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

PRESIDENT'S MALARIA INITIATIVE

Liberia

Malaria Operational Plan FY 2015

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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 comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, tuberculosis, maternal and child health, family planning and reproductive health, nutrition and neglected tropical diseases.

PMI was launched in June 2005 as a 5-year, $1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI was extended and the PMI strategy was revised to achieve Africa-wide impact by halving the burden of malaria in 70% of at-risk populations in sub-Saharan Africa. 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 (M&E); and promoting research and innovation.

Liberia began PMI-supported activities in FY 2008. Liberia's health infrastructure was severely damaged during the long civil war, which ended in 2003, leaving only about 45% of the population with access to essential health services. The entire population of approximately 4 million is at risk for malaria.[1] The 2011 Malaria Indicator Survey (MIS) showed malaria prevalence by microscopy at 28%. The Liberian Ministry of Health and Social Welfare has produced a National Malaria Control Strategy for the years 2010-2015 and is in the process of developing a new five-year strategy following a Malaria Program Review.

Liberia has received malaria funding from the Global Fund to Fight Aids, Tuberculosis and Malaria (Global Fund) since 2004. Liberia is set to receive Global Fund support through Phase 2 of a Round 10 grant with funding of approximately $35 million for the period through June 2016. A concept note under the Global Fund New Funding Model for the period of July 2016 through December 2017 is currently in preparation with an allocation of $4 million.

Based on progress and experiences over seven years of PMI implementation, this FY 2015 Malaria Operational Plan (MOP) for Liberia was drafted during a planning exercise carried out in April 2014 by representatives from the United States Agency for International Development (USAID) and the Centers for Disease Control and Prevention (CDC), in close consultation with the Liberian National Malaria Control Program (NMCP) and with participation of nearly all national and international partners involved with malaria prevention and control in the country. The activities PMI is proposing conform to the MOHSW National Malaria Strategic Plan, and support investments made by the NMCP, Global Fund, World Health Organization (WHO), and

[1] National Population and Housing Census, 2008 plus a growth rate of 2.1%

other donors to improve and expand malaria-related services. The proposed FY 2015 PMI funding of $12 million will support the following activities:

Insecticide-Treated Nets (ITNs): In its recent Strategic Plan, Liberia adopted a "universal coverage" goal for ITNs, defined operationally as one long-lasting insecticidal net (LLIN) for each sleeping space or a maximum of three LLINs per household. The country has set objectives of 90% of families receiving at least one LLIN, and at least 85% of the general population sleeping under LLINs. Currently, mass campaigns are the main distribution method, reinforced by intense behavior change communication (BCC) at the community level. Routine distribution of nets is also occurring during the first antenatal care (ANC) visit and at delivery in a health care institution. Since 2008, nearly 4.6 million LLINs have been distributed in Liberia through rolling campaigns and ANC facilities, including approximately 1.7 million LLINs purchased by PMI. The 2013 Demographic and Health Survey (DHS) documented that 55% of households owned at least one ITN.

The planned activities with FY 2015 funding include procurement and distribution of 320,000 LLINs for routine distribution. The Global Fund will cover the LLIN needs for the NMCP's planned national universal coverage campaign in late 2014. PMI will also support technical assistance to help the NMCP develop a multi-channel continuous distribution system, as well as monitoring of LLIN attrition and physical durability.

Indoor Residual Spraying (IRS) and Entomological Monitoring: In 2013, PMI supported the spraying of 42,708 structures protecting 367,930 people with a long-lasting organophosphate. Also in 2013, routine entomological monitoring was conducted at four sites. While IRS showed a significant entomological impact, due to the higher cost of spraying with an organophosphate insecticide, only about 10% of the population of Liberia could be covered, as compared to 23% of the population in 2012 when a combination of pyrethroids and carbamates was used. Therefore, due to significant pyrethroid and DDT resistance, and after consultations within the PMI interagency team and discussions with the NMCP, the decision was made to suspend PMI-supported IRS in Liberia after the 2013 spray round. With FY 2015 funding, PMI will support the further development of entomology capacity by providing equipment, supplies, training, and mentoring for NMCP entomology technicians to enable them to conduct mosquito density, behavior, and resistance monitoring activities nationwide.

Malaria in Pregnancy (MIP): According to the 2013 DHS, 48% of pregnant women received two or more doses of IPTp during their last pregnancy. PMI continues to support students in pre-service institutions and health providers through in-service trainings. As part of this effort, pre-service and in-service training materials for MIP have been updated to include the new guidelines for IPTp released by WHO in 2012. In addition, comprehensive community health education materials that stress early antenatal care and prevention of MIP have been provided to general community health volunteers (gCHVs). With FY 2015 funding, PMI will maintain its support to practicum sites related to training institutions, capacity building of health providers, and technical assistance to strengthen the distribution of MIP commodities. In addition, PMI will support an assessment of the implementation of the revised IPTp guidelines realized by WHO in 2012 and adopted by Liberia in 2013.

Case Management & Pharmaceutical Systems: The National Malaria Strategic Plan stresses parasitological diagnosis for all suspected malaria cases at both the facility and community level in Liberia. As of 2013, rollout of malaria diagnostics has reached all public facilities, and progress is being made in expansion to all private facilities, private pharmacies, private medicine shops, and at the community level. With FY 2015 funding, PMI will procure laboratory supplies, including reagents for microscopy and rapid diagnostic tests (RDTs). PMI will also continue to support strengthening of the National Public Health Reference Laboratory and will support the NMCP's efforts to conduct refresher training for laboratory technicians.

In 2013, the Health Management Information System (HMIS) reported administration of 1.2 million artemisinin-based combination therapy (ACT) treatments, which represents 63% of the estimated 1.9 million malaria cases reported that were either clinically diagnosed or positive by microscopy or RDT. With FY 2015 funding, PMI will procure approximately 1,276,000 ACT treatments for the public sector, community case management, and private sector facilities. Artesunate and artemether for treatment of severe malaria will also be procured. In addition, PMI will continue to support the extension of malaria case management to the community level and refresher training for facility-level case management. PMI will also support the quality assurance of antimalarial products.

In response to a temporary moratorium on USG-procured commodities between May and August 2013, and with coordinated support from PMI and the Global Fund, the MOHSW and National Drug Service worked to develop an "interim approach" to strengthen commodity distribution and improve internal controls using a "top-up" system whereby MOHSW staff accompany deliveries and verify stock reports from the county level down to the facility level. Lessons drawn from the pilot will inform a revision process of Liberia's Supply Chain Master Plan. With FY 2015 funds, PMI will continue to support strengthening of the drug and laboratory supply chain system at the central and county levels.

Monitoring & Evaluation: The NMCP has an M&E strategy and a costed M&E work plan. The Global Fund and PMI provide the bulk of the funding for M&E activities, while WHO provides technical support. The MOHSW has a fully integrated computerized HMIS that serves all public facilities and those private clinical facilities that receive medications and diagnostic support from the MOHSW. Personnel have been trained and the system is operational nationwide; however, reporting is not uniform and data are underutilized at all levels, primarily summarized for monthly reports to the next level and not used to track trends in malaria cases. The main M&E activities during the last 12 months were the implementation of the DHS 2013 with a malaria module and the completion of the Malaria Program Review, both with contributions from PMI. Preliminary results from the DHS 2013 are available and are included in this MOP.

With FY 2015 funds, PMI will support continued implementation of the end-use verification survey of the availability of malaria commodities and the quality of services at the health facility level. PMI will also provide resources for supportive supervision of M&E activities from the national level, and for malaria data collection and use at the county level. Additionally, FY 2015 funds will be used to support the 2017 Malaria Indicator Survey.

Behavior Change Communication (BCC): During the past year, PMI has assisted the MOHSW in developing communication materials and has trained and equipped health providers to convey malaria messages. At the community level, 350 gCHVs were trained to provide malaria prevention messages through the use of community health education skills toolkits. In addition, partnerships were arranged with nine radio stations for the airings of messages. With FY 2015 funds, PMI will support capacity building of health providers in interpersonal communication and strengthen the implementation of malaria messages through mass media.

ACRONYMS

ACT	Artemisinin-based combination therapy
ANC	Antenatal care
BCC	Behavior change communication
CDC	Centers for Disease Control and Prevention
CHSWT	County health and social welfare team
CSHSS	Collaborative Support for Heath Systems Strengthening
CY	Calendar year
DHIS	District Health Information System
DHS	Demographic and Health Survey
DTS	Dried blood tube sample
EUV	End-use verification
FARA	Fixed Amount Reimbursement Agreement
FY	Fiscal year
gCHV	General community health volunteer
GHI	Global Health Initiative
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GOL	Government of Liberia
HCW	Health care worker
HFS	Health facility survey
HMIS	Health Management Information System
iCCM	Integrated community case management
IMCI	Integrated management of childhood illnesses
IPTp	Intermittent preventive treatment during pregnancy
IRS	Indoor residual spraying
ITN	Insecticide-treated bed net
LLIN	Long-lasting insecticide-treated mosquito net
LMHRA	Liberia Medicines and Health Products Regulatory Authority
LMIS	Logistics Management Information System
M&E	Monitoring and evaluation
MIP	Malaria in pregnancy
MIS	Malaria Indicator Survey
MOHSW	Ministry of Health & Social Welfare
MOP	Malaria Operational Plan
NDS	National Drug Service
NDU	National Diagnostics Unit
NGO	Non-governmental organization
NHSWPP	National Health and Social Welfare Policy and Plan
NMCP	National Malaria Control Program
NPHRL	National Public Health Reference Laboratory
OR	Operational research
PMI	President's Malaria Initiative
QA/QC	Quality assurance/quality control
RBM	Roll Back Malaria
RDT	Rapid diagnostic test

SCMU	Supply Chain Management Unit
SP	Sulfadoxine-pyrimethamine
TA	Technical assistance
TTM	Trained traditional midwife
UNICEF	United Nations Children's Emergency Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

STRATEGY

1. Introduction

The President's Malaria Initiative (PMI) is a major component of the United States Government's (USG's) effort to prevent and control malaria in sub-Saharan Africa. PMI was launched in June 2005 as a 5-year program with funding of $1.2 billion and a goal to reduce malaria-related mortality by 50%. The strategy for achieving this goal was to reach 85% coverage of the most vulnerable groups – children under five years of age and pregnant women – with evidence-based preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated bed nets (ITNs), intermittent preventive treatment during pregnancy (IPTp), and indoor residual spraying (IRS). Owing to PMI's progress, the Lantos-Hyde Act of 2008 extended funding for PMI, and the PMI strategy was revised to achieve Africa-wide impact by halving the burden of malaria in 70% of at-risk populations in sub-Saharan Africa by the end of 2015.

In 2008, Liberia became PMI's eighth focus country. Funding for PMI activities in Liberia has averaged approximately $12 million annually since fiscal year (FY) 2012. In implementing PMI, the USG works closely with host governments and within existing national malaria control plans. Efforts are also coordinated with other national and international partners, including the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund), WHO, UNICEF, and Roll Back Malaria (RBM), as well as non-governmental organizations and the private sector, to ensure that investments are complementary and that host country, RBM, and Millennium Development goals and objectives are achieved. PMI aims to ensure that all country assessment, evaluation, and planning sessions are inclusive, transparent, and collaborative. Over the past few years in Liberia, PMI has strengthened coordination and collaboration among donors, particularly with the Global Fund. In addition, there has been increased cooperation among stakeholders, both USG partners (e.g., Department of Defense/U.S. Naval Medical Research Unit No. 3, Peace Corps) and non-governmental organizations (NGOs) (e.g., the MENTOR Initiative and Clinton Health Access Initiative), resulting in improved harmonization and alignment for the provision of technical assistance dedicated to the control and prevention of malaria in Liberia.

Liberia's Ministry of Health and Social Welfare (MOHSW) continues to provide effective leadership to the national malaria control effort since becoming the principal recipient for the Global Fund grant in 2012. The National Malaria Control Program (NMCP) continues to make progress in decreasing malaria-related mortality amid lingering challenges. This section of Liberia's Malaria Operational Plan (MOP) FY 2015: 1) reviews achievements and the current status of ongoing malaria interventions; 2) identifies challenges, opportunities, and threats that affect the progress of activities under PMI; and 3) outlines a strategic plan to achieve high impact results within a resource constrained environment.

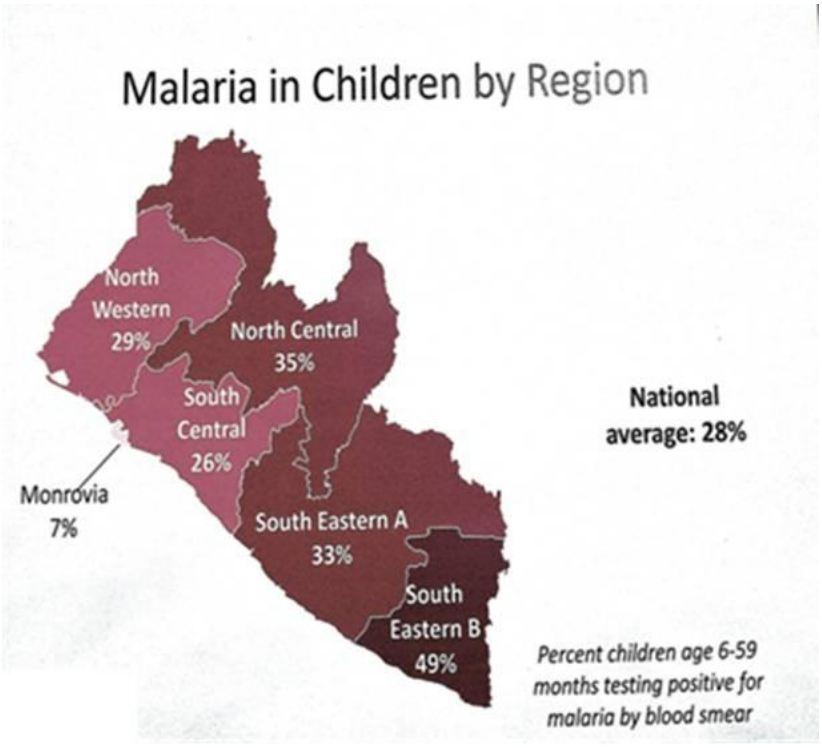
2. Country Malaria Situation

Liberia covers 43,000 square miles in West Africa, and it is bounded by nearly 350 miles of Atlantic Ocean off the southwest and by the neighboring countries of Sierra Leone (northwest), Guinea (north), and Côte d'Ivoire (east and southeast). Most of the country lies at altitudes below 500 meters. The coastal areas are characterized by mangrove swamps, which give way to tropical

rain forest that gradually thins out northwards to be replaced by deciduous forest. All geographic areas of Liberia are favorable to malaria transmission. Liberia has hyper-/holoendemic malaria. The major vectors for malaria are *Anopheles gambiae* s.s., *An. funestus*, and *An. melas*. The major parasite species are *Plasmodium falciparum* (>90%), *P. ovale*, and *P. malariae*.[2]

According to results from the 2005 Malaria Indicator Survey (MIS), the prevalence of malaria parasitemia in children under five was 66%. The prevalence rate fell to 32% in 2009, and was 28% according to the 2011 MIS. The geographical prevalence of malaria according to the 2011 MIS is shown in the map below.

Prevalence of Malaria Parasitemia in Children under Five Years of Age by Region, Liberia 2011 MIS



The entire population of approximately 4 million[3] is at risk of the disease; children under five and pregnant women are the most affected groups. According to reports received by the World Health Organization (WHO) in 2010 from the NMCP, approximately 40% of consultations in outpatient departments in all age groups in public health facilities are due to malaria.[4] The 2009 Health Facility Survey (HFS) estimated that malaria accounts for 33% of in-patient deaths.

[2] Roll Back Malaria-National Desk Analysis-Liberia- 2001
[3] National Population and Housing Census, 2008 plus a growth rate of 2.1%
[4] http://www.aho.afro.who.int/profiles_information/index.php/File:Reported_malaria_cases_by_county.PNG

Since August 2005, Liberia has made considerable progress in malaria control and prevention. The achievements from August 2005 to 2013 documented in the 2013 Demographic and Health Survey (DHS) preliminary report include:

- 55% of households have at least one ITN, up from 18% in 2005[5]
- 38% of children under five slept under an ITN the previous night, up from 2.6% in 2005
- 37% of pregnant women slept under an ITN the previous night; in 2005, 31% of women slept under any type of net
- 48% of women received two or more IPTp doses during their most recent pregnancy, up from 4.5% in 2005
- 17% of children under five received an ACT treatment for malaria within 24 hours from the onset of fever, up from 5% in 2005.

3. Country Health System Delivery Structure and MOHSW Organization

The health system in Liberia is set up in a pyramid structure with community health volunteers as the foundation. Community health volunteers include household health promoters, trained traditional midwives (TTMs), and general community health volunteers (gCHVs). Together, these groups serve outreach functions with prevention messaging and referrals to health clinics and health centers. In some areas, gCHVs also participate in directly observed treatment for tuberculosis and integrated community case management (iCCM) for diarrhea, acute respiratory infections, and malaria.

Health clinics are the primary care unit of the health system and are meant to have at least two professional staff: a nurse and a certified midwife.[6] With catchment areas 10 km in diameter, clinics typically serve populations of 3,500 – 12,000 and are mandated to be open eight hours a day, five days a week. Clinics are intended for outpatient care, and their beds are for observation only. Patients requiring further supervised care are referred to health centers or hospitals.

Health centers provide larger catchment populations of around 25,000 – 40,000 with secondary care, focusing on maternal and child health care. These centers are open 24 hours a day, every day and are meant to have up to 40 beds, laboratory diagnostic services, and provide services for severe medical and obstetric care.

Cases requiring surgical intervention are referred to hospitals, which are meant to be equipped with an operating theater, advanced laboratory, basic radiography, and basic ultrasonography. In addition to secondary care, hospitals have outpatient departments, which provide surrounding residents with primary care.

The MOHSW is working to decentralize responsibility for service delivery from the central ministry to the county level, and this mandate includes delegating responsibility, authority, and

[5] Liberia Malaria Indicator Survey, 2005
[6] Due to the shortage of certified midwives, this combination also takes the shape of a licensed practical nurse and TTM

resources to the counties, so they can effectively manage the systems that most significantly affect the day-to-day delivery of health care. For the last five years, the MOHSW has contracted out most of the service delivery to NGOs with donor funding, focusing on stewardship functions and management tasks, but Liberia is seeing a shift towards placing more responsibility on the county health and social welfare teams (CHSWTs) to directly manage local health systems and oversee service delivery. USAID/Liberia is committed to the MOHSW strategy and is focused on improving the capacity of CHSWTs to effectively make this transition.

4. Updates in MOP Strategy Section since Last Year

- 2013 preliminary DHS results released
- Signing of the second phase of Liberia's Round 10 Global Fund grant
- Completion of a Malaria Program Review
- Appointment of a new Program Manager at the NMCP
- Institution of the "interim approach" to strengthen commodity distribution and improve internal controls using a "top-up" system

5. Country Malaria Control Strategy

The Government of Liberia (GOL)/MOHSW's Liberian Malaria Control Strategy for 2010-2015 aims to sustain progress in reducing malaria-related mortality, scale-up the most effective malaria control and prevention activities from the health facility to the community level, and involve all partners (including the private sector) in supporting health care delivery. A new five-year strategy is currently being developed following a Malaria Program Review in 2014.

Under the 2010-2015 Liberia Malaria Control Strategy, the NMCP assumes the lead coordination role and takes responsibility for the decentralization of malaria control and prevention activities throughout the country by gradually devolving implementation responsibilities to CHSWTs. This coordination role includes all health partners, donors, and private sector stakeholders.

Malaria control and prevention activities in Liberia follow the principle of the "three ones":

- One national malaria control coordinating authority where implementation is a country-led process
- One comprehensive plan for malaria control, including costed work plans
- One country-level monitoring and evaluation framework

The four basic technical pillars or strategic interventions are:

1. ***Case management through improved malaria treatment and the scale up of ACTs***. Resources are to be directed towards increasing the availability and use of malaria diagnostic tools and ACTs as first-line treatment in all public health facilities, at the community level, and in the private sector. To ensure quality of care, training will focus on strengthening key providers' skills. Malaria treatment guidelines will be revised to ensure coordinated implementation at all levels. National targets include:

- At least 80% of patients with uncomplicated malaria receive early diagnosis and prompt and effective treatment according to MOHSW guidelines
- At least 65% of patients with complicated or severe malaria are diagnosed in a timely manner and receive correct treatment according to MOHSW guidelines

2. ***Integrated vector management to prevent mosquito-to-human contact, to reduce vector abundance, and to improve environmental sanitation and control of potential breeding sites.*** Integrated vector management in Liberia includes the provision of long-lasting insecticide-treated nets (LLINs) through mass distribution to all households and targeted distribution to pregnant women and children under five. The strategy also includes targeted indoor residual spraying (IRS) for sleeping structures and targeted larviciding. In its Strategic Plan and Operational Guidelines on Long-Lasting Insecticidal Nets for Liberia 2012-2017, Liberia adopted a "universal coverage" goal for ITNs, defined operationally as one LLIN for each sleeping space or a maximum of three LLINs per household.

National targets include:

- At least 90% of families have received at least one LLIN
- At least 85% of children and pregnant women sleep under LLINs
- At least 85% of the general population sleep under LLINs
- At least 85% of the population in targeted districts is protected by IRS

3. Malaria prevention and control during pregnancy. Since the introduction of intermittent preventive treatment during pregnancy (IPTp) in Liberia in 2004, the use of sulfadoxine-pyrimethamine (SP) for malaria during pregnancy has been gradually increasing, paralleling the gradual increase in access to health care. Trained traditional midwives are expected to refer pregnant women to ANC clinics rather than supply IPTp at the community level. However, for pregnant women residing more than five kilometers from ANC services, certified midwives deliver ANC services, including SP, while also encouraging early and repeated ANC clinic attendance. National targets include:

- At least 80% of pregnant women attending antenatal consultation receive IPTp2 according to the national MIP protocol
- 80% of all pregnant women diagnosed with malaria at health facilities (public or private) receive prompt and effective treatment according to national treatment protocol
- All pregnant women with suspected malaria at the community level are referred to the nearest health facility and receive prompt and effective treatment
- At least 80% of pregnant women attending antenatal consultation receive an LLIN

4. ***Support for advocacy, social mobilization, and behavior change communication (BCC).*** This component will focus on the role of health providers and the community in malaria control and prevention activities, using a multichannel approach for health education with emphasis on radio messages, community health volunteers, and child-to-

child communication. Key change agents for dissemination of malaria messages will include peer educators, trained care-givers, and other locally respected authorities. National targets include:

- All health facilities (public and private) provide updated malaria health education
- 90% of the population has heard a malaria message through multimedia channels

The above four technical pillars in turn rest on a foundation of support functions designed to facilitate their effective rollout and implementation in a cross-cutting manner.

- **M&E and Research**: Monitoring and evaluation is a major focus of both the MOHSW and the NMCP. The NMCP has developed a comprehensive M&E plan in collaboration with the M&E unit of the Department of Planning at the MOHSW and with other technical partners. This plan will be integrated with the health management and information system (HMIS) of the MOHSW. More detailed operational M&E plans will be prepared on an annual basis and revised when necessary. Malaria-specific indicators will be selected from the RBM core indicators, as well as program-specific indicators to measure performance. All data collected (routine and surveys) will be analyzed, and reports will be produced and shared with stakeholders.
- **Supply Chain Management**: Supply chain management continues to be one of the biggest challenges facing health care programs in Liberia. Inadequate storage, inventory and warehouse management practices, and limited information sharing continue to contribute to stockouts of commodities and uncertain drug quality. The NMCP and the public health community see this activity as a key priority.
- **Program Management and Administration**: In order to ensure that the NMCP is able to provide expert advice on malaria prevention and control activities in Liberia, additional capacity building, particularly in program management and M&E are required. This capacity building will be a continuous process that will provide the NMCP with the technical capabilities, resources, and information needed to carry out its responsibilities, including fostering effective partnerships among stakeholders.

The election of President Ellen Johnson Sirleaf as the chairperson of the African Leaders Malaria Alliance in 2012 brought additional political support to the fight against malaria in Liberia.

6. Integration, Collaboration, and Coordination

The Global Health Initiative (GHI) is the USG vehicle for ensuring all USG global health investments are efficiently coordinated with recipient countries' health priorities in order to achieve maximum ownership and results. Thus, the guiding principle of the USG's GHI strategy for Liberia is to ensure all USG health investments align with Liberia's 2011-2021 National Health and Social Welfare Policy and Plan (NHSWPP), which is designed to expand access to basic health services and to establish the building blocks of equitable, effective, responsive, and sustainable health service delivery. The USG complements the Liberian MOHSW's efforts by concentrating its resources on two key focus areas: 1) improving service delivery through the

Essential Package of Health Services and 2) strengthening health systems to increase institutional capacity and sustainability.

Through GHI, the USG will invest in capacity building and technical assistance for policy formulation, strategy development, health systems strengthening, and countrywide BCC initiatives. Additionally, the USG is using MOHSW systems to provide both facility-based and community-based support under performance-based contracting with NGOs for specific health facilities and their catchment communities. The USG is also providing complementary technical assistance for quality assurance, in-service training, and supportive supervision.

Performance-based contracting is a service agreement entered into between the MOHSW and NGOs to carry out service delivery at health facilities and catchment communities. These NGOs are expected to ensure health care services are in accordance with the Essential Package of Health Services, which is a standard government-approved package for primary health care services in Liberia. These contracts include a performance bonus for reaching targets on quantity and quality indicators after verification of submitted data at the county level and counter-verification by the central level committee comprised of the MOHSW and third party stakeholders.

From 2005 until 2007, the Global Fund constituted the majority of external funding for the implementation of malaria control and prevention activities in Liberia. A $37 million Global Fund Round 7 grant was signed in April 2008, with the United Nations Development Program as the Principal Recipient, and in 2011 a $60 million Round 10 grant was signed with the MOHSW and an NGO, Plan Liberia, as the two Principal Recipients. Based on the Phase 1 evaluation of the Round 10 grant that was completed in 2013 and Liberia's Phase 2 application, the current funding is approximately $35 million dollars for the period through June 2016. Both parties signed the grant in April 2014. A concept note based on an updated National Malaria Strategic Plan and country dialog regarding the period from July 2016 through December 2017 is currently in preparation with an allocation of $4 million.

As PMI complements the activities under the Global Fund, support was provided to the NMCP and other parties during the evaluation of the first phase and during the development of the proposal for the second phase of the Round 10 grant. PMI provided technical assistance, particularly regarding the quantification of commodities. A key element of the Global Fund renewal involves the NMCP's plan for a nationwide distribution of LLINs in late 2014. This is a change from the previous strategy of rolling mass distribution of LLINs, during which different parts of the country received nets at different times over the course of a three-year cycle. In coordination with the NMCP, it was agreed that the Global Fund would provide the LLINs for the nationwide campaign and that PMI would provide LLINs for routine distribution through ANC visits and at delivery in a health care institution.

Liberia has recently undergone a Malaria Program Review with an Aide Memoire outlining the findings and recommendations signed in March 2014 by the MOHSW, USAID, Plan Liberia as the Global Fund co-Principal Recipient with the MOHSW, and WHO. The final report is still pending as of April 2014, but will inform the process of updating Liberia's National Malaria Strategic Plan for the period 2016-2020. Note that the current Strategic Plan will also be updated

to reflect the current status toward the goals, and will be costed and reviewed as part of the Liberia Global Fund concept note under the New Funding Model for the period July 2016 through December 2017, which overlaps with the period of implementation for this MOP.

In Liberia, PMI prioritizes the scale-up of iCCM to increase access to health services at the community level, and in collaboration with UNICEF, PMI supports the Community Health Services Division of the MOHSW to implement iCCM. This program provides treatment for malaria, diarrhea, and acute respiratory infections for children under five at the community level. The Global Fund, under its Round 10 grant, has committed support to the expansion of the iCCM program from 2% to 5% of the number of national febrile episodes tested for malaria and treated if positive.

The MOHSW has prioritized the integration of diagnostic capacity for malaria, tuberculosis, and HIV at the central and regional levels. The MOHSW established a National Diagnostics Unit (NDU) to coordinate the support of partners to maintain achievements and continue progress. PMI and other USAID programs are coordinating with the NDU, the Global Fund, and other partners to operationalize an integrated diagnostics strategy that will provide comprehensive diagnostic policies, standard operational guidelines, and a national diagnostic program for Liberia.

The MENTOR Initiative is supporting a pilot in the greater Monrovia area of Montserrado County to provide ACTs to private pharmacies and medicine shops for increased access to malaria treatment. This pilot currently provides testing with RDTs and treatment (if RDT-positive) to an estimated 0.5% of the national febrile cases. PMI has provided technical input to the NMCP, and based on results and lessons learned, the Global Fund will support the scale-up of this pilot private sector activity through their Round 10 Phase 2 grant to cover 3% of the projected national febrile cases annually, which represents 75% of the private sector pharmacies and medicine shops in Montserrado where the bulk of such facilities are found. According to the 2011 MIS, 26% of the population that seek treatment for malaria do so from private facilities with diagnostic capacity that are included in the MOHSW quantification system, while 23% seek care from pharmacies and medicine shops.

Additionally, PMI, in collaboration with the NMCP, had initiated a partnership with private companies to support implementation of IRS in the years that IRS was conducted. Under this initiative, the Arcelor Mittal Steel Company conducted three rounds of spraying in its concession areas in Nimba and Grand Bassa Counties from 2010 to 2012. The Liberia Agriculture Company was also engaged in this public-private partnership and supported one round of spraying in its concessional area in Grand Bassa County in 2011. PMI provided insecticides and technical support, including training and mentoring, to these companies to build capacity to conduct IRS. As IRS is not included in the FY 2014 or FY 2015 MOPs, the equipment remains in storage, and the NMCP plans to work with these companies and other private sector sources to support IRS for their populations. PMI will continue to strengthen the vector control and entomological capacity of the NMCP to better understand vector ecology and insecticide resistance in collaboration with the U.S. Naval Medical Research Unit No. 3, the Liberian Institute for Biomedical Research, the Armed Forces of Liberia, and other groups such as the MENTOR Initiative who are collecting relevant data related to their individual projects.

7. PMI Goals, Targets, and Indicators

The goal of PMI is to halve the burden of malaria in 70% of at-risk populations in sub-Saharan Africa. By the end of 2015, PMI will assist Liberia to achieve the following targets in populations at risk for malaria:

- >90% of households with a pregnant woman and/or children under five will own at least one ITN
- 85% of children under five will have slept under an ITN the previous night
- 85% of pregnant women will have slept under an ITN the previous night
- 85% of houses in geographic areas targeted for IRS will have been sprayed
- 85% of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been sprayed with IRS in the last six months
- 85% of women who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy
- 85% of government health facilities will have ACTs available for treatment of uncomplicated malaria
- 85% of children under five with suspected or confirmed malaria will have received treatment with ACTs within 24 hours of onset of their symptoms

8. Progress on Coverage/Impact Indicators

The most up-to-date information on the status of malaria prevention and control interventions in Liberia comes from the MISs funded by PMI and the 2013 DHS. The table below shows progress since the 2005 MIS, including preliminary results from the 2013 DHS. Of note, with the exception of household ITN ownership, which increased, and prompt treatment with an antimalarial, which decreased, coverage with malaria control interventions remained relatively unchanged from 2011 to 2013.

Progress on Indicators to Date

CORE INDICATORS	MIS 2005	DHS 2007	MIS 2009	MIS 2011	DHS 2013*
Proportion of all households that own at least one ITN	18%	30%[a]	47%	50%	55%
Proportion of children <5 years who slept under an ITN the previous night	2.6%	n/a	27%	37%	38%
Proportion of pregnant women who slept under an ITN the previous night	n/a	n/a	33%	39%	37%
Proportion of pregnant women and children <5 years who slept under an ITN the previous night or in a house that has been sprayed with IRS in the last 6 months	n/a	n/a	n/a	W=45% <5=43%	W=43% <5=44%
Proportion of women who have completed a pregnancy in the last two years and received two or more doses of IPTp during their pregnancy	4.5%	12%[b]	45%	50%	48%
Proportion of children <5 years with fever who received ACTs within 24h of onset of their symptoms	5.3%	8.9%[c]	17%	25%	18%
Proportion of children <5 years with any anemia (severe anemia)[d]	87%	n/a	63% (4.7%)	n/a (7.7%)	n/a
Proportion of children <5 years with parasitemia	66%	n/a	32%	28%	n/a

*The 2013 DHS results are preliminary at the time of writing of this MOP

[a] The 2007 DHS only asked about any net ownership, not specifically about ITNs, and did not ask about net use

[b] The 2007 DHS only asked about pregnant women who took any SP

[c] The 2007 DHS asked about treatment with ACTs without regard to timing

[d] Any anemia is defined as hemoglobin <8.0g/dL and severe anemia is hemoglobin <11g/dL

9. Other Relevant Evidence on Progress

The 2009 Health Facility Survey (HFS) also provides useful information on the progress of facility-based malaria activities. A total of 418 health facilities, representing 79% of all health facilities in Liberia, were visited, and the survey included record review, assessment of commodities, and observation of malaria case management. Results from the 2009 HFS were encouraging, as 86% of health workers were prescribing antimalarial drugs according to national guidelines and 85% of health workers had access to essential malaria drugs. A follow-up HFS was undertaken in 2013 to measure progress against the survey conducted in 2009, and a report should be available by the end of 2014.

Key Indicators of the Liberia Health Facility Surveys

	INDICATORS	HFS 2005	HFS 2009
1	% of GOL health facilities that have all four presentation of ACTs available for treatment of uncomplicated malaria on the day of visit	58	71
2	% of health workers who search for danger signs	11	20
3	% of health workers who prescribe antimalarial drug according to national guidelines	75	86
4	% of health workers who counsel patients/caretakers on malaria	26	45
5	% of health workers with access to essential malaria drugs	48	85
6	% of out-patient department attendance due to malaria among children under five years	59*	38
7	% of pregnant women with confirmed malaria	31	18
8	% of patients receiving appropriate malaria treatment within 24 hours	21	35
9	% of overall deaths with laboratory-confirmed malaria (rapid diagnostic test or blood smear)	44	33

* Clinical malaria

10. Challenges, Opportunities, and Threats

Although appreciable progress has been made, significant strides are required to further reduce malaria-related morbidity and mortality in Liberia. The main challenges include: 1) inefficient supply chain management; 2) inadequate Logistics Management Information System (LMIS) reporting and use; 3) need for greater capacity at the NMCP for managerial and supervisory functions; and 4) budget constraints.

Since its inception in 2008, PMI has allocated an average 40% of its annual budget to the procurement and distribution of antimalarial commodities. The supply chain for these commodities, particularly for ACTs and RDTs, is critical for diagnosis and treatment of malaria. Following reports of leakages and an ongoing lack of controls and safeguards to ensure secure delivery of USG-procured commodities, the USG together with the Global Fund issued a

temporary moratorium between May and August 2013 on the disbursement of USG-procured malaria and reproductive health commodities, and Global Fund-procured malaria commodities. In response, and with coordinated support from PMI and the Global Fund, the MOHSW and National Drug Service (NDS) worked to develop an "interim approach" to strengthen commodity distribution and improve internal controls using a "top-up" system whereby MOHSW staff accompany deliveries and verify stock reports from the county level down to the facility level. The interim approach is designed to ensure that re-supply is based on collected data, which is verified and validated through an approval process involving the county health teams, the disease programs, and the MOHSW's Supply Chain Management Unit (SCMU). The MOHSW piloted this approach throughout Liberia in collaboration with the Global Fund and other partners. PMI is supporting the planning and implementation of the interim approach in five counties through training, technical assistance, and logistical support, and at the central level through overall management support to the SCMU, and the secondment of an operations advisor to strengthen management of commodities at the NDS.

This collaborative effort has enhanced commodity security, accountability and availability for malaria, HIV/AIDS, reproductive health and essential drugs programs. An evaluation of the interim approach in 2014, supported by the Global Fund and PMI, will provide the MOHSW the opportunity to reevaluate the Supply Chain Master Plan developed in 2010, and to ensure donor-supported capacity-building inputs are aligned with MOHSW priorities and strategies for assuring a more secure and transparent supply chain.

The LMIS data emanating from health facilities should feed into the database of the SCMU to inform forecasting, quantification, and procurement planning of health commodities. However, data quality remains unreliable and continues to make forecasting and quantification difficult. The NMCP has recognized these problems and has increased its coordination with PMI to remedy the situation. Additionally, the Global Fund has committed resources to the rollout of the LMIS forms to eleven counties, complementing the effort of PMI in the four largest counties. Through the interim approach, the MOHSW is also piloting a new data form designed to collect more accurate consumption data on malaria commodities that is expected to inform a future revision of LMIS tools, as well as provide stronger evidence to inform future quantification of commodities. The present national quantification for antimalarials was largely derived from data retrieved from cross-referencing services data from the HMIS with demographic data. Local capacity to ensure country-led quantification exercises for antimalarials is crucial to PMI endeavors.

The managerial and supervisory capacity at the NMCP is being bolstered in order to ensure the long-term sustainability of malaria activities. The former deputy program manager was officially appointed as program manager at the NMCP in the fall of 2013. The deputy position will likely continue to be vacant until an organizational assessment is finalized as a Global Fund condition precedent. The NMCP has the opportunity moving forward to track program performance and implementation through its independent leadership.

Despite the increase of the GOL's budget allocation for health sector activities from $10 million in 2006/2007 to $133 million in 2013/2014, significant reliance on donor support for health services delivery and budget shortfalls reflect the uncertainty in ensuring health service delivery

in the future. The GOL's ability to absorb the country's health expenditures is vital in diminishing this uncertainty.

11. PMI Support Strategy

The overall PMI support strategy for Liberia is nested within the GHI strategy for Liberia, which seeks to align, complement, and support Liberia's 2011-2021 NHSWPP. To improve the overall health status of the population, strategic investments need to be made that take the best advantage of resources from government, development partners, and technical agencies.

PMI's national-level support includes health system strengthening, bolstering the HMIS and LMIS, improving pharmaceutical and commodity supply chain management, and enhancing BCC activities. Improving diagnostic capacity, promoting quality medicines, and supporting ITN distribution through ANC clinics and antimalarial commodity distribution through health facilities, are among specific interventions that PMI will continue to support under its nationwide investment approach. In many cases, PMI is one partner among several others, enabling PMI to expand its activities beyond what could have been possible otherwise.

Support at the county level consists of the implementation of Liberia's Essential Package of Health Services at the facility and community levels through a government-to-government Fixed Amount Reimbursement Agreement (FARA). This is the principal delivery mechanism for preventive and curative malaria activities. Three counties are targeted for service delivery and an additional three counties may be targeted for strategic support to augment service delivery and decentralized system strengthening. These counties were prioritized in USAID/Liberia's five-year strategy based on their population concentration (the six counties account for 75% of the total population of Liberia) and their potential to fuel nationwide development. Several USAID funding streams, including HIV/AIDS, maternal and child health, and family planning, will be combined with PMI resources. Scale-up to nationwide coverage for activities will be achieved through coordination with the Global Fund, the multi-donor Pool Fund, and the European Union.

Accountability of PMI resources at the county level will be enhanced through MOHSW performance-based contracting of NGOs supported by PMI through the FARA. There are seven malaria specific indicators used to assess the performance of contracted NGOs under the FARA: management of malaria according to the standard malaria protocol, management of uncomplicated malaria, management of complicated malaria, availability of mosquito nets for ANC, availability of RDTs, availability of ACTs, and availability of SP. USAID visits each FARA county every quarter and randomly selects facilities for field monitoring. USAID uses baseline assessment documents and integrated supervision monitoring reports provided by the county health teams and partners to verify performance of the various health facilities under the FARA. In addition, HMIS indicators may be used evaluate the FARA, as both IPTp and treatment indicators are included as indicators in the performance-based financing scheme. To date, HMIS data shows continued improvements in service delivery within counties supported through the FARA, as well as those supported by other donors. For instance, IPTp2 coverage among pregnant women residing in catchment areas around USAID-supported facilities in Bong in 2012 was 79%, up from 70% the previous year. In Lofa, IPTp went from 45% to 58%.

As the current FARA will end in June 2015, plans are in place to implement a follow-on agreement with the MOHSW. The future agreement will maintain the key interventions, especially those related to malaria and its design and indicators will be influenced by ongoing evaluations of the current FARA.

OPERATIONAL PLAN

1. Insecticide-Treated Nets (ITNs)

NMCP/PMI Objectives

In its Strategic Plan and Operational Guidelines on Long-Lasting Insecticidal Nets for Liberia 2012-2017, Liberia adopted a "universal coverage" goal for ITNs, defined operationally as one LLIN for each sleeping space or a maximum of three LLINs per household. The country has set objectives of 90% of families receiving at least one LLIN, and at least 85% of the general population sleeping under LLINs. Currently, mass campaigns are the main distribution method, reinforced by intense BCC at the community level. The NMCP also aims to complement campaigns with continuous distribution of nets during the first ANC visit, at delivery in a health care institution to encourage delivery in facilities, and through a yet to be determined third routine distribution channel. ANC distribution and distribution of LLINs at institutional delivery has started. Distribution through a third channel is dependent on the availability of funds under the Global Fund's New Funding Model starting in July 2016.

Progress since PMI was launched

Liberia was one of the first countries to distribute LLINs door-to-door through campaigns in combination with net "hang-up" in households. Since 2008 nearly 4.6 million LLINs have been distributed in Liberia through rolling campaigns, ANC services, and at institutional delivery, including approximately 1.7 million LLINs purchased by PMI.

Progress during last 12 months

Two mass LLIN campaigns occurred in Liberia in 2012 supported by PMI and the Global Fund. In total, approximately 1.3 million nets were distributed in nine counties as outlined in the table below. No campaigns took place in 2013, but 80,000 LLINs were procured by the Global Fund to be distributed to ANC clinics. In addition, in 2013 PMI provided technical assistance for the planning of a nationwide mass campaign to be conducted in late 2014. PMI provided assistance with LLIN quantification and macro-planning.

LLIN Distribution by County through Campaigns in 2012

Bomi	Bong	Gbarpolu	Grand Bassa	Grand Cape Mount	Lofa	Margibi	Montserrado	Nimba	Total distributed	Total distributed by PMI
88,194 (Global Fund)	210,035 (Global Fund)	50,977 (PMI)	177,014 (Global Fund)	92,000 (PMI)	185,443 (Global Fund)	149,126 (PMI) 37,178 (Global Fund)	3,850 (PMI), 143,743 (Global Fund)	157,811 (Global Fund)	1,295,371	295,953

Preliminary results from the 2013 Liberia DHS, the first large scale survey conducted after the 2012 distribution campaigns, indicate that while there have been modest improvements in some indicators of net ownership since the 2011 MIS was conducted, there have also been some declines. Although the number of households owning at least one ITN in Liberia increased from

50% in 2011 to 55% in 2013, the percentage of pregnant women and under-fives living in households with an ITN who had slept under an ITN the previous night declined from 77% among pregnant women and 68% among under-fives in 2011 to 63% for both groups in 2013. Additionally, although there was also a small decrease in the number of urban households owning at least one ITN from 52% in 2011 to 50% in 2013, the percentage of rural households that owned at least one ITN increased markedly over the same period from 47% to 61%,

A PMI-supported qualitative assessment of ownership of mass distribution campaign nets was conducted in 2014 to explore possible reasons for low LLIN ownership despite repeated mass campaigns. Data were collected from four communities in two counties (i.e., Grand Cape Mount and Gbarpolu) where PMI-supported LLIN distribution campaigns took place in 2012. Qualitative data collection methods, including community focus group discussions, household in-depth interviews, net observations, and key informant interviews, were used to identify factors among the NGO LLIN distributors and within county health offices, communities, and households that affected LLIN ownership and use. A main finding was that not every household received the number of nets they were eligible to receive. A variety of monitoring- and distribution-related problems were identified that contributed to this outcome (e.g., poor working relationships between the NGO distributors and county and district health teams, inaccurate enumeration of sleeping spaces, incomplete coverage of some communities and/or households, and insufficient availability of nets). The assessment also found that LLIN usage was related to access, with the proportion of sleeping spaces that were covered in the four communities averaging 53% (ranging from 29% to 69%). Key recommendations from the assessment included the need to better involve country and district health teams in campaign activities and to better utilize gCHVs before, during, and after distribution. In addition, the assessment process for how many nets a household will receive and information regarding how campaign staff will be compensated needs to be made transparent.

The NMCP and partners agree that the LLIN distribution system for both campaign and continuous channels has faced significant challenges: poor quantification and forecasting, weak supply chain management, inadequate donor coordination, weak tracking of net distribution by county, sporadic coverage of districts and counties, and slow implementation of distribution through ANC clinics and institutional delivery, all leading to disappointing progress toward achieving targets for ownership and use. Citing these constraints, the NMCP opted to revise its strategy and plan its first-ever national mass LLIN distribution campaign, replacing the strategy of phased campaigns by county in which different parts of the country received nets at different times over the course of a three-year cycle based on a three-year projected lifespan for an LLIN. The plan is for a nationwide mass campaign to occur in late 2014, ensuring that all districts are targeted and that every household is covered with up to three LLINs based on the number of sleeping spaces.

Gap analysis

Need	2013	2014	2015	2016
Campaign distribution		2,195,796		
Continuous distribution: ANC and institutional delivery *	251,624	276,670	292,569	319,314
Total need	**251,624**	**2,472,466**	**292,569**	**319,314**
Committed or distributed and funding source – campaigns				
Global Fund Consolidated Grant		2,195,796		
Total campaign committed or distributed		**2,195,796**		
Committed or distributed and funding source – continuous				
PMI MOP FY 2013 (ANC and institutional delivery)		250,000		
PMI MOP FY 2014 (ANC and institutional delivery)			327,700	
PMI MOP FY 2015 (ANC and institutional delivery)				320,000
Global Fund Consolidated Grant (ANC and institutional delivery)	80,000			
Total continuous committed or distributed	**80,000**	**250,000**	**327,700**	**320,000**
ANNUAL CAMPAIGN GAP	**0**	**0**	**0**	**0**
ANNUAL CONTINUOUS GAP (SURPLUS)	**171,624**	**26,670**	**(35,131)**	**(686)**
TOTAL ANNUAL LLIN GAP (SURPLUS)	**171,624**	**26,670**	**(35,131)**	**(686)**

* Based on 5% expected pregnant women in a year and a growth rate of 2.1%
Source: NMCP Global Fund-Roll Back Malaria Gap Analysis 2013

Plans and justification

The NMCP's new strategy to increase LLIN coverage provides an excellent opportunity for PMI and other partners to support the NMCP to plan and implement a high-quality national campaign. The Global Fund will procure all of the nearly 2.2 million nets needed to achieve universal coverage, and PMI will provide technical assistance to the NMCP for designing all aspects of the campaign, including micro-planning at the county level, BCC activities, and post-distribution activities.

The NMCP is also committed to develop a more robust continuous distribution strategy by scaling-up current distribution through ANC visits and at institutional delivery, and to incorporate new approaches, particularly to enhance coverage for the most vulnerable populations. In coordination with the NMCP, it was agreed that the Global Fund would provide the LLINs for nationwide campaigns and that PMI would provide LLINs for routine distribution.

LLIN durability monitoring will be conducted to measure attrition and physical durability of nets in Liberia as there is a lack of data on how long nets actually last in the country. Two sites will be chosen to represent urban and rural areas. Currently, LLIN durability monitoring is not part of the national LLIN strategy, but PMI will work with the NMCP to incorporate it into their strategy.

Proposed activities with FY 2015 funding ($2,260,000)

- Procure LLINs. PMI will procure approximately 320,000 LLINs for distribution through ANC visits and at delivery in a health care institution, which will meet Liberia's routine distribution needs for calendar year 2016. ($1,440,000)

- Distribute LLINs. PMI will support routine LLIN distribution in all 15 counties, including warehousing and transportation down to the county level, and will provide technical assistance to the MOHSW to plan distribution down to the facility level through existing county distribution mechanisms. The plan is for two distributions per year to facilities that provide ANC services and/or institutional delivery. According to draft Operational Guidelines for Routine Distribution of Long-lasting Insecticidal Nets developed in March 2014, the NMCP will supply nets to the counties, and then county health teams will supply facilities based on identified gaps from monitoring visits. PMI will work with the NMCP to identify the most efficient means of supplying ANC facilities with LLINs. ($720,000)

- Net Durability Monitoring. PMI will support the continuation of physical durability monitoring of nets distributed during the 2014 mass campaign at two sites. Monitoring will begin with reprogramed FY 2014 funds. (funded in M&E section)

- Technical assistance for continuous distribution planning. PMI will fund technical assistance to help the NMCP develop a multi-channel continuous distribution system, including review of the current ANC and institutional delivery distribution system and introduction of distribution through other channels, such as the Expanded Program on Immunizations or school-based distribution, which could be used to maintain coverage after campaigns. The outcome of this assistance will include describing a clear strategy for net distribution through ANC visits and institutional delivery with a micro logistics plan for net distribution and an M&E plan to track the nets distributed. In addition, if there are Global Fund funds available to add another routine distribution channel, technical assistance will be needed in developing an implementation strategy. ($100,000)

2. Indoor Residual Spraying and Entomological Monitoring

NMCP/PMI Objectives

The 2010-2015 revised NMCP strategy included increased use of IRS in rural districts of high malaria prevalence, covering approximately 50% of the population, in order to quickly reduce

malaria transmission. IRS was to be used to complement LLINs to reduce malaria prevalence, morbidity, and mortality.

Progress since PMI was launched

Below is a table summarizing PMI's support for IRS in Liberia from 2009 to 2013.

Liberia IRS Activities, Counties and Insecticide

Year	Counties					Statistics	
	Montserrado	Margibi	Bong	Nimba	Grand Bassa	Number of structures sprayed (% of targeted structures)	Population protected (% country)
2009	X	pyrethroid	X	X	pyrethroid	~22,000	~160,000 (4%)
2010	pyrethroid	pyrethroid	X	pyrethroid	pyrethroid	52,468 (98%)	420,532 (12%)
2011	carbamate	pyrethroid	carbamate	pyrethroid	pyrethroid	89,710 (96%)	834,671 (22%)
2012	carbamate	carbamate	pyrethroid	pyrethroid	pyrethroid	96,901 (98%)	869,707 (23%)
2013	X	X	organo-phosphate	X	X	42,708 (96%)	367,930 (10%)

As part of the IRS program, PMI collaborated with private companies to support implementation of IRS. The Arcelor Mittal Steel Company conducted three rounds of spraying in its concession areas in Nimba and Grand Bassa Counties from 2010 to 2012, and the Liberia Agriculture Company supported one round of spraying in its concessional area in Grand Bassa County in 2011. PMI provided insecticides and technical support, including training and mentoring, to these companies to build capacity to conduct IRS. Although PMI support for IRS ended in 2013, the NMCP has expressed interest in working with these companies and other private sector sources to support IRS for their populations.

Progress during last 12 months

In 2013, IRS was conducted with a long-lasting organophosphate in 42,708 eligible structures (comprising 96.3% of targeted structures), thus protecting 367,930 people living in seven districts in Bong County.[7] Cone bioassays to determine the quality of spraying were conducted within 24 hours post-IRS using wild-caught mosquitoes and a mortality rate of 100% was observed. The decay rate of insecticide on the sprayed wall was assessed on a monthly basis for a period of eight months from May – December 2013. Six months post-IRS, mortality rates above 80% were recorded for cement and wood walls; however, thereafter mortality decreased below 50%.

[7] Liberia End-of-Spray Round Report 2013

Additionally, routine entomological monitoring was conducted in 2013 at four sites (i.e., Careysburg District in Montserrado County and Fuamah, Suakoko and Kpaai Districts in Bong County), including monitoring of mosquito densities and behavior. Collections were performed before the 2013 IRS campaign in February and monthly from May through December 2013. Six gCHVs were trained in mosquito collection methods and vector control unit technicians were given on-the-job training to reinforce their skills. In addition, in early 2014 a shipping container was modified for use as an insectary situated next to the NMCP. The insectary has an adult room, a larval room, and a workroom where resistance tests can be conducted.

The post-IRS indoor resting densities in the two IRS sites where collections were conducted remained below pre-IRS indoor densities. However, during the same period there was an increase in indoor resting densities at a site that had never received IRS and at a site that had received IRS in 2012 but not in 2013. The number of host-seeking vectors measured by human landing catches was also lower in the intervention sites. Fifty-five percent of *An. gambiae* s.l. were caught biting indoors, and the majority of biting occurred after 10 p.m. Molecular identifications showed that 35% of the *An. gambiae* complex mosquitoes that were collected were *An. gambiae* s.s., while 65% were *An. coluzzii.* Furthermore, insecticide resistance assays were conducted in Bong County. The results of testing against all four classes of insecticides currently used in public health are shown below. Resistance data from Margibi, Montserrado, and Grand Bassa collected in 2012 showed a similar pattern of resistance to pyrethroids and susceptibility to organophosphates.

Summary of 2013 Susceptibility Studies on *Anopheles gambiae* s.l. against six insecticides in two districts in Bong County

Month	District	Insecticide tested	Number tested	Number dead	Test Mortality
September	Suakoko	Deltamethrin	128	19	15%
September	Suakoko	Pirimiphos-methyl	100	100	100%
September	Fuamah	Deltamethrin	102	35	34%
November	Suakoko	Alpha-cypermethrin	100	23	23%
November	Suakoko	Bendiocarb	100	95	95%
November	Suakoko	DDT	100	27	27%
November	Suakoko	Fenitrothion	102	102	100%

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

Where testing has been conducted, significant pyrethroid and DDT resistance has been found in Liberia. While spraying with a long-lasting organophosphate in 2013 showed a significant entomological impact, due to the higher cost of this insecticide only about 10% of the population of Liberia was able to be covered, as compared to 23% of the population in 2012 when a combination of pyrethroids and carbamates was used. Therefore, after consultations within the PMI interagency team and discussions with the NMCP, the decision was made to suspend PMI-supported IRS in Liberia after the 2013 spray round, and shift resources to support LLIN

procurements. In areas of pyrethroid resistance, LLINs act as a physical barrier and the irritancy of pyrethroids on the nets may still reduce mosquito blood-feeding.

Entomologic capacity in Liberia is still limited. There are only two NMCP vector control technicians who have received formal training, in Ghana in 2010. There are other staff members in the Vector Control Unit that have had some on-the-job training during their involvement in IRS or LLIN distribution. However, they are part of a pool of vector control technicians and are involved in various projects when IRS or net distribution is not occurring. Two staff members are funded under the Global Fund with the designation of insectary technicians, but due to transportation issues to the previous site of the insectary at the Liberian Institute for Biomedical Research, they have been assigned to be part of the vector control technician pool, so staffing consistency and specialization have been issues. Having a functional insectary situated next to the NMCP office and developing a rotational schedule for routine surveillance, annual insecticide resistance monitoring, insectary maintenance and active collaboration with other partners, such as the MENTOR Initiative and Armed Forces of Liberia, provides an opportunity for the vector control unit staff to become more focused in their entomological monitoring work. In addition, for the past year PMI has supported a full time entomologist to sit at the NMCP to help build the capacity of the vector control unit to organize mosquito collections and analyze data.

Plans and justification

PMI will continue to assist the NMCP in setting up a comprehensive mosquito surveillance program in collaboration with the Armed Forces of Liberia, which have been supported by the U.S. Naval Medical Research Unit No. 3 from Cairo, Egypt since 2011. Other partners collecting entomological data in Liberia include the Liberian Institute for Biomedical Research and the MENTOR Initiative, which is currently evaluating the impact of non-pyrethroid insecticide-treated durable wall linings on vector density and malaria incidence. All relevant data will be shared among partners. Specifically, PMI will work to characterize insecticide susceptibility in Liberia's six regions, determine the spatial and temporal composition and distribution of anopheline species, and maintain and support a functional insectary.

Proposed activities with FY 2015 funding ($424,000)

- Increase NMCP entomology capacity by providing equipment, supplies, and mentoring for NMCP entomology technicians. PMI will provide mosquito surveillance equipment to the NMCP to enable them to scale-up mosquito density, behavior, species identification, and insecticide resistance activities. Entomological monitoring will be conducted monthly at three sites and resistance testing will occur annually at 11 sites, covering the six geographic regions of the country. PMI will also support a full-time entomologist to sit with the NMCP to help build capacity and support on-the-job training. In addition, PMI will continue to support the maintenance of the container insectary established in 2013. ($400,000)

- Provide technical assistance for vector control activities. Centers for Disease Control and Prevention (CDC) staff will conduct two technical assistance (TA) visits to assist with

training and to monitor planning and implementation of vector control activities. Mosquito surveillance activities, including use of WHO tube and CDC bottle assays and mosquito collection techniques, and morphological identifications, will be reviewed. ($24,000)

3. Malaria in Pregnancy

NMCP/PMI Objectives

Liberia's current National Malaria Strategic Plan runs through 2015. Following a Malaria Program Review conducted in 2014, this strategic plan will be revised with new objectives. The current objectives related to MIP include:

- To increase access to prompt and effective treatment of malaria in pregnant women to at least 80%
- To increase the use of at least two doses of sulfadoxine-pyrimethamine (SP) for IPTp among pregnant women to at least 80%
- To increase the use of ITNs among pregnant women to at least 80%.

To meet its MIP objectives, the NMCP receives assistance from PMI in coordination with other partners, including the Global Fund.

In Liberia oral quinine is recommended as the first line treatment for uncomplicated malaria throughout all trimesters of a pregnancy. During second and third trimesters, fixed dose artemisinin-based combination therapy can also be used for treating uncomplicated malaria. In addition, iron/folic acid is distributed to pregnant women during ANC visits. The current formulation contains 200 mg dried ferrous sulfate to 65 mg ferrous iron and 0.25 mg folic acid or 0.4 mg folic acid. This presentation complies with the WHO recommendation for administration at one month intervals.

Progress since PMI was launched

In Liberia, coverage of IPTp2 increased from 45% to 50% between the 2009 MIS and 2011 MIS. The preliminary results from the 2013 DHS are similar to the 2011 MIS with 48% of pregnant women having received two or more doses of IPTp during their last pregnancy. According to the HMIS, in 2013, 51% of pregnant women were given two doses of SP in the USAID focus counties of Bong, Lofa, and Nimba.

Progress during the last 12 months

During the past year, PMI assisted the NMCP in finalizing and launching the updated MIP documents that included the new guidelines for IPTp released by WHO in 2012. These new guidelines on IPTp are being harmonized across all MIP and case management related documents, including the national pre-service curriculum, in-service and community training materials, BCC module and materials, and supervision and M&E tools. These documents were

revised for nationwide use, printed, and distributed in USAID focus counties and pre-service training institutions. HMIS data shows an increase of IPTp2 from 47% to 51% in the USAID focus counties from 2012 to 2013.

PMI also continued to support performance-based financing initiatives through sub-contracts to non-governmental organizations in USAID focus counties. The performance-based financing scheme has contributed to improvements in ANC attendance, among other maternal health related indicators. In 2013, the proportion of pregnant women having at least four ANC visits with a skilled provider was 75% in Nimba, 70% in Lofa, and 59% in Bong. IPTp2 rates were 54% in Bong, 52% in Nimba, and 48% in Lofa. Stockouts of SP, in part due to the moratorium on commodities in 2013, and weak follow-up of pregnant women may explain the discrepancy between IPTp2 rates and the high proportion of women having at least four ANC visits.

Additionally, PMI provided technical assistance to develop and implement a national strategy document and plan for continuous distribution of LLINs through ANC services and after delivery in health facilities as part of the MIP package. As a result, PMI will procure 250,000 LLINs by the end of 2014, and will distribute them nationwide according to counties' needs and the routine distribution strategy.

Outreach efforts by certified midwives continued to be deployed to deliver ANC services, including SP as recommended by the new guidelines to pregnant women residing more than five kilometers from health facilities. According to the national community health policy, there should be one gCHV for every 250-500 people, and as of 2013 there were a total of 8,052[8] gCHVs working in Liberia, 3,727 of who have been trained in iCCM. In addition, 2,856 TTMs have been mapped across the country. There are 1,587 gCHVs and 1,638 TTMs located in USAID focus counties.

Training for gCHVs and TTMs included an update on the new guidelines for IPTp, reminders on danger signs during pregnancy/malaria during pregnancy, and referral guidance to ANC services to ensure that pregnant women comply with routine ANC visits. In addition, comprehensive health education materials on early and recommended timing of ANC attendance and prevention of malaria during pregnancy were distributed.

PMI continued to support pre-service and in-service trainings for health providers, which includes MIP. Pre-service training is supported through monitoring and supervision of training institutions and practicum sites. There are 19 mid-level health worker-training institutions (for nurses, midwives, physician assistants, environmental health technicians, lab technicians, etc.) and one medical school in Liberia. Last year, PMI supported two mid-level training institutions in terms of renovation and equipment, along with the six clinical sites related to those two training institutions. In addition, the curriculum for all cadres of health workers, which is now being used in all training institutions across the country, was updated.

Based on the results of a PMI supported assessment to improve M&E performance, particularly quality and use of data, PMI assisted the NMCP in reviewing ANC ledgers to address the new

[8] Liberia Community Health Road Map (July 1, 2014 – June 30, 2017), NMCP March 2014.

guidelines on IPTp. Furthermore, during the past 12 months, PMI provided support to the NMCP to operationalize their MIP Technical Working Group created in 2013. The MIP working group, which includes the Reproductive Health and Maternal and Child Health Departments of the MOHSW, is led by the NMCP focal point for MIP and co-led by PMI.

Gap analysis

Gap Analysis for SP, Liberia CY 2014-2016

Calendar Year	2014 (Jul-Dec)	2015	2016
Total number of SP tablets needed (NMCP forecast)	754,494	1,452,756	1,483,264
Stock on hand	1,062,100*	307,606	0
Tablets to be procured by PMI	0	470,000	0
Tablets to be procured by Global Fund	0	500,000**	1,213,324
Tablets to be procured by GOL	0	0	300,000
Gap (Surplus)	(307,606)	175,150	(30,060)

*As of July 2014
**estimated delivery for Global Fund is Dec. 2015, creating a possible gap from June-December if consumption remains at current levels. However, revised forecasts indicate consumption will be 890,000 in 2015.

Plans and justification

More than 170,000 pregnancies occur each year in Liberia and all pregnant women are at risk of malaria infection and its consequences. ANC clinic attendance rates are generally high. Preliminary results from the 2013 DHS indicate that 96% of women who gave birth in the five years preceding the survey received care from a skilled provider at least once for their last birth. According to the 2007 DHS, 66% of women had at least four ANC visits. The MOHSW, through the NMCP, the Family Health Division, the Community Health Division, and the Health Promotion Unit continue to make efforts to improve the quality of ANC service delivery throughout the country at health facilities and ANC attendance through outreach efforts.

PMI will continue to provide technical assistance to support the NMCP in the implementation, scale-up, and monitoring of MIP, including implementation of the new IPTp guidelines:

- The implementation of the revised MIP guidelines will be scaled-up and monitored using revised M&E tools
- An assessment will be conducted to evaluate the introduction of the new MIP guidelines in health facilities (public and private) offering ANC services
- LLINs will be procured and distributed nationwide to all pregnant women during ANC visits and at delivery

- SP, procured by the government of Liberia, PMI, and the Global Fund, will continue to be the drug of choice for IPTp and will be administered according to the new guidelines released by WHO
- Pregnant women with malaria symptoms will be tested and treated as directed by the national standard treatment guidelines
- The supply chain and management system will be strengthened to ensure availability of LLINs, SP, and antimalarial drugs in all targeted health facilities
- BCC for MIP will be strengthened (see BCC section)

Proposed activities with FY 2015 funding ($625,000)

- Pre-service monitoring and supervision. Adherence to updated curriculum and clinical standards at the practicum sites associated with clinical training institutions will be monitored, supervised, and evaluated. Joint visits with the Liberian Board of Nursing and Midwifery will continue to occur quarterly and will involve all training institutions implementing updated MIP curricula and standards. ($25,000)

- In-service training and supervision. In-service training and supervision of health care workers at ANC facilities and in the community through the performance-based financing initiative will continue. Like previous years, funding will be routed to the MOHSW through the FARA and/or follow-on direct agreement with the GOL for performance-based contracts with NGOs, which include in-service training and supervision of health providers in targeted health facilities. In addition, support will be provided for the MOHSW and CHSWTs to supervise health facilities in focus counties every quarter. Funding from the Global Fund, the GOL, and other donors support similar activities in the remaining, non-PMI supported counties. ($450,000)

- Perform an assessment of the implementation of MIP activities in Liberia, including an evaluation of the implementation of the revised IPTp guidelines, the impact of the policy change, and an evaluation of the ongoing ANC outreach services by certified midwives, as well as the effect of gCHVs/TTMs on SP and ANC uptake. In addition, best practices will be documented in selected counties with particularly high IPTp2 coverage. The assessment will measure IPTp2, IPTp3 or 4 to evaluate the new guidelines for IPTp released by WHO. It will also measure providers' and communities' knowledge, attitudes and behavior for all three components of MIP (IPTp, case management, and LLINs). This activity was originally scheduled to occur in FY 2014, but has been postponed due to delays in implementing the new guidelines. The MIP working group will be consulted on protocol development. ($110,000)

- MIP assessment support for protocol development, coordination and implementation. ($40,000)

4. Case Management

Diagnosis

NMCP/PMI Objectives

The Liberia National Strategic Plan 2010-2015 adheres to the WHO recommendation for parasitological confirmation of all suspected uncomplicated malaria cases and treatment of positive cases with an ACT. To achieve the malaria diagnostic testing objectives of the Strategic Plan, the NMCP plans to support the scale up of malaria diagnostics in all public and private health facilities regardless of operational level, in private medicine stores and pharmacies, and in the community by gCHVs. In addition, in collaboration with the National Public Health Reference Laboratory/National Diagnostics Unit (NPHRL/NDU) and the County Diagnostics Supervisors, the NMCP plans to continue improving the quality of malaria diagnostic testing through on-site training and supportive supervision in all fifteen counties.

Progress since PMI was launched

As of 2013, the MOHSW provides malaria diagnostics to all public facilities, and all private facilities that provide diagnostic and treatment services through a memorandum of understanding that requires the facilities to also report via HMIS. With support from Global Fund, 75% of the private pharmacies and medicine stores in Montserrado County are targeted for the introduction of testing prior to treatment through provision of RDTs and ACTs by the MOHSW. The NMCP is working with the Community Health Division to reach children less than five years of age in hard to reach areas with RDTs and ACTs through gCHVs and iCCM.

PMI funded nationwide implementation of an outreach training and support supervision program for facility-based malaria diagnosis from 2010-2012. During this program, trained laboratory supervisors visited facilities on a quarterly basis to provide onsite mentoring and training. PMI purchased and funded the distribution of microscopes (including two multi-head training microscopes), parts, bulbs, fuses, glass slides and Giemsa stain to facilities that had microscopy capacity. In addition, PMI procured general laboratory supplies to equip the NPHRL and five regional reference laboratories.

Progress during the last 12 months

The Liberia NMCP continues to show commitment to increasing the proportion of reported malaria cases that are laboratory confirmed. Through Global Fund and PMI funding, sufficient RDTs, microscopes, reagents, and other supplies for microscopy have been procured and distributed. Additionally, Liberia has made improvements in data collection and reporting through the HMIS for the numbers of suspected malaria cases tested and positive cases treated. According to HMIS data, the proportion of reported malaria cases confirmed with a laboratory test has steadily increased from 62% and 79% in 2011 and 2012 respectively, to 82% in 2013.

In order to increase the coverage of malaria diagnostics, in 2013 the NMCP conducted a mapping of gCHVs in all 15 counties in Liberia. The gCHVs are trained in iCCM, and are expected to work in hard-to-reach communities that are greater than 5 km from a health facility and diagnose malaria using RDTs. Based on the mapping exercise, it was determined that there are approximately 8,000 gCHVs nationwide who are tasked with providing malaria diagnostics coverage for hard-to-reach areas. Between 2012 and 2013, 3,727 of the gCHVs were trained in

malaria case management. In addition to supporting malaria diagnosis by gCHVs, Liberia has adopted a policy to promote diagnostic testing with RDTs in private medical stores and pharmacies. Together, these new policies are expected to increase the proportion of reported malaria cases that are confirmed with a laboratory test.

Central level capacity strengthening for malaria diagnosis at the NPHRL/NDU continued in 2013. With PMI support, indicators for monitoring and supervision of malaria diagnostics quality have been included in an integrated laboratory supervision tool. The integrated supervision tool will be used by county diagnostic supervisors to monitor the availability and quality of facility-based malaria diagnostics. In addition, PMI continued to support supervision of RDTs performed in settings without a laboratory through integrated clinical supervision and the procurement of laboratory supplies. Furthermore, in March 2014, PMI sponsored three previously-certified WHO Level 1 microscopists to attend the WHO Microscopy Accreditation course in Nairobi, Kenya, for recertification. A renewal of WHO Microscopy certification is required every three years, and these individuals were last certified in 2010. Results from the re-certification course indicate that the three individuals are now certified at Levels 3 and 4. This implies an urgent need to provide continued support at the central level to strengthen microscopy skills in order for these microscopists to provide the quality training and support needed at lower level facilities.

Similarly, in order to support the scale up of the quality of malaria diagnostics, PMI hired an in-country coordinator who is embedded at the NMCP. The coordinator works closely with the diagnostics team at the NMCP and NPHRL/NDU, particularly on document revisions to clarify malaria diagnostics guidelines. PMI, along with the in-country coordinator and the NMCP Laboratory Coordinator, surveyed the County Diagnostic Supervisors regarding the actual staffing, level of training, and microscopy functionality at the facilities in each county in order to inform cascade training and supervision. All county diagnostic supervisors will attend a training of trainers' course that will equip them with the needed skills implement the revised guidelines and perform onsite training and supportive supervision in their respective counties. Following the training of trainers, PMI will support supervisors from the three counties with the largest number of facilities to conduct refresher training in their respective counties. Global Fund will support refresher training for 27 additional individuals who will be drawn from 11 other counties, with a focus on improving microscopy at the 38 hospitals in Liberia. Training for Montserrado County laboratorians will be accomplished on site.

Since 2012, a total of 2,194 health workers have been trained on malaria case management. Additionally, and as mentioned above, 3,727 gCHVs have also been trained on appropriate malaria diagnosis using RDTs and appropriate malaria treatment. During the same time period, 300 laboratory staff and health practitioners have received training on microscopy and the use of RDTs. Health practitioners who received case management training included physicians, physician assistants, nurses, pharmacists, and certified midwives.

With technical oversight from the NMCP, the MENTOR Initiative concluded a pilot study of RDT and ACT use by private medicine vendors in Montserrado County. The pilot showed that with appropriate training, supervision, and adequate supplies, private vendors adhered to case management guidelines. Based on results from this pilot study, a strategy for testing and treating malaria in pharmacies and medicine stores is being developed. The strategy includes

development and provision of a Private Sector Dispenser Training Manual, job aids for RDTs and ACT administration, and a Dispensary User Guide. Starting in July 2014, with initial implementation in Montserrado County, the NMCP will assume the responsibility of supplying ACTs and RDTs to private medicine stores and pharmacies. Rolling out malaria testing and treatment in the private sector is essential to malaria control in Liberia because approximately 49% of patients seek care in this sector of the health system (2011 MIS).

With support from PMI, the Global Fund, and other donors, adequate supplies of malaria diagnostic commodities exist for all suspected cases to receive a confirmatory test. However, several challenges exist that prevent additional progress. Inconsistent supplies of diagnostic commodities at the facility level, despite availability in county and central stores, remain a major obstacle to access to diagnostic testing. Between May and August 2013, a temporary moratorium between May and August was placed by PMI and the Global Fund on supply and distribution of malaria commodities, including RDTs and ACTs, pending a review of the supply chain to address problems of leakages and stockouts. As a result of the review, an interim approach was adopted to strengthen commodity distribution and improve internal controls.

In addition to supply chain constraints, inadequate collection and analyses of consumption data and trends resulted in diagnostic supplies not being adjusted as needed, resulting in stockouts. However, with increased reporting and use of HMIS data, improved data collection under the interim approach, and logistics management information system (LMIS) strengthening efforts, an opportunity exists to address these challenges. Additionally, a Supply Chain Management Unit has been established within the MOHSW that will work to streamline procurement, stock management, and distribution in a manner that will prevent or minimize stockouts and leakages.

High staff turnover in health facilities and a high attrition rate among gCHVs continue to present challenges to rolling out malaria diagnostics. While some staff remain in the health system and therefore are not lost, these high turnover rates mean more resources are continuously needed to improve malaria diagnostics capacity. Discussions are ongoing in the MOHSW to provide some form of compensation to the gCHVs in order to increase retention rates.

The transition of malaria quality assurance activities from the NMCP to the integrated supervision under the NPHRL/NDU performed by county diagnostic supervisors is yet to be fully implemented. However, it offers a sustainable approach as part of a decentralized system where the counties are responsible and will have an interest in monitoring their staffing, training, competence, and results. As a result of the transition, the last malaria-specific supervision focused on diagnostic capacity was conducted in 2012, and the current state of the quality of malaria diagnostic testing is unknown. Despite these challenges, discussions and consultation have been held to complete the transition. A draft supervisory checklist now includes a section to collect data for assessing the quality of malaria testing. Training for county diagnostic supervisors on the integrated checklist is planned for 2014.

Gap analysis

Gap Analysis for RDTs, Liberia CY 2014-2016*

Calendar Year	2014	2015	2016
Projected number of RDTs needed	1,656,329	2,022,672	2,202,843
RDTs Requested in Global Fund R10 Ph 2	915,081	392,570	263,740
PMI Commitments	1,750,000	1,750,000	2,000,000
Total Annual RDT GAP (Surplus)	**(1,008,752)**	**(119,898)**	**(60,897)**

*Revised projections submitted by the NMCP to the Global Fund as part of the Phase 2 application, October 2013; NMCP calculations included a 10% and 20% reduction in annual malaria cases in 2015 and 2016, respectively, but to be conservative a 0% and 10% reduction were used for this gap analysis

An RBM quantification tool was used by the NMCP for both ACT and RDT quantification, which begins with the same initial assumptions as to the number of anticipated febrile episodes in the various segments of the population, the percent of the population that will seek care, and the percent of those that can be served by the different portions of the health system. For RDTs additional assumptions address the percentage of people who will have any diagnostic test, an RDT or microscopy (~78% for 2012), and the proportion of those tested who will have an RDT (~80%).

In April 2014, PMI supported a quantification exercise that utilized a combination of population based estimates and service based estimates. During this exercise, it was recognized that the prior service based quantification may have underestimated need due to not including adjustments for: (1) under or incomplete HMIS reporting, and (2) unmeasured stockouts at any level of the system (e.g., there may be commodities at the national warehouse but not at the facility and available for use). Additionally, because of transportation difficulties in Liberia, it was recommended to increase the buffer of stock of commodities from 6 months to 9 months, and in some cases 16 months. Therefore, the apparent surplus of RDTs in the MOP may dissipate pending quantification revisions. The population and services based quantifications will continue to be used until reliable consumption based data are available. Quarterly reviews of the quantification assumptions and available data are planned to inform actual procurements.

Plans and justification

PMI will provide support for laboratories, and in collaboration with the Global Fund, will work to strengthen the diagnostic capacity of the MOHSW. For malaria diagnostics, the program plans to initially train one county diagnostics supervisor for each of the 15 counties. These supervisors will then conduct supervision activities in their respective counties primarily by on-site supervision. For the three large counties (Bong, Lofa, Nimba), county supervisors will be trained and supported to conduct training of additional staff to support the supervision work. The number of health workers to be trained under this program depends on staff available to be trained and/or supervisor and staff turnover. PMI has an ongoing survey to assess staffing and equipment levels to inform the program on gaps to be addressed. However, to give a sense of proportion, the total number of medical professional staff reported by the MOHSW in 2012 was

4,500. This number includes public and private facility staff, covering both diagnostics and treatment. Approximately 600 of those individuals are laboratory staff, with one quarter of those targeted for microscopy training, predominately laboratory technicians and about a dozen technologists.

PMI will also procure RDTs and laboratory supplies and promote enhanced collaboration and communication between the NDU, NPHRL, the counties, and the NMCP in developing strategies for resource planning, integrated supportive supervision, and development of an external quality assurance system.

Proposed Activities with FY 2015 funding ($1,587,000)

- Procurement of RDTs. Liberia relies entirely on the Global Fund and PMI to provide RDTs. The Global Fund has committed to providing 1,571,391 RDTs to cover the period from 2014-2016, which leaves a gap of 4,310,453 RDTs for the same period. PMI will procure RDTs to fill this gap. The number of RDTs to be procured by PMI includes surpluses equivalent to 7, 0.7 and 0.3 months' supply of RDTs for 2014, 2015, and 2016, respectively. The surplus in 2014 will be used to help fill the stock pipeline at each level of the distribution system. In FY 2015, PMI will procure 2 million RDTs. The RDT needs include expected consumption in the private sector and the scale up of testing by gCHVs. ($920,000)

- Procure laboratory supplies. PMI will procure quality laboratory supplies, including Giemsa stain, slides, bulbs, and replacement parts for microscopes in health facilities across the country. In addition, reagents and supplies will be procured for the NPHRL and the regional reference laboratories to strengthen the ability of these laboratories to conduct quality assurance activities. ($100,000)

- Support the LMIS. One of the bottlenecks to the availability of malaria diagnostics at the facility level is inadequate monitoring of commodity stocks at the facility, county depots, and the National Drug Stores. In order to ensure that diagnostic commodities reach facilities where they are needed, PMI will continue to support the expansion of diagnostic commodity tracking, analysis of data, and the use of such data to inform commodity procurement, storage, and distribution. This support represents a contribution to the broader MOHSW LMIS. ($100,000)

- Implementation and monitoring of a diagnostics quality assurance system. As part of the decentralization of the healthcare system in Liberia, counties are expected to play significant roles in quality assurance of laboratory testing, starting in 2014. The NDU/NPHRL will provide ongoing technical assistance, mentorship, and logistics for these county diagnostics supervisors to conduct monthly on-site training and supportive supervision in all health facilities in their respective counties, with quarterly participation by a team made up of NDU, NPHRL, and NMCP personnel. The NDU/NPHRL/NMCP will assist the counties to monitor their staffing levels, training, and staff competencies. ($290,000)

- Support for pre-service laboratory/diagnostics training. A shortage of qualified laboratory technicians at both the central and county levels continues to be a major obstacle to the scale up of malaria diagnostics, and expanding the pool of such qualified persons is essential to achieving universal diagnosis. PMI will fund up to four students to attend a three-year laboratory technician training program. The sponsored individuals will be expected to work within the public health system after graduation. ($15,000)

- Capacity development and supportive supervision. As part of a comprehensive approach to malaria case management practices that emphasize testing of all suspected cases and treatment of only positive cases with an ACT, the MOHSW will continue to support health facilities in updating case management practices based on best practices, and will monitor adherence to policy guidelines. Under this activity, PMI will support capacity building at all facilities in the three PMI focus counties and provide supportive supervision with emphases on clinicians adherence to test results, use of case management algorithms, reporting of malaria data to the HMIS, and triangulation of data for decision making. Supervision under this activity includes all points of care, including those outside of facilities such as care by gCHVs. Funding from the Global Fund, the GOL, and other donors support similar activities in the other 12 non-PMI supported counties. ($150,000)

- Technical assistance for malaria diagnostics. CDC will provide technical assistance to the NMCP and the NDU/NPHRL for monitoring and improvement of the quality assurance activities for malaria diagnostics at all levels of the health care system, including testing by private facilities, pharmacies, medicine stores and iCCM. ($12,000)

Treatment and Pharmaceutical Management

Treatment

NMCP/PMI Objectives

The revised 2010-2015 Malaria Policy and Strategic Plan focuses on increasing access to prompt and effective treatment with ACTs to 80% of the population through public and private health facilities, at the community level, and in private medicine stores and pharmacies. According to the MOHSW's 2012 Technical Guidelines on Malaria Case Management, the first-line treatment for uncomplicated malaria in infants > 5 kg, adolescents, and adults is fixed-dose artesunate-amodiaquine. Oral quinine is the first-line treatment for infants < 5 kg and in pregnant women in their first trimester. For severe malaria, the 2012 guidelines added intramuscular (IM)/intravenous (IV) artesunate to intravenous quinine and intramuscular artemether as first-line treatments. Among these three medications, no preferred treatment is specified. Both IM quinine and IM artemether are listed as options for pre-referral treatment in rural areas where IV infusion is not possible. Rectal artesunate is not in the national guidelines and not used in Liberia; however, in the future, the NMCP intends on adding this to the guidelines for pre-referral treatment.

Progress since PMI was launched

In order to increase access to recommended malaria medications and encourage testing prior to treatment, the MOHSW has made RDTs and ACTs available to private sector health care facilities at no cost with the concomitant expectation that those facilities will report results via the HMIS. At the community level, the ratio of gCHVs to community dwellers has increased to one gCHV for every 500 people, up from one gCHV per 1,000 people. This has contributed to progress in diagnosing and treating uncomplicated malaria at the community level in hard-to-reach locations and to increased referrals of persistent febrile cases to health facilities.

The Liberia Medicines and Health Products Regulatory Authority (LMHRA), established with support from PMI in 2010, has been addressing the problem of drug quality. The Global Fund also supported the renovation of the quality control laboratory and procured additional equipment. PMI has provided technical support to LMHRA through training and mentoring and assisted LMHRA in setting up a registry for manufacturers of pharmaceuticals that will serve as a repository for initiating the detection of counterfeit antimalarials being imported into Liberia. Significant quantities of poor quality medicines have been removed from commercial medicine stores and pharmacies and destroyed by the LMHRA following quality control testing. This exercise has become a routine activity of the LMHRA and is conducted quarterly with explicit support from the MOHSW and partners. In addition, medicines imported into Liberia that do not meet the full registration requirements established by the LMHRA for the importation of medicines are confiscated and destroyed. This action has led to several litigation actions against the LMHRA by offenders; however, the LMHRA has succeeded in mitigating these litigations owing to the authority given to LMHRA embedded in its legislative enactment. The Inspectorate of the LHMRA has also been supportive in removing diverted drugs and health commodities found in commercial medicine stores and pharmacies that are donated by donors and partners. These commodities are returned to the NDS for redistribution to public health facilities across Liberia.

Progress during last 12 months

In 2013, 730 health workers were trained in malaria diagnosis and treatment, resulting in 3,579 health workers trained since 2011. Personnel at 647 facilities require training to achieve national scale. From 2012-2013, 3,727 gCHVs were trained in iCCM. These gCHVs are working at the community level to increase access to health and social welfare services for communities more than an hour away (5 km walk) from a health facility. Current policy aims to have one gCHV for every 250-500 people for a population of approximately 4 million. The role of gCHVs in malaria case management is to offer ACTs upon RDT confirmation of malaria and, in the case of severe disease, the plan is for them to administer IM artemether prior to referral to a higher level of care. The gCHVs also perform house-to-house education on a range of malaria topics, including the proper use of ITNs and management of fever in children less than five years of age. In addition to gCHVs, nationwide there are 2,396 Community Health Committees and 2,022 Community Health Development Committees created to empower community responsibility, ownership, and participation in health and social welfare.

Although gCHVs should receive regular supervisory visits from the facility, this is not yet occurring. The Community Health Development Committees are expected to scale up this activity in the upcoming year and have created a community health service supervisor checklist to accompany these visits. Community health service supervisors will be healthcare personnel—often registered nurses, physician assistants, or certified midwives— from the facility assigned to work with the community. Supervisory visits will occur monthly to oversee and mentor peer gCHV supervisors (gCHVs that have been given additional supervisory tasks such as data collection) to be identified in each community, who in turn will oversee and mentor gCHVs with a target ratio of one supervisor for every five to ten gCHVs.

PMI has provided training for personnel in the quality control laboratory of LMHRA and has procured equipment and supplies to ensure the continued functioning of the laboratory. In the past year, over $700,000 worth of stolen medicines were confiscated by LMHRA from private pharmacies and medicine stores, and substandard medicines (not just antimalarials) were identified by laboratory testing more than 125 times. LMHRA has also been instrumental in seizing antimalarial mono-therapies and removing them from circulation and developing a data base of adverse drug reactions.

For gCHVs, different levels of training exist in delivering iCCM for diarrhea, acute respiratory illness, and malaria. Oftentimes, a gCHV will possess sufficient knowledge in only one of the three diseases. For example, a recent survey found that 65% of all gCHVs received malaria case management training, 58% received diarrhea case management training, and only 30% received training on acute respiratory infection case management.

Attrition of gCHVs and lack of incentives are commonly listed as threats to managing malaria in the community, although no current data exists quantifying the actual extent of this perceived problem. The MOHSW is investigating ways to decrease attrition, including non-cash incentives such as material for clothing, offering gCHVs first priority in health campaigns that offer compensation (e.g., net and vaccine campaigns), and reimbursing expenses when the gCHV has to travel for a feedback session.

A temporary moratorium on the distribution of commodities affected the availability of antimalarials until the MOHSW's interim approach was devised in 2013. The NMCP reported stockouts of some medicines (IM artemether), while some medicines (IV artesunate) remained on the shelves unused. There is a lack of clarity on health workers' rationales related to medicine selection, particularly the use of IV artesunate for severe malaria. The NMCP has offered a range of reasons, including the increased complexity and monitoring time required for an IV infusion compared with an IM injection, price differences between the two treatments, and an overall unfamiliarity using an unknown medication. PMI will explore barriers to the use of IV artesunate for severe malaria and measures that will encourage use of this strongly recommended medication.

Gap analysis

Gap Analysis for ACTs, Liberia CY 2014-2016*

Calendar Year	2014	2015	2016
National Needs	1,766,604	2,081,196	2,083,352
PMI	767,000	1,117,000	1,276,034
Global Fund	1,145,518	870,587	807,318
ANNUAL ACT GAP (SURPLUS)	**(145,914)****	**93,609**	**0**

*Revised projections submitted by the NMCP to the Global Fund as part of the Phase 2 application, October 2013; NMCP calculations included a 10% and 20% reduction in annual malaria cases in 2015 and 2016, respectively, but to be conservative a 0% and 10% reduction were used for this gap analysis
**Approximately 1 month of extra stock

The NMCP estimates that 65% of febrile patients will seek care at public facilities, 28% will seek care at private health facilities (which receive ACTs from the MOHSW), 5% of cases will seek care at the community level, and 3% will be managed by private pharmacies and medicine stores. The NMCP uses an RBM tool to quantify how many ACTs annually will cover their target coverage of the population (75% for 2016). This formula incorporates epidemiologic data obtained from past surveys and relies on a number of assumptions, including the assumption that children less than five years of age will have three febrile episodes per year, pregnant women will have two febrile episodes per year, and non-pregnant people over five years old will have one febrile episode per year.

Plans and justification

PMI will continue to support the NMCP's efforts to expand access to malaria case management through iCCM and partnerships with private health care facilities. PMI will re-initiate technical assistance to NMCP efforts, in collaboration with the Global Fund and the MENTOR Initiative, to support a private sector initiative to increase access to RDT testing before treatment and ACTs for those that test positive at medicine stores and pharmacies.

Proposed activities with FY 2015 funding ($2,262,000)

- Procure ACTs. PMI will assure continuity of operations by procuring approximately 1,276,000 ACT treatments for the public sector, community case management, and private sector facilities in 2016. Based on the Global Fund's planned procurement, PMI will fill the remaining gap in ACTs needs. ($1,000,000)

- Procure parenteral medicines to treat severe malaria. Procure parenteral medicines to treat severe malaria. Compared to previous years, we will procure a higher proportion of injectable artesunate—as opposed to IM artemether or IV quinine--to treat severe

malaria, with the goal of doubling the proportion of cases receiving injectable artesunate in 2016 compared with 2014. ($100,000)

- Capacity development. The MOHSW has adopted an integrated approach to community-level treatment of three major childhood illnesses (malaria, diarrhea, and acute respiratory infections), which complements the Integrated Management of Childhood Illnesses (IMCI) at the facility level. PMI will continue support for IMCI and iCCM for appropriate and prompt treatment of uncomplicated malaria and for referrals for severe malaria. This capacity development will occur in all 15 counties, with PMI supporting the counties of Bong, Nimba, and Lofa. Specifically, PMI will support:

    - At the facility level, capacity development and supportive supervision of 100 facility-based health workers in prompt and appropriate treatment of malaria. ($300,000)

    - At the community level, training, equipment, supplies, capacity development, and supportive supervision for gCHVs at a ratio of one gCHV per 250-500 people. Supervisory visits will be monthly from district supervisors and quarterly from the central/county level. PMI will also support refresher training and follow-up of trainers and underperforming gCHVs. PMI is co-funding these activities with other partners. A national training curriculum will be used and medications, revised logbooks, and RDTs will be provided. ($550,000)

- Monitor antimalarial drug quality. PMI will continue to support the LMHRA for quality control and quality assurance of antimalarials through training and procurement of supplies, reagents, and equipment. This activity is geared towards strengthening the QA/QC laboratory that has been set up by the LMHRA to continue testing of randomly-selected antimalarials from the private sector to ensure that these drugs are efficacious and meet treatment standards. ($200,000)

- Technical assistance for iCCM. This activity will cover one visit from CDC to assist the NMCP in ensuring that iCCM training continues as specified in the Liberian Community Health Road Map. The goal is universal gCHV instruction in appropriate malaria case management, with a ratio of one gCHV for every 250-500 people that live greater than 5 km from a health facility. ($12,000)

- Provide technical assistance to support private sector scale-up of appropriate malaria testing and treatment. The target of this technical assistance will be pharmacies/medicine stores in Montserrado. Technical assistance is currently supported by the MENTOR Initiative, whose support will come to an end in March 2015. The NMCP has requested PMI's assistance to continue the technical assistance that MENTOR was providing. PMI technical assistance will facilitate supply chain logistics, coordination of refresher training, training of new staff, onsite supportive supervision, monitoring of consumption data for RDTs and ACTs, and proper waste management. ($100,000)

Pharmaceutical Management

NMCP/PMI Objectives

The MOHSW in collaboration with partners, including PMI, remains committed to ensuring an effective supply chain system for the distribution of health commodities.

Progress since PMI was launched

A 10-year Supply Chain Master Plan was developed in 2010, which integrates all pharmaceutical logistics into a single system to ensure transparency and responsiveness. Though significant progress has been made toward scaling up access to antimalarial drugs and other commodities nationally, and a national LMIS has been established, the national logistics system has continued to face significant challenges ensuring full availability of supplies at all levels, and providing accountability over inventory. Following a PMI-supported Supply Logistics Internal Controls Evaluation in 2012 that indicated significant risks of leakage and diversion, the MOHSW, PMI and the Global Fund temporarily suspended distribution of donated malaria commodities by the GOL pending the institution of additional controls. In 2013, the MOHSW, in collaboration with PMI and the Global Fund, piloted an interim approach throughout Liberia using a "top-up" system whereby MOHSW staff accompany deliveries and verify stock reports from the county level down to the facility level.

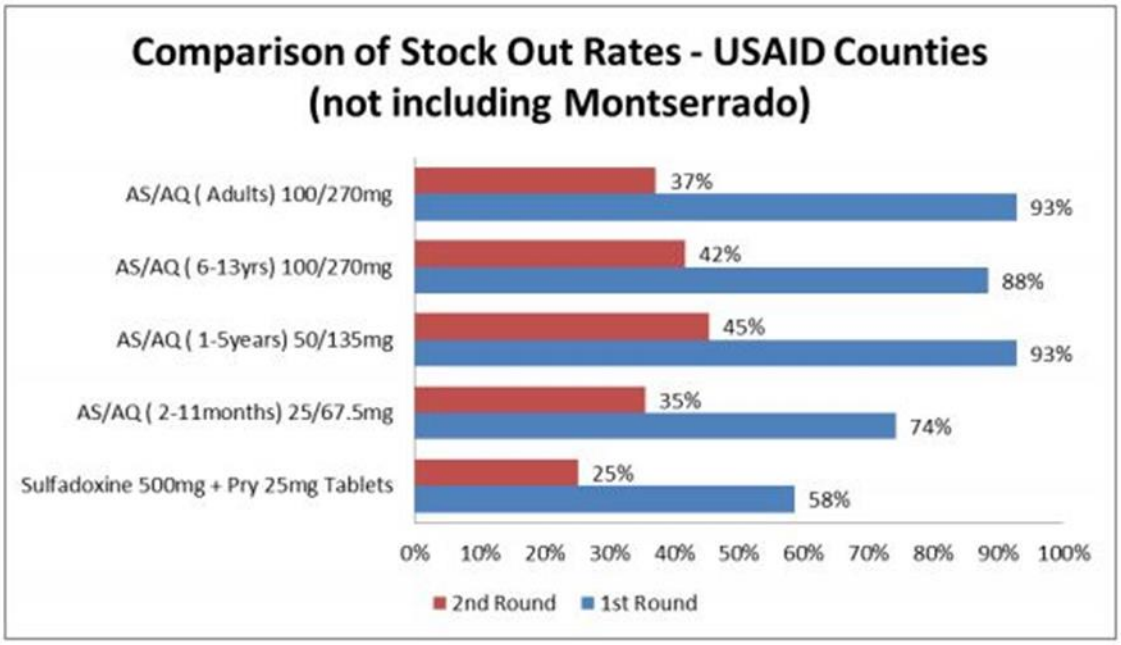
Progress during last 12 months

Monthly stock balance reports were produced by the NDS starting in 2013 with support from PMI, which significantly improved supply planning of health commodities. Over the past year, LMIS tools were increasingly used by health facilities in all the counties, and the SCMU database provided valuable information for the national quantification exercise for malaria commodities.

The storage and distribution of malaria commodities was strengthened through an integrated distribution framework involving the disease programs and the essential drugs program of the MOHSW through the interim approach. The distribution system piloted as part of the interim approach includes commodities for malaria, HIV/AIDS, tuberculosis, reproductive health, and essential drugs. With PMI support, a new data collection form was piloted during the interim approach in one county. The new collection form yielded significantly improved data on stock availability and actual consumption. Consumption data reporting has picked up nationally; however, stockout days at the health facilities were not readily reported previously. The revised interim approach data collection form piloted during the second round of the interim approach captures the days of stockout at health facilities. This form is being rolled out to the other counties supported by both the Global Fund and USAID.

Following two nationwide rounds of distribution under the interim approach, the country has seen significant results in terms of increased visibility, accountability, availability, and security of health commodities. Stock balance reporting is more consistent and the interim approach is

moving to quantification based on consumption data, which was previously not possible before the improvements made by the interim approach. The recent EUV report conducted in March/April 2014 illustrates the improvements the interim approach has made. For example, the report shows over 60% of health facilities visited had more than adequate supply of all formulations of ACTs on the day of visit. The following figure compares stockout rates of tracer commodities between the first distribution and the second distribution under the interim approach.



Lessons drawn from the interim approach will inform a revision of the Supply Chain Master Plan. Technical advisors provided by PMI and the Global Fund are currently assisting the NDS in warehouse supervision and inventory management at the central and county levels, and the SCMU continues to lead this effort with technical support from PMI and the Global Fund. Additionally, PMI has collaborated with the Global Fund to finalize MOHSW plans for the construction of a central warehouse that will provide adequate space for effective management of health commodities.

Maintaining the supply chain system remains a challenge to the effective implementation of the Essential Package of Health Services, the cornerstone of Liberia's 10-year National Health Plan. Central to this problem is the assurance of continued funding for warehousing and distribution, as well as local capacity development that will ensure that supervision and management of pharmaceuticals in Liberia is uninterrupted. Equally critical is the development of dedicated county-level supply chain management capacity within county health teams to effectively coordinate the supply planning and distribution of health commodities between NGOs operating in the counties and the NDS, and to monitor stock levels to ensure full availability. Distribution of malaria commodities has improved as a direct outcome of the interim approach.

The 2012 Supply and Logistics Internal Control Evaluation (SLICE) report showed that the supply chain system in Liberia did not have sufficient systems in place to identify, document,

and report inventory movement and transactions. In 2013, PMI supported a Public Financial Management Risk Assessment of the NDS's internal financial management and procurement systems. In 2014, PMI will work with the NDS to develop a risk mitigation plan to address identified issues, opening up possible opportunities for PMI to work directly with the NDS in the coming years.

Technical advisors seconded by PMI and the Global Fund are providing managerial and technical support to the NDS to enhance capacity development through the transfer of knowledge and skills. The technical assistance being provided to the NDS by PMI and the Global Fund has provided additional impetus to efforts to establish and institutionalize a cohesive and coordinated storage and distribution system, creating a platform that both the MOHSW and partners can build on in the coming years. The risk mitigation plan for the NDS will further strengthen PMI's efforts in addressing crucial supply chain issues, and could potentially provide a common roadmap for other donors and partners to support the capacity-building of the NDS. These actions will further enhance PMI efforts in reducing the level of vulnerability of malaria commodities at all levels.

The Supply Chain Task Force, involving key supply chain stakeholders and partners, met regularly to address emerging problems of the supply chain system in a timely and concerted manner starting in late 2013, providing another venue for enhanced coordination and support to the MOHSW in the area of supply chain management.

Plans and justification

In 2014, PMI will continue to support implementation of the interim approach for supply planning and distribution of health commodities, in collaboration with the SCMU and the Global Fund. PMI's continued support to the supply chain system will be critical in order for the MOHSW to move away from the interim approach system and toward a more sustainable and institutionalized approach for facility-level distribution. The establishment of county-level supply chain management capacity within the county health teams to coordinate supply planning and distribution of health commodities at the county-level will be crucial to ensure health commodities are accounted for, available, and secure from the central level to the health facilities. This will be evaluated through routine monitoring and reporting, and the periodic conduct of end-use verification (EUV) surveys. PMI will continue to support implementation of the NDS risk mitigation plan in 2015.

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

- Strengthening of the central drug and laboratory supply chain system, including strengthening logistics and information systems, supervision, and forecasting at the central level. Specifically, PMI will support the new NDS warehouse operations; continue ongoing mentoring of the SCMU; and supervision, forecasting, and quantification at the central level in line with the revised Supply Chain Master Plan. ($900,000)

- Support to the supply chain at the county level in five counties (Montserrado, Lofa, Nimba, Margibi, and Bong), complementing Global Fund support in the remaining ten counties. At the county level, specific activities will include expanding support to the county depots and county health teams to enhance commodity management, storage, in-county supervision of commodity distribution, and reporting. Previously, support toward strengthening the supply chain at the county level was focused on the transportation of drugs and health commodities from the central level to the county depots. Counties relied on international NGOs operating in the county to distribute drugs and health supplies to health facilities. PMI is increasing its support in this area to adequately cover the costs of devolving greater supply chain functions to the county health teams and implementing greater controls in the system. With greater supply chain responsibilities at the county level, increased funding will be required to establish dedicated structures, conduct training for personnel and provide logistics for an effective county-level supply chain system. ($400,000)

5. Monitoring and Evaluation (M&E)

NMCP/PMI Objectives

Liberia's National Malaria Strategic Plan 2010–2015 calls for monitoring the progress toward program goals and evaluation of the impact and outcomes of planned interventions. Additionally, the plan calls for the implementation of evidence-based program management. The NMCP's 2010–2015 M&E plan uses facility- and population-based indicators consistent with global standards and is fully costed. The NMCP M&E unit operates under the supervision of the central M&E unit of the MOHSW and has quarterly M&E Technical Working Group meetings. M&E activities take place at all levels of the health care system.

Progress since PMI was launched

PMI and the Global Fund have provided the bulk of the funding for M&E activities in Liberia over the past several years. PMI has supported two MIS surveys (MIS 2009 and MIS 2011) to track the coverage of malaria interventions and malaria parasitemia and contributed to one DHS (DHS 2013). PMI has been supporting the EUV surveys to assess the availability of malaria commodities at health facilities since 2011. PMI has also provided continuing support for the NMCP to conduct supportive supervision activities to strengthen data collection and reporting at the health facilities through the county level and finally to the national level. PMI supported sentinel sites up until 2010 to track trends in malaria morbidity and mortality. Global Fund support will be used to establish new sentinel sites from 2015 onwards. The approach to be taken for the Global Fund sentinel sites has not been finalized yet, so PMI will be able to provide input based on lessons learned from previous sites in Liberia, as well as sites in other countries.

Progress during the last 12 months

Fieldwork for the 2013 DHS was completed between March and July 2013. The survey was powered to provide data at the county level for questions asked of all participants. A preliminary

report is currently available and results are provided in the Progress on Indicators to Date section. Also, as noted in the Other Relevant Evidence on Progress section, fieldwork for the 2013 HFS was completed late in the year. This WHO activity targeted all health care facilities and provides the best estimate of the percentage of overall deaths with laboratory-confirmed malaria (rapid diagnostic test or blood smear) until mortality reporting via the HMIS improves. The final report should be available by the end of 2014.

The MOHSW has a fully integrated computerized HMIS-based on data collected manually from health facilities through the county health teams that serves all departments and programs, including malaria care and treatment and distribution of nets at ANC visits and institutional deliveries. Personnel at all levels have been trained and the system is operational nationwide. Private health care facilities that receive commodities and support from the government and provide malaria diagnostic services, medications, and case management are also expected to report. Approximately 210 private facilities treat and report on malaria. Currently, data from gCHVs are aggregated into that of the health facility out of which they operate. The plan going forward is to have the community data reported separately and to use special registers to record the community-based data. These registers were distributed in 2013 but have not yet been uniformly utilized. The system generates several monthly, quarterly, and annual reports; increasingly, the data is being analyzed, frequently with assistance from the CDC PMI resident advisor, to inform local planning and evaluation. However, there are still issues with the quality, timeliness, and completeness of the data, and the system is still primarily used for the creation of required reports and underutilized for surveillance, supportive supervision, monitoring, and planning. PMI is providing support to strengthen the collection, reporting, and use of HMIS data.

In partnership with the NMCP and the SCMU, PMI has supported 11 EUV surveys since 2011. The EUV is a rapid survey that collects data from a sample of health facilities each quarter on the availability of malaria commodities. The survey takes eight weeks from facility visits to the production of the final report and includes a follow-up plan to correct any problems found. Follow-up actions have included emergency procurements, training of health workers, and facilitating requisitions. During the FY 2015 MOP visit, the fieldwork for the most recent EUV survey was completed. This EUV survey was being combined with data collection for verification of the implementation of the "interim approach" for the supply chain since the reporting needs overlapped. This EUV survey indicated that 100% of health facilities had an ACT available on the day of the survey (n=70).[9]

A CDC-supported evaluation of the HMIS system (focusing on Montserrado County) by an epidemic intelligence service officer took place in 2013 and provided useful guidance on specific aspects of the system to target for improvement. The assessment focused on reporting of malaria-specific indicators through the District Health Information System (DHIS) and found that the system was well accepted by the county health team, NMCP, and MOHSW staff, but that there were often large data differences (>10%) between the patient and/or lab registers and the number of positive tests and clinically diagnosed cases included in the monthly reporting that comprises the DHIS.[10] As a result, the NMCP has incorporated similar tools to evaluate these and the other

[9] PMI End-Use Verification Liberia March 2014. DELIVER Project.
[10] Landman, K.Z. Liberia DHIS Evaluation Report. August 2013. CDC.

malaria indicators in the record keeping/ HMIS system and reporting during its supervision visits to health facilities, and where similar discrepancies are noted suggests corrective action to the staff and includes it in the list of findings to the officer in charge.

Despite a sound M&E vision, the MOHSW and NMCP have had problems implementing their routine systems, such as the HMIS, because of limited technical capacity, funding, and oversight. HMIS managers report that most counties do not use data collected by their facilities for making local decisions. Often there is limited tracking of trends in malaria cases at the county level. Inconsistent internet connectivity has also hindered and delayed reporting from county health teams to the DHIS system. Another challenge has been the need for repeated training of health facility staff on reporting given the high turnover at health facilities. Additionally, the NMCP is severely short-handed in M&E and requires additional support in-house. Previously, the M&E section of the NMCP was made up of four individuals. Currently, there is only one person at the NMCP who is designated full-time to deal with all aspects of M&E, from policy setting to tool development to training and supervision. The DHIS software is available and M&E staff members are in place in all county health offices, both of which present opportunities for improving the quality and use of data reported through the HMIS system.

Plans and justification

The NMCP M&E plan is integrated and financed by three sources: PMI, the Global Fund, and the GOL. PMI support to the NMCP's M&E strategy complements Global Fund support and will help provide key population-based indicators for monitoring malaria program implementation. PMI supports population-based surveys such as the DHS and MIS and provides technical assistance with the HMIS. PMI also supports data quality assurance and supportive supervision through the FARA with the MOHSW, while the Global Fund provides funding to support facility data, such as HMIS, health facility surveys, and supportive supervision for data quality assurance. Funding through Global Fund will also be used to establish two sentinel sites for collecting epidemiologic data on malaria. PMI and Global Fund resources will support therapeutic efficacy studies in four sites (two funded by PMI and two by Global Fund) in the coming year (supported with FY 2014 funding).

Improving HMIS data reporting and use will be addressed jointly with the Global Fund and will focus on enhancing the NMCP's capacity to supervise and support counties and districts in their malaria specific M&E activities. As noted above an assessment of the overall routine HMIS system was conducted in 2012 in Bong, Lofa, Nimba, and Grand Bassa Counties using the Performance of Routine Information System Management framework and tools, and a follow-up assessment will be completed in 2014. PMI funding will support follow-up activities resulting from the assessment directly in USAID-supported counties and nationwide by support to the MOHSW for replication of these efforts in the remaining counties

The table below shows the main sources of data and sequence of surveys for malaria program monitoring and impact evaluations.

Data Sources for Monitoring and Evaluation in Liberia, 2005 – 2016												
Data Source	**Calendar (PMI) Year**											
	2005	**2006**	**2007**	**2008 (1)**	**2009 (2)**	**2010 (3)**	**2011 (4)**	**2012 (5)**	**2013 (6)**	**2014 (7)**	**2015 (8)**	**2016 (9)**
HMIS	X	X	X	X	X	X	X	X	X	X	X	X
IDSR*	X	X	X	X	X	X	X	X	X	X	X	X
Sentinel sites	X	X	X	X	X	X					X**	X**
DHS			X						X			
MIS	X***				X		X				X	
Health Facility Survey	X				X				X		X	
Supervision and Evaluation Reports	X	X	X	X	X	X	X	X	X	X	X	X
EUV Survey							X	X	X	X	X	X
Malaria Program Review										X		
RBM Impact Evaluation											X	

*IDSR: Integrated Disease Surveillance and Response
**Sentinel sites have been included in the Global Fund grant.
***MIS 2005 was conducted by the NMCP and MOHSW, whereas the subsequent MIS were led by MEASURE DHS.

Proposed activities with FY 2015 funding ($1,262,000)

- EUV survey. PMI will provide resources to implement the EUV survey on a quarterly basis. Emphasis will be placed on sustainability in terms of simplification of reports, dissemination of results, and follow-up action for any problems identified. ($100,000)

- Strengthen data collection and use (county level). This activity will support the collection, reporting, and use of malaria data through the HMIS system at the county level. There is a need for the county health teams to analyze the monthly HMIS data and use it to track trends in malaria indicators and properly respond. This funding will contribute to the planned embedded technical assistance in the county health teams of Bong, Lofa, and Nimba Counties to ensure that malaria cases and deaths are properly tracked from the health facility level to the county level and to support the county health team to analyze and use the data on malaria trends in responding to changes in the number of malaria cases and planning commodity needs. This activity will also support

the recording of community data from gCHVs and private sector data as separate entries until they are incorporated in the HMIS system and will ensure health facilities are using the proper registers to record patient data. ($100,000)

- Strengthening data collection and dissemination for decision making (national level). The goal of this activity is to improve the collection, reporting, and use of various sources of data including household survey data, HMIS data, implementing partner data, and health facility survey data for decision-making at the national level by the MOHSW and the remaining counties. Resources will be provided to support visits by the MOHSW to the remaining counties, which are, with the exception of Montserrado where the MOHSW is located, much less populated, at which lessons learned from the three counties above will be shared with the respective county health teams as part of on-site supportive supervision. ($200,000)

- PMI will provide financial and technical resources to support the MIS in 2017. These resources will cover a portion of the survey with additional resources to be added later. The sample size will be similar to the 2011 MIS, which sampled almost 4,500 households. In the event that a DHS is planned for 2018, the PMI Liberia team will work with the NMCP and MOHSW to avoid conducting surveys in back to back years, possibly by combining the surveys or adjusting the timing of the surveys. ($750,000)

- Net Durability Monitoring. PMI will support the continuation of physical durability monitoring of nets distributed during the 2014 mass campaign at two sites. Monitoring will begin with reprogramed FY 2014 funds. ($100,000)

- Technical Assistance. CDC will conduct one technical assistance visit to support the NMCP on M&E activities. ($12,000)

6. Operational Research (OR)

Liberia has one OR study that was completed in 2013 and does not have any ongoing studies or studies planned with FY 2015 funding.

Summary of dried blood tube sample (*DTS) OR Study*
RDTs are currently being scaled up in Liberia. In 2012, CDC/PMI developed a DTS method that showed potential for use as a stable source of quality control samples to use in an external quality assurance system with RDTs. In order to assess the feasibility of using DTS in field settings, PMI, in conjunction with NMCPs, conducted pilot studies in Liberia and Ethiopia in 2013. The field work in Liberia was conducted from June to December 2013 at the National Drug Quality Control Laboratory and two health facilities. Staff from the NMCP performed the tests at week zero and then every four weeks for six months. Health facility staff was trained to use the DTS and were asked to test a four-sample proficiency panel at 12 and 24 weeks. Preliminary analysis of the data was done in March 2014 and suggested DTS stability in Liberia appears to be affected by prolonged storage under ambient conditions, whereas there was no difference in Ethiopia. The final report is expected by the end the second quarter of 2014.

Completed OR Studies			
Title	**Start date**	**End date**	**Budget**
Field Testing of Dried Malaria Positive Blood as Quality Control Samples for Malaria RDTs.	June 2013	December 2013	$10,895*
Ongoing OR Studies	**Start date**	**End date**	**Budget**
Title			
None			
Planned OR Studies FY15			
Title	**Start date (est.)**	**End date (est.)**	**Budget**
None			

*Additionally, a MOP funded TDY was used to support diagnostics, as well as for training and setting up this activity.

7. Behavior Change Communication (BCC)

NMCP/PMI Objectives

Liberia's current National Malaria Strategic Plan runs through 2015. Following a Malaria Program Review conducted in 2014, this strategic plan will be revised with new objectives. The current BCC objectives aim to target 90% of the population with malaria messages related to improving knowledge and behaviors around prevention and treatment of malaria. Specifically, behavior change messages and multimedia messages are aimed at ensuring that:

- Children under five receive effective ACT treatment within 24 hours after the onset of signs and symptoms of malaria
- Women receive at least two doses of IPT during pregnancy
- Residents of Liberia are aware of the benefits and are using LLINs to prevent malaria

Progress since PMI was launched

Concerted efforts from PMI and the Global Fund have successfully raised the population's awareness of malaria. The 2011 MIS indicated that 97% of women of reproductive age have heard of malaria, and that of women who have heard of malaria, 82% cited mosquitoes as the cause of malaria. Moreover, among those women who have heard of malaria and who say there are ways to avoid getting malaria or that malaria can be treated, 80% of women cited use of mosquito nets as a way to avoid infection, and 61% knew to treat malaria with ACTs.

Progress during the last 12 months

Malaria BCC activities are part of Liberia's integrated basic health service delivery package. During the past year, PMI continued to assist the MOHSW in developing communication materials, as well as training and equipping health providers, including gCHVs, to convey malaria messages.

The BCC campaign that began in 2012 continued in 2013 to promote malaria priority interventions: malaria case management related to prompt referral, testing, early treatment, full compliance with treatment regimens, and home management for malaria. The messages were disseminated via posters and audio messages. Airing of case management radio messages took place through two Monrovia-based stations and seven community-based partner stations in Bong, Lofa, and Nimba counties. A total of nine partner radio stations were contracted. Messages were aired over six months for a total of 130 playing hours.

Following the airing of case management messages in 2012, airing of radio messages on ITN use, called "Take Cover," took place through various Monrovia-based and community-based radio stations in 2013. The radio campaign featured four pre-recorded radio messages in both English and ten local languages. It ran over a three-month period and was broadcast on all nine partner stations. Messages were aired for a total of 65 playing hours.

In addition, PMI, through its implementing partners, worked with CHSWTs during supportive supervision visits to improve the quality of health messages disseminated at the health facility, specifically on the use of ITNs and malaria case management. The NMCP received and distributed 3,000 posters and 5,000 leaflets outlining how to use ITNs during mass distribution campaigns, and 1,000 kits containing comprehensive, pictorial Community Health Education Skills Toolkits, which include information related to key malaria interventions. A total of 350 gCHVs were trained last year to educate and engage communities on malaria using these kits. To date, a total of 1000 gCHVs have been trained to use these materials in Bong, Nimba and Lofa Counties.

PMI sponsored the NMCP BCC focal person, the Director of Health Promotion, and one implementing partner staff member to participate in the PMI/BCC conference held in Ethiopia in September 2013. The objectives of the conference were: 1) to share updates on current activities and PMI approaches for BCC in various country contexts surrounding malaria epidemiology and program/partner capacity; 2) to identify and discuss best practices and lessons learned from PMI/BCC programs and draw from these lessons in planning future activities.

Furthermore, a malaria BCC technical working group was established by the NMCP at the national/central level in late 2013. This working group, which is progressively becoming operational, will focus on technical issues related to malaria BCC strategy development, materials/messaging, medium of conveying messages, appropriate target audiences, timing, M&E of BCC activities, and BCC community outreach.

Finally, several surveys in the last year were undertaken to better understand issues related to LLINs and other malaria prevention measures in order to inform planned revisions to Liberia's malaria behavior change messaging. PMI supported a qualitative net survey to determine the reasons for low ownership and use of LLINs (described in the ITN section), and the Health

Communication Capacity Collaborative Project, implemented by the Johns Hopkins University Center for Communication, conducted a strategic behavior change communication survey to identify which factors may influence behaviors and examine the relationship between exposure, behaviors, and attitudes regarding net use, receipt of ACTs by children with fever, and SP by pregnant women.

The 2007 DHS results showed that radio and gCHVs are the most frequent sources of information for the population; however, only 55% of the population possessed a radio and the capacity of the community health division at the national level, in charge of developing, directing and monitoring community health policies and approaches, remains weak. The coordination and the supervision of BCC activities conducted by gCHVs, along with the need for gCHVs to serve different programs, also poses serious challenges. In addition, although there is a high level of knowledge about malaria in Liberia, a lot remains to be done to improve social norms toward malaria and translate improved knowledge indicators into improved behavior change indicators.

Plans and justification

The NMCP has advocated for more interpersonal communication versus mass media to address the issue of translating knowledge into behavior change. Based on the results of the qualitative LLIN survey and the strategic behavior change communication survey, PMI is planning to support the revision of BCC materials and the development of tools to strengthen the interpersonal communication skills of health providers. Meanwhile, mass media will continue to be used and reinforced to concomitantly maintain and sustain acquired knowledge and boost behavior change on all malaria interventions promoted by PMI in Liberia.

The impact of PMI's contribution to behavior change in Liberia will be measured through the monitoring of BCC interventions, using the HMIS to monitor improved intervention uptake, and with the next MIS (MIS 2015).

Proposed activities with FY 2015 funding ($950,000)

- Integrated interpersonal communication. PMI will support the continued implementation of integrated interpersonal communication activities, including development of tools for nationwide use and capacity building to enable health care workers to promote all aspects of malaria interventions in Bong, Lofa, Nimba, Margibi, Montserrado, and Grand Bassa Counties. These six counties account for approximately 70% of the population of Liberia. The Global Fund will support capacity building on interpersonal communication activities in the other counties. Health providers, including gCHVs, will be trained on how to effectively communicate preventive and curative messages to mothers/caretakers. ($500,000)

- Mass media. PMI will support the implementation of a revised national communication strategy and the dissemination of revised BCC messaging for all malaria interventions, including the new guidelines on IPTp, LLIN use, iCCM, and testing prior to treatment (particularly in the private sector). Messages will be in local languages and tailored for various locations/groups. ($450,000)

8. Capacity Building and Health Systems Strengthening

NMCP/PMI Objectives

A high priority of the NMCP is to increase the qualifications of its staff, particularly in terms of their managerial and supervisory capacity. In addition, the Liberia MOHSW has made a commitment to decentralize services to the county level and to integrate health services at both the health facility and the community level in order to improve access to health care.

Progress since PMI was launched

To encourage integration of malaria prevention and control activities into routine health care in ways that are sustainable, PMI has supported the NMCP to more actively engage with other parts of the MOHSW involved in malaria related activities, such as the Reproductive Health Division, Community Health Division, Maternal and Child Health Division, the NDU, NPHRL, Tuberculosis Control, and other GOL agencies such as the Liberia Medical and Dental Council.

As part of the transition to a decentralized system, NMCP staff members are adapting to their changing roles in terms of integrated supervision, policy implementation, advocacy, and mentoring of staff on county health teams. Instead of directly providing services, the NMCP is now charged with ensuring that malaria prevention and control measures are well conducted and policy changes are implemented. Parallel to this change is the expansion of the HMIS data system to include more facilities, making it a more representative and useful data tool.

Progress during the last 12 months

In order to support the NMCP to accumulate available data, analyze the quality of individual data sets, and to triangulate various data sources, PMI provided technical assistance in a variety of formats. First, in the first quarter of 2013, PMI facilitated consultants to assist the NMCP with the assessment of Phase 1 of the Global Fund Round 10 grant and preparation of the Phase 2 application, including commodity quantifications. Second, PMI provided direct technical assistance by in-country Resident Advisor staff throughout the year and topic specific external consultants (e.g., with logistics and program design for the national net campaign). The NMCP/MOHSW and Plan Liberia (the other sub-recipient, with technical assistance from Plan Canada) took the lead in all subsequent negotiations and modifications of the Global Fund application, including submission of all documents to meet the conditions precedent that were specific for malaria.

Over the last 12 months, members of the NMCP were able to retrieve appropriate HMIS data related to specific issues. Additional training is needed for all staff to evaluate, analyze, and compare the data from HMIS and other sources to inform policy and planning, for effective monitoring of service delivery at the county level, and mentoring county staff in their supervisory roles.

PMI funds were used to conduct a preliminary capacity building assessment of the NMCP in 2012 using the WHO Six Building Blocks tool for systems strengthening. Priority areas identified for improvement include partner coordination and data management. Based on these findings, the main health implementing partner in Liberia addressed capacity development at the MOHSW and NMCP. Specifically, the following areas were addressed: assessment of the organizational structure, development of job descriptions and performance evaluation plans for individuals, development of a communication plan, and identification of training needs.

Under the FARA, a reimbursement agreement with the MOHSW for health services delivery supported by PMI and other USAID funding, the MOHSW contracted out with NGOs in Bong, Nimba and Lofa counties to support service delivery and provide technical assistance for health system functioning in over 120 facilities. The NMCP participated in the management of FARA activities, as well as the production of the integrated MOHSW newsletter, which covers a range of malaria-related topics such as World Malaria Day events. The NMCP also participated in the integrated supportive supervision of health facilities, a key activity supported by the FARA in Bong, Lofa and Nimba and supported by other donors in Liberia's other 12 counties. PMI provided technical assistance and support to the MOHSW to implement the FARA at all levels through strengthening of supervision systems and processes, support to improve management, HMIS and data use, and introduction of QA/QC mechanisms at all levels. During the last 12 months, there was recognition that the integrated supportive supervision was focused on clinical services and that a similar technical activity was needed for the diagnostic services for malaria, in addition to HIV and tuberculosis. Similarly, the three disease specific programs combined planning for overlapping activities; for example, the Tuberculosis Control Program and the NMCP collaborated on a joint microscopy plan under the Global Fund and all three programs are collaborating on external quality assurance methodology.

The NMCP has demonstrated leadership in revising and adapting its malaria policies to match international best practices. In addition to transitioning its LLIN mass distribution strategy from rolling county-based campaigns to a more cost-efficient and technically effective single nationwide event, the NMCP has begun distributing LLINs to vulnerable populations by providing nets for women at their first ANC visit and at institutional delivery. In addition, Liberia has adopted the new WHO guidelines for IPTp at all routine monthly visits after the first trimester, and the NMCP is working with PMI, WHO, and other partners on BCC messages, training, and data management modifications in reporting tools.

PMI supported the renovation and equipment provision of five spaces at the NMCP office, including space for a PMI-supported Global Fund advisor providing long-term technical assistance and the two PMI resident advisors who now sit regularly at the NMCP office to provide assistance to the staff in various technical areas and program management.

The recent leadership change at the NMCP has created both a critical need and important opportunity to build managerial and technical capacity of key staff. Now that the former deputy has been confirmed as the program manager, the deputy program manager position is empty. The deputy position will likely continue to be vacant until an organizational assessment is finalized as a Global Fund condition precedent. The NMCP organizational assessment report is due to the Global Fund by June 2014.

Generally, Liberia continues to have a shortage of qualified health workers, and the health system remains heavily reliant on external assistance for financing of the NMCP, though the MOHSW is forging ahead with proposed health financing reforms aimed at generating new revenues for the health sector.

The provision of quality malaria-related services is still a major challenge, as the country still lacks a well-functioning system to procure, distribute, and track malaria commodities (LLINs, ACTs, severe malaria kits, RDTs, etc.) in its 647 health facilities. The counties also require mentoring to analyze and use the data from HMIS, LMIS, and integrated supervision collected as part of routine monitoring and evaluation. The counties also need capacity building to follow up with sites on identified problems, areas for improvement, and identifying best practices. With USG assistance, the MOHSW has begun development of an integrated Human Resources Information System to strengthen management of human resources at all levels. The system will eventually serve as a platform to track in-service and pre-service training and continuing medical education requirements. The MOHSW is also undertaking efforts and introducing new processes to strengthen human resources management in line with the national Human Resources Policy and Plan for Health and Social Welfare. Key goals include working to rationalize workforce distribution, increase the availability of skilled personnel, and improve motivation, retention, and accountability of the current workforce.

Plans and justification

PMI will continue its strong focus on building technical and managerial capacity for malaria prevention and control at all levels of the health care system. PMI will continue to support the NMCP to improve the quality, completeness, and timeliness of malaria-specific data reporting from health facilities, surveys, and supervision, and to increase staff skills in data analysis and interpretation. With the phasing out of its support for IRS, PMI will support the NMCP to strengthen its entomological monitoring capacity to better understand the ecology of malaria in Liberia, particularly in terms of insecticide resistance in order to plan vector control interventions in Liberia.

The Malaria Steering Committee is an advisory body to the NMCP that is comprised of all malaria partners, both local and international. The Steering Committee is tasked with providing technical and operational guidance for malaria control activities and with coordinating partners. However, recently its meetings have not been held regularly. To strengthen the Malaria Steering Committee, PMI is assisting the NMCP to establish technical working groups to focus on technical intervention areas.

Proposed activities with FY 2015 funding ($130,000)

- Efforts will include strengthening the NMCP's capacity to conduct integrated post-training follow-up of health workers, providing technical support to strengthen NMCP managerial capacity, planning, supervision, and donor coordination, and improving linkages with the Family Health and Community Services Divisions of the MOHSW. Technical assistance will continue and extend the PMI investments in NMCP capacity

building to carry out the PMI activities that are tracked by Global Fund, such as routine net distribution. (Specific activities described in separate sections.)

- Strengthening management, leadership and planning capacity of the NMCP. PMI will support technical assistance to sustain prior improvements to the NMCP's management and oversight, both internally (e.g., meeting efficiency and setting timelines) and externally (e.g., donor and implementing partner coordination). This may take the form of mentoring via a consultant if there has been favorable experience with the long-term technical assistance recently inaugurated through PMI for assistance with implementation Global Fund activities. ($130,000)

9. Staffing and Administration

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

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

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

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

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

governments will need to be approved by the USAID Mission Director and Controller, in addition to the USG Global Malaria Coordinator.

Proposed activities with FY 2015 funding ($1,200,000)

- In-country staffing and administration. Coordination and staff salaries and benefits, office equipment and supplies, and routine expenses for PMI activities in Liberia.

Table 1
President's Malaria Initiative - Liberia
(FY 2015) Budget Breakdown by Partner

Partner	Activity	Budget ($)	%
CDC	Technical assistance for M&E, malaria diagnostics, MIP, vector control, and iCCM	120,000	1%
CDC/USAID	In-country staffing and administration	1,200,000	10%
CSHSS (this is a new contract for "wrap-around" technical assistance and capacity-building to complement the FARA)	Implementation and monitoring of diagnostics QA/QC system, support for pre-service laboratory training, pre-service monitoring and supervision for MIP, strengthening data collection and use at the central and county levels, and strengthening NMCP capacity	760,000	6%
TBD commodity/ supply chain project	Procurement of LLINs, ACTs, severe malaria drugs, RDTs, and laboratory supplies; supply chain management support and end-use verification	5,060,000	43%
IRS 2 TO6	Increase NMCP entomology capacity and entomological monitoring	400,000	3%
TBD (bilateral M&E)	MIP assessment	90,000	1%
MEASURE DHS	2017 MIS	750,000	6%
MOH/FARA	Capacity development and supportive supervision for malaria diagnostics, in-service supervision and training at ANC facilities, capacity development of facility based and community-based health workers in malaria treatment, interpersonal BCC	1,950,000	16%
TBD	Technical assistance for continuous distribution planning and net durability monitoring; routine distribution of LLINs	920,000	8%
Promoting Quality Medicines	Monitoring of antimalarial drug quality	200,000	2%
TBD community level project	Implementing and monitoring mass media malaria messages; support for strengthening malaria case management in the private sector	550,000	5%
Total		**$12,000,000**	**100%**

Table 2
President's Malaria Initiative - Liberia
Planned Obligations for FY 2015

Proposed Activity	Mechanism	Budget		Geographical area	Description
		Total $	Commodity $		
PREVENTIVE ACTIVITIES					
Insecticide Treated Nets					
Procure LLINs	TBD commodity/ supply chain project	1,440,000	1,440,000	Nationwide	Procure about 320,000 LLINs for routine distribution (ANC and institutional delivery)
Distribute LLINs	TBD	720,000	720,000	Nationwide	LLIN distribution (including warehousing and transportation down to facility level at an average cost of about $2.25 per net)
Technical assistance for continuous distribution planning	TBD	100,000		Nationwide	Assistance for developing a multi-channel continuous distribution system
SUBTOTAL - ITNs		**2,260,000**	**2,160,000**		
Indoor Residual Spraying and Entomological Monitoring					
Increase NMCP entomology capacity and entomological monitoring	IRS 2 TO6	400,000		Nationwide	Provide training, equipment and supplies for NMCP entomology technicians, including insectary support and support for entomology sentinel site monitoring and resistance testing
Technical assistance for vector control activities	CDC	24,000		Nationwide	Two visits to assist with training and to monitor planning and implementation of vector control activities
SUBTOTAL - Entomological Monitoring		**424,000**	**0**		
Malaria in Pregnancy					
Pre-service monitoring and supervision for malaria in pregnancy	CSHSS	25,000		Nationwide	Quarterly joint monitoring and supervision visits of 6 training sites for certified midwives

In-service training and supervision for health care workers at ANC facilities	MOH/FARA	450,000		Bong, Nimba, Lofa	At the facility level continue in-service training and supervision of health workers for malaria in pregnancy; community outreach (MOHSW activity is nationwide with our contribution covering 3 counties)
MIP assessment	TBD (bilat M&E)	110,000		Nationwide	Monitoring and documenting implementation of MIP, including the new WHO guidelines for IPTp
MIP assessment support	CDC	40,000		Nationwide	Technical assistance visit to support MIP assessment
SUBTOTAL - MIP		**625,000**	**0**		
TOTAL PREVENTIVE		**3,309,000**	**2,160,000**		
CASE MANAGEMENT					
Diagnosis					
Procurement of RDTs	TBD commodity/ supply chain project	920,000	920,000	Nationwide	Procure 2 million RDTs to help fill gap
Procure laboratory supplies	TBD commodity/ supply chain project	100,000	100,000	Nationwide	Procure laboratory supplies, including reagents, for health facilities and national reference lab
Support to extend the LMIS	TBD commodity/ supply chain project	100,000		Nationwide	Implement revised LMIS and improve availability and use of consumption data
Implementation and Monitoring of Diagnostics QA/QC system	CSHSS	290,000		Nationwide	Support NPHRL, NDU, and NMCP with technical assistance to strengthen external quality assurance, refresher training for laboratory technicians, and technical laboratory/diagnostic supervision
Support for pre-service laboratory/diagnostic	CSHSS	15,000		Nationwide	Support the laboratory/diagnostic training costs for up

training					to ten students
Capacity development and supportive supervision	MOH/FARA	150,000		Bong, Nimba, Lofa	Continue support to health facilities for early and accurate diagnosis of malaria cases (MOHSW activity is nationwide with our contribution covering 3 counties)
Technical assistance for malaria diagnostics	CDC	12,000		Nationwide	Technical assistance visit to support efforts of the NMCP to review diagnostic guidelines and improve the rollout of malaria diagnostics
SUBTOTAL - Diagnosis		**1,587,000**	**1,020,000**		
Treatment					
Procure ACTs	TBD commodity/ supply chain project	1,000,000	1,000,000	Nationwide	Procure 1,276,000 ACT doses for public and private facilities and community treatment
Procure severe malaria medications	TBD commodity/ supply chain project	100,000	200,000	Nationwide	Procure treatments for severe malaria
Support capacity development of facility-based health workers in prompt and appropriate treatment of malaria	MOH/FARA	300,000		Bong, Nimba, Lofa	Continue support for appropriate and prompt treatment and early referral of malaria cases, with focus on health facilities (MOHSW activity is nationwide with our contribution covering 3 counties)
Support capacity development of community-based health workers in prompt and appropriate treatment of malaria	MOH/FARA	550,000		Bong, Nimba, Lofa	Continue support for appropriate and prompt treatment and early referral of malaria cases, with an emphasis on iCCM
Monitor antimalarial drug quality	Promoting Quality Medicines	200,000		Nationwide	To help strengthen LMHRA to monitor drug quality
Technical assistance for iCCM	CDC	12,000		Nationwide	Technical assistance visit to support efforts of the NMCP

					to strengthen iCCM
Technical assistance to support private sector scale-up	TBD community level project	100,000		Nationwide	Support for strengthening malaria case management in the private sector
SUBTOTAL – Treatment		**2,262,000**	**1,200,000**		
Pharmaceutical Management					
Strengthen supply chain management (central level)	TBD commodity/ supply chain project	900,000		Nationwide	Support new NDS warehouse operations, ongoing mentoring to SCMU, supervision, forecasting, and quantification in line with revised Supply Chain Master Plan
Strengthen supply chain management (county/district level)	TBD commodity/ supply chain project	400,000		Bong, Nimba, Lofa, Margibi, Montserrado	Expand support to county depots and CHSWTs to rationalize commodity management, storage, supervision distribution, and reporting in line with revised Supply Chain Master Plan
SUBTOTAL - Pharmaceutical Management		**1,300,000**			
TOTAL CASE MANAGEMENT		**5,149,000**	**0**		
MONITORING AND EVALUATION					
End-use verification survey	TBD commodity/ supply chain project	100,000		Nationwide	To support the NMCP in the implementation of the EUV survey
Strengthen data collection and use (county level)	CSHSS	100,000		Bong, Nimba, Lofa	Support the county health teams and the individuals embedded there to collect data through the HMIS and utilize the data to track malaria trends in the health facilities in each county and to incorporate community data

					from gCHVs in the revised District Health Information System 2
Strengthen data collection and dissemination for decision making (national level)	CSHSS	200,000		Nationwide	Improve the triangulation of malaria data from HMIS, household surveys, health facility surveys and partner reports to inform decision making at the central level; improve translation of HMIS data to strengthen malaria programming at the central level
MIS 2017	MEASURE DHS	750,000		Nationwide	Support for Malaria Indicator Survey
Net Durability Monitoring	TBD	100,000		At selected sites	Continue to monitor attrition and physical durability of nets distributed during the 2015 mass campaign at two sites
Technical assistance for M&E	CDC	12,000		Nationwide	Technical visit to support monitoring and evaluation activities
TOTAL M&E		**1,262,000**	**0**		
BEHAVIOR CHANGE COMMUNICATION					
Interpersonal communication	MOH/FARA	500,000		Bong, Nimba, Lofa, Margibi, Montserrado, and Grand Bassa	Implement integrated interpersonal communication activities, including health care worker training, to promote all aspects of malaria interventions
Implementing and monitoring mass media malaria messages	TBD community level project	450,000		Nationwide	Messaging for all malaria interventions, including a focus on BCC for LLINs, iCCM, and testing prior to treatment

					(particularly in the private sector)
TOTAL BCC		**950,000**	**0**		
HEALTH SYSTEM STRENGTHENING/CAPACITY BUILDING					
Strengthening management, leadership and planning capacity of NMCP	CSHSS	130,000		Nationwide	TA to sustain prior improvements in NMCP's management and oversight capacity both internally (meeting efficiency, setting timelines) and externally (donor and implementing partner coordination)
TOTAL CAPACITY BUILDING		**130,000**	**0**		
STAFFING AND ADMINISTRATION					
In-country staffing and administration	CDC/USAID	1,200,000	0	Monrovia	Salaries and benefits, as well as administrative-related costs of in-country PMI staff, and support of activities as needed by the Mission
TOTAL STAFFING AND ADMINISTRATION		**1,200,000**	**0**		
GRAND TOTAL		**12,000,000**	**4,380,000**		