

This Malaria Operational Plan has been endorsed by the President's Malaria Initiative (PMI) 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 2009

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EXECUTIVE SUMMARY

In December 2006, President George W. Bush announced that Liberia had been selected as one of the last 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. The entire population of approximately 3.5 million is at risk of malaria. Malaria is the leading cause of morbidity and mortality in Liberia. It accounts for over 40% of all outpatient consultations, and 18% of inpatient deaths.

According to the 2007 Demographic and Health Survey (DHS), which did not include a full malaria module, 30% of households owned a net (treated or untreated), and about 58% of children under-five with fever received a treatment for malaria within two weeks before the survey. No up-to-date information exists on national or county coverage with artemisinin-based combination therapies (ACTs) or intermittent preventive treatment of pregnant women (IPTp). Indoor residual spraying (IRS) was conducted in internally displaced persons (IDP) camps, covering a population of approximately 150,000.

Liberia was the recipient of a Round 3 malaria grant from the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) totaling \$12 million; however, this grant ended in the first quarter of 2007. Liberia was successful in their Round 7 Global Fund malaria proposal for \$37.4 million (over 5 years), and is awaiting fund dispersal by the end of 2008. This award will cover such areas as salaries for National Malaria Control Program (NMCP) staff, infrastructure development, training and commodities. Additional support of over \$15 million was provided for malaria control through the PMI, UNICEF, and WHO in 2008. Several international and local NGOs have supported malaria control efforts as well, primarily in insecticide-treated bednet (ITN) distributions, drug procurements, and training and supervision of health care workers.

The following table outlines the proposed targets and expected outcomes for Year 1 PMI activities in Liberia:

Proposed Year 1 Targets (PMI and partners)	Expected Results after 1 Year of Implementation (March 2009)
1,232,000 ITNs distributed of which PMI will distribute 622,000 nets	504,147 nets have already been distributed, including 197,000 during PMI launch; by March 2009 an additional 467,000 ITNs will have been distributed of which PMI will contribute 425,000
25,000 houses sprayed (125,000 residents protected) by IRS in one county	Planning for the February 2009 IRS campaign is underway; before the March 2009 rainy season, 125,000 residents will have been protected with IRS
943,000 ACT treatments will be purchased and distributed by PMI	496,000 ACT treatments have already been purchased and distributed; by March 2009 the remaining 447,000 treatments will have been procured and distributed.

This PMI Year 2 Malaria Operational Plan for Liberia was developed based on a planning visit carried out in June 2008 by representatives from USAID and the Centers

for Disease Control and Prevention (CDC) in close consultation with the 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 support fit in well with the Ministry of Health and Social Welfare (MOH&SW) 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. To achieve the goal and targets of the MOH/NMCP and PMI in Liberia, the following major activities will be supported during Year 2 of the Initiative:

Insecticide-treated nets: The NMCP set a target of one LLIN for each sleeping space, or approximately three nets per household. In Year 1, Liberia has a projected need of 1,232,000 LLINs, with over 504,000 already distributed through door-to-door and other types of campaigns, and free distribution through antenatal clinics (ANCs). The PMI, in Year 1, pledged 425,000 LLINs for free distribution through ANCs and 197,000 through a door-to-door campaign, with other partners pledging 442,000 LLINs. The projected need for Year 2 in Liberia is 1,334,000 LLINs; PMI has budgeted for the purchase of 480,000 LLINs and for assistance to support strengthening the management of the national net program, including support to improve logistics, forecasting and storage. Although ownership of ITNs has increased dramatically over the last few years, usage remains low and PMI will work with non-governmental organizations (NGOs) to support community-based information, education, and communication/behavior change communication (IEC/BCC) campaigns to increase demand for and correct usage of nets.

Indoor residual spraying: Indoor residual spraying during the last two years has primarily been done in camps for internally displaced persons or returning refugees, with a population of approximately 150,000 covered, supported by Office of Foreign Disaster Assistance (OFDA) funds. No recent information is available on the distribution or abundance of mosquito vector species, or insecticide resistance status. The NMCP would like to begin IRS for the general population, but has not yet developed a detailed national plan. In Year 1, PMI will support spraying of 25,000 houses (protecting approximately 125,000 people) as a first step towards building capacity for IRS in Liberia. During Year 2 PMI will provide continued support for building entomologic capacity at the NMCP, including development of the National Malaria Vector Control Plan, partnering with private industry, and expand IRS coverage to approximately 50,000 households. Insecticide selection for this IRS campaign will be based on a 2008 study funded by PMI comparing DDT and synthetic pyrethroids.

Intermittent preventive treatment of pregnant women: Although there is no recent data on coverage of IPTp, improving political stability and service coverage, as well as increased attendance at ANCs, should increase the use of IPTp in Liberia. During Year 1, PMI will train 750 facility- and community-based health workers in malaria in pregnancy and create the demand for early and frequent ANC attendance. In Year 2, PMI will continue to support training in these areas. All needed supplies of sulfadoxine-pyrimethamine (SP) are being provided by the Global Fund.

Case management: The PMI is helping the NMCP to update national policy guidelines for malaria diagnosis. Rapid diagnostic tests (RDTs) have been the primary means of malaria diagnosis until capacity in microscopy can be developed. The RDTs have been purchased through the Global Fund and other donors. In Year 1, the PMI procured an emergency consignment of 496,000 treatments of amodiaquine-artesunate. This procurement was in response to stock out of ACTs due to the ending of the Global Fund grant. As well, in Year 1, the PMI will procure RDTs and equipment and supplies for malaria microscopy, assist in the development of a national reference laboratory, train 900 health workers in case management and 150 technicians in laboratory diagnosis. In Year 2, the PMI will procure 1 million ACT treatments as well as drugs for treatment of severe malaria and invest in strengthening supply chain management and provide training and support improved supervision of health workers to ensure the proper use of ACTs.

Monitoring and evaluation: The MOH has developed a plan to establish a streamlined Health Management Information System (HMIS), and a costed M&E plan to help support the development process. During November 2008 with Year 1 funding, PMI will provide support to a Malaria Indicator Survey (MIS) in order to gather baseline data for the NMCP and PMI on the coverage of all major malaria control interventions. The PMI will also assist the MOH to integrate malaria surveillance into the central surveillance system, as well as with training and capacity building in data collection and management. In Year 2, PMI will continue to support the strengthening of the general HMIS and the capacity of the NMCP staff in M&E, including supervision, management, data collection and analysis.

Building NMCP capacity: The health infrastructure in Liberia was badly damaged during the civil war and the NMCP has placed a high priority on strengthening their capacity in M&E, entomology, and IRS. In addition, insufficient national funding is available to cover staff salaries, office space, equipment and supplies, and transportation. In Year 1, PMI agreed to assist in the renovation of the NMCP offices. This activity is in the planning stages and we have already received a confirmation letter from the government on the identified site. The PMI will also support training of staff and community-level volunteers in malaria in pregnancy and case management, as well as M&E. In Year 2, PMI will continue to support staff training and staff development in these areas.

The proposed FY09 PMI budget for Liberia is \$11.8 million. Of this amount, 30% will support procurement and distribution of ITNs, 34% procurement of ACTs and improved case management, 8% IRS, 3% malaria in pregnancy activities, and 6% monitoring and evaluation. Approximately 53% of the total budget will be spent on commodities.

ABBREVIATIONS and ACRONYMS

ACT	Artemisinin-based combination therapy
AM	Artemether
ANC	Antenatal care
AQ	Amodiaquine
AS	Artesunate
ARV/ART	Anti-retroviral/therapy
BCC	Behavior change communications
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
GOL	Government of Liberia
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
M&E	Monitoring & evaluation
MIS	Malaria Indicator Survey
MOH&SW	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
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

THE PRESIDENT'S MALARIA INITIATIVE

In June 2005, the United States Government (USG) announced a new five-year, \$1.2 billion initiative to 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 three years of full implementation in each country. This will be achieved by reaching 85% coverage of the most vulnerable groups – children under five years of age, pregnant women, and people living with HIV/AIDS – 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, Zambia and seven other countries were added to reach a total of 15 countries covered under the PMI. Funding began with \$30 million in FY06 for the initial three countries, increased to \$135 million in FY07 and to \$300 million in FY08 and FY09, and will increase to \$500 million in 15 countries in FY10.

In implementing the PMI, the USG 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, the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), and the non-governmental and private sectors, to ensure that investments are complementary and that RBM and Millennium Development Goals are achieved.

This document presents a detailed one-year implementation plan for the second 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 2 activities under the PMI. The document was developed in close consultation with the Ministry of Health and Social Welfare (MOH&SW)/National Malaria Control Program (NMCP) and with participation of most national and international partners involved in malaria prevention and control in the country. The total amount of PMI funding requested for Liberia is \$11.8 million for FY 2009.

MALARIA SITUATION IN LIBERIA

Liberia has a 350 mile Atlantic Ocean coastline and is bordered by Sierra Leone (west and northwest), Guinea (north) and Cote d'Ivoire (east and southeast). Liberia is administratively divided into 15 counties and 65 political districts. The country is grouped among the least developed countries in the world ranking 174 out of 175

countries in the UNDPs Human Development Index for 1999¹. The population according to the recently completed 2008 national census is 3,489,072.

Liberia was in a state of intermittent civil war for more than a decade until 2003 and humanitarian assistance groups have been providing much of the services to the Liberian population over the last two to three years, including almost all health services. 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 is holoendemic (perennial intense transmission with considerable immunity outside of childhood) throughout Liberia and is a leading cause of morbidity and mortality. The major vectors for transmission are *Anopheles gambiae s.s.*, *An. funestus*, and *An. melas*; the major parasite species is *Plasmodium falciparum*, which accounts for more than 90% of all infections. Malaria is the leading cause of out-patient department attendance (40-45%), and the number one cause of inpatient deaths (18%). The 2007 DHS indicates that the under-five mortality rates are on the decline, although still very high at 111/1000. An estimated 60,000 children less than five years of age of five die each year in Liberia, putting conservative estimates of malaria-attributable childhood deaths at 10,800 annually, but this number may well be underestimated because of a weak surveillance system and poor reporting. The maternal mortality ratio is one of the highest in the world at 760/100,000². Since pregnant women constitute about 4% of the population, at any given time in a year, approximately 140,000 pregnant women are at risk of malaria each year.

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, ending in February, 2007 for improved case management including the procurement of ACTs, IPTp, vector control, information, education, and communication (IEC)/behavior change communication (BCC) activities, and community mobilization, and improving overall program management, including paying salaries of the NMCP staff. The Round 7 grant was approved in November 2007 for \$37,380,198 and will continue through 2012; it was signed in April 2008. 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 SP to more than 300,000 pregnant women.

In addition, WHO will be hiring a National Professional Officer for malaria with funding from USAID Africa Bureau. UNICEF has assisted with the procurement and distribution of LLINs in the past, but no specific plans have been outlined for 2009 related to net

¹ Malaria Programmatic and Financial Gap Analysis in Liberia, World Bank Joint Mission, Nov 25-December 3, 2006

² UNICEF

distribution or other related malaria control and prevention activities. The United Nations Development Program will act as Principal Recipient for the new Round 7 grant, as it did under the Round 3 award. Non-governmental organizations such as MENTOR, Africare, Save the Children, and the Red Cross continue to provide significant support to the Government of Liberia (GOL) and, in particular, the MOH&SW, to ensure that health service provision continues in the areas they are working.

NATIONAL MALARIA CONTROL PLAN AND STRATEGY

The GOL is committed to improving health service delivery, as well as malaria prevention and treatment measures nationwide. This is reflected in key policy documents, including the National Health Policy of the MOH&SW (January, 2007), the National Malaria Strategic Plan 2004-2008, and the NMCP Malaria Action Plan for 2008. 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.

Under the 2008 Malaria Action Plan, the NMCP has a policy to limit the kind of ITNs that are being brought into the country. They are currently working to expand the kinds of ITNs that are approved by the WHO Pesticide Evaluation Scheme. Also, they are waiting approval of another drug company from which to purchase artesunate-amodiaquine (AS-AQ), the first-line treatment for uncomplicated malaria. Finally, they plan a more integrated approach to IEC/BCC and to further develop the Monitoring & Evaluation (M&E) system as a component of the larger Health Management Information System of the MOH&SW.

The MOH&SW has just completed a new five-year National Malaria Strategic Plan for 2009-2013, which aims to scale up proven malaria control interventions at both the health facility and community level. The new Strategic Plan takes into consideration gaps identified during the implementation of the previous National Strategic Plan.

To strengthen partnerships and coordination at the country level, a Malaria Steering Committee (MSC) has been formed. The MSC is made up of the NMCP, all implementing partners, relevant government ministries and agencies, international and national non-governmental organizations (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. Many of these facilities are run by faith-based organizations

(FBOs). While drug vendors are common, they usually sell unregulated products; for example, chloroquine is still widely available and sold in these shops.

The NMCP acknowledges the private sector and the potentially important role they can play, including private locally-owned facilities and shops, and facilities managed by NGOs. There is a need, however, to try and bring these groups under a single coordinating authority, in order to promote improved care and provision of quality drugs. With only 41% of the population having access to health care, the greater challenge will be extending the coverage of general health services, including 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 2005 Malaria Indicator Survey (MIS), which was conducted by the NMCP with assistance from WHO, since the 2007 DHS did not include a malaria module. The MIS showed weak case management practices for malaria in children under-five. Only 5.3% of children with a fever in the last two weeks were seen within 24 hours of the onset of their fever (3.5% the same day and 1.8% the next day). Of those treated, only 3.2% received artemisinin-based combination therapy (ACT), which was the national first-line treatment at the time, while 45.7% received chloroquine. Other antimalarial drugs used included sulfadoxine-pyrimethamine (SP) (0.5%) and quinine (2.5%), while more than 38% of patients were not given any antimalarial drug.

Use of preventive measures is also inadequate, although there has been some recent progress in coverage and use of ITNs. The 2005 MIS reported household ownership of *any* net in Liberia to be 18%; of those who owned a net, only 36% owned an ITN. Of 8,933 children under-five sampled, only 2.6% had slept under an ITN the previous night. The most common reason people gave for not owning a net was that they were too expensive. The 2007 DHS showed that 30.4% of all households owned at least one bed net, a marked improvement, due in part to contributions made by the Global Fund Round 3 grant. This proportion has undoubtedly increased as a result of the recent PMI-supported free distribution of about 200,000 LLINs in Bomi and Cape Mount Counties in March 2008.

According to the 2005 MIS, only 4.3% of pregnant women had taken two or more doses of IPTp as recommended, and 31% had slept under any mosquito net the previous night. Data is not available on how many had slept under an ITN. Of the 68% of women who took any drug to prevent malaria in the survey, only 12% took SP, while 59% took chloroquine, and almost 29% took another drug or did not know the name of the drug they received. The recent 2007 DHS showed that 12% of pregnant women took SP, although not always the two recommended treatments.

Malaria Indicators (2005 Liberia MIS)	
Indicator	Estimate
Proportion of children with fever in the last 2 weeks receiving an ACT within 24 hours of onset of illness	<1%
Proportion of households with at least one ITN	6%
Proportion of children under five who slept under an ITN the preceding night	2.6%
Proportion of pregnant women who slept under an ITN the preceding night	NA
Proportion of women who received two or more doses of IPTp during their last pregnancy in the last two years	4.3%
Proportion of targeted houses adequately sprayed with a residual insecticide in the last 12 months	NA*

*At the time of the 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 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 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 TWO

Prevention:

- Procure and distribute 480,000 free LLINs to vulnerable groups through existing approaches to help reach approximately 65% household ownership of one or more ITNs; and
- Support IRS of 50,000 households to protect 250,000 residents.

Case Management:

- Procure and assist with the distribution of more than one 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 with suspected malaria who receive an ACT within 24 hours of the onset of symptoms to 40%;
- Procure approximately one-half of the nationwide need 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 1.2 million RDTs and provide training and ongoing supervision in their use.

INTERVENTIONS: PREVENTION

Insecticide-Treated Nets

Current Status

The new NMCP National Strategic Plan for 2008-2013 aims at universal coverage with ITNs and to increase use of a net to 65% by 2009, to 80% by 2010 and 85% by 2013. 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 that is too high for most residents, and integrated disease campaigns. The NMCP supports strategies to promote demand creation to ensure the development of a sustainable ITN market. Recently, the NMCP lifted a restriction on the kind of LLIN to import to Liberia, which previously allowed only Permanet® to be brought into the country and distributed; now, all WHOPEs-approved nets are permitted. Also, as the only existing, central distribution point for health-related commodities, the National Drug Service (NDS) is in need of assistance to store and properly distribute nets in Liberia.

Progress to date

The MOH&SW, along with NGOs and FBOs, have been providing the highest risk groups with free ITNs, funded by the Global Fund. 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. 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 late January 2007 with door-to-door LLIN distribution occurring in 7-9 counties; 193,000 LLIN were distributed through various Antenatal Clinics (ANCs) and through mass campaigns in coastal counties. Since 2005, it is estimated that a total of 1,363,047 ITNs have been distributed in Liberia.

ITN Distribution by Year and County

COUNTY	2005	2006	2007	2008	TOTAL
Bong	96,393	0	0	0	96,393
Bomi	0	0	0	83,100	83,100
Gbarpolu	21,670	0	31,920	0	53,590
Grand Bassa	66,477	0	0	0	66,477
Grand Gedeh	0	20,261	16,636	50,500	87,397
Grand Cape Mount	0	0	0	121,900	121,900
Grand Ku	0	0	0	23,821	23,821
Lofa	0	84,267	69,191	18,726	172,184
Margibi	43,966	0	64,600	14,000	122,566
Maryland	0	41,472	34,053	66,000	141,525
Montserrado	100,954	46,000	500	4,000	151,454
Nimba	74,585	0	0	0	74,585
Rivercess	38,534	0	0	45,000	83,534
River-Gee	7,421	0	0	32,800	40,221
Sinoe	0	0	0	44,300	44,300
TOTAL	450,000	192,000	216,900	504,147	1,363,047

Source: National Malaria Control Program

The 2008-2013 national policy has set a target of one LLIN for each sleeping space, or approximately three per household. Thus, for 2008, there is a projected need of 1,232,000 LLINs at 60% coverage (including nets distributed only in 2007 and 2008). PMI pledged 480,000 LLINs for free distribution through ANCs and 197,000 through a door-to-door campaign, with other partners pledging 442,000 LLINs in 2008. To date, approximately 590,000 of these nets have been received, resulting in a gap of 425,100 LLINs in 2008. Once PMI procures the remainder of its nets (approximately 425,000) the gap will have been filled for 2008 and the target met. The projected need for 2009 is 1,334,000 LLINs for 65% coverage. Since 1,232,000 nets will already have been distributed (including 2007 and 2008) the gap will be only 102,000 nets for 2009. PMI has budgeted for the purchase of 480,000 LLINs and for assistance to support strengthening the management of the national LLIN program, which is expected to help the NMCP, along with contributions from other partners, including the Global Fund, to fill the gap for 2009 and significantly exceed the target. The durability and acceptability longitudinal study of WHOPES approved LLINs will be continued.

The NMCP has an IEC component 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 an 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.

Proposed USG activities: (\$3,550,000)

1. Procure approximately 480,000 LLINs for free distribution through ANC and EPI clinics, as well as through community-based systems such as the door-to-door distribution used in the integrated campaign (\$3,360,000);
2. Provide support for strengthening management of national ITN program. Warehousing and distribution of the Global Fund LLINs was managed by United Nations Development Program (UNDP), and there is a need to build the capacity of the NMCP to take over these tasks. Funding would include strengthening management skills within the NMCP, and supporting rental of a warehouse for central storage, in collaboration through an MOU with UNICEF, and costs related to the distribution of nets (\$140,000); and
3. Continue support to the durability and acceptability longitudinal study of WHOPEs approved LLINs, at selected sites. This project will provide information on net durability to the PMI and NMCP in order to more accurately estimate the number and cost of nets required for replacement of existing nets that are no longer effective. Estimates of ITNs required to achieve PMI targets must take into account replacing worn nets in order to maintain net coverage among populations receiving nets in past net campaigns. This project is planned to begin in late 2008 pending approval from the PMI Operations Research Committee (\$50,000).

Indoor Residual Spraying and other Vector Control Measures

Current Status

From 1958-61, UNICEF and WHO sponsored a malaria eradication project to ascertain whether transmission could be interrupted with IRS. The project covered the central province of Liberia, an area of ~14,000 km², using DDT at 2 gm/m² with one application per year. Entomological investigations showed an apparent disappearance of vectors immediately after spraying; control persisted for up to 26 months. Bioassays 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 sparingly and 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 IDPs, refugee camps, and temporary shelters 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. MENTOR trained approximately 800 individuals as sprayer operators for IRS in the IDP camps; however, they currently have only 20 functional spray pumps, no dedicated transport and a limited stock of alpha-cypermethrin (Fendona[®]). From September 2004-July 2006 MENTOR sprayed 26,872 shelters covering a population of approximately 148,000. There has been no quality control conducted on the insecticide used, and the original source and expiration date for the Fendona are unknown. IRS is not being conducted at the Firestone Rubber Plantation, the largest employer in the nation, and we were unable to determine if any IRS activities were being conducted by other private companies. Neither a pre-IRS environmental assessment nor recent insecticide resistance monitoring of anopheline vector mosquitoes has been conducted. Therefore there is a need to conduct this kind of monitoring in order understand the current vector population so that more rationale planning can be done, given the lack of information about vector biology in Liberia. There is no tax/tariff relief on the importation of insecticides.

The NMCP has very limited malaria vector surveillance or control capacity. There is no laboratory or equipment available for mosquito collection, identification or for determining the resistance status of malaria vectors. Only two individuals on the NMCP staff have IRS experience, however, a new IRS manager has been appointed, and the recently appointed head of entomology in the NMCP just graduated from pharmacy school, and has no experience or training in vector control or entomology.

Progress to date

The NMCP requested PMI support to establish a malaria vector surveillance capacity and assistance in conducting an IRS baseline assessment to determine efficacy and cost, and identify the optimum parameters to include insecticide, duration of efficacy, etc. The following activities are planned with Year 1 PMI funding: (1) an environmental assessment, as required for all USG-supported IRS activities; (2) procurement of IRS equipment, including sprayers, personal safety equipment, insecticides, and other supplies; (3) establishing an insectary and entomology laboratory to support malaria vector studies; (4) beginning insecticide resistance monitoring at selected sentinel sites; (5) conducting a pilot of IRS in about 25,000 houses at a site to be determined, in order to develop technical capabilities and develop information which the MOH can use to base their selection of insecticide(s) for IRS in Year 3 of PMI and beyond; and (6) technical assistance from CDC to monitor planning and implementation of vector control activities. These activities will be initiated as PMI funding and personnel from the NMCP, Research Triangle International (RTI), and CDC, become available.

Proposed USG Activities: (\$999,200)

1. Support spraying of approximately 50,000 households with an insecticide to be selected by the NMCP following completion of the pilot described above (\$825,000);
2. Capacity strengthening for senior vector control officer and for new entomological and IRS technical staff (\$100,000);
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); and
4. Insecticide resistance monitoring at selected sentinel sites (\$50,000).

Intermittent preventive treatment in pregnant women (IPTp)Current status

The expected number of pregnant women for the national population of about 3.5 million inhabitants is 175,000. The 2005 NMCP/WHO national malaria survey for Liberia showed that 30.6% of pregnant women seen at outpatient clinics in health facilities had malaria and the 2006 Liberia Human Development Report also states that malaria is the primary cause of severe anemia among pregnant women and a major contributor to maternal mortality.

Despite the 2005 MIS report indicating that only 6.9% and 4.3% of pregnant women received IPT1 and IPT2 respectively, the increasing political and social stability in the country in recent years resulted in an increased use of antenatal care services to 60%, according to the Division of Family Health and, with the improving supply of SP to health facilities, more women should receive IPTp.

The new National Malaria Strategic Plan (2008-2012) includes the control and prevention of malaria in pregnancy as one of the focused areas of intervention. The Plan promotes prompt and effective treatment of malaria in pregnant women and the use of ITNs and IPTp with SP. The NMCP's training manual for management of malaria advocates the following guidance for IPTp:

- Three tablets of SP should be administered to pregnant women, once in the second trimester, and again in the third trimester. The administration of these dosages should be directly observed by the health worker;
- Doses of SP should be given at least four weeks apart;
- Women should be given clear instructions on when to return for the next dose of SP; and
- Women should be instructed that they may still fall sick with malaria and should see a health worker immediately if they develop fever.

The SP is free of charge and health workers are encouraged to provide cups and water so that they can directly observe patients swallowing their medications.

As part of NMCP policy, pregnant women are to be given a free ITN on their first ANC visit, together with education on the importance of malaria prevention in pregnancy.

Progress to date

With Global Fund Round 3 funding, the NMCP, together with the Division of Family Health, developed training manuals on prevention and control of malaria in pregnancy for health workers. More than 4,000 workers were trained. The two programs have just been revised and updated the malaria in pregnancy training manuals and they will soon be reprinted and additional training started.

The NMCP also procured and distributed SP to health facilities that offer prenatal care services. The quantification of SP need was based on consumption but with unreliable reporting data, this resulted in frequent stock-outs in some health facilities. The situation seems to be improving however and there are adequate quantities of SP in the country to meet demand for the coming year.

Although it is the NMCP policy to distribute free ITNs to pregnant women through ANCs, this is not currently being done due to the limited supply of nets. In April 2008, PMI delivered 197,000 LLINs to launch the Initiative in Liberia. These ITNs were distributed free of cost in Bomi and Grand Cape Mount Counties through house-to-house visits by community health workers to explain how to hang the nets and promote their regular use. A total of 29,000 nets remaining from this campaign, which the NMCP intends to give to pregnant women through ANC.

Proposed USG activities: (\$300,000)

1. Continue to support training on malaria in pregnancy within the context of focused antenatal care (FANC) at all pre-service institutions especially nursing and medical schools. The review and update of the curriculum is to take place under FY08 funding. (\$150,000); and
2. Continue to support on-the-job training of midwives and other health workers in malaria in pregnancy. Some of the funds may be used to reprint the revised training manuals and to provide cups, clean water, registers and educational posters, to facilitate health workers and mid-wives efforts to promote IPTp (\$150,000).

INTERVENTIONS: CASE MANAGEMENT

Malaria diagnosis

Current status

Malaria laboratory diagnostic capacity in Liberia is limited, due in large part to the destruction of health facilities during the war and limited human resource capacity. During the last three years, more than 80% of health facilities have been made operational through the work of NGOs, and diagnosis has been encouraged using RDTs. Although MOH&SW policy related to laboratory diagnosis of malaria is not clearly defined in the 2004-2008 National Malaria Strategic Plan, the NMCP has promoted the use of parasitological diagnosis (microscopy or RDTs) for all patients with suspected malaria. At health facilities where laboratory diagnosis is not possible, patients with fever and suspected malaria should be presumptively treated for malaria. The NMCP would like to transition from a predominantly RDT-based diagnosis to microscopy in facilities where it is practical. Diagnosis is free of charge in MOH&SW health facilities.

While these recommendations are not in line with IMCI, the NMCP believes that health workers will be more motivated to seek out the underlying etiology of fever in those with a negative RDT (e.g., urinary tract infection ARI, meningitis) than if they routinely treated all febrile patients with an antimalarial. The PMI team will continue to work with the NMCP and the MOH&SW to review this policy to make certain that children under five remain the focus of malaria treatment, and that RDT needs are rationally projected and that the tests are correctly used.

Although all hospitals and health centers are supposed to be staffed with at least one laboratory technician and therefore Liberia requires 300 laboratory technicians, there are currently only 78 registered technicians in country, many of whom are not working in the public sector. Most, non-hospital based laboratory facilities operate with only laboratory aides. The NMCP wants to expand microscopic capacity to lower-level clinics, however, most trained technicians in Liberia, are either working in other fields or for international NGOs. A three-year course for laboratory technicians is offered at the Mother Patern College of Health Sciences in Monrovia; Phebe Hospital in Bong County also provides some training in laboratory diagnosis. The output of both schools is only about 20 trained staff every two years due to a lack of tutors and facilities.

There has been no central procurement unit for laboratory equipment and supplies since the war. Laboratory supplies and reagents have been purchased with Global Fund Round 3 support, which ended in February 2007. Approximately 50 microscopes were procured through the Global Fund tuberculosis grant; an additional 200 microscopes will be procured with support from the World Bank. Currently, most laboratory supplies are purchased locally through pharmacies on an as-needed basis, but shortages are common. At the time of the PMI Needs Assessment in late March 2007 there was approximately a three-month supply of RDTs remaining, or about 350,000 tests. MENTOR will be funding an additional 100,000 RDTs in the grant extension they'll receive from Office of Foreign Disaster Assistance (OFDA). The NMCP has estimated their annual need for RDTs at approximately two times the projected number of malaria cases, or about 3.8

million tests. It is expected that the Global Fund Round 7 grant will procure more than 2 million RDTs per year, and be able to fill the remaining gaps in supply.

Training on the use of RDTs has been undertaken by the NMCP with support from MENTOR. Approximately 3,400 national health workers (MOH&SW, NGO and/or FBO) have been trained/coached in case management including diagnosis. The trainings have targeted the County Health Teams, health agency supervisors, dispensers (including medicine stores in Monrovia) and screeners. Currently, an estimated 80% of health facilities are using RDTs for malaria diagnosis and treating malaria cases with ACTs. There is no quality assurance/quality control system in place for malaria laboratory diagnosis.

A decision has been taken to develop an integrated national public health reference laboratory at the Liberian Institute of Biomedical Research (LIBR), a national research institution established in 1975. It has functioned intermittently since then, depending on available resources. The vision of the Institute is a group of Liberian scientists with scientists from developed nations playing a collaborative and supportive role. The Institute would also like to continue its training function in laboratory sciences. It is located approximately one hour from central Monrovia.

Progress to Date

A rapid assessment of malaria laboratory diagnostic capabilities in Liberia was carried out by a team from the Improving Malaria Diagnostics (IMaD) project in collaboration with the NMCP in March 2008. The assessment team found that few health facilities, other than major hospitals in Monrovia and Phebe Hospital in Bong County, are not capable of performing microscopic diagnosis of malaria, and, thus, laboratory diagnosis has been primarily limited to the use of RDTs. Most facilities do not have a steady supply of electrical power and have to rely on generators or solar power. Widespread shortages of essential equipment and supplies were observed. The quality of performance of MOH&SW microscopists could not be determined but the last refresher training for national-level laboratory staff was in 2007.

With FY08 funds, PMI will provide technical assistance to the MOH&SW in support of the national public health reference laboratory at LIBR, support training of laboratory technicians, and procure 1.1 million RDTs, together with microscopes, external light sources, and laboratory supplies. The IMaD project will support additional training and supervision of laboratory workers to improve the quality and consistency of laboratory diagnosis of malaria using both microscopy and RDTs. Initially, the focus will be on training laboratory technicians to improve laboratory diagnostic capabilities in Liberia, but later, training will be extended to additional health workers to ensure adherence to the results of testing. As part of this effort, IMaD will work with the NMCP and the PMI in-country team to introduce routine monitoring of the shelf life of RDTs to avoid expiry of stocks and guide the timing of procurements.

Proposed USG activities: (\$1,312,100)

1. Continue to assist the MOH&SW in support of the national reference laboratory at LIBR. This includes training for current staff (\$50,000) and support for malaria laboratory diagnosis quality control and supervision by LIBR and MOH&SW staff (\$100,000). (Support to procurement of laboratory equipment and supplies is covered in #5 and #6 below) (Total \$150,000);
2. Technical assistance visit for CDC malaria laboratory staff to help with strengthening national capacity in microscopic diagnosis and use of RDTs. This visit will be done in coordination with the IMaD Project and complement IMaD support in this area (see #3 below) (\$12,100);
3. Continue to support training of laboratory technicians in MOH&SW facilities at central and county levels in malaria microscopy and use of RDTs (\$100,000);
4. Procurement of 1.2 million RDTs. This quantity together with the more than 2 million RDTs to be procured by the Global Fund is sufficient to cover essentially all RDT needs (\$700,000); and
5. Procurement of laboratory supplies for preparation, staining, and examination of malaria thick blood smears (\$200,000) and laboratory equipment, including binocular microscopes, battery-operated light sources, and related laboratory equipment for LIBR and health facilities (\$150,000).(Total \$350,000).

Pharmaceutical Management and Treatment

Current status

Liberia changed its national malaria treatment policy and adopted ACTs in May 2003 in response to increasing reports of *P. falciparum* resistance to chloroquine and sulfadoxine-pyrimethamine (SP). Artesunate-amodiaquine (AS-AQ) had been introduced in 2003 in Liberia as first-line treatment for malaria by *Médecins sans Frontières* and other NGOs during the country's complex emergency. Additional pressure to change to an ACT came from the Global Fund, which rejected Liberia's Round 2 malaria proposal, in part because the NMCP planned to continue recommending chloroquine as the treatment of choice for uncomplicated malaria. The NMCP adopted AS-AQ as the official first-line treatment not only because of its use by NGOs, but also because artemether-lumefantrine was more expensive at that time and could not be used during pregnancy or in children weighing less than 10 kg. Oral quinine is the second-line treatment for uncomplicated cases. Intramuscular artemether (AM) is the pre-referral treatment for severe malaria.

The therapeutic efficacy of amodiaquine alone, or the AS-AQ combination, was not studied in Liberia prior to its introduction as first-line treatment. A small efficacy study of AS-AQ and artemether-lumefantrine, the most likely alternative to AS-AQ should it become necessary to change the first-line treatment policy again, has been carried out at

JFK Hospital in Monrovia with technical support from WHO. There have been problems with data analysis and the final results of this study have not been released.

Through the Global Fund Round 3 malaria grant, the NMCP and its partners implemented AS-AQ on a national scale, including training of health workers in the appropriate use of ACTs, supplying all MOH facilities with adequate stocks of the new drug, and educating residents about correct treatment as part of a comprehensive BCC/IEC strategy for malaria control. The NMCP together with MENTOR have trained more than 4,000 health workers of all cadres, including CHWs.

Quantification of antimalarials has posed a major challenge to the implementation of the new treatment policy due to the lack of information for either a morbidity-based or consumption-based forecast of ACT needs. As Principal Recipient of the Global Fund Round 3 grant, UNDP has taken primary responsibility for the procurement of malaria medicines and supplies. The final Global Fund ACT procurement under UNDP arrived in March 2007. Since then the only ACTs in Liberia have been provided by PMI as part of an emergency shipment of 496,000 treatments that arrived in February 2008. This AS-AQ will expire in September 2009. The National Drug Service does not presently procure any antimalarials.

The most recent estimate of total AS-AQ needs is a morbidity-based quantification, carried out in preparation for the Global Fund Round 7 proposal. The estimated annual needs for 2008-09 are 1,900,000 treatment courses of AS-AQ per year to cover all adults and children who have access to health facilities. The approved Round 7 Global Fund grant will procure half of this amount each of the first two years of the grant. In the past, Liberia has also received drug donations from the Chinese government and UNITAID, but no additional donations are expected from these sources.

In-kind donations from NGOs, bilateral donors and multilateral funding agencies helped fill critical gaps in the supply of malaria medicines during and after the complex emergency. Since 2005, these NGOs have received most of their stock of AS-AQ from the NMCP through the Global Fund Round 3 grant.

The pharmaceutical sector in Liberia is comprised of the Pharmacy Division, Pharmacy Board, and the National Drug Service (NDS). The Pharmacy Division, which is part of the MOH&SW and headed by the Chief Pharmacist, has been responsible for drug registration. This process has consisted primarily of signing the importation approval for medicines being brought in by the private sector. On paper, this Division also has responsibility for drug quality testing, although it has not had sufficient funding, equipment, or technical capacity to do drug testing since the war. The Pharmacy Board is slated to become the National Drug Regulatory Authority, which will be responsible for registering all drugs for use in the private sector as well as in MOH&SW programs.

The NDS is a semi-autonomous organization, which is responsible for procurement of essential medicines, customs clearance, storage and distribution through a contract with MOH. It also serves these same functions for NGOs, as well as some United Nations

agencies. Although the NDS was not responsible for procurement of antimalarials through the Global Fund grant, it continues to have responsibility for the storage and distribution of those medicines. Global Fund grant funds have been used to upgrade the NDS storage space, but many of the nine county drug depots are in poor condition and need minor repairs as well as improved security for the commodities stored there.

The antimalarials procured, distributed and used within the public health system in Liberia are consistent with WHO's recommended treatment regimens for malaria and are included in the country's current treatment guidelines but all of them are on the Essential Medicines List. The Essential Medicines List, which has not been updated since 1998, is currently undergoing revision.

The NDS has implemented a decentralized model for drug distribution, which uses depots at the county health offices as holding areas for the facilities' regular orders. The NDS prepares the orders at the central warehouse based on the NMCP-approved requisition forms from facilities, and then sends the pre-packaged orders out to the nine county-level depots, where they are stored until the facilities come to pick them up. A new drug distribution system is being piloted in which medicines are distributed to the county depots on a quarterly basis using a push system. County depots will in turn supply their health facilities on a monthly basis using a pull system. In both cases, transportation will be provided by the distributor, not the receiver. As part of this decentralization process, county depots will also assume responsibility for collecting consumption and existing stock level reports from the facilities each month. The new system is currently being piloted in three counties to assess its feasibility.

Since 2005, the inventory of antimalarials has been managed at the central level according to a system that was set up specifically and exclusively for the Global Fund grants. The inventory management system to be used for the Round 7 malaria grant has been clearly outlined in the procurement and supply management plan and accompanying standard operating procedures. Although the basic roles and responsibilities of NDS and the facilities have not changed substantially from those instituted under the previous grant, the structure of the system has been modified to include the county drug depots as an intermediary point.

The rational use of ACTs and other antimalarials has been promoted and strengthened through nationwide trainings in the new malaria treatment policy, followed by on-site coaching visits. Estimates obtained from follow-up assessments of health workers who underwent training in case management suggest that more than 80% of health workers are using AS-AQ correctly. The methodology NMCP and MENTOR developed for the trainings uses a cascade approach based on a training-of-trainers model. It targets nearly all cadres of health workers, including both prescribers and dispensers. The training modules cover background on the malaria situation in Liberia, diagnosis, treatment, adverse events/pharmacovigilance, complicated malaria, malaria during pregnancy, IPTp, and supervision and surveillance. No studies on patient adherence to AS-AQ have been conducted to date.

The use of WHO pre-qualified medicines and approved suppliers, particularly for medicines procured under the Global Fund grants, has been the primary means of assuring the quality of antimalarial drugs in the public health system. A post-marketing surveillance system has not been instituted to assure the quality of medicines already available in the public and private sector. Three Liberians have been trained in the use of mini-labs in the detection of substandard or counterfeit products. The plan is to use mini-labs for preliminary testing, and if potential problems are detected, to send samples to the reference laboratory in Ghana, where there is sufficient capacity for more sophisticated compendia testing.

After reports of problems with side effects to amodiaquine, the NMCP recognized the importance and necessity of a pharmacovigilance program. This is also important with the recent introduction of AS-AQ, since this combination had formerly not been used or fully tested in larger patient populations. Although standard reporting forms have been developed and distributed, it is unclear if they are filled out appropriately or consistently. Additionally, nothing is being done with the information that is collected.

Under the Global Fund grant, the NMCP has supplied some private facilities with ACTs, but the majority of private facilities still procure medicines on their own.

Progress to Date

PMI supported an emergency procurement of AS-AQ in late 2007 to cover a gap in drug supplies between the end of the Global Round 3 grant and the beginning of PMI funding. An order for 496,000 treatments was placed and delivered to Liberia in February 2008.

With additional FY08 funds, PMI is supporting procurement of 1.2 million AS-AQ treatments, drugs for the treatment of severe malaria, and providing pre-service and in-service training for health workers and technical assistance for pharmaceutical management.

Currently, BASICS is supporting the MOH&SW in improving the delivery of health services at the community level through training of community health workers in early diagnosis and prompt treatment and referral for malaria as well as other major childhood diseases. The Mission will transfer the responsibility of these activities to a new bilateral under the Basic Package of Health Services (BPHS) RFA.

Proposed USG activities: (\$2,645,000)

1. Procurement of 1 million AS-AQ treatments for uncomplicated malaria (\$1,200,000);
2. Procurement of drugs and supplies for the treatment of severe malaria, including intramuscular artemether, intravenous quinine, and administration kits (\$345,000);

3. Pre-service and in-service training on case management at both public and NGO/FBO run facilities together with support to ongoing supervision and coaching (\$400,000);
4. Technical assistance to strengthen the national pharmaceutical management system (\$250,000);
5. Limited upgrading of the nine county drug depots, including repairs to roofs, walls, and floors and strengthened security (\$100,000);
6. Technical assistance to strengthen national drug quality monitoring capacity, including training and policy and regulatory planning (\$100,000);
7. A pilot evaluation of community-based distribution of AS-AQ to provide the MOH&SW with experience to support expansion of ACTs to the community level (\$200,000); and
8. Support to *in vivo* efficacy monitoring of AS-AQ and possibly artemether-lumefantrine in two or three additional sites outside Monrovia (\$50,000).

HIV/AIDS and MALARIA

The HIV/AIDS epidemic in Liberia is characterized by a prevalence of just 1.5% in the general population, but with higher rates among women than men, and among urban populations versus rural ones. Since the recent conflict destroyed much of the health system and rendered the HMIS non-functional, accurate data are not available for the entire country. Voluntary counseling and testing services are available and some services are provided for people living with HIV/AIDS (PLWHA) in urban areas. Prevention of mother-to-child transmission (PMTCT) is part of the national program, but the geographic reach of this effort is limited. The government is currently implementing a Round 6 HIV/AIDS grant from the Global Fund, which addresses PMTCT, PLWHA, drugs and other prevention activities as well as capacity building for the national program and for community-based efforts. The NMCP does not have a specific policy or plan in place to address HIV/AIDS and malaria, nor PLWHA including pregnant women.

Proposed USG Activities: (no proposed funding for specific HIV/AIDS activities)

While not specifically designed to support HIV/AIDS services, several activities funded in Year 2 of PMI are expected to contribute to the success of PLWHA and PMTCT activities in Liberia. Although the National HIV/AIDS Program does not officially release information on PLWHA, PMI will try to ensure through its implementing partners that, where possible, PLWHA receive an LLIN. Also, PMI, through its implementing partners, will try to ensure that pregnant women who are HIV positive receive at least three doses of SP as part of IPTp, and that they are monitored during routine ANC visits

for possible malaria infection and prompt treatment. Finally, IEC/BCC activities will include messages for PLWHA and women who are HIV positive, on the risks of malaria in pregnancy, the need to protect themselves by using an LLIN, and to the need for prompt treatment when they develop a fever.

CAPACITY BUILDING WITHIN NATIONAL MALARIA CONTROL PROGRAM

Current Status

Scale up of effective malaria programs in Liberia will depend on a well-trained and active malaria staff at the national, county and facility levels. The PMI will work to improve the human resource capacity of the MOH&SW and its key partners, improving quality of care and support and management systems. 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 MOH&SW and the NMCP.

A plan will be developed to strengthen the institutional capacity of the MOH&SW, the NMCP, the Health Promotion Division, and county health teams.

In post-conflict Liberia, there is a huge need to develop the public health workforce. Capacity strengthening will be needed in virtually every aspect of the malaria program. Skilled workers are needed to handle the management and health promotion of LLINs, monitor resistance of vectors to insecticide and parasites to drugs, vector control activities, as well as diagnostic testing (microscopy, use of RDTs), and patient counseling and education. Technical assistance and training will work alongside MOH&SW and NGO personnel, building know-how in these areas. Workers in the national reference laboratory (planned to open in 2009), malaria experts from the NMCP, laboratory technicians (or assistants), health clinicians (usually nurses or nurse associates) and community health workers all require refresher training on malaria. Various methods will be employed including short term training of health workers at accredited schools, on-the-job training in quality control and supervision, formal and one-on-one training in commodity stock management, drug quality monitoring capacity, M&E, and improving capacity for program management and supervision.

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 their offices. The NMCP has identified a building to be renovated. An engineer and architect have reviewed the site and determined it to be useable. The NMCP is getting official documentation to verify that the identified site is government property and that the NMCP has a right to occupy it.

Along with office renovations, through a new mission bilateral agreement, a large truck, to be used for transportation of LLINs from central storage to the counties, will be purchased.

Proposed USG Activities: (\$300,000)

1. Capacity strengthening in entomology, including training and mentoring for a senior vector control officer and in-country training for entomology technicians (see IRS section);
2. Continue to support training of facility- and community-level personnel and volunteers in malaria in pregnancy (see Malaria in Pregnancy section);
3. Training laboratory technicians in malaria diagnostics; support MOH&SW to improve supervision and quality control in malaria diagnostics; training of health workers in malaria case management with ACTs; support the MOH&SW to strengthen the drug management system capacity; and support the MOH&SW to strengthen inspection and quality control of antimalarial drugs (see Diagnostics section);
4. Support training of health workers in data collection, management, analysis and reporting; and facilitate short-term training in M&E (see M&E section); and
5. Improve NMCP capacity for program management and supervision through training (in-country and regional, short-term courses in management and leadership) and mentoring (provided by in-country, PMI advisors) and by filling office equipment needs to be identified through an assessment, but may include photocopiers, computers and printers, projectors and fax machines (\$300,000).

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:

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 keeping abreast of progress toward start-up of activities and grant implementation. The CCM does not however have any direct role in implementation of any 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.

Proposed USG Activities: (no cost to PMI)

In Year 2, two malaria advisors (one representing CDC and the other USAID) are being hired to handle both technical and logistical planning for PMI activities. In collaboration with existing USAID/Liberia staff, these Advisors will help coordinate PMI activities with the NMCP and other key stakeholders, and be active members of both the CCM and the MSC where appropriate. It is expected that both Advisors will spend a significant proportion of their time at the NMCP offices.

PRIVATE SECTOR PARTNERSHIPS

Several commercial firms employ large numbers of employees and lease substantial tracts of land parcels in Liberia. Firms, such as Firestone and Liberia Agriculture Company (rubber plantation), and Acelor Mittal (steel and iron), are among those that provide significant health and environmental services to their employees, and may be partners that could be engaged in private-public partnerships to improve health care services and impact. The USAID Mission intends to encourage and broker such partnerships in several areas, including health. As these relationships mature, they may offer strategic opportunities for the PMI and the NMCP to take advantage of the infrastructure and other resources they offer to institutionalize IRS and sustainable ITN distribution.

The role of private facilities and employers is not yet well-defined in the National Malaria Strategy, and these potentially powerful resources are not yet enlisted in support of national malaria objectives. During the preparation of the FY2009MOP, discussions with senior MOH officials made it clear that the MOH is prepared to encourage greater collaboration with the private sector, and would welcome PMI's assistance in developing such opportunities. For instance, the MOH agreed that private pharmacists and health providers (who currently do not have access to recommended first-line drugs for Rx of malaria) could be more effectively engaged and involved. Social marketing is another possibility that has some support within the MOH. While there is not yet in place a specific policy or approach to social marketing of health commodities, the MOH has expressed in writing and through numerous public statements that it is in favor of such an approach.

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. Secondly, the possibility of co-funding and logistical support would lower costs to the PMI for IRS and simplify M&E.

MONITORING AND EVALUATION PLAN

Current status

Although the GOL is increasingly taking over management of health facilities in Liberia, many are still operating under the responsibility of NGOs. Neither the NGO health facilities nor the government health facilities submit regular reports to the MOH&SW, and when they do, the reports are often late and incomplete. The existing national Health Management Information System (HMIS) is very weak. The system is designed for health information to flow from the health facility at the district level to the county health department and then to the national level. While there are data entry personnel at the HMIS central unit, these staff members have limited expertise in data management and are unable to carry out meaningful analyses and provide feedback to the counties and districts. The MOH&SW intends to establish a streamlined HMIS in the country. This will be implemented through support from USAID.

The MOH&SW is promoting health information management at the county level as part of the GOL decentralization plan to improve the delivery of health services in the country. According to the National Health Plan, the decentralized functions of the various levels of the HMIS are as follows:

- Central: monitoring and evaluation of implementation of the National Health Plan
- County: compile, analyze and provide HMIS data to central level and feedback to districts
- District: compile, analyze and provide HMIS data to county level and feedback to communities
- Community: Collection of health data by community health workers

Weekly reporting of the seven epidemic diseases to the central MOH&SW continues to receive support from WHO.

Because of the weak HMIS, vertical data collection systems have been established to allow specific disease control programs track their performance. In the new National Malaria Strategic Plan 2008-2012, the NMCP will develop an M&E system in collaboration with the MOH&SW Planning Department and integrate it into the overall HMIS. The NMCP intends to establish a functional M&E system including surveillance

at the national level with a regular feedback mechanism to the county and district levels, and have recently put together a costed M&E plan. The NMCP will also establish monitoring units in each county and train personnel to manage data at each level that will feed into the production of the annual malaria report.

Although the NMCP M&E Unit has a unit head and a data management person, neither of them has had any formal training in M&E.

Progress to date

To date, PMI has supported the Monitoring and Evaluation Systems Strengthening Tool (MESST) workshop, which was well attended and received good support from the MOH&SW. Planning is underway for the nationwide MIS that will be conducted in October/November of 2008. When the MIS was proposed and discussed in FY08 it was estimated that it would cost about \$1.2 million dollars, but only \$950,000 was made available through the PMI budget. The additional funds being proposed for FY09 will help to cover the remaining costs which will include finalizing the MIS report and its dissemination. Although the NMCP requested a larger sample size with county-level estimates, the need for such detail was questioned. The NMCP stance is that they are decentralizing, and each county will manage its own information and resources, therefore, they need this information down to this level. Following discussions within the PMI country team and PMI M&E groups, it was decided that PMI should not support this. Therefore, the Mission will continue to advocate for national rather than county-level data in the MIS.

An *in-vivo* study has been completed on drug efficacy at two health facilities in Monrovia, JFK and ELWA. However, the result is not representative of antimalarial drug sensitivity in the country. Data collection forms have been developed to report on cases of malaria attended to at health facilities and are being used by the NMCP but the reporting is untimely and incomplete. Support supervision to the counties and health facilities was carried out on very limited scale during the year due to lack of funding and similarly the bi-annual review of NMCP activities, according to their strategic plan, was not carried out as the Global Fund support ended. Currently BASICS is already supporting the MOH&SW in systems strengthening for HMIS. The capacity to collect data, analysis and interpret data for use is inadequate at all levels. The PMI is being requested to support the NMCP's efforts to improve M&E in order to strengthen the routine HMIS. PMI has discussed with the NMCP to establish four sentinel sites, where regular quality data will be collected to monitor the effect of malaria interventions on malaria morbidity and mortality.

Proposed USG activities: (\$692,100)

1. Support the MOH&SW to strengthen M&E capacity through short-term training for central and county level staff in order to improve the routine HMIS and the capacity of data use for planning, monitoring and evaluation purposes and

- support training of M&E personnel at the county and district levels in data collection, management, analysis and reporting at all levels (\$140,000);
2. Support for completion of the 2008 MIS (\$440,000);
 3. Support site selection and establishment of two more sentinel sites to collect data on malaria morbidity and mortality, and provide continuing support to previously established sentinel sites from 2008 (\$100,000); and
 4. Technical assistance visit from CDC to support M&E activities (\$12,100).

STAFFING AND ADMINISTRATION

Two new health professionals are being hired to oversee the PMI in Liberia, one representing CDC and one representing USAID. The USAID Advisor arrived in country in June 2008 and the CDC Advisor is expected in October. In addition, one FSN was hired to support the PMI team. All PMI staff members are part of a single inter-agency team led by the Health Team Leader, as designated by the USAID Mission Director. 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. The candidates for the in-country Advisor positions were evaluated and/or interviewed jointly by USAID and CDC, and both agencies were involved in hiring decisions, with the final decision made by the individual agency.

These two PMI professional staff will 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 will report to the Health Team Leader. The CDC staff person will be supervised by CDC both technically and administratively. All technical activities will be undertaken in close coordination with the MOH/NMCP and other national and international partners, including the WHO, UNICEF, the Global Fund, World Bank, and the private sector.

Locally-hired staff that support PMI activities either in Ministries or in USAID are 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.

Table 2

President's Malaria Initiative – Liberia
Planned Obligations for FY 2009 (USD \$11,800,000)

Proposed Activity	Mechanism	Budget (commodities)	Geographic area	Description of activity
PREVENTIVE ACTIVITIES				
ITNs				
Procure LLINs	Deliver	3,360,000 (3,360,000)	Nationwide	Procure 480,000 LLIN for free distribution through health facilities and community-based systems
Systems support for strengthening management of national LLIN program	Deliver	140,000	Nationwide	Support for strengthening management of national LLIN program through the NDS and NMCP
Evaluation of durability and acceptability of WHOPES-approved LLINs	MENTOR	50,000	Selected Sites	Conduct a longitudinal evaluation of durability and acceptability of WHOPES-approved LLINs in selected sites throughout the country
SUBTOTAL Insecticide-treated bednets		\$3,550,000 (\$3,360,000)		
IRS				
IRS	RTI	825,000 (350,000)	Selected Sites	50,000 households will be sprayed with an approved insecticide
Capacity strengthening in entomology	RTI-IVM	100,000	NA	Training and mentoring for a senior vector control officer and in-country training for entomology

Proposed Activity	Mechanism	Budget (commodities)	Geographic area	Description of activity
				technicians
Technical assistance related to malaria vector control	CDC	24,200	NA	Technical assistance visits to monitor implementation of vector control activities
Insecticide resistance monitoring	RTI	50,000	Multiple sites	Assist NMCP to maintain insecticide resistance monitoring system
SUBTOTAL: Indoor Residual Spraying		\$999,200 (\$350,000)		
IPTp				
Pre-service training for malaria in pregnancy	New RFA Basic Package of Health Services (BPHS)	150,000	Nationwide	Support training curriculum for malaria in pregnancy at medical and nursing schools, including development and production of training materials
In-service training of facility- and community-based health workers and midwives	MENTOR	150,000	Nationwide	Support on-the-job training of facility-based and community level personnel and volunteers in malaria in pregnancy, including development and production of training materials
SUBTOTAL: Malaria in Pregnancy		\$300,000 (\$0)		

Proposed Activity	Mechanism	Budget (<i>commodities</i>)	Geographic area	Description of activity
TOTAL Preventive		\$4,849,200 (\$3,710,000)		
CASE MANAGEMENT ACTIVITIES				
Diagnosis				
Assist with development of national reference laboratory; support laboratory quality control and supervision	IMaD	150,000	Monrovia	Assist MOH&SW to identify specific equipment and supply needs for the national reference laboratory at LIBR and support development of quality control of malaria laboratory diagnosis
Technical assistance on malaria laboratory diagnosis	CDC	12,100	NA	Technical assistance to oversee progress on diagnostic capacity development
Train laboratory technicians	IMaD	100,000	Nationwide	Train laboratory technicians in malaria microscopy and RDTs
Procurement of RDTs	DELIVER	700,000 (700,000)	Nationwide	Procure 1,200,000 RDTs
Procurement of laboratory supplies and equipment	DELIVER	350,000 (350,000)	Nationwide	Procure laboratory supplies and equipment including reagents, microscopes, and battery-operated lights for LIBR and health facilities
SUBTOTAL: Diagnostics		\$1,312,100 (\$1,050,000)		
Pharmaceutical Management and Treatment				
Procurement of ACTs	DELIVER	1,200,000 (1,200,000)	Nationwide	Procure 1 million AQ-AS treatments for uncomplicated malaria

Proposed Activity	Mechanism	Budget (commodities)	Geographic area	Description of activity
Procurement of drugs and supplies for treatment of severe malaria	DELIVER	345,000 (345,000)	Nationwide	Procure parenteral artemether and quinine and administration kits
Pre-service and in-service training for case management	New RFA BPHS	400,000	Nationwide	Train students in health care professions and public and private health care workers and drug sellers in case management, including coaching; updating the curriculum and producing materials and distributing guidelines, including training supplies
Strengthen national pharmaceutical management system	SPS	250,000	Nationwide	Support MOH&SW to strengthen the drug management system, including forecasting registration, logistic/information system, supervision, and warehousing at all levels
Upgrading of county drug depots	DELIVER	100,000	Nationwide	Minor repairs and improved security for the nine country drug depots
Strengthen drug quality control	USP-DQI	100,000	Monrovia	Support MOH&SW to strengthen inspection and quality control of antimalarial drugs
Pilot evaluation of community-based management with ACTs	New RFA BPHS	200,000	TBD	Support a pilot evaluation of community-based use of ACTs
Support to <i>in vivo</i> drug efficacy monitoring	MENTOR	50,000	TBD	Assist NMCP to monitor efficacy of AS-AQ in selected additional sites outside of Monrovia
SUBTOTAL: Treatment		\$2,645,000 (\$1,545,000)		
TOTAL Case Management		\$3,957,100 (\$2,595,000)		
IEC/BCC				

Proposed Activity	Mechanism	Budget (<i>commodities</i>)	Geographic area	Description of activity
Integrated IEC/BCC for malaria case management, ITNs, malaria in pregnancy, IRS	New RFA BPHS	900,000	Nationwide	Support IEC/BCC at the community and national levels via the MOH&SW Health Promotion Division; promote key malaria prevention and control interventions through small grants to NGOs, CBOs and FBOs
TOTAL IEC/BCC		\$900,00 (\$0)		
MONITORING AND EVALUATION				
Strengthening of M&E system through training of personnel in data collection and management	New RFA BPHS	140,000	Nationwide	Training of health workers in data collection, management, analysis and reporting at all levels including short-course training in M&E for select NMCP staff
Support MIS	Measure DHS Phase III	440,000	Nationwide	Support for final analysis and publication of the 2008 MIS report
Support establishment of additional sentinel sites	MENTOR	100,000	TBD	Assist NMCP to select and establish additional sentinel sites to collect malaria morbidity and mortality data
Technical assistance to M&E activities	CDC	12,100	NA	TA visit by CDC staff to support M&E activities
TOTAL: Monitoring and Evaluation		\$692,100 (\$0)		
CAPACITY BUILDING				

Proposed Activity	Mechanism	Budget (commodities)	Geographic area	Description of activity
Improving capacity for NMCP program management and supervision	New RFA BPHS	300,000 (\$0)	TBD	Improve NMCP capacity for program management and supervision at central and county levels through short-term training and mentoring; procure office equipment as needed
TOTAL: Capacity Building				
IN-COUNTRY MANAGEMENT AND ADMINISTRATION				
In-country staff and administrative expenses	USAID/CDC IAA	1,101,600 (\$0)	NA	Salaries ,benefits and related administrative costs of in-country PMI staff
		\$1,101,600 (\$0)		
GRAND TOTAL		\$11,800,000 (\$6,305,000)	Commodities represent 53.4% of the total budget	

Table 3

**President's Malaria Initiative – Liberia
Year 2 (FY09) Budget Breakdowns by Intervention (\$11,800,000)**

Area	Commodities \$ (%)	Other \$ (%)	Total \$
Insecticide-treated Nets	3,360,000 (95%)	190,000 (5%)	3,550,000
Indoor Residual Spraying	350,000 (35%)	649,200 (65%)	999,200
Case Management	2,595,000 (66%)	1,362,100 (34%)	3,957,100
Intermittent Preventive Treatment	0 (0%)	300,000 (100%)	300,000
IEC/BCC	0 (0%)	900,000 (100%)	900,000
Monitoring and Evaluation	0 (0%)	692,100 (100%)	692,100
Capacity Building	0 (0%)	300,000 (100%)	300,000
Administration	0 (0%)	1,101,600 (100%)	1,101,600
Total	6,305,000 (53%)	5,495,000 (47%)	11,800,000

Table 4**Year 2 (FY09) Budget Breakdowns by Partner (\$11,800,000)**

(Once the FY09 Implementation Plan is approved and contracts/grants cooperative agreements awarded, all other partners will be listed here)

Partner Organization	Geographic Area	Activity	Budget
DELIVER	Nationwide	Procure LLIN	3,360,000
		Systems support for strengthening management of national LLIN program	140,000
		Procurement of RDT	700,000
		Procurement of laboratory supplies	200,000
		Procurement of laboratory equipment	150,000
		Procurement of ACTs	1,200,000
		Procurement of drugs for severe malaria	345,000
		Strengthening of drug management system	100,000
RTI	TBD	IRS	825,000
	NA	Capacity strengthening in entomology	100,000
	TBD	Insecticide resistance monitoring	50,000
New RFA BPHS that will provide sub-grants to NGOs and FBOs	Nationwide	Pre-service training for MIP	150,000
		Pre-service and in-service training for case management	400,000
		Integrated IEC/BCC for malaria case management, ITNs, malaria in pregnancy, IRS	900,000
	TBD	Pilot evaluation of community-based management with ACTs	200,000
	NA	Strengthening of M&E system through training of personnel in data collection and	140,000

		management	
	TBD	Improving capacity for NMCP program management and supervision	300,000
MENTOR	Selected Sites	Durability and acceptability evaluation of WHOPEs approved LLIN	50,000
	Nationwide	Training of CHWs, HCWs and midwives	150,000
	TBD	Supporting <i>in vivo</i> clinical efficacy monitoring	50,000
		Supporting the establishment of additional sentinel sites	100,000
IMaD	Monrovia	Assist with development of national reference laboratory and support laboratory quality control and supervision	150,000
	Nationwide	Train laboratory technicians	100,000
SPS	Nationwide	Strengthening of drug management system	250,000
USP-DQI	Monrovia	Strengthening drug quality monitoring capacity	100,000
Measure DHS Phase III	Nationwide	Support for 2008 MIS	440,000
Staffing and Administration	NA	Staffing plus CDC TDYs and TA	1,148,400

