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PRESIDENT'S MALARIA INITIATIVE
Malaria Operational Plan — FY 2011 (Year 4)

GHANA

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ABBREVIATIONS

ACT	Artemisinin-based combination therapy
AGA	AngloGold Ashanti mining company
AMFm	Affordable Medicines Facility - Malaria
ANC	Antenatal care
AS/AQ	Artesunate-amodiaquine
AL	Artemether-lumefantrine
BCC	Behavior change communication
BCS	Behavior Change Support Project
CBA	Community-based agent
CCM	Country Coordinating Mechanism
CDC	Centers for Disease Control and Prevention
CHIM	Center for Health Information Management
CHPS	Community-based Health Planning and Services
CHV	Community health volunteer
CMS	Central medical stores
DDT	Dichloro-diphenyl-tichloroethane
DfID	Department for International Development, UK
DHAP	Dihydroartemisinin-piperaquine
DHIMS	District Health Information Management System
DHS	Demographic and Health Survey
DMIS	District Management Information System
DSS	Demographic surveillance site
EPA	Environmental Protection Agency, Ghana
FANC	Focused antenatal care
FBO	Faith-based organization
FDB	Food and Drugs Board
FRHP	Focus Region Health Project
FSN	Foreign Service National
FY	Fiscal Year
GFATM	The Global Fund to Fight AIDS, Tuberculosis and Malaria
GHS	Ghana Health Service
HBM	Home-Based Management
HCW	Health care workers
HMIS	Health Management Information System
HSS	Health Systems Strengthening
IAA	Inter-Agency Agreement
IDSR	Integrated disease surveillance and response system
IEC	Information, education and communication
IMaD	Improving Malaria Diagnostics
IMCI	Integrated Management of Childhood Illnesses
IPTi	Intermittent preventive treatment of infants
IPTp	Intermittent preventive treatment of pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated net

LCS	Licensed Chemical Sellers
LF	Lymphatic filariasis
LLIN	Long-lasting insecticide-treated net
LMIS	Logistics Management Information System
MCH	Maternal and child health
M&E	Monitoring and evaluation
MICS	Multiple Indicator Cluster Survey
MIP	Malaria in pregnancy
MIS	Malaria Indicator Survey
MOH	Ministry of Health
MOP	Malaria Operational Plan
NHIS	National Health Insurance Scheme
National Strategic Plan	Strategic Plan for Malaria Control in Ghana 2008-2015
NGO	Non-governmental organization
NMCP	National Malaria Control Program
NMIMR	Noguchi Memorial Institute of Medical Research
NTD	Neglected Tropical Diseases
NQCL	National Quality Control Laboratory
PEPFAR	President's Emergency Plan for AIDS Relief
PLWHA	People living with HIV/AIDS
PMI	President's Malaria Initiative
ProMPT	Promoting Malaria Prevention and Control in Ghana project
RCC	Rolling Continuation Channel (Global Fund proposal type)
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RFA	Request for Applications
RTI	Research Triangle Institute
SP	Sulfadoxine-pyremethamine
SPS	Strengthening Pharmaceutical Systems
USG	United States Government
USP	United States Pharmacopeia
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VCT	Voluntary Counseling and Testing (for HIV)
WHO	World Health Organization

EXECUTIVE SUMMARY

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

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, and tuberculosis. The PMI was launched in June 2005 as a five-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through FY 2014. Programming of PMI activities follow the core principles of GHI: encouraging country ownership and investing in country-led plans and health systems; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; implementing a woman- and girl-centered approach; improving monitoring and evaluation; and promoting research and innovation.

Malaria is a major public health concern in Ghana with the entire population of 24 million at-risk. More than 3 million cases of clinical malaria are reported in public health facilities each year, of which 900,000 cases are in children under five years. Despite this, significant progress in malaria control is being achieved in Ghana through the combined efforts of the Global Fund, PMI, and other partners. For example, household ownership of an insecticide-treated net (ITN) has risen from 3% in 2003 to 33% in 2008.

Ghana became a PMI country in December 2006. Large-scale implementation of malaria interventions began with FY 2008 funding and has progressed rapidly with continued support from PMI and other partners. This FY 2011 Malaria Operational Plan is based on progress over the previous three years and was developed with the participation of the National Malaria Control Program (NMCP) and national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing to support with FY 2011 funding fit well with the Ministry of Health's *Strategic Plan for Malaria Control in Ghana 2008–2015* (National Strategic Plan) and complement funding from other donors. The proposed PMI funding of \$28.9 million for FY 2011 will be focused on the following areas:

Insecticide-treated nets (ITNs): Scaling up to universal coverage of ITNs is a high priority for Ghana's NMCP. With support from PMI and several development partners, including the Global Fund and the United Kingdom Department for International Development (DfID), the NMCP expects to receive sufficient long-lasting ITNs (LLINs) to achieve universal coverage by December 2011. PMI is procuring 2.3 million LLINs to expand free distributions to vulnerable populations. With FY 2011 funding, PMI will procure approximately 1.9 million LLINs and will support their free distribution through antenatal and immunization clinics to maintain coverage for vulnerable populations and to meet replacement needs for expired nets. In addition, PMI will provide technical assistance for planning and logistics to strengthen Ghana's routine

distribution systems and will continue to support activities at the national and local levels to promote net ownership and usage.

Indoor residual spraying (IRS): Ghana's National Strategic Plan calls for a rapid scale up of IRS, building on the successful programs supported by PMI in Northern Region and the AngloGold Ashanti (AGA) Mining Company in the Obuasi District of Ashanti Region. The PMI-supported IRS program is building national capacity and expanding spray operations to eight districts in 2010. IRS activities supported by PMI include pesticide procurement, environmental assessment and compliance monitoring, insecticide resistance monitoring, community mobilization, spray operations, data collection and reporting. PMI-supported IRS activities currently underway will protect 800,000 residents. With FY 2011 funding, PMI will expand IRS into a ninth district in the Northern Region to expand protection to a total of 950,000 residents. PMI will also continue to support entomologic and environmental monitoring and to build capacity in IRS planning, operations and supervision. PMI will also assist the Global Fund/AGA program expand IRS activities across the north.

Intermittent preventative treatment in pregnant women (IPTp): Ghana adopted an IPTp policy employing three doses of sulfadoxine-pyrimethamine (SP) in 2004. The PMI has been the NMCP's primary partner supporting training in malaria in pregnancy, including IPTp. During the past year, PMI supported training for 1,170 health care workers in all districts in Northern and Upper East Regions and 40 targeted districts in other regions in Ghana. PMI also helped to publish and disseminate guidelines and training manuals to support IPTp activities. PMI has procured 10 million doses of SP annually for the past two years and also provided supplies to support SP administration under direct observation and supported BCC activities to promote IPTp and ITN use in pregnant women.

With FY 2011 funding, PMI expects to scale up training to all remaining districts in Ghana for a total of 10,000 health workers over a three-year period. PMI will also procure sufficient SP to fill national gaps, strengthen comprehensive antenatal care through supportive supervision and quality improvements, and continue support for behavior change communication (BCC) activities to increase attendance at antenatal clinics and full adherence to IPTp.

Case management:

Diagnosics — During the past year, PMI provided technical assistance related to malaria laboratory diagnosis and launched an on-site quality assurance program that will reach all 402 clinical laboratories in the country. PMI also procured microscopes and laboratory equipment to fill gaps in the national laboratory system. With FY 2011 funding, PMI will procure additional microscopes and rapid diagnostic tests (RDTs) as necessary and will support quality assurance of malaria diagnosis at health facilities and at the community level.

Treatment — During the past year, PMI procured artemisinin-based combination therapies (ACTs) and artesunate suppositories for pre-referral treatment of severe malaria. PMI collaborated in conducting case management training in three regions reaching 1,144 health workers. PMI-technical assistance has been focused on nationwide training for public and private-sector health workers and scaling up of home-based management of malaria. With FY 2011 funding, PMI will procure severe malaria medications and expand supervision and quality

assurance programs nationally. All needs for ACTs are expected to be covered by the Global Fund. PMI will support the scale-up of home based management of malaria activities and provide technical assistance to strengthen the capacity of licensed drug sellers for effective case management of malaria in the private sector. PMI will also continue to support BCC to improve care/treatment seeking behaviors.

Pharmaceutical management — PMI is supporting strengthening of the pharmaceutical management system to ensure availability and appropriate use of malaria commodities including ACTs and RDTs as well as strengthening drug quality monitoring capacity. PMI has also supported quantification of antimalarial drugs and activities to promote rational use of ACTs, drug quality monitoring, and *in vivo* drug efficacy testing. Collectively, these efforts are helping the Central Medical Stores improve management of ACTs and move away from emergency procurements. With FY2011 funding, PMI will build on these investments to strengthen logistics and supply chain systems including implementation of the end user verification tool. PMI support will continue to improve ACT prescribing and dispensing practices in the public and private sectors. PMI will also strengthen drug quality monitoring, post market surveillance and capacity of the Food and Drugs Board to enforce drug quality regulations.

Health system strengthening:

In line with GHI principles, PMI will increase support for activities that build local capacity and strengthen health systems. The PMI has supported non-governmental and faith-based organizations in Ghana through a sub-grant program in five regions that extends the reach of malaria interventions to the community level. PMI has supported professional development of NMCP staff through training and educational opportunities and provided technical assistance to strengthen commodity supply chains for ITNs and pharmaceuticals. With FY 2011 funding, PMI will intensify focus on building management, leadership, and technical capacity of Ghana Health Service and district health management teams for the implementation and oversight of effective integrated community outreach and HBM activities. PMI will also increase support to the NMCP to enable their effective monitoring and supervision of malaria control activity implementation nationwide.

Integration with other Global Health Initiative programs

As a component of GHI, PMI in collaboration with other USG funding streams will expand support for implementation of integrated health programming to maximize impact of USG investments on the overall health system while still ensuring specific goals in maternal and child health, nutrition, reproductive health, water and sanitation, malaria, and HIV/AIDS are maintained. In three regions (Greater Accra, Western and Central) the USG with PMI and other health sector funding will intensify support for a package of integrated services at the community, district and regional levels to encourage positive behavior change, improve quality of health service delivery, and improve health management systems. With FY 2011 funding, PMI will expand support for USG efforts aimed at strengthening health system supply chains, providing technical assistance to improve integrated antenatal care services, and increasing coordination between PMI and PEPFAR programs, specifically with respect to laboratory services and monitoring and evaluation systems.

Monitoring and Evaluation (M&E):

PMI has supported the Ghana Health Service to develop a comprehensive national malaria M&E plan, and funded the malaria module of the 2008 Demographic and Health Survey (DHS). To guide future IRS activities in Ghana, PMI is also conducting an evaluation of one annual round of IRS compared to two rounds. With FY 2011 funding, PMI will support the NMCP to strengthen routine malaria data systems at the national, regional, district and sub-district levels, assess the availability of malaria commodities at the health facility level, and collect data for the Roll Back Malaria/PMI impact evaluation.

INTRODUCTION

Global Health Initiative

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

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

President's Malaria Initiative

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, maternal and child health, and tuberculosis. The PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through FY 2014 and, as part of the GHI; the goal of the PMI is now to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by reaching 85% coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including ACTs, ITNs, IPTp, and IRS.

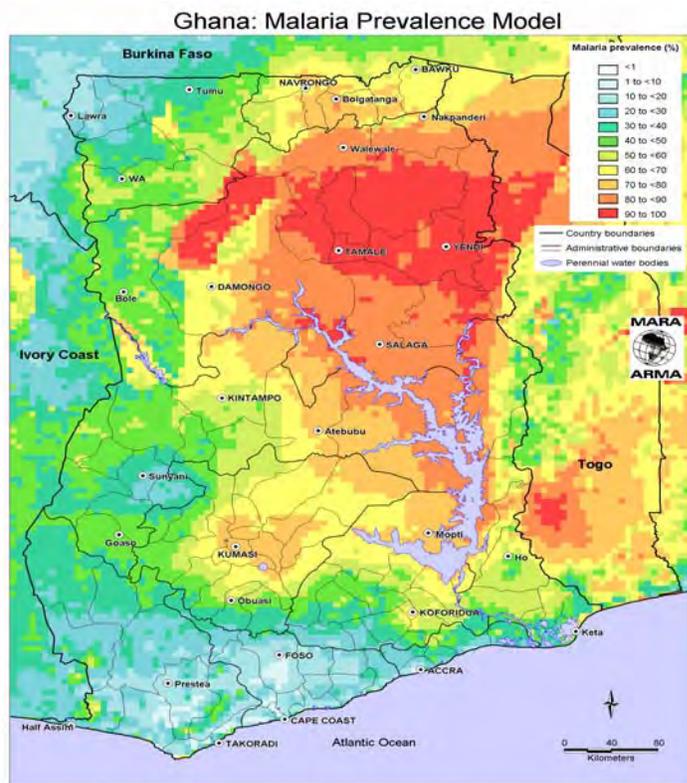
Ghana became a PMI focus country in December 2006. Large-scale implementation of malaria interventions began in 2008 and has progressed rapidly with continued support from PMI and other partners

This FY 2011 Malaria Operational Plan presents a detailed implementation plan for the fourth year of PMI in Ghana, based on the PMI Multi-Year Strategy and Plan and the NMCP's 7-Year Strategy. It was developed in consultation with the Ghana National Malaria Control Program and with participation of national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing will support the National Strategic Plan and build on investments made by PMI and other partners to improve and expand malaria-related services, including the Global Fund Round 8 and Rolling Continuation Channel (RCC) grants. This document briefly reviews the current status of malaria control policies and interventions in Ghana, describes progress to date, identifies challenges and unmet needs, and provides a description of planned FY 2011 activities.

MALARIA SITUATION IN GHANA

Malaria is hyper endemic in all parts of the country. Ghana's entire population of 24 million is at risk of malaria, although transmission rates are lower in the urban areas. Transmission occurs year-round with seasonal variations during the rainy season. According to Ghana Health Service (GHS) health facility data, malaria is the number one cause of morbidity, accounting for about 38% of all outpatient illnesses, 36% of all admissions, and 33% of all deaths in children under five years. Between 3.1 and 3.5 million cases of clinical malaria are reported in public health facilities each year, of which 900,000 cases are in children under five years. An estimated 14,000 deaths in children under five were attributable to malaria in 2008. The verbal autopsy component of the 2008 DHS household survey found that malaria accounted for 43% of all deaths in children aged 29 days to 5 years, and that roughly half of deaths in children under five occurred at home.

Ghana can be stratified into three malaria epidemiologic zones: the northern savannah; the tropical rainforest; and the coastal savannah and mangrove swamps. The major vectors are *Anopheles gambiae* and *An. funestus*. Characteristically, these species bite late in the night, are indoor resting, and are commonly found in the rural and peri-urban areas where socio-economic activities lead to the creation of breeding sites. *Anopheles melas* is found in the mangrove swamps of the southwest and *An. arabiensis* in savannah areas of northern Ghana. Northern Ghana experiences pronounced seasonal variations with a prolonged dry season from September to April. The normal duration of the intense malaria transmission season in the northern part of the country is about seven months beginning in April/May and lasting through to September. There are no areas of epidemic malaria in Ghana.



This map is a product of the MARAJARMA collaboration (<http://www.mara.org.za>). March 2002, Medical Research Council, PO Box 17120, Congella, 4013, Durban, South Africa
 CORE FUNDERS of MARAJARMA: International Development Research Centre, Canada (IDRC), The Wellcome Trust UK, South African Medical Research Council (MRC), Swiss Tropical Institute, Multilateral Initiative on Malaria (IMI) / Special Programme for Research & Training in Tropical Diseases (SPRTD), Roll Back Malaria (RBM), Malaria Prevalence Model: 1. Klooschmidt et al. 2001. An empirical malaria distribution map for West Africa. Tropical Medicine and International Health 6: 779-785
 Topographical data: African Data Sampler, WRI; http://www.igis.org/wri/ids/maps/ids/ath_1d

Current Status of Global Fund Malaria Grants and other partners

The NMCP is currently receiving funds through an RCC grant to scale up prompt and effective treatment of malaria at health facilities, to expand IPTp for all pregnant women, and to scale up universal coverage of ITNs. In mid-2009, Ghana was awarded a Round 8 grant to scale up IRS and home-based care (HBC). The HBC component in the grant targets children under five and intends to expand a successful pilot to 123 districts by promoting improved recognition of malaria symptoms at the household level and using trained community drug distributors to provide prompt and effective treatment with ACTs. The IRS component in the grant will be implemented by Anglo Gold Ashanti as the Principal Recipient, and aims to extend IRS coverage to approximately 35 districts over five years.

Ghana has been selected as a pilot country for the Affordable Medicines Facility - malaria (AMFm), a Global Fund program which is designed to dramatically reduce the cost of ACTs in the country and thereby push out monotherapy and sub-standard malaria treatments. Funding for all ACT requirements for Ghana during the FY 2011 will be covered under the RCC grant. Ghana expects to realize considerable savings in ACT procurements through the AMFm pilot, which will be redirected into LLIN procurements, supportive activities for improved case management, and operations research.

In addition to the Global Fund, other major malaria control partners in Ghana include the World Bank, UNICEF and DfID. The World Bank is procuring and distributing 200,000 LLINs per year in 2009, 2010, and 2011 in the three northern regions as part of an integrated nutrition

project. In 2010, DfID committed to procure and support distribution of 2.3 million LLINs through a grant to UNICEF.

NATIONAL MALARIA CONTROL PLAN AND STRATEGY

Overview of the Health System

The Ministry of Health (MOH) and the GHS collectively oversee both the public health and clinical care sectors in Ghana. The MOH exercises oversight and overall control of the entire health system, as well as policy formulation, and monitoring and evaluation (M&E) of progress in achieving set targets. GHS is responsible for delivery of public health and clinical services along with the two teaching hospitals in Accra and Kumasi. GHS operates at four levels: national, regional, district, and sub-district. There are over 320 hospitals, 760 health centers, and 1120 clinics in the country. Of these facilities, 83% are in the public sector and 9% are faith-based institutions most of which are closely integrated with GHS. The remaining 8% of facilities in the private sector are located primarily in the larger cities. The penetration of GHS services at the community level is variable. In many rural areas, networks of government-trained community health volunteers are active. Approximately 5% of Ghanaians also have access to community health nurses through the innovative Community-Based Health Planning and Services (CHPS) program. A major recent development in health system financing is the National Health Insurance Scheme (NHIS), initially implemented in 2006. By July 2008, 50% of the population had been enrolled, resulting in increased attendance at health facilities.

National Malaria Control Program

The NMCP which falls under GHS enjoys strong leadership and an excellent record of implementation under the Global Fund. The NMCP is headquartered in Accra, with zonal offices in Accra and Kumasi. The disease control officers and the malaria focal persons at the district and regional levels work closely with the NMCP at the central level. In June 2008, the NMCP led the development of a revised National Strategic Plan, which calls for a 75% reduction in malaria (morbidity and mortality) by the year 2015 (using 2006 as the baseline). The primary interventions supported in the National Strategic Plan include:

- early diagnosis of malaria using microscopy or RDTs;
- prompt and effective treatment with ACTs (target: 90% of patients with uncomplicated malaria will be correctly treated using ACTs at public and private facilities by 2015);
- universal coverage with ITNs (target: 85% of children under five years and pregnant women sleeping under an ITN by 2015);
- rapid scale up to cover one third of the country with IRS (target: 90% of all structures in targeted districts are covered); and
- IPTp with SP (target: 100% of pregnant women receiving at least two doses of IPTp by 2015).

During the PMI Malaria Operational Plan development process, the NMCP identified five critical gaps requiring priority attention from PMI, including 1) LLIN procurement, distribution and promotion; 2) Behavioral Change Communication (BCC) and community mobilization; 3) SP procurement; 4) diagnostic support, including RDT procurement; and 5) monitoring and evaluation (M&E).

CURRENT STATUS OF MALARIA CONTROL INDICATORS

Main Data Sources

The most recent Demographic Health Survey (DHS) was carried out in July–October 2008. During the interim between the 2003 and 2008 DHS surveys, the United Nations Children’s Fund (UNICEF) conducted a Multiple Indicator Cluster Survey (MICS) in August–October 2006 and used the MICS methodology in a survey conducted in three northern regions in 2007. Less nationally representative data are also available from NMCP surveys conducted in 2007 and 2008, which were weighted toward the districts and regions that received focused support from the Round 2 and Round 4 Global Fund grants. A NetMark survey sampled households in six regions in 2004 and 2008, focusing on bed net use. The 2008 DHS data provide the baseline for key PMI indicators. A Malaria Indicator Survey (MIS) is planned for 2011, which will repeat the malaria module of the DHS survey and will provide data for PMI in Ghana after three full years of implementation.

Trends in Malaria Intervention Indicators

Ghana has achieved steady gains in many of the key malaria intervention indicators. Between the 2003 and 2008 ITN ownership and use, uptake of IPTp, and treatment with ACTs have all increased significantly (Table 1 details the national level increases in the key indicators). However, significant regional differences in the coverage of key interventions demonstrate that efforts to scale up interventions must continue for Ghana to achieve the RBM, PMI and national targets.

In the 2008 DHS, ITN ownership averaged 33% for the country but varied from 47% in the Upper East Region to a low of 20% in the Greater Accra Region. The largely rural Northern Region had only 27% ITN ownership and is the focus of PMI net distributions in 2010. Coverage with IPTp2 was 44% nationally but varied from a high of 64% in Brong Ahafo Region to 26% in Upper East Region.

Indicator	2003 DHS	2006 MICS	2008 DHS
Proportion of households with one or more ITN	3%	19%	33%
Proportion of children under five years old who slept under an ITN the previous night	4%	22%	28%
Proportion of pregnant women who slept under an ITN the previous night	3%	NA	20%
Proportion of women who received two or more doses of IPTp during their last pregnancy in the last two years*	0	28%	44%
Proportion of children under five years old with fever in the last two weeks who received treatment with ACTs*	NA	3%	12%

*ACTs were adopted in 2004; SP was adopted for IPTp in 2003.

GOAL AND TARGETS OF THE PRESIDENT’S MALARIA INITIATIVE

The goal of PMI is to reduce malaria-associated mortality by 70% compared to pre-Initiative levels in the 15 original PMI countries. By the end of 2014, PMI will assist Ghana 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 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 houses in geographic areas targeted for IRS will have been sprayed;
- 85% of women who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy;
- 85% of government health facilities will have ACTs available for treatment of uncomplicated malaria; and
- 85% of children under five with suspected malaria will have received treatment with ACT within 24 hours of onset of their symptoms.

Baseline coverage figures for PMI/Ghana will come from the 2008 DHS data and will be compared to the 2011 MIS survey to gauge overall progress over the first three years of the initiative.

EXPECTED RESULTS – YEAR FOUR

Prevention:

- At least 1.9 million LLINs will be procured and distributed with PMI support. This, together with other partner’s contributions is expected to bring ownership of one or more ITN to 65%
- At least 85% of houses in nine districts targeted for IRS will have been sprayed, protecting at least 950,000 residents; and
- At least 60% of pregnant women will receive two doses of SP for IPTp, nationally, with PMI’s contributions including procurement of SP, support for supervision and quality improvements in the delivery of IPTp, and BCC activities to increase early ANC attendance.
- An evaluation comparing one versus two rounds of IRS on anemia and parasitemia in northern Ghana will have been implemented with results informing Ghana’s IRS strategy going forward.
- A nationwide evidence-based insecticide resistance management strategy will have been developed.

Case Management:

- All 402 clinical laboratories in the country will be capable of providing reliable laboratory confirmation of suspected malaria cases, and

- Treatment with ACTs will be available through an integrated home based care program in 63 priority rural districts, with PMI supporting all required training (i.e. more than 200 community health workers and 5000 community health volunteers).

INTERVENTIONS — PREVENTION ACTIVITIES

Insecticide-Treated Nets (ITNs)

Background

Ghana's National Strategy calls for universal coverage with ITNs, (one net for every two people), with specific targets to increase the proportion of the general population sleeping under an ITN to 80%, increase household ownership of at least one ITN to 100%, and increase the number of children under five and pregnant women sleeping under an ITN to 85% by 2015. From 2002 through 2009, the NMCP embraced a mixed model of ITN distribution, including free and subsidized distribution to vulnerable populations through campaigns, routine health systems, and NGO activities, as well as private sales at full cost to those who can afford them. These strategies have helped Ghana to increase ITN ownership from 3% to 33% in five years. However, access to affordable ITNs has been inconsistent for most Ghanaians. With coverage rates remaining below targets, it has become clear to the NMCP and its partners that "catch up" strategies will need to take priority over "keep up" or maintenance strategies. As a result, in early 2010, the NMCP and MOH determined that all LLINs will be distributed free of charge.

As Ghana strives toward the target of universal coverage the NMCP has refocused and streamlined their distribution approach to emphasize free mass distribution campaigns. The NMCP has eliminated its ongoing support for a voucher scheme (a distribution method designed to provide vulnerable populations with LLINs at a highly subsidized rate and utilizing private sector vendor/shops to provide choice in the type of net and to stimulate private sales) within four regions and has instead shifted the Global Fund support to distribution via free campaigns. The NMCP has advised PMI to discontinue the PMI-supported voucher program when the MOP FY09 activities are completed in September 2010 and to prioritize support for free distribution through mass campaigns, ANC, and child health clinics.

The NMCP expects to receive over ten million LLINs in 2010 and 2011. The LLINs will be distributed through a series of free distribution campaigns, with a goal of achieving universal coverage by December 2011. Regions will be included in campaigns in order of their 2008 DHS reported ITN use rates (regions with lowest rates covered first). The two regions that are predominantly urban (Greater Accra and Ashanti) will be covered last. Aside from PMI, the major support for LLINs will be provided by the Global Fund and DfID, with additional contributions from the World Bank and UNICEF. The Global Fund has authorized the NMCP to immediately procure all 3 million of the LLINs allocated for the first three years of the RCC grant and Global Fund is in the process of reprogramming funds to procure an additional 1.3 million LLINs. All LLINs procured through Global Fund grants will be distributed through free mass campaigns. Approximately 2.35 million LLINs will be provided by DfID and the World Bank expects to provide 200,000 LLINs in 2010 and 2011 for distribution in the northern half of Ghana through facility-based distribution.

Table 2. LLIN requirements and procurements to achieve universal coverage by December 31, 2011			
LLIN Requirements			
Total Population	UC Requirement*	Pre-2010 Distribution	Universal Coverage Need
24,000,000	12,000,000	2,059,564	9,940,436
LLIN Procurements			
Development Partners	2010	Expected 2011	Total procurements 2010 & 2011
Global Fund RCC 2009-11	1,965,360	1,100,800	3,066,160
Global Fund reprogram (ACT procurement savings from AMFm)		1,300,000	1,300,000
PMI (FY09 - FY10)	955,000	2,300,000	3,255,000
UNICEF	24,700		24,700
World Bank	200,000	200,000	400,000
DfID		2,350,000	2,350,000
TOTAL	3,145,060	7,250,800	10,395,860

*requirement to meet UC by December 31, 2011

The need for nets in 2012 after reaching universal coverage will primarily be for replacement nets and for coverage of the new cohort of pregnant women and infants. Table 3 indicates that approximately 3 million LLINs will be needed to maintain coverage beginning in 2012.

Table 3. ITN Gap analysis after meeting universal coverage – 2012 Net Needs		
Item	Detail	LLINs
Population	24,000,000	
Percent of pregnant women	4%	
Number of pregnant women	960,000	
Number of nets needed		960,000
Pre-2010 net distributions (needing replacement)		2,059,564
Total nets required in 2012		3,019,564

Progress During Last 12 Months

PMI is a key partner in meeting Ghana's ITN needs. Building on support provided in Year 1, PMI procured 955,000 LLINs in Year 2 for distribution through campaigns. Based on the NMCP criteria to target regions with lowest ITN use first, vulnerable populations in Northern Region (11.2% LLIN use among children under 5) were targeted for the first campaign in May 2010. Every community in Northern Region was covered with a door-to-door distribution and

hang-up campaign. Although the NMCP expects to cover Northern Region with IRS as part of the Global Fund grant, it will likely be another two to three years before the IRS program reaches all of Northern Regions. Thus malaria prevention through increased LLIN use is critically needed. The eight districts that received PMI supported IRS in 2010 were included in the LLIN campaign because the NMCP views IRS and LLIN use as complementary malaria prevention interventions. Along with PMI, the NGO, NetsforLife, with financial support from Comic Relief/UK and MalariaNoMore/UK, supported the ITN distribution and hang-up campaign in Northern Region. The Northern Region campaign will be followed with a universal coverage campaign in the Eastern Region campaign in November 2010. With FY2010 funding, PMI expects to procure another 2.3 million LLINs primarily for distribution through campaigns. PMI is working with the NMCP to plan rolling campaigns that will target regions with the lowest ITN ownership and use as measured by the 2008 DHS, and to support most aspects of the campaigns, including planning, logistics, implementation and evaluation. A small proportion of the PMI procured LLINs will be distributed through facility-based systems and community mobilization activities.

PMI supported distribution of more than 200,000 LLINs through a subsidized voucher program in Central Region in Years 1 and 2. The voucher program will end in September 2010. During Year 3, PMI support for routine LLIN distribution will focus on working with the NMCP and local health facilities to strengthen the system for routine facility-based distribution to vulnerable populations and to replace worn-out LLINs. The revised system will roll out to regions following mass campaigns, starting where the 2010 campaigns have taken place and where PMI has supported facility-based distribution in 2009 and 2010. In Year 2, PMI supported the NMCP to update the National Malaria Behavior Change Communications Strategy and is promoting ITN use through radio; IEC; community mobilization using community health volunteers (CHVs), NGOs, FBOs, and information officers, etc.; traditional communication tools; and other methods. These behavior change activities will continue during 2010 and expand to include television and to integrate malaria prevention and control into an integrated health promotion campaign focused around positive health messages. The PMI BCC implementing partners are conducting baseline and endline surveys to assess behavior change, and the PMI communications team is planning a monitoring trip to assess PMI/Ghana BCC investments.

Proposed FY2011 Activities: (\$13,100,000)

With the expectation that Ghana will achieve universal ITN coverage through mass campaigns by December 2011, PMI support for ITN distribution will shift focus over the course of FY2011 from campaign support to targeted distribution to cover the new cohort of pregnant women, and replace worn out nets and maintain keep-up through routine systems. Through BCC activities, PMI will continue to promote net demand and use.

1. Procure LLINs for routine replacement and keep-up distribution: (\$10,500,000)

Procure and transport to district level at least 1,880,000 LLINs for distribution through routine ANC and child welfare clinics at health facilities to replace worn out ITNs and to maintain coverage of vulnerable populations. This contribution represents roughly 60% of the expected gap in 2012. The Global Fund, DfID and the World Bank are expected to meet the remaining gap. Geographic targeting will depend on previous campaign results, the status of improvements to routine distribution systems rollout, and MOH guidance. In

addition to procurement, funding in this activity includes transporting LLINs to districts and potentially to lower levels.

2. Planning, logistics, distribution, and evaluations for LLIN campaigns in late 2011 and strengthened routine LLIN distribution systems: (\$1,300,000)

During FY2011, Ghana will be transitioning from intensive LLIN distribution through campaigns to a routine replacement and maintenance distribution system. PMI will support a free LLIN distribution campaign (i.e. planning, logistics, operations, and post-campaign evaluation) planned for November or December 2011 and provide technical assistance to the GHS to strengthen routine LLIN distribution systems (e.g. develop guidelines, support training, etc). The activity will leverage any other campaign contributions of other development partners.

3. Promote ITN use through BCC and community mobilization: (\$1,300,000)

PMI will support BCC activities to promote ITN use at all levels from national to local utilizing mass media, IEC, community mobilization, and integrated health promotion campaigns. The PMI support for BCC and community mobilization is a high priority for the NMCP following the elimination of these activities from the Global Fund grants. The PMI ITN promotion will be evidence based and guided by the National Malaria Communications Strategy. PMI will continue to provide technical assistance to the National Malaria Communications Committee to ensure harmonized messaging and maximum geographic and population coverage. Evaluations of the ITN campaign and other ITN distribution activities will include a BCC component to assess effectiveness of BCC activities.

Indoor Residual Spraying (IRS)

Background

Ghana's National Strategic Plan calls for a scale up of IRS to one third of districts nationwide by 2015. Table 4 and Figure 1 summarize the planned IRS activities in Ghana. To date, the major programs are those supported by AGA in one district in the southern forest zone, and PMI in eight districts in the northern savannah zone. In order to enhance collaboration and strengthen MOH/NMCP oversight among IRS implementers, the Malaria Vector Control Oversight Committee was re-established in June 2009. This committee is developing national standard operating procedures and advocating for their enforcement by the Environmental Protection Agency and Food and Drug Board; promoting high standards in training and environmental compliance; and developing insecticide resistance management strategies.

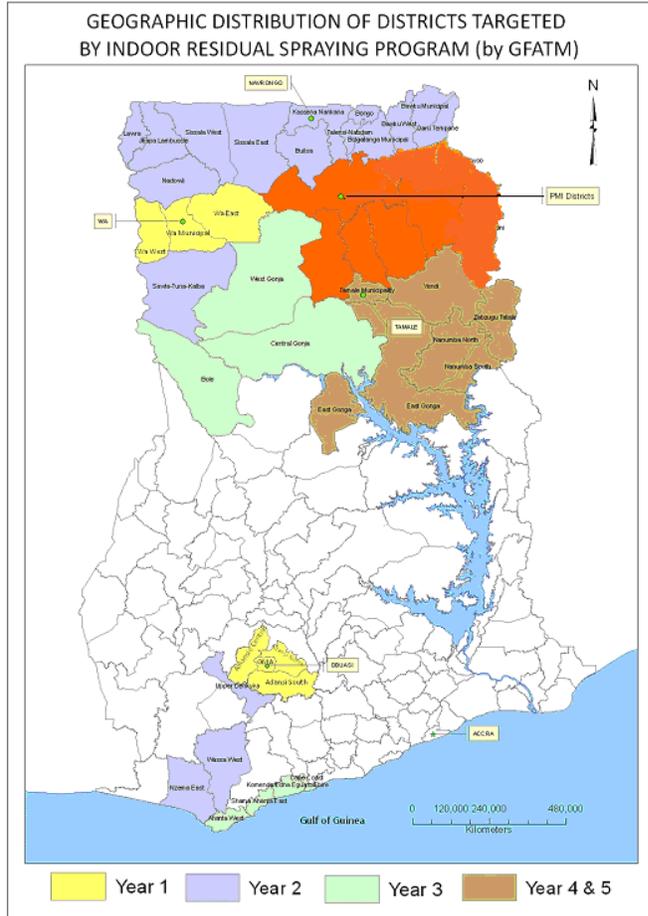
Since 2005, AGA has conducted IRS and larviciding in Obuasi municipality, an urban area of intense, year-round transmission. AGA will implement a five-year \$130 million Global fund grant, which is expected to start in 2010, to expand IRS into approximately 35 additional districts nationwide. This grant was awarded in November 2009, but grant implementation has been delayed due to an impasse over tax exemption and tax liability. At scattered locations in southern Ghana, additional small-scale IRS operations have been funded by Newmont, Red Back, other smaller mines, and a few plantations, reflecting increasing private sector interest in IRS.

In 2008, PMI supported IRS in all communities in five districts in Northern Region. The program expanded to six districts in 2009 and then to eight districts in 2010, covering a population of 850,000. The PMI field operations rely heavily on the existing systems of the GHS for storage and office space, human resources for training and supervision (e.g., the NMCP officers and regional and district disease control officers), and community mobilization through the network of community health volunteers. Close cooperation between the PMI-supported program and the future Global Fund program in northern Ghana is anticipated, including joint investments in entomologic monitoring; cooperation in training; and joint planning in procurement, M&E, insecticide resistance, and other areas.

The increased IRS activity has relied on the country's laboratories, insectaries, and research facilities to support the necessary entomologic and epidemiologic monitoring. The key facilities, located in Navrongo (GHS), Obuasi (AGA), and Tamale (PMI), have all benefitted from the technical guidance and malaria control expertise of the Noguchi Memorial Institute for Medical Research staff (NMIMR).

Program (Location)	Period	Ecolog. Zones	Period of Intense Transm.	Max. Popul'tn Covered	Spray Cycle	Pesticides Used to Date	Malaria Burden Impact Measures
AGA (Obuasi)	Since 2005	Forest --- Mostly Urban	10-11 mos.	240,000	2/ year -- full time workers	Pyrethroids O.phosphate Carbamate	A&P studies AGA hospital cases District cases Workforce measures Entomologic parameters
PMI/GHS (N. Reg)	Since 2008	Savan. --- Rural	6-7 mos.	900,000	1/ year, -- seasonal workers	Pyrethroids	A&P studies (future) District cases Entomologic parameters
Future Global Fund (national)	From 2010	Mixed	6-12 mos.	8 million (estim.)	2/ year -- TBD	TBD	A&P studies District cases Entomological Parameters

Figure 1. IRS target districts in Ghana, showing the 9 PMI districts (in red) and the future AGA/Global Fund districts (by year of proposed implementation).



Modified from: Ghana CCM, Round 8 Global Fund Malaria Proposals, June 2008

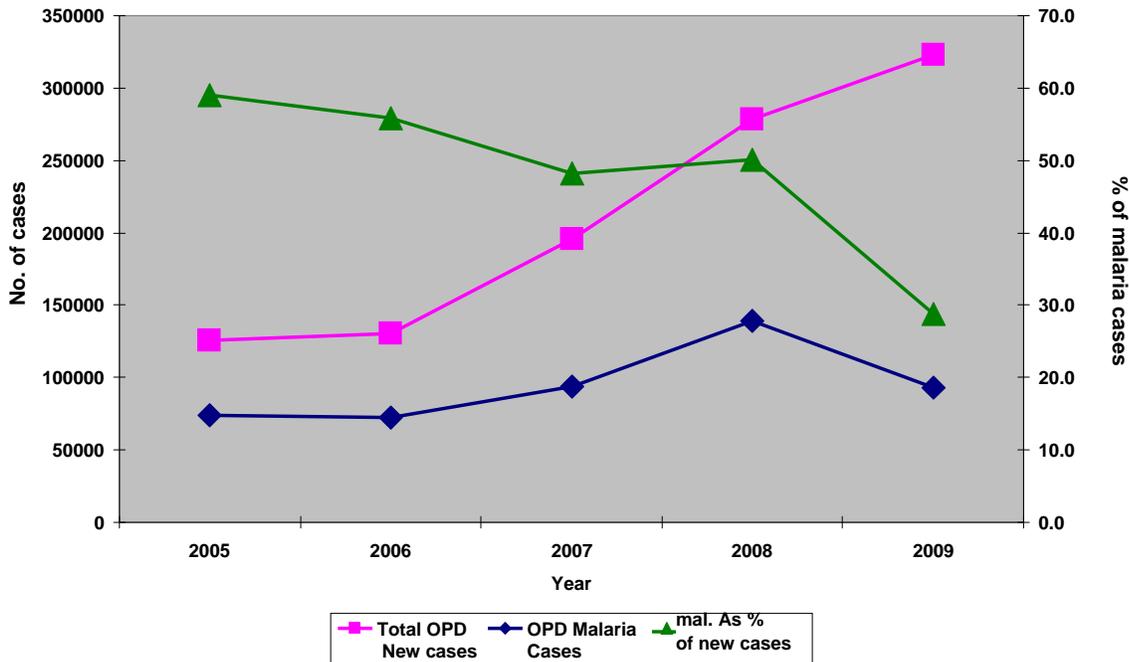
Progress During Last 12 Months

The PMI-funded program has demonstrated that large-scale, public-sector IRS can be established safely and rapidly in Ghana, even in remote districts where roads are poor and infrastructure limited. GHS and the Environmental Protection Agency (EPA) have praised the transparency of the PMI program and its high level of interaction with partners. Districts were targeted based on high malaria burden, pronounced rainy season transmission, and logistic feasibility. The PMI program reached 849,620 people and sprayed 342,876 rooms in 2010. Simultaneous operations were conducted at 22 sites covering 92% of sprayable structures and reaching the remotest areas first, before the rains began.

According to GHS analysis of its routine facility data, the IRS districts in Northern Region have experienced a decline in malaria cases as a proportion of all outpatient cases (Figure 2). In the districts not covered by IRS, no such decline in the proportion of malaria cases was observed. This trend was discernable against a background of significantly increased total out-patient department (OPD) cases due to the expansion of NHIS. A PMI-supported IRS rapid impact assessment using local hospital records in April 2010 found a favorable trend at two of four

facilities studied, but was inconclusive overall, due largely to the low rates of malaria confirmatory testing and other data quality issues.

Figure 2. OPD malaria cases in IRS districts of Northern Region, 2005-2009. IRS began in 2008.



Source: Ghana Health Service Northern Region Directorate, Annual Health Sector Review, February 2010.

Entomological monitoring

Entomological monitoring in Northern Region also provides evidence of the impact of the IRS program. A 64% reduction of *An. gambiae* was seen in sprayed houses versus those in non-IRS districts, and *An. gambiae* biting rates inside houses were reduced 28-33%, again indicating the positive impact on vector populations of IRS insecticides. Cone assays on walls in six IRS monitoring sites have shown excellent insecticide residual activity (93.2-97.6% mortality of *An. gambiae*, Kisumu strain) for alpha-cypermethrin after seven months on predominantly mud walls.

With support from PMI Ghana, the Noguchi Institute conducted insecticide susceptibility studies in the Northern Region since 2008 to support IRS operations. WHO Insecticide susceptibility assays were carried out by Noguchi in IRS districts using insecticide compounds from all four classes (pyrethroids, organophosphates, carbamates, and organochlorines). Percentage mortality results were high (95-100%) for the pyrethroids, organophosphates and carbamates but low (26-29%) for organochlorines.

A potentially worrisome finding in Northern Region is the change in behavior patterns seen for *An. gambiae* in IRS areas. Recent results have shown *An. gambiae* biting more outdoors than

indoors compared to non-IRS areas. These results may indicate the expected excito-repellency effects of pyrethroids or they might indicate a more problematic genetic trend towards biting outdoors for this important vector. Continued entomological surveillance will be necessary to monitor these behaviors closely.

The NMCP has identified key elements of an insecticide resistance management strategy, to include close oversight of all antimalaria vector activities by the Malaria Vector Control Oversight Committee. Insecticide rotation to a class other than pyrethroids for IRS should follow early detection of resistance and determination of resistance mechanism that allows evidence-based decisions. PMI will continue to provide technical assistance to the NMCP in this area. Continued vigilance is essential, as resistance to multiple classes of pesticides is well known in southern Ghana (associated with intensive pesticide use in agriculture) and elsewhere in West Africa.

Proposed FY2011 Activities: (\$6,034,000)

The NMCP expects PMI to expand its IRS geographic coverage as feasible. With FY2011 funding, PMI will support program expansion into one additional district, for a total of 950,000 people protected in nine districts of Northern Region. Building national capacity, transferring increasing responsibility to the MOH, and collaborating with all IRS stakeholders will continue to be guiding principles in Year Four. In the unlikely case that the Global Fund grant was to be cancelled due to failure to resolve the prolonged impasse on tax waivers, PMI would need to reevaluate its plans. Grant cancellation would raise important programmatic and epidemiologic questions regarding the rationale for expansion of PMI investments in IRS.

Given the seasonal transmission pattern in the target area, the assumption for FY2011 planning purposes continues to be that just one spray round will be conducted annually, at the start of the rainy season. However, a final determination will be made based on post-spray entomologic data, including pesticide susceptibility. Due to a lack of evidence, there is disagreement as to whether a single spray round provides adequate protection for the local population, and conversely, whether the extra costs of a second spray round are justifiable. An operations research activity will be supported to help answer this question. (As described in the Monitoring and Evaluation section of the MOP)

1. Support for IRS program implementation: (\$6,000,000)

In collaboration with GHS and with a continued focus on building local capacity, support the implementation of the fourth year of the IRS program in Northern Region. This will encompass entomological monitoring, spray operations, data collection, environmental assessment and compliance monitoring, BCC activities including community mobilization, and logistics support to cover a population of approximately 950,000 persons in at least nine districts. Activities will include continued support for procurement of insecticide and equipment; support for appropriate supervision by GHS, EPA, and NMIMR personnel; and collaboration with the Global Fund IRS program and other partners.

2. CDC expert TDY visit and provision of supplies to support entomologic monitoring for IRS: (\$34,000)

Provide technical assistance and quality assurance, through two visits by CDC expert personnel, for entomologic monitoring, including support for insecticide resistance management which includes limited funding for test equipment and supplies.

Malaria in Pregnancy (MIP)/Intermittent preventive treatment of pregnant women (IPTp)

Background

Malaria accounts for approximately 14% of outpatient attendance by pregnant women in Ghana, 11% of hospital admissions, and 9% of maternal deaths (MOH/GHS, 2008). IPTp with SP was adopted as the national policy in 2004, with three doses of SP to be administered to HIV-negative pregnant women starting after quickening (16 weeks or thereafter). The doses are administered at least one month apart with the last dose administered at least one month before delivery. All doses of SP are to be administered under direct observation. HIV-positive pregnant women are expected to receive monthly doses of SP after quickening (with a total of four doses) except if they are receiving co-trimoxazole. The National Strategic Plan target is 100% of all pregnant women receiving at least 2 doses of SP by 2015. The objective of the revised National Strategic Plan is 100% of all pregnant women receiving at least 2 doses of SP by 2015.

Attendance at ANC clinics has risen in recent years, with the percentage of women attending ANC clinics four or more times increasing from 69% in 2003 (DHS) to 78% in 2008 (DHS). In 2008, PMI supported a nationwide health facility survey that found that IPTp is offered in 94% of facilities sampled; this strong ANC attendance positions Ghana well to make gains in IPTp coverage. However, challenges include SP stock outs (27% of health facilities reported stock outs in the previous six months) and MIP training for all HCWs. The NMCP has asked PMI to prioritize filling critical shortages in SP (shortages due to Global Fund grant reductions and complexities within the MOH and National Health Insurance Scheme (NHIS) systems), support supply chain management, and help improve the quality of MIP services.

Progress During Last 12 Months:

ANC clinic attendance continues to increase and uptake of IPTp appears to be rising. PMI has focused on rolling out health worker in-service training in MIP along with behavior change and community mobilization to promote early ANC attendance and uptake of IPTp and nightly ITN use. Using the MIP protocols and training manuals that were developed during Year 1, PMI has partnered with the GHS to print over 10,000 copies, enough to cover the country and in conducting MIP in-service training in three regions, reaching over 2,500 HCW by mid-2010. In FY 2010, PMI plans to extend the MIP training throughout the rest of the country to support pre-service training in MIP for nurses and midwives and will work with GHS and teaching hospitals to integrate the revised MIP protocols into the teaching hospital programs for doctors and other health workers. In Year 2 and 3 PMI is procuring ten million doses of SP to meet the IPTp needs for the year and providing technical assistance to improve malaria pharmaceutical management and supply chains (details in pharmaceutical management section).

For the past two years PMI has promoted IPTp and ITN use among pregnant women through BCC including community mobilization through CHVs, NGOs, FBOs, information officers, etc.;

traditional communication tools; and other methods. With FY2010 funding, PMI is expanding these BCC activities to include television and creative use of media. PMI will integrate MIP BCC messages into USAID's MCH program, leveraging the combined resources to promote early ANC attendance and uptake of the full range of MIP services.

Proposed FY2011 Activities: (\$1,250,000)

1. Strengthen antenatal care (ANC) services and pre-service training to deliver a package of malaria prevention and care services to pregnant women: (\$500,000)
Provide support to improve the provision of quality, comprehensive and integrated ANC services to enhance malaria prevention and care to pregnant women, including the use of an LLIN and three doses of IPTp. National - and health facility - level support will include improving health worker capacity through pre-service training, supportive supervision, refresher training as needed, and quality assurance.
2. Procure SP for IPTp: (\$350,000)
Procure 10 million doses of SP to fulfill Ghana's IPTp requirements for the year.
3. Support BCC activities to increase early attendance at ANC and full adherence to IPTp: (\$400,000)
Support BCC activities focused on women of child bearing age to improve early presentation at ANC and increase adherence to the full three doses of IPTp. The MIP BCC activities will be integrated with MCH activities to leverage other USAID and development partner resources and to strengthen the combined impact of these resources. Malaria content will be highlighted in national health messaging, in addition to national and local malaria specific messaging. The PMI investment in BCC to promote IPTp will be geographically and temporally linked with other IPTp activities to maximize impact. This activity is part of a comprehensive BCC strategy that is directly linked to the National Malaria Communications Strategy and to other malaria prevention and treatment BCC. PMI will continue to provide TA to the National Malaria Communications Committee to ensure harmonized messaging and maximum geographic and population coverage. The messages and materials that are developed will employ evidence-based and creative communications techniques to promote maximum uptake of IPTp.

INTERVENTIONS — CASE MANAGEMENT

Malaria Diagnosis

Background

The NMCP/GHS continues to place high priority on improving malaria diagnostics. In this highly endemic country with a relatively weak laboratory infrastructure, the sheer volume of suspected cases presents enormous challenges. Appropriate and regular use of malaria laboratory tests has been the exception rather than the rule in Ghana, as documented in a PMI-supported 2008 laboratory assessment. In 2010, a PMI-supported quality assurance exercise

found that, where test results were negative, antimalarials were still prescribed 50% of the time in 1/2 of facilities, 75% of the time in 2/5 of facilities; and 100% of the time in 1/4 of facilities.

Several factors have combined recently to create momentum for increased malaria testing in Ghana:

- GHS insistence on improving the case management of malaria, as reflected in the revised national *Standard Treatment Guidelines (2010)*;
- NMCP frustration with continued high rates of “malaria” cases reported by district health authorities;
- Evolving international standards, notably the WHO’s recommendation for universal testing, even in highly endemic zones [Ref: WHO Guidelines for the treatment of malaria - 2nd edition, 2010];
- The imperative to promote rational, cost-effective use of ACTs, as expressed in the MOH 2009 malaria treatment policy, and the 2010 Global Fund agreements; and
- Increased donor interest in malaria diagnostics, including procurement of RDTs (e.g. by the Global Fund, PMI, Rotary Club, Malaria No More, etc.).

In late 2009, the NMCP began to actively promote a policy of universal malaria case confirmation (microscopy or RDTs) in all age groups. Current emphasis is being placed on strengthening capacity for laboratory confirmation in patients older than five years, through improved microscopy and scale-up of RDTs. The near-term focus is on scaling-up testing in MOH facilities, as well as private hospitals and clinics. As of mid-2010, the prerequisites for implementation at this level were largely in place, including: needs assessments, revised policies and guidelines, training of laboratory and front-line HCW, procurement, and funding.

The long-term objective is to scale up RDT use in peripheral settings, notably private pharmacies, licensed chemical seller shops, and potentially among community-based agents (CBAs) in settings of supervised home-based care programs. Policies, guidelines and resources for scale up at the peripheral level remain in the nascent stages. The NMCP has expressed interest in convening national stakeholders (including GHS, NHIS, LCS and pharmacists) in order to formally coordinate efforts in this area. The NMCP also plans to conduct operations research on the use of RDTs by LCS under the AMFm pilot.

Progress During Last 12 Months

To help scale up and improve quality malaria diagnostics, PMI partnered with the NMCP, the National Public Health Reference Lab, and the newly formed GHS Clinical Laboratories Unit at three levels: 1) developing national policy framework; 2) laboratory capacity; and 3) strengthening front-line health care worker capacity. The PMI supported finalization and dissemination of the *National Guidelines for Laboratory Diagnosis of Malaria*, which includes standard operating procedures and a detailed supervisory checklist. At the health facility level, PMI supported refresher training of laboratory technicians and supervisors, initiated a national reference slide bank program, as a tool for training and quality assurance; and in 2010 supported an ambitious program of nationwide outreach training and supportive supervision. In the first round, regional supervisors provided on-site training to 245 lab personnel in 60 laboratories and laid plans to cover all 402 laboratories within the year. The outreach training and supportive supervision is generating facility-specific data on equipment, training needs, prescriber

compliance, stock-outs, technician performance, which will guide future GHS and PMI investments. Thirty microscopes, 74,000 RDTs, and additional supplies were procured to help fill gaps. An additional \$1M procurement of microscopes, RDTs and supplies is in the planning stage. At the level of front-line HCW, PMI provided technical assistance to incorporate RDTs and improved diagnostics in GHS and Pharmacy Council training courses. By the end of May 2010, approximately 1500 HCW in three regions have been trained in improved diagnostic practice with PMI support.

Proposed FY2011 Activities: (\$850,000)

1. Procure microscopy equipment, RDTs, and other laboratory supplies: (\$550,000)
Procure additional microscopes, microscopy supplies (reagents, slides, lancets, etc), and RDTs to increase malaria diagnostic testing capacity in Ghana. Based on based experience, it is anticipated that half of this amount would best be used to procure microscopes and microscopy kits in a 1:3 ratio, and the other half for RDTs. The precise numbers and product specification will be tailored to meet national gaps at the time, and will be contingent upon the findings of the PMI-supported outreach training and supportive supervision activity. RDT procurements will be coordinated with those of GHS, the Global fund, and other partners.
2. Build capacity for microscopy and RDTs and support implementation of diagnostic policy — laboratory settings: (\$150,000)
Support the NMCP and National Public Health Reference Laboratory to improve the capacity of clinical laboratories to perform malaria diagnostic tests nationwide. Further strengthen and extend the reach of the quality assurance program commenced in Year Two, including support for supervisory field visits and on-the-job training. This will include strengthening the capacity of the laboratory system to provide quality assurance for RDT use by non-laboratory personnel such as nurses. Provide technical assistance to further define and address laboratory-level bottlenecks to increase dramatically the rates of malaria confirmatory testing, in line with MOH objectives.
3. Build capacity for microscopy and RDTs and support implementation of diagnostic policy — front-line clinical settings: (\$150,000)
In support of the national diagnostic policy, provide technical assistance to expand the appropriate use of RDTs by front-line HCWs (i.e. non-lab personnel) in the public and private sectors in targeted regions. The initial focus will be RDT use in facilities where microscopy is unavailable, including health centers and CHPS compounds. Consideration will be given to supporting RDT use as a complement to microscopy in selected hospitals as well. To achieve high testing rates, certain busy hospitals may need to use RDTs after hours and during time of peak outpatient visits. This will include in-service training and supportive supervisory visits for healthcare providers. In addition, PMI will provide support to the NMCP to develop and implement guidelines for expanded RDT use by pharmacists, LCS, and CBAs.

Malaria Treatment

Background

Scaling up appropriate malaria treatment remains one of the greatest challenges in Ghana. According to the 2008 DHS, just 12% of children under five years old with fever were treated with an ACT within 24 hours. The proportion of children under five years old receiving any malaria treatment for an episode of fever with onset within the two weeks prior to the 2008 DHS was 43%. This indicator remained approximately the same when compared to 44% in 2003 (DHS) and 48% in 2006 (MICS).

Ghana first adopted ACTs as first-line therapy in 2004, recommending the use of artesunate and amodiaquine (AS/AQ). Artemether-lumefantrine (AL) and dihydroartemisinin-piperaquine (DHAP) therapies are officially endorsed as second-line treatments, reserved, at least in theory, for patients who do not tolerate amodiaquine. The MOH recognizes that promotion of multiple ACTs creates inefficiencies and is not in harmony with international recommendations. Yet it has concluded, with reason, that offering alternate ACTs is essential for overcoming the public resistance to AS/AQ. This stems from unsafe AS/AQ adult formulations that entered the market on initial roll out in 2004 and attracted much media attention at the time. Public acceptance of the alternate ACTs, and of pediatric formulations, has remained strong.

For severe malaria and for the treatment of uncomplicated malaria in the first trimester of pregnancy, quinine is the drug of choice. Rectal artesunate is endorsed for pre-hospital referral settings. All malaria treatment guidelines and training manuals have been revised accordingly and the MOH is now focusing on implementing the new policy through such measures as health care worker training and supervision banning monotherapies, and ensuring that NHIS insurance coverage policies for medications are consistent with the national malaria treatment

PMI-funded assessments of health facilities (2008) and pharmaceutical systems (2009) demonstrated that the public sector had made progress in complying with the national malaria treatment policies. Provider adherence was considerably worse in the private sector (e.g. FBOs, clinics, private pharmacies, LCSs, NGOs, and traditional healers), where approximately 60% of Ghanaians initially seek malaria treatment. Use of ACTs by healthcare professionals for confirmed uncomplicated malaria cases was 86% and 66% for the public and private sectors, respectively, although significant deficiencies in health worker prescribing practices remain. Ghana has over 10,000 LCSs, which typically do not have a pharmacist on staff and are heavily frequented as point-of-service facilities at the community level. Although the Food and Drug Board in 2009 and 2010 has taken a more aggressive stance, Ghana's private sector remains rife with substandard ACT products and artemisinin monotherapies. Poor public acceptance of AS/AQ discourages patients from purchasing this therapy. Consumers tend to prefer AS monotherapy, chloroquine, SP, or some combination of SP with an adjunct such as artesunate because they are more familiar and less expensive than ACTs.

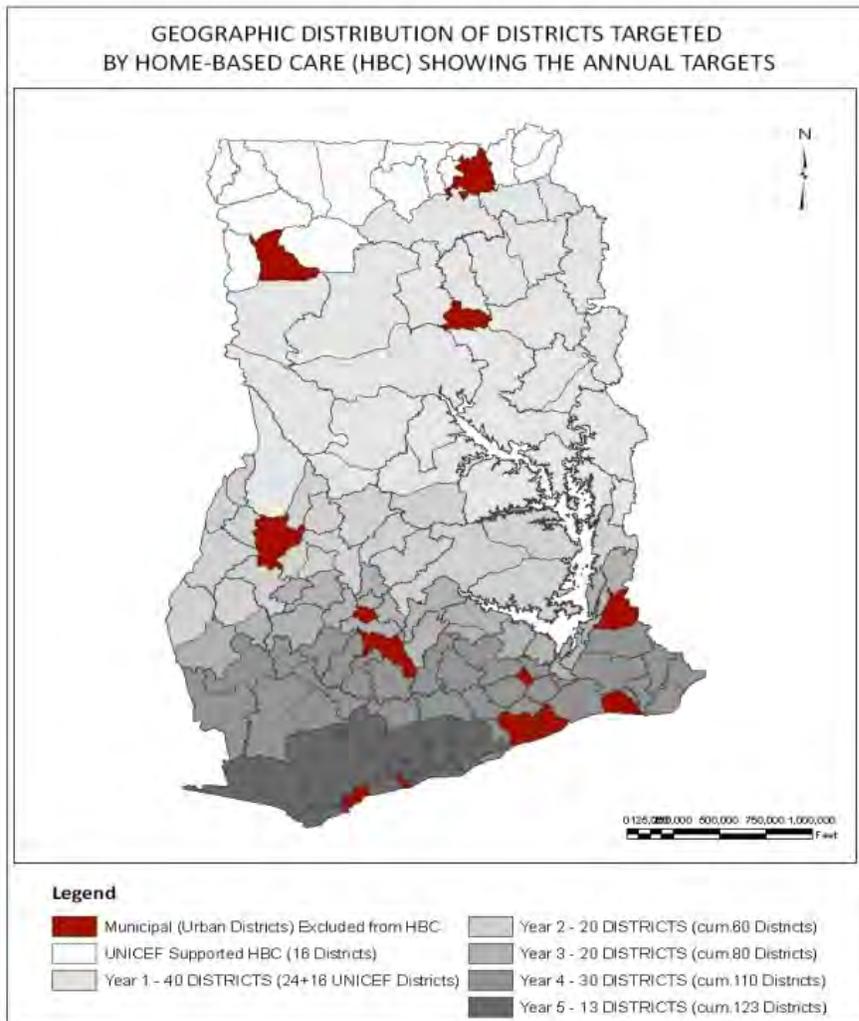
A number of elements in Ghana's malaria treatment strategy hold promise for increasing the rates of appropriate ACT administration. The NHIS has greatly increased outpatient attendance rates since 2006, however the reimbursement practices are poorly harmonized with NMCP treatment policies and the NHIS is experiencing financial challenges. Reclassification of ACTs

as over-the-counter products was accomplished in 2009; however, high costs, and the increasing emphasis on confirmatory testing prior to treatment have limited the impact of this policy shift to date. The AMFm pilot has the potential to increase the availability of low-cost, high-quality ACTs on the market and is intended to complement the HBM activities, if implemented successfully. However, the AMFm approach is unproven and implementation has been delayed due to delays in the grant award process.

The AMFm pilot will bring modest resources to support BCC and training, and other quality improvement efforts in the private sector. However, the need for private-sector capacity building will continue to be high in Ghana, where over 50% seek medical care from the private sector. Indeed, the need for assistance to improve rational use of antimalarials is expected to become even greater under the AMFm pilot. PMI-funded assessments in 2008 and 2009 showed rampant mismanagement of malaria in the private sector, including over prescribing of malaria medications, reflective of weak capacity. MOH priority inevitably tends to go to strengthening public facilities and systems, thus the rationale for PMI support of malaria management in the private sector will continue to be strong.

The home-based management of malaria (HBM) is to be integrated with acute respiratory and diarrheal diseases, under the Integrated Management of Childhood Illnesses (IMCI). Through education of the public to create ACT demand and through the deployment of community drug distributors to increase ACT supply, caretakers of children are to be empowered to access ACTs promptly for malarial symptoms. Administration of rectal artesunate is the recommended pre-referral treatment in HBM. This approach was pioneered by a UNICEF-funded IMCI program in 16 northern districts, where community agents correctly prescribed ACT treatment more than 95% of the time and significantly reduced treatment seeking time. Using a Round 8 Global Fund grant, the NMCP plans to scale up HBM to 63 districts over five years. (See figure 3) Guidelines and training materials have been developed. However, implementation had yet to begin as of mid-2010, due to prolonged delays in the grant award process.

Figure 3. Geographic distribution



Impeded access to ACTs is the principal issue driving HBM in Ghana. Formal health services only reach about 60% of the population with the geographical distribution biased towards urban areas. People living in rural areas are not able to access the formal health services due to geographic barriers access and socio-economic factors. The HBM strategy addresses this problem by providing prompt and effective treatment in areas with limited access. Total USG funding includes MCH bilateral support of community-based programs. In addition to the USG, the NMCP has a Global Fund grant to scale up HMM to 63 districts with a budget of approximately \$30m over 5 years. UNICEF may provide an additional \$1M over this same time period. PMI support would complement this external support, and would be directed to technical assistance in areas of USG comparative advantage, such as health worker training, supply chain strengthening, quality assurance, and BCC.

Progress During Last 12 Months

The thrust of PMI support for ACT scale-up in Ghana has been in the areas of policy dissemination and health worker training. In Year 2, a suite of nine documents to support implementation of the national treatment policy were finalized and disseminated. These included case management guidelines as well as training manuals for HCW, pharmacists, and LCS. The PMI and GHS collaborated in conducting case management training in three regions, reaching over 1,500 HCW by mid-2010. During 2010, PMI plans to support health worker in-service training in all additional regions. Special efforts will be made to incorporate the staff of teaching hospitals. In Ghana teaching hospitals do not fall under the national health service, and historically they have tended to resist changes in malaria case management. To help fill commodity gaps, PMI contributed \$700,000 worth of ACTs and severe malaria medications, including rectal artesunate. To complement health worker training, PMI supports BCC activities to promote ACTs and appropriate health treatment seeking behavior. Rational use of ACTs was promoted through the rejuvenation of Drugs and Therapeutics Committees in leading hospitals in three regions, with a focus on monitoring and enforcing the appropriate use of antimalarials and other essential medications.

To assist the MOH prepare for nationwide scale up of HBM, PMI supported the finalization of national guidelines and policies. These documents covered management of acute respiratory infection and diarrhea, along with malaria. In target districts, PMI trained and equipped Community Drug Distributors. In 2010, PMI will seek to assist the NMCP in clarifying policy, setting priorities, and addressing bottlenecks in scaling up improved case management. For example, PMI will facilitate a policy workshop with NHIS to harmonize case management guidelines and funding, and help to reactivate the RBM Case Management Subcommittee.

During 2009 and 2010, the NMCP plans to procure sufficient ACTs through Global Fund grants to cover all AS/AQ and AL needs in the country, complementing NHIS, AMFm, and private sector resources. It appears that PMI resources would not be needed for procurement of ACTs in Years 2 and 3. While continuing to monitor supplies to verify the availability of ACTs, Therefore in Years 2 and 3 PMI will plan its procurements to meet gaps in severe malaria medications and SP for IPTp.

Proposed FY2011 Activities: (\$2,962,000)

The priority for the next year will be to assist the MOH to further scale up the appropriate use of antimalarials in the public and private sectors, focusing on procurement, supportive supervision, improving case management in the private sector, and expanding HBM.

1. Procure antimalarial medications to fill gaps: (\$500,000)
Procure rectal artesunate, severe malaria drugs, and potentially ACTs, in quantities to be determined. The primary aim of the FY2011 procurements will be to fill gaps and help prevent stock-outs of antimalarial medications in FY 2011..
2. Support training and supervision of HCW to improve malaria treatment: (\$450,000)

Support on-the-job training and supportive supervision of HCW to increase adherence to treatment guidelines for uncomplicated and severe malaria. These activities will be carried out with a range of HCW, including physicians, nurses, pharmacists, and drug vendors in the private and public sectors. Support strengthened adherence to case management protocols at teaching hospitals, other pre-service institutions, and additional public sector service delivery points that did not receive training in Years 1 – 3. PMI may also make a small amount of funds available to procure commodities, such as weighing scales, to allow for the correct ACT dosing.

3. Support Home-based Management of Malaria: (\$1,000,000)
Support the NMCP's goal of mass scale up of home-based management of malaria (HBM), leveraging GFATM support, by providing targeted technical assistance and logistical support to address key bottlenecks and fill gaps in the national HBM program. PMI will focus on the effectiveness of CBAs to implement HBM. Illustrative activities would include supporting training and supervision of large numbers of CBAs in targeted regions, (up to sixty districts) community mobilization, and supporting quality control activities such as coaching by district officers and review meetings, provide logistics for volunteers where needed among others. These activities will be carried out in close coordination with the GHS/NMCP, UNICEF, WHO, and other stakeholders. (MCH funds are in the health system strengthening and logistics components of the program in the three focus regions.)
4. Support private sector dispensers, including LCS, to improve malaria treatment: (\$500,000)
Continue Year 2 and 3 activities to build capacity for improved malaria case management in the private sector, focusing primarily on LCS and private pharmacies. Partnering with the relevant professional societies (such as the Pharmaceutical Society of Ghana) and regulatory bodies (such as the NMCP and the FDB), and building on the experience of pilot programs (e.g. the Pfizer-funded Mobilizing Against Malaria activities in Ashanti and Brong-Ahafo regions), PMI will support training, supportive supervision, BCC, and other methods to increase private sector compliance with malaria treatment guidelines and improve the safety and quality of services provided. Of note, PMI's support to improve private sector delivery of malaria treatment and services pre-dates the AMFm pilot. FY09 and FY10 PMI-funded programs are already working with licensed chemical sellers (LCS) and other private sector actors. Moreover, these efforts are part of an integrated activity within the context of the USAID Ghana health sector strategy. FY11 support will build on these efforts. PMI funds will not directly support the AMFm, consistent with USG policy.)
5. Support BCC to improve malaria care and treatment-seeking behavior : (\$500,000)
Support BCC strategies targeting HCW and the general public to promote correct and consistent use of ACTs by vulnerable groups. Activities will promote appropriate testing and treatment for malaria among the general population and healthcare providers. The PMI investment in BCC to promote appropriate malaria testing and treatment will be geographically, temporally, and programmatically linked with other case management activities to maximize impact. This activity is part of a comprehensive BCC strategy that is directly linked to the National Malaria Communications Strategy and to other malaria prevention and treatment BCC. PMI will continue to provide TA to the National Malaria Communications Committee to ensure harmonized messaging and maximum geographic and

population coverage. The messages and materials that are developed will employ evidence-based and creative communications techniques. The BCC activities may include mass media, IEC materials, and community mobilization (e.g. CHVs, information officers, NGOs, etc.).

6. Provide technical assistance for strengthening case management: (\$12,000)

Provide technical assistance from a CDC expert to assist with the implementation of the national antimalarial guidelines.

Pharmaceutical Management and Drug Quality

Background

Despite evidence of progress, there continues to be a need to strengthen Ghana's pharmaceutical management system. A well-defined regulatory framework, a robust healthcare policy infrastructure and qualified HCWs are among the many assets of the existing system. However, problems such as stock outs of key drugs and supplies at the facility level as well as limitations in forecasting drug utilization, information systems and compliance with the existing regulatory framework persist.

Mass enrollment in the National Health Insurance Scheme (NHIS) since 2005 has placed an unanticipated fiscal burden on the MOH because the national levies anticipated to support the NHIS have not been sufficient to sustain the package of services provided. A recent assessment indicates that districts and health facilities procure approximately 70% of their drugs from the private sector as they are cheaper and more regularly available. The MOH and its partners have stated their intention to enact progressive procurement and supply chain reforms. USG health sector programs including PMI are ready to support this effort.

Ghana will receive funding from the Global Fund's AMFm to pilot an effort aimed at increasing access to inexpensive, high-quality ACTs. The AMFm effort is expected to begin late 2010. If successful, the AMFm pilot activity could positively impact the availability of quality ACTs in both public and private sectors in Ghana, while resulting in a decrease in demand for malaria monotherapy and malaria combination therapies of unknown quality.

The widespread availability of artemisinin monotherapies and other products not approved for the treatment of uncomplicated malaria highlights the need for improved pharmaceutical management. Although the FDB is active in registering and auditing local manufacturers, the great majority of manufacturers do not adhere to WHO Global Malaria Program standards and the FDB does not appear to have a mechanism to ensure their compliance.

Progress During the Last 12 Months

In collaboration with the Pharmacy Unit and GHS, PMI support is helping to identify strengths and weaknesses in the supply chain distribution system. This activity, which began in Year 2, extends to all ten regional medical stores. As part of overall logistics strengthening, PMI also helped implement a stock-monitoring exercise at Central Medical Stores (CMS), designed to detect potential shortages in advance, and review forecasting needs as well as gain a better understanding of ACT consumption. Collectively, these efforts are helping CMS improve the management of ACTs and move away from emergency procurements to routine procurements

based on quantifiable needs over time. An end-use verification activity was carried out in Greater Accra Region in February 2010, identifying both strengths and weaknesses in the systems. The activity found that none of the facilities had expired commodities and all facilities had at least some ACT formulations in stock. However, the stock availability was between 67% and 100% for first line ACTs. Challenges remain in training and supervision for personnel managing commodities with 52% trained in inventory management and 60% receiving a supervisory visit in the previous six months. In FY2010, PMI will increase support to build the NMCP's technical capacity for logistics management and improve linkages with the GHS Procurements Unit, CMS, RMS, and other levels of the supply chain. The PMI is also providing technical assistance and support for training and supportive supervision to ensure good ACT prescribing and dispensing practices at the facility level.

In addition, PMI collaborated with the MOH, NMCP, and FDB to monitor antimalarial drug quality and assess the pharmacovigilance system, harmonize the adverse drug reaction reporting process, and develop recommendations for improving the safety of antimalarials. Results of drug quality monitoring at five sites around the country showed that 128 of 447 antimalarial drugs sampled (28%) from local markets did not conform to one or more quality standard, which led to FDB withdrawing 22 products from the market, including detection of counterfeit Coartem (AL) and its ultimate withdrawal from the market. In Year 3 PMI aims to assist the FDB to meet international standards for the design of a new testing laboratory, scheduled for completion in 2011. Finally, in Year 3, PMI is providing support for *in vivo* clinical efficacy monitoring of antimalarials in collaboration with the NMIMR.

Proposed Year 4 Activities: (\$900,000)

The PMI has prioritized building capacity of the pharmaceutical management system including strengthening drug quality assurance systems in Year 4 in the following ways:

1. Strengthen logistics and supply chain systems: (\$500,000)

The PMI will provide continued support for strengthening Ghana's procurement, logistics and supply chain system to improve the availability of malaria commodities (including malaria treatments, SP for IPTp, RDTs, and other commodities) throughout all levels of the system. Activities will build on investments made in Years 1 – 3, with a focus on addressing known bottlenecks in finance, management, forecasting, transportation, and reporting systems which have hindered the distribution of malaria medications and laboratory supplies. Because over 60% of Ghanaians access health care through the private sector, activities will target both the public and private sectors.

2. Strengthen drug management capacity: (\$200,000)

In the context of an integrated USAID project to strengthen health systems in three focus regions, PMI will promote the rational use of ACTs. By building more robust monitoring and supervisory systems within the regional health systems, compliance with national malaria treatment guidelines will be improved. Illustrative activities include training and technical assistance to hospital Drugs and Therapeutics Committees, and supportive supervisory visits by regional and district managers. The target regions will be Western, Central, and Greater Accra, which together contain roughly one third of Ghana's population.

3. Strengthen drug quality monitoring capacity: (\$200,000)

Support strengthened drug quality monitoring capacity in collaboration with the FDB by collecting data on antimalarial drug quality. Activities will build on investments made in Years 1 - 3. Support will enable an expansion of the number of sampling sites to include strategic border districts. Increased emphasis will be placed on strengthening FDB enforcement capacity combined with explicit support for activities that raise awareness among the public regarding counterfeit and substandard medicines identified in Ghana.

CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING

Background

The NMCP leads Ghana's malaria control efforts, through the formulation of policy strategies, coordination of all actors involved in malaria control in Ghana, and its role as Principle Recipient for the country's current malaria-related Global Fund grants. Established to operate at the national and zonal levels and work with the regional and district-level Ghana Health Services (GHS) staff to implement programs, the NMCP, through its Global Fund projects, also manages activities throughout the country in concert with NGOs and private companies. The NMCP expanded its staff and capacities over the past year to lead Ghana's growing malaria program. However, the need for more intensive management and coordination continues to expand, and additional resources are required for the NMCP to address that need.

As the NMCP begins to role out community-based treatment for malaria with funds from its Global Fund grants, PMI/Ghana has identified support for the management of this process as a priority contribution. Community mobilization for malaria prevention has traditionally been a significant component of both PMI and NMCP programs. As the role of the community volunteer shifts to include case management, a greater need for strong linkages between the GHS and their community volunteers is emerging. While in previous years, PMI has worked through local NGOs to improve the capacity of community volunteers to engage and mobilize communities to take action, in FY2011, PMI will focus on supporting the capacity of the GHS and the NMCP to utilize these volunteers as health outreach workers.

In addition to the specific activities listed below, PMI will implement several activities which will strengthen health systems while achieving goals stated in the previous sections of this document. The PMI program will provide technical assistance to strengthen commodity supply chains for ITN distribution and management of pharmaceutical products; strengthen routine health information systems, and build capacity for appropriate diagnostic techniques and drug quality monitoring. Each of these efforts will contribute towards improved, effective health systems, as well as contributing to Ghana's malaria-specific goals.

Progress since the last 12 Months

In FY2010, the low capacity of most local NGOs in malaria program implementation was identified as a major barrier to achieving community engagement for behavior change objectives by both NMCP and PMI. Funding was made available for the training of all NGOs working with the NMCP at the community level in community engagement skills including participatory skills. Additional funding was made available as grants to support the work of NGOs involved in implementation of social mobilization and BCC for IPTp, ITNs and case management. Thirteen

NGOs in 13 targeted districts have been trained in malaria technical areas and participatory skills to implement these interventions. A request for application has also gone out to support an additional 25 NGOs and support home management of malaria in districts targeted by the NMCP.

Proposed FY2011 USG activities (\$1,350,000)

1. Strengthen the capacity of the NMCP/GHS to implement community-based malaria prevention and control activities (\$1,000,000)

Implement at the regional and district level community-based malaria prevention and control activities. This will include improving management systems for supervision of community-based volunteers operating at the sub-district level to identify and treat malaria as a component of an integrated community child health program. Regional and district managers will be engaged in participatory planning meetings to define malaria activities in the context of the integrated child health program, set targets and develop implementation and monitoring plans. Community level supervisors will also be trained in participatory methods and data management skills to improve the quality of delivery and data quality from communities. These activities are expected to be carried out in 60 districts. The funds will provide management support for the HMM program at the regional and district level.

2. Strengthen management capacity of the NMCP (\$150,000)

Continue to build the management capacity of the NMCP at the central level, with a focus on improving strategic planning, information management, and M&E through staff training. This support will be used to support the development of the NMCP's information technology infrastructure.

3. Support supervisory visits and monitoring activities (\$200,000)

Support supervisory visits and monitoring activities by central public health authorities including NMCP and GHS staff in support of NMCP efforts to strengthen overall malaria program management.

INTEGRATION WITH OTHER GLOBAL HEALTH INITIATIVE PROGRAMS

Background

The MOH, its agencies including the GHS, and affiliated groups such as the Christian Health Association of Ghana (a consortium of mission hospitals) provide a comprehensive package of maternal and child health services, including malaria control activities. Intermittent preventive treatment during pregnancy is fully integrated into the focused ANC package, along with promotion of use of LLINs. Whenever possible, semi-annual child health campaigns carried out by the GHS and local authorities combine malaria prevention education and LLIN distributions with their standard offerings of immunization, Vitamin A supplementation and growth monitoring.

Expanding resources and the related need for comprehensive coordination and implementation of malaria interventions have led the NMCP to take a relatively vertical approach in some cases,

particularly when rolling out training for case management and for LLIN distribution campaigns. However, there is widespread agreement among government agencies and all development partners, including the USG, on the benefits of integrated programming. An example of the commitment of the NMCP to integration is their plan to support programs for community-based care; a package for integrated management of childhood illness which includes diagnosis and treatment of malaria, diarrhea, and acute respiratory illness by community volunteers.

The GHI mirrors the Government of Ghana commitment to achieve its Millennium Development Goals related to health. The USG supports integrated health programs in Ghana to strengthen health systems while addressing specific goals in maternal and child health, nutrition, reproductive health; water and sanitation, malaria, and HIV/AIDS. As part of USAID's overall health strategy, a set of projects was developed and awarded in 2009 to support reproductive, maternal and child health programs by working simultaneously on the quality of key health interventions and on the health systems that support these interventions. In three regions, covering one third of Ghana's population, these projects work at the community, district, and regional levels to encourage positive behavior change, improve the quality of service delivery, and improve health management systems. These three regions embody some of the main challenges facing Ghana's health system: increasing urbanization with high-density low-income populations (Greater Accra Region); low income and low health indicators relative to national indicators (Central Region); and unique challenges posed by the introduction of oil and gas industry in a previously agricultural, rural context (Western Region.) USG malaria programming has been integrated into these region-specific efforts to ensure that malaria-specific content is strengthened (e.g. in training and quality assurance), and that health system strengthening will lead to improvement in malaria control indicators (e.g. improved availability of ITNs and ACTs).

In addition, there is considerable complementarity between the USG's work under PMI and that done under PEPFAR to combat HIV/AIDS, particularly in monitoring and evaluation and laboratory service strengthening. The USG is well represented and engaged in oversight bodies in Ghana such as the Health Sector Working Group organized by the MOH, the Country Coordinating Mechanism for the Global Fund, and the semi-annual Health Summits that draw participants from all over the country to review and plan national health interventions. USG agencies are frequently asked to provide in-house expertise or consultants to help the MOH or its agencies perform program assessments, develop long-term strategies, or otherwise contribute to the national health agenda.

Planned Integration of FY11 PMI Activities (Funding included in other sections):

1. PMI will support USG efforts to strengthen health system commodity supply chains for LLIN distribution and management of pharmaceutical products in the Greater Accra, Central, and Western Regions (USG focus regions). The PMI support is part of a concerted effort to improve supply chains for all pharmaceuticals and health commodities, and will positively impact all health services in these regions.
2. PMI's technical assistance to IPTp will include its integration into ANC throughout Ghana. In the focus regions, PMI resources will be combined with USG maternal and child health resources to improve the knowledge, counseling skills, and management of midwives and nurses providing ANC (and IPTp).

3. PMI will work with GHS to improve case management nationally; in focus regions, PMI support will be integrated with quality improvement programs aimed at strengthening provider skills in several areas, including malaria case management. This integration is expected to be effective in establishing quality systems for supportive supervision of health providers, and should serve as a model for the GHS to implement in other regions.
4. PMI will support the NMCP to roll out and manage community-based care for malaria, implemented by community volunteers as part of an integrated child health package.
5. PMI and PEPFAR investments in laboratory systems will be harmonized through coordination of microscopy and RDT procurements and joint planning of laboratory technician training and supervision.
6. PMI and PEPFAR will collaborate to help the GHS implement a new routine HMIS data system, the web based DHIS2. Implementation of DHIS2 will strengthen routine disease data to include malaria, HIV/AIDS, and tuberculosis data in an integrated reporting system that will include data from all levels of the system (community, health facility, district, region, and national). Migration to the DHIS2 will require major investment on the part of the GHS. PMI's support is anticipated to be limited, and will focus on optimizing the capture of malaria data by the system.

COMMUNICATION AND COORDINATION WITH OTHER PARTNERS

The NMCP plays the leading role in coordinating all implementation activities related to malaria by both development partners and the Ministry of Health. It also plays a lead role in formulating policies.

The NMCP's government budget has been supplemented significantly by the Global Fund since 2002. The NMCP has received four different grants from the Global Fund since 2002. In the round 8 NMCP received 157 million dollars to undertake IRS and Home Based Care of malaria. The Rolling Continuation Grant (RCC) awarded in 2009 makes provision for the NMCP to fund a wide range of malaria interventions for a six-year period. The Country Coordination Mechanism (CCM) of the Global Fund in Ghana has been the main driving force behind the resource inflows from the Global Fund. It was also instrumental in the development of the national malaria strategy by bringing together the relevant stakeholders and coordinating the process.

The Role Back Malaria (RBM) Coordinating Committee has been defunct for two years as an umbrella group for coordinating malaria activities. In the years that it existed sub-committees were formed to coordinate the different malaria technical areas. Currently, most of these sub-committees are functional. They include the ITNs, Case Management, Vector Control, Communications and Home-Based-Care committees. These committees have enabled different partners such as WHO, UNICEF, PMI and civil society organizations to coordinate their activities and undertake joint technical work under the auspices of the NMCP.

Main health sector donors include the Royal Netherlands Embassy (RNE), the Danish International Development Agency (DANIDA), DfID, Global Fund, the World Bank, Japan International Cooperation Agency (JICA), UNICEF, UNFPA, WHO and the African Development Bank. UNICEF is supporting community IMCI, which has a malaria component, in four of the ten regions in the country. DfID has also offered to work through UNICEF to support the purchase and distribution of LLINs worth 10 million pounds sterling. This support will play an important role in helping the NMCP reach universal coverage by the end of 2011. The World Bank is also working with the NMCP in a Nutrition and Malaria program in targeted districts. The program procured and distributed 900,000 nets to children under five and pregnant women in 2008. An additional 200,000 nets are in country and an additional 3.6 million dollars is available to purchase nets for distribution to vulnerable populations.

Progress During the Last 12 Months

The National Malaria Communications Committee was reconstituted and the National Malaria Communication Strategy was finalized and adopted with strong support from PMI in collaboration with the NMCP and other partners. The PMI provided leadership in the formation of a vector control committee to oversee the activities of partners involved in IRS. The ITN subcommittee of the RBM was revived with leadership from PMI. It successfully undertook a distribution and hang-up campaign involving the hanging of over 560,000 LLINs for pregnant women and children under five in one region using nets purchased by PMI. The Home Management of Malaria sub-committee of the RBM also became functional with PMI support. The CCM has recently worked to strengthen its oversight role. An oversight plan was developed and approved in 2010. USAID sits on the CCM executive committee, and PMI chairs the newly formed Malaria Oversight Committee.

Proposed FY2011 Activities: (no cost to PMI)

1. Convene PMI/NMCP Partner Workplan coordination meetings
PMI staff will take the lead in organizing the workplan coordination meetings. These meetings will bring together PMI implementing partners and NMCP to harmonize workplans for the year and review progress on implementation. The meetings will also help PMI to identify gaps in NMCP activities and align its plans with the NMCP's strategic needs.
2. Revive the RBM Coordinating Committee
Currently most of the sub-committees of the RBM coordinating committees including ITN, Vector Control, Communication, Home Management of Malaria and Case Management are active, but the coordinating committee is defunct. This problem arose because issues that would otherwise be discussed by the committee came to be discussed at the Country Coordinating Mechanism (CCM) of the Global Fund as the influence of the CCM increased due to the large Global Fund grants. PMI will provide support under the leadership of the MOH and GHS in collaboration with the WHO country office to reactivate the committee to coordinate malaria control activities in Ghana. (Expenses related to this activity are expected to be minimal).

3. Strengthen CCM Oversight function

In Ghana, as in many countries, the CCM has been more effective in its role of mobilizing Global Fund resources than in overseeing the grants once awarded. Throughout 2010, the CCM engaged in a process of strengthening its oversight function, including the development of new guidelines and tools. USAID and CDC staff will continue to play an active role on the Ghana CCM, including at the level of the newly formed CCM Malaria Grant Oversight Committee, providing technical assistance, contribution to performance reviews, and participating in site visits. It is anticipated that the Ghana CCM will receive enhanced funding for oversight functions through the Global Fund beginning in January 2011. Thus this activity would not have cost implications for PMI.

SURVEILLANCE, MONITORING AND EVALUATION (M&E)

Background

Routine Data Systems:

The main sources of routine surveillance information are the GHS's Center for Health Information Management, the Integrated Disease Surveillance and Response System (IDSR), and the NMCP surveillance system. The GHS maintains the district health information management system (DHIMS) that serves as the foundation for the country's Health Management Information System. Individual programs have been encouraged to discontinue developing vertical M&E systems. The DHIMS has been implemented nationally at all health facilities in all regions. However, complete implementation has been hampered by hardware and software problems at the health facility and district levels. The Center for Health Information Management has recently decided to replace the current DHIMS with the District Health Information System (DHIS2). The DHIS2 is an open-source web based tool used for the collection, validation, analysis, and presentation of aggregate statistical data. The system is designed to support integrated health information management activities at all levels of the health system. Plans for migrating DHIS2 are in the early phases; full implementation will likely take several years and require significant GHS investments in training, support, supervision and IT infrastructure.

Routine information on malaria is collected through a variety of surveillance systems in Ghana:

1. In 2000, the GHS through the National Surveillance Unit with collaboration from WHO/AFRO undertook an effort to improve the national infectious disease surveillance system by implementing WHO/AFRO's IDSR strategy. The IDSR provides weekly data on clinically diagnosed and laboratory-confirmed malaria cases and deaths from sentinel health facilities. The strategy has now been implemented nationally; however, data quality varies by district, tending to be better in rural districts.
2. The Center for Health Information Management receives monthly reports on malaria cases and deaths from all public health facilities and some NGO clinics. These data include both clinical and laboratory-confirmed malaria cases and are managed using Excel spreadsheets at the health facility and national levels. As a result, the system is inefficient, thereby limiting both the timeliness and completeness of data.

3. Data on IPTp coverage, LLIN distribution, malaria cases and deaths and other aspects of Global Fund implementation are collected through a parallel system established and maintained by the NMCP for the purposes of monitoring grant performance and reporting to the Global Fund. These data are collected from the sub-district level and passed through district and regional levels to the national level on a weekly, monthly, or quarterly basis, depending on the measure involved. Data are collated in Excel spreadsheets, analyzed and used at the district, regional, and national levels.

National Surveys:

The most recent DHS, conducted during the July–October rainy season of 2008 incorporated a malaria module, which included ITN and ACT coverage indicators, anemia and verbal autopsy evaluations, and communications indicators, among other measures. These data will provide baseline estimates (see Table 1 on page 12 for details) for all coverage indicators for use in PMI. PMI is supporting an MIS in 2011 to collect household level data on malaria indicators. These data will provide estimates on all key coverage indicators after three years of PMI implementation and will be comparable to the 2008 DHS estimates.

Progress During Last 12 Months

During Year 1, PMI provided support for the 2008 DHS. Sentinel site surveillance has also been implemented in five health facilities to collect routine facility-based data on malaria mortality and morbidity among in-patients and outpatients. Data collection began in September 2008. Patient-level and aggregate data from October 2008 – July 2009 were submitted to USAID and CDC. In FY2009, PMI continued to support the sentinel site program, however the program will not be continued past September 2010. PMI also supported the NMCP to organize a workshop with all key malaria control stakeholders to develop a unified and comprehensive M&E plan for malaria control for Ghana. The M&E plan was published in July 2009.

The PMI supported implementation of the newly drafted M&E plan through a variety of capacity building activities. In February 2010, PMI and the WHO co-sponsored a workshop to produce priority recommendations for strengthening routine malaria data through the DHIMS. Various stakeholders from the Government of Ghana, international partners, and implementing partners attended the meeting. Priority areas and recommendations included: 1) innovative ways to increase data quality; 2) improving facility data; and 3) methods for optimizing use of facility data by NMCP. In December 2009, three regional meetings were organized with regional and district health information officers, regional nurses, and regional disease control officers to identify areas for DHIMS improvement at the health facility, district, and regional levels. In April 2010, an evaluation of the impact of IRS was conducted in four health facilities using a modified methodology of WHO's rapid malaria impact assessment using health facility data.

Proposed FY2011 Activities: (\$1,004,000)

Work with the NMCP to implement a comprehensive M&E strategy.

1. Strengthen Routine M&E Systems: (\$600,000)

Support the GHS/NMCP to strengthen routine systems for malaria M&E, including completion of unified data collection formats; revision of data collection forms; training NMCP staff on data collection, analysis and reporting; and limited computer hardware and

software to fill gaps. Support strengthening the quality of malaria data (completeness, accuracy, timeliness, and consistency) at the health facility and district levels. . Assuming that the plans for migrating to DHIS2 system are on course, PMI would provide assistance to ensure that the malaria component of the DHIS2 is technically optimal prior to GHS national scale-up (\$450,000). In addition, technical assistance will be provided to strengthen malaria M&E in USAID Ghana's three focus regions (Greater Accra, Central, and Western regions) (\$150,000).

2. PMI Impact Evaluation: (\$100,000)

Support the collection and analysis of data to provide insight into trends in malaria morbidity and mortality in children under five years of age. These data will complement data from national surveys and provide context to overall trends in malaria morbidity and child mortality.

3. Anemia and Parasitemia Survey: (\$180,000)

Support the continuation of anemia and parasitemia surveys in one IRS district (Bunkpurugu-Yuyoo) as part of operational research to compare the impact of annual vs. biannual IRS in the northern savannah setting. One-half of the district will be sprayed in April-May and again in October-November, while the other half will be sprayed in April-May only. The household level anemia and parasitemia surveys will be conducted in October-November 2011 and March-April 2012 (i.e. at the local peak and trough transmission periods). They will be the second in a series of annual surveys to assess the impact of annual vs. biannual IRS in the study district.

4. End-User Verification Survey: (\$100,000)

Implement the newly developed, standard PMI protocol to verify end-user receipt of commodities. This tool is being adopted across PMI countries to provide rapid, real-time assessments of the availability of antimalarial drugs at the facility level.

5. Technical Assistance: (\$24,000)

Support for technical assistance from the CDC PMI M&E team. Technical assistance will include working with the NMCP to finalize and implement their harmonized malaria M&E plan, continued support for the implementation and evaluation of the DHIS2 at all levels of the system, and support for the anemia/parasitemia survey.

STAFFING AND ADMINISTRATION

PMI staff includes two PMI resident advisors, one representing CDC and one representing USAID, one USAID Foreign Service National (FSN) malaria program specialist, and one USAID FSN malaria program management assistant. The PMI staff work collaboratively to oversee and manage all aspects of day-to-day PMI implementation in Ghana.

All PMI team members in Ghana will be part of a single inter-agency team led by the USAID Mission Director or his/her designee in country. The PMI team will share responsibility for development and implementation of PMI strategies and work plans, coordination with national

authorities, management of collaborating agencies, and supervision of day-to-day activities. The PMI team will work together to oversee all technical and administrative aspects of PMI in Ghana, including project design, implementing malaria prevention and treatment activities, M&E of outcomes and impact, and reporting results. The PMI resident advisors will report to the USAID Mission Director or his/her designee. The CDC staff person will be supervised by CDC, both technically and administratively. The USAID advisor will supervise the PMI FSN staff. All technical activities will be undertaken in close coordination with the MOH, the 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 must be approved by the USAID Mission Director and Controller.

Proposed Year 4 Activities: (\$1,450,000)

These funds will be used for coordination and management of all in-country PMI activities including staff salaries and benefits, office equipment and supplies, and routine expenses.

Ghana FY2011 Planned Obligations

ITNs						
	Proposed Activity	Mechanism		2011 Total \$	Geographical area	Description
	Procure and transport LLINs	DELIVER		10,500,000	National	Procure approximately 1,880,000 LLINs to replace expired LLINs and to maintain LLIN coverage for vulnerable populations. LLINs will be distributed primarily through routine health services. Budget includes funds to transport LLINs to the districts and potentially to sub-district levels.
	TA for LLIN delivery and supply chain	DELIVER	200,000	1,300,000	National	Support to GHS to distribute LLINs through mass campaigns and routine facility-based distributions. Provide technical assistance to strengthen routine LLIN distribution planning, logistics, supply chain management, training, and end-user distribution systems.
		ProMPT	800,000			
		FRHP	300,000		Western, Central, Gr. Accra Regions	
	BCC to promote LLIN ownership and use	ProMPT	700,000	1,300,000	National	Support development and implementation of BCC activities to promote LLIN ownership and use, including malaria specific BCC and incorporating ITN messages into national health promotion BCC. Employ evidence-based and creative communications techniques to promote LLINs. Illustrative activities include mass media, community mobilization activities, and IEC materials. Provide Technical assistance (TA) and support to the NMCC.
		BCS	600,000		Western, Central, Gr. Accra Regions	
	SUBTOTAL ITNs			13,100,000		

IRS						
	Proposed Activity	Mechanism		2011	Geographical area	Description
				Total \$		
	Support IRS implementation activities, include procurements and TA	IRS2 IQC		6,000,000	Northern Region	In collaboration with GHS, and with continued focus on capacity building, support IRS operations to cover all communities in at least 9 districts with approximate population of 950,000.
	Technical assistance visit to support entomological monitoring for IRS	CDC		34,000	Northern Region	Provide TA and quality assurance for entomologic monitoring, including insecticide resistance management. Budget includes 2 entomology visits including equipment and supplies
	SUBTOTAL IRS			6,034,000		

IPTp						
	Proposed Activity	Mechanism		2011	Geographical area	Description
				Total \$		
	Strengthen ANC services and pre-service training	ProMPT	400,000	500,000	National	Support the GHS to improve health worker capacity to effectively deliver a package of malaria prevention and care services to pregnant women. Illustrative activities include pre-service training, supportive supervision, refresher training as needed, and quality assurance.
		FRHP	100,000		Western, Central, Gr. Accra Regions	
	Procure SP for IPTp	DELIVER		350,000	National	Procure 10 million doses of SP to fulfill Ghana's IPTp requirements for the year
	BCC to promote IPTp	ProMPT	100,000	400,000	National	Support development and implementation of BCC activities to increase adherence to the full three doses of IPTp. Integrate MIP BCC activities with MCH activities for enhanced impact. Illustrative activities include mass media, community mobilization activities, and IEC materials. Provide TA and support to the NMCC and strengthen the NMCC's linkages with MCH BCC partners.
		BSC	300,000		Western, Central, Gr. Accra Regions	
	SUBTOTAL IPTp			1,250,000		

Case Management - Diagnosis						
	Proposed Activity	Mechanism		2011	Geographical area	Description
				Total \$		
	Procure microscopy equipment and RDTs to fill gaps	DELIVER		550,000	National	Procure microscopes, RDTs and other microscopy supplies as needed per national needs and contingent with OTSS findings
	Build capacity for microscopy and RDT use and support implementation of diagnostic policy (laboratory level)	IMaD		150,000	National	Support quality malaria testing at the laboratory level to improve capacity. Extend the reach of the quality assurance program to include RDT use by non-laboratory personnel. Provide TA to address laboratory bottlenecks.
	Build capacity for RDT use and support implementation of diagnostic policy (front line health care worker level)	ProMPT		150,000	National	Support the national diagnostic policy and provide TA to expand appropriate RDT use by front line health care workers to include in-service training and supervisory visits by healthcare providers. Also provide support to the NMCP to develop and implement guidelines for expanded RDT use by pharmacists, LCS and CBAs.
	SUBTOTAL - Case Management - Diagnosis			850,000		

Case Management - Treatment						
	Proposed Activity	Mechanism		2011 Total \$	Geographical area	Description
	Procure anti-malarial medications to fill gaps	DELIVER		500,000	National	Procure rectal artesunate, severe malaria drugs and ACTs in quantities sufficient to fill gaps and prevent stockouts.
	Support training and supervision to improve malaria case management	ProMPT	250,000	450,000	National	Support on-the-job training and supportive supervision of HCW in public and private sectors on treatment guidelines and adherence to case management protocols. . Some limited funding will be allocated to procure clinic equipment, such as weighing scales. .
		FRHP	200,000			
	Support home-based management of malaria	ProMPT	700,000	1,000,000	National	Provide TA and logistical assistance to address bottlenecks and fill gaps in the national HBM program focusing on CBAs. Support the scale up of HBC to 63 target districts through the training of health care workers and community health volunteers.
		BCS	300,000		Western, Central, Gr. Accra Regions	
	Support Licensed Chemical Sellers to improve malaria treatment	ProMPT	350,000	500,000	National	Build capacity for case management in the private sector focusing on LCS. Partner with relevant professional societies and support training, supportive supervision, BCC and other methods to increase private sector compliance with treatment guidelines.
		BCS	150,000		Western, Central, Gr. Accra Regions	
	Support BCC to improve malaria case management, including treatment seeking behavior	ProMPT	250,000	500,000	National	Support BCC by targeting HCW and the general public to promote correct and consistent use of ACTs. Activities will promote appropriate testing and treatment for malaria. These activities to be part of a comprehensive BCC strategy linked to the National Malaria Communication Strategy and will include TA to the NMCC for harmonizing messages.
		BCS	250,000		Western, Central, Gr. Accra Regions	
	Technical assistance	CDC IAA		12,000	National	Provide technical assistance and quality assurance for malaria case management

						through one TDY visit.
	SUBTOTAL Case Management - Treatment			2,962,000		

Case Management - Pharmaceutical Management						
	Proposed Activity	Mechanism		2011	Geographical area	Description
				Total \$		
	Strengthen logistics and supply chain systems	DELIVER	300,000	500,000	National	Provide TA for strengthening logistics/supply chain. Activities will focus on addressing bottlenecks in finance, management, forecasting, transportation and reporting systems in both the public and private sectors.
		FRHP	200,000		Western, Central, Gr. Accra Regions	
	Strengthen drug management system capacity, including rational use	FRHP		200,000	Western, Central, Gr. Accra Regions	Promote rational use of ACTs and build a robust monitoring and supervisory system in the USAID Focus regions.
	Strengthen capacity in drug quality monitoring	USP		200,000	National	Partner with the Food and Drug Board to strengthen drug quality monitoring, including post-market surveillance and support test-lab systems. Support effective enforcement of anti-malaria drug regulations.
	SUBTOTAL Pharma Management			900,000		

Capacity Building and Health System Strengthening

	Proposed Activity	Mechanism		2011	Geographical area	Description
				Total \$		
	Strengthen capacity to implement community-based malaria prevention and control activities	ProMPT	700,000	1,000,000	National	Provide technical assistance to build the capacity of regional and district staff of Ghana Health Service and community volunteers for engaging communities on IPTp, HBC, ITNs and MIP. Provide support for building the capacity of community leaders involved in malaria control.
		FRHP	300,000		Western, Central, Gr. Accra Regions	
	Strengthen the management capacity of the NMCP	ProMPT		150,000	National	Provide support for professional development of key NMCP staff, including training of at least one logisticians, to building capacity in strategic planning, logistics, information management, and M&E. Continue targeted operational support for data management and information technology infrastructure development.
	Supervisory visits	ProMPT		200,000	National	Provide support for supervisory visits and monitoring activities at regional and district level by public health officials including NMCP and MOH/GHS staff in support of NMCP efforts to strengthen overall malaria program management and supervision efforts.
	SUBTOTAL – Capacity Building			1,350,000		

Monitoring and Evaluation						
	Proposed Activity	Mechanism		2011	Geographical area	Description
				Total \$		
	Strengthen routine systems for malaria M&E at national, regional, district and subdistrict levels	ProMPT	450,000	600,000	National	Support enhancement of DHIMS (or DHIMS2) data collection forms; training of NMCP staff on data collection, analysis and reporting; and strengthening of data capture at the health facility and district levels. Focus on scale-up of the DHIMS or (DHIMS2) nationwide to enhance timely, accurate, and consistent reporting.
		FRHP	150,000		Western, Central, Gr. Accra Regions	
	Impact evaluation	TBD		100,000	National	Support for the collection and analysis of data to provide insight into trends in malaria morbidity and mortality in children under five years of age.
	Anemia and parasitemia survey	RTI		180,000	National	Support for an anemia and parasitemia survey in one IRS district (Bunkpurugu-Yuyoo) as part of operational research to compare the impact of one round per year of IRS to two rounds per year.
	End use verification	DELIVER		100,000	National	Implement PMI standard protocol to verify end user receipt of commodities
	Technical assistance	CDC IAA		24,000	National	Support for technical assistance from the CDC PMI M&E team
	SUBTOTAL - M & E			1,004,000		

In-country Staffing and Administration						
	Proposed Activity		Mechanism	2011	Geographical area	Description
				Total \$		
	In-country staff and administrative expenses	USAID / CDC IAA		1,450,000		
	SUBTOTAL - In-Country Staffing			1,450,000		
	GRAND TOTAL			28,900,000		

Budget Breakdown by Partner				
Partner	Geographical Area	Budget (\$)	% of Total	Activity
DELIVER	National	12,500,000	43%	Procure LLINs for routine distribution and mass campaigns; procure antimalarial medications and laboratory equipment; strengthen logistics and supply chain systems
IRS2 IQC	Northern Region	6,180,000	21%	Provide technical assistance, procure pesticides, conduct spraying operations in support of IRS implementation, including entomologic monitoring.
ProMPT	National	5,200,000	18%	Support ITN distributions, strengthen malaria case management, support FANC and MIP, implement sentinel site surveillance and support the national M&E strategy; implement comprehensive BCC strategy, strengthen NGO capacity and support NMCP management and supervision
BCS	Central, Western and Greater Accra Region	1,600,000	6%	Support malaria BCC activities focused on vulnerable groups
FRHP	Central, Western and Greater Accra Region	1,450,000	5%	Provide technical assistance to improve systems and facilities; improve planning and logistic management; improve case management in the private sector; support M&E, and address bottlenecks in financial management
UPS	National	200,000	1%	Support for national drug quality monitoring and enforcement

IMaD	National	150,000	1%	Support implementation of the malaria laboratory policy, with a focus on quality assurance in clinical laboratories.
TBD for Impact Evaluation	National	100,000	0%	Support collection and analysis of data to determine impact of malaria interventions
CDC		70,000	0%	Provide technical assistance for entomologic monitoring for case management including laboratory diagnosis; and for malaria M&E.
Staff		1,450,000	5%	
Total		28,900,000	100%	