficiency and effectiveness. The scope of work for this position includes; on-the-job training for NMCP staff on malaria M&E including the formulation of NMCP M&E plans, collect and analyze malaria data, and work together with NMCP M&E staff to design and maintain the NMCP malaria database, implement mapping software and conduct secondary analysis of major survey data. This person also assists NMCP M&E sub unit in the design and implementation of various surveys (including, but not limited to the MIS, DHS net tracking for the Global Fund Round 7 grant), and help NMCP to design and implement support supervision at the district level. In addition, this specialist assists in enhancing the district level reporting system including training, data collection, and compilation of quarterly malaria reports and preparation of various other reports required by NMCP (e.g. Global Fund). PMI will fund this position until the end of December 2011. The NMCP agreed to turn this position into a permanent position funded by the MOH as of January 2012. PMI has also provided information technology equipment for NMCP staff.

At district level, PMI has supported M&E training of all HMIS and malaria focal persons and the district health educator in 23 districts, including data collection tools and processes, output and outcome indicators and reporting. In addition, internet modems were provided to HMIS focal persons in these districts to facilitate timely reporting; this has led to an improvement of HMIS reporting in these districts.

Implementing partner monitoring and evaluation

The USAID/Uganda Mission has a central data collection point for all implementing partners, including those supported by PMI. This project assists partners in developing performance management plans and ensuring they are harmonized with the Uganda/USAID Performance Monitoring Plan, collects project data and information, conducts data quality assessments and provides compiled data and quarterly reports to USAID.

Proposed PMI FY 2011 Activities: (\$1,375,000)

- **Support sentinel sites:** PMI will continue support for the six existing sentinel sites (\$500,000);
- **Program monitoring and tracking system development - NMCP:** To enhance the ability of the NMCP to monitor its progress, improve program efficiency and effectiveness, and advocate for GOU and international support, PMI will continue to second an M&E specialist to the NMCP and provide support for strengthening and maintaining central level databases. In addition, support to build capacity on data analysis and reporting will be provided. (\$100,000);
- **Program monitoring and tracking system development – districts:** PMI will continue the work started in FY 2009 in 23 districts to further strengthen district level M&E activities through information technology training and support, capacity building on data analysis and reporting and data interpretation (\$300,000);
- **PMI data collection and reporting:** PMI will continue to support the USAID/Uganda sector-wide project to serve as the central data collection point for all implementing

partners. In addition, PMI will use this mechanism to conduct data quality assessments and analyze progress (\$100,000);

- **RBM and PMI Impact Evaluation:** PMI will support data collection and analysis to evaluate the 10-year impact of malaria interventions in Uganda (\$100,000);
- **Household surveys:** If the 2010 post-IRS household surveys in the northern districts do not show a significant change in epidemiological indicators when compared to control areas, a second household survey will be conducted in 2011 using the same methodology and carried out at the same time of year (November). If the 2010 survey clearly demonstrates a change, the survey will not be done. This data will provide district level information to help PMI better use its resources to maximize impact and provide the NMCP with valuable data to advocate for further resources (\$250,000); and
- **2 TDYs from CDC-Atlanta:** CDC staff will provide technical support for M&E activities including the DHS, sentinel sites, and operations research projects (\$25,000).

HEALTH SYSTEMS STRENGTHENING AND CAPACITY BUILDING

Background

The weak health system in Uganda is a significant impediment to successful malaria control. Inadequate financing, organization and coordination; lack of human resources (and the capacity of existing personnel), infrastructure and commodities; and poor leadership and governance are some of the challenges affecting the success of the malaria program.

The 2007 SPA found that health facilities in Uganda are struggling; fewer than 10% of facilities have regular water and electricity and only half have a full package of basic services (outpatient care, sexually transmitted infections treatment, family planning, ANC, immunization and child growth monitoring). While all facilities offer malaria treatment services, laboratory diagnostic capacity is available in only one quarter of health facilities. First-line antimalarials were available in eight out of 10 facilities (this is likely much lower now due to significant stock-outs in 2009-2010), and while 75% of facilities had ITNs, only a small proportion of ANC health care workers were seen offering these to ANC clients.²²

According to the 2009 Capacity Project Evaluation, Uganda is experiencing a human resources for health (HRH) crisis. Only 38% of established posts are filled in health facilities and there is an extreme degree of inequity and poor distribution of human resources for health, with the rural population left largely underserved. To address gaps, there is significant task shifting to low cadres of health workers who are often unqualified to perform additional duties. Unsatisfactory performance and low productivity of health workers has resulted in under utilization and poor quality of health services. Although a human resources for health policy and strategic plan have

²² 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.

been developed with USAID support, immense challenges of deployment, retention, and effective and efficient human resource management persist.

Due in part to the weak public health system, the private sector continues to play an important role in the delivery of health services in Uganda. The reach of the private sector is expansive; of the estimated 4,640 health facilities in Uganda, nearly half are private, for-profit facilities.

Within the NMCP, coordination is poor amongst the different partners at all levels (donors, implementing partners, zonal and district malaria focal persons and health facilities) and often amongst the different interventions led by the NMCP malaria focal persons. This has limited the progress of malaria control in Uganda through overlapping coverage in some areas with poor coverage in others, inadequate data sharing for partners to monitor progress and poor utility of existing resources.

Progress to Date

Recognizing these gaps, PMI, USAID/Uganda, PEPFAR and the GOU are placing an increased emphasis on health systems strengthening. PMI has supported health systems strengthening since its inception and plans to provide further support through its own programs as well as integrated support with other USAID/Uganda and external partners.

In collaboration with PEPFAR and other USAID health programs, PMI supports improving workforce policy and planning through strengthening human resource information systems; supporting development and implementation of evidence-based human resources strategies; strengthening human resource units within MOH, local government and NMCP; advocating for policies that increase workforce retention and productivity; and developing in-service training strategies.

As previously described, pharmaceutical management is an essential PMI health systems strengthening activity that is jointly supported by USAID and PEPFAR.

Leadership and governance in the health sector remain weak in Uganda. Since FY 2008, PMI has committed up to \$200,000 for capacity building of the NMCP to enhance its leadership role and management functions. PMI will also invest in internship programs for Masters in Public Health students through the Mission's planned internship program in order to enhance leadership training.

To improve the quality of health information, a PMI-supported M&E specialist has re-established the national NMCP database and contributed to the redesign of HMIS indicators. In addition, PMI has supported training of 56 HMIS focal persons and 15 NMCP staff in monitoring and evaluation.

Capacity-building of the NMCP is supported in part by the two PMI Senior Technical Advisors and two Malaria Program Management Specialists on all aspects of malaria control activities and programming. Advisors have played key roles in the country's malaria technical working groups. Since 2008, PMI has also equipped the NMCP with computers and accessories, scanners and photocopiers. PMI also supports four quarterly RBM/NMCP partner review meetings each year and two technical working group meetings on malaria laboratory diagnostics and ITNs.

In addition to strengthening the public health system, PMI support to the private sector has led to increased private sector involvement in malaria control through the creation of a pool of six private marketers of LLINs, a robust social marketing platform for malaria products including nets and ACTs, and the engagement of at least 15 major corporations to invest their own funds to provide malaria services to both their workers and surrounding communities. PMI has also supported efforts to strengthen the role of civil society in malaria control through its support to the malaria communities programs and the Malaria and Childhood Illness NGO Secretariat (MACIS), which is a coalition of civil society organizations in Uganda, engaged in malaria and/or integrated management of childhood illnesses interventions.

Proposed PMI FY 2011 Activities (most activities are integrated in implementing partners' work plans, therefore no additional costs assigned) (\$500,000):

- PMI will support the NMCP to improve coordination with malaria stakeholders through RBM coordination meetings, supportive supervision for district level program implementation, and public symposia to share program updates, challenges and best practices (\$100,000);
- PMI will support the USAID/Uganda sector-wide initiative to address human resource shortages and develop the capacity of the health workforce at national and district level. This support will help prioritize the recruitment, retention, and performance of health workers who will address the highest burden health issues in Uganda, including malaria. USAID/Uganda's human resource technical assistance program will also work with other USAID-supported partners to ensure proper human resource planning at the district level. PMI's investment leverages over \$1.5 million of PEPFAR and other USG health investments (\$400,000); and
- 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 NGOs) and receive on-the-job training. As FY 2010 funds have not yet been used, PMI will apply this funding for activities in FY 2011 (\$0).

INTEGRATION WITH OTHER GLOBAL HEALTH INITIATIVE PROGRAMS

As part of the GHI, the USG has developed an expanded PMI strategy prioritizing integration of malaria prevention and treatment activities with maternal and child health, HIV/AIDS, neglected tropical diseases, and tuberculosis programs; strengthening host country health systems to ensure sustainability; and ensuring a women-centered approach for malaria prevention and treatment activities at both the community and health facility levels.

In Uganda, PMI will contribute to the goals of the GHI by:

- Supporting health systems strengthening efforts, including:
 - Strengthening supply chain management for health commodities at the central, regional, and district level (costs included under the Pharmaceutical Management section)

- Addressing human resources for health and developing the capacity of the health workforce at national and district level (costs included under the Health Systems Strengthening and Capacity Building section)
- Strengthening the quality and timely use of HMIS data (costs included under the M&E section);
- Supporting integration of malaria control in MCH and PMTCT programs to promote a harmonized approach for district-based health delivery (costs included under the Case Management section);
- Improving the quality and use of ANC through integrated support for FANC (costs included under the IPT section);
- Working with PEPFAR to improve laboratory diagnostic capacity through the development of QA/QC systems along with training and supervision (costs included under the Diagnostics section);
- Continued support of integrated HIV/AIDS, tuberculosis and malaria programs which include public-private partnerships (cost sharing with private companies) and capacity building (costs included under the IPT and Case Management section); and
- Continued support for integrated supportive supervision of health workers at central and district level (costs included under the Case Management section).

STAFFING AND ADMINISTRATION

PMI staff in Uganda is comprised of two Malaria Technical Advisors (one CDC and one USAID), who provide oversight to all PMI-related activities in Uganda, and two USAID Project Management Specialists who support the management and administration of PMI activities. The PMI team is situated within the USAID/Uganda Health Team, with the Health Team Leader involved in strategic planning, budgeting, cross-cutting issues, and linkages with broader SO8 and Mission efforts. The Health Team is a part of SO8, which coordinates health, HIV, and education efforts to improve the health and education status of Ugandans. SO8 is involved in the implementation of four presidential health-related initiatives, plus presidential initiatives related to education.

The PMI team is responsible for the development and implementation of PMI strategies and work plans, the coordination of malaria activities with national authorities, the management of PMI funded collaborating agencies, and the supervision of day-to-day PMI-related activities. The PMI team oversees all technical and administrative aspects of PMI, including project design, managing malaria prevention and treatment activities, M&E of outcomes and impact, and reporting of results. All technical activities are undertaken in close coordination with the MOH/NMCP and other national and international partners, including the WHO, UNICEF, the Global Fund, private stakeholders, and district officials. PMI also collaborates closely with other Mission colleagues on cross-cutting issues and ensuring that PMI activities are well-coordinated with US Mission goals for sustainable development in Uganda and to ensure a cohesive approach to the GHI principles.

Staff members from CDC and USAID headquarters provide additional technical support to the Uganda-based PMI team and, when needed, provide on-site technical assistance.

Proposed PMI FY 2011 Activities: (\$2,030,000)

- **Management of PMI:** Support two PMI Malaria Technical Advisors (one USAID and one CDC) based at the USAID Mission in Kampala, including all work-related expenses (e.g., travel, supplies), and two Project Management Specialists (\$2,030,000).

ANNEXES

MOP FY11 ACTIVITY TABLE

Proposed Activity	Mechanism	Total Budget	Description of Activity	Geographic area
PREVENTION				
IRS				
Support for IRS in northern Uganda	Abt Associates	\$14,000,000	Two rounds of spraying in six districts of the Acholi and Lango regions	Kitgum, Pader, Gulu, Amuru, Apac and Oyam districts
Entomological monitoring	Abt Associates	\$350,000	Establish six entomological sentinel sites for entomological surveillance and monitoring	National
Develop local capacity to plan, manage and oversee quality IRS	Abt Associates	\$150,000	Capacity Development of GOU - NMCP, NEMA and district government to plan, manage and oversee technical quality, environmental monitoring and accountability of IRS programs in Uganda	National
Technical assistance related to IRS	CDC	\$25,000	Technical assistance visit for planning and monitoring entomological, vector control activities, and supervision of IRS activities	National
Subtotal		\$14,525,000		
LLINs				
LLIN procurement	DELIVER (Procurement)	\$3,900,000	Procurement of 650,000 LLINs	National
Routine ANC distribution in southern/central Uganda	SMP	\$900,000	Distribution of 450,000 LLINs	Selected areas in Southern/Central Uganda
Routine ANC distribution in northern Uganda	TBD/NUMAT	\$400,000	Distribution of 200,000 LLINs	Selected districts in Northern Uganda
IEC/BCC	SMP	\$900,000	Includes all types of IEC/BCC	Selected areas in Southern/Central Uganda

				1 Uganda
Subtotal		\$6,100,000		
IPTp				
Malaria in pregnancy services in southern/central Uganda	SMP	\$1,000,000	Includes provision of safe water and cups to aid with DOT and emergency stock of SP tablets, training, IEC/BCC and support supervision	Selected areas in Southern/Central Uganda
Malaria in pregnancy services in northern Uganda	TBD/NUMAT	\$150,000	Includes provision of safe water and cups to aid with DOT, training, IEC/BCC and support supervision	Selected districts in Northern Uganda
Support of private sector company health facilities for comprehensive IPT services	HIPS	\$50,000	Support comprehensive IPTp services through HIPS partner companies. (1:1 matching)	Partner companies nationwide
Support of private sector health facilities including clinics, drug shops through the UHMG network of good life clinics	UHMG/AFFORD	\$200,000	Includes training of private health providers on IPTp, early detection of malaria in pregnancy and provision of DOTs for IPTp	UHMG network of Good Life clinics
Procurement of sulfadoxine-pyrimethamine	DELIVER (Procurement)	\$200,000	Procurement of sufficient supplies to provide the public sector with 3 doses of SP per pregnant woman	National
Subtotal		\$1,600,000		
Subtotal: Prevention		\$22,225,000		
TREATMENT				
Diagnosis				
Strengthen malaria diagnostic capacity in 12 districts	UMSP (Training)	\$500,000	12 Districts - this includes QA/QC and private sector (NUMAT districts will be prioritized) and provide assistance to development of national QA/QC plan.	National
Strengthen malaria diagnostic capacity in southern/central Uganda	SMP (Training)	\$600,000	23 Districts - this includes QA/QC and private sector	Selected areas in Southern/Central Uganda
Strengthen malaria diagnostic capacity within private companies	HIPS (Training)	\$50,000	Training on diagnostics (1:1 matching) to private companies	Partner companies nationwide
Support malaria diagnostic capacity of health providers in private clinics not associated with large companies on	UHMG/AFFORD	\$225,000	Training health providers on diagnostics throughout the UHMG network of good life clinics	National

Sustained IEC/BCC campaign on proper diagnosis before treating fevers as malaria	UHMG/AFFORD	\$175,000	Use all existing media channels to strengthen use of diagnostics before malaria treatment	National
1 TDY	CDC	\$12,500	Technical assistance to strengthen diagnostics	
Subtotal		\$1,562,500		
Pharmaceutical management				
Pharmaceutical supply chain management	SURE	\$800,000	TA to MOH, NMS and JMS for improved quantification and forecasting, procurement, warehousing, distribution, LMIS and reporting plus expansion to district level. Provide support to NDA for quality assurance and post-marketing surveillance.	National
Subtotal		\$800,000		
Case Management				
Procurement of malaria drugs and diagnostics	DELIVER (Procurement)	\$3,607,500	Procure drugs and diagnostics for malaria case management	National
Private health sector support	UHMG	\$150,000	Build capacity of private sector health care provision, including TA, networking, quality improvement and supervision for case management and diagnostics	National
Supportive supervision for case management in southern/central Uganda	SMP	\$2,100,000	Provide support to service delivery for uncomplicated and severe malaria - including supportive supervision, training and job-aids	Selected areas in Souther/Central Uganda
Supportive supervision for case management in northern Uganda	TBD/NUMAT	\$150,000	Provide support supervision, in collaboration with the MoH, for case management, including in-service training.	Selected districts in Northern Uganda
Integration of malaria case management and IPTp into maternal and child health programs	STRIDES	\$300,000	Integrate malaria services in MCH services in 8 districts (case management and malaria in pregnancy)	STRIDES districts outside SMP
Support for drug efficacy studies	TBD	\$100,000	Support studies on drug efficacy for first line antimalarials	National
Subtotal		\$6,407,500		
Subtotal: Treatment		\$8,770,000		
OTHER ACTIVITIES				
Support for epidemic surveillance and response	WHO	\$50,000	Strengthen system to detect epidemics and respond in 15 districts	Epidemic-prone districts

Epidemic response	TBD	\$50,000	Emergency funds for epidemic response	National
Subtotal		\$100,000		
MONITORING AND EVALUATION				
Strengthen sentinel sites	UMSP	\$500,000	Collect and monitor hospital and outpatient data on malaria-related cases and fatalities in up to 6 sites.	National
Program Monitoring and maintaining tracking system - NMCP	SMP	\$100,000	Support of seconded M&E specialist to NMCP. Sustain databases for NMCP to track programmatic progress in key malaria intervention areas (e.g. ITN tracking database)	National
Support to routine data systems - Districts	SMP	\$300,000	Support M&E of malaria activities in the district (includes support of data collection, analysis at facility and district level);	National
Impact Evaluation	TBD	\$100,000	Impact evaluation of PMI program in Uganda	National
Continued support to UMEMS	UMEMS	\$100,000	PMI data collection, dissemination, reporting, DQAs and partner meetings, etc.	National
Fix (biomarkers)	UMSP	\$250,000	Conduct second A&P survey in selected districts	
2 TDYs	CDC	\$25,000	Technical assistance visits for sentinel site surveillance and impact evaluation	National
Subtotal		\$1,375,000		
HSS and CAPACITY BUILDING				
Capacity building support to NMCP	SMP	\$100,000	Seconded staff, equipment, coordination of partner meetings & supportive supervision	National
Integrated supportive supervision through leadership training at district levels	CAPACITY PROJECT	\$400,000	District based activities on leadership capacity, performance, and scale of PMI involvement. Also support for central MOH leadership training	National
Subtotal		\$500,000		
STAFFING AND ADMINISTRATION				
CDC Management	CDC	\$380,000	Management, CDC Resident Advisor's salary and TDYs	
USAID Management	USAID	\$1,650,000	Includes management, CDC Resident Advisor's ICASS costs and TDYs	
Subtotal		\$2,030,000		
GRAND TOTAL		\$35,000,000		

**Budget Breakdown by Partner
President's Malaria Initiative – Uganda
Year 6 (FY11) (\$)**

Budget Breakdown by Partners Table PMI - Uganda Year 5 (FY 2010) Budget Breakdown by Partners			
Partner Organization	Geographic Area	Activity	Total Budget
Abt Associates	Kitgum, Pader, Amuru, Gulu, Apac and Oyam	Procurement of IRS insecticide & equipment, training, IEC/BCC and environmental monitoring; support to NMCP IRS activities; strengthen entomologic capabilities of NMCP/VCD. Develop public sector capacity to oversee IRS.	\$14,500,000
STOP Malaria	South, not covered by NUMAT	Procurement & distribution of LLINs through ANC clinics, LLIN net facility and mass campaigns; IPT policy implementation; comprehensive IPTp services at ANC facilities; support supervision and job-aids on the use of severe malaria drugs; support to HMIS; program monitoring and tracking system development	\$6,000,000
TBD/NUMAT	Acholi and Lango regions	Distribution of LLINs through ANC clinics; comprehensive IPTp services at ANC facilities; supportive supervision to CMDs providing home-based management of fever	\$700,000
DELIVER	National	Procure severe malaria drugs and some buffer stock of ACTs, procure 2 million RDTs	\$7,707,500
HIPS	National	Subsidized nets to private sector corporations that add additional subsidies for free distribution to end users and comprehensive IPTp services with PMTCT at private sector health facilities	\$100,000
SURE	National	TA to MOH, National Medical Stores, and Joint Medical Stores for improved quantification and forecasting, procurement, warehousing, distribution, LMIS and reporting.	\$800,000

CAPACITY PROJECT	National	District based activities on leadership capacity, performance, and scale of PMI involvement. Also, support for central MOH leadership training.	\$400,000
TBD	National	Impact evaluation	\$100,000
UMEMS	National	PMI data collection, dissemination, reporting, DQAs and partner meetings. Also to implement the End user verification tool	\$100,000
WHO	Epidemic prone districts	Strengthen system to detect epidemics and respond in 10 districts	\$50,000
STRIDES	Eight districts	Integrate malaria case management and IPTp into MCH services	\$300,000
UMSP	National	Sentinel sites, diagnostic training and drug resistance monitoring	\$1,350,000
UHMG	National	Support for improvement of malaria services through the private sector clinics not associated with large companies	\$750,000
TBD	National	Epidemic response	\$50,000
CDC TDYs	National	TDYs	\$62,500
CDC	National	Staffing and administration	\$380,000
USAID	National	Staffing and administration	\$1,650,000
Total			\$35,000,000