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PRESIDENT'S MALARIA INITIATIVE

Malaria Operational Plan

KENYA

FY 2012

November 11, 2011

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ABBREVIATIONS

ACT	Artemisinin-based combination therapy
AMFm	Affordable Medicines Facility-malaria
ANC	Antenatal care
AL	Artemether-lumefantrine
BCC	Behavior change communication
CCM	Community case management
CDC	Centers for Disease Control and Prevention
CHW	Community health workers
DDSR	Division of Disease Surveillance and Response
DfID	Department for International Development (UK)
DHA-PPQ	Dihydroartemisinin-piperaquine
DHS	Demographic and Health Survey
DOMC	Division of Malaria Control
DSS	Demographic Surveillance System
FANC	Focused Antenatal Care
FELTP	Field Epidemiology and Laboratory Training Program
GHI	Global Health Initiative
Global Fund	The Global Fund for HIV/AIDS, Tuberculosis and Malaria
GOK	Government of Kenya
HMIS	Health Management Information System
IDSR	Integrated Disease Surveillance and Response
IEC	Information, education and communication
IPTp	Intermittent preventive treatment for pregnant women
IRS	Indoor residual spraying
ISTp	Intermittent screening and treatment for pregnant women
ITN	Insecticide-treated bednet
KEMRI	Kenya Medical Research Institute
KEMSA	Kenya Medical Supplies Agency
LMIS	Logistics Management Information System
M&E	Monitoring and Evaluation
MIP	Malaria in pregnancy
MIS	Malaria Indicator Survey
MOP	Malarial Operational Plan
MOPHS	Ministry of Public Health and Sanitation
NGO	Non-governmental organization
NMS	National Malaria Strategy
PEPFAR	President's Emergency Plan for AIDS Relief
PMI	President's Malaria Initiative
QA/QC	Quality assurance/quality control
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
SP	Sulfadoxine-pyrimethamine
TWG	Technical Working Group
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

EXECUTIVE SUMMARY

Malaria prevention and control are major foreign assistance objectives of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI the USG will improve health outcomes, building upon and expanding the USG's successes in addressing specific diseases and issues.

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, maternal and child health, and tuberculosis. The PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through FY 2014.

Programming of PMI activities follows the core principles of GHI: encouraging country ownership and investing in country-led plans and health systems; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; implementing a woman- and girl-centered approach; improving monitoring and evaluation; and promoting research and innovation. Kenya is a GHI plus country, and is receiving additional technical and management resources to accelerate the implementation of GHI's innovative approach.

A decline in the burden of malaria in Kenya has been observed in recent years resulting in low malaria transmission intensity in most parts of the country. The 2010 MIS results confirmed that malaria prevalence is three times as high in rural areas (12%) as in urban areas (5%), but documented that moderate to high levels of transmission remain in certain endemic zones. Malaria prevalence in the lake endemic zone remains concerning at 38%, while prevalence in other non-endemic zones has dropped to less than 5%. Consequently, as part of the Division of Malaria Control's (DOMC) 2009-2017 National Malaria Strategy, prevention and control interventions are tailored to the current epidemiology of malaria.

Kenya's Round Four malaria grant from the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) ended in January 2011 with a no-cost extension until July 2011. Kenya submitted a successful application for a \$138 million Round 10 malaria grant, and negotiations are underway to finalize the grant and disburse funding as soon as possible. This new grant will, over the next five years, provide critical support for maintaining universal ITN coverage, ensuring a nationwide supply of ACTs, and rolling out the national diagnostic policy and getting RDTs into lower-level health facilities.

The PMI 2012 Malaria Operational Plan was developed in close consultation with the Ministry's DOMC and with participation of numerous national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing for FY 2012 are matched with identified needs and priorities described in the DOMC's National Malaria Strategy (2009-2017) and build on investments designed to improve and expand malaria-related services during the first four years of PMI funding. The proposed FY 2012 PMI budget for Kenya is \$32.4 million.

To achieve the goals and targets of the DOMC and PMI, the following major activities will be supported with FY 2012 funding:

Insecticide-treated nets (ITNs): The 2009-2017 National Malaria Strategy promotes universal ITN coverage, defined as one net per two people, within prioritized regions of the country. In 2011, Kenya is conducting a rolling mass distribution campaign to scale up to universal coverage of ITNs in priority endemic areas. This is the first mass distribution of ITNs in Kenya since 2007. Other distribution strategies include free or highly-subsidized ITNs provided through antenatal care (ANC) clinics, routine ITN distributions through the expanded program on immunization services, child health action days, community-based initiatives, and retail outlets. In 2010, household ownership of ITNs was 48%, while proportions of children under five years and pregnant women who slept under an ITN the previous night were 42% and 41% respectively.

By the end of 2011, PMI will have purchased approximately 5.85 million ITNs and distributed over 4.5 million to support both the routine free distribution to vulnerable populations, as well as the 2011 rolling universal coverage mass distribution campaign. To continue supporting national ITN policies, PMI will procure 1.5 million ITNs with FY 2012 funding for free routine distribution through ANC clinics. PMI will support the DOMC to pilot innovative ways to replace worn out nets at the community level. Additionally, PMI will continue to work with non-governmental organizations on community-based information, education and communication/ behavior change communication (IEC/BCC) campaigns to increase demand for and correct usage of ITNs.

Indoor residual spraying (IRS): The Government of Kenya's IRS program in epidemic-prone districts ended in 2010, and has transitioned towards districts with higher malaria transmission rates. PMI has supported the national IRS program since 2007. PMI currently targets ten districts in Western and Nyanza Provinces and protects over 1.2 million people annually. With FY 2012 funding, PMI plans to spray in up to ten districts, covering an estimated 747,321 houses and protecting an estimated 1.4 million people. Additionally, PMI will support entomological monitoring to detect and respond to resurgences of mosquito populations in districts transitioning away from IRS programs.

Intermittent preventive treatment of pregnant women (IPTp): The 2010 Malaria Indicator Survey results showed improved though continued low coverage of IPTp—only 25% of pregnant women receive two or more doses of sulfadoxine-pyrimethamine, despite high ANC attendance (86% of women attend ANC two or more times during their pregnancy). A pilot study conducted in 2010 confirmed that implementation of a simplified version of the IPTp policy with add-on supervisory visits to ANC staff increased IPTp uptake in targeted districts. Since 2008, PMI has trained approximately 7,000 community health workers on focused antenatal care/malaria in pregnancy, reached 40,000 women with educational messages, and worked with the DOMC to strengthen pre-service curricula for health workers, and simplify provider guidelines on how and when to provide IPTp. With FY 2012 funding, PMI will fund supportive supervision to ensure that the implementation of the revised IPTp policy among health facility workers is underway. PMI will also strengthen community-based behavior change and social mobilization activities that are designed to increase client demand for ANC and IPTp services.

Case management: The third edition of Kenya's national guidelines for diagnosis, treatment and prevention of malaria was issued in 2010, and recommends diagnosis-based treatment as part of effective case management. Since 2008, PMI has trained 485 health workers in malaria diagnosis while procuring and distributing 280 microscopes. By the end of 2011, PMI will have also procured over two million rapid diagnostic tests (RDTs) as part of its support in rolling out the DOMC's new

diagnosis policy. By the end of 2011, PMI will have procured approximately 23 million treatments of artemether-lumefantrine (AL) for Kenya and distributed 19 million to nearly 5,000 health facilities nationwide. With FY 2012 funding, PMI will procure 1.5 million RDTs and support their roll out in malaria endemic areas, as needed, and will support training to strengthen microscopy practices nationally. Additionally, PMI will procure up to 6 million treatments of AL to help ensure adequate supply of ACTs in Kenya throughout the year. PMI will also continue to strengthen the supply chain and logistics systems to ensure reliable access and a steady supply of these essential medications. To ensure that AL is properly used and to improve the quality of malaria case management, PMI will help strengthen the DOMC's direct supervision system.

Behavior change communication (BCC): Through community mobilization, interpersonal communication and use of mass media and/or local radio stations to disseminate key messages and encourage correct health seeking behavior, PMI is promoting increased ITN use, prompt diagnosis and treatment for fever, and demand for IPTp in targeted prioritized communities. With FY 2012 funding, PMI will continue to support this cross cutting BCC investment at community and national levels.

Monitoring and evaluation (M&E): The PMI/Kenya program works to ensure that critical gaps in the DOMC M&E strategy and plan are filled and helps to standardize data collection and reporting. During its first three years, PMI has supported pre-service epidemiology training, *in vivo* antimalarial drug efficacy monitoring, the 2008-2009 Demographic and Health Survey, and the 2010 Malaria Indicator Survey. With FY 2012 funds, PMI will support a malaria module in one of these nationwide household surveys in 2013 and continue support to increase the DOMC's M&E capacity to analyze routine data and conduct ongoing program monitoring for specific interventions. These areas of support include: epidemiologic surveillance in IRS districts to inform scale back timelines and to track epidemic detection; continuous monitoring of malaria in pregnancy activities; monitoring quality of care for malaria case management; and the logistics management information system to monitor commodity stockouts. PMI will also continue its support to the DOMC and the Ministry of Public Health and Sanitation to improve supervision of malaria activities and effective management and administration of its Global Fund grants, by creating tools to collate and report required data.

Health Systems Strengthening and Integration: In line with GHI principles, PMI has reinforced its efforts to build capacity and integrate across programs. PMI/Kenya strengthens the overall health system by improving governance in the pharmaceutical sector; strengthening pharmaceutical management systems, expanding access to essential medicines, and improving service delivery in the different intervention areas. In 2010, PMI supported the implementation of the malaria commodity logistics management information system, emergency AL distribution to avoid stockouts, and drug quality monitoring. PMI also trained community health workers in focused antenatal care and malaria in pregnancy, supported training and supervision of health workers in IPTp, and trained laboratory technicians in malaria diagnosis. In 2011, PMI is working with Walter Reed, DOMC and the Office of the Chief Medical Technologist to implement quality assurance and quality control systems for malaria diagnostics. To build human resource capacity and improve service delivery, PMI continues to train health workers at the facility and community levels.

GLOBAL HEALTH INITIATIVE

Malaria prevention and control is a major foreign assistance objective of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. 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 GHI is a global commitment to invest in healthy and productive lives, building upon and expanding the USG's successes in addressing specific diseases and issues.

The GHI aims to maximize the impact the United States achieves for every health dollar it invests, in a sustainable way. The GHI's business model is based on these key concepts: implementing a woman- and girl-centered approach; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; encouraging country ownership and investing in country-led plans and health systems; improving metrics, monitoring and evaluation; and promoting research and innovation. The GHI will build on the USG's accomplishments in global health, accelerating progress in health delivery and investing in a more lasting and shared approach through the strengthening of health systems. Framed within the larger context of the GHI and consistent with the GHI's overall principles and planning processes, BEST (Best practices at scale in the home, community and facilities) is a United States Agency for International Development (USAID) planning and review process that draws on our best experience in Family Planning, Mother and Child Health, and Nutrition to base our programs on the best practices to achieve the best impact.

PRESIDENT'S MALARIA INITIATIVE

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, maternal and child health, and tuberculosis. The PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through FY2014 and, as part of the GHI, the goal of the PMI is to achieve a 70% reduction in the burden of malaria in the original 15 countries by 2015. This will be achieved by reaching 85% coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment for pregnant women (IPTp), and indoor residual spraying (IRS).

Kenya was selected as a PMI country in FY 2007. Large-scale implementation of ITNs, ACTs and IPTp began in FY 2008 and has progressed rapidly with support from PMI and other partners. This FY 2012 malaria operational plan (MOP) presents a detailed implementation plan for Kenya, based on the PMI Multi-Year Strategy and Plan, and the Division of Malaria Control's (DOMC) national malaria strategy. It was developed in consultation with the DOMC and with participation of national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the DOMC's 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 Kenya,

describes progress to date, identifies challenges and unmet needs if the targets of the DOMC and PMI are to be achieved, and provides a description of planned FY 2012 activities.

BACKGROUND

Kenya's 2009 population is approximately 38.6 million people, with an estimated population growth of 2.8% per year.¹ Children under five years of age account for about 16% of the total population.² Geographically, the country falls into two main regions: lowland areas, both coastal and around lake basins, and highland areas on both sides of the Great Rift Valley. Kenya has approximately 42 ethnic groups, and is a predominantly agricultural economy with a strong industrial base. Kenya is ranked 128 out of 169 countries on the 2010 United Nation's Human Development Index, which measures life expectancy, adult literacy and per capita income. Life expectancy in Kenya has seen an overall downward trend since the late 1980s, but has recently increased to 58.9 years.³ The HIV/AIDS estimated adult prevalence is 6%.⁴ The total expenditure on health increased from 4.1% of the gross domestic product in 2004 to 7.9% in 2007. The per capita health expenditures in Kenya have also risen from \$9 in 2000 to \$33 in 2009.⁵ There has been a remarkable decline of 36% in under-five child mortality from 115 deaths per 1,000 live births recorded in the 2003 Kenyan demographic and health survey (DHS) to 74 deaths per 1,000 observed in the 2008-2009 DHS.⁶

Malaria control efforts under PMI Years 1, 2, and 3 were organized around a long-standing older district structure, which had prioritized 72 districts for targeted interventions. Starting with the FY 2011 MOP, PMI referred to the new administrative structure of eight provinces and 265 districts. Despite the changed structure, the population and geographic coverage for PMI activities remains the same.

Following the Constitutional Referendum of 2010, Kenya will in 2013 institute a devolved government, with provinces giving way to 47 counties as the unit of administration. This change will necessitate the alignment of intervention implementation to the new administrative units in 2013. This organizational change may impact operational costs, due to new county level malaria focal points to equip, train and support, and other logistical and political pressures.

Ministry of Health

Following the signing of the National Accord and Reconciliation Act of 2008, and as part of Government's re-organization process, the Ministry of Health was split into the Ministry of Public Health and Sanitation (MOPHS) and the Ministry of Medical Services. The role of MOPHS is to provide focus on public health and preventive measures and leadership in ensuring that public health policy objectives are implemented. The strategic goals and priority investments of each Ministry are designed to ensure that adequate human, infrastructure, and financial resources are available to support program implementation. In addition, within its 2008-2012 Strategic Plan, the MOPHS has a stated goal of "*reducing malaria incidence to 15% through utilization of cost-effective control*

¹ 2009 Kenya Population and Housing Census

² Ibid, page 38

³ Ibid, page 28

⁴ Ibid, page 239

⁵ WHO Global Health Observatory—Kenya Profile. www.apps.who.int/ghodata last accessed on May 24, 2011

⁶ KNBS and IFC Macro, page 129

measures”. Although each of the Ministries has different functions, they work closely together to avoid duplication of efforts. At the central level, both Ministries oversee, govern and facilitate health activities, while passing on more responsibility for service provision and supervision to the province, district, and soon to be county levels.

The DOMC is part of the MOPHS, and is staffed by technical professionals who are seconded from other departments and divisions in the ministry. The division has six technical units (vector control, diagnosis and case management, malaria in pregnancy, epidemic preparedness and response, advocacy communication and social mobilization, and surveillance, monitoring and evaluation). Each unit has a focal point and one or more technical officers. In 2009, the MOPHS supported a Malaria Program Performance Review which found that the DOMC was strong in its structure and functioning at the central level, but had a weak coordinating capacity at provincial and district levels. This resulted in a lack of support for the delivery of malaria control interventions as well as for monitoring and evaluation. The devolution to a county structure will likely pose continued challenges to the DOMC in overseeing the country’s malaria control program.

Figure 1: Map of Kenya



MALARIA SITUATION IN KENYA

Malaria transmission and risk in Kenya is determined largely by altitude, rainfall patterns and temperature and therefore varies considerably across the country. The variations in altitude and terrain create contrasts in the country's climate, which ranges from hot and humid tropical along the coast to temperate in the interior and very dry in the north and northeast. There are two rainy seasons—the long rains occur from April to June and the short rains from October to December. The temperature remains high throughout these months. The hottest period is from February to March and the coldest from July to August. All four species of human *Plasmodium* occur with *Plasmodium falciparum* causing the most severe form of disease and accounting for 98% of all malaria infections. The major malaria vectors are members of the *Anopheles gambiae* complex and *Anopheles funestus*.

About 70% of the population of Kenya is at risk for malaria. The majority of this at-risk population (27 million) lives in areas of low or unstable transmission where *P. falciparum* parasite prevalence is less than 5%. However, an estimated 3.9 million people live in areas of Kenya where parasite prevalence is estimated to be $\geq 40\%$ and malaria remains a serious risk.

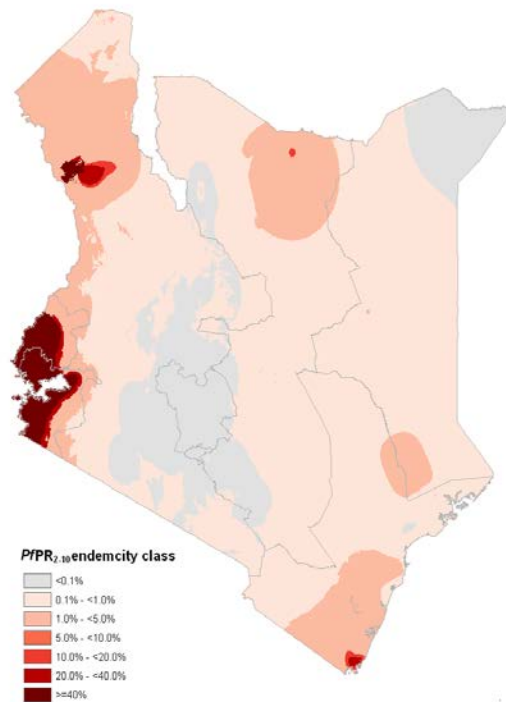
For the purposes of malaria control, the country has been stratified into four epidemiological zones:

- **Endemic areas:** This area of stable malaria has altitudes ranging from 0 to 1,300 meters around Lake Victoria in western Kenya and in the coastal regions⁷ of the country. Transmission is intense throughout the year with a *P. falciparum* prevalence between 20%-40% and high annual entomological inoculation rates. Of the total Kenyan population, 29% lives in a malaria endemic zone.
- **Highland epidemic-prone areas:** Malaria transmission in the western highlands is seasonal with considerable year-to-year variation. The entire population is vulnerable and case fatality rates during an epidemic can be up to ten times greater than in regions where malaria occurs regularly. Approximately 20% of Kenyans live in these areas; their malaria prevalence ranges from 1% to 5% but with some areas experiencing prevalence between 10% and 20%.
- **Seasonal malaria transmission areas:** This epidemiological zone comprises arid and semi-arid areas of northern and southeastern parts of the country which experience short periods of intense malaria transmission during the rainy seasons. Approximately 21% of the Kenyan population lives within these arid/semi-arid areas of the country; the malaria prevalence is less than 5%.
- **Low malaria risk areas:** This zone covers the central highlands of Kenya including Nairobi. Approximately 30% of Kenyans live in these areas where there is little to no disease transmission.

⁷ The DOMC is maintaining Coast Province in this zone even though the area has seen a recent decrease in malaria (currently carrying an estimated malaria risk classification of less than 5%). This is because this reduction is not yet stable and the risk for a resurgence of malaria burden in the area remains.

The country's endemicity map (Figure 2 below) was updated in 2009, and depicts the current malaria transmission intensity for the entire country, with high transmission intensity in endemic zones highlighted by the dark shaded areas.

Figure 2: 2009 Kenya Malaria Endemicity Map



The assembly of limited outpatient and more comprehensive hospital inpatient data⁸ provides additional strong evidence that many previous malaria at-risk areas are transitioning towards low, stable transmission conditions.

National Malaria Control Plan and Strategy

The Government of Kenya (GOK) remains committed to improving health service delivery and places a high priority on malaria control. In order to address malaria morbidity and mortality burden in Kenya, the Government has prioritized malaria prevention and treatment interventions and outlined them in the 2009-2017 National Malaria Strategy (NMS), which has six strategic objectives:

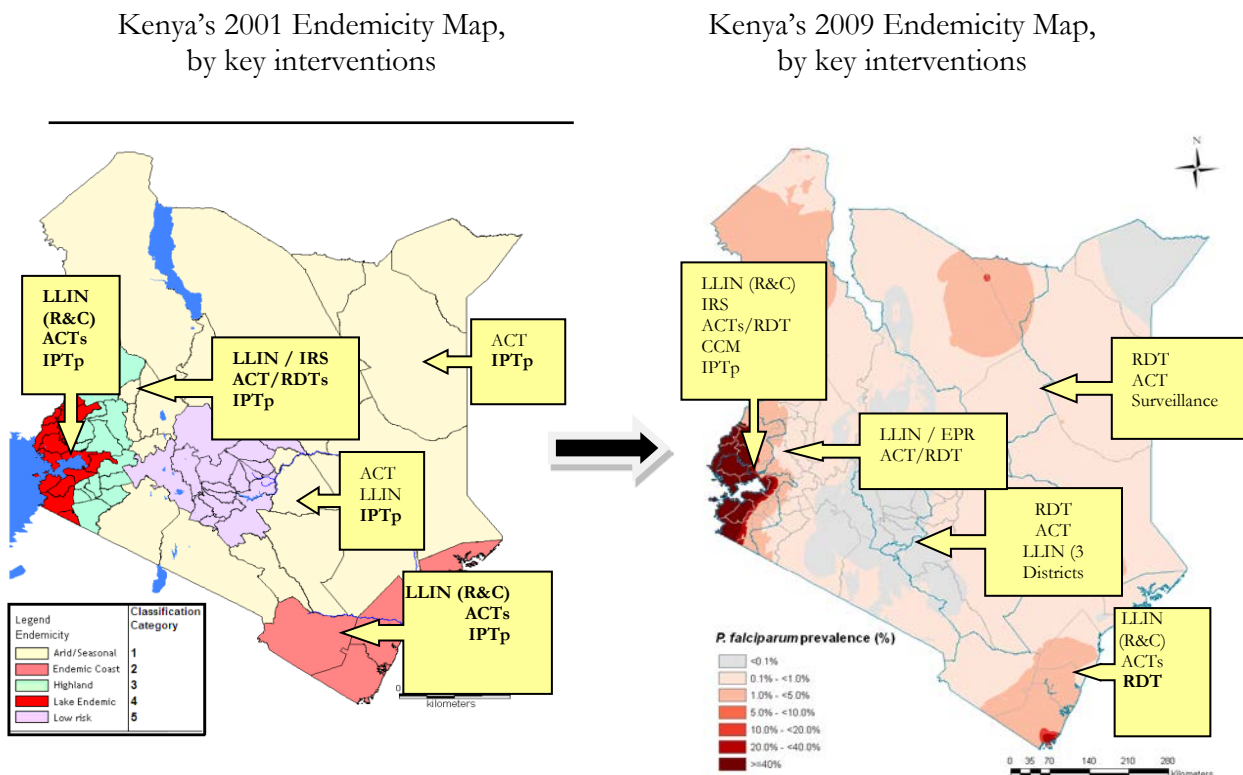
- 1) **Objective 1:** By 2013, to have at least 80% of people living in malaria risk areas using appropriate malaria preventive interventions
- 2) **Objective 2:** To have 100% of fever cases which present to a health worker receive prompt and effective diagnosis and treatment by 2013

⁸ Snow RW, Okiro EA, Noor AM, Munguti K, Tetteh G, Juma E. *The coverage and impact of malaria intervention in Kenya 2007-2009*. Division of Malaria Control, Ministry of Public Health and Sanitation, December 2009

- 3) **Objective 3:** To ensure that all malaria epidemic-prone districts have the capacity to detect and the ability to respond to malaria epidemics annually
- 4) **Objective 4:** To strengthen surveillance, monitoring and evaluation systems so that key malaria indicators are routinely monitored and evaluated in all at-risk malaria districts by 2011
- 5) **Objective 5:** To strengthen advocacy, communication and social mobilization capacities for malaria control to ensure that at least 80% of people in areas at risk of malaria have knowledge on prevention and treatment of malaria by 2014
- 6) **Objective 6:** By 2013, to strengthen capacity in program management in order to achieve malaria programmatic objectives at all levels of the health care system

Strategies to support the achievement of NMS objectives include adopting a multi-sectoral approach to malaria control; decentralizing malaria control operations to the province, district and county (in the near future); tailoring interventions to the prevailing epidemiology; and strengthening the malaria control performance monitoring system. Given the varied and changing malaria epidemiology, Kenya is targeting appropriate intervention measures for specific malaria risk areas. Figure 3, below, compares the changes in Kenya's endemicity map from 2001 to 2009, and notes the shift towards focusing interventions on key geographic areas for the highest impact. The DOMC has strategically reprioritized the approved malaria control interventions according to malaria risk, in order to target resources towards achieving the highest impact possible.

Figure 3: Kenya's Changing Malaria Epidemiology, 2001-2009



CURRENT STATUS OF MALARIA INDICATORS

Main Data Sources

In Kenya, coverage with effective interventions and the ensuing health impact are measured largely through national household surveys. The country purposes to undertake a Malaria Indicator Survey (MIS) once every three years and a DHS once every five years. Routine surveillance through the country's Health Management Information System (HMIS) and Demographic Surveillance System (DSS) is intended to provide additional data for supplemental analyses.

The 2007 MIS and the 2008-09 DHS provided evidence of Kenya recording progress in achievement of national targets. Data from the 2010 MIS, funded by PMI, Department for International Development (DfID) and Population Services International, has provided more current evidence on the status of key malaria control indicators (Table 1).

Table 1: Summary of Selected Malaria Indicators Intervention

	2003 Kenya DHS ⁱ	2007 Kenya MIS ⁱⁱ	2008-2009 Kenya DHS ⁱⁱⁱ	2010 Kenya MIS
Proportion of households with at least one ITN	6%	48%	56%	48%
Proportion of children under five years old who slept under an ITN the previous night	5%	39%	47%	42%
Proportion of pregnant women who slept under an ITN the previous night	4%	40%	49%	41%
Proportion of women who received two or more doses of sulfadoxine-pyrimethamine (SP) during their last pregnancy in the last two years	4%	13%	14%	25%
Proportion of children under five years old with fever in the last two weeks who received treatment with ACTs within 24 hours of onset of fever	N/A	4%	4%	11%
All cause under-five mortality	115 per 1000 live births	--	74 per 1000 live births	--
ⁱ Pre-PMI baseline data for all-cause under-five mortality ⁱⁱ PMI baseline data for coverage indicators ⁱⁱⁱ PMI baseline data for all-cause under-five mortality				

The 2010 MIS has demonstrated minor changes in malaria coverage levels since the baseline which was carried out in 2007. Indicator changes are described under the various intervention sections.

MALARIA CONTROL FUNDING SOURCES

Although the DOMC's NMS budget request for the 2012-2013 financial year is approximately \$384 million, the available funding to the DOMC, from all sources, for the FY 2012 implementation period (October 2012-September 2013) falls short of the need. An analysis of known bilateral and multilateral donors (Table 2) shows that during the period in question (shaded) the confirmed

contributors to malaria control will be from Global Fund, DfID and PMI, with the Affordable Medicines Facility-malaria (AMFm) support ending by June 2012. Based on this analysis, the PMI Kenya team has concluded that its FY 2012 budget (\$32.4 million) will need to fill significant priority gaps, leaving little flexibility to meet less essential yet still important activities. As discussed in the following sections, the FY 2012 budget and activities have been developed in light of available donor funding.

Table 2: Malaria control donor funding & contributions, by USG fiscal year and quarter (shaded quarters indicate when PMI's FY 2012 funding will be available)

Donor Source	2011		2012				2013			
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Global Fund										
<i>Round 10, Year 1</i>	\$12.2 million									
<i>Round 10, Year 2</i>						\$38 million				
<i>Round 10, Year 3</i>										\$40 million
DfID										
<i>FY 2011</i>	~£11.8 million									
<i>FY 2012</i>				~£16.6 million						
<i>FY 2013</i>							~£15.5 million			
PMI										
<i>FY 2010</i>	\$40 m.									
<i>FY 2011</i>		\$36.4 million								
<i>FY 2012</i>						\$32.4 million				
<i>FY 2013 (est.)</i>										TBD
AMFm (using GF R 4 funds)	~32 million ACT Tx									

Global Fund: The Malaria Round 10 grant covers a five-year period and is valued at \$138 million, with about \$12 million budgeted for its first year of implementation. The DOMC decided to reprogram the remaining funds in its Round 4 grant in order to meet essential prevention and treatment gaps before it ends in July 2011, including supporting the universal coverage campaign and the AMFm, which is providing ACTs for public health facilities.

DfID: The UK's Department for International Development (DfID) has renewed its commitment to supporting malaria control in Kenya for another five years (2011-2015). The new strategy will continue to support the distribution of free ITNs through antenatal care (ANC) clinics (£32m), strengthen Kenya's vector control efforts as outlined in the DOMC's malaria strategy (£5m), and will add support for IRS programs and strengthening the country's malaria information systems (£21m). Additionally, with its scale up of international public health funding, DfID will invest £510 million in health system strengthening in Kenya over the five year strategy. This expanded support for the malaria control program and the health sector overall has just been announced, and PMI is working closely with DfID staff to identify how these new investments may complement those of PMI. As of writing, the DfID budget for the 2012/2013 fiscal year, which overlaps with the PMI fiscal year discussed in this MOP, is planned at £16.8 million, including the procurement of 1.225 million ITNs for distribution through the routine system.

Affordable Medicines Facility—Malaria (AMFm): The funding for the AMFm proposal is from the Global Fund’s Round 4 grant, which had a budget of \$18,329,872 for ACT procurement. These funds were reprogrammed to support AMFm interventions, with approximately \$2 million designated for ACT procurement. With this level of funding, approximately 12 million ACTs (including 1.1 million ACTs for community-level distribution) have been procured and will arrive in country on/about July 2011. An additional 12 million ACTs will be procured and distributed to public sector facilities in the coming year. Implementation of the AMFm extends from June 2010-June 2012. It is anticipated that the Global Fund Round 10 grant will take over once the AMFm funds end.

World Bank: While no new World Bank funding is available for malaria control support in Kenya, the World Bank did reprogram some of its existing funding to procure 2.3 million ITNs for the 2011 rolling universal coverage campaign.

EXPECTED RESULTS—YEAR FIVE (FY 2012)

By the end of 2013, the PMI together with other partners will have achieved the following key results:

Prevention:

- Approximately 2.7 million ITNs (of which PMI will provide 1.5 million) will have been distributed to children under-five and pregnant women through ANC and child welfare care clinics.
- At least 85% of targeted houses in the up to ten districts supported by PMI for IRS will be sprayed. (Pending insecticide selection for the 2013 spray season, PMI estimates that up to 750,000 houses will be targeted, protecting up to 1.4 million people of the 8 million needing protection from IRS).
- Intermittent preventative treatment with sulfadoxine-pyrimethamine (SP) in pregnant women will have been enhanced by supporting implementation of the IPTp policy by health workers and community mobilization in all malaria endemic districts.

Treatment:

- Up to 6 million treatments of artemether-lumefantrine (AL) will be procured and distributed.
- Up to 1.5 million rapid diagnostic tests (RDTs) will be procured and distributed to support the roll out of the new malaria diagnostic policy.
- Supply chain distribution systems will be strengthened to improve drug distribution, quantification of drug consumption, and stock monitoring.

PREVENTION ACTIVITIES

Insecticide-Treated Bednets

Background:

Under the 2009-2017 Kenya NMS, one of the objectives of the DOMC is to attain universal coverage of ITNs, defined as reaching a ratio of one ITN for every two people, in conjunction with increasing use of those nets to 80%, within prioritized regions of the country by 2013. Universal coverage is to be achieved through multiple distribution channels including mass distribution of ITNs to all households in the targeted regions every three years, routine distribution to all pregnant women and children under one year, and social marketing of nets at subsidized prices in targeted markets. Funding from the successful Global Fund Round 10 malaria grant, in combination with significant contributions from other donors, will enable Kenya to maintain national coverage targets through the following distribution strategies (summarized in Table 3, below):

Mass Distribution: The ongoing mass ITN distribution campaign, which will provide over 20 million people with access to free ITNs, should reach the country's universal coverage targets by December 2011. The DOMC plans to conduct mass distribution campaigns every three years, and estimates that for the next campaign in 2014 about 12 million nets will be needed to maintain universal coverage in endemic and epidemic-prone districts in Nyanza, Western, Rift Valley and Coast Provinces. There are enough funds in the Global Fund Round 10 grant to cover 60% of the 2014 mass distribution replacement campaign, while the balance of support will need to come from partners (such as PMI). In anticipation of reaching universal ITN coverage by the end of 2011, a key challenge for Kenya will be developing a systematic way of replacing worn out nets among targeted households. Developing a tracking and replacement system to methodically identify households that need replacement nets on a routine basis and finding additional distribution channels to cost effectively reach them (and, thus, reduce the demand for replacement nets in the 2014 mass distribution campaign) is a critical step in maintaining high coverage levels in between periodic campaigns.

Routine Distribution: The DOMC continues to support routine distribution of free ITNs to pregnant women and children through ANC and child welfare clinics. Routine distribution is targeted for all vulnerable populations living in all malarious areas in Kenya, and exceeds the geographic areas targeted in the mass distribution campaign. It remains the primary channel for access to ITNs between mass distribution campaigns.

Social Marketing: Through its support to a private sector partner, Population Services International, DfID has supported a small social marketing program, which sells about 500,000 ITNs per year on the open market. These ITNs sell for KSH 50 (~USD \$0.75) each and are primarily sold in rural areas in endemic and epidemic-prone districts. The DOMC estimates that demand for socially marketed nets exceeds current supply levels, and is a program that could be expanded.

Private Sector: While the national policy supports only the distribution and sale of ITNs, local manufacturers are still producing untreated nets. Consequently, Population Services International, with DfID support, has bundled some of these locally manufactured nets with a long-lasting retreatment kit and is selling them at a subsidized price through its retail outlets. However, Population Services International does not have funding to continue this activity and is in

discussions with the DOMC and local manufacturers to try to ensure that locally-produced nets continue to be bundled with insecticide. The DOMC supports strategies to promote a sustainable ITN market, including decreased taxes and tariffs on netting material and development and airing of generic demand-creation messages from which manufacturers can promote their individual brands.

	Target Population	Target Areas	Method	Current Donors
Universal coverage via mass distribution	1 ITN for every 2 people	Priority malaria endemic and epidemic-prone provinces (Western, Nyanza, Rift Valley and Coast)	Free of charge	Global Fund, World Bank, World Vision, PMI
Routine distribution to ANC and child welfare clinics	Pregnant women and children under one	Endemic, epidemic and seasonal transmission districts	Free of charge	DfID, PMI
Routine distribution to comprehensive care clinics	HIV/AIDS infected persons	Nationwide, but prioritized by HIV/AIDS endemic provinces	Free of charge	PEPFAR and Global Fund
Commercial sector sales	Those who can afford commercially priced nets	Urban/rural centers	Imported ITNs sold at full cost (USD\$7-10) in urban shops. Nets, bundled with insecticide, are sold for KSH 100 (\$1.50) in rural shops and kiosks	Financed by private sector DfID (funding retreatment kits)*
Social marketing to communities	Households in targeted areas	Rural areas in priority malaria endemic and epidemic-prone provinces	ITNs sold for \$KSH 50 (\$0.75) at health clinics	DfID
* Activity on hold. There is currently no available funding from DfID for this activity.				

ITN Coverage: Data from MIS and DHS surveys over the past decade have shown considerable progress in access to ITNs. ITN ownership increased from 6% in 2003 to 48% in 2007 following a mass distribution campaign. With consistent support for routine distribution through ANCs, the 2010 MIS results document that household ownership of at least one ITN remained at 48%. Likewise, the ITN use among pregnant women (41%) and children under five (42%) has also remained stable from the 2007 MIS baseline (where use was ~40% for both target groups). The MIS measured that in 2010, the ITN ownership ratio was one ITN for every five people at risk in Kenya. While the ITN coverage levels have not increased since 2007, given that 11 million nets are scheduled to be distributed in 2011, the DOMC expects that ITN ownership will increase dramatically during the next national household survey.

ITN Gap Analysis: As detailed below, the ITN gap analysis for FY 2012 highlights the risk associated with anticipated net loss following mass distribution. By 2013, PMI estimates that among the at-risk population living in malaria endemic provinces who qualify for universal ITN coverage, there will be a 3 million ITN gap, based on the estimated population growth and an estimated net loss rate of 20% (at 24 months after the end of the mass distribution campaign). For the routine distribution system, based on pledged ITNs from PMI and DfID, PMI anticipates that the routine system needs will be met.

Table 4: FY 2012 ITN Gap Analysis Table

A. Targeted UC Districts (endemic districts in Western, Nyanza and Coast Provinces)	
Data Inputs	Country data
At-Risk Population (2010 Estimates)	19,692,220
Expected annual population growth	2.80%
Average number of persons per net	1.8
Distributed ITNs	
Distributed ITNs in 2010 (UC Campaign only)	0
Distributed ITNs in 2011 to date (UC Campaign only)	0
ITNs pledged to be distributed in 2011 (UC Campaign only)	11,000,000
Pledged ITNs	
ITNs pledged to be distributed in 2012 (UC Campaign only)	0
UC ITNs Need Calculation for 2013	
Population at risk in 2013 (UC Campaign Districts)	21,393,115
Total number of ITNs needed (UC Campaign Districts only)	11,885,064
Viable Nets from Previous years (3 year durability, UC Campaign Districts). <i>(Assumes 20% ITN loss at 24 months post distribution, per the Harmonization Working Group recommendation)</i>	8,800,000
Nets in-country	8,800,000
ITNs gap or (surplus)	3,085,064
B. ANC/EPI Routine Distribution (nationwide to vulnerable populations)	
Population at risk in 2013 (Routine System)	2,837,475
Total number of ITNs needed (Routine System)	2,837,475
Viable Nets from Previous years	0
Pledged ITNs	
Pledged ITNs in 2013 (via routine distribution) (includes pledged ITNs from: PMI: 1,500,000; and DfID 1,300,000)	2,800,000
ITNs gap or (surplus)	37,475
Data Source: 2010 Global Fund Round 10 Kenya Proposal	

Progress to Date

Routine Distribution: PMI continues to support the DOMC's routine distribution program, to ensure that vulnerable populations (pregnant women and children under one) have consistent access to ITNs. From January 2010 through May 2011, PMI procured an additional 300,000 ITNs for distribution through the routine system, building upon previous investments in this channel. PMI continues to partner with DfID to ensure that 100% of the ITN needs for distribution through the routine system are fully met.

Universal Coverage Mass Distribution: PMI procured 2.6 million nets to support the rolling mass campaign, which began in the first quarter of 2011. This distribution effort will roll out to the targeted districts in Western, Nyanza and Coast Provinces as the ITNs arrive in country, and is scheduled to conclude before the end of 2011. PMI is also supporting the campaign's logistic costs and will contribute to a post-campaign evaluation scheduled for the last quarter of 2011. PMI continues to promote increased use of ITNs distributed through both the universal coverage campaign as well as through the routine system, through national and community-based communication activities (discussed in detail in the BCC section).

In summary, as of the end of FY 2011, in support of both Universal Coverage policies as well as the routine system, PMI will have procured over 4 million ITNs and distributed approximately 3.5 million nets - the bulk of which will have gone out in the past year.

Proposed PMI Activities with FY 2012 Funding: (\$10,160,000)

1. *Procure ITNs for Routine Distribution:* Fill 50% of the ITN gap for routine distribution by purchasing 1.5 million ITNs to distribute free-of-charge to pregnant women and children under one through the ANC and child welfare clinics. (\$8,160,000)
2. *Logistics and Program Support for Routine Distribution:* Provide logistical support, including transportation and storage of nets, for distribution of the 1.5 million ITNs within the national routine distribution system. (\$1,500,000)
3. *Community-based ITN tracking and replacement distribution system:* Support the establishment of a community-based ITN tracking and replacement program to maintain the universal coverage levels achieved in 43 priority districts in the aftermath of the 2011 mass distribution campaign. This activity will identify ways to replace worn out nets, track ownership at the community level, and promote correct and consistent use over time through the existing community-based community health worker (CHW) network. First year start up activities include training CHWs, collecting baseline data, collecting and analyzing quarterly data, monitoring net replacement activities and evaluating results. Annual maintenance of this activity over time will be supported through the Global Fund Round 10 grant. (\$500,000)

Indoor Residual Spraying

Background

Through 2010, the DOMC's IRS program targeted sixteen highland, epidemic-prone districts in Western Kenya. As ITN coverage has expanded throughout Kenya, malaria prevalence has fallen sharply, particularly in those highland districts that had been targeted for IRS activities. The Global Fund (Round 4 malaria grant) and PMI funded IRS campaigns in the highland districts, with PMI providing concentrated technical assistance and capacity building.

With the 2009-2017 Kenya NMS, the DOMC has phased out IRS in the highland, epidemic-prone districts and begun to focus on endemic districts, particularly those bordering the highlands. According to the national strategy, IRS should be implemented for at least three years while ITNs are scaled up to achieve universal coverage, after which IRS may be phased out. Rachuonyo, a lowland district bordering these endemic districts had already been sprayed with PMI funds since 2008. Surveys showed a greater than 50% reduction in malaria and anemia prevalence 12 months after the initial round of IRS in Rachuonyo. Beginning in May of 2010, the PMI supported IRS program expanded to cover 10 lowland districts⁹ along Lake Victoria which border highland, epidemic-prone districts. These districts are located in areas with some of the highest *P. falciparum* prevalence rates in the country. While PMI is currently the only partner supporting IRS campaigns in these important lowland districts, DfID has very recently pledged £21m for four years to support further expansion of IRS campaigns to other areas around the lake.

With IRS efforts shifting away from the highlands, the DOMC has shifted to an epidemic surveillance and response system to detect rising cases of malaria and respond using a combination of targeted IRS and improved case management. The details of this are described in the section on Epidemic Surveillance and Response.

Progress to Date

The PMI IRS program in Kenya began in 2008. PMI spraying was done in conjunction with the Kenya DOMC which conducted IRS in focal areas in 16 highland districts. PMI assumed responsibility for spraying two highland districts aiming for complete coverage. In addition, PMI sprayed one lowland endemic district that bordered the highlands as an initial phase of plans to create a buffer between the lowland endemic districts and the highland epidemic districts where IRS was slated to be phased out. PMI sprayed the same three districts in 2009.

In the 2010 spray round, the DOMC assumed responsibility for IRS in all 16 districts in the highlands while PMI supported IRS in 10 lowland districts targeting an estimated 747,321 houses and 1,444,066 people. Spray operations for 2010 began in May and included one endemic district (now divided into two districts) that had been previously sprayed by PMI in 2008 and 2009, as well as eight additional endemic districts, resulting in a total of ten targeted districts under the new districting scheme. To date, all IRS in Kenya has been conducted using pyrethroid insecticides.

⁹ These ten endemic districts reflect the reorganized district structure. The geographic coverage of these ten new lowland endemic districts is the same as the three districts referenced in previous MOPs. With the new constitution, Kenya will be divided into counties which may not correspond to the current geographic target area. This may have some implications on the actual geographic and population targets for IRS in 2013.

The 2011 spray round was underway as of the writing of this operational plan. The start of the spray season was delayed until June due to the timing of the universal coverage ITN distribution campaign in the districts. The target population for 2011 is the same as that of 2010.

In addition, PMI and other donors provided support for surveillance and monitoring to document the effectiveness of IRS in areas with high ITN coverage. Entomological surveys showed high insecticide susceptibility of the major malaria vector in the targeted districts, and wall bioassays indicated the insecticide remained effective for at least eight months. In August 2009, twelve months after the first round of IRS and four months after the second round of IRS, malaria prevalence across all age groups in the lowland IRS district (Rachuonyo District) was approximately 67% lower than that observed in a neighboring, unsprayed district (Nyando District). In related work supported by the Malaria Transmission Consortium, an incidence cohort that was followed in the same two districts showed a 58% decline in the incidence of new infections. These declines were observed in the context of moderate net ownership and use—one year after the initial spray round, 46% of all people in Nyando District and 48% of all people in Rachuonyo district reported sleeping under an ITN the previous night.

While these initial surveys indicated a reduction in the incidence of parasitemia and the prevalence of parasitemia and anemia, more recent national data from the 2010 national MIS suggest that malaria prevalence in these areas remains high in spite of multiple interventions, including the scale up of ITNs. While IRS is expected to reduce malaria prevalence in the targeted districts, heightened surveillance is needed to monitor progress.

One factor that may influence the DOMC's IRS program is the emergence of insecticide resistance. Insecticide resistance monitoring has been conducted at eight sites in western Kenya. Moderate to high levels of DDT and pyrethroid resistance have been detected in *An. gambiae s.s.* in sites near the Uganda border. Observed resistance in this species has ranged from 38 to 67% for DDT, 72 to 84% for permethrin and 37 to 58% for deltamethrin. However, *An. gambiae* is currently rare or even absent in sites along the lake shore, including the districts where PMI has been conducting IRS operations. The predominant mosquito species in these areas is *An. arabiensis* and this species remains susceptible to all four classes of insecticides available for IRS. However, there is the threat of resistant populations of *An. gambiae s.s.* and *An. funestus* expanding to and rebounding in areas where they are currently under control. The most recent data from PMI monitoring indicates pyrethroid resistance levels within *An. arabiensis* of up to 15%; while this is below the critical threshold of 20% resistance, it suggests that pyrethroid insecticides may not be a viable option for IRS in 2012. Given the increased operational costs associated with using non-pyrethroid insecticides, this decision is likely to have significant impact on the geographic coverage and the total population protected by future IRS programs.

Proposed PMI Activities with FY 2012 Funding: (\$7,067,400)

With FY 2012 funding, PMI will spray up to ten endemic districts¹⁰ pending the choice of insecticide. PMI will also provide support to the DOMC to monitor disease trends in both highland

¹⁰ With the new constitution, Kenya will be divided into counties which may not correspond to the current geographic target area. This may have some implications on the actual geographic and population targets for IRS in 2013.

areas where IRS is being phased out and in lowland areas where IRS is being scaled up. Specific activities include:

1. *IRS implementation:* Support IRS in up to ten endemic districts (estimated to reach 747,321 houses) with a target of 85% coverage in all districts. This is approximately the same number of houses that PMI has sprayed in the last four years. Currently, the same districts will be targeted as were sprayed with FY2011 funds although the target may have to be revised downward if pyrethroid insecticides are not a viable option due to insecticide resistance (\$6,850,000);
2. *Epidemiological surveillance:* Support epidemiological surveillance and monitoring from 40 sites in endemic IRS districts to provide information that the DOMC can use to make decisions on the best strategy for IRS. The surveillance will include disease burden monitoring (for which the methodology will be determined in subsequent discussions with the PMI/Kenya and PMI/M&E teams). This activity will be designed to monitor malaria burden over time and to provide the DOMC with data that will guide the scale down of IRS in the wake of universal ITN coverage. (*This activity is budgeted under the M&E section*)
3. *Insecticide resistance monitoring:* Given the expansion of IRS in lowland areas of western Kenya and the detection of low levels of insecticide resistance in border areas near Uganda, PMI will continue entomologic and insecticide resistance monitoring in eight sites in western Kenya. With additional funding through the DOMC, the number of sites will be expanded to over 40 for 2012 to assist with planning of IRS operations for the future. (\$180,000);
4. *Conduct environmental monitoring assessment:* Conduct the required bi-annual, independent environmental monitoring evaluation of the PMI IRS program. (\$25,000);
5. *Technical assistance:* Support one visit from Centers for Disease Control and Prevention (CDC) to provide technical assistance in the entomological monitoring of IRS activities (\$12,400).

Malaria in Pregnancy

Background

Kenya's malaria in pregnancy (MIP) program is based on a close working relationship between the Division of Reproductive Health and the DOMC. The Division of Reproductive Health manages program implementation, while the DOMC is responsible for technical oversight. Prevention of MIP is an integral component of the focused antenatal care (FANC) approach in Kenya. The 2008-2009 DHS showed that 92% of women in Kenya receive antenatal care from a medical professional during pregnancy; however, only 15% of women obtain care in the first trimester and only 52% before the sixth month of pregnancy. Overall, only 47% of pregnant women make four or more antenatal visits during pregnancy, with the median gestational age at first visit being 5.7 months. While ANC visits provide an opportunity for administration of IPTp doses, other approaches will be necessary to increase the uptake of IPTp.

The proportion of pregnant women receiving two or more doses of SP for intermittent preventive treatment of malaria in pregnancy increased from 13% in 2007 to 25% in 2010. In 2009, with PMI support, the DOMC began to clarify IPTp guidelines and provide supportive supervision for delivery of this intervention by health workers.

The first-line treatment for malaria in pregnancy is oral quinine in the first trimester of pregnancy and AL or oral quinine in the second and third trimesters. The DOMC recommends diagnosis by blood smear. It also recommends that pregnant women receive ferrous sulfate (200mcg) and folic acid (5mg) at their second and third ANC visits, and that signs and symptoms of anemia are evaluated during their first and fourth ANC visits.

The recently revised National Guidelines for the Diagnosis, Treatment and Prevention of Malaria in Kenya (May 2010) emphasize the integration of MIP in the overall antenatal care package for maternal health that includes IPTp, ITNs, prompt diagnosis and treatment of fever due to malaria, and health education.

IPTp with SP has been a policy in Kenya since 1998. According to the national guidelines:

- IPTp is recommended in areas of high malaria transmission
- IPTp should be administered with each scheduled visit after quickening to ensure that women receive a minimum of two doses of SP
- IPTp should be given at an interval of at least four weeks
- IPTp should be given under directly observed therapy
- Folic acid tablets should only be administered 14 days following the administration of IPTp

Although the 2009-2017 NMS has a 2013 target of 80% of people living in malaria risk areas using appropriate malaria prevention interventions – including IPTp among pregnant women– the uptake of IPTp in Kenya has remained low. The 2007 MIS national results showed that only 25% of women received IPTp1 and 13% received IPTp2, while the 2008-2009 DHS data showed that 36% of women received at least one dose of IPTp and 14% received at least two doses. The proportion of women receiving two doses of IPTp increased to 25% in 2010 (MIS, 2010).

In 2008 and 2009, PMI supported the DOMC in a pilot to distribute simplified policy guidelines on MIP to health workers in three malaria endemic districts to improve the uptake of IPTp. The process involved orientation of members of the District Health Management Teams on the IPTp guidelines with an emphasis on administering IPTp during each ANC visit after quickening unless SP had been taken in the prior four weeks. During supervisory visits to ANC facilities, ANC staff were observed assessing patients and were provided feedback.

A significant increase in IPTp uptake was observed in those areas where the simplified guidelines were disseminated. In three divisions within Nyanza Province, pregnant women receiving one dose of IPTp increased from 48% to 76% (Asembo division), from 44% to 67% (Gem division) and from 39% to 66% (Karemo division). In the same areas, 48%, 44%, and 39% of pregnant women, respectively, received two doses of SP (Ouma P, Calhoun, L, 2010). This PMI-supported study also showed that SP was available in over 80% of the health facilities. Based on these results, the DOMC with the support of PMI has developed and is currently rolling out the dissemination of the simplified MIP guidelines to all 67 malaria endemic districts in the country.

The dissemination of simplified messaging and guidelines focuses on service providers in MCH clinics and the sensitization of community health workers (CHWs) on prevention of malaria in pregnancy - especially the importance of IPTp. With this support, it is estimated that 5,456 service providers will be oriented on the guidelines/policy and provided with simplified messaging on IPTp and 3,480 CHWs sensitized. The target is sensitization in 67 districts (this includes newly created districts which numbered 55). The CHWs will be expected to reach all women of reproductive age with appropriate information on prevention of malaria in pregnancy and MCH service providers will ensure that eligible women attending ANC receive IPTp.

In areas with stable moderate to high malaria transmission, the main strategies for controlling malaria in pregnancy are ITNs and IPTp. However, the progress made in the last decade is now under threat from increasing resistance of the parasite to SP, the only antimalarial currently recommended for IPTp. There is now evidence from Malawi, Tanzania and Zambia suggesting that SP resistance could be adversely affecting IPTp efficacy. In addition, western Kenya has moderate to high levels of SP resistance, experiencing a dramatic increase in dihydrofolate reductase (*dhfr*) and dihydropteroate synthase (*dhps*) quintuple mutations that confer clinically relevant levels of parasite resistance among pregnant women, from 7% in 1997 to 89% in 2009 (Ya Ping Shi, unpublished data). This has implications for the current policy of using SP for IPTp in endemic areas including Western Province.

With the increased availability of malaria RDTs, and the observed reductions in malaria transmission in many parts of Kenya, screening for infection is becoming a key feature of malaria control in pregnancy. In the context of increased SP resistance and decreasing transmission, intermittent screening and treatment in pregnancy (ISTp) provides a potential alternative strategy that is increasingly being considered for women protected by ITNs. ISTp consists of scheduled screening using a malaria RDT three or four times during pregnancy as part of FANC, and treating RDT-positive women with a long-acting ACT for symptomatic malaria in the 2nd and 3rd trimesters. There is already some evidence from a single trial in Ghana, conducted in an area that had low levels of SP resistance, that ISTp may be as effective as IPTp-SP as a future strategy for areas with low or markedly reduced levels of transmission.

Progress to Date

In 2008 and 2009 PMI procured a total of 840,000 SP treatments for IPTp. During the same period, an estimated 7,000 CHWs were trained on FANC/MIP in Nyanza and Western provinces. An estimated 39,498 women in 12 districts in Nyanza and Western provinces were reached with information on the prevention and treatment of malaria through community Behavior Change Communication (BCC) activities. In 2009/2010, through one of PMI's implementing partners, an estimated 12,636 women were reached directly or indirectly with messages on prevention of malaria in pregnancy in target districts in Nyanza, Western and parts of Rift Valley. PMI continues to support information, education and communication (IEC)/BCC at the community level for prevention of malaria in pregnancy. PMI support also ensures strengthened monitoring of MIP, including ensuring improved reporting.

PMI has also supported a review of the pre-service curriculum to include IPTp as an essential part of all pre-service training targeting clinicians and nurses. To date, the clinical officers training

curriculum at the Kenya Medical Training College and the Kenya Methodist University has been updated and the process initiated to update the nurses and laboratory technologists' curriculum. This has been accompanied with sensitization of tutors to improve their knowledge on MIP. The updated curricula will ensure that MIP is an integral part of pre-service training, thus reducing the need to update health practitioners on MIP through in-service training, as is currently the practice.

PMI supported the production of 3,000 simplified guidelines (with simplified messages) on FANC/MIP and their distribution in endemic districts. As discussed above, this three-pronged approach of 1) dissemination and orientation on the new guidelines, 2) emphasis on ensuring availability of SP, and 3) BCC activities, has had an impact on improving the uptake of IPTp2 in target divisions in Nyanza Province. With the completion of this successful pilot, the simplified messages and guidelines will be rolled out in 2011 to all districts in Western, Nyanza and Coast provinces in line with the national strategy of targeting IPTp in endemic areas.

Proposed PMI activities with FY 2012 Funding: (\$600,000)

PMI will support the following activities:

1. *IPTp supportive supervision in target endemic districts:* Building on PMI's efforts to roll out the simplified IPTp guidelines in 67 target malaria endemic districts and supportive supervision activities in FY2011, PMI will continue to fund supportive supervision for the trained MCH service providers and CHWs who will have been sensitized on the simplified messaging on IPTp. An estimated 8,936 MCH service providers and CHWs will be supervised to consolidate gains that will have been achieved through the more intensive FY2010 and FY2011 investments. The supervision will focus on reinforcing provider skills to improve IPTp2 uptake. (\$450,000)
2. *Intermittent screening and treatment in pregnancy pilot:* Support a research study on intermittent screening and treating of pregnant women in selected areas in Nyanza Province to facilitate the DOMC maintaining a robust MIP policy in a context of increasing SP resistance. The information generated through this pilot will be instrumental in influencing national policy on the prevention of malaria in pregnancy. (\$150,000)
3. *Malaria in pregnancy monitoring and evaluation:* Support monitoring and evaluation of IPTp2 uptake in targeted endemic districts by the DHMTs and DOMC with technical support from KEMRI/CDC and implementing partners. This will include specific monitoring of the supportive supervision activity such as the quality of supervision provided and health provider perceptions and practice. At the end of the intervention, an evaluation will be undertaken to determine the uptake of IPTp2 among pregnant women. This will provide programmatic information to the DOMC to guide continued implementation of IPTp. (*This activity is budgeted under the Me&E section*)
4. *Behavior change for malaria in pregnancy:* Support targeted community BCC and social mobilization to increase demand for and uptake of IPTp. (*This activity is budgeted under the BCC section*)

CASE MANAGEMENT

As part of the overall effort to achieve malaria elimination in Kenya, a key objective of the 2009-2017 NMS is to scale-up and sustain access to prompt and effective treatment to at least 80% of the population by 2013 and maintain this through 2015. In support of this objective, there is a national commitment to ensure that ACTs are accessible at all public health care levels, including through community health workers, and in the private sector through subsidy schemes. As the intervention programs are scaled up, there will be an increased need for emphasis on laboratory diagnosis for all age groups presenting with clinical symptoms of malaria at all levels of the health system, except at the community level, and in all epidemiological zones.

Malaria Diagnosis

Background

Following adoption of a laboratory diagnosis-based malaria treatment policy, the DOMC has produced a third revision of the National Guidelines for Diagnosis, Treatment, and Prevention of Malaria in Kenya (MOH, 2010). Although the new guidelines recommend that the diagnosis of malaria in public health facilities should be based on the detection of parasites in the blood, it stresses that under no circumstances should a patient with suspected malaria be denied treatment, nor should treatment be delayed for lack of a parasitological diagnosis. It also encourages clinicians to confirm malaria even after presumptive treatment has been administered.

Ensuring that all public health facilities have the ability to undertake parasitological diagnosis is proving to be a huge undertaking for the DOMC. The DOMC's RDT implementation plan calls for RDTs to be used as the primary method of malaria diagnosis at dispensaries and health centres. While microscopy remains the gold standard for diagnosis at sub-district, district, provincial and national referral hospitals, the DOMC plans to procure and distribute RDTs for use in these same facilities, when microscopy is not feasible. However, RDTs will not be provided to CHWs at the community level until 2013, by which time the DOMC anticipates that dispensaries and health centres will be stocking and properly using RDTs and will function not only as a referral center for CHWs at community level but also be able to properly supervise malaria diagnosis by CHWs. Until 2013 therefore, CHWs will continue to stock and provide ACTs to patients presumptively.

Since 2006, case management trainings targeting clinicians and laboratory staff have incorporated a module on RDT use, but only epidemic-prone districts have been supplied with RDTs. To support the use of RDTs, beginning in 2011, the DOMC intends to procure and distribute RDTs on a national scale. It is assumed that there will be 43.5 million fever cases presenting in 2011 that will require a diagnostic test. The country's target for diagnostic coverage in 2011 is 25% (all through health facilities) with 5% being RDTs (approximately 2.2 million RDTs). By 2013, when funds from the FY 2012 MOP will be available, diagnostic coverage will be 55%, with 30% coming from RDTs (approximately 11.5 million). This assumes that in 2013, total number of fever cases expected will be approximately 42.7million¹¹ and therefore total RDTs needed in the public sector would be about 11.5 million. The Global Fund Round 10 grant will fund an estimated 10 million RDTs, leaving,

¹¹ It is estimated that fever cases account for 60% of OPD attendance at health facilities. Of the fever cases, 50% are diagnosed (largely clinically) as having malaria [HMIS 2008]

therefore, a gap of 1.5 million RDTs. While rolling out RDTs in a phased manner, the DOMC will continue to support microscopy services by strengthening microscopy capabilities and producing and disseminating appropriate job aids and standard operating procedures.

As the DOMC strengthens malaria diagnosis at community and health facility levels, it is putting in place a malaria reference laboratory to coordinate laboratory-based parasitological and entomological testing at national and sub-national levels. Through this reference laboratory, the DOMC will support all malaria intervention areas, including case management and malaria in pregnancy, vector control, epidemic preparedness and response, and surveillance, monitoring, evaluation and operational research. Support for this laboratory comes from the GOK and malaria stakeholders.

Progress to Date

PMI support for malaria diagnosis in Kenya is in line with DOMC priorities. Initially, the DOMC's focus was to increase the availability of microscopes and the quality of microscopy. With the adoption of RDTs in Kenya, PMI support has shifted towards ensuring correct use of RDTs in low-risk malaria areas, as well as providing RDTs for surveillance in low-risk, seasonal transmission and endemic districts in Coast Province which are currently demonstrating low parasite prevalence rates.

In 2009, a joint PMI-DOMC assessment of PMI-funded laboratory capacity building activities performed in 2008 identified the following gaps in the attainment of proficient malaria diagnosis nationwide:

- Laboratories lack standard operating procedures and refresher trainings.
- Major malaria diagnostic commodities and microscopes were in short supply.
- There is a shortage of laboratory staff, especially at the health center level, as well as supervisory support visits.
- Laboratory rooms are poorly designed and are too small in many health facilities.
- Few facilities were performing malaria parasite identification and density determination, and less than 10% of facilities had quality assurance procedures.

To address these gaps, PMI has procured a total of 280 microscopes. Eighty have been distributed to priority facilities in malaria endemic and epidemic-prone districts. The second procurement of 200 microscopes was received in Kenya in May 2011, and will be distributed by the end of 2011. To further improve the quality of malaria diagnosis, PMI and its implementing partners are currently working with the DOMC and Office of the Chief Medical Technologist to implement a quality assurance/quality control (QA/QC) system for the laboratory diagnosis of malaria. A major component of this system is the provision of supportive supervision and on-the-job training of health facility laboratory and clinical staff. A total of 562 laboratory technicians have been trained to date, and PMI will train another 120 individuals by the end of 2011. Supervisors, some of whom are drawn from the pool trained by PMI in 2008, are equipped to undertake supervisory visits and while in the field, assess staff capabilities, provide on-site remedial action, conduct internal and external quality assurance of malaria smear preparation and reading, and ensure quality control of reagents and equipment.

In January 2010, PMI supported two DOMC staff to attend the World Health Organization (WHO) accredited course on microscopy in Kenya. The two officers are being utilized as part of the

national-level training team supporting outreach supervision as part of QA/QC and will also support the operation of the malaria reference laboratory. The QA/QC system utilizes existing microscopy capacity at district, provincial and national level for supportive supervision of hospitals, health centers and dispensaries and on-the-job or outreach training (as necessary). The shortage of laboratory staff remains a concern, and the Ministry of Health continues to meet staffing needs through task shifting. As PMI implements the QA/QC system, it will validate quantification of staff needs alongside quality improvements.

Until sufficient funds are available through the Global Fund for nationwide RDT roll out and use, PMI will continue to support a targeted RDT roll out in priority areas. During 2011, PMI will distribute 547,800 RDTs to public health facilities. Of the RDTs distributed, 110,600 will serve selected facilities in epidemic-prone districts with 437,200 RDTs distributed for use in all level 2-3 facilities (which include dispensaries, health centers and maternity/nursing homes) in five selected districts in all four epidemiologic zones. It is anticipated that over the next 12 months, PMI will procure an additional 1.5 million RDTs to serve primarily facilities in high malaria endemic zones. In addition, PMI will support the training and supervision of laboratory and clinical staff in the correct use of RDTs. PMI and the DOMC will monitor the RDT roll-out process and gain experience that will be used to guide interventions aimed at improving health worker adherence to RDT results. In 2011, PMI assisted in the review of national laboratory policy guidelines and drafted job aids for RDTs and microscopy. Both documents will be printed and disseminated with PMI support.

Proposed PMI Activities with FY 2012 Funding: (\$2,512,400)

PMI will support the following malaria diagnostic activities:

1. *Procurement of RDTs:* In support of DOMC's RDT scale-up plan, procure and distribute 1.5 million RDTs to dispensaries and health centers in malaria endemic areas as needed. This will be done in coordination with other partner contributions. The main funding partner, the Global Fund, will provide approximately 54 million RDTs for use in low-risk and seasonal transmission areas between 2011 and 2016, which leaves a gap in endemic areas where significant malaria control investments are being made. (\$1,500,000)
2. *Procurement of microscopes and supplies to support malaria diagnostics:* Support increased diagnostic capacity of trained laboratory technicians with necessary equipment and reagents by procuring 100 microscopes, reagents and consumables to support malaria diagnostics. This number of microscopes is based on quantification of need, and in recognition that the Global Fund Round 10 application does not have a provision to procure additional microscopes over the next five years. (\$300,000)
3. *Implementation Support for RDT Rollout:* Provide funding for supportive supervision, refresher training, and monitoring of implementation, including implementation of the QA/QC system, to ensure adherence to the DOMC's new RDT policy guidelines. PMI will work with the DOMC to provide technical assistance building on the experience gathered through the roll-out of RDTs funded by previous PMI annual budgets. The QA/QC system utilizes existing microscopy capacity at district, provincial and national level to provide support and supervision of hospitals, health centers, and dispensaries with on-the-job or outreach training (as necessary). (\$400,000)

4. *Capacity Building and Strengthening Microscopy:* Strengthen capacity for malaria microscopy through supportive supervision and on-the-job training at national, provincial, district and health facility levels in collaboration with the Ministry of Medical Services and DOMC. With the establishment of the malaria laboratory QA/QC system, it will validate the personnel that are needed to ensure appropriate implementation of the system. The DOMC coordinates all its diagnostic partners to ensure that there is no duplication of effort and interventions are in line with the national strategy. PMI support will be managed within this overall coordination arrangement. (\$300,000)
5. *Technical Assistance:* Support one CDC TDY to provide technical assistance for malaria diagnostics. (\$12,400)

Malaria Treatment and Pharmaceutical Management

Background

Kenya began dispensing artemether-lumefantrine (AL) as its first-line treatment for uncomplicated malaria in 2006. Aside from emphasizing the adoption of a diagnosis-based malaria treatment policy, the third edition of the National Guidelines for Diagnosis, Treatment, and Prevention of Malaria in Kenya (MOH 2010) calls attention to the following changes from previous editions:

1. Introduction of the dispersible formulation of AL and guidance on its use in children < 24 kgs.
2. Introduction of a second ACT, dihydroartemisinin-piperaquine (DHA-PPQ), as the second-line treatment of uncomplicated malaria in all age groups.
3. Confirmation of continued efficacy of SP for intermittent preventive treatment in pregnancy and restriction of its use in ANC clinics to the targeted 67 highly malaria endemic districts.
4. Authorization of the use of ACTs at the community level for effective malaria case management.

With support from the Global Fund Round 4 grant, PMI, and DfID, the DOMC has been able to provide training on the malaria treatment guidelines to approximately 20,000 health workers. In addition, to date approximately 70 million AL treatments have been procured with ongoing distribution to all public health facilities, using funds from the Global Fund since 2006 and PMI since 2008.

The DOMC has prioritized efforts to ensure accurate quantification of AL and other antimalarial drugs, evidence-based planning and appropriate distribution of AL stocks among facilities, good inventory management to avoid wastage of drugs through leakage and expiry, supervision/monitoring of availability of antimalarials, and information sharing through a logistics management information system. National stockouts, due primarily to slow procurement and delivery processes, have made ensuring an uninterrupted supply of AL to public health facilities a challenge over the past two years.

The DOMC has received support from WHO and PMI to establish and maintain a post-marketing surveillance system and undertake pharmacovigilance. The post-market surveillance system is being implemented by the Pharmacy and Poisons Board and its National Quality Control Laboratory, and is facilitating strengthened surveillance and removal of antimalarials of poor quality that might be entering the market. Voluntary reporting of adverse drug reactions to antimalarials is also being undertaken by the Pharmacy and Poisons Board following the roll out of pharmacovigilance guidelines and reporting tools and the sensitization of health workers. In order to continuously monitor the efficacy of current antimalarials and to replace them if needed, the DOMC has established sites to undertake *in vivo* drug efficacy monitoring to test the sensitivity of AL and examine efficacy of new ACTs such as DHA-PPQ.

The DOMC is now ready to scale up appropriate malaria treatment in the private sector and at the community level. In June 2010, the DOMC began implementing the AMFm, a two-year pilot program designed to expand access to affordable ACTs through the public, private, and non-governmental organization (NGO) supply chains by providing ACTs at a unit cost of US\$0.05, in comparison to the current average costs of \$0.24, \$0.46, \$0.60 and \$0.91 for the four AL weight bands. Under this pilot, approximately 24 million treatments will be procured and distributed through public sector facilities, of which an estimated 1.1 million treatments will be allocated for distribution to the community. There is the expectation that five currently registered private sector suppliers of ACTs will access AL at the same cost of \$0.05 and distribute them through private hospitals, clinics, pharmacies and retailers. It is worth noting that the design of AMFm did not take into account the need for diagnostics. The DOMC's attempt to scale up the use of diagnostics is initially targeted to the public sector with planned extension into the community. There is currently no DOMC strategy for use of diagnostics in private pharmacies or in medicine retail outlets. When a public health facility has no public sector ACTs in stock, it issues prescriptions to patients to access AMFm ACTs from nearby private pharmacies and retail outlets. Currently, the private pharmacies and retail outlets require neither a prescription nor the results of a malaria diagnostic test to dispense ACTs. The host grant for Kenya's application is the Global Fund Round 4 grant; however, AMFm will be implemented through June 2012, while other support through the Global Fund Round 4 grant ends in July 2011.

Although the proportion of children with fever in Kenya who received prompt treatment with an ACT, as measured in the MIS, improved from 4% in 2007 to 11% in 2010, there is substantial room for improvement. The DOMC plans to implement community case management of malaria (CCM) in Western and Nyanza Provinces by integrating with the country's Community Strategy (MOH, 2006). Using Global Fund Round 4 funds (through the AMFm program), the DOMC has undertaken CCM preparatory activities in 2011 including procurement of ACTs and holding of community education meetings to increase awareness, compliance and provision of prompt treatment. Planned activities for 2012 include development of CCM guidelines and training of 2,000 CHWs to bring health services closer to the population.

Progress to Date

Pharmaceutical Management

To date, substantial progress has been made in the area of pharmaceutical management in Kenya with PMI support. PMI has helped maintain ACT stock levels to complement to the Global Fund

ACT procurements and to strengthen the supply chain to ensure an uninterrupted supply of ACTs to all public health facilities. PMI has procured large quantities of AL both on a planned and emergency basis, which has alleviated stockouts at the facility level. By the end of 2011, PMI will have procured over 23 million treatments of AL to Kenya and distributed 19 million to nearly 5,000 health facilities nationwide. Despite many efforts to resolve multiple issues in the procurement process, the Global Fund scheduled deliveries of AL continue to be delayed and national stock levels of AL often fall below optimal levels of 6-9 months of stock. PMI remains committed to ensuring that AL stockouts in Kenya do not occur. In addition to providing emergency stocks of AL, PMI worked with the DOMC, KEMSA and the Global Fund Principal Recipient to develop a supplier performance monitoring indicator to be included in future contracts.

PMI support for pharmaceutical management, including assistance with ACT quantification and distribution, supply chain strengthening, drug quality monitoring and case management supervision, has focused on health facilities, but has also helped in the DOMC's planned roll out of CCM to Western and Nyanza Provinces.

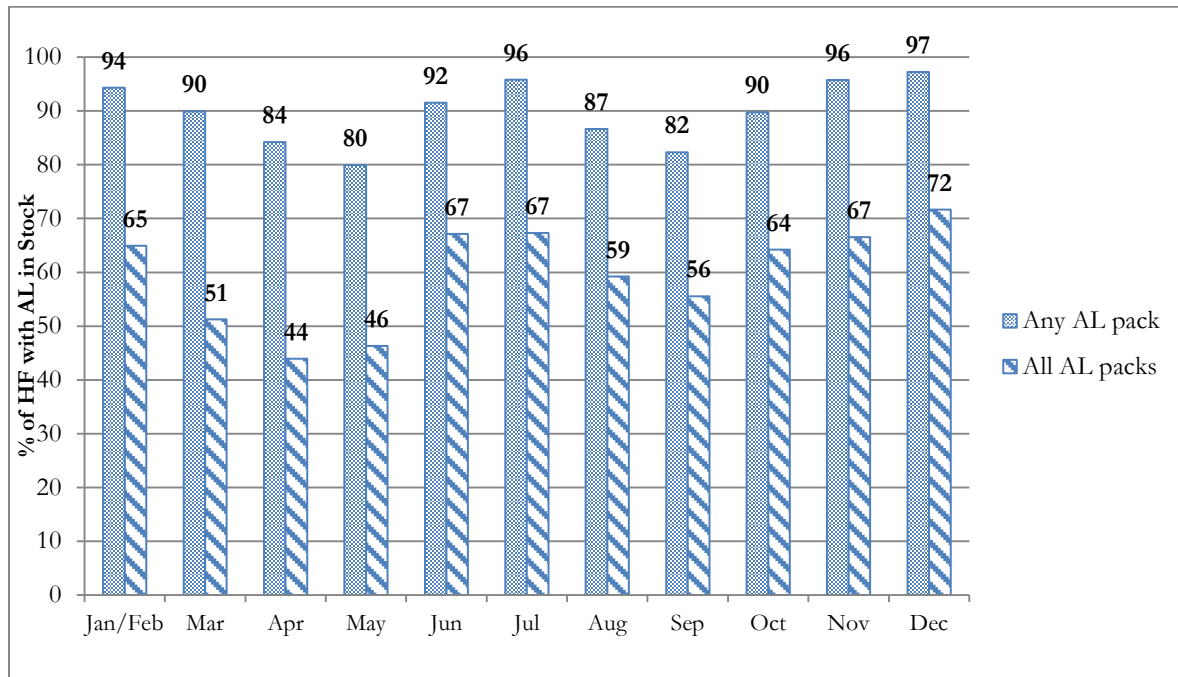
Another major accomplishment is the implementation of the malaria commodity logistics management information system (LMIS). This system monitors availability of antimalarials and their respective consumption rates and was rolled out with PMI support in 2008 in response to a Global Fund requirement. This LMIS is fully operational in all districts in Kenya. Currently, an average of 52% of facilities expected to provide reports on LMIS indicators do so each month. This is an improvement from 11% of these facilities reporting when PMI began supporting this activity in June 2008. PMI sponsors monthly drug supply management sub-committee meetings to plan and monitor the stock situation for antimalarials.

Careful analysis of the LMIS stock and consumption data coupled with epidemiologic data has led to AL distribution being rationed throughout the country: the DOMC and the Kenya Medical Supplies Agency (KEMSA), the parastatal entity charged with the procurement, warehousing and distribution of public health commodities, have limited AL distribution in areas of low prevalence while increasing the availability and heightening the monitoring of ACT consumption in high prevalence areas. These efforts have improved the availability of AL to more accurately match demand at the facility level, particularly in highly endemic areas.

PMI has also supported two end-use verification facility surveys which assessed the availability of malaria commodities at the end-user level, as well as provided a snapshot of how malaria was being diagnosed and treated at a sample of health facilities. In order for the end-use surveys to accurately guide the detection and correction of issues surrounding programmatic implementation, the DOMC requested that it be merged with a quality of care survey conducted by the Kenya Medical Research Institute (KEMRI)/Wellcome Trust. By integrating these two surveys the DOMC is able to integrate the data and use the findings to make improvements to case management. The coordination of DOMC, Wellcome Trust and PMI on this effort has allowed the previously pilot-scale quality of care survey to become a nationally representative survey. PMI has contributed to this effort by providing: technical assistance for the protocol development, with particular focus on the drug management component; support to train research assistants on drug management component data collection; logistical and financial support for data management; support for supervision of field work by the DOMC; and support for report writing, printing and dissemination.

Findings from two rounds of national quality of care surveys revealed an undulating trend of availability during 2010 which is likely related to drug distribution cycles. Figure 4 documents that in 2010, the availability of at least one AL pack at the 174 health facilities surveyed varied between 79.9% and 97.2% of facilities while availability of all four AL packs varied between 41.1% and 71.6% of facilities.

Figure 4: 2010 Monthly Trend of Non-Expired AL in Kenyan Health Facilities



PMI is supporting annual national quantification exercises to ensure that the AL requirements are being properly forecasted. The latest quantification exercise conducted in June 2011 determined AL stock requirements for July 2011 - June 2012. Extrapolation of the quantification requirements and a stock situation analysis undertaken during MOP planning calculated the country requirements through September 2013. While Table 4, below, confirms that the Global Fund Round 10 is scheduled to cover 100% of the anticipated ACT needs for the public sector facilities, this analysis does not include the buffer stock considered essential to ensure that national stockouts do not occur when stock management and drug procurement schedules are delayed.

TABLE 4—Quantification of ACT need through September 2013

	Number of Treatments
Average Public Sector Monthly Consumption of ACTs	1,400,000
Projected Need October 2010—September 2011 (12 months)	16,800,000
Projected Need October 2011—September 2012 (12 months)	16,700,000
Projected Need October 2012—September 2013 (12 months)	16,700,000
<i>Sources of Funding for October 2012 – September 2013:</i>	
Global Fund Grant, Round 10	15,600,000
PMI ACT contribution for Oct 2012 – Sept 2013 period	6,000,000
<i>Remaining projected gap from October 2012 through September 2013^A</i>	(4,900,000)
NOTES:	
A. PMI ACTs will help fill the supply pipeline and ensure the availability of a 6 month buffer stock to alleviate potential stockouts due to delays in delivery of Global Fund-funded ACTs.	

Over the next 12 months, PMI will considerably scale up the post-market surveillance system that was established in October 2009. This system is allowing Kenya to routinely provide evidence-based data on antimalarial quality and present data to policy makers for appropriate action and enforcement of medicine quality. PMI will also provide continued support for the implementation of pharmacovigilance, as it has been doing since 2008. In addition, in 2010 and 2011 PMI conducted *in-vivo* drug efficacy testing in two selected sites in Western Kenya, and will continue to support drug efficacy monitoring. This support will allow evaluation of the efficacy of two ACTs, AL and DHA-PPQ, following standard WHO protocol, by determining cure-rates on day 14 and 28 in children aged 6 - 59 months with uncomplicated *P. falciparum* malaria. Results of *in vivo* testing will assist in validating the choice of ACT combination.

Training and Supervision

In 2011, PMI will fund the strengthening of supportive supervision and on-the-job training of health workers. This will be achieved through operationalization of an integrated malaria supervision plan at provincial and district level. Through this support it is anticipated that over the next 12 months PMI will have helped improve the quality of malaria case management by health facility staff in Western and Nyanza Provinces. This is expected to result in high coverage of prompt and effective treatment in the most malaria endemic provinces.

Proposed PMI Activities with FY 2012 Funding: (\$7,425,000)

PMI will undertake the following activities in support of malaria treatment:

1. *AL procurement:* Procure and distribute up to 6 million AL treatments and severe malaria drugs, as needed, to fill in supply gaps in the public sector through September 2013. If the roll-out of community-based treatment is successful during 2011, PMI will provide some of these treatments for the support of this effort in the home-based management of malaria in targeted malaria endemic districts (\$6,025,000);

2. *Strengthen KEMSA in supply chain management:* As the national supplier of medicines, including AL to the public sector health facilities in Kenya, PMI will support KEMSA to strengthen supply chain management, warehousing, and financial management and information systems at the national level. PMI will also provide support to transition the sole management and ownership of the malaria LMIS to KEMSA. The LMIS is currently co-managed through PMI's technical assistance partner, KEMSA and the DOMC. (\$250,000)
3. *Pharmaceutical management strengthening:* This activity will target lower levels of the antimalarial supply chain from district to facility level in the highly endemic districts and will include the following (\$350,000):
 - heightened monitoring of AL and SP availability
 - improving LMIS reporting rates
 - end-use verification/monitoring of availability of key antimalarial commodities at the facility level
 - technical and financial support to the DOMC, Division of Pharmacy and district pharmacists to ensure effective quantification of drug needs, procurement, distribution and supervision of stock monitoring, on-the-job training and collection of antimalarial drug consumption data gathering.
4. *Drug quality monitoring:* Strengthen antimalarial drug quality monitoring through the provision of technical, strategic and operational support to the Pharmacy and Poisons Board and DOMC. This activity will support improved quality assurance of antimalarials. (\$200,000)
5. *Case management supervision:* Support the DOMC to strengthen malaria supervision and on-the-job training for case management at all levels of the public health care system. (\$600,000)
6. *End-use verification:* Monitor quality of care for malaria case management and the LMIS to assess stockouts through the semi-annual end use verification tool survey. (*This activity is budgeted under the M&E section*)
7. *In vivo drug efficacy monitoring:* Support drug efficacy monitoring, using standard WHO protocol, at two sites in western Kenya (*This activity is budgeted under the M&E section*)

EPIDEMIC SURVEILLANCE AND RESPONSE

Background

Of the 16 epidemic-prone areas in Kenya (currently divided into 39 districts under the new organizational structure), three are in Nyanza Province, eleven are in Rift Valley Province and two in Western Province. Four other seasonal transmission districts in the North Eastern Province experience epidemics, usually associated with heavy rains and flooding. The total population of these districts is 6.5 million. Historically, Kenya relied primarily on case management for the control of epidemics, but, over the last several years, the DOMC has been implementing preventive measures in these districts with the help of various partners.

Indoor residual spraying in the 16 epidemic-prone areas was started in 2006, supported through the Global Fund Round 4 grant. In 2008 and 2009, PMI supported IRS in two of these areas. These

two areas and the 14 other epidemic-prone areas in the DOMC IRS program were sprayed for the last time in 2010 as the IRS program in Kenya moved to endemic districts. However malaria surveillance continues in the epidemic-prone districts as part of overall integrated disease surveillance and focalized epidemic responses. Malaria rates have fallen in the North Eastern districts as ITN coverage has increased, which has raised concern about an increased risk for epidemics in these districts. As Kenya now refocuses its IRS program on endemic districts, and addresses the consequences of decreasing malaria in seasonal districts, the DOMC has refined its surveillance, epidemic preparedness and response program.

Progress to Date

The malaria surveillance and response system for the 39 epidemic-prone districts, managed by the Division of Disease Surveillance and Response (DDSR), is an important part of Kenya's 2009-2017 M&E plan. Epidemic thresholds for malaria have been set for four to six sentinel facilities in each of these districts. PMI has supported the DOMC and the DDSR in PMI-supported districts to establish these thresholds and to make use of locally-collected data for planning. Health centers submit data to districts on a weekly basis, and districts then transmit the data to provincial and national level by text message. Data is reviewed at the district level and case counts above preset thresholds are investigated by the district health officer. The district officer works with DDSR and DOMC to validate the data and in the event that there is a pocket of increased cases, the DOMC works with KEMSA/district health facilities to treat cases. There have been many investigations to date.

Proposed PMI activities with FY 2012 Funding: (\$200,000)

During Year 5, PMI will support the government to strengthen its malaria surveillance and epidemic preparedness and response capacity through the integrated disease surveillance system within districts previously targeted for IRS spraying. Specifically, PMI will support the following activities in Year 5:

1. *Implementation of surveillance, epidemic preparedness and response:* The DOMC, working with the DDSR, will lead the implementation of the Epidemic Preparedness and Response plan for the epidemic-prone and seasonal districts, including improving malaria surveillance, updating and refining the national epidemic response plan as needed, supporting the mapping of epidemic-prone areas, identification and training of health care workers in health facilities on epidemic preparedness and responses and generally enhance their capacity on malaria surveillance. Specific targets will be included in the activity work plan and will include measures of the number of district health officers trained in epidemic response as well as timeliness and completeness of district reports. The malaria surveillance and response system for the epidemic-prone districts is managed by the DDSR. Epidemic thresholds for malaria have been set for four to six sentinel facilities in each of these 39 districts. Health centers submit data to districts on a weekly basis, and districts then transmit the data to provincial and national level by text message. Data is reviewed at the district level and case counts above preset thresholds are investigated by the district health officer, who works with DDSR and DOMC to validate the data. When pockets of increased cases are detected, the DOMC works with KEMSA/district health facilities to treat cases. *(This activity is budgeted under the M&E section)*

2. *Establishing epidemic preparedness stockpile:* In addition to maximizing ITN ownership and use in epidemic-prone districts through support of routine and mass ITN distribution described in the ITN section, PMI will support the procurement of supplies for epidemic response stockpiles in the epidemic-prone districts, including RDTs for diagnostics and ACTs and severe malaria medicines for large-scale treatment, if needed. Supplies will be held centrally and the supplies not used for epidemic response will be recycled through routine distribution channels to avoid expiry. (\$200,000)

BEHAVIOR CHANGE COMMUNICATION

Background

The NMS (2009-2017) aims to ensure that by 2014, 80% of the population in malaria endemic regions has knowledge on the prevention and treatment of malaria. However, evidence from surveys and research indicates that uptake of these interventions is still below the national, Roll Back Malaria and PMI targets. ITN use by children under five and pregnant women is still below 50%, however IPTp2 uptake has increased from 14% to 25% and only 11% of children under five received prompt management of fever within twenty four hours. The DOMC working with partners and other stakeholders needs to engage more with communities by assisting them to develop communication strategies that use specific, targeted messages and a variety of approaches to enable people to initiate and sustain healthy behaviors.

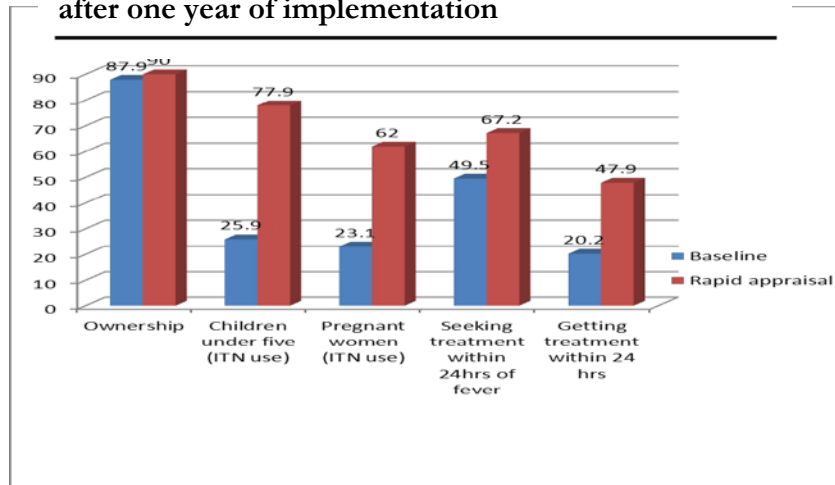
The GOK is committed to ensuring that health services are available at the community level through the introduction of a community strategy, which focuses on the delivery of an essential package of health by CHWs.

Progress to Date

PMI provided financial and technical support to three local NGO grantees to build the local BCC capacity in Western and Nyanza Provinces to promote the uptake of malaria control interventions through community-BCC activities. This support included intervention design, message development and monitoring of activities. This focused, community-based intervention is generating impact. As shown in Figure 5, below, one of the PMI-supported NGOs in 12 districts of South Nyanza demonstrated increases in the major coverage and uptake rates of ITN use and treatment seeking behavior within the activity's target population.

PMI is also continuing to support media promotional campaigns to increase the use of ITNs in malaria endemic regions of the country. In the last year, PMI reached 109,694 people through community-based organization outreach efforts, trained 25 community-based organizations in eight districts, trained three Peace Corps Volunteers and two staff from Peace Corps headquarters, and conducted 20,000 outreach sessions.

Figure 5: Malaria Prevention and Control Update, after one year of implementation



Proposed PMI Activities with FY 2012 Funding: (\$1,000,000)

PMI anticipates supporting the following activities with FY 2012 funding:

1. *Targeted community based IEC/BCC in endemic and epidemic prone districts:* Expand community-based IEC/BCC efforts by increasing outreach to priority populations, especially pregnant women and children under five years, through different strategies and channels of communication. Messages and modes of dissemination will depend on the venue and target population. Interpersonal communication will be used during home visits by CHWs, while *barazas* will be held in villages and during public gatherings where messages are delivered through public address systems. During these gatherings, skits and dramas will be used to deliver messages on malaria control in a more engaging manner in order to:
 - Increase ITN ownership and promote correct and consistent use of ITNs;
 - Promote early and regular ANC attendance by pregnant women to increase the proportion of women using IPTp; and
 - Increase early and appropriate health-seeking behavior and prompt management of fever. (\$645,000)
2. *National IEC/BCC efforts:* With the DOMC issuing its new malaria control strategy, and revising its policies and guidelines regarding IPTp and RDTs (among others), it requires assistance with national level IEC efforts. PMI will support national-level IEC message development and dissemination on key malaria control interventions related to the new policies and guidelines (i.e. MIP, case management, diagnosis, IRS, etc). The DOMC will work with partners to roll out the new messaging on the use of IPTp for malaria in pregnancy as indicated by the new epidemiological changes of malaria endemicity. PMI will also support the DOMC to coordinate donors and undertake advocacy-related activities, including a regular review meeting with donors to monitor and guide their progress in malaria control interventions. This will help to ensure that malaria control remains as a national priority. (\$300,000)

3. *PMI- Peace Corps collaboration:* Under the PMI-Peace Corps Initiative, Peace Corps has recruited three Malaria Support Volunteers who will work under the guidance of PMI country advisors and closely with the host government and other stakeholders to support malaria control activities within the existing national malaria control plan. PMI will support these three Peace Corps volunteers with resources to carry out BCC activities in some of the intervention areas namely - IRS, ITNs, MIP and case management, as well as in cross-cutting areas of capacity building and surveillance, monitoring, evaluation and operations research. PMI will also provide resources to support malaria activities identified by other volunteers in their respective areas of operation. (\$55,000)

INTEGRATION WITH OTHER GLOBAL HEALTH INITIATIVE PROGRAMS

Kenya is a GHI plus country and has developed a strategy that embraces the key tenants of the initiative. GHI Kenya seeks to establish a robust whole-of-government, multi-layer communication strategy, reflecting all fundamental principles of the President's initiative. This will benefit the full complement of the USG health portfolio in Kenya. GHI Kenya builds upon the existing interagency management platform. Building on a solid interagency governance system, GHI Kenya makes appropriate modifications to the structure already functioning in country. US Peace Corps, Department of Defense, CDC, USAID and President's Emergency Plan for AIDS Relief (PEPFAR) have implemented and reported on a large program base for several years. This tight, multi-tiered governance structure allows for full participation across agencies, at all levels, and across technical areas – resulting in well-conceived programs that are responsive to country needs.

In Kenya, GHI adds new dimensions to the existing disease-focused structure. GHI Kenya embraces a strong management base and expands into broader public health areas relevant to the GHI Strategy. GHI Kenya emphasizes the development of programs that leverage unique capacities of each of the agencies, utilizing existing activities and platforms to create efficient and functional cross-agency synergies. Over time, this model will mature into expanded inter-agency work to achieve GHI objectives and targets under the learning agenda.

PMI in Kenya has been working closely with the Walter Reed Army Institute of Research (WRAIR). WRAIR has received funding from PMI/Kenya in previous years to purchase and distribute microscopes and to provide training on microscopy for malaria. WRAIR has also assisted in finalizing the Kenya DOMC's National Diagnostics Guidelines and is currently working to develop and implement an external quality assurance program for malaria microscopy in support of DOMC and PMI malaria control activities.

PMI in Kenya is in the process of expanding its collaboration with Peace Corps. Under a renewed effort to "Stomp Malaria Out of Africa", Peace Corps-recruited Malaria Support Volunteers will work under the guidance of PMI country advisors and closely with the host government and other stakeholders to support malaria control activities within the existing national malaria control plan.

CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING

Background

The DOMC is responsible for planning, organizing, and coordinating all malaria control activities in the country. It is also responsible for developing training and implementation guidelines for all the intervention areas through the different technical working groups. The DOMC has twenty four staff members at the national level, four physicians, one PhD entomologist, four public health officers, three clinical officers, two pharmacists, three nurses, one health records officer and various other support staff. These officers are assigned as focal point persons to the following interventions: vector control, monitoring and evaluation, advocacy communication and social mobilization, epidemic preparedness and response, malaria in pregnancy, case management and diagnostics, and program management. In the spirit of decentralization of malaria control operations, malaria focal persons at the district and provincial level have been designated and trained in malaria management (including decision-making, planning, budgeting, supervision, and M&E). The malaria focal points are staff within the MOPHS who take on additional responsibilities to support malaria control activities. With these new responsibilities, the district and provincial malaria focal points require trainings to bring them up to speed with the latest malaria control strategies, policies, and guidelines that are being rolled out.

The focal points at the DOMC are required to conduct supervisory field visits together with the district and provincial focal points to assess how the interventions are being implemented. However these visits tend to occur in an ad hoc manner due to inadequate planning and timing, and do not achieve the intended results of ensuring that services are delivered as expected and corrective measures are taken where needed.

The GOK passed a new constitution in 2010, which has divided the country into 47 new counties. The devolution of governance, management and coordination of services in the new constitution is still unclear and is bound to bring with it new challenges for coordination, service delivery and staff capacities, since the management of health service delivery will be the responsibility of the new counties.

In order to address these new challenges the DOMC needs to ensure that staff in these new district/county and province structures are adequately trained to plan and manage the implementation of malaria control activities based on the needs of the district/county or province.

The focus of the training will not be technical capacity enhancement but more related to human resources development in organizational management under the new county structures and processes where the malaria focal points might take more responsibilities than is currently happening. This will ensure that malaria control teams are able face the new challenging circumstances under which they will be working. They will get training in problem solving approaches, leadership skills, managing change, communication etc.

However, a lack of sufficient funds and logistical issues may continue to challenge the DOMC's ability to adequately supervise and support staff through this transition.

The DOMC technical working groups (TWGs) serve as a way of engaging key partners and overseeing implementation of programs. Currently there are six TWGs, including: vector control;

surveillance, monitoring, evaluation and operations; and case management. The groups are comprised of all key partners working in a specific technical area, with the DOMC acting as the secretariat. The groups meet either quarterly or on an ad hoc basis to address emerging issues. The TWGs report regularly to the Malaria Interagency Coordinating Committee. Continued support to the TWGs is important, especially for those TWGs that are less active.

Progress to Date

DOMC Capacity Building

PMI has continued to support the DOMC to fulfill its responsibilities in conjunction with other partners. PMI's DOMC capacity building efforts work towards a stronger GOK and a more sustainable malaria control program. Previous PMI support to the DOMC has included training and supervision of health workers to ensure that they are in compliance with the new treatment guidelines. Building on work in previous years in M&E, PMI currently supports the DOMC to ensure timely collection of quality health information through the Malaria Information Acquisition System and the national HMIS. In the last year PMI supported two focal points (M&E and disease surveillance) to attend the East Africa Roll Back Network EARN meeting in Rwanda. One M&E officer was supported to attend M&E training in Ghana facilitated by MEASURE Evaluation.

Through support to the TWGs, PMI strengthens policy dialogue and supports the development of appropriate tools, interventions, guidelines, strategies and policies that promote effective integrated management of malaria, pharmaceutical system strengthening and program monitoring. The PMI Advisors assisted in writing the 2009 Kenya Malaria Program Performance Review, revising the current NMS (2009-2017), and writing the successful Global Fund Round 10 proposal. Currently the PMI advisors are assisting the DOMC in writing the 2010 MIS final report.

Contributions to Health System Strengthening

PMI strengthens the overall health system by improving governance in the pharmaceutical sector, strengthening pharmaceutical management systems, expanding access to essential medicines, and improving service delivery. PMI supported the implementation of the malaria commodity LMIS, emergency AL distribution, and drug quality monitoring. PMI is working with the DOMC and Office of the Chief Medical Technologist to implement a QA/QC system for malaria diagnostics. To build human resource capacity and improve service delivery, PMI has continued to support the training of health workers at the facility and community levels. Specifically, PMI supported the training of 93 medical tutors on malaria in pregnancy as part of capacity enhancement for training institutions in malaria control interventions, and supported the training of a total 390 health workers in drug management, case management and diagnostics from Coast Province. In addition, PMI supported the training of seven laboratory technicians on the WHO accredited course on malaria microscopy.

Proposed PMI Activities with FY 2012 Funding: (\$550,000)

PMI will use FY 2012 funds to continue to improve the DOMC's technical capacity, help it fulfill its leadership role, enhance the role of the technical working groups, improve management of the Global Fund grants, and increase donor coordination. Health systems strengthening activities are incorporated into activities funded in the different intervention areas. Specifically, PMI will fund the following:

1. *PMI direct technical support to DOMC:* Provide technical support by USAID and CDC PMI Advisors to the DOMC. These Advisors will spend a portion of their work week with the DOMC and will have a workstation within the DOMC offices to effectively integrate into the national team. *(no additional cost)*
2. *DOMC capacity building:* Improve the DOMC's technical capacity with regard to implementation and supervision. PMI's funding will enable the DOMC focal point persons to supervise and track malaria prevention and control activities carried out in priority districts. Support for these supervision activities will be undertaken in collaboration with other Ministry of Health officers, to create synergy and strengthen the overall malaria program management. *(§200,000)*
3. *Attendance of DOMC staff at technical consultative meetings.* Assist DOMC focal point persons to keep abreast with the latest developments and advances in the field of malaria control by attending key technical meetings (such as the East Africa Roll Back Network or inter-country meetings organized to discuss monitoring and evaluation). Attendees will be expected to make presentations and share key technical updates with other DOMC members. *(§25,000)*
4. *Support the DOMC Technical Working Groups:* PMI in collaboration with other development partners will lead efforts to ensure the TWGs are strengthened, functioning effectively and efficiently, and holding regular meetings to establish and identify key topical issues in malaria control that need to be addressed in order to enhance the overall achievement of planned goals for the program. *(US\$ 25,000)*
5. *Decentralization to the new county system:* PMI will support the DOMC's efforts to operationalize malaria control efforts within the new 47-county administrative system to ensure that the delivery and coordination of malaria prevention and control activities and services in the new counties are not disrupted. The new county-level malaria focal points will receive training in problem solving approaches, leadership skills, managing change, communication etc. They will be expected to provide critical links within the new decentralized system between the DOMC and the sub-county operations to ensure that programs continue to operate and function well. *(§250,000)*
6. *Support to improved effectiveness of Global Fund grant management:* One of the major contributors to Kenya's problems with the Global Fund mechanism is a weakness in the reporting system and documentation of achievements related to specific indicators that need to be reported to the Global Fund. These funds will enable PMI to promptly assist in the development of tools that will collate and provide reporting information required by the Global Fund i.e. meeting reporting deadlines. Through this process the capacity of personnel in the DOMC will be enhanced to more effectively manage and administer grants from the Global Fund. *(§50,000)*
7. *Health systems strengthening in supply chain management, health worker training, laboratory strengthening, and district-level supportive supervision:* Described in the case management section.

COMMUNICATION AND COORDINATION WITH OTHER PARTNERS

There are a number of very active partners in malaria control in Kenya, including research institutions, NGOs, WHO, the private sector and development partners that work closely with the DOMC and each other through both formal and informal structures. PMI is an integral partner with the DOMC and actively participates in all technical and other partner related activities.

A malaria subgroup under the Interagency Coordination Committee is convened by the head of the DOMC on behalf of the Director of Public Health. It includes the Ministry of Health, NGOs, faith based organizations, the private sector and development partners. This group meets quarterly with additional interim meetings occurring as needed. There are also several technical working groups led by the DOMC around particular issues. These include the Drug Policy Technical Working Group, which was convened to help implement Kenya's drug policy change; a formal IEC working group which comprises representatives from various departments of the MOPHS and stakeholders to assist in the implementation of the IEC strategy and plan; a MIP working group; an integrated Vector Control working group; and a Surveillance, Monitoring, Evaluation and Operational Research working group.

MONITORING & EVALUATION

Background

Framework for monitoring and evaluating the DOMC

Effective monitoring and evaluation of the program has been prioritized in the NMS 2009-2017 as an essential function of DOMC program management in assessing progress made towards achieving set program objectives and targets. The DOMC has an M&E unit which is mandated to coordinate the generation of information on the progress of malaria intervention implementation as well as the evaluation of programs. The unit is equipped with the requisite hardware and software to enable data compilation, analysis and storage in an M&E database. The unit consists of one epidemiologist, one clinician, one health records information officer and an information and communications technology systems specialist, all working to ensure routine monitoring, evaluation, supervision, data auditing for quality, data dissemination and use.

Since 2009, the DOMC and its stakeholders have been using one comprehensive national M&E framework (DOMC M&E plan, 2009-2017) to enable transparent and objective management of information on the national malaria control activities. Kenya has a large number of stakeholders with the interest and capacity to conduct effective surveillance, monitoring, evaluation and operational research. Key M&E stakeholders (drawn from government, universities, research institutions, private sector, NGOs and donor agencies) are organized into a surveillance, monitoring, evaluation and operations research working group to collectively provide guidance to M&E activities. Overall, malaria data flow within the M&E framework is from the community to the district, provincial and national levels, as well as to DOMC partners. It is anticipated that with the new government structure, data flow will adjust to include the county level. The M&E plan articulates the program objectives by intervention area; lists key indicators; highlights required data and data sources; reviews the institutional arrangements for gathering, analyzing, and reporting data, and for investing in capacity building; and states the ways in which M&E findings will be fed back into decision making.

The costed M&E work plan is used for M&E advocacy, communications and resource mobilization.

Data Sources and Reporting Systems

The types and sources of data for DOMC M&E indicators include:

1. Routine disease and service reporting and national surveillance from the HMIS, LMIS, the Integrated Disease Surveillance and Response (IDSR) system, and district, county (new), provincial and national administrative systems.
2. Routine sentinel surveillance information from selected sites prospectively monitoring different parameters. These include five sites monitoring antimalarial drug quality and two sites monitoring antimalarial drug efficacy. With decreasing malaria risk in the country, health facilities in sentinel districts established in 2000 to represent the four different epidemiologic zones are no longer routinely used by the DOMC/KEMRI/Wellcome Trust to collect retrospective data on implementation and health impact of malaria control interventions.
3. Routine demographic sentinel information from Kenya's DSS sites in Kisumu (population of 135,000 managed by KEMRI/CDC) and Kilifi (population of 220,000, managed by KEMRI/Wellcome Trust). In the absence of functional national vital registration systems, these sites monitor birth and death rates, mortality and morbidity rates, socio-economic indicators, and conduct verbal autopsies to ascribe probable causes to all deaths. Data from the DSS sites is provided to the DOMC quarterly as per agreements.
4. Non-routine DOMC activity information on ITN, IRS, IPTp and case management activities, generated and transmitted vertically following activity implementation by the DOMC and implementing partners supported with Global Fund, DfID/WHO and PMI funds.
5. Non-routine survey information gathered from health facilities, schools, communities and households (e.g. DHS, MIS, Multiple Indicator Cluster Survey, national census).
6. Non-routine information from ongoing malaria-related research and special studies including operational research.

While the DOMC uses routine information to track changes in program performance over time, impact and outcome measurements of the program and population-based coverage are estimated through facility and household surveys and routine surveillance (HMIS, DSS).

Notable strengths of the Kenyan malaria M&E system include the organizational structure of the M&E unit; M&E partnerships; the presence of a comprehensive M&E system and costed M&E plan; and the presence of an M&E database to store routine and activity data as well as data from surveys and evaluations. The main weakness, as reported by two separate Data Quality Assessments conducted in 2010 by the Global Fund and Kenya's Ministry of Public Health and Sanitation, is the delay in data made available through the HMIS. In addition, with the varied epidemiology of malaria in Kenya, sample sizes for household and health facility surveys need to be very large to get sub-national estimates.

The DOMC implements most malaria M&E activities through funding from the Global Fund and PMI. Available funding is targeted towards achieving:

1. Improved functioning of M&E unit resources (existing technical capacity, available hardware and software capability, and satisfactory information dissemination);
2. Coordination of malaria M&E within the country;
3. Improved data flow from all data sources;
4. Data quality assurance; and,
5. Using data for decision making.

Progress to Date

PMI has supported the measurement of the outcome and impact indicators listed below by providing support for the malaria component of the 2008/09 DHS and the 2010 MIS:

Indicators:

- All cause under-five mortality
- Proportion of households with at least one ITN
- Proportion of children under five years old who slept under an ITN the previous night
- Proportion of pregnant women who slept under an ITN the previous night
- Proportion of women who received two or more doses of SP during their last pregnancy in the last two years at least one of which was received during an ANC visit
- Proportion of children under five years old with fever in the last two weeks who received treatment with ACTs within 24 hours of onset of fever

Since January 2010, PMI has provided financial and technical support to module design, field work, data analysis and report writing for the 2010 MIS. PMI has supported reporting of complementary data on malaria-related morbidity and mortality in the DSS. PMI has also been supporting *in vivo* antimalarial drug efficacy monitoring. In addition, PMI is providing support to the DOMC's acquisition of routine data through the Malaria Information Acquisition System and for strengthening the quality and timeliness of data from various data sources.

In addition, PMI has provided technical assistance to support malaria M&E coordination, improved data flow, data quality assurance and use of data for decision making. PMI has done this by building DOMC/M&E capacity at the national level. As capacity is built, the DOMC/M&E staff are able to strengthen their national DOMC counterparts as well as provincial and district level M&E staff with support from the Global Fund and PMI.

Within the last 12 months, PMI has:

- Provided technical assistance for the DOMC's M&E and governance structures including the M&E TWG, where support has focused on planning for and fielding the 2010 MIS and providing M&E support for the development of an ITN dashboard to help the DOMC track the progress of the ITN universal coverage campaign. Support has also been provided to the Operations Research TWG and Malaria Inter-Agency Coordinating Committee.

- Assisted with the strengthening of the malaria surveillance systems by supporting the development of a national malaria surveillance strategy and assessing the gaps in indicator collection from the main data sources (HMIS and IDSR) and development of a plan of action for implementation of the DOMC surveillance activities. Since October 2010, with PMI support, the DOMC has been working with HMIS and DDSR to implement a plan for establishing/enhancing routine surveillance systems for malaria. Kenya's changing epidemiology and its vision of being malaria-free have emphasized the need for robust routine surveillance data for use in guiding intervention planning as the country transitions from high transmission to low transmission to pre-elimination. It was agreed at the start of the planning process that PMI funds would establish the foundation of the system (framework development, review of HMIS/IDSR existing systems and tool, gap identification, tool re-design/upgrade, pilot) and Global Fund R10 funds would be used for printing of tools, capacity building and scale up of the system.
- Supported M&E capacity building in the DOMC by funding DOMC M&E officers to attend malaria M&E and Health Systems Management trainings.

It is anticipated that over the next 12 months, with FY 2011 funding, PMI will support:

- A national M&E workshop to refresh key M&E stakeholders on the fundamental concepts and practical approaches to malaria M&E. The workshop will aim to achieve data use mapping. This process will identify opportunities for information use, lead to better data quality, and ultimately strengthen program service delivery.
- Achievement of a finalized gap analysis of current surveillance systems including HMIS, IDSR, LMIS and Laboratory Information Management System, with clear recommendations on next steps to upgrade/redesign the systems.
- The logistics and facilitation of the Malaria Evidence to Action Forum in Kenya. As the DOMC unit continues to monitor progress, it has determined the need to harness the efforts of individuals, institutions and organizations involved in the generation and use of malaria data to better inform its control strategies and policies. In addition to the dissemination of information to all stakeholders through the DOMC website and technical working group meetings, the DOMC will use the national malaria conference on October 10-11, 2011 to bring together producers and users of malaria-related data to discuss and further devise data demand and use strategies.
- Improved DOMC capacity to provide technical leadership in the area of malaria M&E and to provide direction to donors and implementing partners. This will be achieved through PMI provision of training in program management and information management including data analysis, use and dissemination. In addition, PMI will have provided funding for two health workers to complete the CDC's Field Epidemiology and Laboratory Training Program (FELTP). The two FELTPs are currently going through the program which runs from May 2011 to July 2013. Although training will be finished in July 2013, one FELTP is already attached to and providing support to the M&E unit of the DOMC. In July 2013, it is hoped that the MoH will second the PMI-funded FELTPs to the DOMC's M&E and MIP units for a minimum two year commitment.

- Implementation of the national M&E plan and effective use of data by supporting specific activities within the national malaria M&E plan, including: supporting the development and implementation of a data quality strategy; strengthening the surveillance system; undertaking epidemiological surveillance and monitoring in both highland and lowland districts; implementing national- and district-level supervision and on-the-job training for health workers; conducting analyses and updating presentations of national and sub-national level data to demonstrate progress; strengthening malaria data management; and disseminating use of M&E data.
- Additional analyses of DHS 1998, 2003, 2008-9, MIS 2007 & 2010, AIDS Indicator Survey 2008 and Service Provision Assessment 2010 surveys, reporting on childhood mortality in Kenya, showing levels, trends and differentials. This will also provide information for the RBM/PMI impact evaluation in Kenya scheduled for 2014.

Proposed PMI Activities with FY 2012 Funding: (\$1,800,200)

With FY 2012 funding, PMI will continue to support malaria M&E within the framework of the National Malaria M&E Plan (2009-2017) as follows:

1. *M&E implementation:* Continue support for implementation of the national M&E plan by providing technical assistance to increase the capacity of existing DOMC M&E staff and to ensure that data is used for program improvements. Specific activities are listed below. (\$500,000)
 - Provide support to the strengthening of routine surveillance systems including contributing to the review and incorporation of relevant malaria indicators, including IPTp indicators, into the HMIS and DDSR systems to heighten surveillance in different epidemiologic settings. The DOMC uses the DDSR information to prevent and manage epidemics. Specifically, FY2012 funding will help the DOMC complete scale up; ensure the generation of quality data; produce, publish and disseminate a quarterly bulletin; encourage data use by supporting performance review meetings, supervision and decision making; and undertake monitoring and evaluation (including feedback, supervision and system improvements).
 - Support the improvement of the quality of data collected through routine systems by supporting the standardization of forms, supervision, conducting data checks and participating in annual Data Quality Audits. This will ensure that data collected through the routine system is of high quality and can be utilized for malaria surveillance and epidemic detection.
 - Support the DOMC to analyze and present data for incorporation into quarterly reports, briefs for policy makers and journalists and for updates on the DOMC website.
 - Organize an annual malaria review meeting for stakeholders.
 - Support DOMC planning of operations research and designing evaluations.
2. *Malaria module in a nationwide household survey:* Support the collection of malaria indicator data through a 2013 MIS or a malaria module in a 2013 DHS. Based on a schedule of conducting

an MIS survey every three years and a DHS survey every five years, both surveys are due in 2013. The DOMC will begin discussions with the Kenya National Bureau of Statistics about these surveys to avoid two similar surveys in one year. PMI is waiting on a DOMC decision regarding the surveys and will support either an MIS or the malaria module in the DHS in 2013, but not both. If both an MIS and DHS are scheduled in 2013, PMI will support the DHS. The current budget reflects the maximum amount PMI will contribute to a malaria survey in 2013, identified through a funding gap analysis by the DOMC for an MIS. Similarly, this level of funding could cover malaria biomarker (parasitemia) data collection through a DHS extended into the high transmission season. Parasitemia data from 2013 will be compared against parasitemia levels in the 2010 MIS to track national progress towards reducing the malaria burden and to monitor transitions from high burden to low burden to pre-elimination. (\$600,000)

3. *Monitoring of interventions:* Support M&E activities for specific intervention areas which are fully described under the relevant technical sections: (\$575,400)
 - a. Monitor stock status and avert stock outs through use of the end use verification tool. The activity will be done semiannually as part of the DOMC's quality of care survey so as to allow the DOMC to design holistic recommendations to improve case management. (\$100,000)
 - b. Monitor human malaria infections in IRS districts to inform DOMC's intervention strategy and when to scale down IRS activities. Human malaria infections will be monitored by a methodology that will be determined in discussions with the PMI/Kenya and PMI/M&E teams. (\$150,000, see the full activity description in the IRS section)
 - c. Conduct continuous monitoring of MIP activities, specifically monitoring the effect of implementation of the revised IPTp policy. (\$75,400 see the full activity description in the IPTp section)
 - d. Support epidemiologic surveillance in highland and seasonal transmission districts for epidemic detection. (\$200,000, see the full activity description in the Epidemic surveillance and response section)
 - e. *In vivo* drug efficacy monitoring: Support drug efficacy monitoring, using the standard WHO protocol, at two sites in western Kenya. (\$50,000, see the full activity description in the case management section)
4. *Field Epidemiology and Laboratory Training Program:* Train two FELTP trainees for a two-year secondment, upon graduation, to the DOMC M&E and case management teams. As there is very low attrition in the MOPHS among the graduates of this program, PMI anticipates that this investment will increase the long-term capacity within the DOMC to be able to carry out appropriate program planning, implementation and monitoring and evaluation. The budget for each trainee includes tuition, stipend, laptop, materials, training, travel, and conferences for the two-year program. (\$100,000)

5. *Technical Assistance:* Support two CDC TDYs to provide technical assistance for a) the household survey with the malaria module and b) M&E capacity building. *(\$24,800)*

STAFFING AND ADMINISTRATION

Two health professionals have been hired as Resident Advisors to oversee the PMI in Kenya, one representing CDC and one representing USAID. In addition, an additional health professional, a full time FSN staff member, has been hired to join the PMI team. All PMI staff members are part of a single inter-agency team led by the USAID Mission Director. The PMI team shares responsibility for development and implementation of PMI strategies and work-plans, coordination with national authorities, managing collaborating agencies and supervising day-to-day activities.

The three PMI professional staff work together to oversee all technical and administrative aspects of the PMI in Kenya, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, and reporting of results. The USAID staff members report to the Director of the Office of Population and Health at the USAID/Kenya Mission. The CDC Resident Advisor is supervised by CDC, both technically and administratively. All technical activities are undertaken in close coordination with the Ministry of Health/DOMC and other national and international partners, including WHO, DfID, Global Fund, World Bank and the private sector.

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

Proposed USG Component: *(\$1,085,000)*

- *In-country PMI staff salaries, benefits, travel and other PMI administrative costs:* Continued support for two PMI (CDC and USAID) and one FSN (USAID) staff members to oversee activities supported by PMI in Kenya. Additionally, these funds will support pooled USAID Kenya Mission staff and mission-wide assistance from which PMI benefits. *(\$1,085,000)*

Table 1: Year 5 (FY2012) Budget Breakdown by Partner

Partner Organization	Geographic Area	Activity	Activity Budget	Project Subtotals
TBD bilateral	Endemic/ Epidemic districts	Logistic support to routine LLIN distribution	\$1,500,000	\$3,000,000
		Support a community-based LLIN tracking and replacement distribution system pilot	\$500,000	
		Integrated community-based IEC/BCC	\$645,000	
		National IEC promotion	\$300,000	
	Nationwide	Peace Corps Support	\$55,000	
APHIA plus "Zone 1"	Zone 1 (includes Nyanza and Western)	Strengthen malaria supervision for case management	\$600,000	\$600,000
DELIVER	Endemic/ Epidemic districts	Procure LLINs for routine distribution	\$8,160,000	\$16,185,000
		Procure RDTs	\$1,500,000	
		Procure 100 microscopes, reagents and consumables to support malaria diagnostics	\$300,000	
		Purchase AL and/or severe malaria medication	\$6,025,000	
		Stockpile epidemic response equipment and supplies	\$200,000	
New KEMSA Bi-lateral	Nationwide	TA for supply chain management at national level and in-country drug distribution	\$250,000	\$250,000
USP PQM	Nationwide	Strengthen antimalarial drug quality monitoring and surveillance	\$200,000	\$200,000
IRS TO2	10 Endemic Districts	IRS implementation and management	\$6,850,000	\$6,850,000
CDC IAA (with sub-grant to KEMRI)	10 Endemic Districts	Entomological monitoring of IRS effectiveness in sprayed districts	\$180,000	\$555,400
	DSS Sites	Malaria in Pregnancy Screen and Treat	\$150,000	
	Nationwide	Epidemiologic surveillance in endemic IRS districts	\$150,000	
		Support continuous MIP monitoring in endemic districts	\$75,400	
CDC IAA	10 Endemic Districts	CDC IRS TDY visits	\$12,400	\$149,600
		CDC Diagnostics TDY support	\$12,400	
	priority endemic districts in Nyanza, Western and Coast	Train two field epidemiology and laboratory training program epidemiologists	\$100,000	
	Nationwide	CDC M&E TDY support	\$24,800	
GEMS	10 Endemic Districts	Environmental Monitoring Visit	\$25,000	\$25,000

ACCESS bi-lateral	priority endemic districts in Nyanza, Western and Coast	Support supervision of FANC/IPTp program	\$450,000	\$450,000
HCSM	targeted district(s)	Provide support to the DOMC for implementation of RDTs	\$400,000	\$850,000
		TA for supply chain management at district level	\$350,000	
		Support the end-use verification tool	\$100,000	
MEASURE Evaluation	Nationwide	Support for implementation of the National M&E plan	\$500,000	\$700,000
		Implementation of surveillance, epidemic preparedness and response	\$200,000	
TBD	Nationwide	Support for 2013 Malaria Module Household Survey	\$600,000	\$600,000
TBD	Nationwide	Support to DOMC	\$250,000	\$250,000
MVDP (Walter Reed)	Nationwide	Provide supportive supervision within the established QA/QC system for the national laboratory network	\$300,000	\$350,000
		In vivo drug efficacy testing	\$50,000	
Capacity	Nationwide	Facilitate decentralization to new county system	\$250,000	\$300,000
		Strengthen DOMC global fund grant management	\$50,000	
USAID/CDC	Nationwide	PMI Staffing and Administration expenses	\$1,085,000	\$1,085,000
				\$32,400,000

Table 2: FY 2012 Planned Obligations Kenya

Proposed Activity	Mechanism	FY 2012 Budget	FY 2012 Commodities	Geographic area	Description of Activity
Insecticide Treated Nets					
Procure LLINs for routine distribution	DELIVER	\$8,160,000	\$8,160,000	Endemic/ Epidemic districts	Fill the ITN gap for routine distribution by purchasing 1.5 million LLINs to distribute free-of-charge to pregnant women and children under one through the ANC and child welfare care clinics. Nets are estimated at \$5.5 each.
Logistic support to routine LLIN distribution	TBD bilateral	\$1,500,000	\$0	Endemic/ Epidemic districts	Provide logistical support, including transportation and storage of nets, for distribution of the 1.5 million LLINs within the national routine distribution system
Support a community-based LLIN tracking and replacement distribution system pilot	TBD bilateral	\$500,000	\$0	Selected priority endemic districts	Support a community-based LLIN distribution pilot, which will focus on developing and validating an LLIN tracking system, and undertake use/hang up activities through community-based CHW network
USAID TDY visit	USAID	\$0	\$0	Nationwide	Support one visit from USAID to provide assistance in implementing ITN program (Core Funded)
Subtotal		\$10,160,000	\$8,160,000		
Indoor Residual Spraying					
IRS implementation and management	IRS TO2	\$6,850,000	\$2,260,500	10 Endemic Districts	Support IRS in ten endemic districts (estimated to reach 747,321 houses) with a target of 85% coverage in all districts, includes emergency focal spraying in epidemic districts (as needed), and TA to DOMC for spray operations.
Entomological monitoring of IRS effectiveness in sprayed districts	CDC IAA (with sub-grant to KEMRI)	\$180,000	\$0	10 Endemic Districts	Continue insecticide resistance monitoring in ten sites in western Kenya and expand to include new endemic districts targeted for spraying by PMI
Environmental Monitoring Visit	GEMS	\$25,000	\$0	10 Endemic Districts	Conduct biannual independent environmental monitoring visit.
CDC IRS TDY visit	CDC IAA (Atlanta)	\$12,400	\$0	10 Endemic Districts	Support one visit from CDC to provide assistance in implementing IRS activities
Subtotal		\$7,067,400	\$2,260,500		

Intermittent Preventative Treatment of Pregnant Women					
Support supervision of FANC/IPTp program	ACCESS bi-lateral	\$450,000	0	priority endemic districts in Nyanza, Western and Coast	Supportive supervision to continue correct implementation of the simplified IPTp guidelines in all target 55 malaria endemic districts. This activity builds on the pilot facility level interventions aimed at strengthening IPTp delivery in targeted areas
Malaria in Pregnancy Screen and Treat	CDC IAA (with sub-grant to KEMRI)	\$150,000	\$0	DSS Sites	Operational research study comparing IST with IPTp.
Subtotal		\$600,000	\$0		
Case Management					
Diagnosics					
Procure RDTs	DELIVER	\$1,500,000	\$1,500,000	targeted district(s)	In support of DOMC's RDT scale-up plan, procure and distribute 2,000,000 of the required RDTs to dispensaries and health centers in targeted districts.
Procure 100 microscopes, reagents and consumables to support malaria diagnostics	DELIVER	\$300,000	\$0	targeted district(s)	Support increased diagnostic capacity of trained lab technicians with necessary equipment and reagents.
Provide support to the DOMC for implementation of RDTs	HCSM	\$400,000	\$0	targeted district(s)	Provide funding for DOMC supportive supervision, refresher training, and monitoring of implementation, including implementation of QA/QC system, to ensure adherence to DOMC RDT policy guidelines in the same districts.
Provide supportive supervision within the established QA/QC system for the national laboratory network	MVDP (Walter Reed)	\$300,000	\$0	Nationwide	Strengthen capacity for malaria diagnostics through supportive supervision within the QA/AC system.
CDC Diagnostics TDY support	CDC IAA (Atlanta)	\$12,400	\$0	Nationwide	Support one CDC TDY to provide technical assistance for malaria diagnostics

<i>Treatment</i>					
Purchase AL and/or severe malaria medication	DELIVER	\$6,025,000	\$6,025,000	Nationwide	Procure and distribute up to 4 million AL treatments and severe malaria drugs, as needed, to fill in supply gaps in the public sector through September 2013. Procure severe malaria drugs, (injectable artesunate), as needed.
TA for supply chain management at national level and in-country drug distribution	New KEMSA Bi-lateral	\$250,000	\$0	Nationwide	As the national supplier of medicines, including AL to the public sector health facilities in Kenya, PMI will support KEMSA to strengthen supply chain management, warehousing, financial management and information systems.
TA for supply chain management at district level	HCSM	\$350,000	\$0	Nationwide	Support to target lower levels of the antimalarial supply chain from district to facility level in the highly endemic districts. Key activities will include heightened monitoring of AL and SP availability in the high endemic districts, improving LMIS reporting rates, end-use verification/monitoring of availability of key antimalarial commodities at the facility level, technical and financial support to the DOMC, Division of Pharmacy and district pharmacists to ensure effective quantification of drug needs, procurement, distribution and supervision of stock monitoring, on-the-job training and collection of antimalarial drug consumption data gathering.
Strengthen antimalarial drug quality monitoring and surveillance	USP PQM	\$200,000	\$0	Nationwide	Strengthen antimalarial drug quality monitoring through the provision of technical, strategic and operational support to the PPB and DOMC. Support improved quality assurance of antimalarials and strengthening of pharmacovigilance.
Strengthen malaria supervision for case management	APHIA plus "Zone 1"	\$600,000	\$0	Zone 1 (includes 2 provinces - Nyanza and Western)	Support the DOMC to strengthen malaria supervision and on-the-job training for case management in conjunction with the DHMT's . Activities will include promotion of prevention and treatment activities.
USAID TDY visit	USAID	\$0	\$0	Nationwide	1 USAID TDY to provide assistance for CM/Drug Procurement (Core Funded)
<i>Subtotal</i>		\$9,937,400	\$7,525,000		

Epidemic Surveillance and Response					
Stockpile epidemic response equipment and supplies	DELIVER	\$200,000	\$200,000	targeted district(s)	Support the procurement of supplies for epidemic response stockpiles in the targeted districts, including, IRS for focal spots, RDTs for diagnostics and ACTs and severe malaria medicines for large-scale treatment, if needed.
Subtotal		\$200,000	\$200,000		
IEC/BCC					
Integrated community-based IEC/BCC	TBD bilateral	\$645,000	\$0	targeted endemic districts in Nyanza, Western and Coast	Expand community-based IEC/BCC efforts by increasing outreach to priority population's especially pregnant women and children under five years through different strategies and channels of communication. Messages and mode of dissemination will be dependent on the venue and target group. In hospitals, at the ANC clinics, interpersonal communication will be used as well as in homes during home visits by community health workers, while barazas will be held in villages and during public gatherings where messages are delivered through public address systems.
National IEC promotion	TBD bilateral	\$300,000	\$0	Nationwide	Support national-level IEC message development and dissemination on key malaria control interventions on the new policies, donor coordination, undertake advocacy-related activities, including regular review meeting with donors working in the malaria constituency to monitor and advice on their progress in malaria control interventions.
Peace Corps Support	TBD bilateral	\$55,000	\$0	Nationwide	Continue PC activities and support three malaria PCVs.
USAID TDY visit	USAID	\$0	\$0	Nationwide	1 USAID TDY visit to provide assistance for IEC/BCC Program (Core Funded)
Subtotal		\$1,000,000	\$0		

Capacity Building and Health Systems Strengthening					
Support to DOMC	TBD	\$250,000	\$0	Nationwide	Provision of technical assistance and capacity building to improve the DOMC's technical capacity to fulfill its role in support to implementation and supervision; ensure the technical working groups are strengthened and hold regular meetings.
Facilitate decentralization to new county system	Capacity	\$250,000	\$0	priority endemic districts in Nyanza, Western and Coast	Strengthen malaria coordinators at the county level to ensure that they are able to manage county-level program that is new and needs to be operationalized.
Strengthen DOMC global fund grant management	Capacity	\$50,000	\$0	Nationwide	Strengthen DOMC capacity for effective Global Fund grant management and administration to ensure timely and effective implementation of planned activities.
Subtotal		\$550,000	\$0		
Monitoring and Evaluation					
Support for implementation of the National M&E plan	MEASURE Evaluation	\$500,000	\$0	Nationwide	Continue support for implementation of the national M&E plan by providing technical assistance to increase the capacity of existing DOMC M&E staff and to ensure that data is used for program improvements. Section 4.2.2: HMIS support to strengthen data collection and reporting systems, and facilitating interpretation, dissemination and use of data to improve malaria prevention and control activities.
Support for 2013 Household Survey	TBD	\$600,000	\$0	Nationwide	Support 2013 malaria module in a household survey.
Support the end-use verification tool	HCSM	\$100,000	\$0	Nationwide	Monitor quality of care for malaria case management and the LMIS to assess stock outs through the end-use verification tool.
Epidemiologic surveillance in endemic IRS districts	CDC IAA (with sub-grant to KEMRI)	\$150,000	\$0	10 Endemic Districts	Support epidemiological surveillance and monitoring in endemic IRS districts. The surveillance will include support for improved surveillance at select facilities in the IRS districts in order to monitor prevalence changes over time and to provide the DOMC with data that will guide the scale down of IRS in wake of universal LLIN coverage.

Support continuous MIP monitoring in endemic districts	CDC IAA (with sub-grant to KEMRI)	\$75,400	\$0	priority endemic districts in Nyanza, Western and Coast	Support to monitoring of MIP activities in targeted endemic districts, includes specific monitoring of MIP interventions where new guidelines are disseminated with supportive supervision and enhanced community BCC activities.
Implementation of surveillance, epidemic preparedness and response	MEASURE Evaluation	\$200,000	\$0	Epidemic-prone/seasonal districts	Implementation of the Epidemic Preparedness and Response plan, including improving malaria surveillance, updating and refining the national epidemic response plan, supporting the mapping of epidemic-prone areas, identification and training of health care workers in health facilities on epidemic preparedness and responses and generally enhance their capacity on malaria surveillance.
<i>In vivo</i> drug efficacy testing	MVDP (Walter Reed)	\$50,000	\$0	targeted district(s)	Continue <i>in vivo</i> drug efficacy monitoring at eight established DOMC sites to test the sensitivity of AL and examine efficacy of ACTs.
Train two field epidemiology and laboratory training program epidemiologists	CDC IAA (Atlanta)	\$100,000	\$0	Nationwide	Train two FELTP trainees for a two-year sucundment, upon graduation to the DOMC CM and M&E teams to increase the long-term capacity within the DOMC to carry out appropriate program planning, implementation and monitoring and evaluation. The budget for each trainee includes tuition, stipend, laptop, materials, training, travel and conferences for the two year program.
CDC M&E TDY support	CDC IAA (Atlanta)	\$24,800	\$0	Nationwide	Support 2 CDC TDYs to implement MIS if needed, (if DHS not needed) and M&E: training, survey monitoring, follow up. If DHS survey, two TDYs for MIS support, if not needed, will be shifted to other M&E priorities.
Subtotal		\$1,800,200	\$0		
Staffing and Administration					
PMI In Country Administration and Staffing	USAID/ CDC IAA	\$1,085,000	\$0	Nationwide	CDC, USAID Staffing, and USAID Mission wide support efforts
Subtotal		\$1,085,000	\$0		
GRAND TOTAL		\$32,400,000	\$18,145,500		

