

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



PRESIDENT'S MALARIA INITIATIVE



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Ghana

Malaria Operational Plan FY 2015

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ABBREVIATIONS AND ACRONYMS

ACT	Artemisinin-based combination therapy
AGA	AngloGold Ashanti Mining Company
AGAMal	AngloGold Ashanti Malaria Control Program
ANC	Antenatal care
BCC	Behavior change communication
CDC	Centers for Disease Control and Prevention
CHPS	Community-based Health Planning and Services
CWC	Child Welfare Clinics
DFID	U.K. Department for International Development
DHIMS2	District Health Information Management System
DHS	Demographic and Health Survey
FDA	Food and Drug Authority
FELTP	Field Epidemiologic and Laboratory Training Program
FY	Fiscal year
GHI	Global Health Initiative
GHS	Ghana Health Service
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
G2G	Government to Government
GOG	Government of Ghana
HMIS	Health Management Information System
iCCM	Integrated community case management
IPTp	Intermittent preventive treatment of pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
MaVCOC	National Malaria Vector Control Oversight Committee
M&E	Monitoring and evaluation
MCH	Maternal and child health
MICC	Malaria Inter-Agency Coordinating Committee
MICS	Multiple Indicator Cluster Survey
MIP	Malaria in pregnancy
MOH	Ministry of Health
MOP	Malaria Operational Plan
NHIA	National Health Insurance Agency
NHIS	National Health Insurance Scheme
NMCP	National Malaria Control Program
OTCMS	Over the Counter Medicine Sellers
OTSS	Outreach Training and Supportive Supervision
PMI	President's Malaria Initiative
RDT	Rapid diagnostic test
SP	Sulfadoxine-pyrimethamine
UNICEF	United Nations Children's Fund
USG	United States Government
USAID	United States Agency for International Development
WHO	World Health Organization

I. EXECUTIVE SUMMARY

Malaria prevention and control is a major foreign assistance objective of the U.S. Government. In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the United States will 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.

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 the passage of the 2008 Lantos-Hyde Act, funding for PMI was extended and, as part of the GHI, the goal of PMI was adjusted to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by continuing to scale up coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

Ghana became a PMI country in December 2007. Other donor partners include the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), which has provided an estimated \$145 million towards malaria control since 2003 and the U.K. Department for International Development (DFID) whose 5-year, \$16 million grant began in 2013.

Malaria is endemic in all parts of the country, with seasonal variations that are more pronounced in the north. Ghana's entire population of 24.2 million (2010 Census) is at risk of malaria infection, but children under five years of age and pregnant women are at higher risk of severe illness due to lowered immunity. Transmission is markedly less intense in large urban centers compared to rural areas.

This FY 2015 Malaria Operational Plan was developed in collaboration with the Government of Ghana (GOG), National Malaria Control Program (NMCP), and other development partners and based upon analyzing malaria control data and trends and reviewing lessons learned over seven years of PMI implementation. The 2011 Multiple Indicator Cluster Survey provided data on point prevalence of parasitemia as well as information on trends in malaria control interventions. The FY 2015 planned budget is \$28 million.

Insecticide-Treated Nets

Following a successful universal mass distribution ITN campaign in 2012, starting in late 2013, Ghana's ITN strategy shifted its primary focus to support for maintaining ITN ownership through continuous distribution at primary schools, antenatal care (ANC) clinics, and vaccination programs offered through child welfare clinics. With FY 2015 funding, PMI plans to continue working with the NMCP, Global Fund, and DFID to sustain universal coverage through the continuous distribution strategy. PMI will procure and distribute 300,000 ITNs, support the GOG to implement the continuous distribution system, and promote ITN use.

Indoor Residual Spraying

The PMI technical support for IRS in Ghana and related entomological monitoring continues to be an important component in malaria control. Epidemiological and entomological data from the PMI IRS spray districts have greatly increased our understanding of how IRS works and possible strategies to optimize its efficacy and deployment in Ghana. Together with the Noguchi Memorial Institute for Medical Research and the Ghana Health Service (GHS), PMI has conducted anemia and parasitaemia monitoring since 2010 (pre-IRS) to assess the impact of IRS in the Bunkpurugu-Yunyoo district in northern Ghana. After the switch to organophosphates in 2013, there was a decrease of more than 50% in the overall rate of parasitemia (compared to data from 2012). The sharp decline in these indicators suggests a positive epidemiologic impact of changing pesticide used in 2013, while the steady improvement of key entomological indicators in 2011 and 2012 suggests a concomitant cumulative effect of pyrethroid use.

With FY 2015 funding, PMI plans to continue the IRS activities in the Northern Region: spraying four districts with organophosphates; employing enhanced information, education and communication and behavior change communication efforts to increase ITN usage; and maintaining intensive epidemiologic and entomologic monitoring.

Malaria in Pregnancy

The 2011 Multiple Indicator Cluster Survey found that 96% of pregnant women reported attending ANC four or more times, while also confirming that Ghana has made tremendous gains in IPTp coverage over the past few years. The national proportion of women reporting that they received at least two doses of IPTp during their most recent pregnancy increased from 44% (2008 Demographic Health Survey) to 64% (2011 Multiple Indicator Cluster Survey), although regional disparities exist. To increase the level of uptake and adherence to IPTp, the PMI strategy for malaria in pregnancy is to continue to work to provide in-service training, pre-service training and supportive supervision to maintain and increase the knowledge, skills and practices of IPTp among healthcare workers at ANC clinics. At the same time, PMI aims to expand IPTp capacity at peripheral healthcare facilities, services and Community-based Health Planning and Services (CHPS). PMI will emphasize support for ANC and IPTp in regions where the IPTp rates are lagging. Additionally, PMI will encourage malaria prevention during pregnancy through vector control by supporting the routine distribution of ITNs to pregnant women during their first ANC visit.

Case Management

With FY 2015 funding, PMI will significantly increase support for malaria case management. PMI will procure over 2.5 million RDTs and up to 10.9 million treatments of ACTs, with an emphasis on pediatric presentations of ACTs and severe malaria medication. Support from PMI will also aim to improve the knowledge, skills, and practices of healthcare workers who have received malaria case management training in the past and expand malaria case management capacity to CHPS zones and peripheral healthcare facilities. The focus will be on strengthening quality assurance of malaria diagnosis, addressing the low rates of RDT use and adherence to negative RDT results by health care providers through outreach training and supportive supervision visits. The PMI strategy also includes funding to support private sector case management approaches through National Health Insurance Agency accredited pharmacies and

over the counter medicine sellers, formerly known as licensed chemical sellers. PMI activities will strengthen the connections between these private sector health service providers with GHS and support activities to address incentives for malaria case management compliance.

Monitoring & Evaluation (M&E)

The FY 2015 PMI plan supports the NMCP to strengthen routine health information systems for malaria M&E through continued training and supportive supervision of district and regional data management staff. Implementation of the revised District Health Information Management System (DHIMS2) is fairly new; PMI will support monitoring the quality of data collected and reported to DHIMS2. In line with NMCP and PMI strategies, FY 2015 support will continue monitoring nationwide insecticide resistance and efficacy of antimalarial drugs. With expected results from the 2014 Demographic and Health Survey (DHS), an impact evaluation is scheduled using FY 2015 funds.

Operational Research (OR)

The NMCP in Ghana has strong in-country technical capacity, which includes many experienced epidemiologists and entomologists. During 2010-2012, PMI supported an OR study that measured the prevalence of *Plasmodium falciparum* parasitemia and anemia in children under five years of age at baseline and following annual and bi-annual spraying in a northern district with a high malaria burden. Results from the study showed significant impact of one-spray round of IRS. With FY 2015 funding, PMI will support an OR study to identify strategies to improve clinician adherence to Ghana's national case management guidelines requiring testing of all suspected malaria cases and adherence to those test results, which currently remain low, despite years of supportive supervision and training.

Behavior Change and Communication (BCC)

Awareness about malaria transmission continues to increase, yet misconceptions about the cause of malaria persist. Subjective reasons (e.g., "being too hot or uncomfortable") are still cited as the primary reason mentioned for non-use of ITNs. Moreover, continued high rates of presumptive malaria diagnosis based on fever and lack of adherence to negative RDT results present additional communication opportunities. With FY 2015 funding, PMI will build on previous BCC investments, including the *Good Life* campaign, to promote correct and consistent use of ITNs, improved IPTp uptake, and strengthened malaria-related care seeking behavior. PMI will also work to improve the capacity of GHS's Health Promotion Department to directly promote improved malaria prevention and care seeking behaviors.

II. STRATEGY

PRESIDENT’S MALARIA INITIATIVE

The President’s Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS and tuberculosis. 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 and, as part of the GHI, the goal of PMI has been adjusted to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by continuing to scale up coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

Ghana was selected as a PMI country in fiscal year (FY) 2007. Large-scale implementation of ACTs and IPTp by the National Malaria Control Program (NMCP) in Ghana Health Services (GHS) began in 2005-06, and has progressed rapidly with the scale up of interventions with support from PMI and other partners. Rapid diagnostic tests, ACTs and IPTp are now available and being used in public health facilities nationwide and millions of long-lasting ITNs have been distributed.

This FY 2015 Malaria Operational Plan (MOP) presents a detailed annual implementation plan for Ghana, based on the PMI Strategy and NMCP’s 6-Year National Malaria Control Strategy (2014-2020). The MOP was developed in consultation with the NMCP and with the participation of national and international partners, including the Global Fund, who have been involved in malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the National Malaria Control Strategic Plan and build on investments made by PMI and other partners to improve and expand malaria-related services. This document briefly reviews the current status of malaria control policies and interventions in Ghana, describes progress to date, identifies challenges and unmet needs if the targets of the NMCP and PMI are to be achieved, and provides a description of planned FY 2015 activities.

MALARIA SITUATION IN GHANA

Malaria is endemic and perennial in all parts of Ghana, with seasonal variations that are more pronounced in the north. Ghana’s entire population of 24.2 million is at risk of malaria infection, but children under five years of age and pregnant women are at higher risk of severe illness due to lowered immunity. Malaria cases seen in health facility outpatient departments (OPD) increased from approximately 250/1,000 population in 2000, to about 437/1,000 population in 2012. This rate increase translates to an upsurge in total OPD cases from 4.9 million to 11.3 million over the period, resulting from improved data reporting, improved financial access due to the expanding coverage of the National Health Insurance Scheme, improved geographical access to health care due to the increasing number of CHPS zones, and continued presumptive diagnosis

of malaria. During the same time period, malaria admissions increased from approximately 5/1,000 to approximately 17.5/1,000 population, driven by the same reasons as those driving up OPD cases. However, significant reductions in malaria mortality have been observed with the institutional case fatality rate among children under five declining from 14.1% in 2000 to 0.6% in 2012.

The length of the malaria transmission season varies by geographic region in Ghana, depending on the length of the dry season (December-February) during which there is very little transmission. In Ghana, there are two major transmission patterns. In the northern part of the country, there is a six to seven month transmission season, with the highest number of cases occurring between July and November. In the southern part of Ghana, the transmission season is nine months or more, with a small peak May to June and a larger peak October to November.

Plasmodium falciparum accounts for 85-90% of all infections. *Plasmodium malariae* (<10%) is also found and more rarely *P. ovale* (0.15%). The major vectors are *Anopheles gambiae* species complex and *An. funestus*. These species generally bite late in the night, will rest both indoors and outdoors, and are most common in the rural and peri-urban areas. Outdoor biting is common in the northern savannah (>50% outdoor biting pre-IRS was documented at several monitoring sites in the northern region). *Anopheles melas* is found in the mangrove swamps of the southwest and *An. arabiensis* in savannah areas of northern Ghana.

Ghana can be stratified roughly into three malaria epidemiologic zones: the northern savannah, the tropical rainforest, and the coastal savannah/mangrove swamps. Although the boundaries of these zones have not been defined precisely, the demarcations used since 1998 by the Ghana Statistical Service in its periodic living standards surveys provide a close approximation (see Figure 1). Malaria surveillance is not adequate to permit a robust stratification at the district level. However, the *Ghana Multiple Indicator Cluster Survey (MICS) with Malaria Biomarker Survey*, conducted from mid-September to mid-December 2011 (the late rainy season), provides a rough snapshot of regional and zonal differences in parasitemia malaria prevalence (Figures 1 and 2).

Ghana is urbanizing rapidly, with the 2010 census demonstrating that over 50% of the population now live in urban areas. Published research and the 2011 MICS/Malaria Indicator Survey show that malaria transmission tends to be significantly less intense in large urban centers — as documented in the PMI-supported Ghana Urban Malaria Study released in April 2013. Parasitemia rates among children under five in the three large cities were found to be significantly lower than the level in rural areas in the same ecologic zone. The proportion of children with a recent fever who tested positive for malaria was 80.2% in rural areas, but just 6.6% in Accra and Kumasi.

Figure 1. Malaria Prevalence in Children 6-59 months, by Region. Source: 2011 MICS.

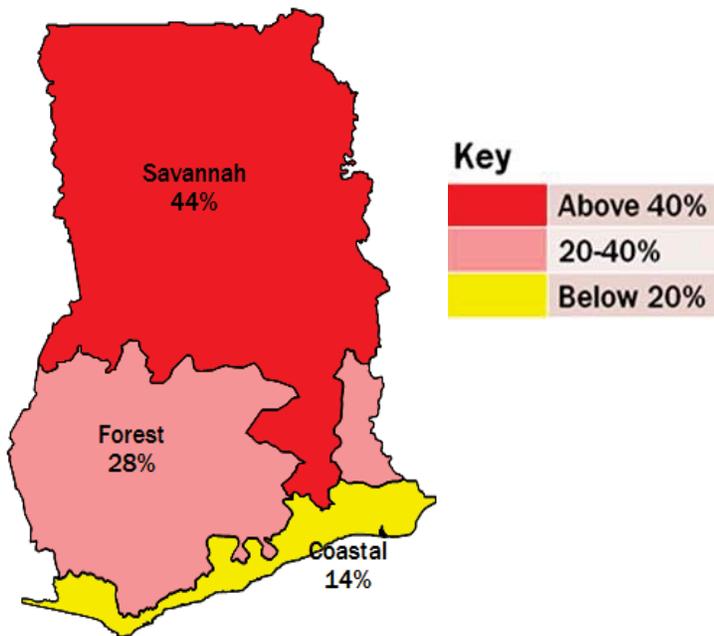
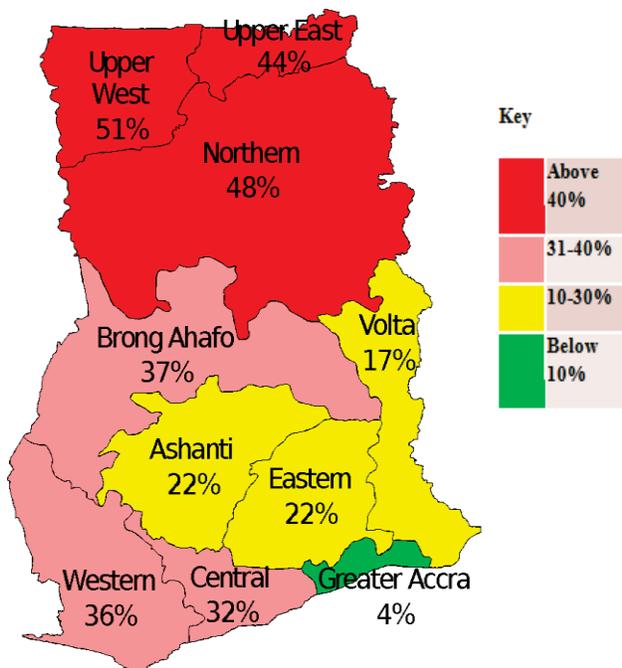


Figure 2. Malaria Prevalence in Children 6-59 months, by Ecologic Zones. Source: 2011 MICS.



HEALTH SYSTEM DELIVERY STRUCTURE AND MINISTRY OF HEALTH ORGANIZATION

The Ministry of Health (MOH) exercises oversight and control over policy formulation and monitoring progress towards achieving established targets. The GHS is responsible for delivery of public health and clinical services, in parallel with the three teaching hospitals in Accra, Kumasi, and Tamale. The National Health Insurance Scheme (NHIS), implemented since 2003, represents a major development in health system financing and has increased attendance at health facilities. The total number of malaria outpatient cases increased from 3,551,452 in 2006 to 11,291,745 in 2011.¹

The GHS operates at three levels: national, regional (10 regions), and district (216 districts). Policies and major aspects of program design are developed at the national level by the central leadership and programs, such as the NMCP, while implementation and management of health services is primarily the responsibility of the decentralized health management teams at the regional and district levels. The ratio of 1.1 nurses and 0.1 doctor per 1,000 population falls short of the WHO minimum of 2.2 and 0.2 per 1,000 population, respectively, needed by countries to achieve the Millennium Development Goals. There are 343 hospitals, 760 health centers, 1,200 clinics, and 379 private maternity homes in the country. Of these, 83% are in the public sector and 9% are faith-based institutions, most of which are closely integrated with the GHS. The remaining 8% of facilities are in the private sector and located primarily in the larger cities.

The GHS has rolled out an updated electronic District Health Information Management System (DHIMS2). The system was scaled up in early 2012, with PMI supporting improved malaria data quality. By mid-2012, the DHIMS2 system was providing monthly reports that met benchmarks for completion and timeliness resulting in the phase out of NMCP's parallel reporting system.

The penetration of the GHS services at the community level is variable. The GHS uses the innovative CHPS approach to extend services to underserved communities. The CHPS program was launched to address the challenge that more than 70% of all Ghanaians lived over eight kilometers from the nearest health care provider,² a problem made worse by inadequate road and transport facilities. CHPS program provides access to community health nurses in communities of at least 6,000 people. Since its inception in 1999, CHPS has scaled up from 300 to 1,863 functional CHPS zones by 2012. A CHPS zone refers to the base of operation for a community health nurse and consists of a two-room facility with equipment for basic curative and preventive care. In many rural areas, networks of government-trained community health volunteers promote public health services.

The NMCP is a program within GHS that is the principal recipient of grants from Global Fund. The NMCP manages all clinical and community-based interventions related to malaria. With government decentralization of services in Ghana, regional and district level malaria control activities are managed and implemented by the Malaria Focal Persons and/or the Disease Control Officers who report to the Regional and District Health Management Teams.

¹ NMCP/GHS report, 2012.

² Ministry of Health of the Republic of Ghana. 1998. A profile of health inequities in Ghana. Accra: Ministry of Health.

NATIONAL MALARIA CONTROL PLAN & STRATEGY

In the past two decades, Ghana has consistently improved malaria control methods, increased resources for malaria, and promptly adopted revised international technical standards. In 2002-2004, Ghana adopted ACTs as the first-line antimalarial drugs. In 2003-04, IPTp using sulfadoxine-pyrimethamine (SP) was adopted as the national policy, implemented by the Reproductive Health Division in collaboration with the NMCP. Starting in 2003, international support for malaria control increased sharply, as Ghana benefited from a succession of Global Fund grants, the launch of PMI in 2007, and significant additional support from DFID, United Nations Children's Fund (UNICEF), the World Bank, and the governments of Japan, China, and Cuba. Beginning in 2005, IRS was implemented on a district-wide scale by the AngloGold Ashanti (AGA) mining company in Obuasi, Ashanti Region.

The availability of unprecedented external resources encouraged the NMCP to pursue an aggressive scale up of proven malaria control methods, as captured in the *National Malaria Control Strategy 2008-2015*.

In light of the marked inter-regional and urban/rural difference in malaria burden, the NMCP, in collaboration with major malaria partners, namely the Global Fund, DFID, and PMI, are moving away from the de facto "one size fits all" approach to programming malaria control interventions which has characterized the past decade. Moving forward, every effort is being made to tailor malaria control interventions and case management based on the unique needs of different localities.

In 2013, the national malaria strategy was reviewed with support from Roll Back Malaria and partners which resulted in the report of the Malaria Program Review (MPR) and an *Aide Memoire* that was signed by the Minister of Health and the development partners in January 2014. Based on the recommendations from the MPR and new and emerging interventions at the global level, the NMCP developed the *National Malaria Control Strategic Plan for 2014-2020*, which was finalized in August 2014. PMI provided support in the development of the new strategic plan which will replace the current national strategy.

The scope of the new strategic plan is to consolidate the recent gains and accelerate malaria control in the high transmission areas to further reduce malaria burden, and move towards establishing more lower-transmission areas in Ghana by the end of 2020. The plan calls for reducing the malaria morbidity and mortality burden by 75% (using 2012 as baseline) by the year 2020 with specific objectives outlined below.

The objectives and proposed strategies outlined in the new national plan are as follows.

- *To protect at least 80% of the population at risk with effective malaria prevention interventions by 2020*
 - To maintain the universal coverage already achieved, distribute ITNs through mass campaigns (one ITN per two persons) and continuous distribution through antenatal clinics (ANC), child welfare clinics (CWC) and primary schools,

targeting pregnant women, children under five years and school children respectively

- IRS for areas with high parasite prevalence
 - Larval control that involves larviciding and environmental management in the context of integrated vector management
 - Seasonal malaria chemoprevention implemented in phases in the northern part of the country where malaria transmission is highly seasonal
 - Prevention of malaria in pregnancy offered as a package of interventions including the use of ITNs and IPTp with SP
- *To provide correct diagnosis to all suspected malaria cases and prompt and effective treatment to 100% of confirmed malaria cases in accordance to treatment guidelines by 2020*
 - Routine laboratory testing by microscopy or RDTs to address the issue of rational use of ACTs. Ghana's policy recommends that all suspected malaria cases are confirmed in accordance with the T3 initiative (Test, Treat and Track)
 - Strengthening health worker capacity for malaria case management via supportive supervision
 - Increasing access to underserved communities where there is no CHPS through the integrated community case management (iCCM)
 - Improving access to diagnosis and treatment in the private sector and enforcing adherence to guidelines in the private sector
 - *To strengthen and maintain the capacity for program management, partnership and coordination to achieve malaria programmatic objectives at all levels of the health care system by 2020*
 - Holding regional and national malaria reviews
 - Facilitating relevant committee and working group meetings
 - Advocating at corporate and parliamentary levels for increased resource allocation for malaria control activities
 - Ensuring efficient and effective procurement and logistics management
 - Developing and implementing a financing sustainability plan for accelerated malaria control
 - *To strengthen the systems for surveillance and M&E in order to ensure timely availability of quality, consistent and relevant malaria data at all levels by 2020*
 - Enhancing routine surveillance and coordinated monitoring of program progress
 - Supporting population based surveys (DHS, MICS, MIS, and KAP)
 - Improving data quality and dissemination of survey and surveillance reports
 - *To increase awareness and knowledge of the entire population on malaria prevention and control so as to improve uptake and correct use of all interventions by 2020*
 - Advocating to political leaders, policy makers, opinion leaders and corporate bodies for support for malaria control
 - Advocating to health worker for conforming to T3 strategy for correct case management of malaria

- Sustaining communication, education, and community mobilization to increase knowledge among the general population to enhance uptake of malaria prevention interventions (ITN ownership and use, IRS, IPTp, etc.)

In 2009, a revised Integrated Vector Control Strategy was released and a National Malaria Vector Control Oversight Committee (MaVCOC) was established with PMI support. This committee's mandate is to ensure safe and effective implementation and management of malaria vector control operations, in accordance with WHO guidelines and local Environmental Protection Agency pesticides regulation requirements. This committee also serves as the technical advisory body on vector control to the NMCP and the Malaria Inter-Agency Coordinating Committee (MICC).

Since 2008, the MOH has sponsored the Cuban Labiofam company to conduct larviciding, beginning with a pilot in central Accra and expanding to central urban districts of Kumasi, and Sunyani. A ribbon cutting for construction of a factory for manufacturing bio-larvicides took place in 2013. Larviciding is not considered a stand-alone intervention, but an integrated part of NMCP's integrated vector management, and will be conducted in areas where breeding sites are few, fixed, and findable. However, as the number of unbiased studies on the efficacy or effectiveness in Africa, including Ghana, is limited, larviciding in Ghana will be conducted within the context of generating data on its impact.³

INTEGRATION, COLLABORATION, AND COORDINATION

Funding

The PMI program in Ghana has traditionally been designed to provide technical assistance and fill funding and commodity gaps in support of the country's malaria control program. Given the pivotal role played by the Global Fund grants in Ghana, PMI is working with the NMCP and coordinating closely with the Global Fund to plan for the most effective use of resources available. During the FY 2015 MOP visit, the PMI team met with the Global Fund to discuss the coordinating activities to fill gaps and avoid duplication of efforts. Global Fund supports two active malaria grants—one to the AngloGold Ashanti Malaria Control Program (AGAMal), the primary recipient of the Round 8 Grant, and the other to the NMCP/MOH (Round 4).

Under Global Fund's recently implemented New Funding Model, Ghana will receive additional funding of \$8.6 million to add to the funding available in the current grants of \$116.4 million, for a total of \$125 million to fund malaria control efforts in Ghana through 2016. This represents a substantial decrease in Ghana's allocation from Global Fund. While AGAMal previously planned to scale up IRS implementation to 40 districts, the current funding will not support the expansion. The NMCP is re-programming funds away from IRS, whose original grant value was \$120 million, to cover other malaria control activities. Therefore, AGAMal will reduce its coverage from its current 25 districts to 12 districts in 2015.

³WHO, Global Malaria Program 2012
http://www.who.int/malaria/publications/atoz/interim_position_statement_larviciding_sub_saharan_africa.pdf

DFID expects to provide approximately £10 million (approximately \$16 million) over five years beginning in 2013 to support malaria control in Ghana, including support for ITNs, malaria diagnostics, and malaria case management. DFID support includes funding for a seasonal malaria chemoprevention pilot in Upper East Region, in coordination with WHO, and support for training, supervision, and data quality audits to improve data quality in the DHIMS2. PMI and DFID are coordinating closely on future program planning.

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 Coordination 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. In addition, the USG coordinates with malaria control stakeholders through multiple committees organized under the NMCP, including the MaVCOC, the LLIN Coordinating Committee, and the National Malaria Communications Committee. Ghana's Roll Back Malaria Coordinating Committee became defunct in 2008, a deficiency highlighted in the MPR. With advocacy by WHO and PMI, this essential national body was revived in December 2013 as the Malaria Inter-agency Coordinating Committee (MICC). During this meeting, terms of reference for the MICC and its technical working groups have been reviewed, revised and approved. During the MOP visit, PMI sponsored a MICC meeting and, as part of the agenda, presented the PMI key activities and accomplishments to date. PMI also shared plans for the way forward with FY 2015 and received input from the MICC.

Private Sector

Ghana has a large and rapidly growing private sector whose engagement in malaria control has increased substantially during the past decade. This has encompassed corporate social responsibility programs (e.g. AGA/Global Fund, oil companies), work place health care promotion efforts (e.g. mines and plantations), and marketing of malaria medications and preventive services (e.g. pharmaceutical manufacturers, sanitation companies, and larviciding). As expected, not all private sector engagement has been aligned with NMCP policy or international public health interests (e.g., the distribution of substandard medications, the confusion of garbage control with anopheles control, and the aggressive marketing of new health and diagnostic technology).

PMI continues to work to improve malaria diagnostics, treatment, and referrals in the private sector, specifically community businesses, such as pharmacies and OTCMS. PMI coordinates with the NMCP, GHS, National Drugs Program, Pharmacy Council, GOG researchers, pharmacy associations, and other stakeholders to introduce RDT diagnosis and scale up appropriate case management or referral of clients at OTCMS and pharmacies.

PMI also works with larger private sector companies involved in malaria control in Ghana, as well. AngloGold Ashanti Mining Company, as part of its corporate social responsibility program, established a malaria control program in Obuasi District in 2005 that includes IRS, targeted larviciding, and other interventions. In October 2009, Ghana secured a \$120 million Global Fund Round 8 Grant to scale up IRS with AGAMal, a foundation established by AGA as the grant's principal recipient. As discussed further in the IRS section, below, funding constraints will limit the number of districts receiving IRS through this grant to 12, far short of the original

goal of 40. The PMI and AGAMal IRS programs frequently collaborate in areas such as training and community mobilization, and continue to share best practices in operations, timing and duration of spray rounds, entomological monitoring, spray quality, insecticide selection, and procurement. As members of the MaVCOC, each organization contributed to developing the country's first Standard Operating Procedures for IRS (2011).

Within USG

PMI functions within the GHI strategy and collaborates with other USG agencies supporting malaria control in Ghana such as Peace Corps, Centers for Disease Control (CDC), Naval Medical Research Unit, Department of Defense, National Institutes of Health, and the State Department. Peace Corps volunteers are posted to United States Agency for International Development (USAID) projects to support community mobilization and promote malaria control interventions. Peace Corps volunteers have been particularly engaged in the ITN distribution campaigns and selected PMI operational research. The Department of Defense, National Institutes of Health, and Naval Medical Research Unit No. 3 support malaria vaccine research, surveillance of incidence and causes of fevers, laboratory system strengthening for infectious disease, and drug resistance monitoring. The CDC, under the President's Emergency Plan for AIDS Relief, continues to coordinate its technical assistance in strategic information, Field Epidemiologic and Laboratory Training Program (FELTP), and laboratory system strengthening. The USG supports integrated health programs in Ghana to strengthen health systems while addressing specific goals in maternal and child health (MCH), nutrition, reproductive health, water and sanitation, malaria, and HIV/AIDS. USAID/Ghana works in all ten regions, at the community, district, and regional levels to encourage positive behavior change, improve the quality of service delivery, and improve health management systems, thereby achieving results across the full spectrum of health elements. PMI-supported malaria programming has been integrated into these 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, PMI supports expanded case management interventions (e.g., lab and clinical supportive supervision, etc.) to ensure the entire country is covered.

PMI support to strengthen commodity supply chain management is combined with USG funding under President's Emergency Plan for AIDS Relief and other GHI areas, in a concerted effort to improve supply chain management for all pharmaceuticals and health commodities. PMI's contributions and technical assistance to IPTp is integrated with the ANC program and includes support to strengthen training institutions for midwives throughout the country. Support for case management provided in concert with capacity building for management of other childhood illnesses, such as diarrhea and respiratory infections, brings added value to both PMI and MCH programs.

PMI GOALS, TARGETS, AND INDICATORS

The goal of PMI is to reduce malaria-associated mortality by 70% compared to pre-Initiative levels in the 15 original PMI countries and to reduce malaria-associated mortality by 50% in new countries added to PMI in FY 2010 and later. By the end of 2015, PMI will assist Ghana to achieve the following targets in populations at risk for malaria:

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

PROGRESS ON COVERAGE/IMPACT INDICATORS TO DATE

As in many African countries, PMI and the NMCP rely on nationally representative health surveys to track progress in coverage of malaria control interventions in Ghana. There have been four such surveys since 2003, each implemented by the Ghana Statistical Service and partners, and each conducted during the late rainy season, albeit during different months and in some cases employing slightly different methods. The 2003 DHS was conducted in July-October and the 2006 MICS in August-October. The 2008 DHS, conducted September-November 2008, provides the baseline for key PMI indicators.

The 2011 MICS incorporated a full malaria module and was conducted in September-December 2011. This latest survey, entitled 2011 Ghana MICS4 with Enhanced Malaria Module and Biomarkers, was led by Ghana Statistical Service and UNICEF, with PMI and the NMCP supporting a robust malaria module through technical assistance, funding, and oversight. Although the 2003 and 2008 DHS included anemia testing, a new feature in the 2011 MICS was the inclusion of malaria prevalence data (using both microscopy and RDTs). The survey provided a unique nationwide snapshot of peak season malaria point-prevalence in children age 6-59 months, as referenced in Figure 1.

Ghana has achieved steady gains in many of the key malaria intervention indicators, as indicated in Table A. Between 2003 and 2011, ITN ownership and use, uptake of IPTp, and treatment with ACTs have all increased. Given the number of ITNs distributed since 2011 (and discussed in

more detail below), it is expected that the 2014 DHS will show an increase in ITN ownership and use.

Table A. Recent Estimates of Malaria Indicators

Indicator	2003 DHS	2006 MICS	2008 DHS	2011 MICS
Proportion of households with one or more ITN	3%	19%	33%	49%
Proportion of children under five years old who slept under an ITN the previous night	4%	22%	28%	39%
Proportion of pregnant women who slept under an ITN the previous night	3%	NA	20%	33%
Proportion of women who received two or more doses of IPTp during their last pregnancy in the last two years*	NA	28%	44%	64%
Proportion of children under five years old with fever in the last two weeks who received treatment with ACTs*	NA	3%	12%	18%**
Under-five mortality	111	111	80	82
<p>* SP was adopted for IPTp in 2003; ACTs were adopted in 2004. ** The 2011 MICS did not distinguish adequately between responses for “amodiaquine” (23.6%) and “artesunate-amodiaquine,” which was counted along with arthemeter-lumefantrin, dihydroartemisinin – piperaquine as “any ACT” (18%). Thus, the true figure may lie somewhere between 18% and an estimated 36%. Supporting this conclusion, government health centers and CHPS compounds were found to prescribe an implausible 55.6% “amodiaquine.” Moreover, it has emerged that in popular speech, artesunate-amodiaquine is often called “amodiaquine.”</p>				

CHALLENGES, OPPORTUNITIES, AND THREATS

While essential for achieving PMI goals, health commodity supply chain reform has been slow to make progress. Various stakeholders have sought to protect vested interests and political will remains weak. Over the last year not much progress has been made on this front. Consultations between the GHS, the MOH, and the country’s development partners — including PMI — are ongoing. Recently however, the MOH asked USAID and the Global Fund to pilot a private sector distribution system which will be piloted in three regions. In addition, the MOH constituted a steering committee to oversee implementation of the Supply Chain Master Plan and the private sector distribution pilot. Though the committee is yet to meet given recent leadership

changes and distraction by the Ebola threat and cholera outbreak in Ghana, it is encouraging to see renewed interest on both the MOH and donor side in this issue.

Currently, malaria diagnosis and treatment services are bundled under the national insurance scheme (the NHIA). As a result, malaria-related services are reimbursed whether a diagnostic test is done or not. NHIA reforms are required over the long term in order to promote the use of diagnostics and to ensure malaria treatment based on microscopy or RDT results.

Furthermore, delayed allocations to the NHIA resulting in delayed reimbursement to providers continues to be a major challenge in providing reliable healthcare. Long delays in reimbursing providers has often led to severe stress on the finances of health facilities leading to extended stockouts of essential medicines, including ACTs. Despite these challenges, significant opportunities exist with NHIA, which is currently estimated to cover 60% of total health expenditure. Malaria remains the fourth largest cost center of the NHIA.

The delayed government to government (G2G) agreement between PMI/Ghana and NHIA has been signed recently and supports activities such as clinical audits and policy reforms. In addition, the regional and district health teams have demonstrated capacity to directly manage agreements. This presents an excellent opportunity to use the GHS structure and support Regional Health Management Teams so they can tailor activities to their specific needs. PMI plans to provide direct financial support to GHS institutions as part of the FY 2015 funded activities.

The worsening macro-economic conditions in the country, precipitated by rising inflation and rapidly depreciating currency, presents significant threats for major disruption in the economy. Real incomes continue to decline on a monthly basis due to depreciation of the local currency. This has the potential to precipitate an exodus of skilled health staff from the country. Inadequate government support for the health sector beyond paying salaries of health staff also presents significant threat to gains made so far. The health system relies largely on donors for commodities such as ITNs, as well as most of its training needs. Although the central government recognizes the need to sustain present gains, domestic resource mobilization remains weak.

PMI SUPPORT STRATEGY

The PMI/Ghana strategy includes all of the major interventions supported by PMI. The emphasis and level of support for each of the interventions takes into consideration the contributions from the GOG, Global Fund, DFID, and other stakeholders to ensure priority interventions are scaled up, gaps are filled, and regional variations in malaria epidemiology and progress to-date are addressed.

PMI will support continuous ITN distribution through schools, ANC, and CWCs to sustain the gains made through mass distribution campaigns. PMI will also continue supporting IRS in the same four districts covered during the FY 2014 in the Northern Region.

Since the details of Global Fund programming had not yet been finalized as of the writing of this MOP, and recognizing the limited progress on prompt treatment with ACTs, the FY 2015 MOP priorities include procurement of RDTs, pediatric formulations of ACTs, and enhanced technical assistance for case management. The PMI/Ghana strategic approach will continue to be data driven, using data from the MICS and the anemia and parasitemia studies to inform how to target PMI's interventions. As such, prevention efforts will be a lower priority for PMI in Greater Accra Region, which has the lowest regional parasite prevalence (4%).

Investing in universal confirmatory testing to promote rational use of ACTs will be a higher priority for PMI in the coming years. In FYs 2014 and 2015, PMI has significantly increased the proportion of the budget supporting malaria case management, including RDT and ACT procurements. Drawing on concerns about adequate supplies of quality pediatric formulations of ACTs, past stockouts of RDTs, and uncertainty about the future Global Fund grant, PMI will considerably increase procurement of ACTs and RDTs. PMI will also contribute to the integrated USAID activity to reform the GOG pharmaceutical supply chain management system.

The PMI strategy will continue to solidify the gains from training health workers in the malaria case management guidelines through supportive supervision and quality improvement while shifting the emphasis for new activities to rural and peripheral health services. The PMI strategy will support expansion of the CHPS program and enhancing the quality of the malaria case management services. The PMI strategy will also include a private sector activity to enhance pharmacy and OTCMS compliance.

III. OPERATIONAL PLAN

INSECTICIDE-TREATED NETS (ITN)

NMCP/PMI objectives

The NMCP's objective for deploying ITNs is universal coverage for the entire population, defined as one long-lasting ITN for every two people (which is quantified as one net per 1.8 people to account for households with odd number of occupants). Ghana completed its nationwide universal long-lasting ITN coverage campaign at the end of 2012. These door-to-door distribution campaigns with a hang-up component distributed more than 12.4 million long-lasting ITNs to households in all ten regions and achieved the universal coverage objective.

Progress since PMI was launched

The ITN distribution strategy is shifting from mass campaigns to support for continuous ITN distribution, including both school-based mini-campaigns and distribution at ANC and CWCs. Malaria stakeholders completed the implementation of mass campaigns for universal coverage in all ten regions in December 2012. Sustaining the gains made through the mass campaigns by continuous distribution through schools and ANC and CWC has been the priority of PMI since then.

To maintain universal ITN coverage, the NMCP, with PMI support, pioneered a mixed model of continuous distribution channels in 2013 with a pilot to test the viability of ITN distribution through different channels, including: ANCs, CWCs (through the Expanded Program on

Immunization), primary schools, and with e-vouchers in partnership with private sector shops in the Eastern Region. These distribution channels targeted, respectively, first registrants at ANCs, children under 18 months receiving their second measles booster vaccination, school children in primary classes 2 and 6, and the general public with the ability to purchase a subsidized net through private shops.

More than 99% of targeted school children in classes 2 and 6 received nets during the pilot school-based distribution, and coverage rates for CWC and ANC were 98% and 50%, respectively (the low rate of ANC uptake is attributed to under reporting, a problem currently being addressed). The evaluation of the Eastern Region's continuous distribution pilot confirmed that it was successful in sustaining the ownership gains made with the mass campaigns by replacing older nets as well as filling ownership gaps in households that the campaign did not completely reach.⁴ Based on the coverage rates achieved and the exceptionally good level of cooperation from school authorities, the NMCP decided to scale up the distribution of ITNs nationwide using these three channels in 2014 and beyond.

With help from PMI, the NMCP also supports communication and community mobilization activities to promote correct and consistent ITN use, with a target of 85% of pregnant women and children under five years of age sleeping under an ITN every night.

Progress during the last 12 Months

In 2014, PMI procured 2,640,000 long-lasting ITNs for distribution through these continuous channels, of which a total of 2,017,948 long-lasting ITNs have been distributed in primary schools (1,510,100 ITNs), ANC clinics (306,318 ITNs) and CWC clinics (201,530 ITNs). It is expected that the remainder of ITNs will be distributed by the end of the year.

School-Based Distribution

The national school-based distribution of ITNs to students enrolled in classes 2 and 6 was led by the School Health Education Program in collaboration with the NMCP. It was organized in all ten regions during the second term of the 2013-2014 academic school year. Class enrollment registers were used to identify the students eligible for distribution. The supply chain for the nets was a successful collaborative model with the involvement of the Ghana Education Service. Insecticide-treated mosquito nets were positioned at the district stores and circuit supervisors coordinated the movement of the nets to schools in their catchment area. Once the nets arrived at the schools, the distribution to students was supervised by the head teacher. The distribution was conducted after the students received instruction on malaria, ITN use, and care. Parent-teacher association meetings provided the platform for information dissemination on ITNs with the aim of encouraging household acceptance and use of ITNs. A total of 1,510,100 nets were distributed through this channel.

⁴ For additional details, please see the "Results from Networks Ghana Eastern Region Continuous Distribution" presentation made at the 2014 VCWG Annual Meeting. The presentation can be downloaded at: http://www.rbm.who.int/partnership/wg/wg_itn/ppt/ws3/m9AKilian.pdf

Facility-Based Distribution

In FY 2014, PMI worked with the NMCP and Public Health Division of the MOH to revise the ANC forms to include space to record the ITNs distributed. Not having a dedicated space on the form was leading to under-reporting. PMI expects that the revised ANC forms and complementary supportive supervision will improve ITN quantification going forward. The supportive supervision will also help improve ITN distribution management, especially at lower level health facilities. PMI recognizes that proper training and education, health worker attrition, storage constraints, and accurate quantification of ITNs continue to be challenges associated with the health facility-based distribution channel. Careful monitoring of activities and supportive supervision must remain a priority to ensure continuous improvements in ITN distribution through clinics.

E-Coupon Pilot

In 2013, a small pilot was conducted to test selling long-lasting ITNs in the private sector with an "e-Coupon" subsidy. Ghana had previously used paper vouchers for ITN distribution (2004-2010). An e-Coupon, conceptually similar to a paper coupon, uses a digital/electronic platform, which reduces the required number of management staff, improves efficiencies, and reduces fraud. An e-Coupon issuing point (health clinic, workplace, or other participating issuer) gives out a coupon with an electronically generated discount code (written onto a pre-printed coupon) to a target beneficiary. The beneficiary can then redeem their coupon at a participating retailer for an ITN, paying only the top-up. The retailer submits the coupon code using their mobile phone.

The pilot was conducted in Koforidua, the capital of the Eastern Region of Ghana and was designed to reach three target groups: the general population (with a 50% subsidy), employees of two selected large Ghanaian companies (100% subsidy), and school children in grade 4 in selected schools (100% subsidy). Full retail price of a net varied between 14 – 18 GHC (\$3.50-\$4.80) depending of the type of net (double, small, rectangular, conical, etc.) that the general public selected. With a full subsidy provided for the nets offered at the work place and schools, nets redeemed with these coupons were free of charge to the recipients.

A process evaluation for the e-Coupon pilot indicated that an e-Coupon platform was successfully created and it was able to efficiently manage subsidies from multiple donors to a variety of target populations. While the six-month pilot was not able to satisfactorily create demand for subsidized ITNs in the target area, there was good uptake of the program in one workplace plantation. Additionally, the pilot did not fully demonstrate a cost effective public private partnership to reach targeted consumers with different levels of subsidies. Private sector issuers and redemption outlets also reported doubt as to the viability of selling ITNs in the current Ghanaian policy of free ITN distribution through the public sector. The PMI-sponsored pilot is now complete. Although the study raised a number of questions, there was consensus that these issues could be overcome and this was nevertheless a viable channel. The pilot concept and its initial results sparked interest from DFID, who made a three-year multi-million dollar commitment to further refine the design and take the e-Coupon to scale in targeted areas within Ghana.

Capacity Building

PMI continued to increase the capacity of key individuals to promote ITN ownership and use. In the past year, a total of 10,214 health workers (approximately 25% of Ghana's public health sector workers⁵) have been trained and equipped with skills to manage continuous distribution of ITNs through ANC and CWC clinics. Those trained include 160 district malaria focal persons, district health information officers, and district public health nurses who were supported to provide monitoring and supervision support to the health facilities in their districts. Additionally, teachers and School Health Education Program (SHEP) coordinators have been trained in 16,007 schools on the use of art forms (e.g., drama, songs, etc.) to conduct mobilization activities at their schools and communities. PMI also supported community mobilization and mass media communications (radio and television) to promote correct and consistent ITN use and care, with the goal of reaching 85% of the population with behavior change communication (BCC) messages.

ITN Gap Analysis

The continuous distribution system has been scaled up in 2014 and will continue throughout 2015 and 2016. The NMCP guideline for continuous distribution recommends procuring long-lasting ITNs in bulk to benefit from economies of scale, with shipments scheduled twice a year to cover the next six-month supply need. The ITN shipments will be divided and transported to regional medical stores upon receipt at the Central Medical Stores. According to the guidelines, ANC and CWC clinics will initially receive a three-month supply of ITNs, and thereafter will request monthly shipments based on consumption during the previous month, maintaining a one-month buffer as minimum level of stock.

The NMCP currently expects to conduct its next mass campaign in 2017 instead of 2016 (as was originally planned). This change further reduces the ITN gap for 2016, which is expected to be fully covered through the new Global Fund grant.

⁵ According to the Ghana Health Service's National Strategic Plan, in 2013 there was an estimated 42,000 public health sector workers operating 2,205 facilities. This workforce includes 2,007 doctors, 12,763 nurses, 1,321 pharmacists and 381 allied health professionals.

Table B: ITN Gap Analysis			
Calendar Year	2014	2015	2016
Total Targeted Population ¹	27,095,702	27,743,081	28,406,503
Continuous Distribution Needs			
Channel #1: ANC ²	1,120,500	1,148,513	1,177,226
Channel #2: CWC ²	1,120,500	1,148,513	1,177,226
Channel #3: Primary schools ³	1,300,000	1,500,000	1,600,000
<i>Estimated Total Need for Continuous Distribution</i>	3,541,000	3,797,026	3,954,452
Mass Distribution Needs			
Mass distribution campaign ⁴	2,991,050	-	-
<i>Estimated Total Need for Campaigns</i>	2,991,050	-	-
Total Calculated Need: Continuous Distribution and Campaign	6,532,050	3,797,026	3,954,452
Partner Contributions			
PMI	2,640,000	300,000	300,000
Global Fund ⁵	5,200,000	-	
DFID	1,100,000	200,000	-
World Bank	-	1,000,000	-
<i>Estimated Total Partner Contributions</i>	8,940,000	1,500,000	300,000
Surplus/Carried over ITNs from previous year	1,500,000	3,907,950	1,610,924
Total ITNs available in calendar year	10,440,000	5,407,950	1,910,924
Total ITN Surplus* (Gap)	3,907,950	1,610,924	(2,043,528)

1. Average national growth rate of 2.5% was applied.
2. For each single pregnancy reported at ANC, there will be a resultant single live baby who will access CWC services, hence the same rate of 4% expected pregnancy per population was applied.
3. The Education Management Information System was used to estimate enrollment in Grade 2 and 6.
4. The 2014 campaign will be held in Eastern and Volta Regions
5. At the time of writing the NMCP was in the process of developing their Global Fund Concept Note; although anticipated contributions from this funding for 2015 and 2016 are not yet known, NMCP is confident about the ITN gap being closed by the GF grant.

Plans and justification

PMI will concentrate community mobilization and communications to promote ITN use in regions where the need is greatest (e.g. large rural population and high parasite prevalence) and the potential for gains is highest (e.g. low existing net use and large population size). In FY 2015, PMI will procure long-lasting ITNs for distribution through continuous distribution channels and provide technical and financial support to the NMCP and Ghana Education Service (GES) to train staff for implementation. At the time of writing the FY 2015 MOP, NMCP was in the process of developing its Global Fund Concept Note where it intends to include the ITN commodity needs that remain. The NMCP's plan to conduct a mass distribution campaign in 2017 instead of 2016 will further reduce the ITN gap for 2016 to 2,043,528, which the Global Fund's grant should adequately be able to address.

PMI will continue to support community mobilization and mass media campaigns to create awareness about continuous distribution, ITN care, and to promote ITN use. Further detail on communications strategy, background and rationale for promotion of ITN use and maintenance is covered in the BCC section of the MOP (see below).

Proposed activities with FY 2015 funding (\$2,770,000)

- Procure and transport of long-lasting ITNs: (\$1,500,000)
Procure a minimum of 300,000 long-lasting ITNs at an average cost of \$5 per ITN (including the cost of transporting ITNs to distribution points) to fill the estimated annual ITN gap to maintain universal coverage. This will cover an estimated 8% of national need, complementing nets contributed by Global Fund and potentially other donors. These nets are intended to support continuous distribution channels.
- Technical assistance for ITN distribution and supply chain: (\$1,270,000)
Contingent on successful implementation through a bilateral agreement with GHS in FY 2013, PMI will expand direct financing and technical assistance to GHS and the GES to implement the routine ITN distribution through ANC, CWC, and primary schools nationwide. PMI will support the distribution of up to 1.7 million ITNs through this activity. This will include training health care workers to distribute and document distribution of nets, as well as working with GES and schools throughout the country to distribute and promote nets through the school-based distribution channel. Technical assistance through an implementing partner will continue to support the NMCP and provide additional support, as needed, to ensure the routine distribution system remains well functioning.
- Behavior change communications: (see BCC section)
Building on existing BCC materials for ITNs, PMI will support GHS and GES to implement communications activities to promote ITN ownership and use, employing an evidence-based approach. PMI will support community mobilization, radio and television spots, and communications materials. Particular focus will be placed on net care and misperceptions about use. Technical assistance will be provided to the NMCP, the National Malaria Communications Committee, and the School Health Education Program. Support will be channeled through two USAID projects.

INDOOR RESIDUAL SPRAYING (IRS)

NMCP/PMI objectives

Ghana's Draft National Strategic Plan for Malaria Control (2014-2020) aims to protect at least 80% of the population at risk by 2020 through a combination of universal coverage of ITNs, IRS in areas with high parasite prevalence, (i.e., >40% parasitemia prevalence), larviciding, seasonal malaria chemoprevention, and prevention of malaria in pregnancy. Currently, NMCP plans IRS coverage in 16 districts with PMI and Global Fund support: Upper West (11), Northern (4), and Ashanti (1).

Progress since PMI was launched

PMI began supporting IRS in Ghana in 2007, with a focus on local capacity building, strict environmental compliance, and entomological monitoring. In consultations with GHS, a cluster of districts in the Northern Region was selected for spraying due to their having a high malaria burden (>40% parasitemia, children under 5), less healthcare and economic infrastructure, and a relatively short malaria transmission season.

Within the first two years, the PMI IRS program demonstrated that IRS can be scaled up quickly and safely in the more remote rural areas of the country. In 2008, working in close collaboration with GHS and local communities, the program protected 601,000 people in five districts. By 2011, the program had expanded to cover a population of 926,000 in nine districts (see Table C). Each year, the program exceeded the previous 90% national target for coverage of local structures found. Entomological monitoring sites are located in two IRS districts, Bunkpurugu-Yunyoo, Savelugu-Nanton, one district from which IRS was withdrawn in 2013, Tolon Kumbungu, and one control area (non-IRS), Tamale municipality.

To contribute toward the NMCP and PMI objective of national IRS capacity-building, PMI facilitated the establishment of a Malaria Vector Control Oversight Committee (MaVCOC), to help the NMCP coordinate and guide IRS implementation in the country. The committee includes partners such as AGAMal, the Noguchi Institute, the Environmental Protection Agency, and other IRS partners, and has proven to be a dynamic, well-attended forum which has been meeting quarterly since 2009. The committee assists the NMCP in meeting national objectives for quality control, environmental compliance, and insecticide resistance management and has established and disseminated national IRS standard operating procedure, and facilitated information exchange and coordination of efforts.

Ghana is the beneficiary of a 5-year, \$120 million Global Fund grant to further scale up IRS with AGAMal, a not-for-profit subsidiary of the gold mining company that bears the same name, as the Principal Recipient. The original plan was to eventually cover 40 districts with two rounds of spraying, but a reduction in the 2014-2018 Global Fund allocation has necessitated the modification of these plans. At present, AGAMal covers 25 districts, but will reduce the program to cover only 12 districts – 11 in Upper West Region and 1 in Ashanti Region – based on the new level of allocated funding. If the Global Fund awards additional funds above the current allocation, it is possible that additional districts would be covered by AGAMal IRS. However,

following PMI's lead, which only sprays once a year and has reduced the number of spray days from 53 to 36, AGAMal will now spray only once a year and reduce their spray season from five to three months in Upper East Region, actions that are expected to save considerable funding in future years.

As AGAMal/Global Fund has become the largest implementer of IRS in the country, PMI's overall objective has shifted from scale up to maintenance of high quality operations, with a focus on efficacy monitoring, optimization of design, and targeting for increased impact. With MaVCOC helping to institutionalize a culture of evidence-based decision making in IRS, both the AGAMal/Global Fund and PMI programs have increased their investments in entomologic and epidemiologic monitoring over time.

Table C: PMI IRS Coverage (Northern Region), 2011-2015

Year	Number of Districts Sprayed	Insecticide Used	Number of Structures Sprayed	Coverage Rate	Population Protected
2011	9	Pyrethroids	354,207	92%	926,699
2012	9	Pyrethroids	383,142	93%	941,240
2013	4	Organophosphates in 3 districts, pyrethroids in 1 district	197,655	91%	534,060
2014*	4	Organophosphates	205,230	83%	570,572
2015**	4	Organophosphates	190,000		500,000

* Preliminary data, final report expected in September 2014

** Projected, based on possible change in district selection

Progress during the last 12 months

In 2014, there have been two spray rounds (April-June 2013 and April-May 2014). In 2013, the PMI-funded spray operations reached 534,060 people, including 11,617 pregnant women and 102,115 children under five, in four districts. This 43% decrease in population coverage compared to 2012 is the result of a reduction in the number of spray districts sprayed, from nine to four. The reduction in districts was caused by the increased cost of pesticides, as vector resistance necessitated switching from pyrethroids to organophosphates, which are six to seven times more expensive than pyrethroids. In 2013, teams operating from 16 operational sites in four contiguous districts of Northern Region (Bunkpurugu-Yunyoo, East Mamprusi, Savelugu Nanton, and West Mamprusi) sprayed 197,655 structures, exceeding 90% target coverage.

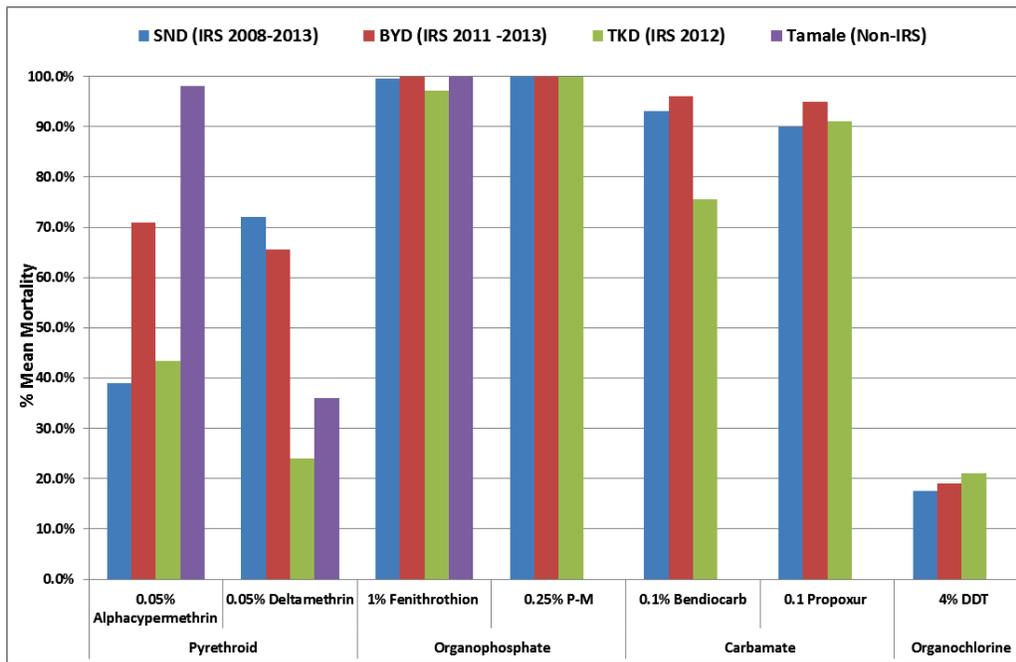
During 2014, PMI-supported IRS operated in the same districts as in 2013, with 570,579 people protected, including 12,538 pregnant women and 105,980 children under five. Across the four

districts, 205,230 structures were sprayed, achieving an 83% coverage rate, which was slightly short of the 85% PMI target. This shortfall was primarily due to two events: 1) the 18% increase in the number of structures found, resulting from improved enumeration, and 2) improved spray coverage reporting, due to improved supervision, which revealed lower than projected coverage. These events occurred to some degree in East and West Mamprusi, but occurred extensively in Savelugu Nanton, which had coverage of 67.5% in 2014, compared to 91.1% in 2013. The low coverage in Savelugu Nanton is believed to be attributed to its more urban setting and spray fatigue of its inhabitants, having been sprayed since 2008. Additional spray hours, mobilization and sensitization activities, and packing assistance were provided in these three districts in an effort to improve coverage; these steps proved successful in East and West Mamprusi. The program provided seasonal employment to almost 1,700 local community workers in 2014. A cumulative total of almost 4,000 IRS implementers have been trained, and management capacity continues to grow at district, regional, and national levels.

The program has matured, completing its seventh spray round in 2014, with increased emphasis on evaluation, monitoring, and quality control. Enhanced entomologic monitoring, undertaken in collaboration with the Noguchi Memorial Institute of Medical Research (NMIMR), has demonstrated the strong impact insecticides (from ITNs and IRS) has had on several entomological parameters. For example, a shift to a younger average age of female *Anopheles* mosquitoes reflects the insecticidal effects on the older, plasmodium infected proportion of the population. Data from community monitoring sites have documented a ten-fold reduction in entomological inoculation rates, which measure the number of infective mosquito bites delivered per person per night.

Across the five spray rounds of 2008-2012, entomologic monitoring detected the gradual emergence of pyrethroid resistance, leading Ghana's MaVCOC to recommend a transition to a long-acting organophosphate (Figure 3). In 2013, three of the four districts and in 2014 all four of the districts were sprayed with a long-acting organophosphate, Actellic CS 300 (pirimiphos methyl). Monthly wall bio-assays in 2013 demonstrated pesticide efficacy of >80% mortality for a duration of at least six to eight months, which was comparable to the previously used pyrethroids. Comparable data from the 2014 spray season will not become available until early 2015.

Figure 3. 2013 insecticide susceptibility status of local *An. gambiae* s.l. mosquitoes from entomological sentinel sites (Years of IRS) against WHO recommended insecticides for IRS.



Also in 2013, the results of a PMI-supported operations research study in Bunkpurugu-Yunyoo district became available. In collaboration with Noguchi Institute, PMI compared the effectiveness of one versus two annual rounds of spraying in this northern savannah district. Baseline surveys in children under five were conducted in the study district during the 2010 peak and trough transmission seasons. Baseline (2010) and follow-up surveys (2011-2013) included anemia, parasitemia, history of fever, and malaria RDT result. During both the 2011 and 2012 seasons, half the district was sprayed once (Area A) and half the district twice (Area B), with surveys conducted during the annual peak and trough transmission seasons. The results showed that spraying twice a year did not lead to a significant reduction in parasitemia as compared to one round of spraying. Baseline levels of parasitemia were not significantly different and the differences in parasitemia levels at the end of the study in the two areas had overlapping confidence intervals, 5.2% (95% CI: 0.5, 9.9) for Area A and 4.3% (95% CI: -0.2, 8.8). Combining the two areas, there was a modest but statistically significant decline in Bunkpurugu-Yunyoo from 52.4% to 47.7% ($p=0.005$) (Table D). The reduction was modest compared to malaria reductions seen in some IRS settings, both in Ghana and other countries. However, there is considerable variation in the settings and outcomes of IRS activities. A qualitative study conducted in March 2014 found outdoor sleeping and nighttime activities to be common, which may have contributed to modest reduction parasitemia.

After the switch to organophosphates in 2013, there was a decrease of more than 50% in the overall rate of parasitemia. As a counterpoint to this, entomological indicators showed consistent improvement from 2010 thru 2013 in Bunkpurugu-Yunyoo. For example, parity rates dropped

from 74.5% in 2010 to 32.4% in 2013, and EIRs decreased from 0.35 to 0.018 infective bites per night.

Table D: Selected epidemiological and entomological variables, Bunkpurugu-Yunyoo, 2010-2013

	2010 (Pre-IRS)	2011 (pyrethroids)	2012 (pyrethroids)	2013 (organo-phosphates)
Percent of children with positive RDT	69.9%	70.4%	66.0%	28.8%
Percent of children with fever	69.4%	59%	43.9%	22.1%
Percent of children with asexual parasitemia	52.4%	50.0%	47.7%	20.6%
Percent of children with anemia (Hb<11g/dl)	77.7%	72.5%	67.8%	48.3%
Entomological inoculation rate in district (bites/person/night)	0.35	0.13	0.02	0.02
Parity (Percent of mosquitoes that were pregnant)	74.5%	66.5%	48.6%	32.4%

Meanwhile, the AGAMal/Global Fund IRS program began reporting data from its newly established sentinel sites with a protocol that specifies testing of all “suspected” malaria cases with RDTs during one week per month in three clinics per IRS district. AGAMal/Global Fund is also conducting pre- and post-IRS anemia and parasitemia monitoring in three districts, with the first round of post-IRS data becoming available in the Quarter 3 of 2014.

Plans and justification

Given the maturity and success of PMI’s IRS program and in line with NMCP’s strategic plan, PMI will maintain its current coverage of four districts in the Northern Region. However Ghana’s MaVCOC has decided that Savelugu Nanton will be replaced by another district. This decision was based on low coverage rates, entomological monitoring that revealed a 0% sporozoite infection rate in mosquitoes captured in Savelugu Nanton last year, and the emergence of organophosphate insecticide resistance. Entomological monitoring will continue in Savelugu Nanton after the withdrawal of IRS, as will continuous and periodic mass distribution of bednets. It has been proposed that Savelugu Nanton be replaced with Tolon-Kumbungu District, from which IRS was withdrawn in 2013, and where entomological indices have worsened since that withdrawal. A final decision will be made at the November 2014 MaVCOC meeting. As coverage rates are above the new National Strategic Plan’s 80% target, there is no discussion of transitioning out of East or West Mamprusi at this time.

PMI will also continue to play a critical role in building national capacity for IRS and informing the national strategy through its support of sentinel entomological monitoring sites and the development of a national database for insecticide resistance and entomological monitoring data.

Proposed activities with FY 2015 funding (\$4,734,000)

- Support for IRS program implementation: (\$4,700,000)

In collaboration with GHS and consultation with PMI/HQ IRS Team — and with continued focus on capacity building — support IRS implementation and programmatic evaluation in four districts in the Northern Region. Funding will support entomological monitoring, spray operations for an estimated 190,000 structures, data collection, environmental assessment and compliance monitoring, BCC activities including community mobilization, and logistics. Proposed activities include continued support for procurement of insecticide and equipment; support for supervision by GHS, Environmental Protection Agency, and Noguchi Memorial Institute personnel; and collaboration with the NMCP, the MaVCOC, the Global Fund/AGAMal IRS program, and other partners. Programmatic evaluation includes the M&E activities that measure the performance of IRS, particularly those relating to monitoring coverage levels, spray quality assessment, and mosquito susceptibility levels.

- CDC technical assistance TDY visits and provision of supplies to support entomologic monitoring for IRS: (\$34,000 = \$24,000 for TA + \$10,000 for supplies)
Provide technical assistance and quality assurance, through two visits by a CDC entomologist, for ongoing entomologic monitoring of the PMI-funded IRS program. To assess entomologic factors that might potentially limit IRS impact in the Northern Region. These factors include insecticide resistance, indoor and outdoor resting and biting habits of *Anopheles*, EIRs, and parity rates. This includes limited funding for test equipment and supplies. In addition, assist MaVCOC in implementing a new network of sites for insecticide resistance monitoring nationwide.

MALARIA IN PREGNANCY (MIP)

NMCP/PMI objectives

The National Guidelines for Malaria in Pregnancy recommend a multi-pronged approach to the prevention and treatment of malaria during pregnancy. Three major strategies guide the approach: IPTp, vector management (namely ensuring the availability and distribution of ITNs as described above), and case management of malaria.

Progress since PMI was launched

Ghana's MIP program is coordinated by an MIP technical working group comprising of the NMCP, Family Health Division of the GHS, development partners, NGOs and other stakeholders. Collaboratively, the Family Health Division and NMCP make decisions on policy guidelines and content of training. Over the past few years, high ANC attendance rates in Ghana have provided great opportunity to achieve the NMCP/PMI IPTp objectives. Based upon the 2011 MICS, 86% of pregnant women reported attending ANC four or more times. The MICS also shows that Ghana has made tremendous gains in IPTp coverage over the past few years. The national proportion of women reporting that they received at least two doses of IPTp during their most recent pregnancy in the past two years increased from 44% (2008 DHS) to 64% in 2011 (MICS), although regional disparities exist. Though an impressive improvement, the gap between ANC attendance and IPTp2 uptake remains unacceptably high. The main driver for this anomaly has been frequent SP stockouts due to procurement challenges. In 2011, there was a mass training of health staff at ANC clinics, and this was followed in 2012 with supportive

supervision to ensure skills taught were applied correctly. Maintaining strong and regular supportive supervision has the potential to sustain and expand the gains made over the last few years. There is, however, a high attrition rate of trained personnel which requires continuous training.

The NMCP has updated its MIP guidelines based on the revised WHO recommendations. The current policy recommends 0.4mg daily dose of folic acid instead of 5mg daily that was previously administered to pregnant women. The guidelines recommend that SP should be given from 16 weeks of gestation or at quickening, subsequent doses should be given at least four weeks intervals to a minimum of three doses and a maximum of five doses. The guidelines also adopt the WHO recommendation of giving SP until delivery.

Progress during the last 12 months

In order to support the GHS to improve health worker capacity to effectively deliver a package of malaria prevention and care services to pregnant women, PMI has collaborated with NMCP to train more than 1,185 health care providers in MIP in 2014.

During the past 12 months, PMI strengthened the pre-service education for midwives, community and public health nurses by updating technical MIP and IPTp training materials within a larger maternal health training that includes ANC and other MCH activities. A total of 38 health professional schools (ten community health nursing schools, one public health nursing school, one medical assistant training school, and 26 midwifery schools) representing 100% of public sector facilities in these categories received support for pre-service education to improve the knowledge, skills, and practices of the GHS MIP guidelines. The pre-service training in community nursing and medical assistant schools are stand-alone malaria trainings. Additionally an e-learning module on MIP supported by PMI provides a stand-alone MIP training for all the student categories listed above.

Plans and justification

PMI will continue to sustain and build on increasing IPTp rates for the upcoming year. PMI will support the GHS to continue to strengthen ANC services, print and distribute the revised national policy based on WHO guidance, maintain support for pre-service training, print revised training manuals, and promote early and regular ANC attendance.

The stockouts of SP at many health facilities in 2014, due to delays in procurement of SP, have been resolved. Resources for the procurement of SP came from PMI, Global Fund, and GoG. There is enough stock arriving in the second half of 2014 to last through calendar year 2016. Therefore, PMI will not commit resources to the procurement of SP with FY 2015 funding.

Table E. SP Gap Analysis

SP Needs and Contributions	2014	2015	2016
Estimated population	27,095,702	27,743,081	28,406,503
Total number of pregnant women attending ANC ¹	1,055,960*	1,077,000*	1,098,733*
Total Annual SP Need²	6,494,154	7,269,750	8,009,764
SP from MOH	3,750,000	-	-
SP from PMI	2,700,000	-	-
SP from Global Fund	18,230,400	-	-
Estimated SP Surplus (Gap)	18,186,246	10,916,496	2,906,732

1. Figures from the December 2013 Quantification Review Report

2. The SP tablets in the table were calculated after calculating total number of visits for IPTp 1, 2, 3 and 4 for each year based on NMCP's targeted percentages. Total number of visits for 2014 was estimated as 2,164,718. If at each visit, 3 tablets of SP are given, then the total number of tablets required for the 2,164,718 visits in 2014 comes to 3 x 2,164,718 = 6,494,154 Tablets. This calculation was done for 2015 and 2016 using the same methodology to arrive at the 7,269,750 and 8,009,764 tablets respectively for 2015 and 2016.

PMI supports all aspects of MIP in five regions (Greater Accra, Central, Western, Volta and Northern Regions). In the remaining five regions PMI implementing partners fund the GHS to conduct supportive supervision to health workers, including supervision to ANC activities, and trains health workers in MIP and data management at ANC. PMI will scale up case management of malaria in pregnant women and will continue to support pre-service training for IPTp and MIP. PMI's focus regions for intensive support on IPTp and MIP include the three regions with the lowest current coverage for IPTp. This support is integrated with work to improve focused antenatal care overall. Supportive supervision for MIP, as a component of case management, in the other five regions will also be supported by PMI (see the case management section, below). PMI will also provide training and policy support on IPTp to the non-focus five regional health management teams. The PMI team anticipates that the NMCP, with Global Fund financing, will support intensified MIP activities in the non-PMI focus regions.

PMI intends to use the CHPS platform to expand and improve the reach of MIP services through mentoring, supportive supervision of CHPS nurses and coordination of community health volunteer activities. Through a mentoring program that will allow the CHPS nurse to work with district hospitals and understudy a midwife for up to one month, PMI hopes to improve the quality of MIP services at CHPS and increase the confidence of the public in utilizing MIP services at CHPS compounds. PMI will also assist the GHS to make the CHPS nurse the link between the community volunteer and the regular health service. The CHPS nurse will support the community volunteer to provide education on MIP in communities.

Proposed activities with FY 2015 funding (\$990,000)

- **Strengthen ANC services and in-service training:** (\$540,000)
Support the GHS to improve health worker and health system capacity to effectively deliver a package of malaria prevention and care services to pregnant women. PMI support will focus on supportive supervision for ANC staff on SP administration, data management and improved ITN coverage for pregnant women, training of new staff and

on-site training as needed, quality improvement to increase healthcare worker administration of at least three IPTp doses, and support for implementing updated MIP guidance. Intensive support will be targeted to five focus regions, with additional support as needed in the other regions.

- Pre-service training for MIP: (\$450,000)
Provide technical pre-service training for nurses, midwives and medical assistants in the prevention of MIP. Continue with training of teaching staff in all 58 general nursing and midwifery schools as applicable and provide technical assistance towards the development of training manuals.
- BCC to promote IPTp: (see BCC section)
Support the distribution and use of communication materials to improve health workers' administration of IPTp. Support community mobilization and communication materials (print and mass media) to promote IPTp with a particular focus on geographic areas and/or cultural groups with low IPTp uptake rates. MIP messages will be incorporated with national health promotion and MCH BCC activities.

CASE MANAGEMENT

Diagnosis

NMCP/PMI objectives

More than 50% of all clinic visits in Ghana are due to febrile illnesses. The NMCP policy requires parasitological confirmation of all malaria cases. Reliable malaria testing – whether through microscopy or RDTs – is essential to providing appropriate care to these patients, as well as to providing reliable surveillance. In late 2009, the NMCP began promoting a policy of universal malaria diagnosis (microscopy or RDTs) in all age groups consistent with the new WHO guidelines. Since then, the focus has been on improving the quality of microscopy at the higher-level facilities and scaling up the use of RDTs in peripheral settings, including the CHPS zones. Progress on scaling up diagnostics has quickened significantly in the last year. Challenges, such as RDT stockouts, have been resolved but reluctance of providers to adhere to test results remains a major problem.

Progress since PMI was launched

PMI has been working closely with NMCP, the National Public Health Reference Lab, and the GHS Clinical Laboratories Unit to improve the quality and scale up of malaria diagnosis in Ghana. PMI has been supporting the Outreach Training and Supportive Supervision (OTSS) program, which consists of periodic rounds of structured supervisory visits to clinical laboratories by regional technical specialists in the GHS. A formalized checklist is used to assess infrastructure, personnel, and efficiency. In 2008 a national malaria laboratory assessment indicated that only 55% of laboratories had received a supervisory visit in the last six months and more than half of the laboratories had only one or no staff trained in malaria diagnosis. The OTSS program has been rolled out systematically across Ghana. All 408 health facilities with a laboratory (as counted in a 2008 assessment) have been enrolled into the OTSS program

including 302 (74%) public facilities, 45 (11%) private and 61 (15%) public/private facilities. All staff in the enrolled facilities have been trained in malaria diagnosis. A national archive of malaria slides (NAMS) has been established to support proficiency testing of laboratory personnel. Mass training of health workers in use of RDTs at all levels of health service provision have been completed and RDTs have been scaled up fully in the public sector and its use is increasing in the private sector especially in private clinics and pharmacies.

Availability of microscopes in the public and quasi-public sector has significantly improved over the last few years. PMI has supplied microscopes to NMCP/GHS on an as-needed basis since 2009. The GoG through the GHS regularly procures microscopes for its laboratories, and public health facilities generate funds to procure reagents and lab supplies. The GF has procured microscopes for other disease programs such as TB and HIV, which are also used for malaria programs. All 408 labs enrolled in the OTSS program now have a functioning microscope.

Progress during the last 12 months

Ghana has a long history of presumptive treatment of malaria consequently testing rates have been historically low. However, according to the DHIMS, testing of suspected cases of malaria in public facilities has increased from 44% in 2008 to 57% as at half year 2014. Prescriber adherence to negative test results as reported from the lab OTSS activity has also improved with prescribers adhering to 59.4% of RDT and 57.1% of microscopy tests

As of June 2014, ten rounds of OTSS have been conducted. Most labs have received more than three rounds of visits. Since September 2013, a total of 240 labs were supervised under the OTSS program. These visits led to the training of 779 technicians. Since the program began in 2009, the percentage of laboratory technician agreement with supervisor microscopy readings (gold standard) has been maintained at over 90%. Refresher training for district supervisors has been ongoing and is supported through the dissemination of a WHO CD-ROM on malaria microscopy for self-practice. The PMI-supported national archive of malaria slides to support proficiency testing is set to be certified by WHO in the next few months.

PMI has also supported the scale up of RDTs through the procurement of RDTs and training of health workers in diagnosis and case management. Over the last 12 months, 2,283 health workers have been trained. The NMCP also gave approval for over the counter medicine sellers (OTCMS) to use RDTs. Training of this cadre of service providers is ongoing and will be completed before the end of the fiscal year.

Plans and justification

PMI will continue to support the OTSS program and seek mechanisms to further integrate management of this program into the GHS Clinical Laboratories Unit, refresher training on microscopy, and regular supervisory visits. PMI plans to continue holding four rounds of OTSS every year, with each round covering 205 laboratories in all ten regions and providing on-the-job training to at least 500 laboratory personnel.

PMI will also continue to support the scale up of RDTs with a specific focus on peripheral health facilities and CHPS zones. This will include pre-service and in-service training, and a focus on improving provider compliance and patient demand for diagnostics. Depending on the results of

the pilot and direction of the new policy, PMI will also support the roll out of RDTs in the private sector through over the counter medicine sellers and pharmacies.

Table F. RDT Gap Analysis (Public Sector) (as of May 2014)

	2014	2015	2016
National Public Sector Requirement¹	9,200,864	8,981,796	10,357,133
Pledged Commitments			
Global Fund	11,783,200	Unknown	Unknown
DFID	3,600,000	1,400,000	1,000,000
PMI	5,700,000	1,000,000	1,400,000
Surplus/Carried over RDTs from previous year	0	11,882,336	5,300,540
Surplus/(Gap)	11,882,336	5,300,540	(2,656,593)

1. RDT needs are calculated based on the number of expected fever episodes derived from MICS 2011. A factor of net decline in fever episodes due to interventions, as agreed by consensus at the quantification workshop, was applied for each year. The requirement of RDTs for public and private sector was deduced from the health seeking behavior of adults and children reported in MICS as well as NMCP's estimate of providers' choice for malaria diagnosis (RDTs or microscopy) in public and private sectors. Factors such as increasing access to health facilities and a reduction in fever episodes due to interventions such as ITN usage, etc., the net total expected fever episodes came to 29,984,145 for 2014, 25,611,461 for 2015, and 26,251,742 for 2016. Other factors, including an increase of the percent of fevers that are seen in public sector facilities were subsequently applied to these fever episodes expected including public/private split to arrive at the final fever episodes to be tested by RDT in the public sector. This is fundamentally the reason behind the noted trend of RDT requirement from 2014 to 2016

Proposed activities with FY 2015 funding (\$2,962,000)

- Procure RDTs and microscopy equipment: (\$1,550,000)
Support procurement of approximately 2.5 million RDTs to support the public sector gap. Procure limited number of microscopes and microscopy kits to fill gaps in a fast-growing health system.
- Strengthen quality of microscopy and RDT use at laboratory level: (\$400,000)
Continue to support quality improvements to malaria microscopy and RDT use at the laboratory level, building upon and continuing the scale up of the successful OTSS program. Focus on improving the efficiency of testing processes and on using the test results to inform clinical decisions and surveillance. The quality assurance program contains supervisory field visits and on the job training, including proficiency testing using the recently developed slide archive. Provide technical assistance and financing for supportive supervision and on-the-job training of laboratory personnel, complemented by refresher training for lab supervisors.
- Scale up RDT use in clinical settings: (\$1,000,000)

Accelerate collaborative efforts with the NMCP and GHS at all levels to achieve high rates of parasitological testing, with a focus on scaling up RDT use in clinical settings. Support identification and removal of operational, financial, policy, and other bottlenecks to the use of RDTs. Use OTSS data to identify and address barriers to RDT use. Support capacity building to ensure consistent availability and use of RDTs at public health facilities, particularly CHPS. Building on recent GHS pilot projects and operations research, PMI will support the roll-out of RDTs to community-based agents, over the counter medicine sellers, and pharmacies as the GHS/ NMCP has approved these entities to use RDTs. PMI will support linkages with National Health Insurance Agency (NHIA) to improve testing rates. PMI will provide technical assistance to Regional Health Directorates to undertake measures such as in-service training, supervision, and reporting of stockouts. Periodic end use verification (EUV) surveys will also determine availability and adequacy of supplies at facilities and advise Regional Health Directorates appropriately.

- Provide technical assistance in diagnostics: (\$12,000)
CDC will provide technical assistance to support implementation of microscopy, quality assurance for diagnostics, and RDT implementation.

Treatment

NMCP/PMI objectives

The NMCP strategy calls for widespread, prompt access to ACTs. Ghana first adopted artesunate-amodiaquine as a first-line therapy for uncomplicated malaria in 2004. Artemether-lumefantrine and dihydroartemisinin-piperaquine are officially endorsed as alternative treatments, and malaria treatment guidelines reflecting this policy were revised in 2008/2009. The current treatment guidelines call for oral quinine for treatment in the first trimester of pregnancy with either oral quinine or ACTs in the second or third trimester. Intravenous artesunate has been approved for use as treatment for severe malaria. Rectal artesunate is endorsed for pre-referral use but is often in short supply at the CHPS compound, where it is most needed.

The Global Fund supports the provision of ACTs to both the public and private sector. The NMCP has also been supporting scale up of case management at peripheral levels through the CHPS facilities and community case management of malaria through community health workers.

Progress since PMI was launched

Over the last few years Ghana has made significant progress in improving its case management of malaria. More than 90% of all prescribers have been trained in case management. A PMI-funded supportive supervision of case management program, which seeks to assure the quality of case management at all levels of health delivery, has enrolled all public sector facilities. Since 2012, three rounds of supportive supervision have been provided to health workers covering more than 97% of those trained. PMI has also facilitated extensive training in data management for health information officers and now include data monitoring in the supportive supervision program.

Population-based data shows access to ACTs for children under five years of age increasing from 4.4% in 2006 to 18.2% in 2011. Access to ACTs, which is higher in urban areas, also increased from 12% in 2006 to 26% in 2011, as compared with rural areas, (0.9% to 13.3%, respectively).⁶ Facility based data shows >85% of malaria cases are treated with ACTs.⁷

After a long period of uncertainty over the source of drugs for the pneumonia and diarrhea components of iCCM, the GHS has now resolved the problem, and iCCM is reinvigorated with trainings for community volunteers in targeted districts across the country. Currently, community volunteers are not permitted to use RDTs in diagnosing malaria, however research is underway which will inform policy reform.

Procurement challenges encountered over the last few years have been addressed by the NMCP decision to use the Global Fund Voluntary Pooled Procurement system for accessing malaria commodities. ACTs, SP, and RDTs are now available in all health facilities.

PMI has continued to support pre-service education over the years, with its initial support for midwife education expanding to include medical assistants, nurses, and medical doctors. PMI is also assisting with the updating of medical curriculum for medical schools and nurses training colleges.

Progress during the last 12 months

PMI's technical assistance to the NMCP in the last year focused primarily on supervision of health care workers. Most first-line health workers have received training or orientation on the malaria case management guidelines. In the last 12 months, the PMI implementing partner provided technical and financial support to regional and district directorates to conduct supportive supervision on case management and diagnostics to health facilities. These supervisors provided supportive supervision to 11,596 health workers in seven regions. The NMCP revised the malaria case management guidelines based on new WHO recommendations. The new guidelines introduce RDTs as additional diagnostic tool. The drug of choice for severe malaria has been changed from quinine to parenteral artesunate and artemisinin use in pregnancy is permitted in the second and third trimesters. The new guidelines also emphasize testing before treatment and tracking the patient after treatment.

PMI supported the printing of the guidelines and provided training on the new guidelines for 1,802 health workers. PMI continued to provide support to pre-service training in 38 public health schools (community health nursing, public health nursing, and midwifery schools).

As reported in the 2011 MICS, a significantly high number of cases of febrile illness are treated at home without testing. Currently PMI is rolling out training for OTCMS in appropriate case management and use of RDTs. This is being followed up with supportive supervision to encourage and ensure that OTCMS are adhering to malaria protocols. The NMCP is also running a campaign on national TV and radio that is encouraging the public to demand to be tested before treatment. To ensure regular supply of RDTs to the private sector PMI is supporting the

⁶ Data retrieved from the MICS 2006 p.48, MICS 2011 p.107, and MPR 2013, p. 144

⁷ MPR 2013, p113

coordination between private sector suppliers and buyers to ensure regular supply of RDTs to OTCMS and private clinics.

PMI continued to support the Food and Drug Authority (FDA) to monitor the quality of antimalarial drugs. The antimalarial medicines quality monitoring program in Ghana, which is in its fifth round, has led to the identification of several counterfeit and substandard medicines which has prompted the FDA to recall several batches of antimalarial medicines from the market as well as referring illegal activities to the law enforcement agencies. The overall failure rate for antimalarials in 2013 was 4% as compared to 8% in 2012, and 18% in 2010.

During the last year, PMI supported the development of a risk-based compliance guide for pharmaceutical manufacturers towards Good Manufacturing Practices compliance. A training workshop for Ghana-FDA's Good Manufacturing Practices inspectors was held as an initial step towards capacity-building for Good Manufacturing Practices improvement in-country. Additionally, PMI supported trainings for FDA on Risk Based Approach to Drug Evaluation as a means to streamline medicines registration to reduce delays and provided technical assistance for FDA laboratory staff. As a result, the Ghana FDA lab recently received an internationally renowned ISO/IEC 17025 accreditation. This accreditation will allow the Ghana FDA to test medicines (imported and funded by international donors) in-country rather than having to send them out to other accredited laboratories in South Africa and elsewhere. Furthermore, the Ghana FDA will be able to test medicines for other countries that do not have accredited labs.

Plans and justifications

PMI will continue to support training, supervision, and quality improvement in overall case management. Over the last three years, PMI focused significant efforts on improving the quality of care at district, regional and community level health facilities. PMI has supported supervision and training of data managers. Such efforts to ensure quality of care in all facilities are ongoing and will be continued during FY 2015.

At the national level, PMI will provide targeted technical assistance to various entities within the GOG which will include sections of the Ghana Health Service within the Ministry of Health, (National Malaria Control Program-NMCP, the Institutional Care Division and Clinical Laboratory Unit-CLU, the Policy Planning Monitoring and Evaluation-PPME/Centre for Health Information Management (CHIM), various malaria-related national coordinating committees and task groups, among others.

At the regional level, in line with USAID Forward principles, PMI will assist the government's Regional Health Management Teams (RHMTs), to build capacity for planning and implementing malaria control interventions and services. Improved management, leadership, data management and supervision will be critical components of such assistance. PMI will support RHMTs to integrate iCCM services into the GHS supervision system. Efforts will build upon successes achieved from previous PMI activities to improve the quality of malaria case management.

At district level, together with local GHS staff, PMI will target improving malaria case management services. This is to facilitate not only the provision of improved quality malaria services but also the ability of facilities to monitor their own progress in applying better, more

robust malaria control interventions. PMI will provide direct assistance to both the District Health Management Teams (DHMTs) and the RHMTs where strategic planning will help DHMTs to prioritize activities, segment geographic coverage for greatest impact, and support facilities to remove roadblocks and resolve challenges to improve compliance with malaria control guidelines. Assistance to health facilities will be prioritized on a district-by-district basis based on those in the first point of contact for suspect malaria cases (e.g., CHPS and rural facilities), those with the highest volume of suspect malaria patients (e.g., district and semi-rural health centers), and those that may be out of compliance with GHS malaria control guidelines.

At the health facility level, PMI will provide in-service trainings and OTSS to increase laboratory and clinical staff's knowledge, skills and compliance with malaria diagnostics and integrated case management protocols. At the community level, PMI will provide support for CHPS in malaria case management, supply chain and pharmaceutical management, MIP services, capacity building in interpersonal skills, community mobilization, etc. The GHS is continuing to expand the CHPS facilities and services to bring basic public health and clinical services closer to communities in rural and hard to reach areas. The CHPS zones provide community outreach services through the placement of Community Health Nurses. The CHPS program has broad support within the GHS system, provides a range of public health services and is an excellent platform for expanding access and availability of appropriate malaria case management services. PMI's work with CHPS is in line with and in support of the GHS strategies.

The 2011 MICS found that 50.3% of children presenting with fever were not brought for treatment, 3.1% were brought to a CHPS provider, 13.5% were brought to a private sector provider (clinic or pharmacy shop), and 32.8% were brought to a public sector clinic or health center. By improving and expanding the CHPS program, GHS and PMI plans to affect an increase in the proportion seeking treatment by shifting a portion of that 50.3% into the category of children who receive appropriate treatment at the peripheral (CHPS) level. The CHPS zone is the first, and often the only, health service point accessed by many rural populations who reside far from a higher-level health facility. Ghana's CHPS program is an essential tool to decrease disparities in access to care and to ensure effective referral systems.

Ghana has a little over 340 hospitals and about 760 health centers. The hospitals are either in the regional capital or the district capital. Health centers are mostly found at sub-district capitals. Travel time from communities to district and sub-district facilities averages between two to four hours. Distance, travel time, cost of transport, and quality of roads are all restrictive factors in accessing health for rural dwellers below the sub-district. Based on the geographic distribution of health facilities and the relative difficulty in access to health care the needs of the rural population below the sub-district level seems to be much greater than the urban and semi-urban population. Two recent studies in Ghana indicate that travel distance to health facility is a significant deterrent to accessing health care.^{8,9} For the disease symptoms studied (i.e. acute fever, fever for three days, acute diarrhea, and diarrhea for one week) the intention to visit a hospital decreased constantly with increasing travel distance. Being enrolled in the NHI scheme

⁸“Treatment choices for fevers in children under-5 years in a rural Ghanaian district”, Malaria Journal 2010

⁹“Health care utilization and symptom severity in Ghanaian children – a cross sectional study”, PLoS One November 2013

increased the willingness to attend a hospital. Travel distance shows the strongest association with clinic attendance. Its effect has been shown in a number of previous studies and is often referred to as distance-decay. While the overall national utilization of CHPS is low at 3.1%, Northern, Upper East, and Upper West Regions registered 6.6, 9.6 and 12.6 percent respectively. Significantly these areas are also the regions that have the highest malaria prevalence. Northern Region alone is estimated to be one-third the size of Ghana, with very disparate populations. In some districts in these three regions, CHPS compounds are sometimes the only health facilities available.

In 2013, CHPS services covered an estimated 40% of the rural population. USAID, with PMI funding and other health funds, supports the expansion and improvement of CHPS services to deliver an expanded package of proven interventions to reduce maternal and child mortality and morbidity, including malaria case management, child health services, and maternal health services (including IPTp). USAID will scale up CHPS coverage to improve access to health care by providing equipment, training and supervisory support to community health officers in these zones, as well as orientation of community leaders to support the establishment and functioning of CHPS in their communities. Specific training on malaria case management will be provided to CHPS nurses. The skills of CHPS nurses will be further enhanced in a program to provide them with targeted supervision and mentorship in district and regional hospitals. Health facility and district staff tasked with supervising CHPS nurses will be supported to provide appropriate case management supervision and supplies to the CHPS zones for which they are responsible.

PMI will build upon previous years' achievements in providing case management training to health providers in GHS clinics and hospitals, ensuring that supportive supervisory systems are in place to promote quality improvement and adherence to protocols. CHPS nurses will be especially targeted through attachment to district facilities for mentorship and regular visits by district supportive supervision teams.

PMI will provide the NMCP support to explore policy options for RDT roll out and continue to support case management through the private sector OTCMS. The Pharmacy Council will be used to provide supportive supervision to both OTCMS and pharmacy shops to improve their case management and dispensing practices and data reporting. Pharmacy shops operators have already been trained in the use of RDTs. This intervention will further be reinforced through supportive supervision and technical assistance to the NMCP to develop sustainable channels for the supply of quality RDTs to the private sector. Currently, the NHIA regulation on compensation for malaria case management bundles the cost of ACTs and diagnostic tests but only makes payment when a client has been treated. This means that a provider will not be compensated for only a diagnostic test. PMI is currently working with the NMCP and NHIA to unbundle reimbursement for RDTs and ACTs to encourage providers to adhere to negative test results. PMI works to strengthen the ability of OTCMS to provide correct information on malaria prevention and appropriate dispensing practices for malaria treatment and to practice appropriate referral practices.

PMI will continue to provide funding for ACT procurement and rectal artesunate for severe malaria as needed. Based on past procurement needs in FY 2014 and 2015, and the decrease in severe malaria, the anticipated need is less than \$100,000, or approximately 1.5% of the

treatment budget. CHPS compounds and health facilities will receive rectal artesunate for pre-referral use. The NMCP is in the process of training health workers on the updated clinical guidelines for malaria case management, which includes administration of rectal artesunate. Based on the gap analysis, below, PMI will prioritize ACT procurements on WHO prequalified pediatric treatments given that the Global Fund is anticipated to provide some support for ACTs in the private sector and that NHIA will continue to reimburse health facilities who supply adult ACT treatments through their own budgets. During the first half of 2014, the number of pediatric cases was 516,648 out of 1,526,106 total confirmed malaria cases. This corresponds to about 33.9% pediatric cases and 66.1% adult cases. According to 2013 DHIMS, out of 3,570,674 confirmed malaria cases, 1,017,823 used private sector (28.5%).

Table G. ACT Gap Analysis¹

	2014	2015	2016
National Public Sector Requirement ²	12,300,000	12,931,739	13,319,692
Global Fund/Other Funders ³	6,062,194	Unknown	Unknown
PMI	5,000,000	5,533,000	5,533,000
ACT Surplus/(Gap)	(1,237,806)	(5,102,424)	(5,421,488)

1. This gap analysis only covers needs for the public sector

2. The number of ACTs procured in any given year will be driven by actual consumption and need. PMI funded procurement deliveries will be timed accordingly across all three years.

3. At the time of writing, Global Fund commitments were unknown, and the concept note will not be completed until October 2014. PMI will adjust deliveries of ACTs, prioritizing pediatric treatments, as needed to fill gaps and alleviate supply concerns to the extent possible.

Since 2012, there have been renewed discussions with the Ghana NHIA on improving the quality of care and financial viability of the insurance scheme. The NHIA is committed to supporting the malaria diagnostic policy and is considering policy options to link reimbursement for malaria treatment to a confirmed parasitological diagnosis. PMI will continue providing support to NHIA to support compliance with the policy, but also to ensure that the reimbursement policy creates incentives for appropriate case management.

PMI will continue to support pharmaceutical management strengthening activities in the areas of quantification, supervision, and end use verification.

PMI will continue to provide support for pre-service training and BCC activities to address the issues of provider compliance and confidence in malaria RDTs and improve treatment seeking behavior, including demand for diagnostics. In addition, PMI will continue to support pre-service training and continuing medical education through the medical schools and physicians' association on diagnosis and malaria treatment in order to address the ongoing concerns on physician reluctance to abide by the new malaria case management policy and also to ensure that graduates from medical schools are properly trained before they start professional practice.

Proposed activities with FY 2015 funding (\$11,090,000)

- Procure ACTs and severe malaria medication: (\$8,660,000)
PMI will support the procurement of first-line ACTs (up to 10.9 million pediatric treatments), with a heavy emphasis on pediatric presentations of ACTs and severe malaria medication as needed. PMI will support the NMCP plans to manage severe malaria by procuring both injectable and rectal artesunate (actual quantities of which will be determined at the time of order). This will complement the current health worker training on the updated clinical guidelines for malaria case management (of which administration of these medications is included).
- Support to pre-service training for nurses, midwives, and medical assistants: (\$265,000)
PMI will continue to support pre-service training for nurses, midwives, and medical assistants to improve competencies in knowledge, skills, and practices for malaria diagnosis and case management guidelines and treatment protocols. PMI will expand training from the 28 schools currently supported to 58 midwifery and general nursing schools.
- Support to continuing medical education and pre-service training for physicians: (\$140,000)
PMI will support pre-service training for medical students and the revision of the medical school curricula to support the new case management guidelines. PMI will also support continuing medical education for accredited practicing physicians through the medical schools and physician associations. Pre-service training for physicians will cover three universities with medical colleges and a fourth school with a medical school only. The colleges encompass medical school, nursing, pharmacy, and lab technology. The implementing partner will conduct a needs assessment, curriculum development, and training and updates for lecturers. The implementing partner will also support the individual professional bodies such as the Pharmaceutical Society and the Medical Association and Nurses and Midwives Council, in their efforts to provide continuous medical education for their members.
- Support improved malaria case management at health facilities: (\$1,300,000)
PMI will collaborate with GHS at all levels to improve compliance with national guidelines for the management of both uncomplicated and severe malaria in health facilities. PMI will provide technical assistance and financial support for supportive supervision, on-the job and class room training, and quality improvement among health workers, with an emphasis on CHPS staff. PMI will support training, supervision, and other measures to link diagnosis to treatment, including promotion of provider adherence to test results. PMI will support at least two rounds of supportive supervision in at least 80% of all district and regional facilities with emphasis on CHPS compounds. PMI will provide training for all staff at CHPS compounds that have not been trained in case management and MIP.

- Support NHIA to implement clinical audits to confirm clinical compliance with GHS malaria diagnosis and case management guidelines. (\$325,000)

The NHIA is exploring several cost-containment interventions and has identified clinical audits as a tool to promote cost containment, recoup inappropriate expenditures and to promote quality assurance. Treatment with ACTs regardless (or in the absence) of the diagnostic test results has been an important issue. PMI will fund the NHIA to expand their clinical audit activity to ensure health care provider compliance with clinical guidelines and accurate diagnosis and treatment of malaria cases.

- Support to improved case management through over the counter medicine sellers: (\$400,000)

PMI will support activities to build over-the-counter medicine sellers' capacity for and compliance with GHS malaria diagnosis, treatment and referral guidelines and address issues related to for-profit, business motivations to comply with GHS guidelines.

- BCC to improve treatment seeking behavior: (see BCC section)

PMI will support community mobilization and improved demand for case management by targeting the general public to promote correct and consistent use of ACTs. Activities will be integrated with MCH activities as appropriate and will promote community awareness of appropriate testing and treatment. The importance of testing to assess for non-malarial causes of fever will be given special emphasis in urban areas.

CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING

NMCP/PMI objectives

Although much progress has been made, the MOH continues to have significant gaps in its capacity for program management, commodity and supply chain management, and M&E. PMI's top health systems priority is to strengthen procurement and supply chain management, while also building capacity for quality assurance and supportive supervision, with a goal of sustainable and equitable health systems.

Progress since PMI was launched

Over the last few years PMI has undertaken significant capacity development for malaria control. PMI has supported the NMCP with computers and other information communication technology equipment to facilitate the timely compilation and transfer of malaria data from districts and regions to the national data center. As a result of this investment and other capacity building activities, Ghana has seen improvements in data reporting in the last few years. PMI has also invested considerable funds in supporting supply chain reforms aimed at improving efficiency and curtailing chronic stockout of health commodities.

With the expansion of the country's health insurance scheme, an increased number of people have access to health care yet they do not always obtain required medicines. Therefore, PMI has

also supported quantification of malaria commodities to aid effective planning of the malaria program and help ensure availability of malaria products.

Furthermore, PMI has funded the training of an entomologist. PMI has assisted the NMCP to attend important malaria meetings overseas and has funded technical malaria program meetings.

Progress during the last 12 months

PMI has supported capacity building and systems strengthening to improve nursing schools' curricula, practical skills, and teaching skills for malaria. PMI has also supported capacity building of in-service health providers, and improved systems for data collection and analysis. In the last 12 months, PMI's investments in supply chain and pharmaceutical management have continued to focus on building the NMCP's capacity to better manage malaria commodities through participation in quantification training, integrated supportive supervision, improvements to the logistics management information system, and the end-use verification survey. National quantification exercises for malaria RDTs, ACTs, and severe malaria medicines have been undertaken for the public health facilities and the iCCM program. In addition, PMI investments have been supporting implementation of the Supply Chain Master Plan to address overall public sector supply challenges. Using PMI and other earmarked USAID funding, PMI will partner with the Global Fund to pilot a private sector commodity distribution system.

PMI supported a malaria project which is building the capacity of GHS regional and district health staff to improve program planning management and quality of service delivery capacity. This has been instrumental in developing regional capacity to manage USG funds directly. In addition, PMI supports Ghana's regional health management teams to fund supportive supervision for malaria case management.

During the last 12 months, PMI has worked with the NHIA to build the capacity of private sector providers in under-served areas of Ashanti, Brong Ahafo, Central, and Western and Eastern regions to access financing and information on standards of quality for malaria services.

Plans and justifications

PMI will continue to support the GHS to implement regional quality assurance programs to improve malaria case management (see Treatment section). Regions will be given technical assistance to analyze their specific conditions, confirm malaria cases, assess progress towards achieving malaria control targets, and tailor their activities to address their specific needs. PMI will continue to support capacity building within the NMCP, including entomology training and limited support for international and/or regional technical meetings. Although the FDA recently attained ISO accreditation and is on track to be an independent entity, PMI will continue to provide assistance in some critical areas. Even after receiving the ISO-17025 accreditation, then Ghana FDA has a backlog of quality control of medicines prior to registration. Furthermore, strengthening post-marketing surveillance is a priority, and PMI will continue to support the Ghana FDA with assistance.

Proposed activities with FY 2015 funding (\$1,870,000)

- Strengthen logistics and supply chain systems: (\$550,000)

Provide technical assistance for strengthening logistics/supply chain to improve availability of malaria commodities including SP, RDTs, and other commodities. Activities will focus on addressing bottlenecks in finance, management, forecasting, transportation, and reporting systems. PMI, in partnership with other USAID health program elements, will pilot private sector distribution in three regions and, subsequently, update the Supply Chain Management Plan. Discussions are being held with Global Fund to contribute toward the pilot. It is also expected that expertise from Coca-Cola in route optimization and contracting with private sector companies will form part of the alliance. The pilot is currently under design.

- Strengthen drug quality monitoring capacity: (\$200,000)
Support the further strengthening of drug quality monitoring in collaboration with the Ghana FDA. Support the recent expansion of the post-market surveillance program (increased frequency and increased number of surveillance sites). Support increased enforcement capacity, as well as educational efforts to heighten responsiveness to counterfeit and substandard antimalarials, which may include: streamlining dossier evaluation and drug registration process; developing, testing and supporting new technologies to help detect counterfeit malaria medicines (e.g. an electronic library of registered antimalarials on phones to check on registration status in the field, and CD3); Working on in-country good manufacturing practices to increase local manufacturers' capacity in producing good quality medicines (e.g. SP). This work will entail further training of FDA inspectors and drug manufacturers on good manufacturing practices, assisting with the development of specific SOPs, and improvement of systems.
- Strengthen management capacity of the NMCP: (\$100,000)
Continue to provide support to the NMCP, GHS, and GOG for technical capacity building and improved malaria control systems. This activity will support: 1) attendance in malaria-specific trainings, conferences by select NMCP, GHS, and GOG employees to further build in-country capacity; 2) assisting NMCP with organizing meetings that are important for planning and management of malaria prevention and control activities; and, 3) supporting limited information technology investments, such as computers, laptops, internet connection at the GHS's Regional Health Directorate level to ensure timely data reporting to DHIMS.
- Access treatment through National Health Insurance: (\$400,000)
Complement other USAID-funded support investments (using non-malaria funds) in the NHIA to accredit new providers in underserved rural areas and conduct clinical audits on their performance. Clinical audits are a method to increase quality, ensure adherence to standard protocols and also is also used to check fraud and abuse. Given that malaria remains the fourth cost center for the NHIA (after maternal health and hypertension) and is an index condition for data collection, review of malaria case management is a major piece of all clinical audits. USAID will also use non-malaria funds to support appropriate management of the preferred provider and capitated payment plans in order to ensure continuous access to malaria services by affected regions.

- Ensure that the National Health Insurance program provides access to appropriate malaria treatment : (\$350,000)
Develop communication materials including print, radio and television messaging. Procure radio, air, and TV time and community engagement activities to promote active enrollment in NHIA and access to NHIA-accredited facilities among the general population, with a focus on high burden rural areas.
- Build local civil society capacity for monitoring malaria service provision: (\$200,000)
Build the capacity of local Ghanaian non-governmental organizations and civil society organizations to monitor the quality and ease of access to health services, with a focus on malaria diagnostics and treatment. Strengthen community structures for advocating for patients' rights and client-centered care, including the availability of malaria commodities. The activity will train and support local non-governmental organizations and civil society organizations in monitoring health services and advocating for improved services as warranted, with a focus on supporting government, community, and service provider dialogues to improve the quality and responsiveness of health services and promote a customer service orientation among health providers. Emphasis will be placed on civil society involvement in monitoring access to quality ACTs and diagnostics. PMI estimates that approximately 20 local community groups in five regions will be supported through this activity. These groups will monitor the quality of health services and help to identify areas for improvement.
- Support Peace Corps: (\$10,000)
Support Peace Corps Volunteers as a part of Peace Corps' "Stomping Out Malaria" campaign and collaboration with PMI. Peace Corps Volunteers are posted with implementing partners and engage in malaria control and prevention activities such as community mobilization for BCC, ITN distribution, and operational research data collection.
- Support to WHO National Professional Officer (NPO): (\$60,000)
The National Professional Officer will continue to give technical assistance to the NMCP for guidance on a variety of malaria activities such as strengthening monitoring and evaluation activities, the implementation of integrated community case management (iCCM), and pharmacovigilance issues.

MONITORING AND EVALUATION (M&E)

NMCP/PMI objectives

The *National Malaria Control Monitoring and Evaluation Plan (2014-2020)* guides the strategic framework for M&E in malaria control in Ghana. The plan was developed in conjunction with the revised national strategic plan by the NMCP with technical assistance from PMI, WHO, and other partners. The M&E plan aims to reinforce the information systems and processes to provide timely, accurate, reliable, and valid data for programmatic planning, management, and decision making.

Progress since PMI was launched

Ghana uses routine health management information system (HMIS) data as the main source of data for tracking and measuring programmatic progress. Managed by the GHS/NMCP, the updated DHIMS2 platform for reporting and analyzing district level data from health facilities was rolled out in April 2012, and is available in all 216 districts. PMI provided support towards the DHIMS2 upgrade, which includes a customized dashboard to report malaria-focused indicators. Health facilities use standard paper forms to manually summarize data from the registers and report monthly to the district health officer, who then electronically enters the data into DHIMS2.

From 2008-2011, PMI supported five GHS sentinel surveillance sites, collecting patient-level and aggregate data on approximately 30 malaria indicators. Following an evaluation of the sites in 2011 that showed low testing rates and poor data use, PMI stopped providing financial and technical support. Under the Global Fund Round 4 grant (Phase 2), the NMCP recently established 26 sentinel sites for monitoring trends in malaria burden and other disease indicators. These sites are an expansion of the 10 therapeutic efficacy study sites, and were established to ensure quality weekly and monthly reporting to DHIMS2 of multiple disease indicators including malaria. In addition to reporting routine data, some sites are also used for special studies such as tracking parasite prevalence, or defining characteristics of *P.falciparum* resistance to combination therapies. The NMCP's vision is to generate a database on clinical and parasitological response to antimalarial drugs in the country that will be compatible with the entomological and insecticide resistance monitoring data.

PMI has supported two national malaria household surveys, the DHS 2008 and the MICS 2011. Both were conducted during the peak malaria season — late rainy season from August to December. The 2008 DHS serves as the baseline estimate for all PMI coverage indicators and includes a malaria module comprised of anemia testing, verbal autopsy evaluations, intervention coverage indicators, and knowledge/attitude/practice indicators. PMI and the NMCP provided financial support and technical assistance for the inclusion of malaria biomarkers in the 2011 MICS: anemia testing and malaria testing using RDTs and microscopy. In concordance with previous national household surveys, the DHS planned for 2014 will be conducted during the peak malaria season and include malaria markers.

There are currently 10 Global Fund-supported therapeutic efficacy study sites, operated by Noguchi Institute for *in vivo* drug efficacy monitoring throughout the ten regions of Ghana. PMI, WHO, and Naval Medical Research Unit No. 3/Department of Defense have provided support for monitoring efficacy of the two first-line ACTs used for the treatment of uncomplicated malaria. Efficacy studies are conducted biennially and testing is rotated among the 10 sites.

In collaboration with other partners, such as AGAMal and Navrongo Research Center, PMI also continues to support entomological monitoring of IRS activities. Table H summarizes the different M&E activities that have been supported by PMI as well as other partners.

Progress during the last 12 months

To improve M&E capacity-building within the NMCP, PMI has supported an M&E Advisor seconded to the NMCP since 2011. This enhanced efficiency in NMCP data reporting, provided in-house mentoring for the NMCP's M&E staff, and provided technical leadership for the malaria surveys. PMI also provided support for laptops, desktop computers, and printers to improve data management and analysis.

Accurate and timely data collection is one of the NMCP's most immediate challenges. During the last 12 months, PMI continued to work with the NMCP and other partners to improve the quality of data and build capacity for evidence-based decision making. Support was at the national, regional, and district/sub-district levels and included:

- Training 213 health information officers in supportive M&E supervision (surpassed annual target of 170 officers trained)
- Through the first round of OTSS, M&E supportive supervision visits were conducted to 1,756 health facilities (surpassed annual target of 1,500 health facilities)
- Conducted data quality improvement/DHIMS2 training for 361 hospital and district health information officers (surpassed annual target of 230 health officers trained)
- Supported M&E technical working group activities and regional level review meetings
- Supported the development of the NMCP M&E Plan
- Conducted training on OTSS data review and data utilization

The routine M&E system has enhanced the capacity of health information officers in data analysis, interpretation and use, provided coaching on data validation at facility levels, and helped to clarify malaria indicator definitions and data sources for facility level staff.

PMI has supported the School of Public Health at the University of Ghana to establish a "malaria track" within the existing FELTP program. PMI is supporting two GHS staff in the malaria track of the FELTP. One of the students has conducted a survey in one district on the factors affecting IPTp uptake. The two GHS staff will continue in their advanced classroom and practical training in field epidemiology, focusing on priority issues in malaria surveillance and operations research identified by the NMCP and PMI.

Table H: Monitoring and Evaluation Activities, Calendar Year 2007-2016

Data Source	Activities	'07	'08	'09	'10	'11	'12	'13	'14	'15	'16
Household Surveys	Demographic and Health Survey		X						X		
	Multiple Indicator Cluster Survey*					X					
Health Facility and Other Surveys	EUV survey				X	X	X	X			
	Anemia and parasitemia monitoring				X	X	X	X	X		
Malaria Surveillance and Routine System Support	Sentinel surveillance		X	X	X	X		X**	X**	X**	X**
	Support to HMIS	X	X	X	X	X	X	X	X	X	X
Entomological monitoring	Entomological surveillance and resistance monitoring		X	X	X	X	X	X	X	X	X
Therapeutic	<i>In vivo</i> efficacy testing							X**		X	
Other Data Sources	Malaria Impact Evaluation										X

*The Multiple Indicator Cluster Survey contained all elements of a malaria indicator survey, including anemia and parasitemia sampling.

**Not PMI-funded

Plans and justification

PMI is committed to working with the NMCP to support the implementation of the national malaria M&E plan. As identified through a PMI-supported strength, weaknesses, opportunities and threats (SWOT) analysis of the M&E system during the strategic planning process, PMI will focus on addressing the weaknesses identified (e.g. data quality and timeliness) and continue to build on the strengths gained (e.g. standardization of data collection tools, development of malaria performance indicators).

PMI is committed to support monitoring the quality of data collected through DHIMS2 to ensure programmatic and technical needs of NMCP are met. This will be accomplished by: 1)

continuing to build human capacity and technical guidance within NMCP by supporting an M&E Advisor; 2) improving supportive supervision and training at all health levels to ensure proper data collection, reporting and interpretation (which will also focus on the private sector); 3) continuing to support regional malaria data review workshops (which will include the private sector) to discuss DHIMS2 data use and programmatic implications; 4) work with the NMCP on the integration of DHIMS2 data with OTSS and other health facility data; and 5) continue to build infrastructure by updating computer hardware and software.

With FY 2013 reprogrammed funds, PMI will support the design and implementation of a baseline survey to assess malaria control activities related to health systems strengthening. In collaboration with other health areas such as HIV and maternal and child health, the baseline survey will evaluate approximately 20 malaria program indicators collected and reported by multiple implementing partners conducting various malaria prevention and control activities. The baseline survey will be planned so that the data collection tools and analysis provide optimal and consistent comparison over time. The survey design will take into account other population-based surveys such as the DHS, MICS, and MIS. Subsequent midterm and final surveys will be conducted in subsequent years to assess the overall programmatic and health system strengthening contributions PMI has made since 2007.

With FY 2014 reprogrammed funds, PMI will support the design and implementation of a national database that will contain entomological and insecticide resistance for all 10 regions of Ghana. Contributors to the database will be NMCP, PMI, AGAMal, Labiofam, and any other partners collecting such data. The data will provide an overview of current and longitudinal trends in entomological and insecticide resistance, a crucial component in monitoring the impact of malaria control interventions and the selection of future vector control components.

Given the changing epidemiology of the *Anopheles* mosquito, the rotation of insecticides used and the duration of the spraying, PMI recognizes the importance of enhanced monitoring of insecticide resistance, and will continue to support this activity in FY 2015.

Results from the 2014 DHS will help inform an evaluation of the impact that PMI, together with other partners, is having on malaria-related illnesses and deaths in Ghana. Using results from the 2014 DHS, this impact evaluation is scheduled to take place using FY 2015 funds.

Proposed activities with FY 2015 funding (\$839,000)

- **Strengthen and support routine M&E systems: (\$515,000)**
Provide continued support for GHS/NMCP to strengthen routine systems for malaria M&E, including OTSS of district and regional staff on data collection, reporting and analysis, and providing limited computer hardware and software to fill gaps. Support strengthening the quality of malaria data including scaling-up dissemination of revised patient registers and continued implementation of a robust DHIMS2. Support NMCP to analyze and utilize data from routine systems to inform programmatic decisions. Support an M&E advisor seconded to the NMCP. The advisor provides in-house mentoring for the NMCP's M&E staff and provides technical leadership for the malaria surveys.

- Nationwide insecticide resistance monitoring: (\$50,000)
In collaboration with other partners and national research institutions, continue to support routine insecticide resistance monitoring at a network of sites nationwide. PMI will provide technical assistance, equipment training, and funding for routine data collection. These resources will leverage other vector-control partner resources for entomological monitoring activities and will help fill gaps to ensure national coverage.
- Impact evaluation: (\$100,000)
Led by the NMCP, PMI will support the evaluation of the impact of malaria control interventions over the period 2008 – 2014. Evaluation of these activities will provide insight into the progress of malaria interventions in reducing malaria morbidity and mortality, and help explore issues that hamper progress and provide solutions. Funding will support planning and organizations activities for the evaluation.
- Long-term field epidemiology and laboratory training : (\$150,000)
Support long-term training of individuals to build capacity at the NMCP or GHS in epidemiology, M&E, or other malaria program management functions as needed through the FELTP, which was established with USG support at GHS in collaboration with the University of Ghana’s School of Public Health.
- Technical assistance: (\$24,000)
Support for two technical assistance visits from the CDC PMI M&E team. Technical assistance will include working with the NMCP to support strengthening HMIS, IRS epidemiologic monitoring and support for the impact evaluation.

OPERATIONAL RESEARCH (OR)

Table I. PMI-funded Operational Research (OR) Studies

Completed OR Study			
Title	Start date	End date	Budget
Prevalence of <i>Plasmodium falciparum</i> parasitemia and anemia in children under five years of age at baseline and following annual vs. biannual indoor residual spraying (IRS) in Bunkpurugu-Yunyoo district, northern Ghana	4/2011	4/2013	\$480,000
Planned OR Study FY 2015			
Title	Start date	End date	Budget
Identifying and testing methods to improve clinician adherence to rapid diagnostic testing in public health facilities in Ghana	6/2016	12/2016	\$100,000

Planned FY 2015 OR study

With the introduction of RDTs in 2010, Ghana revised their national policy of presumptive diagnosis to testing before treating, as part of the 3T Strategy – Test, Treat, Track. Despite increased support and efforts to improve quality care through supportive supervision, on-the-job training, and pre-service training of health workers, the testing rate according to HMIS remains at 35%. Additionally, there remains poor adherence to test results by prescribers, with irrational use of ACTs when the RDT is negative.

With FY 2015 funding, Ghana/PMI proposes to develop and implement research that will identify strategies and test methods to improve clinician adherence to Ghana's national case management guidelines. The specific research objective, study design and budget will be developed in collaboration with the NMCP.

Proposed activities with FY 2015 funding (\$100,000)

- Operational research: (\$100,000)
Develop, evaluate, and implement methods to improve clinician adherence to diagnostic testing.

BEHAVIOR CHANGE COMMUNICATION (BCC)

NMCP/PMI objectives

The National Malaria Behavior Change Communication Strategy was created by the NMCP with support from PMI in 2010. The plan provides strategic direction to guide the development, implementation, and monitoring of the communication and behavior change component of malaria prevention and control efforts. It defines communication and behavior change objectives, key target groups, messages, channels, and communication interventions at different levels aiming to raise awareness about malaria and addressing the key determinants of behavior for prevention and control interventions, with the ultimate goal of a long-term normative shift in behaviors among the key target groups nationwide. The National Malaria Communication Committee is the body charged with oversight in the implementation of the strategy. Officially a sub-committee under the MICC, it is a

PMI's BCC and community mobilization strategy aims to complement the NMCP's efforts to promote positive behaviors that support malaria control as defined in the NMCP National Malaria Behavior Change Communication Strategy (2010 – 2015) objectives. The NMCP's BCC priority objectives include: 1) increasing household ownership of ITNs to 90% of households; 2) increasing nightly utilization of ITNs to 85% among children under five years and pregnant women and to 80% among the general population; 3) increasing the percentage of children under five years of age with fever receiving an appropriate ACT within 24 hours of onset of fever and of all patients with uncomplicated malaria correctly managed at public and private health facilities using ACTs to 90%; 4) increasing to 90% caretakers and parents able to recognize early symptoms and signs of malaria; 5) reducing by 50% the proportion of the population that has

common misconceptions about causes of malaria; 6) increasing the percent of service providers who promote ITNs, SP, and ACTs to clients to 90%; and 7) increasing percent of pregnant women who attend ANC during the first four months of pregnancy and receive their first dose of IPTp after quickening to 90%.

In April 2014, NMCP held a workshop to start revising The National Malaria Behavior Change Communication Strategy and, at the time of this MOP writing, the revision was in progress. PMI is an active member of the National Malaria Communication Committee, hence participated in the workshop and anticipates being actively involved in the development of new communication strategies.

Progress since PMI was launched

PMI was a key partner in the revision of the NMCP National Malaria Behavior Change Communication Strategy (2010 – 2015), which provided the framework from which all malaria communication activities are implemented. PMI has also continued to support mass media activities, the development of BCC materials, and training of community volunteers in malaria prevention and control in over 1,500 communities. Specialized BCC campaigns have been developed which focus on specific malaria campaigns, such as universal coverage and related “hang up” campaigns, designed to increase uptake of key behaviors. BCC has been implemented as a cross-cutting activity across all PMI-supported intervention areas, and has been used to target health workers and the general public in the promotion of correct and consistent use of ACTs, promote early presentation at ANC to increase full adherence to IPTp and decrease IRS refusal rates.

Continued opportunities exist due to Ghana’s relatively well-developed media infrastructure, which has grown from 5 television stations in 2010 to 13 in 2013 (one of which has a national reach) and private sector communication agencies. Over 100 local radio stations are distributed throughout the country and can be found in almost all districts, with heavier concentrations in the urbanized areas. Local radio stations broadcast in the range of local languages providing opportunities for targeted communications. However, most local stations broadcast over a limited geographic area, and thus, reaching national coverage through radio requires agreements with many different stations. According to the 2011 MICS, 56% of women and 63% of men watch television at least once per week and 68.6% of women and 85% men listen to radio at least once per week. The print media is not as well developed, and only a few news publications are national in scope.

While awareness about malaria transmission has increased, some misconceptions about malaria continue to persist. According to the 2011 MICS, the most common misconceptions include dirty surroundings (55%), eating contaminated foods (19%), and working in the sun (12%). More respondents identified keeping your surroundings clean (60%) as a means of preventing malaria than those who identified sleeping under an ITN (53%). Additionally, “being too hot/uncomfortable” was the major reason for non-use of nets in a baseline survey conducted in 2010. It has also been reported that, in some parts of the country (e.g. Northern Region), significant amounts of outdoor sleeping occurs, undermining the effectiveness of malaria prevention efforts.

Moreover, malaria is often seen as synonymous with fever, and high rates of presumptive diagnosis of malaria based on fever contribute to the confusion that all or most febrile illness is malaria. In Ghana, about 40% of all cases of febrile illness suspected to be malaria are treated at home, and treatment seeking behavior for children needs to be improved. OTCMS and pharmacies are important sources of malaria treatment. Specific BCC messaging geared towards OTCMS and pharmacies would also be helpful. In addition, low rates of RDT testing and provider adherence to negative RDT test results present another challenge and calls for health provider-specific BCC messaging.

In addition, Ghana's Health Promotion Department needs significant support to provide leadership for BCC in Ghana. Currently, they assist with the pre-testing of communication materials. PMI will support the Health Promotion Department and build its capacity, so they can become a resource center for BCC, ensuring appropriate material development and messaging.

For community mobilization, PMI has supported the formation of district health advocacy teams and municipal health advocacy teams. District and municipal health advocacy teams are multi-sectorial teams committed to supporting effective health service delivery in districts and municipalities. PMI worked with the district and municipal health advocacy teams to develop and implement community action plans, utilize the Information Services Department and local FM radio stations to disseminate information on ITN use for malaria prevention, hold stakeholder forums for information sharing, and lay the foundation for community ownership and sustainability of BCC activities.

Progress during the last 12 months

In the last 12 months, PMI completed the production of four additional television spots (two spots each in Akan and English). Because heat and discomfort emerged as a barrier to ITN use, one spot, titled "Game Plan" aimed to tackle this issue in an entertaining but memorable way. The second spot, titled "*Nmomtom Po Suro*" (Even mosquitos fear) uses a catchy tune performed by Praye, a popular signing group in Ghana, and popular response format called *djama* to educate users on basic practices to take good care of the nets to make it last. TV broadcast of the spots were strategically placed during popular TV programs (a total of 170 spots). In addition, 5271 radio spots were aired using the same songs. Broadcasting of malaria media campaigns previously launched, such as "*Aha Ye De*" and HeHaHo weekly radio shows continued on regional FM stations and around the nation. Malaria messaging aimed to educate Ghanaians on serious complications related to severe malaria infections (e.g. anemia, child development, and brain damage from cerebral malaria), to dispel misconceptions while empowering public to use ITNs and IPTp by portraying them as positive social norms that are part of a modern lifestyle.

An evaluation of the "*Aha Ye De*" campaign was conducted in 2014. The end line survey showed a significant increase in total number of nets owned by all participating households (60% at baseline vs. 78% at end line), with net ownership was associated with exposure to "*Aha Ye De*" campaign spot that promoted the use of ITNs ($p < 0.001$). Furthermore, exposure to "*Aha Ye De*" campaign spot was significantly associated with sleeping under a net the previous night ($p < 0.01$). Three-fourths of those who reported this positive behavior stated that they have heard this message. There was significant association between exposure to malaria campaign spots and children under five sleeping under the net. More than half (56%) of respondents who heard these

spots reported that the children in their households always slept under a net compared to 45% of participants who were not exposed to this campaign (p=0.04).

During this past year, PMI also supported the open-ended malaria prevention and control drama scripts developed for primary schools. These scripts were pre-tested with school children and teachers, and then revised prior to being disseminated to schools. BCC messaging and community mobilization activities have been closely linked to promote correct and consistent ITN use, regular ANC attendance and IPTp uptake, early diagnosis and treatment with ACTs.

PMI continues to support using community and national radio to ensure a nationwide BCC message. In total, 6,772 spots have been broadcasted. These included jingles, live presenter mentions, radio live discussions on continuous distribution, and on ITN use, care and repair. In addition, as part of the Northern zone community mobilization, a total of 2,400 spots have been aired within the reporting period in eight local languages. Malaria prevention and continuous distribution strategy orientation was provided for 46 Christian and Muslim religious leaders. As a result, 6,210 congregants were reached with ITN use and care messages. Drama and quiz competitions were organized in 40 districts in three regions in Northern Ghana, targeting 120 schools.

In March 2014, a qualitative formative study on outdoor sleeping and nighttime activities was conducted in the Upper West and Northern Regions of Ghana. In-depth interviews and nighttime observations were used to document outdoor sleeping and a variety of social, cultural, and economic activities that occur during night time. Outdoor sleeping due to heat was reported and observed frequently among household members of all ages. Insecticide-treated net use was observed to be low irrespective of whether people slept indoors or outdoors, in both regions. In addition to outdoor sleeping, a variety of outdoor nighttime activities were documented including cooking and other household chores, socializing both within the household compound and elsewhere, and studying both within the household compound and at night school classes. Funerals emerged as a common large-scale nighttime event with participants reporting that they attended funerals up to once a week. The findings indicate the need for specific BCC messaging in these regions.

Plans and justification

To sustain the investments PMI has made in the NMCP's malaria prevention and control program, PMI will build on previous investments in BCC and branding of the Good Life health messaging campaign. There is an urgent need to continue delivering key BCC messages, so PMI will support the dissemination and implementation of community mobilization and communications activities and materials (print and mass media) to:

- Facilitate adjustment in attitudes and social norms in a way that ITNs become a lifestyle product that are used consistently and swift care seeking behavior becomes the norm in case of febrile illness;
- Increase knowledge about how malaria carrying mosquitos bite at night and how ITNs provide protection, signs and symptoms of malaria;
- Increase threat perception (e.g. malaria being #1 killer for children under five, severe malaria causes disability) for prompt and proper care-seeking behaviors;

- Increase knowledge that every febrile illness is not malaria and that public should ask for RDTs before accepting malaria treatment;
- Increase health worker knowledge, belief, and practices regarding RDT use and facilitate adherence to negative RDT results, and,
- Strengthen the NMCP and the National Malaria Communications Committee capacity to take the lead on implementing a comprehensive communication program.

As PMI scales up improved case management and IPTp, it will continue to integrate community-level BCC messaging to strengthen the role of health workers as active promoters of ITNs, IPTp, and ACTs. PMI will continue to disseminate and leverage the existing branded BCC communications materials and revise as appropriate. The effectiveness of BCC activities will be assessed through questions and analysis of the 2014 DHS. Local media monitoring organizations will be used to monitor the number of spots aired on radio and television.

Proposed activities with FY 2015 funding (\$1,100,000)

- BCC and community mobilization to promote ITN ownership and use, IPTp, and improve malaria-related care and treatment seeking behavior: (\$1,100,000)
Through this activity, PMI will support:
 - The dissemination and implementation of community mobilization and communications activities to promote ITN ownership and use. Particular focus will be placed on net care and barriers to use. Technical assistance will be provided to the NMCP and the National Malaria Communications Committee.
 - The distribution and use of communications materials and community mobilization to improve administration of IPTp by healthcare workers and promote IPTp with a particular focus on geographic areas with low IPTp rates. Messages will be integrated with MCH BCC activities as appropriate.
 - Community mobilization and mass communication to improve demand for case management, to increase prompt and appropriate care seeking behavior for malaria symptoms. Communications activities will target the general public to promote correct and consistent use of ACTs and confirmatory testing. The importance of testing to assess non-malarial causes of fever will be given special emphasis in urban areas. Activities will be integrated with MCH activities as appropriate.

STAFFING AND ADMINISTRATION

Two health professionals serve as Resident Advisors to oversee the PMI in Ghana, one representing CDC and one representing USAID. In addition, one or more Foreign Service Nationals work as part of the PMI team. All PMI staff members are part of a single inter-agency team led by the USAID Mission Director who has designated this authority to the Senior Health Officer. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, managing collaborating agencies and supervising day-to-day activities. Candidates for resident advisor positions (whether initial hires or replacements) will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

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

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

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

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

Proposed activities with FY 2015 funding (\$1,545,000)

These funds are slated to be used for coordination and management of all in-country PMI activities including support for salaries and benefits for two resident advisors and local staff, office equipment and supplies, and routine administration and coordination expenses.

Table 1: FY 2015 Budget by Mechanism					
Partner Organization	Geographic Area	Activity	Activity Budget	Project Budget	Percent of Total
TBD (New commodity/ supply chain project)	Nationwide	Procure ITNs for distribution through routine systems	\$1,500,000	\$12,560,000	45%
		Support for local ITN distribution activities and strengthening the supply chain	\$300,000		
		Procure RDTs and microscopes to support diagnostic capacity in facilities	\$1,550,000		
		Procure ACTs and/or severe malaria treatment	\$8,660,000		
		Strengthen logistics and supply chain systems	\$550,000		
IRS 2 TO6	Northern Region	IRS implementation and management	\$4,700,000	\$4,700,000	17%
MalariaCare	Nationwide	Strengthen quality of malaria diagnostic capacity in laboratories	\$100,000	\$1,455,000	5%
		Scale up RDT use in clinical settings	\$500,000		
		Support pre-service training for health care workers and physicians to improve malaria case management capacity	\$140,000		
	5 Regions	Build management capacity at NMCP, GHS and other GOG partners	\$100,000		
		Provide technical assistance to improve malaria case management at the national and health facility levels	\$350,000		
		Strengthen routine M&E systems	\$265,000		
		Ensure mass access to appropriate malaria treatment through the NHIA program	\$400,000		
Health Financing & Governance	Nationwide	Strengthen the malaria case management capacity of licensed chemical sellers and pharmacies	\$400,000	\$400,000	1%
SHOPS	Nationwide	TA to support entomological monitoring for IRS	\$34,000	\$220,000	1%
		TA for diagnostics	\$12,000		
		Support for the field epidemiology and laboratory training program	\$150,000		
		Technical assistance for M&E	\$24,000		
CDC	Northern Region and Nationwide	Strengthen drug quality monitoring capacity	\$200,000	\$200,000	1%
		Support pre-service training for health care workers	\$450,000		
USP-PQM	Nationwide	Support pre-service training for health care workers and physicians to improve malaria case management capacity	\$265,000	\$715,000	3%
TBD (New communications project)	Nationwide	BCC and community mobilization to promote ITN ownership and use, IPT uptake, and improved care seeking behavior	\$650,000	\$650,000	2%

TBD (New evaluation project)	Nationwide	Support the malaria impact evaluation	\$100,000	\$200,000	1%
		Conduct research to improve understanding of case management discordance between treatment results and treatment in Ghana	\$100,000		
Systems for Health	5 Regions	Strengthen ANC services and in-service training for health care workers	\$540,000	\$2,040,000	7%
		Scale up RDT use in clinical settings	\$500,000		
		Provide technical assistance to improve malaria case management at the national and health facility levels	\$550,000		
		Strengthen routine M&E systems	\$250,000		
		BCC and community mobilization to promote ITN ownership and use, IPTp uptake, and improved care seeking behavior	\$200,000		
G2G: Clinical Laboratories Unit, Noguchi, NHIA, and Institutional Care Division	Nationwide	Strengthen quality of malaria diagnostic capacity in laboratories	\$300,000	\$1,075,000	4%
		National insecticide resistance surveillance	\$50,000		
		Support NHIA to implement clinical audits	\$325,000		
		Provide technical assistance to improve malaria case management at the national and health facility levels	\$400,000		
TBD (New Malaria Vector Control Project)	Nationwide	Support for local ITN distribution activities and strengthening the supply chain	\$970,000	\$1,220,000	4%
		BCC and community mobilization to promote ITN ownership and use, IPTp uptake, and improved care seeking behavior	\$250,000		
TBD	Nationwide	Strengthen the role of civil society in malaria advocacy	\$200,000	\$200,000	1%
TBD	Nationwide	Support Peace Corps malaria volunteers	\$10,000	\$360,000	1%
		Develop communications to promote enrollment in NHIA	\$350,000		
WHO Umbrella PIO Grant	Nationwide	Support for WHO national professional officer	\$60,000	\$60,000	0%
USAID and CDC	Nationwide	In-country staff and administrative expenses	\$1,545,000	\$1,545,000	6%
		Total			\$28,000,000

Table 2: FY 2015 Planned Obligations Ghana					
Proposed Activity	Mechanism	FY 2015 Budget	Com-modities	Geographic Area	Description of Activity
ITNs					
Procure ITNs for distribution through routine systems	TBD (New commodity/supply chain project)	\$1,500,000	\$1,500,000	Nationwide	Procure approximately 300,000 long-lasting ITNs, estimated to meet 8% of the national need, to provide ITNs to vulnerable populations and to contribute towards maintaining universal coverage of ITNs. The budget of \$5 per unit includes transportation of LLINs to distribution points.
Support for local ITN distribution activities and strengthening the supply chain	TBD (New commodity/supply chain project)	\$300,000	\$0	Nationwide	Provide technical assistance to GHS, GES, and other stakeholders to strengthen routine ITN distribution planning, logistics, supply chain management, training, and end-user distribution systems.
	TBD (New Malaria Vector Control Project)	\$970,000	\$0	Nationwide	Support the continuous distribution of ITNs through schools and health facilities with support to the GHS/NMCP and GES/SHEP. Funds will support the costs of training, planning, supervision, operations and M&E.
ITNs Subtotal		\$2,770,000	\$1,500,000		
IRS					
IRS implementation and management	IRS 2 TO6	\$4,700,000	\$1,410,000	Northern Region	In collaboration with GHS, and with continued focus on capacity building, support IRS implementation and programmatic evaluation in targeted districts. Districts will be selected by December 2014 for optimal IRS impact on morbidity. Targeting will be based on the recommendations of the ongoing national scoping exercise, as well as epidemiologic and entomologic monitoring data from PMI and AGA/Global Fund IRS programs. Encompasses entomological monitoring and limited epidemiologic monitoring, spray operations, data collection, environmental assessment and compliance monitoring, BCC activities including community mobilization, and logistics support.
TA to support entomological monitoring for IRS	CDC	\$34,000	\$0	Northern Region and Nationwide	Conduct two technical assistance and quality assurance TDYs to support entomologic monitoring, including insecticide resistance management. Budget includes entomology equipment and supplies.
IRS Subtotal		\$4,734,000	\$1,410,000		

Malaria in Pregnancy						
Strengthen ANC services and in-service training for health care workers	Systems for Health	\$540,000	\$0	5 Regions	Support the GHS to further improve HCW/health system capacity to effectively deliver a package of malaria prevention and care services to pregnant women. PMI support will focus on supportive supervision, on-site training as needed, quality improvement to increase HCW administration of all three IPTp doses, and support for implementing updated GHS guidance.	
Support pre-service training for health care workers	TBD	\$450,000	\$0	Nationwide	Provide technical pre-service training for nurses, midwives, and medical assistants in prevention and treatment of malaria in pregnancy.	
Malaria in Pregnancy Subtotal		\$990,000	\$0			
Case Management						
<i>Diagnosis</i>						
Procure RDTs and microscopes to support diagnostic capacity in facilities	TBD (New commodity/ supply chain project)	\$1,550,000	\$1,550,000	Nationwide	Procure approximately 2.5 million RDTs, estimated to meet 40-50% of the national need, as well as limited diagnostic supplies (e.g. microscopes and microscopy kits/reagents) to fill identified gaps and ensure that health facilities maintain capacity to test fevers and diagnose malaria cases. The costs are budgeted at \$0.60 per RDT.	
Strengthen quality of malaria diagnostic capacity in laboratories	MalariaCare	\$100,000	\$0	Nationwide	Support continued quality improvements to malaria microscopy at the laboratory level, building upon and scaling up the successful OTSS program. Provide supportive supervision and on-the-job training of laboratory personnel, complemented by refresher training for lab supervisors. Focus on improving the efficiency of testing processes and on using the test results to inform clinical decisions and surveillance. Emphasize the transfer of increased management responsibility to the GHS CLU.	
	G2G: GHS CLU	\$300,000	\$0			
Scale up RDT use in clinical settings	Systems for Health	\$500,000	\$0	5 Regions	Collaborate with GHS/NMCP to achieve high rates of parasitological testing, with focus on scaling up RDT use in clinical settings. Accelerate efforts to identify and remove operational, financial and policy barriers to increased RDT use. Support capacity building to ensure consistent availability and use of RDTs at public health facilities, especially at the CHPS level. Support the roll-out of RDTs to community-based agents, licensed chemical sellers and pharmacies.	
	MalariaCare	\$500,000	\$0	Nationwide		
TA for diagnostics	CDC	\$12,000	\$0	Nationwide	Provide technical assistance for microscopy QA and to realize full potential of RDTs at all levels	
Diagnostics Subtotal		\$2,962,000	\$1,550,000			

<i>Treatment</i>						
Procure ACTs and/or severe malaria treatment	TBD (New commodity/supply chain project)	\$8,660,000	\$8,660,000	Nationwide	Procure approximately 10.9 million pediatric ACT treatments, estimated to meet 100% of the national pediatric requirement as well as additional quantities of adult ACT formulations, rectal artesunate, and severe malaria drugs as necessary to fill gaps and prevent stockouts.	
Support pre-service training for health care workers and physicians to improve malaria case management capacity	TBD	\$265,000	\$0	Nationwide	Support pre-service training for general nurses, midwives, and medical assistants to improve competencies in knowledge, skills, and practices for malaria diagnosis and case management in compliance with GHS guidelines and protocols. Support implementation of revised school curricula. Develop training for managing cases with negative malaria test results.	
	MalariaCare	\$140,000	\$0	Nationwide	Support pre-service and/or continuing medical education training for physicians and revision of medical school curricula to improve competencies in knowledge, skills, and practices for malaria diagnosis and case management in compliance with GHS guidelines and protocols.	
	G2G (Institutional Care Division)	\$400,000	\$0	5 Regions	Provide financial support to GHS regional and districts teams to promote improved malaria case management. Focus on implementing supportive supervision and incentivizing health care providers. Provide nationwide technical assistance and support in malaria case management.	
Provide technical assistance to improve malaria case management at the national and health facility levels	MalariaCare	\$350,000	\$0	5 Regions	Collaborate with GHS to improve compliance with national guidelines for management of uncomplicated and severe malaria in health facilities. Provide technical assistance for supportive supervision, on-the-job and class room training, and quality improvement among HCWs, with an emphasis on CHPS staff. Promote provider adherence to test results.	
	Systems for Health	\$550,000	\$0	5 Regions	Support NHIA to implement clinical audits to confirm clinical compliance with GHS malaria diagnosis and case management guidelines. NHIA emphasis on confirmatory testing to accompany majority of malaria treatment reimbursements.	
Support NHIA to implement clinical audits	G2G (NHIA)	\$325,000	\$0	Nationwide	Support activities to build the capacity of licensed chemical sellers and pharmacists to comply with GHS malaria diagnosis, treatment and referral guidelines. Address issues related to for-profit, business motivations to comply with GHS guidelines.	
Strengthen the malaria case management capacity of licensed chemical sellers and pharmacies	SHOPS	\$400,000	\$0	Nationwide		
<i>Treatment Subtotal</i>		<i>\$11,090,000</i>	<i>\$8,660,000</i>			
<i>Case Management Subtotal</i>		<i>\$14,052,000</i>	<i>\$10,210,000</i>			

Capacity Building and Health System Strengthening						
Strengthen logistics and supply chain systems	TBD (New commodity/supply chain project)	\$550,000	\$0	Nationwide	Provide technical assistance for strengthening logistics/supply chain to improve availability of malaria commodities including SP, RDTs, and other commodities. Activities will focus on addressing bottlenecks in finance, management, forecasting, transportation and reporting systems. Support end use verification activities. Implement Supply Chain Master Plan to reform health commodity procurement and supply. Partner with Global Fund to pilot a private sector distribution system.	
Strengthen drug quality monitoring capacity	USP-PQM	\$200,000	\$0	Nationwide	Support the strengthening of anti-malaria drug quality monitoring in collaboration with the Ghana FDA. Consolidate the recent expansion of the post-market surveillance Support increased enforcement capacity and education. to heighten responsiveness to counterfeit and substandard medicines.	
Build management capacity at NMCP, GHS and other GOG partners	MalariaCare	\$100,000	\$0	Nationwide	Continue to provide support to the NMCP, GHS, and GOG for technical capacity building and improved malaria control systems. Support limited information technology investments to enhance malaria program management.	
Ensure mass access to appropriate malaria treatment through the NHIA program	Health Financing & Governance	\$400,000	\$0	Nationwide	Provide technical assistance to ensure mass access to appropriate malaria treatment through NHIA program, support the scale-up of capitation, strengthen claims management to ensure sustainability	
Develop communications to promote enrollment in NHIA	TBD	\$350,000	\$0	Nationwide	Support BCC to promote active enrollment in NHIA and access to NHIA-accredited facilities among the general population to facilitate prompt care-seeking behaviors for malaria, with a focus on high burden rural areas.	
Strengthen the role of civil society in malaria advocacy	TBD	\$200,000	\$0	Nationwide	Build the capacity of local Ghanaian non-government and civil society organizations to monitor the quality and ease of access to malaria testing and treatment services. Support will include strengthening community structures for advocating for patients' rights and client-centered care, emphasizing public access to quality ACTs and diagnostics.	
Support Peace Corps malaria volunteers	TBD	\$10,000	\$0	Nationwide	Support Peace Corps volunteers to carry out malaria prevention and control activities such as community mobilization for BCC, LLIN distribution, and OR data collection in their communities	
Support for WHO national professional officer	WHO Umbrella PIO Grant	\$60,000	\$0	Nationwide	Support WHO's National Professional Officer in her ongoing consultative and facilitative role for NMCP, PMI, and other partners in a range of technical and strategic areas, such as strengthening monitoring and evaluation activities, the implementation of iCCM, and pharmacovigilance issues.	
Capacity Building and Health System Strengthening Subtotal		\$1,870,000	\$0			

Monitoring and Evaluation						
Strengthen routine M&E systems	MalariaCare	\$265,000	\$0	5 Regions	Support GHS/NMCP to strengthen routine systems for malaria M&E, including training district and regional staff on data collection, analysis and reporting; and limited computer hardware and software to fill gaps. Support strengthening the quality of malaria data. Support GHS and NMCP stakeholders to perform assessment of routinely collected malaria data.	
	Systems for Health	\$250,000	\$0	5 regions	Support GHS at the regional level to strengthen routine systems for malaria M&E, including training district and regional staff on data collection, analysis and reporting. Provide limited computer hardware and software to fill gaps. Support strengthening the quality of malaria data.	
National insecticide resistance surveillance	G2G (Noguchi)	\$50,000	\$0	Nationwide	In collaboration with other partners and research institutions, continue to support routine insecticide resistance monitoring at a network of sites.	
Support the malaria impact evaluation	TBD (New evaluation project)	\$100,000	\$0	Nationwide	Support the evaluation of the impact of malaria control interventions over the period 2008 – 2014.	
Support for the field epidemiology and laboratory training program	CDC	\$150,000	\$0	Nationwide	Continue to support long-term training of two individuals from GHS/NMCP in epidemiology, surveillance, monitoring and evaluation. To be implemented as a “malaria track” imbedded in FELTP program at the University of Ghana.	
Technical assistance for M&E	CDC	\$24,000	\$0	Nationwide	Support for two TDYs from the CDC PMI M&E team to provide technical assistance. Technical assistance will include working with the NMCP to support strengthening HMIS, IRS epidemiologic monitoring and support for the impact evaluation.	
M&E Subtotal		\$839,000	\$0			
Operations Research						
Conduct research to improve understanding of case management discordance between treatment results and treatment in Ghana	TBD (New evaluation project)	\$100,000	\$0	TBD	Evaluate and improve clinician adherence to diagnostic testing: identify factors associated with clinicians' non-adherence with diagnostic testing and test methods to increase clinician adherence in public and private sectors.	
OR Subtotal		\$100,000	\$0			

BCC					
BCC and community mobilization to promote ITN ownership and use, IPTp uptake, and improved care seeking behavior	TBD (New communications project)	\$650,000	\$0	Nationwide	Support the development and implementation of communications activities to promote ITN ownership and use, improved administration of IPTp by healthcare workers and uptake by pregnant women, and update of IPTp employing an evidence-based approach. Support community mobilization, radio and television spots, and communications materials. Focus on net care and misperceptions about use. Provide technical assistance to the NMCP and the National Malaria Communications Committee, and SHEP. Support community mobilization and mass communication to improve demand for case management, to increase prompt and appropriate care seeking behavior for malaria symptoms. Activities will be integrated with MCH activities as appropriate. Integrate activities with MCH activities as appropriate. Provide technical assistance to GHS (NMCP, National Malaria Communications Committee, and Health Promotion Unit).
	TBD (New Malaria Vector Control Project)	\$250,000	\$0	Nationwide	Support the development and implementation of communications activities to promote LLIN ownership and use, employing an evidence-based approach. Support community mobilization, radio and television spots, and communications materials. Focus on net care and misperceptions about use. Provide technical assistance to the NMCP and the National Malaria Communications Committee, and SHEP.
	Systems for Health	\$200,000	\$0	5 Regions	Support the distribution and use of communications materials to improve administration of IPTp by healthcare workers. Support community mobilization and communications materials (print and mass media) to promote IPTp with a particular focus on geographic areas and/or cultural groups with low IPTp rates.
BCC Subtotal		\$1,100,000	\$0		
Staff and Administration					
In-country staff and administrative expenses	USAID/ Ghana and CDC IAA	\$1,545,000	\$0	Nationwide	Coordination and management of all in-country PMI activities including staff salaries and management costs. Includes posting of one USAID and one CDC resident advisor to Accra.
Staffing and Administration Subtotal		\$1,545,000	\$0		
GRAND TOTAL		\$28,000,000	\$13,110,000		