This Malaria Operational Plan has been endorsed by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. If any further changes are made to this plan, it will be reflected in a revised posting.

PRESIDENT'S MALARIA INITIATIVE

Malaria Operational Plan (MOP)

LIBERIA

FY 2010

TABLE OF CONTENTS

EXECUTIVE SUMMARY

In December 2006, President George W. Bush announced that Liberia had been selected as one of the final eight countries in the five-year, $1.2 billion President's Malaria Initiative (PMI) to rapidly scale-up malaria prevention and treatment interventions in high-burden countries in sub-Saharan Africa. Liberia's health infrastructure was severely damaged during the long war and only about 45% of the population has access to essential health services. The entire population of just over 3.5 million is at risk for malaria. The 2009 Malaria Indicator Survey (MIS) showed that net use is still low at about 33%, while malaria prevalence using rapid diagnostic tests (RDTs) was 37%.

Liberia is in the first year of a 5-year, $37 million malaria grant from the Global Fund to Fight Aids, Tuberculosis and Malaria (Global Fund), which is paying for personnel, technical assistance, infrastructure development and commodities. Several international and local non-governmental organizations (NGOs) provide major support to malaria prevention and control efforts as well through importation and distribution of insecticide-treated nets (ITNs), antimalarial drugs and training of healthcare workers and community health volunteers.

This PMI Year 3 Malaria Operational Plan for Liberia was based on progress and experiences in the first two years. It was drafted during a planning exercise carried out in May 2009 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 that the PMI is proposing to carry out conform to the Ministry of Health and Social Welfare (MOHSW) National Malaria Strategic Plan, and support investments made by the NMCP, Global Fund, UNICEF, WHO, and other donors to improve and expand malaria-related services. A few interventions, such as indoor residual spraying (IRS), will be incorporated into the Ministry's revised Strategic Plan (in development).

Progress to date and Year 3 plans for each of the major interventions:

Insecticide-treated nets: The MOHSW National Strategic Plan for 2008-2013 aims to increase usage of ITNs to 85% among the entire population. The malaria strategic plan set a target of one long-lasting insecticide treated net (LLIN) for each sleeping space, or approximately three nets per household. There are an estimated 670,295 households in Liberia. Approximately 1.2 million ITNs have been distributed in Liberia between 2005 and 2008, via door-to-door campaigns, and through antenatal clinics (ANCs). Preliminary data from the 2009 MIS indicated that ownership of ITNs has increased dramatically over the last few years, with 49% of households reporting ownership of at least one net. However usage among ITN owners remains low, with only 51% of children under-five and 63% of pregnant women sleeping under them the night before the survey. In FY2008 PMI purchased 172,000 LLINs as part of a jump start activity with distribution in two counties (Bomi and Cape Mount) and in FY2009 430,000 LLINs were

procured and distributed door-to-door in three counties (Lofa, Nimba and Grand Bassa). In Year 3, PMI will procure 350,000 LLINs for free distribution through facilities and community-based programs. PMI will also continue to support strengthening the management of the national net program, to include improved logistics, forecasting, storage, distribution, training, and associated information, education and communication (IEC).

Indoor residual spraying: Liberia has a history of IRS with dichloro-diphenyl-trichloroethane (DDT) during the malaria eradication era in the late 1950s. Spraying during the last few years was primarily in camps for internally displaced persons or returning refugees, with a population of approximately 150,000 covered. No recent information is available on mosquito vector species, distribution or insecticide resistance status. The PMI-supported efforts to develop a data base of malaria vector species and insecticide resistance status however these plans have been delayed due to the lack of qualified personnel in the NMCP to carry out regular collection and identification of mosquitoes. The MOHSW leadership foresees IRS coverage eventually reaching large numbers of the population, but, lacks technical capacity and the resources to reach this objective. During the past year the NMCP approved plans to initiate an IRS program using a pyrethroid insecticide and, with funding from the PMI, completed an environmental assessment and began implementation of the program. By the end of the fiscal year, PMI will have sprayed approximately 25,000 houses (protecting 125,000 people) as a first step towards building capacity for IRS in Liberia. An environmental assessment for the use of DDT for IRS has been initiated at the request of the NMCP. In Year 3, PMI will support IRS for approximately 80,000 houses, provide continued support for building entomologic capacity at the NMCP, and partner with private industry.

Intermittent preventive treatment of pregnant women (IPTp): Implementation of IPTp in Liberia has been limited due to the lack of access to facilities. Information from the 2009 MIS showed that 46% of pregnant women received the required two treatments as prescribed by national guidelines. PMI has updated and printed training manuals that are being used for in-service training of health workers by the NMCP and some NGOs. During the past year 60 senior maternal and child health and clinical supervisors and 748 health care providers were trained in malaria case management and malaria in pregnancy. With Global Fund sources, the NMCP is procuring sulfadoxine-pyrimethamine (SP). In Year 3, the PMI will continue to support in-service training of health workers, refresher training for tutors in training institutions, and educational materials for IPTp.

Case management: Due to the limited resources for laboratory diagnostics, most health facilities use the rapid diagnostic test (RDT). Presently, there are 78 licensed laboratory technicians in the country including two technologists and about 300 laboratory assistants. During the past year PMI funded an assessment of laboratory capacity was and worked with the NMCP to develop a work plan for training. The PMI procured 850,000 RDTs and has distributed about half of them to counties and health facilities. The remaining half is being delayed and will be requested at the appropriate time to avoid overburdening the storage capacity of the National Drugs Supply (NDS). In Year 3, PMI

will support the development of the National Reference Laboratory and continue to support training and procurement of diagnostic supplies including RDTs and microscopes.

The 2009 MIS showed that only 17% of children under-five received an artemisinin-based combination therapy (ACT) within 24 hours of onset of fever. Currently, only 45%[1] of the population has access to a public facility where ACTs are stocked. Chloroquine is still widely available in private facilities and pharmacies, and 16% of children under-five received chloroquine within 24 hours of onset of fever, according to the 2009 MIS. During the past year, PMI purchased about one million ACT treatments as well as quinine kits for treatment of severe malaria, and trained 280 health workers in case management. In Year 3, PMI will purchase ACT treatments and supplies for treating severe malaria, as well as continue to support training of health facility staff and community-based staff in case management of malaria.

Building NMCP capacity: The long war not only destroyed health facilities but also had a serious negative impact on human capacity, as many qualified people left the country and training programs languished. During the past year, PMI identified a building to rehabilitate which will serve as the NMCP headquarters, procured vehicles to facilitate supervision and provided training for key NMCP staff as well as facility-based staff. In Year 3, PMI will continue to support the development of human resources within the NMCP, as well as to managers and health care workers at county, clinic and community levels. Additionally, PMI will work with other partners to improve the capacity of the drug management system.

Monitoring and evaluation (M&E): Liberia's M&E system is weak. For instance, the MOHSW and partners instituted a facility accreditation scheme that provides a comprehensive assessment of each facility's ability to meet standards and provide the Basic Package of Health Services (BPHS). Malaria diagnosis, treatment and prevention are integrated into this package. Every six months the accreditation review is repeated and managers are focused on improving ratings. Plans to improve M&E are linked closely with the plan for decentralization that places responsibility for collecting and synthesizing data at the county level, feeding into the central system. During the past year PMI supported a Monitoring and Evaluation Systems Strengthening Tool (MESST) workshop to assess malaria M&E capabilities in Liberia. In addition, PMI supported a Malaria Indicator Survey (MIS) that will provide baseline data for several key indicators. In Year 3, PMI will continue to support sentinel, malaria, surveillance sites and expand to new sites. The Mission is moving to develop Lot Quality Assurance sampling methodology for attitudes and behaviors related to health seeking behavior (demand) and care (supply), which will include several indicators on malaria. In addition, PMI will contribute to the planning of the next DHS or MIS, depending on a final decision from the Ministry of Health and Social Welfare.

The proposed FY2010 PMI budget for Liberia is $18.0 million, of which 26% will support procurement and distribution of ITNs, 37% improved malaria diagnosis,

[1] Ministry of Health and Social Welfare data for 2008.

procurement of ACTs and case management, and 23% for IRS. Approximately 45% will be spent on commodities.

ABBREVIATIONS and ACRONYMS

ACT	Artemisinin-based combination therapy
AM	Artemether
AMREF	African Medical Research Foundation
ANC	Antenatal care
AQ	Amodiaquine
AS	Artesunate
ARV/ART	Anti-retroviral/therapy
BCC	Behavior change communications
BPHS	Basic Package of Health Services
CCM	Country Coordinating Mechanism
CDC	Centers for Disease Control and Prevention
CHW	Community health workers
CSHGP	Child Survival and Health Grants Program
DDT	Dichloro-Diphenyl-Trichloroethane
DHS	Demographic and Health Survey
EC	European Commission
EML	Essential medicines list
FBO	Faith-based organization
HBM	Home-based management/of fever
HCW	Health care worker
HMIS	Health Management Information Service
ICRC	International Committee of the Red Cross
IDP	Internally displaced persons
IEC	Information, Education and Communication
IM	Intramuscular
IMaD	Improving Malaria Diagnostics
IMC	International Medical Corps
IMCI	Integrated Management of Childhood Illnesses
IPTp	Intermittent preventive treatment of pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated bed net
IV	Intravenous
LIBR	Liberian Institute of Biomedical Research
LLIN	Long-lasting insecticide-treated bed net
LQAS	Lot Quality Assurance Sampling
M&E	Monitoring & evaluation
MIS	Malaria Indicator Survey
MOHSW	Ministry of Health & Social Welfare
MSC	Malaria Steering Committee
NDRA	National Drug Regulatory Authority
NDP	National Drug Plan
NDS	National Drug Service
NGO	Non-governmental organization
NMCP	National Malaria Control Program

OFDA	Office of Foreign Disaster Assistance
PLWHA	People living with HIV/AIDS
PMI	President's Malaria Initiative
PMTCT	Prevention of mother-to-child transmission
RBHS	Rebuilding Basic Health Services
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RTI	Research Triangle Institute
SP	Sulfadoxine-pyrimethamine
UNDP	United Nations Development Program
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Emergency Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

PRESIDENT'S MALARIA INITIATIVE

In late June 2005, the United States Government (USG) announced a new five-year, $1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions in high-burden countries in sub-Saharan Africa. The goal of this Initiative is to reduce malaria-related mortality by 50% after in PMI countries. This will be achieved by reaching 85% coverage of the most vulnerable groups---children under-five years of age and pregnant women ---with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated bed nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

The President's Malaria Initiative (PMI) began in three countries in 2006: Angola, Tanzania, and Uganda. In 2007, four countries were added: Malawi, Mozambique, Senegal, and Rwanda. In 2008, eight additional countries were added to reach a total of 15 countries covered under the PMI. Funding began with $30 million in Fiscal Year (FY) 2006 for the initial three countries, increased to $135 million in FY2007 and to $300 million in FY2008 and FY2009, and will reach $500 million in 15 countries by FY2010.

In implementing the U.S. Government component of this Initiative, the U.S. is committed to working closely with host governments and within existing national malaria control plans. Efforts will be coordinated with other national and international partners, including the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund), Roll Back Malaria (RBM), the World Bank Malaria Booster Program, and the non-governmental and private sectors, to ensure that investments are complementary and that RBM and Millennium Development Goals are achieved. Country Assessment and Planning sessions for the PMI, as well as subsequent evaluations, will be highly consultative and held in collaboration with the National Malaria Control Program and other partners.

This document presents a detailed one-year implementation plan for FY2010 year of the PMI in Liberia. It briefly reviews the current status of malaria control and prevention policies and interventions, identifies challenges and unmet needs if the goals of the PMI are to be achieved, and provides a description of planned Year Three activities under the PMI. The document was developed in close consultation with the National Malaria Control Program (NMCP) and with participation of many national and international partners involved in malaria prevention and control in the country. The total amount of PMI funding requested for Liberia is $18 million for FY2010.

MALARIA SITUATION IN LIBERIA

Liberia is administratively divided into 15 counties and 95 political districts. The population according to the recently completed 2008 national census is 3,489,072. Most of the country lies 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.

The immediate post-conflict situation in Liberia saw the return of refugees and resettlement of displaced population throughout the country. This has created the need for more health care services. The internal conflict affected the livelihood of the general population and the ability of the Ministry of Health and Social Welfare (MOHSW) to provide basic primary health care services. Although, access to health services for the most vulnerable groups, women and children, is low (45%), the public health system in Liberia is gradually being revitalized.

Humanitarian assistance groups have been providing much of the health services to the Liberian population over the last four to five years because Liberia was in a state of intermittent civil war for more than a decade until 2003. Very little information is available on health or other indicators, but as the country begins to transition from an emergency to a development phase, data is becoming available through several different organizations. Life expectancy for females and males is 44 and 41 years, respectively. The expenditure on health is approximately 5.6% of the Gross Domestic Product. A Demographic and Health Survey (DHS) conducted in early 2007 reported an HIV prevalence of 1.5%.

Malaria accounts for 40-45% of out-patient clinic attendance, and 18% of inpatient deaths. The 2007 DHS indicates that the under-five mortality rates are on the decline, although still very high at 111/1000 live births. An estimated 60,000 children under-five die each year in Liberia, putting conservative estimates of malaria-attributable childhood deaths at 10,800 annually, but this may well be an underestimate because of a weak surveillance system and poor reporting. The maternal mortality ratio is one of the highest in the world at 984/100,000[2]. Since pregnant women constitute about 5% of the population, at any given time in a year, approximately 175,000 pregnant women are at risk of malaria each year.

Malaria is holoendemic (perennial intense transmission with considerable immunity in older children and adults) throughout Liberia. The major vectors for transmission are *Anopheles gambiae s.s*, *An. funestus*, and *An. melas*. *Plasmodium falciparum* accounts for more than 90% of all infections.

Until 2007, the Global Fund, WHO, and UNICEF constituted the major external sources of funding for the implementation of malaria control and prevention activities in Liberia. The Round 3, Global Fund grant provided $12 million over two years for improved case management including the procurement of ACTs, SP for IPTp, vector control, information, education, and communication (IEC)/behavior change communication (BCC) activities, community mobilization, and program management, including paying salaries of the NMCP staff; it ended in February 2007. The $37 million Round 7 grant was signed in April 2008, with the United Nations Development Program as the Principal Recipient. With Round 7 funding, Liberia plans to procure and distribute 7 million ACT

treatments, 1.6 million LLINs to children under-five and pregnant women, and two doses of sulfadoxine-pyrimethamine (SP) to more than 300,000 pregnant women.

The WHO will be hiring a National Professional Officer to provide technical assistance related to malaria. UNICEF has assisted with the procurement and distribution of LLINs in the past and is expected to distribute over 350,000 LLINs in Liberia for FY2010. Non-governmental organizations (NGOs) such as John Snow International, MENTOR Initiative, EQUIP, Africare, Save the Children, and the Red Cross continue to provide significant support to the Government of Liberia and, in particular, the MOHSW, to ensure health service delivery continues in the more than 290 health facilities they assist.

NATIONAL MALARIA CONTROL PLAN AND STRATEGY

The Government of Liberia is committed to improving health service access and delivery, including malaria prevention and treatment measures nationwide. This is reflected in key policy documents, including the National Health Policy of the MOHSW (January, 2007). The vision of the National Health Policy is a nation with improved health and social welfare status of its citizens through equitable and sustainable health promotion and protection, and the provision of comprehensive and affordable health care and social welfare services. The Plan aims to accomplish this by (1) expanding access to a basic package of health care by investments in infrastructure, human resources, and decentralized management; and (2) establishing the building blocks of an equitable, effective, cost-effective, responsive, and sustainable decentralized health care delivery system.

The current National Malaria Strategic Plan 2009-2013, and the NMCP Malaria Action Plan for 2009 were developed by NMCP in consultation with partners and stakeholders in malaria control and prevention. The plan aims at creating a framework of priority activities that should be carried out at various levels (both at the health facility and community levels). The new Strategic Plan takes into consideration gaps identified during the implementation of the previous National Strategic Plan (2004-2008); however, the new Strategic Plan is also under revision to update some of the strategic interventions. There was a gross underestimation of total needs in malaria commodities including LLINs, ACTs and IRS, due to poor information on the malaria situation in Liberia immediately following the conflict, resulting in under-costing of key malaria control activities. The previous Strategic Plan targeted only children under-five and pregnant women for free LLINs distribution and yet aimed for a national household coverage of 80%. Since the targeted population constitutes only 20% of the total population, achieving a 100% coverage in that population does not necessarily translate into 80% national household coverage.

To strengthen partnerships and coordination at the country level, a Malaria Steering Committee (MSC) was formed. The MSC is made up of the NMCP, all implementing partners, relevant government ministries and agencies, international and national NGOs, and funding agencies. It meets on a monthly basis. The Committee advises and guides

the NMCP and other participating partners on the content and organization of their malaria work plan and projects.

The role of private health facilities in Liberia is not yet well-defined, and they are not regulated or monitored, even though the NMCP has a Memorandum of Understanding with them regarding supply of ACTs for use by patients, at no cost. Facilities run by faith-based organizations (FBOs) are an exception. Most FBOs cooperate in national programs and are closely linked to the MOHSW. On the other hand, informal health providers abound, including drug vendors operating without regulation or oversight, who usually sell unregulated products. Chloroquine, for example, is still widely available in shops and stalls in market places. The National Malaria Control Program plans to eliminate chloroquine and improve access to ACTs through: 1) strengthening and expanding the trainings of health care workers both at public and private health facilities (clinics, pharmacies, and drug vendors) on the malaria treatment guidelines; 2) expanding and maintaining the availability of ACTs in private and public health facilities; 3) making ACTs more available for free through community health workers; 4) increasing the awareness of the end-users through year round communication; and 5) reinforcing the rules and regulations on how to use ACTs as the first line of treatment for uncomplicated malaria.

The NMCP acknowledges the private sector and the potentially important role they can play, including private locally-owned facilities and shops, and some health clinics and NGOs offering care outside of the National Plan and MOHSW cooperation. There is a strongly felt need to bring these groups under a single coordinating authority, in order to promote improved care and provision of quality drugs. This MOP has partially met this need through provision of training sessions and supervisory visits to private locally-owned facilities. With only 45% of the population having access to the BPHS mandated by the National Health Plan, community-based health services and private health service providers could play a major role in extending access to malaria prevention and treatment to the more remote and isolated regions of the country.

CURRENT STATUS OF MALARIA INDICATORS

The most up-to-date information on the status of malaria prevention and control interventions in Liberia comes from the 2009 Malaria Indicator Survey (MIS), which was conducted by the Liberia Institute of Statistics and Geo-Information Services in collaboration with the NMCP and with technical assistance from MACRO, Inc. The survey was funded by PMI since the 2007 DHS did not include a malaria module. The MIS showed weak case management practices for malaria in children under-five.

Only 37% of children with a fever in the last two weeks were seen within 24 hours of the onset of their fever. Of those treated, only 17% received an ACT, which was the national first-line treatment at the time, while 17% received chloroquine. This finding suggests the importance of care seeking in the private sector, which routinely offers chloroquine. Other antimalarial drugs used included SP (< 1%) and quinine (5%).

Prevention is also inadequate, although there has been some recent progress in coverage and use of ITNs. The 2007 DHS showed that 30% of all households owned at least one bed net. Whereas, the 2009 MIS reported household ownership of *any* net in Liberia to be 49%; 47% of these nets were ITNs. Only 27% of children under-five had slept under an ITN the previous night. The most common reason people gave for not owning a net was that they were not available (60%) and too expensive (24%)., This increase is undoubtedly due to Global Fund and PMI-supported free distribution of LLINs in several counties.

According to the 2009 MIS, 46% of pregnant women had taken two or more doses of IPTp as recommended during ANC visits, and 33% had slept under an ITN the previous night. Of the 66% of women who took any drug to prevent malaria in the survey, 46% took SP. The 2007 DHS showed that only12% of pregnant women took SP, although not always the two recommended treatments.

Malaria Indicators (2009 Liberia MIS)

Indicator	Estimate
Proportion of children with fever in the last 2 weeks receiving an ACT within 24 hours of onset of illness	17%
Proportion of households with at least one ITN	47%
Proportion of children under-five who slept under an ITN the preceding night	27%
Proportion of pregnant women who slept under an ITN the preceding night	33%
Proportion of women who received two or more doses of IPTp during their last pregnancy in the last two years	46%
Proportion of targeted houses adequately sprayed with a residual insecticide in the last 12 months	NA*

*At the time of the 2009 MIS, IRS was only being carried out in IDP camps

GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

The goal of PMI is to reduce malaria-associated mortality by 50% compared to pre-Initiative levels in PMI countries. By the end of 2010, PMI will assist Liberia to achieve the following targets in populations at risk for malaria:

- More than 85% of households with a pregnant woman and/or children under-five will own at least one ITN;
- 85% of children under-five will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses 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 6 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 have ACTs available for treatment of uncomplicated malaria; and
- 85% of children under-five with suspected malaria will have received treatment with an ACT within 24 hours of onset of their symptoms.

EXPECTED RESULTS – YEAR THREE

Prevention:

- Procure and distribute 350,000 free LLINs to vulnerable groups through door-to-door campaigns, and health facilities approaches to help reach approximately 65% household ownership of one or more ITNs; and
- Support IRS of 80,000 households to protect 400,000 residents.

Case Management:

- Procure and assist with the distribution of 2.3 million artesunate-amodiaquine (AS-AQ) treatments. This, together with training and IEC/BCC efforts related to case management supported by PMI and other partners is expected to increase the proportion of children under-five with suspected malaria who receive an ACT within 24 hours of the onset of symptoms to 45%;
- Procure approximately 150,000 treatments to supply almost all nationwide needs for drugs and supplies for management of severe malaria;
- Enhance laboratory capacity for microscopic and rapid diagnostic test (RDT) diagnosis of malaria through provision of training, equipment, and laboratory supplies;
- Procure approximately 1.75 million RDTs and provide training and ongoing supervision in their use.

INTERVENTIONS: PREVENTION

Insecticide-Treated Nets

Background

The NMCP National Strategic Plan for 2008-2013 aims at universal coverage with LLINs and to increase use of a net to 65% by 2009, to 80% by 2010 and 85% by 2013. Universal coverage is defined as one LLIN per sleeping space with three sleeping spaces per household. Based upon the 2008 census there are just over 697,000 households in

Liberia, which means that the total need for universal coverage is just under 2.1 million LLINs.

Distribution outlets for ITNs are not widespread, with access limited to the few health facilities that have them in stock, private sector establishments that sell ITNs at a price too high for most residents, and integrated disease campaigns. The NMCP supports strategies to promote demand creation to ensure development of a sustainable market.

Progress to Date

Prior to the recent conflict, there was little history of ITN use in Liberia. At the time the National Malaria Strategic Plan was written in 2004, ITN ownership and use in country was low. Since then, the MOHSW, along with NGOs and FBOs, have been providing the highest risk groups, including children under-five and pregnant women, with free ITNs, funded by the Global Fund, PMI, UNICEF, the German government, and other NGOs. Round 3 of the Global Fund provided 493,000 ITNs to Liberia: 300,000 LLINs were a part of the integrated campaign led by the Canadian Red Cross in January 2007 with door-to-door LLIN distribution occurring in seven counties; 193,000 LLIN were distributed through various ANCs and through mass campaigns in coastal counties. In 2008, PMI purchased 197,000 LLINs as part of a jump start activity with distribution in Bomi and Cape Mount counties and an additional 430,000 LLINs were procured, arrived in country were distributed door-to-door in Lofa, Nimba and Grand Bassa counties in June of 2009. Since 2005, over 2.3 million ITNs have been delivered and distributed free-of-charge through door-to-door and other types of campaigns, as well as through ANCs.

Table 1: ITN Gap Analysis for 2008 - 2010 for Universal Coverage

Description	Jan-Dec 2008	Jan-Dec 2009	Jan-Dec 2010
Total Need	2,010,885	1,244,133	822,411
PMI Contribution	197,000	430,000	480,000**
Other Contribution	830,747*	262,470	389,380
GAP	983,138	551,663	46,969***

Includes the ITNs/LLINs from 2006 and 2007 distribution (448,947) and within the life- span
** From MOP-09 that will be distributed in early 2010
***Surplus by 46,969

Preliminary data from the 2009 MIS indicated that net ownership has increased over the last few years, with 49% of households reporting ownership of at least one ITN (versus 30% ownership in the 2007 DHS) and 19% with more than one net. However in households with a net usage remains low, with only 51% of children under-five, 60% of women, and 63% of pregnant women sleeping under them the night before the survey. The primary reasons for not having a net were: "lack of availability" (60%), followed by "too expensive" (24%) and "don't like to use" (11%). PMI will continue working with NGOs to support community-based IEC/BCC campaigns to increase demand for and correct usage of nets.

With FY2010 funding, PMI activities will include procurement of 350,000 LLINs for distribution through facilities and community-based programs. PMI will also continue to provide assistance for distribution of LLINs purchased by other donors and strengthening the management of the national net program, to include improved logistics, forecasting, storage, distribution, training, and associated IEC/BCC.

The NMCP has an IEC component related to ITNs in its strategy document, however, it is uncertain how completely the ITN/IEC strategy has been implemented or how effective it has been. Billboards promoting ITN importance and usage have been set up and posters promoting similar messages distributed in health clinics. The health facility staff interviewed stated that they always slept under and ITN and encouraged pregnant women and mothers of children under-five to acquire ITNs, but they did not have LLINs for distribution and did not know where to obtain them. A small survey carried out in 2009 by PMI staff, whereby teachers in a few, selected schools, in zones where PMI nets had been distributed, asked children in their classes to encourage ITN usage at home while community volunteers would follow-up to determine if distributed nets were being used, indicated that school students and community volunteers could be mobilized to increase ITN usage.

The cost per ITN for distribution door to door in Liberia is $1.98. This cost was computed as indicated below from the experiences of donors and implementing partners in Liberia and from the context of the geographical inaccessibility of Liberia.

Port Clearance and Warehouse	0.22
Transport/Logistics to Counties	0.32
Transport/Logistics to Communities	0.34
IEC/BCC, TA, M&E	1.10
Total	**1.98**

Proposed FY2010 USG Activities: ($2,766,900)

1. Procure approximately 350,000 LLINs for distribution, hang-up and keep-up through health facilities and community-based systems in selected counties ($2,100,000);

2. Distribution, training of supervisors for campaigns, and IEC/BCC pre-distribution and during campaigns to promote uptake and usage of nets ($666,900); and

3. Integrated IEC/BCC for malaria case management, ITNs, malaria in pregnancy and IRS (See IEC/BCC Section of Table 2 for cost).

Indoor Residual Spraying and other Vector Control Measures

Background

From 1958-61, UNICEF and WHO sponsored a malaria eradication project in Liberia to ascertain whether transmission could be interrupted with IRS. The project covered the central province of the country, an area of ~14,000 km^2, using DDT at 2 gm/m^2 with one application per year. Entomological investigations showed an apparent disappearance of vectors immediately after spraying which persisted for up to 2 years. Bio-assays on walls demonstrated activity 12 months after spraying. Conclusions drawn from this study were that anopheline vectors in the area were highly susceptible to single annual application of DDT and that interruption of transmission was technically feasible in the forest areas of Liberia. Population movement and the lack of trained spray personnel, equipment and facilities to support the program were identified as major limiting factors for IRS-based vector control at that time.

More recently, the NMCP has used IRS primarily as an emergency response in Internally Displaced Persons (IDP) camps during and after the conflict. The 2004-2008 National Policy for Malaria Control and Prevention targeted 100% of all IDP and refugee camps for IRS by 2008. Along with the NMCP, two NGOs, MENTOR and CONCERN, have implemented IRS in several counties. A small cadre of trained workers now exists in country.

The NMCP has limited malaria vector surveillance or control capacity. Only two individuals on the NMCP staff have IRS experience, however, a new IRS manager has been appointed. The head of entomology at the NMCP just graduated from pharmacy school, and has no experience or training in vector control or entomology.

Progress to Date

The NMCP has stated their desire to develop a strong IRS program using DDT, but it was not included in either the current 2008-2013 National Malaria Control Strategy or the Global Fund Round 7 proposal. Recently a consultancy visit from a Global Fund malaria expert organized by the Rebuilding Basic Health Services (RBHS) USAID bilateral integrated health program led the MOHSW leadership to call for a revision in the strategy. At the present time, the NMCP is grappling with how to include IRS in the revised strategy and any new Global Fund proposal. Also, the NMCP requested PMI support to establish a malaria vector surveillance capacity and assistance in

conducting a baseline assessment to determine efficacy and cost, and identify the optimum parameters to include insecticide efficacy for a country wide IRS program.

The MOHSW leadership endorsed the NMCP plan to initiate IRS using a pyrethroid insecticide. With PMI funding, an environmental assessment was completed and purchased pyrethroid insecticide ICON® and personal protective equipment. Spraying began in Marshall Town, located one hour from Monrovia in Margibi County. Approximately 25,000 houses (protecting ~125,000 people) will be sprayed by September 2009. This is a significant first step towards building capacity for IRS in Liberia. At the request of the NMCP, an environmental assessment for the use of DDT for IRS has been initiated by RTI,

Proposed FY2010 USG Activities: ($4,214,200)

1. Support spraying of approximately 80,000 houses (protecting 400,000 people) with an insecticide to be selected by the NMCP ($4,000,000);

2. Training, equipment, supplies, and mentoring for NMCP entomology technicians ($140,000);

3. Technical assistance on vector control activities: CDC staff will conduct two TA visits to assist with training and to monitor planning and implementation of vector control activities ($24,200);

4. Assist NMCP with insecticide resistance monitoring at two sites ($50,000); and

5. Integrated IEC/BCC for malaria case management, ITNs, malaria in pregnancy and IRS (See IEC/BCC Section of Table 2 for cost).

Intermittent preventive treatment in pregnant women (IPTp)

Background

In 2005, the NMCP, with technical assistance from WHO, conducted a RBM survey, which showed 31% of pregnant women seen at the outpatient department had malaria parasite. The quality of the RBM survey has been called into question and most likely the true rate is below the number stated. Nonetheless in high malaria endemic areas, malaria is known to significantly contribute to maternal anemia and low birth weight, which is closely related to neonatal mortality. According to the 2009 MIS approximately 95% of women ages 15 – 49 years of age made at least one ANC visit during their last pregnancy.

In the 2009 MIS 33% of pregnant women slept under an ITN the previous night before the survey while 63% living in a household with an ITN slept under the net the previous night.

Free IPTp with SP is part of the national policy of Liberia to control malaria in pregnancy. Implementation of IPTp was initiated by NGOs at their clinics and later the MENTOR Initiative helped the NMCP to conduct training of health personnel. With political stability and economic progress following the war, an increasing number of health facilities are functioning and accessibility to health facilities has increased to 45% (personal communication with NMCP staff). According to the Division of Family Health of the MOHSW, the usage of antenatal services among pregnant women is about 60%, although the 2007 DHS indicated that 79% of women made at least one visit to an ANC during their last pregnancy. The 2009 MIS shows that IPTp1 coverage is 55% and IPTp2 coverage is 45%.

The NMCP strategy for control of malaria in pregnancy includes the distribution of LLINs to pregnant women during their first antenatal visit with education on malaria prevention and proper and continuous use of the nets. The NMCP has regular LLIN distribution to pregnant women through antenatal clinics in six counties with LLINs provided by PMI, Global Fund, Mentor Initiative and the German government, but this is not sufficient to meet all needs.

According to the NMCP Strategic Plan (2008-2012):

- Pregnant women should receive at least two doses of SP after the 1st trimester of pregnancy, at an interval of not less than one month apart;
- The SP dose should be administered under direct health worker observation;
- Clear instruction on the next appointment date after the 1st dose should be given to the pregnant woman;

Pregnant women should also be advised that they may still acquire malaria and should therefore seek immediate medical attention whenever they develop a fever.

Progress to Date

Training manuals for in-service training of health workers by the NMCP and some NGOs in the health facilities were updated and presented last year. During the past year, 60 senior maternal and child health supervisors and clinical supervisors were trained in the prevention and treatment of malaria in pregnancy, while 748 health care providers were trained in malaria case management and malaria in pregnancy.

Since the NMCP is purchasing sufficient SP from its Global Fund Round 7 grant to meet all requirements, PMI will not procure SP.

Proposed FY2010 USG Activities: ($400,000)

1. Refresher training in prevention and treatment of malaria in pregnancy will be conducted for the tutors of pre-service institutions like nursing, midwifery, medical schools ($100,000);

2. PMI will support the distribution of prophylaxis for malaria in pregnancy through ANC visits in the seven focused counties of USAID ($100,000);

3. Continue the support for in-service training of health workers in prevention and treatment of malaria in pregnancy. Educational materials will be printed for health workers and the public and water-cups will be provided to health facilities to ensure directly observed IPTp. This activity will be conducted in collaboration with the Division of Family Health ($200,000); and

4. Integrated IEC/BCC for malaria case management, ITNs, malaria in pregnancy and IRS (See IEC/BCC Section of Table 2 for cost).

INTERVENTIONS: CASE MANAGEMENT

Malaria diagnosis

Background

The laboratory diagnostic capacity in Liberia is very limited. The National Health Facility Accreditation Report (MOHSW, March, 2009) showed that of the nine areas measured, laboratory/diagnostics was the weakest. In fact, of the 477 (349 public and 88 private) health facilities visited, only 17% had laboratory capacity (84% of hospitals and 13% of health centers). Many health facilities do not have a laboratory or do not have the necessary equipment to perform microscopy. Additionally, there are only 78 licensed laboratory technicians in the country including two technologists and about 300 laboratory assistants, and many of them are working in the private sector.

Due to the limited resources for microscopic diagnosis, most health facilities use RDTs. The new NMCP strategic plan encourages the use of laboratory test to diagnose malaria except in children less than five years old where the Integrated Management of Childhood Illnesses (IMCI) algorithm is applied and therefore clinical diagnosis is permitted. Malaria diagnostic testing in MOHSW facilities is free of charge while faith-based and private organizations generally charge for this service. Due to distance and the difficulty in travel, many patients with fever or other illnesses consult with a neighbor, traditional healer, or private pharmacy.

Hospitals and health facilities with a laboratory are expected to have at least one laboratory technician, although this is not the case in all such facilities. With the increasing number of functioning public health facilities, the MOHSW has estimated that they need an additional 300 laboratory technicians. Most county and district hospitals have at least one technician but a greater proportion of health facilities without in-patient capacity do not have a laboratory aide.

There are two functioning laboratory technician training schools in Liberia, the Mother Patern College of Health Science in Monrovia and Phebe Hospital in Bong County. These schools have a shortage of teaching staff and limited infrastructure. The present

annual intake of students into these institutions is limited, resulting in few graduates each year. With this low output it will be difficult to meet the national need for laboratory technicians.

With Global Fund Round 3 funding, about 50 microscopes were procured and distributed to public health facilities.

According to the NMCP, there is a high need of RDTs due to the following reasons: (1) WHO and National policy is set to change soon emphasizing RDT use; (2) Observations from two clinic site visits that health workers use RDTs over microscopy as patient load increases; (3) Demand for RDTs in clinic is increasing and is expected to be even higher by the time 2010 MOP funds available; and (4) The numbers of health facilities are set to increase, which will also drive up use of RDTs. This level of spending requires careful monitoring of RDT use. PMI will recommend an assessment of RDT use, including stock control, supervision, scale-up plan and end-use verification.

Progress to Date

In March 2008, the Improved Malaria Diagnostics (IMaD) project carried out assessment of laboratory capacity in collaboration with the NMCP. The findings from this assessment confirmed that only a few health facilities other than major hospitals in Monrovia and Phebe are able to perform adequate microscopic diagnosis of malaria and that the rest of health facilities are using only RDTs. Frequent shortages of reagents were identified as a major problem.

The IMaD project made a second visit to Liberia last year but has yet to conclude arrangements with the NMCP to hire a staff person in country to help coordinate its activities. IMaD is helping the NMCP to develop laboratory training materials which will be used in the subsequent trainings. During the period of the Global Fund Round 3, the NMCP laboratory technologist was able to carry out limited supervision of some health facilities, but since mid-2007 no such supervisory visits have been conducted.

The PMI procured 850,000 RDTs and has taken delivery of 425,000 tests, which have been distributed to health facilities. The remaining RDTs will be ordered at the appropriate time to avoid overburdening the storage capacity of the National Drugs Supply (NDS).

Proposed USG activities: ($1,912,500)

1. Continue to support the National Reference Laboratory with reagents and training ($100,000);

2. Technical assistance visit from CDC diagnostics specialist to strengthen national capacity in microscopy and RDT diagnosis. The visit will be carried out in collaboration with IMaD and the NMCP ($12,100);

3. Continue to support in-service training of laboratory technicians in health facilities in the use of RDTs through IMaD ($200,000);

4. Procure 1.75 million RDTs ($1,300,100);

5. Procure laboratory supplies such as reagents and slides for existing health facilities ($150,000);

6. Improve the quality of diagnostic services in the seven USAID focus counties ($100,000); and

7. Support private health facility and pharmacy providers in diagnostics ($50,000).

Pharmaceutical Management and Treatment

Background

In 2003, the NMCP adopted artesunate-amodiaquine (AS-AQ) as the first-line treatment for uncomplicated malaria. Second-line treatment is with oral quinine, and intramuscular artemether is the pre-referral treatment for severe malaria. Although there are no plans to change treatment policy, the recent development of a co-formulated AS+AQ has caused NMCP to consider if it would be more appropriate to procure this formulation instead of the current co-blistered one. According to NMCP, there is substantial anecdotal evidence that patients discard the amodiaquine tablet because of its bitter taste and frequent side effects, and only take the artesunate.

During 2008, significant quantities of malaria commodities for malaria case management were procured and distributed in the country. Figure 1 show the quantities purchased with Global Fund and PMI resources. Additionally, smaller quantities of some malaria commodities were also imported by other partners; however, those quantities are not specifically tracked by current systems.

Figure 1: Total commodities purchased and distributed in Liberia during 2008 by partner

Commodity	Global Fund	PMI	TOTAL
AS+AQ (3+3)	120,610	416,025	536,685
AS+AQ (6+6)	66,580	439,625	506,205
AS+AQ (12x12)	289,710	474,475	767,185
Quinine tablets	856,800	816,000	1,672,800
Fansidar	108,000	236,000	344,000
RDTs	468,800	425,000	893,800
ITNs	194,000	170,440	364,440

Progress to Date

During 2008, PMI purchased and brought into the country 255,000 doses of AS+AQ for children under <5 years; 138,000 doses for ages 5-14, and; 550,000 doses for >14 years. Most drugs have been distributed to health facilities and according to a Global Fund-supported assessment of 342 (out of 374) health facilities in 2008, approximately 75% of health facilities had a regular supply of ACTs. Still, anecdotal evidence of stock outs in several parts of the country is reported. During the MOP visit, the team heard from professionals from different international agencies and local organizations that supply chain management is one of the most important problems facing case management of malaria. To date, PMI has supported the strengthening of the drug supply system and has helped trained 89 pharmacists and other health professionals in drug financing, registration, logistic/information system, supervision, forecasting and warehousing plans at all levels.

PMI has also procured drugs for severe malaria. A total 32,500 of intravenous quinine (kits) have been procured and have arrived in country. An additional 67,500 doses of intramuscular artemether (125,000 ampoules) will soon be procured.

According to a recent (July 2009) quantification and forecasting by the USAID | Deliver Project and the NMCP approximately 3.3 million ACTs doses will be required for the 18-month period starting January 2010 and ending June 2011. Approximately 1.2 million doses will be provided by the Global Fund, leaving a gap of 2 million doses. PMI will fill this gap and provide a small surplus with FY 2010 funds.
All drugs procured by PMI are lot quality tested and are shipped to country only after they have passed rigorous testing. The MOHSW considers this a stop-gap measure and is interested in building its own capacity for conducting drug quality monitoring and has requested PMI and others for technical and equipment support. The PMI has supported, through United States Pharmacopeia-Drug Quality and Information Program (USP-DQI), the development of a drug policy and has trained two personnel in “mini-lab” for quality testing. The MoHSW is vocal in seeking better quality testing capacity.

The PMI is supporting “in vivo” testing of ACTs in two (out of five) sentinel sites. Sites have been identified and a protocol is being completed.

One of Liberia’s most important constraints is the availability of trained personnel. Nowhere is this most critical as in the management of malaria in health facilities. PMI supports pre-service and in-service training of malaria case management. Materials for pre-service training have been developed and training of personnel has started. Approximately 280 of in-service personnel have been trained in case management. These activities complement Global Fund supported training activities that saw 748 personnel trained in malaria case management and malaria in pregnancy during 2008. The RBHS bilateral is revising curricula for the MOHSW – including malaria diagnosis and treatment.

To further extend the reach of malaria case management, the NMCP, as part of a larger MOHSW integrated community health strategy, has decided to deploy a community-based treatment (CBT) for early diagnosis, prompt treatment and rapid referral at

community level. The PMI, through the BASICS project and RBHS bilateral, supported the development of the policy and training materials and both are now in place and under final review. This activity forms part of a larger community-based strategy within the MOHSW that seeks aggressive participation from the community in public health. The community program of the MOHSW is also developing a manual for this comprehensive approach.

Proposed FY2010 USG activities: ($4,673,600)

1. Procurement of ACTs. By far the most important activity under case management is ensuring that sufficient ACTs are available in health facilities for the treatment of uncomplicated malaria. The PMI will purchase 2.35 million doses of ACTs to help fill 65% of Liberia's ACT needs ($2,823,600);

2. Procurement of drugs for severe malaria; PMI will procure 150,000 treatments for severe malaria ($200,000);

3. Pre-service and in-service training for case management; PMI will provide resources to train health workers both in-service and pre-service as well as follow up with supportive supervision. PMI will also support the finalization of a national training plan. Facility-based health worker training and community health volunteer training will be carefully coordinated ($150,000);

4. Support community-based treatment including the training and deployment of community health volunteers to extend the reach of current health services to difficult to reach areas. CHVs will initially do passive case detection, treatment of uncomplicated malaria and referral of severe cases. Initial deployment will be in two or more counties and if evaluations determine the approach to be justified it will be scaled up with the collaboration of several partners (e.g. RBHS, UNICEF, MERLIN, MENTOR) ($300,000);

5. Strengthening of the drug management system. Coupled with the procurement of drugs is the need to support and strengthen the drug management system in the country. This activity is seen as a key priority by the NMCP and the public health community, and will be a continuation of efforts started under previous MOPs ($750,000);

6. Increasing demand for and improving quality of services for malaria in the seven USAID focus counties ($300,000);

7. Strengthening drug quality monitoring capacity. In response to MOHSW felt need to improve its capacity to monitor the quality of ($100,000);

8. Supporting in vivo clinical efficacy monitoring. NMCP will continue and PMI will support continuing sentinel surveillance of in vivo clinical efficacy of ACTs ($50,000);

9. End Use Tool implementation. PMI will support the deployment of the End Use Tool developed by PMI to assess the availability of malaria commodities, specifically antimalarials, in a sampling of health facilities each quarter. This information will help planners better prepare quantification, distribution and prevent stock outs. The End Use Tool will also provide information on case management and use of RDTs in facilities ($80,000); and

10. Integrated IEC/BCC for malaria case management, ITNs, malaria in pregnancy and IRS (See IEC/BCC Section of Table 2 for cost).

HIV/AIDS and MALARIA

The 2007 DHS indicated that HIV prevalence in Liberia is 1.5% in the general population but the rate is higher among women than men and also among urban populations than rural. Data from 2007 sentinel sites survey among pregnant women attending antenatal clinics indicate that HIV seroprevalence is 5.4% (ranging 2.6% to 10.4%). Higher prevalence is found in Monrovia and the eastern region of the country, particularly in counties along international borders with commercial, mining and cross-border trading activities. The National AIDS Control Program is establishing sites for HIV voluntary counseling and testing. These testing sites increased from 42 in 2007 to 89 in December 2008. The Global Fund Round 6 HIV/AIDS grant is being used to support the training of staff and supervisors for the functioning of these sites. Few health centers are serving as antiretroviral (ARV) centers and treatment is giving for opportunistic infections. However, there is no specific policy by the NMCP to address HIV/AIDS and malaria or people living with HIV/AIDS (PLWHA) including pregnant women. In 2008, the NMCP distributed a total of 8,000 LLINs to PLWHA through local NGOs.

Proposed FY2010 USG activities: (costs covered under other sections)

1. PMI will work through its implementing partners to link with organized groups and NGOs to reach PLWHA with LLINs, IEC/BCC and ensure that pregnant women receive ARV or daily cotrimoxizole through the health facilities or SP for IPTp, if that is the only available option.

CAPACITY BUILDING WITHIN NATIONAL MALARIA CONTROL PROGRAM

Background

In post-conflict Liberia capacity strengthening will be needed in virtually every aspect of the malaria program. The scale up of malaria activities in Liberia will depend on a well-trained and active malaria staff at the national and county levels. The PMI sponsored thirteen NMCP and county staff to attend a three-week monitoring and evaluation course in Nairobi at African Medical and Research Foundation (AMREF). The PMI will

continue working to improve the human resource capacity of the MOHSW and its key partners, improving quality of care and support and management systems. These PMI interventions will complement other health activities (funded by USAID and other donors) to improve financial and program management, procurement of malaria drugs, LLINs and diagnostics, and the IEC/BCC and monitoring and evaluation capabilities of the MOHSW and the NMCP.

The national logistics system and the supply chain management of health products including malaria products in Liberia are not effective and efficient, since there is no system such as the Integrated Standard Operating Procedures. There is a compelling need to build capacity and to put in place an Integrated Standard Operating Procedures for Procurement and Supply Chain Management. The Supply Chain Management Working Group that includes representatives from all the five health programs of the Ministry of Health and Social Welfare, the NDS, Clinton Foundation, and USAID, with GF-UNDP as the lead organization, is working on training of trainers at the national level and the roll out of cascade trainings to counties for the implementation of Standard Operating Procedures. This is a high priority to the NMCP/ MOHSW and all donors who procure health products. Other donors (UNDP/GF, UNCEF) have allocated some funds to roll out the Standard Operating Procedures to health facilities

The Standard Operating Procedures manual is developed and serves as a reference for health facility and county personnel by outlining all the activities required to maintain adequate supplies, record and report on consumption of health products and order, issue, receive and store health products. It includes job aids for counties and facilities on how to complete the forms step-by-step, who approves the forms, when and where to submit the forms.

This process will maintain a strong logistics system and supply chain management of health products including malaria commodities in Liberia.

Progress to Date

Due to the post-conflict situation in Liberia and the lack of satisfactory offices for the NMCP, it was agreed with PMI Year 1 funds to support the rehabilitation of the NMCP offices. The NMCP has identified a building to be renovated and the renovation work is under progress through the bilateral mechanism. In addition three vehicles have been purchased; one for the county and two for malaria activities at the central level. A training of trainers' workshop has been completed where 30 participants trained to train in their respective counties.

Proposed USG Activities: ($1,050,000)

1. Short term trainings for 25 trainers from NMCP (5), Counties (20) on different compelling training needs (designing community based IEC/BCC strategies: techniques of IEC messages sequencing; malaria related data collections, organizing, analyzing and interpreting; supervisory, computer and skills, etc. (250,000);

2. Development of malaria related materials for roll out of trainings to the Counties and facilities and communities ($35,000);

3. A quarterly supportive supervisions at all levels (from central to Counties and from counties to district and health facilities and from facilities to community health services- community health volunteers ($50,000);

4. To furnish and equip with computers and accessories two offices at NMCP and eight county offices($50,000);

5. To procure entomology equipments in order to strengthen the entomological laboratory ($120,000);

6. Strengthening the supportive supervision through supporting fuel and vehicle maintenance cost ($45,000);

7. To strengthen the national logistics system and the supply chain management of Health Products including malaria commodities through rolling out to counties and districts ($500,000);

COMMUNICATION AND COORDINATION

The NMCP National Strategic Plan includes the need for a multi-sector committee for coordinating activities related to the prevention and control of malaria in Liberia. The following communication and coordination mechanisms exist in Liberia and provide minutes and reports that are made available to all who participate:

Country Coordinating Mechanism (CCM)
The CCM meets regularly with health sector stakeholders to review options and plans for submission of proposals to the Global Fund and keeps abreast of progress toward start-up of activities and grant implementation. The CCM does not however have any direct role in implementation of malaria activities, including those associated with the Global Fund grants. Liberia was successful with their Round 7 Global Fund proposal and has recently signed their grant. USAID is a voting member of the CCM.

Malaria Steering Committee (MSC)
As part of the NMCP strategic plan and in response to the current malaria situation in Liberia, a Malaria Steering Committee (MSC) was formed to strengthen partnerships and coordination. The MSC includes the NMCP as well as representatives of all implementing partners, including relevant government ministries and agencies, international and local NGOs, donor agencies, and multilateral organizations. It meets on a monthly basis. The MSC advises and guides the NMCP and other participating partners on the content and organization of their work plan and projects.

Donors' technical coordination forum
The PMI team initiated a donors' technical coordination forum where GF/UNDP, UNICEF, WHO USAID and Clinton Foundation meet monthly to exchange information on their mutual interests and activities.

Donor coordination meeting
Every month the Minister of Health and Social Welfare chairs a meeting of donors and heads of departments in the MOHSW and reviews major developments in the sector. The PMI and other USAID health programs participate.

Proposed FY2010 USG Activities: (no additional cost to PMI)

The two PMI Advisors (one representing CDC and the other USAID) will handle both technical and logistical planning for PMI activities. In collaboration with existing USAID/Liberia staff, the Advisors help coordinate PMI activities with the NMCP and other key stakeholders, and are active members of the MSC. The CDC Malaria Advisor has an office within the NMCP where he works every morning with NMCP staff. The USAID Advisor spends a significant proportion of his time at the NMCP. The USAID Health Officer works to ensure coordination of PMI partners and activities, briefs the Chief of Mission and USAID management team on progress and any arising issues, and liaises with senior government of Liberia officials on the PMI and its contribution to USAID assistance to Liberia.

PRIVATE SECTOR PARTNERSHIPS

The USAID Mission encourages partnerships in several areas, including health. USAID looks for strategic opportunities for the PMI and the NMCP to take advantage of the infrastructure and other resources the private sector partnerships offer to institutionalize IRS and sustainable ITN distribution.

Although the role of private facilities and employers is not yet well-defined in the National Malaria Strategic Plan, the need for defining the roles of private sector providers is paramount in order to make full use of these potentially powerful resources. During the preparation of the FY2010 MOP, discussions with senior MOHSW officials made it clear that the MOHSW is prepared to encourage greater collaboration with the private sector, and PMI has budgeted assistance in developing such opportunities. For instance, the MOHSW agreed that private pharmacists and health providers (who currently do not have access to recommended first-line drugs for treatment of malaria) could be more effectively engaged and involved. However, the private health facilities have a memorandum of understanding with NMCP/MOHSW where the private health facilities benefit from trainings of case management through the MENTOR initiative, receive ACTs through NDS at no cost to them on a monthly base upon request based on the estimated consultations for malaria per month. The private health facilities treat patients free of charge or at no cost to the patients using ACTs and submit a monthly malaria treatment report to the NMCP.

This is part of the plan to eliminate chloroquine in the market of Liberia through improving access to ACTs. The NMCP plans on this regard are: 1) strengthening and expanding the trainings of health care workers both at public and private health facilities (clinics, pharmacies, and drug vendors) on the malaria treatment guidelines; 2) expanding and maintaining the availability of ACTs in private and public health facilities; 3) making ACTs more available for free through community health workers; 4) increasing the awareness of the end-users through year round IEC/BCC; and 5) reinforcing the rules and regulation on how to use ACTs as the first line of treatment for uncomplicated malaria

Social marketing is another possibility that has some support within the MOHSW. While there is not yet in place a specific policy or approach to social marketing of health commodities, the MOHSW has expressed in writing and through numerous public statements that it is in favor of such an approach. The PMI advisors will facilitate and support the establishment of these kinds of partnerships and work to get the NMCP to include them in their strategic plan.

There are many advantages to developing public-private partnerships to promote health goals, such as IRS. The rubber plantations routinely spray to control vegetation; hence they have a workforce with relevant experience in planning and managing logistics and safety measures. The rigorous environmental and safety requirements of IRS would be far easier to ensure with an organized and experienced workforce.

MONITORING AND EVALUATION PLAN

Background

The existing Health Management Information System has begun to produce some facility-based data but it still far from being functional and producing data that is useful for monitoring purposes. The vertical reporting system established by the NMCP has produced some initial data but the quality, completeness and validity are still questionable. These vertical reporting forms are now being supplanted by an integrated case management reporting system. Figure 2 presents the latest data available from the 2009 MIS.

The Global Fund Monitoring and Evaluation Systems Strengthening Tool (MESST) was completed in 2008. Liberia is far from having a mature monitoring and evaluation strategy and plan—the final overall grade from the MESST is 35%, and to date no follow-up has been done by the NMCP.

Although the NMCP has an M&E plan, it is not a costed national malaria M&E plan; rather, it is focused mainly on Global Fund supported activities and monitors Global Fund-related indicators. The Global Fund has provided approximately $76,331 for monitoring and evaluation activities. Although the NMCP M&E unit has a unit head and a data manager, neither has received any formal training in M&E and the MESST's

assessment of the Management Unit indicates that it has some serious deficiencies. A tentative work plan has been developed for enhancing the Management Unit capacity; however, the work plan has not been implemented. In contrast, the MESSTs assessment of the facility-based management information system indicates significant progress.

Because management, planning and implementation of malaria activities are being decentralized to counties, the NMCP feels strongly that any M&E data should be representative at the county level. However, the costs of doing so are prohibitive for a country the size of Liberia. The PMI will continue to support activities that offer representation at the regional and national level.

Progress to Date

Given that measuring declines or increases in malaria-specific mortality is impossible using currently available tools, the M&E strategy for Liberia will focus on obtaining evidence of trends from different sources and analyzing for the plausibility that changes in all-cause mortality are due to changes in malaria-specific mortality and are related to malaria interventions. Several activities outlined in the PMI M&E strategy are already contained in Liberia's previous and current MOPs—namely, health management information system data, MIS, DHS, and other survey data, sentinel surveillance, etc. The most significant activity during this period was the 2009 MIS. Data from this will serve as baseline for many PMI indicators.

An MIS was completed in 2009 by the Liberia Institute of Statistics and Geo-Information Services, in cooperation with the NMCP and Measure – DHS. Preliminary results from the MIS were made available to the MOP team and are cited in Figure 2 below. NMCP expressed its satisfaction with the quality of the final results and the capacity-building manner in which it was conducted. The sample included 4,162 households and involved 4,397 caretakers. Blood samples for testing for anemia and parasitemia (RDT and slides for microscopy) were collected from approximately 4,020 children under-five years of age. Final costs for the MIS are estimated at $1.4 million. A second MIS was planned for 2011, however, recent changes (see below) by the NMCP will impact the viability and logic of conducting another MIS so close to the Demographic and Health Survey (DHS) which is now planned for 2010.

Figure 2
Preliminary results from MIS

Indicator	Value (%)
Proportion of children under-five years old who slept under an ITN the previous night or in a house sprayed with IRS in the last 6 months	27%*
Proportion of pregnant women who slept under an ITN the previous night	33%**
Proportion of pregnant women who slept under an ITN the previous night or in a house sprayed with IRS in the last 6 months	29%***

Proportion of women who have received two or more doses of IPTp during their last pregnancy in the last two years AND who received an antimalarial as part of an ANC visit*	45%
Proportion of children under-five years old with fever in the last two weeks who received treatment within 24 hours of onset of fever	37%
Proportion of children under 6 – 59 months with severe anemia (below 8.0g/dl)	5%
Proportion of children under-five with parasitemia	37%****

Source: MIS 2002009. Measure, National Malaria Control Program.
*In households that owned an ITN, 51% of children under-five slept under an ITN the previous night. No IRS has been conducted in Liberia so this indicator represents protection with an ITN.
**In households that owned an ITN, 63% of pregnant women slept under an ITN the previous night.
***In households that owned an ITN, 61% of women 15-49 years of age slept under an ITN the previous night.
****As measured with an RDT. Slide results were not available at the time of writing.

Discussions with the Government of Liberia and USAID have lead to a plan to carry out a DHS in 2012 to make certain that all data needs are in line.

The FY2008 MOP contains resources for establishing three sentinel surveillance sites to assist NMCP to collect malaria morbidity and mortality data disaggregated by age group and pregnancy status. MENTOR was selected to implement this activity. Sites have been selected and at least one site is now operational. First report from the initial sentinel site is expected in September 2009.

Proposed USG Activities: ($404,200)

1. Support 2012 DHS. This survey will provide updated malaria indicators and estimates of all-cause infant and under-five mortality. Depending on the proximity of this survey to other surveys being planned, the DHS may include a parasitemia component ($100,000);

2. Support to sentinel sites. Now that data collection systems have been developed, staff have been trained and the first site is operational, the implementation of sentinel sites will be accelerated. NMCP and PMI consider this data source key given that there is a dearth of other data sources in the country outside of surveys($200,000);

3. Support for the use of the End-use Verification Tool ($80,000);

4. Support to M&E activities. The CDC will conduct two visits to provide technical assistance to M&E activities. ($24,200); and

5. An additional activity, not budgeted in Table 2, is technical support to NMCP for the completion of a costed M&E plan. Based on the MESST findings, partner's needs and NMCP's ultimate goals and objectives a monitoring and evaluation plan will be developed. Technical assistance will be provided by Measure – DHS and paid from PMI core funds.

STAFFING AND ADMINISTRATION

Two health professionals have been hired as Resident Advisors to oversee the PMI in Liberia, one representing CDC and one representing USAID. In addition, one Foreign Service National (FSN) has been hired to support the PMI team. All PMI staff members are part of a single inter-agency team led by the USAID Mission Health Team Leader. 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.

These two 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, and reporting of results. Both staff members report to the USAID Mission Director or his/her designee. The CDC staff person is supervised by CDC both technically and administratively. All technical activities are undertaken in close coordination with the MOHSW/NMCP and other national and international partners, including the WHO, UNICEF, the Global Fund, World Bank, and the private sector.

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.

ANNEX 1

Table 1

President's Malaria Initiative – *Liberia*
Year 3 (FY10) Timeline of Activities

ACTIVITY	2009	2010											
	OCT-DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Procure commodities (ACTs, severe malaria drugs/kits, LLINs, RDTs, lab supplies)													
Develop logistic and managerial support to distribute LLIN door to door													
Assess and complete improvements to storage capacity for commodities													
Develop operational plan and materials needed to implement the NMCP's IEC/BCC strategy re: LLINs, case management, IPTp.													
Implement IEC/BCC strategies													
Train CHWs, Midwives and HCWs in MIP and ANC referral													
Pre-service training for HCWs in MIP and case management and in-service training for HCWs and drug sellers in case management													
Distribution of LLINs													
Distribution of ACTs, sever malaria drugs and RDTs													
Strengthen drug management system													
Strengthen drug quality monitoring system													
Conduct IRS													
Strengthen insecticide resistance													

monitoring system													
Train senior entomologist and entomology technicians													
Provide TA to assist with development of National Reference Laboratory													
Train laboratory technicians													
Provide TA to NMCP to improve laboratory quality control													
Train HCW in data collection and management													
Finalize MIS document													
Establish malaria sentinel sites													
Support private providers in diagnostics													
Support community based treatment													
Improve capacity for program management and supervision													

Table 2 President's Malaria Initiative – Liberia Planned Obligations for FY 2010 (18,000,000)				
Proposed Activity	**Mechanism**	**Budget 2010**	**Geographic Area**	**Description of Activity**
PREVENTIVE ACTIVITIES				
Insecticide Treated Nets				
Procure LLIN	Deliver TO III	2,100,000 (3,000,000)	Nationwide	Procure 350,000 LLINs for distribution, hang up and keep up through facilities and community-based systems
LLIN Distribution	UNICEF	666,900	Nationwide	Distribution, training or supervisors, IEC/BCC pre-distribution and during campaign.
Sub-Total Insecticide Treated Nets		2,766,900 (2,100,000)		
Indoor Residual Spraying				
IRS sites selected on need, projected effectiveness and insecticide resistance levels	IRS-IQC	4,000,000 (1,600,000)	Selected areas based on need, projected effectiveness and insecticide resistance levels	Approximately 80,000 houses well be sprayed using an insecticide selected on projected effectiveness and insecticide resistance levels
Capacity strengthening in entomology	IVM	140,000	NMCP	Training and mentoring for entomology technicians
Technical assistance on vector control activities	CDC	24,200	NMCP	CDC will conduct two visits to monitor planning and implementation of vector control activities.
Insecticide Resistance Monitoring	IRS-IQC	50,000	2 Sentinel Sites	Assist NMCP to conduct insecticide resistance monitoring system.
Sub-Total Indoor Residual Spraying		4,214,200 (1,600,000)		
Malaria in Pregnancy				
Pre-service training for MIP	RBHS	100,000	Nationwide	Continue support and promote training for MIP at medical and nursing schools, including development and

				production of learning materials.
Training of CHW, HCW and Midwives	MENTOR	200,000	Nationwide	Continue support and promote training of facility-based, as well as community-level, personnel and volunteers in MIP and ANC referral, including development and production of learning materials.
Support MIP/IPTp	RBHS	100,000	USAID focus counties	Support IPTp through active tracking of pregnant women through Community Health Volunteers
Sub-Total Malaria in Pregnancy		400,000		
TOTAL PREVENTIVE		**7,381,100 (3,700,000)**		
CASE MANAGEMENT ACTIVITIES				
Diagnosis				
Assist with development/strengthening of national reference laboratory	IMaD	100,000	Monrovia	Support NMCP/MOHSW to strengthen the national reference laboratory, in collaboration with other donors.
TA Visit	CDC	12,100	MOHSW, NMCP and health facilities	TA visit to oversee progress on diagnostic capacity enhancement.
Train laboratory technicians	IMaD	200,000	Nationwide	Train laboratory technicians in malaria diagnostics
Procurement of RDTs	Deliver TO III	1,300,100 (1,300,100)	Nationwide	Procure 1.75 million RDTs
Procurement of laboratory supplies	Deliver TO III	150,000	Nationwide	Procure laboratory supplies, including reagents and others.
Support private providers in diagnostics	IMaD	50,000	National	Assist the MOHSW/NMCP in developing policy strategy on public-private strategic partnership.
Support capacity development for accurate and prompt diagnosis of malaria	RBHS	100,000	USAID focus counties	Support 108 health facilities for early and accurate diagnosis of malaria
Sub-Total Diagnostics		1,912,500 (1,300,100)		
Treatment				
Procurement of ACTs	Deliver TO III	2,823,600	Nationwide	Procure 2.35 million ACT doses

		(2,823,600)		
Procurement of drugs for severe malaria	Deliver TO III	200,000 (200,000)	Nationwide	Procure 150,000 treatments for severe malaria
Support capacity development for appropriate and prompt treatment of malaria and early referral	RBHS	300,000	USAID focus counties	Support capacity development for appropriate and prompt treatment and early referral of malaria cases
Pre-service and in-service training for case management	MENTOR	150,000	Nationwide	Continue training HCW students and HCW in both public and private facilities in case management, including coaching and producing desk reference materials and books, job aids and guidelines
Support community-based treatment	UNICEF	300,000	Nationwide	Support MOHSW/NMCP to implement the policy and strategy for early diagnosis, prompt treatment and early referral at community level.
Strengthening of drug management system, logistics and supply chain management	SPS	750,000	Nationwide	Support NMCP/MOHSW to strengthen the drug management system capacity, including development of drug financing, registration, logistics, information systems, supervision, forecasting and warehousing plans at all levels.
Strengthening drug quality monitoring capacity	USP-DQI	100,000	Monrovia	Support NDS to strengthen inspection and testing of anti-malaria drugs.
Supporting *in vivo* clinical efficacy monitoring	MENTOR	50,000	Selected sites	Support NMCP to run selected sites for monitoring drug efficacy.
Sub-Total Treatment		**4,673,600 (3,023,600)**		
TOTAL CASE MANAGEMENT		**6,586,100 (4,323,700)**		
IEC/BCC				
Integrated IEC/BCC for malaria case management, ITNs, malaria in pregnancy, IRS.	RBHS	1,400,000	Nationwide	Implement an integrated communication campaign to promote all aspects of malaria interventions. It will support year-long IEC/BCC at community level to assist NMCP to promote correct and consistent use of LLINs, particularly by pregnant women and children under-five, using mixed media including school children. Post-

				distribution follow up to verify hanging of LLINs is also to be included. Support broad communication strategy of NMCP on dangers of malaria, the need for prompt referral to health facilities, and current drug policy, and MIP, targeting HCWs and general public.
TOTAL IEC/BCC		**1,400,000**		
MONITORING AND EVALUATION				
Support MIS/DHS	Measure DHS Phase III	100,000	Nationwide	Support DHS with Malaria Component
Supporting establishment of sentinel sites	MENTOR	200,000	Selected areas	Support NMCP to select and establish 4 additional sentinel sites to collect malaria specific and all-cause mortality data disaggregated by age group and pregnancy status.
Support for End-use Verification Tool	SPS	80,000	Nationwide	Support NMCP to apply End-use Verification Tool for monitoring purposes
TA Visit to support M&E activities	CDC	24,200	MOHSW, NMCP and selected health facilities	One TA visit by CDC staff to support M&E activities
TOTAL MONITORING AND EVALUATION		**404,200**		
CAPACITY BUILDING NMCP				
Building capacity in IEC/BCCI	UNICEF	250,000	Nationwide	Short term trainings for 25 trainers (5 from NMCP and 20 from counties) on different compelling training needs: designing community based IEC/BCC strategies; techniques of IEC messages sequencing; malaria related data collections; organizing, analyzing and interpreting; supervisory and computer skills.
Development of training materials	UNICEF	35,000	Nationwide	Development of malaria-related materials for roll out of trainings to the counties, including facilities and communities.

Support supervision	UNICEF	50,000	Nationwide	Support quarterly supervisions at all levels: from central to counties; from counties to district and health facilities; and from facilities to community health services including community health volunteers.
Supply computers and related office equipment	UNICEF	50,000	Selected offices and counties	Furnish and equip with computers and accessories two offices at NMCP and eight county offices.
Procure entomology equipment and supplies	UNICEF	120,000	Central	Procure entomology equipment and related supplies in order to strengthen the entomological laboratory.
Strengthen supportive supervision	UNICEF	45,000	Central	Support supervision by covering costs for fuel and vehicle maintenance.
Strengthen Standard Operations Procedures	Deliver TO III	500,000	Nationwide	Support the supply chain management and roll out of the Standard Operations Procedures.
TOTAL CAPACITY BUILDING		**1,050,000**		
MANAGEMENT AND ADMINISTRATION				
In-country staff and administrative expenses	USAID/CDC	1,178,600	Monrovia	Salaries and benefits as well as administrative-related costs of in-country PMI staff and support and other cross cutting activities as needed by the Mission.
TOTAL MANAGEMENT AND ADMINISTRATION		**1,178,600**		
GRAND TOTAL		**18,000,000 (8,023,700)**		***Commodities represent 45% of the total budget***

Table 3 President's Malaria Initiative – Liberia Year 3 (FY 10) Budget Breakdown by Intervention (18,000,000)			
Area	Commodities $ (%)	Other $ (%)	Total $
Insecticide-treated Nets	2,100,000 (76%)	666,900 (24%)	2,766,000
Indoor Residual Spraying	1,600,000 (38%)	2,614,200 (62%)	4,214,200
IPTp		400,000 (100%)	400,000
Case Management	4,323,700 (66%)	2,262,400 (34%)	6,586,100
IEC/BCC		1,400,000 (100%)	1,400,000
Monitoring and Evaluation		404,200(100%)	404,200
Capacity Building		1,050,000 (100%)	1,050,000
Administration		1,178,600 (100%)	1,178,600
Total	8,023,700 (45%)	9,976,300 (55%)	18,000,000

Table 4 President's Malaria Initiative – Liberia Year 3 (FY 10) Budget Breakdown by Partner (18,000,000)			
Partner Organization	Geographic Area	Activity	Budget
CDC	Nationwide	-Provide technical support -Staff, administrative and management costs	599,200
Deliver	Nationwide	-Procurement of LLINs, ACTs, RDTs, Severe malaria drugs and laboratory supplies	7,086,100
IMaD	Nationwide	-Assist with strengthening national laboratory capacity, train laboratory technicians and provide support with diagnostics with private sector providers	350,000
IVM	Local	-Capacity strengthening in entomology	140,000
Measure – DHS	Nationwide	-Preparation for DHS	100,000
MENTOR	Nationwide	-Train health workers and CHVs in MIP -Pre- and in-service training for malaria case management	600,000
RBHS	Nationwide	-Pre-service training for MIP -Integrated IEC/BCC campaign to support malaria interventions	2,000,000
IRS-IQC	Selected sites 2 sentinel sites	-Procure IRS supply and conduct IRS in selected districts	4,050,000
SPS	Nationwide	-Strengthen drug supply chain management system	830,000
USP	Nationwide	-Strengthen drug quality monitoring capacity	100,000
UNICEF	Nationwide	-Support LLIN distribution -Support community-based treatment of malaria -Capacity building within NMCP	1,516,900
USAID	Nationwide	-Staff, administrative and management costs	627,800
Total			18,000,000