

This Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. The final funding available to support the plan outlined here is pending final FY 2013 appropriation. If any further changes are made to this plan it will be reflected in a revised posting.



PRESIDENT'S MALARIA INITIATIVE



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Ethiopia

Malaria Operational Plan FY 2013

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ACRONYMS & ABBREVIATIONS

ACT Artemisinin-based combination therapy

AL	Artemether-lumefantrine
ANC	Antenatal care
CBO	Community-based organization
CDC	Centers for Disease Control and Prevention
CJTF-HOA	US Department of Defense “Combined Joint Task Force-Horn of Africa”
DDT	Dichloro-diphenyl-trichloroethane
DHS	Demographic and Health Survey
EHNRI	Ethiopian Health and Nutrition Research Institute
ESR	Epidemic Surveillance and Response
FBO	Faith-based organization
FELTP	Field Epidemiology and Laboratory Training Program
FMHACA	Food, Medicine and Health Care Administration and Control Authority
FMOH	Federal Ministry of Health
FSN	Foreign Service National
GHI	Global Health Initiative
GFATM/	
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GIS	Geographic information systems
GoE	Government of Ethiopia
HEP	Health Extension Package
HEW	Health Extension Worker
HMIS	Health Management Information System
HSDP	Health Sector Development Plan
iCCM	Integrated Community Case Management
IPTp	Intermittent preventive treatment of pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated bed net
IVM	Integrated Vector Management
LLIN	Long-lasting insecticidal net
MCST	Malaria Control Support Team
M&E	Monitoring and Evaluation
MIS	Malaria Indicator Survey
MNCH	Maternal and Neonatal Child Health
MOP	Malaria Operational Plan
NGO	Non-governmental Organization
NMCP	National Malaria Control Program
ORHB	Oromia Regional Health Bureau
PEPFAR	President’s Emergency Plan for AIDS Relief
PFSA	Pharmaceutical Fund and Supply Agency
PLMP	Pharmaceutical Logistics Master Plan
PMI	President’s Malaria Initiative
PMTCT	Prevention of mother-to-child transmission
QA/QC	Quality assurance/quality control
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RHB	Regional Health Bureau

SBCC	Social behavior change communication
SEA	Supplemental Environmental Assessment
SNNPR	Southern Nations, Nationalities and People's Regional State
TAC	Technical Advisory Committee
UNICEF	United Nations Children's Emergency Fund
USAID	United States Agency for International Development
USG	United States Government
VCHW	Voluntary community health worker
WHO	World Health Organization
WHOPES	WHO Pesticide Evaluation Scheme

EXECUTIVE SUMMARY

Malaria prevention and control are major foreign assistance objectives of the U.S. Government (USG). The purpose of this Malaria Operational Plan (MOP) is to provide a framework and a rationale for nominating and supporting malaria prevention and control projects in Ethiopia with FY 2013 US Agency for International Development (USAID) funds to accomplish the USG's foreign assistance objectives through the President's Malaria Initiative (PMI) in the context of the Global Health Initiative (GHI). Through the GHI, the USG will help partner countries improve health outcomes, with a particular focus on improving the health of women, newborns, and children. The MOP process for PMI Year 6 (FY 2013) considers information from the Ethiopian Federal Ministry of Health (FMOH), international malaria program donors including the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), malaria subject matter experts, and other malaria program stakeholders about the malaria situation, and the malaria control program capacities and gaps in Ethiopia.

The President's Malaria Initiative is a core component of the GHI, along with health programs for HIV/AIDS and tuberculosis. PMI was launched in June 2005 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. 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.

Malaria is ranked as the leading communicable disease in Ethiopia, accounting for about 30% of the overall Disability Adjusted Life Years lost. Approximately 68% of the total population of 84.3 million lives in areas at risk of malaria. According to the FMOH, in 2009/2010, malaria was the leading cause of outpatient visits, accounting for 14% of all visits, and health facility admissions, with 9% of all admissions. Malaria is one of the top ten causes of inpatient deaths among children less than five years of age.

President's Malaria Initiative support to malaria prevention and control in Ethiopia began in FY 2008 with an initial focus on Oromia Regional State, the largest of Ethiopia's nine regional states, covering a third of the country. PMI has contributed between \$20 and \$43 million annually to malaria control efforts during the last four years. In addition, Ethiopia has received three malaria grants from the GFATM. With this support and that of other donors, the Government of Ethiopia (GoE)'s FMOH has been able to dramatically scale-up its efforts in malaria prevention and control.

The most recent Malaria Indicator Survey (MIS), in 2011, showed that the prevalence of malaria parasitemia was approximately one percent, and that long-lasting insecticidal net (LLIN) ownership had dramatically increased from the baseline in 2000, but was still below target levels. Historically, Ethiopia has experienced cycles of malaria epidemics every five to eight years, with the last nationwide epidemic in 2003.

The activities PMI proposes for FY 2013 will complement the FMOH's National Malaria Strategic Plan for Malaria Prevention and Control 2011-2015, and build on investments made by the GoE and other partners over the past three years. While the primary focus continues to be on Oromia Regional State, PMI began to expand support nationwide in FY 2011 and will continue these activities in FY 2013. The proposed FY 2013 PMI budget for Ethiopia is \$37 million. Outlined below are the FY 2013 budget's major components, which envisage sustaining and expanding PMI support to ongoing activities.

Insecticide-treated nets (ITNs): Between 2005 and 2012, approximately 40 million LLINs were distributed by the FMOH nationwide, including 5.8 million LLINs in Oromia by PMI, with most of the other LLINs purchased through GFATM grants. In FY 2013, 2.5 million PMI LLINs will be delivered through Oromia Regional Health Bureau (ORHB) channels and distributed mainly through community based distribution channels. LLIN distribution will be complemented by comprehensive social behavior change communication (SBCC) efforts, as well as targeted hang-up campaigns to ensure that LLIN use by the population is maximized. PMI will also provide support for national net coverage efforts by building on and strengthening routine distribution systems and support to national malaria commodity micro-planning activities, which estimate district and community-level LLIN needs and gaps.

Indoor Residual Spraying (IRS): With FY 2012 funding, PMI supported Ethiopia's long-standing and extensive IRS program through a comprehensive range of activities, including improved targeting and enumeration of areas for IRS operations, improved IRS commodity and insecticide procurement, distribution and storage systems, training and supervision of spray personnel and appropriate pesticide management, entomological monitoring, and environmental compliance. By the end of the 2012 spray round 500,000 structures are expected to be sprayed in the 36 districts and PMI will partially support the graduated districts to spray an additional 512,000 structures. With FY 2013 funding PMI will provide the same level of support in spraying 500,000 structures in 36 districts protecting an estimated 1.5 million residents and will provide minimal support to the graduated districts. PMI also will continue to support building the capacity of the regional, zonal, and district-level vector control specialists to conduct basic entomological monitoring and improved IRS targeting and implementation as well as improved pesticide management.

Malaria in Pregnancy: Because of the generally low endemicity of malaria in Ethiopia, intermittent preventive treatment of pregnant women (IPTp) is not a part of the national strategy. Instead, the focus of activities for malaria in pregnancy is on promoting universal LLIN coverage, giving special emphasis and priority to LLIN use among pregnant women, and prompt diagnosis and treatment of clinical cases when they occur. In FY 2013, PMI will support improved malaria case management for pregnant women through an integrated approach to fever management at the community level provided by health extension workers (HEWs) and expanded access to high-quality antenatal care (ANC) through health centers and health posts.

Case Management: PMI assisted the FMOH in updating the national malaria case management guidelines in 2012. These guidelines reinforce the importance of confirmatory diagnostic testing for all suspected malaria cases, with microscopy at health facility level and RDTs at community level. The guidelines also revise recommendations for severe disease management, promoting

rectal artesunate for pre-referral treatment and intravenous artesunate for inpatient management. PMI has expanded support for quality-assured diagnostic testing for malaria to 180 clinical laboratories in Oromia and regional labs in Amhara, Dire Dawa, SNNPR, and Tigray. PMI supports training and clinical supervision strengthening activities for HEWs in 293 districts in six Regional States. PMI also supports provision of supplies, training, supervision and implementation of quality assurance/quality control (QA/QC) systems to improve the quality and accuracy of malaria diagnosis and clinical management of fever, while providing sufficient quantities of rapid diagnostic tests (RDTs) and artemisinin-based combination therapy (ACTs) to meet all requirements for Oromia and fill gaps in other states. PMI also procures enough chloroquine, rectal artesunate and intravenous artesunate to meet national requirements.

President's Malaria Initiative also is strengthening the pharmaceutical management system, including procurement, warehousing, and delivery of malaria commodities, in line with the national Pharmaceutical Logistics Master Plan (PLMP). PMI also is supporting the ORHB and its expanding system of HEWs to promote early care-seeking behavior and adherence to malaria drug treatment. PMI support also has been provided to the Ethiopian Food, Medicine, and Health Care Administration and Control Authority (FMHACA) to ensure that all malaria products entering the country meet quality standards. Four of the ten anti-malarial drug efficacy monitoring sites throughout the country are being supported by PMI in Oromia.

With FY 2013 funding, PMI will procure and distribute 6 million multi-species RDTs, 3 million ACT treatments, 2 million chloroquine treatments (for treatment of *Plasmodium vivax*), together with drugs for severe disease and pre-referral care. In addition, PMI's quality assurance activities will be expanded to additional laboratories in Oromia and to the remaining regional state reference laboratories.

Epidemic Surveillance / Monitoring and Evaluation: With malaria prevalence low and decreasing in some places, improved data and information management for operations in Ethiopia, tracking both the focal malaria burden and the local status of malaria-related commodities and operations, will be of great importance. To improve routine surveillance, PMI is assisting the FMOH in the roll-out of the newly updated Health Management Information System (HMIS) for routine collection of facility-based data, and is supporting the establishment of an epidemic detection system to capture indicators beyond routine surveillance data, and track morbidity and mortality to evaluate program progress and effectiveness.

With FY 2013 funding, this support will be sustained, together with efforts to monitor malaria morbidity, mortality, and availability of malaria commodities at the district level. This complements support for nationwide, district-level ('bottom-up') malaria commodities micro-planning to ensure that commodity procurements and distributions match district-level needs and are reaching beneficiaries. In FY 2013, PMI will continue to support three staff enrolled in the Field Epidemiology and Laboratory Training Program (FELTP) and will increase regular on-site support and technical assistance to the Ethiopian Health and Nutrition Research Institute (EHNRI).

Health Systems Strengthening and Integration: As one of the GHI Plus Countries, PMI in Ethiopia is fully aligned with the GHI principles of building country capacity and integrating across programs. PMI provides significant support to Ethiopia's Health Extension Program

(HEP) that includes 30,000 HEWs staffing 15,000 health posts, that provide curative and preventive services for a range of conditions, including malaria, at the community level. With FY 2013 funding, PMI will continue its support for integrated training and supervision of HEWs and for development of their capacity to detect malaria outbreaks in their catchment population. In addition, PMI and PEPFAR will continue to provide the majority of the support for implementing the PLMP and strengthening Ethiopia's drug management system. The PMI-led initiative on micro-planning for malaria commodities is building capacity for forecasting commodities requirements and monitoring consumption at national, regional, and district levels. These skills can easily be used to forecast and monitor other essential health commodities. In addition, PMI support has helped to re-establish the capacity within Ethiopia to conduct entomologic surveillance and monitor insecticide resistance. Lastly, PMI is leveraging support through PEPFAR, to strengthen laboratory diagnosis of malaria, in conjunction with strengthening of laboratory capacity to diagnose tuberculosis and HIV infections.

STRATEGY

INTRODUCTION

Malaria prevention and control are major foreign assistance objectives of the U.S. Government (USG). The purpose of this Malaria Operational Plan (MOP) is to provide a framework and a rationale for supporting malaria prevention and control projects in Ethiopia with FY 2013 US Agency for International Development (USAID) funds to accomplish the USG's foreign assistance objectives. Drafting of this MOP document began in mid-2012, with finalization expected by late 2012. Previously published MOP documents available on www.pmi.gov were used as references to develop this document for Ethiopia. Proposed PMI Ethiopia FY 2013 funding is contingent on USG official approval processes; any approved PMI FY 2013 funding will likely be unavailable for authorized expenditures until late 2013. The MOP process considers information from the Ethiopian Federal Ministry of Health (FMOH), international malaria program donors including the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), malaria subject matter experts, and other malaria program stakeholders about the malaria situation, and the malaria control program capacities and gaps in Ethiopia.

The President's Malaria Initiative (PMI) was launched in June 2005 as a 5-year, \$1.2 billion inter-agency initiative to rapidly scale up malaria prevention and treatment interventions and to reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. The USG announced Ethiopia as a PMI focus country in 2007, supported by \$20 million PMI funding beginning in FY 2008. PMI support was initially targeted to malaria control activities in the Oromia Regional State, which has about one-third of Ethiopia's malaria burden, population, and land area. With both GFATM and PMI support and that of other donors, the Government of Ethiopia (GoE)'s FMOH has been able to dramatically scale-up its efforts in malaria prevention and control.

The 2008 Lantos-Hyde Act extended PMI program funding through FY 2014. In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a multi-year, comprehensive USG effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the USG provides assistance to partner countries improve health outcomes, with a particular focus on improving the health of women, newborns, and children. PMI immediately became a core component of the GHI, along with the USG's global health programs for HIV/AIDS (the President's Emergency Program for AIDS Relief, PEPFAR) and tuberculosis and, included the USG's support for GFATM. The USG closely aligned its support for PMI, PEPFAR, and GFATM through various steering and oversight committees with funding processes within the GHI framework.

Programming of PMI activities has been aligned to follow the core principles of GHI: encouraging country ownership and investing in country-led plans and health systems; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; implementing a woman- and girl-centered approach; improving monitoring and evaluation; and promoting research and innovation. In June 2010, the USG selected Ethiopia as one of the first eight 'GHI Plus' countries, involving comprehensive, multi-sectorial approaches

to USG global health development including PMI's support for malaria control and prevention. Since 2011, PMI annual budgets for Ethiopia increased sufficiently (up to \$43 million annually) to allow more support for malaria activities beyond the borders of Oromia Regional State.

Malaria is ranked as the leading communicable disease in Ethiopia, accounting for about 30% of the overall Disability Adjusted Life Years lost. Approximately 57.3 million (68%) of the 84.3 million population of Ethiopia live in areas at risk of malaria. According to the FMOH, malaria was the leading cause of outpatient visits and health facility admissions in 2009/2010, accounting for 14% of reported outpatient visits and nearly 9% of admissions. Malaria also was among the ten leading causes of inpatient deaths among children less than five years of age. Because of a weak malaria disease surveillance system and the inability of the Health Management Information System (HMIS) to capture all necessary malaria related indicators, official estimates of the true burden of malaria in Ethiopia are imprecise.

Previous PMI MOPs for Ethiopia highlighted unique aspects of malaria in Ethiopia, including the PMI geographical focus; Ethiopia's long history of commitment to malaria control; the structure of the health care system; the community-level Health Extension Program (HEP); the importance of diagnostics given the presence of both *Plasmodium falciparum* and *P. vivax* each with distinct treatment regimens according to current national guidelines; and the instability of malaria transmission and historical pattern of recurrent epidemics. There have been important changes in four of these elements these past years.

Geographical focus and scale: PMI in Ethiopia primarily focused on Oromia during the first three years of the initiative. Oromia is both the largest and, by many health indicators, the most underserved regional state in Ethiopia. PMI commodity and operations support from FY 2013 funding will continue to concentrate primarily in Oromia. However, PMI support has expanded nationwide by filling commodity gaps and supporting planning, training and use of strategic information. Besides strengthening these national level capacities, PMI will also continue to support the FMOH-led nationwide roll-out of Integrated Community Case Management (iCCM) with targeted support to districts in six regional states. This program is believed to have had a significant impact in malaria disease-related morbidity and mortality, especially in children less than five years of age, which has greatly contributed to Ethiopia's progress towards achievement of Millennium Development Goal 4. PMI also has expanded its support for malaria laboratory strengthening activities to other regional states in cooperation with EHNRI.

Diagnostics and the treatment of malaria and pneumonia: The HEP is a cornerstone of the FMOH's malaria control strategy. In recent years, the FMOH has refined its HEP strategy by supplying HEWs with multi-species RDTs, that can diagnose both *P. falciparum* and *P. vivax*, and with stocks of chloroquine for the treatment of *P. vivax* (which was previously often treated with artemether-lumefantrine (AL)). Beginning in 2012, rectal artesunate will be supplied to HEW's for pre-referral treatment of severe febrile illness. In addition, HEWs have now been trained to treat suspected pneumonia cases with the antibiotics such as cotrimoxazole. These new tools are being rolled-out through iCCM and have the potential to greatly increase the HEWs' capacity for accurate differential diagnosis and correct clinical management of fevers at the community level.

Entomological monitoring and insecticide selection: With support from PMI, Ethiopia has greatly expanded its capacity for entomological monitoring, including testing for insecticide resistance in anopheline mosquitoes. Evidence of resistance to dichloro-diphenyl-trichloroethane (DDT) and, in some areas, to pyrethroid's, prompted the FMOH to pursue a long-term insecticide resistance management strategy and to discontinue DDT after almost six decades of use as the insecticide of choice. A network of Ethiopian institutions and entomologists has been established to sustain and coordinate entomological monitoring, which will provide an evidence basis for decision making on the use and deployment of IRS and LLINs.

Epidemic threat: So-called “epidemic years,” occurring every five to eight years, have been the typical pattern of malaria in Ethiopia, with the last such epidemic years occurring in 2003-2004. The western, central and eastern highlands, as well as the highland-fringe areas along the Rift Valley are especially vulnerable to epidemics. In the past three decades 48 major ‘epidemic episodes’ have occurred, with especially large epidemics in 1988, 1991, 1992, 1998, 2003, 2004 and 2005. Unexpected population movements, local flooding and famine conditions, and emerging resistance to antimalarial drugs and insecticides may also affect local communities’ risks for local seasonal malaria transmission and for malaria epidemics. While no epidemics were reported in 2006 or 2007, several district level outbreaks have been reported in 2008 through 2012. The unstable and largely unpredictable epidemiology of malaria in Ethiopia makes accurate, timely surveillance of paramount importance.

MALARIA SITUATION IN ETHIOPIA

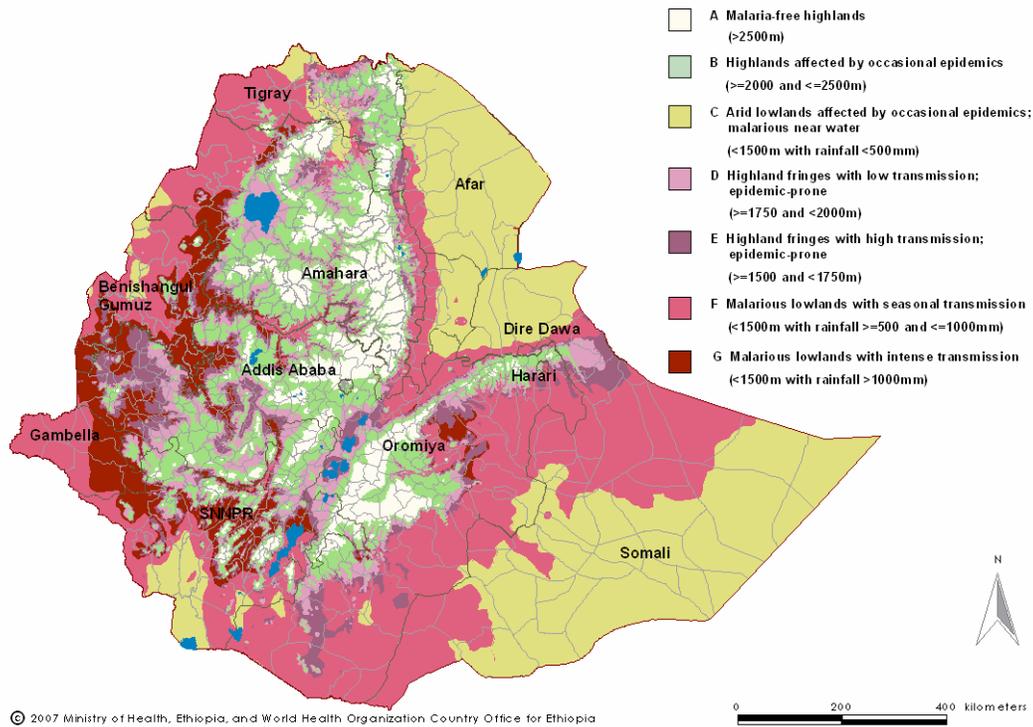
Epidemiology

In Ethiopia, malaria transmission is largely determined by altitude and climate as affected by Indian Ocean conditions and global weather patterns, including El Nino and La Nina. Most of the malaria transmission occurs between September and December, after the main rainy season from June to August. Certain areas, largely in the western and eastern parts of the country experience a second “minor” malaria transmission period from April to May, following a short rainy season from February to March. Five main malaria eco-epidemiological strata are recognized:

- Stable, year round, transmission in the western lowlands and river basin areas of Gambella and Benishangul-Gumuz Regional States;
- Seasonal transmission in lowland areas <1,500 meters;
- Epidemic-prone areas in highland fringes between 1,500 – 2,500 meters;
- Arid areas where malaria is only found near semi-permanent water bodies; and
- Malaria-free highland areas >2,500 meters.

Additional stratification is based on annual rainfall (**Figure 1**).

Figure 1. Distribution and Seasonality of Malaria in Ethiopia.



The 2007 MIS indicated that parasite prevalence (as measured by microscopy) in Ethiopia was 0.7% and 0.3%, respectively for *P. falciparum* and *P. vivax* below 2000 meters altitude. The MIS 2011 draft report shows 1.3% of children under age of 5 years were positive for malaria in microscopy and 4.5% were positive for malaria using RDTs. *P. falciparum* constituted 77% of these infections. The 2011 MIS survey demonstrated a remarkable demarcation of malaria risk at an altitude of 2,000 meters, with a thirteen-fold higher malaria prevalence at lower altitudes compared to higher elevations. There was essentially no *P. falciparum* detected by microscopy among persons surveyed within households having measured elevations above 2,000 meters in the MIS 2011.

Burden of Clinical Malaria

Despite the low malaria parasite prevalence compared to many African countries, malaria remains the leading communicable disease seen at health facilities in Ethiopia. Historically, malaria has forced people to inhabit the less agriculturally productive highlands. Given that the country's economy is based on agriculture and peak malaria transmission coincides with the planting and harvesting season, this has placed a heavy economic burden on the country.

As stated previously, malaria is the leading cause of outpatient consultations and of health facility admissions. About 75% of the geographic area of the country has significant malaria transmission risk (defined as areas <2,000 m), with about 68% (57.3 million) of the country's total population living in these areas.

The FMOH estimates that there are between 5–10 million clinical malaria cases each year.

However, only about one million malaria cases are officially reported. Just 462,623 (55.84%) of all suspected cases were tested and 256,487 (23.68%) confirmed positive by a diagnostic test, according to in the 2009/2010 Health and Health Indicators Report. Ethiopia reported 1,581 malaria deaths in 2010 according to the 2011 World Malaria Report.

Malaria morbidity reporting from these official FMOH surveillance systems is improving, but is still substantially incomplete. PMI sponsored a micro-planning survey in late 2011 to help estimate malaria morbidity and malaria commodity requirements from July 2010-June 2011 based upon district level reporting from 672 districts (woredas), representing 95% of malarious districts in Ethiopia. This micro-planning survey documented 10,021,543 suspected malaria cases, of which 5,888,381 (58%) had a diagnostic test; 7,035,179 malaria cases were diagnosed, including 2,902,017 laboratory confirmed and 4,133,162 probable malaria cases (which were treated without diagnostic testing). There were 1,904,853 laboratory confirmed *P. falciparum* cases, and 997,164 *P. vivax* cases reported. Of those who underwent diagnostic testing, 49% were confirmed to have malaria. From these micro-planning data, an estimated 3,421,905 *P. falciparum* and 1,741,618 *P. vivax* cases would have been diagnosed had all of the 10,020,000 suspected malaria patients been laboratory tested. There is evidence that the annual ACT requirements in Ethiopia will continue to decline below the peak of approximately 9 million ACT treatments annually as RDT's and microscopy continue to be scaled-up.

Recent data appear to indicate a drop in malaria morbidity and mortality compared to 2000-2004, with an apparent low point of outpatient malaria morbidity in 2007, and an estimated 30% increase in malaria outpatient morbidity since 2007. While no large malaria epidemics were reported in 2006 and 2007, there are signs suggesting an increase in malaria transmission in some parts of the country, including several focal outbreaks reported in SNNPR, Amhara, Tigray, and Oromia in the last five years. Despite this apparent increase in morbidity, annual inpatient malaria cases, malaria deaths, and malaria epidemics in Ethiopia have substantially decreased through 2012, compared to the baseline year of 2004.

Malaria Vectors

Anopheles arabiensis, a member of the *An. gambiae* complex, is the primary malaria vector in Ethiopia, with *An. funestus*, *An. pharoensis* and *An. nili* secondary vectors. The sporozoite rate for *An. arabiensis* has been recorded to be up to 5.4%. The host-seeking behavior of *An. arabiensis* varies, with the human blood index collected from different areas ranging between 7.7 and 100%. *An. funestus*, a mosquito that prefers to feed on humans, can be found along the swamps of Baro and Awash rivers and shores of lakes in Tana in the North and the Rift Valley area. *An. pharoensis* is widely distributed in Ethiopia and has shown high levels of insecticide resistance, but its role in malaria transmission is unclear. *An. nili* can be an important vector for malaria, particularly in Gambella Regional State. Detailed information on the basic ecology and distribution of these vectors in Ethiopia is provided in the FY 2008 MOP. However, insecticide resistance among these vectors has become an important issue, with implications for vector control strategies.

ETHIOPIA'S HEALTH SYSTEM

Ethiopia operates under a federal system of government. Administratively, the country is divided into regional states, zones, districts, and communities/municipalities (*kebeles*) (**Figure 2**). There are about 700 districts containing areas with substantial malaria risk in Ethiopia, with an estimated at-risk population of 57.3 million people. The best available proxy for local malaria transmission risk in Ethiopia is household altitude below 2,000 meters (above sea level), since malaria is rarely transmitted at higher elevations. Many districts have variable topographical features, with some households located above and other households located below 2,000 meters. Because of this, malaria risk is unevenly distributed within many districts and kebeles in part because household locations are at various altitudes and distances from efficient malaria vector breeding sites.

According to the Health Sector Development Plan (HSDP) IV Annual Performance Report EFY 2003 (2010/2011), there were a total of 122 public hospitals, 2,660 health centers, and 15,095 health posts in Ethiopia. Oromia has 306 districts divided into 18 zones and 9 'special towns' (**Figure 3**). According to 2010/2011 ORHB data, there are 36 hospitals, 1,157 health centers, 656 health stations and 5,929 functional health posts operated by the GoE. In addition, there are 4 hospitals, 2 health centers, 80 health stations and 5 health posts operated by NGOs. There are also 4 hospitals, 3 health centers and 115 health stations under other governmental organizations (e.g., teaching or armed services hospitals). Oromia's health professional to population ratio is very low with one physician serving 107,602 people (WHO standard is 1:10,000), and one nurse serving 9,309 people (WHO standard is 1:5,000). The available hospital beds (GoE 2,867 and NGO 340 hospital beds) total 3,207 with a bed-to-population ratio of 1:9,153 (WHO standard 1:3,000). The health service coverage in Oromia is lower than in most of the other regional states in Ethiopia, which has contributed to low coverage in vital indicators such as vaccination and family planning.

As in the rest of the country, the health care service delivery system in Oromia has been re-organized from the previous six-tiers into a four-tier system. The lowest tier is known as the 'Primary Health Care Unit', which is composed of one health center and five satellite health posts, designed to serve approximately 25,000 people. The second tier is a district hospital with a catchment population of 100,000 people. The third is a zonal hospital covering a population of one million people and the top tier is the specialized (regional) hospital for a population of five million.

Figure 2. Administrative Regional States and Zones of Ethiopia.

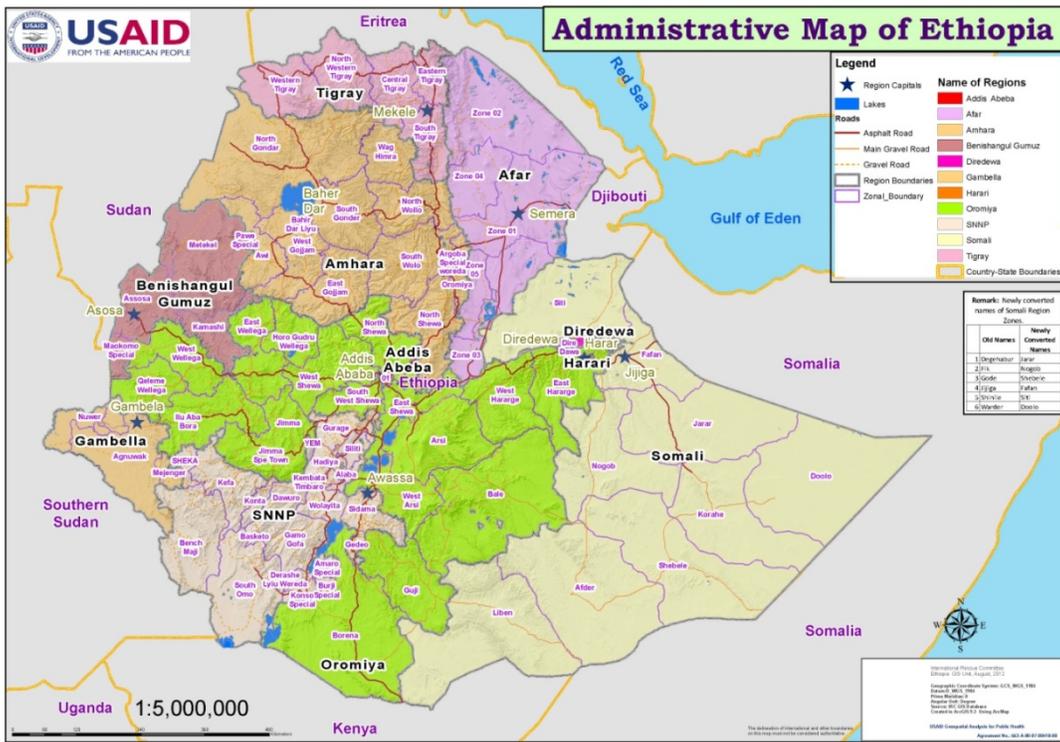
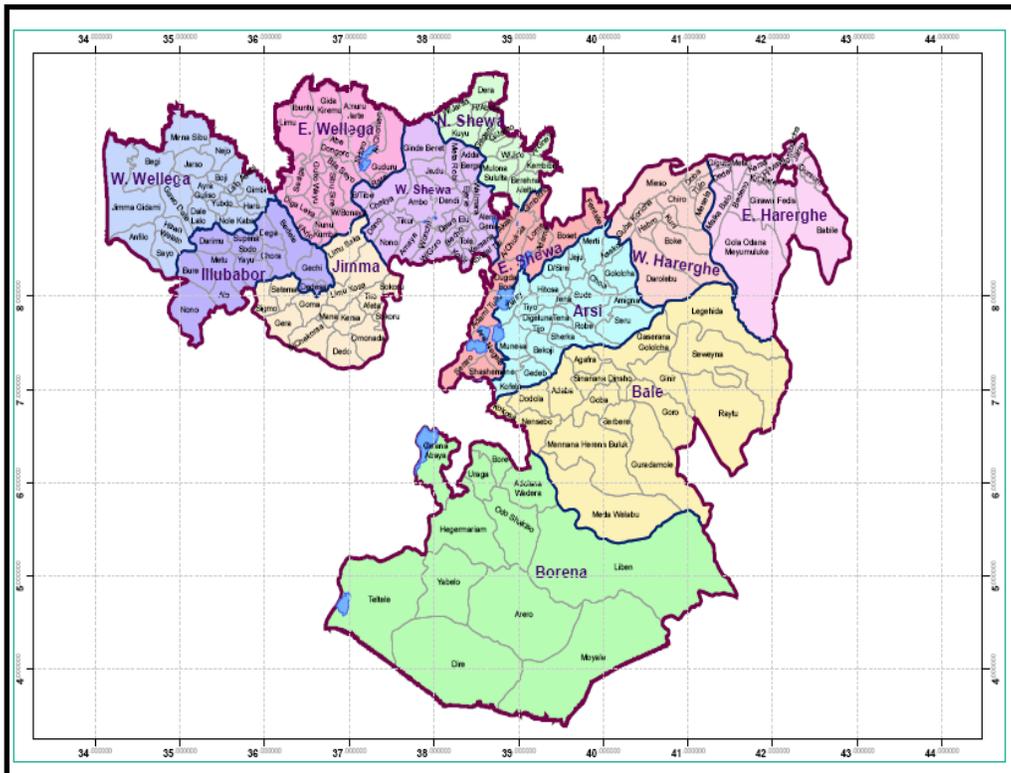


Figure 3. Administrative Zones and Districts of Oromia Regional State.



The typical health post is staffed by two HEWs delivering 16 selected health packages, including one on malaria [<http://cnhde.ei.columbia.edu/training/index.html>]. HEWs are paid FMOH staff; they undergo a one-year training after a high school diploma, and usually originate from the communities they serve. The HEWs focus on preventive services, except for malaria, mild pneumonia, and non-bloody diarrhea where they are expected to provide curative services using the iCCM approach. For malaria, they can confirm diagnosis with an RDT and provide patients with AL (for *P. falciparum*) or chloroquine (for *P. vivax*) if the RDT is positive. Severe malaria cases are to be referred to the next appropriate health facility. HEWs are also expected to supervise seasonal activities, including SBCC and mass vaccination campaigns, participate in surveys and a range of other community health activities. Additionally, HEWs have become more directly involved in supervising IRS spray teams and door-to-door mobilization for IRS. The FMOH envisages decentralizing IRS operations to the primary health care unit level, where HEWs would be primarily responsible for managing the operations in their catchment area (kebele). Nevertheless, this approach has not been fully developed and there are concerns that this may result in a drop in the quality of spray operations, substandard environmental compliance, and use of insecticide for unintended purposes.

The health center provides comprehensive primary health care services and backup to the health posts by accepting referral cases, while district and zonal hospitals provide secondary health care. In Oromia, hospitals in Adama, Nekemte, Asella, Mettu and Ambo can potentially serve as specialized referral hospitals based on geographical suitability. Jimma Hospital, under the Ministry of Education, is providing tertiary level health care for the city of Jimma and the surrounding population.

ETHIOPIA'S MALARIA CONTROL STRATEGY

The framework of the national malaria control strategy is the GoE's, 2011-2015 HSDP. Ethiopia developed a five-year National Strategic Plan for Malaria Prevention and Control (2011 – 2015). This strategic plan was developed following the 2007 MIS, as well as the discussions and recommendations following a consultative meeting held in Adama, Ethiopia, in March 2009 with key in-country and international malaria stakeholders. The HSDP and the national strategic plan are in line with RBM partnership objectives. The following goals and objectives are set out in the five-year strategic plan:

Goals

- By 2015, achieve malaria elimination within specific geographical areas with historically low malaria transmission;
- By 2015, achieve zero deaths due to malaria in the remaining areas with malaria transmission.

Overall objective

The objective of the National Strategic Plan for Malaria Prevention and Control 2011 – 2015 is to consolidate the achievements of the 2006-2010 strategic plan and sustain its impact.

Specific objectives

- 100% of suspected malaria cases are diagnosed using RDTs and/or microscopy within 24 hours of fever onset;
- 100% of positive malaria diagnoses are treated according to national guidelines;

- 100% of households in malarious areas own, on average, two LLINs;
- At least 80% of people at risk of malaria use LLINs;
- IRS coverage is increased and maintained to 90% of households in IRS-targeted areas;
- 100% of health posts in malarious *kebeles* provide the full malaria prevention and treatment package, including outreach services; and
- To achieve a high quality, broadly-based malaria infection detection, investigation and response surveillance system to further reduce malaria transmission.

In the new strategic plan, community empowerment and social mobilization are given top priority among malaria control strategies, based on the results of the 2007 MIS, which showed substantial differences between the coverage and utilization of key malaria interventions by the populations at risk of malaria. Similarly, malaria diagnosis, case management, disease surveillance and epidemic control are geared to serve Ethiopia's goal of shrinking malaria endemic areas by 2015 and country-wide elimination by 2020. Accordingly, all malaria diagnosis is to be based on diagnostic testing, either by microscopy or RDTs, and treatment of malaria cases are to be guided by the result of the diagnosis. Surveillance will focus primarily on individual cases to identify the sources of infection and to limit further transmission.

PMI provided technical assistance to FMOH for a 2012 update to the Ethiopian National Guidelines for malaria diagnosis and treatment, vector control, and malaria epidemic detection and response, available at link: http://www.moh.gov.et/English/Resources/Documents/National%20malaria%20guidelines_2012.pdf

INTEGRATION, COLLABORATION AND COORDINATION

Maternal, Neonatal and Child Health, Family Planning, Reproductive Health

Following the first National Family Fertility Survey conducted in 1990, the USG started supporting the delivery of key maternal, neonatal and child health (MNCH), family planning and nutrition services at the community level including expanded immunization, family planning, essential nutrition actions, malaria prevention, control and case management, promotion of ANC, and water, sanitation and hygiene. These interventions are delivered through health centers, health posts and households and focus on rural, peri-urban and hard-to-reach populations. To date, the program has trained over 60,000 community health volunteers, provided assistance to over 13,000 HEWs, and has reached over 32 million people (40% of the Ethiopian population) in 286 districts in six of the country's nine regions. Under the Feed the Future Initiative, the USG will also continue to integrate health, agriculture, and humanitarian assistance and livelihood sector platforms to maximize impact on nutrition.

Most of PMI support to these activities is being implemented through partners supporting the rural HEWs and the recently scaled up Health Development Army at community-levels with a multi-agency collaborative approach using GHI and USAID processes and structures. PMI uses this platform to reach the most needy communities in malaria diagnosis and treatment, epidemic detection and response, and also to promote best practices in malaria case management by HEW's at health posts, including use of iCCM clinical algorithms.

President's Emergency Plan for AIDS Relief (PEPFAR) , GHI, and other USG Programs

PMI is working with PEPFAR within the GHI framework through USAID and CDC structures, to harmonize the Ethiopia FY 2012 Country Operational Plan (COP), with the USAID Health team's Operational Plan (OP) for tuberculosis and population health to ensure the respective plans complement and strengthen each other. Thus, currently approximately 20% of PMI's budget is going to so-called 'wrap around' activities with PEPFAR, i.e., either through co-funding of an award or by leveraging resources that have been established through previous PEPFAR support (e.g., laboratory infrastructure overlapping with HIV, and tuberculosis diagnosis, malaria SBCC harmonization with other health messages). PMI also has important cooperative malaria bed net hang up projects with Department of Defense (DoD) Combined Joint Task Force-Horn of Africa (CJTF-HOA) and other malaria projects with Peace Corps and CDC (i.e., Field Epidemiology and Laboratory Training Program (FELTP)) within the GHI context.

Neglected Tropical Diseases

Several neglected tropical diseases (NTDs) are prevalent in Ethiopia, including soil-transmitted helminths, filariasis, leishmaniasis, onchocerciasis, schistosomiasis, and trachoma. The FMOH and certain other in-country stakeholders have detailed information concerning some of these NTDs, but data for other NTDs is limited (e.g., filariasis and schistosomiasis).

Only trachoma and onchocerciasis have large-scale intervention programs in Ethiopia, with mass drug administration campaigns using azithromycin and ivermectin, respectively. For those areas where malaria, filariasis and leishmaniasis occur, it is likely that the malaria vector control interventions of IRS and LLINs will also have a beneficial impact on other vector-borne diseases.

PMI also supported the development of a malaria risk map for Oromia and SNNPR regions using data from school-based malaria surveys. Leveraging additional funding support from the Wellcome Trust, school children were surveyed for helminths. Continued efforts are needed to reduce anemia prevalence in children, both by controlling malaria and soil-transmitted helminths.

The PMI in-country staff is assisting the FMOH in finalizing a National Neglected Tropical Disease Strategy as well as supporting the FMOH in coordination and integration of malaria activities with activities planned under the NTD strategy.

Coordination with other Partners

The Malaria Control Support Team (MCST) provides coordinated malaria technical support to the national and regional programs and is comprised by members of the FMOH, donor and international organizations, governmental and non-governmental organizations, and academia. The primary task of the MCST is to support the FMOH and regional health bureaus (RHBs) through ongoing technical assistance, resource mobilization, and support to epidemic

preparedness and response. The MCST provides a common forum to share duties and responsibilities, avoid duplication and discuss priorities. PMI has been a member of the MCST since 2008.

Part of the MCST is the Technical Advisory Committee, which includes the main malaria stakeholders in the country, i.e., FMOH, Carter Center, CNHDE, MACEPA, Malaria Consortium, PMI, UNICEF and WHO. PMI is also a member of the Technical Advisory Committee representing a technical core of the MCST which advises the FMOH on policy and program implementation issues, providing technical assistance on an *ad hoc* basis, and assisting with malaria program integration issues.

PMI has also been instrumental in the development and finalization of five Global Fund proposals (Round 7, 8 and 10, Round 2 Rolling Continuation Channel, and recent Transitional Funding Mechanism) as well as the development and updating of in-country guidelines and strategies.

In addition, PMI is supporting coordination of malaria research stakeholders, academia and FMOH to fill the gap between the implementation of malaria research and its use by researchers, practitioners, policymakers, and organizations involved in the prevention and control of the disease. Resolving this gap would serve to increase the benefits of quality research to improve prevention and control, and avoid duplication of efforts and waste of resources.

PMI GOALS, TARGETS AND INDICATORS

Under the GHI, the goal of PMI is to reduce the burden of malaria (morbidity and mortality) by 70% compared to 2006/2007 levels in the initial PMI countries. By 2015, PMI will have assisted the Oromia Regional State of Ethiopia to achieve the following targets in populations at risk for malaria and targeted by activities supported by PMI:

- >90% of households with a pregnant woman and/or children <5 years of age will own at least one ITN;
- 85% of children <5 years of age will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses in geographic areas targeted for IRS will have been sprayed;
- 85% of pregnant women and children <5 years of age will have slept under an ITN the previous night or in a house that has been sprayed with IRS in the last 12 months (*note*, because of the highly seasonal transmission of malaria in Ethiopia, one spray round per year is thought to be enough to protect the community); and
- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria.

PROGRESS ON COVERAGE AND IMPACT INDICATORS

Malaria Indicator Survey 2007 and 2011

The 2007 and 2011 MIS surveyed key malaria interventions, treatment-seeking behavior, anemia prevalence in children less than five years of age, malaria prevalence in all age groups, malaria

knowledge among women, and indicators of socioeconomic status. PMI provided technical and financial support to over-sample Oromia Regional State to provide a regionally representative baseline and follow-up for PMI activities. For both surveys, field work was carried out from October to December during the high transmission season. The survey results were stratified by regional states, altitude (with communities <2,000 meters considered ‘malarious’), and thus designated for NMCP targeting.

Table 1. Key Malaria Indicators Reported in DHS 2005, MIS 2007 and MIS 2011 at National Level and in Oromia.

<i>Indicator</i>	<i>DHS 2005</i>	<i>MIS 2007</i>			<i>MIS 2011</i>	
	<i>National</i>	<i>National (< 2,000 m)</i>	<i>National (≤ 2,500 m)</i>	<i>Oromia (≤ 2,500 m)</i>	<i>National <2000m</i>	<i>Oromia <2000m</i>
Percent households with at least one LLIN	3.4	65.3	53.1	41	54.8	43.7
Percent households with more than one LLIN	-	36.6	29.5	21.4	23.6	17.3
Percent children < five years of age sleeping under an LLIN the previous night	1.6	41.5	33.1	24.3	38.0	26.5
Percent pregnant women sleeping under an LLIN the previous night	1.1	42.7	35.2	25.6	34.7	26.7
Percent households reporting indoor residual spraying in the past 12 months	2.3	20.0	14.2	12.5	46.6	43.0
Percentage of households protected by at least one LLIN and/or IRS					71.7	63.7
Percent children < five years of age with fever in past two weeks	-	24.0	22.3	21.5	19.7	15.4
Percent children with fever who took antimalarial drugs	0.7	11.9	9.5	6.6	32.6	38.8
Percent who took an antimalarial drug same or next day	-	4.8	3.9	1.3	8.5	13.8
Percent children with fever who sought treatment from facility/provider same/next day	-	16.3	15.4	16.4	51.3	59.5
Malaria prevalence by microscopy <i>P. falciparum</i> (%)	-	0.7	0.5	0.1	1.0	0.2
Malaria prevalence by microscopy <i>P. vivax</i> (%)	-	0.3	0.2	0.2	0.3	0.3

Compared to the Demographic and Health Survey (DHS) conducted in 2005, results from the MIS 2007 reflect the significant effort of the FMOH-led scale-up of malaria prevention and control interventions, with substantial increases in ITN ownership and use, as well as malaria knowledge. The 2011 MIS did not show an improvement in LLIN ownership or use from MIS 2007, but those seeking treatment within 24 hours and women’s malaria knowledge were markedly improved. **Tables 1 and 2** report national data for areas <2,000 m and <2,500m; whereas, data reported for Oromia includes all areas ≤ 2,500 m in 2007 and <2,000m in 2011).

Table 2. Malaria Knowledge among Eligible Women Age 15-49 years

<i>Survey</i>	<i>Region</i>	<i>Percent who have heard of malaria</i>	<i>Percent who recognize fever as symptom</i>	<i>Percent who report mosquito bite as cause</i>	<i>Percent who report nets for prevention</i>
<i>MIS 2007</i>	<i>National (< 2000 m)</i>	79.5	50.8	41.1	38.2
	<i>National (≤ 2500 m)</i>	74.6	44.4	35.8	32.8
	<i>Oromia (≤ 2500 m)</i>	68.8	31.6	32.0	22.6
<i>MIS 2011</i>	<i>National (<2000m)</i>	71.3	76.0	71.2	63.4
	<i>Oromia (<2000m)</i>	68.7	71.3	73.2	65.5

Both the 2007 and 2011 MIS showed the gaps in the scale-up of malaria interventions, clearly indicating needs for better targeting of LLIN distributions and a comprehensive SBCC approach to (i) maximize use of ITNs; (ii) maximize the efforts made in scaling-up IRS activities (e.g., by reducing refusal rates of households to be sprayed and decreasing the practice of plastering after IRS); and (iii) continue to increase access to malaria case management services.

Health Facility Surveys 2007 – 2012

In 2007, with the support of WHO, the FMOH carried out a health facility survey in a stratified convenience sample of 13 hospitals in Afar, Amhara, Oromia and Tigray. The main impact indicators were percentage change in number of in-patient malaria cases, in-patient malaria deaths and laboratory-confirmed out-patient cases in children < 5 and ≥ 5 years old prior to 2001–2005/6 and after 2007 (i.e., after the nationwide implementation of LLINs and ACTs).

Comparing 2007 against the average of 2001–2006, observed declines of 73% for children < 5 years old in inpatient malaria cases, 62% for inpatient malaria deaths, and 85% for outpatient laboratory-confirmed cases. Adjusting for pre-intervention trends, the estimated declines in the two age groups ranged from 3% to 91% across the malaria indicators and age groups for which statistical testing was possible. For inpatient deaths in children under five years of age, too few data points were available to allow statistical testing. In comparison, non-malaria out-patient cases and in-patient cases and deaths were higher (by 1% to 45%) in 2007 compared to the average of 2001–2006, except for inpatient deaths which declined by 13% for those <5 years and 31% for those ≥ 5 years of age. After adjustment for trends over 2001–2006, non-malaria inpatient cases declined significantly, ranging from 11–25%, while outpatient cases increased in children <5 years of age, but decreased in the age group ≥ 5 years of age. For in-patient deaths, no significant changes were apparent in 2007, when adjusting for prior time trends.

Although the findings were encouraging, their relevance for the overall monitoring of national malaria intervention efforts was limited due to a number of factors, including the survey's small sample size and the exclusion of health centers and health posts, where most malaria cases are being diagnosed and treated. Other investigators (Lancet 2011; 378: 1139–65 including online appendix data) recently estimated that among children less than five years of age in Ethiopia, 376,922 and 277,186 deaths from all causes, and 7,743 and 4,514 malaria deaths occurred in 2000 and 2010, respectively.

Epidemic Detection Sites 2010 – 2012

Since March 2010 and through April 2012, PMI assisted ORHB to fully scale up support to malaria epidemic detection sites (see also section J.2.), within ten malarious districts in Oromia Regional State. These ten epidemic detection sites comprise distinct Primary Healthcare Units, (i.e., health centers and their satellite community-level health posts), serving a combined catchment area of approximately 423,000 people and featuring weekly reporting of laboratory confirmed malaria morbidity via weekly text messages from 83 health facilities.

During the initial surveillance interval of 27 months since the system was established, 239,960 patients attended health services at these sites. Of these, 102,568 patients were tested for malaria, 28,339 (28%) of which had a confirmatory diagnosis for either mixed or *P. falciparum* (47%) or only *P. vivax* (53%). The overall incidence of severe malaria was 87 / 28,334 (0.3%) among those with confirmed malaria; one death due to malaria was reported from these ten sites within the last two years. Four district level malaria epidemics were detected (using standard WHO criteria): two due to *P. falciparum* and two due to *P. vivax*. An epidemic of relapsing fever due to louse-borne borreliosis was also detected by this surveillance system. This epidemic detection system also helped to promptly identify and mitigate shortages of malaria commodities such as antimalarial medicines and laboratory reagents.

At one district, a *P. falciparum* epidemic lasted about nine months, causing one death, and 62 hospitalizations. This outbreak failed to respond to prompt detection, maintenance of adequate diagnostic and treatment capacities, and three rounds of IRS spraying. After a special investigation revealed a profound lack of LLINs in the district and evidence of vector insecticide resistance, the malaria outbreak waned after PMI helped organize a bed net hang-up, and keep-up campaign to facilitate distribution and proper use of PMI nets jointly with CJTF-HOA and an implementing partner specializing in SBCC.

CHALLENGES, OPPORTUNITIES AND THREATS

Challenges

Programmatic challenges in malaria prevention and control include human resources gaps including shortages of appropriately educated and trained health professionals within malaria programs in districts, Regional Health Bureaus, and at the FMOH, and high staff turnover. PMI supports the FELTP that is designed to educate and train epidemiologists and laboratory personnel supporting malaria programs in Ethiopia. PMI also supports WHO district level malaria program trainings, integrated refresher trainings and iCCM trainings per FMOH request.

Supply chain issues are an ongoing challenge. Ethiopia is a large country, with many remote areas that are far from major roads, providing challenges to delivering LLINs, RDTs, and malaria treatments to districts and to Health Centers. Even more challenging is delivering RDTs, malaria treatments, and LLINs to health posts and households in remote rural areas within districts where access is especially difficult during the rainy seasons. Information management systems to detect malaria commodity shortages and stock outs need strengthening.

Opportunities

The FMOH of Ethiopia is committed to malaria prevention and control, giving high priority to health interventions that are also supported by PMI. There is especially high political commitment for the HEP. This is an important opportunity for malaria prevention and control since the HEP supports diagnostic testing and treatment for malaria, stabilization and referral of severe cases (including the use of rectal artesunate), LLIN distributions, and epidemic detection and response. SBCC activities are delegated increasingly to the HEP and to the new Health Development Army, that augments activities of HEWs in rural communities. Diverse elements of the Ethiopian public health system, academia, non-governmental organizations, and many other malaria stakeholders are committed to support the FMOH's effort in malaria prevention and control. The FMOH consults the Malaria Control Support Team's Technical Advisory Committee (TAC) and its sub committees for most technical issues. The TAC committee had been involved in helping to draft proposals for grants from Global Fund and helping to ensure that PMI's support to FMOH integrates well with Global Fund malaria support in Ethiopia.

PMI has several implementing partners that are capable of procuring, importing and distributing malaria commodities in a manner that harmonizes with FMOH's similar processes for Global Fund procurements. The Pharmaceutical Funding and Supply Agency (PFSA) has been strengthened by several years of PEPFAR support, and is actively supported by PMI's supply chain partners. Another PMI implementing partner has supported FMHACA in assessing and maintaining the quality of antimalarial drugs. PMI expects to work more closely in the future with PFSA through various supply chain partners to meet the FMOH malaria program needs.

Threats

Variable weather conditions, including *El Nino* and *La Nina*, that affect seasonal rains, and global warming trends may fuel malaria vector proliferation with resulting focal and widespread malaria epidemics, and may also create famines and population migrations. In response, PMI supports a malaria epidemic detection system in ten Oromia Region districts using weekly SMS reporting that are expected to expand to 40 districts under EHNRI supervision to supplement surveillance provided the PHEM system and HMIS. PMI supports the FELTP designed to investigate and help mitigate possible malaria outbreaks.

Currently standard malaria treatment includes artemether-lumefantrine (AL) for *P. falciparum* and chloroquine for *P. vivax* infections. In southeast Asia, antimalarial drug resistance has been well documented for these medicines. It is important to continue to document *in vivo* drug efficacy of these medicines and to provide an evidence basis for use of appropriate medicines for the respective infecting malaria species according to a laboratory-based diagnosis. PMI's promotion of best practices in malaria care and treatment such as assisting with drafting of the recently updated FMOH malaria diagnosis and treatment guidelines should help to reduce over-use of antimalarial medicines and delay the onset of antimalarial drug resistance.

Well-documented insecticide resistance already threatens the effectiveness of IRS and makes such operations increasingly costly. IRS requires precise targeting to ensure that spraying will be

effective and scarce resources are not wasted. There are concerns that increasing pyrethroid (deltamethrin) resistance will reduce effectiveness of both IRS and LLINs. Alternative insecticides to deltamethrin require less convenient timing of IRS application, and are more costly to keep the existing coverage. Proper handling, storage, and disposal of unused insecticides such as DDT pose occupational health, environmental impact and logistical challenges. PMI supports ongoing assessments of the emerging insecticide resistance situation to assist the FMOH, and continues to promote best practices in insecticide use.

PMI SUPPORT STRATEGY

PMI's support strategy for Ethiopia has evolved since PMI began its activities in FY 2008. Originally, support was focused primarily on Oromia Regional State. Since 2011, PMI has expanded its support in a number of areas beyond Oromia, providing technical assistance to national structures, and technical and programmatic support and commodities to other Regional States.

Support activities continued to be focused on scaling up LLINs, IRS, and improved case management, along with supportive activities such as SBCC, strengthening supply chain management and strategic information (i.e., surveillance, epidemic detection, and commodities micro-planning).

PMI's support to Ethiopia is in-line with GoE's HSDP (2011-2015) and National Strategic Plan for Malaria Prevention and Control (2011 – 2015). Funding is targeted to fill gaps in activities that are not already supported by the FMOH, Global Fund, or other donors. PMI support also has been targeted to translating best practices to areas and activities currently supported by other funding agencies.

OPERATIONAL PLAN

INSECTICIDE-TREATED NETS (ITNS)

NMCP/PMI Objectives

A cornerstone for malaria disease prevention in Ethiopia is the use of LLINs. The key strategy used by the country is a rolling periodic (every three years) free distribution of LLINs to all population groups living in endemic, high and moderate malaria risk areas of Ethiopia. Two LLINs per household was used as a strategy until 2011. Currently, Ethiopia aims to achieve universal coverage by distributing 1 LLIN per 1.8 persons (sleeping space) through mass, free campaigns at the community level through the HEWs and/ or health facilities. Ethiopia has distributed about 40 million LLINs since 2005. The recent MIS showed significant improvements in LLIN ownership in malaria risk areas from 3.4% in 2005 (DHS 2005) to 65% in 2007 and 55% in 2011 (MIS 2007, 2011). The proportion of children less than five who used an LLIN the previous night below 2,000 meters increased from 1.6% in 2005 (DHS) to 42% in 2007 and 38% in 2011.

Progress During the Last 12 Months

Between FY 2008 and FY 2012, PMI procured a total of 5.8 million LLINs, which were distributed primarily through the HEWs in Oromia Regional State. Distribution of LLINs was based on an Oromia-wide micro-plan developed by PMI in collaboration with the ORHB. This micro-plan includes district and kebele (lower level administrative unit) level data about number of malaria cases and key malaria commodities including ACTs, chloroquine, LLINs and RDTs. For LLINs, each annual micro-planning meeting compiles records of the number of LLINs previously distributed within the last three years, and documents LLINs that were more than three years old and which need to be replaced. The micro-plan estimates the 12-month need and gap of LLINs based on district-level sub-populations with malaria risk (generally by kebele), malaria morbidity, and LLIN data.

In addition to replacement LLINs, the number of “gap filling” nets was calculated by quantifying the number of new households (resulting from immigration and population growth rates) and malaria affected households that never received nets in previous distributions. The micro-planning process has now been adopted by other Regional States and has helped streamline and coordinate the commodity procurement and distribution process as well as allowing for tracking and prioritization of commodity distributions. The ORHB also used the micro-plan process to distribute with PMI support 475,000 LLINs procured by the World Bank.

In collaboration with CJTF-HOA and C-Change, LLIN hang-up campaigns were executed in seven districts. To date they have hung a total of more than 225,000 LLINs. A post-campaign assessment, undertaken in Dolo Mena woreda a year after the distribution, showed that this low-cost, high-impact intervention which was supplemented by provision of SBCC materials and training, increased ownership and use of LLINs from 5% to 99% and 3.2% to 33%², respectively. In May 2010, 35,000 LLINs were distributed by a U.S. Army Civil Affairs team (CJTF-HOA) to a population of 93,000 in Dollo Mena District, Bale Zone, Oromia. In July 2010 and in March

2012, PMI helped distribute and hang nets in two districts in the midst of focal malaria epidemics, and in both cases, the malaria emergencies resolved promptly.

Challenges, Opportunities and Threats

To date PMI procured LLINs are distributed to the district level in Oromia Regional State. Local districts apparently lack operational funds to distribute these nets to health posts and households. PMI funding to reimburse districts for distribution costs might reduce PMI's risks of LLIN losses from district storage facilities, and reduce malaria risks from LLIN non-use.

Gap Analysis

Table 3: FY 2014 Oromia LLIN Gap Analysis.

Oromia LLIN Need Calculation for 2014	
Population at risk in 2014 (micro-plan FY 2011), considering population growth of 2.9% (CSA 2008)	18,705,061
Total number of LLINs needed (1 LLIN for 1.8 people)	10,391,701
Available LLINs (from FY 2011 micro-plan)	4,399,451
Additional LLINs distributed in 2012	2,500,000
2009 + 2010 distributed LLINs to be worn-out in 2013	(1,550,000)
LLIN gap for FY 2014	5,042,250

Plans and Justification

The President's Malaria Initiative supports the FMOH policy and distribution of LLINs to most needy communities in the Oromia regional state. In addition to the LLIN procurement and distribution, PMI in collaboration with FMOH and other in-country stakeholders are currently developing an LLIN replacement strategy for the country.

Proposed Activities with FY 2013 Funding (\$10,100,000):

- **Procurement and distribution of LLINs** (\$10,000,000) Due to the pressing need in covering the LLIN gap, PMI will increase its support for procurement and distribution to 2.5 million LLINs. The LLINs will be distributed free to communities mainly through health facilities, HEWs, and in some occasions through NGOs.
- **Hang-up campaigns** (\$100,000): In FY 2013, PMI will continue to support LLIN hang-up campaigns in selected districts; districts will be selected following discussions with the ORHB and CJTF-HOA. Similar to previous LLIN hang-up campaigns, all households within a district's malaria-endemic kebeles will be targeted and hang-up activities will include comprehensive SBCC messaging. All activities will be coordinated with local authorities in order to ensure that engagement of targeted districts is maximized.

INDOOR RESIDUAL SPRAYING (IRS)

NMCP/PMI Objectives

IRS was first implemented in Ethiopia in the mid-1960s and has remained a key component of the national malaria prevention and control strategy since that time. In the current National Strategic Plan for Malaria Prevention and Control in Ethiopia (NSP 2011 – 2015), IRS is given high priority as a main component of vector control. The FMOH’s IRS objective is “to increase and maintain IRS coverage to 90% of households in IRS-targeted areas.” The targeted areas include high malaria burden areas, epidemic-prone areas, development projects, and malaria-affected communities with low access to the health care system. Specific IRS-targeted communities (kebeles) are selected based on historical malaria case loads, altitude, presence of nearby anopheline breeding sites, agriculture and water development practices, epidemic records, and other economic or social factors (settlements, etc). The selection of communities for IRS is refined every year and the same communities are often repeatedly selected for IRS because of continued high numbers of suspected malaria cases or other factors conducive to high malaria transmission. Malaria transmission in Ethiopia is seasonal, lasting for about three months, mostly peaking after the main rainy season. Depending on the residual life of the insecticide used and timing of spray operations, one spray round per year could give the required protection against malaria.

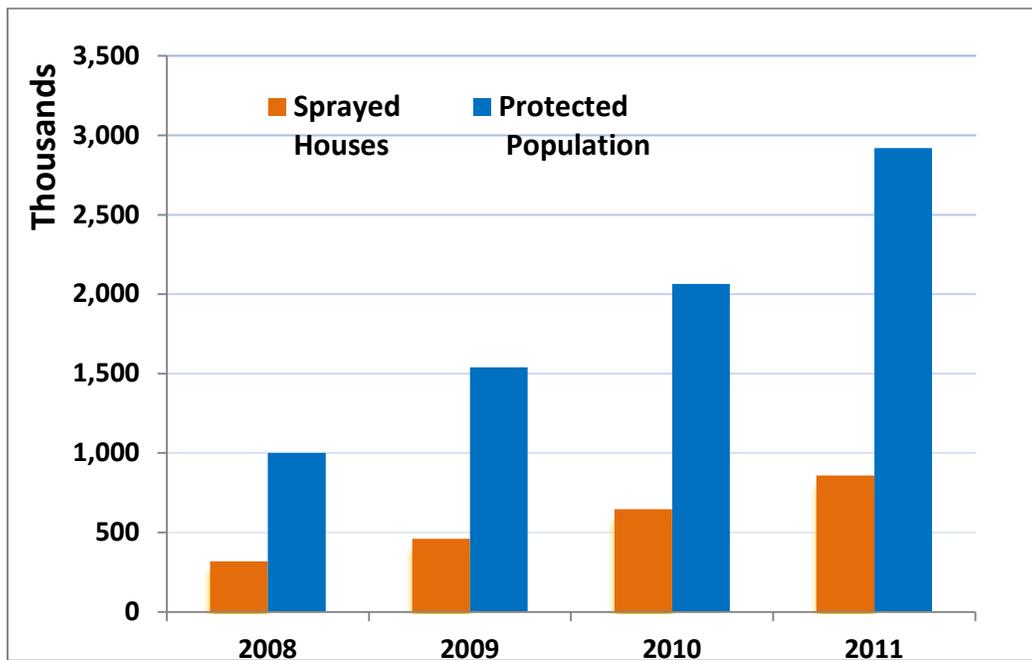
Progress During the Last 12 Months

Ethiopia’s spray program has expanded significantly since PMI began support for IRS in 2008, with an almost three-fold increase in sprayed structures from 2008 to 2011 (Figure 4). In 2011, PMI supported IRS operations across 50 districts in eight zones of Oromia Regional State. PMI’s spray program achieved a 98% coverage rate, resulting in 858,657 sprayed structures and the protection of 2,920,469 people. IRS operations were conducted in two rounds in 2011. The first spray round occurred from June to August 2011 using pyrethroids (deltamethrin) in 24 districts and the second spray round occurred from August to October 2011 in 26 districts with known pyrethroid resistance, using carbamates (bendiocarb). The difference in the spray timing is due to differences in the residual life of these two insecticides.

In 2011, PMI began a district graduation approach, whereby districts that had received PMI support for two or more years were considered to have sufficient capacity to assume greater technical and financial responsibility for the spray program. These districts were supported only partially in 2011 (referred to as “graduating districts”) and were responsible for providing the transportation costs of the spray program. This is in contrast to districts that had received two years or fewer of PMI support, which still received full funding and technical assistance from PMI. The rationale for this approach is as districts build capacity to undertake IRS operations, they can sustain the practice with less assistance and the funds saved will be used to provide greater support to IRS in new districts. PMI provided partial support to 24 graduating districts in 2011 and found that these districts still had high coverage levels and implemented the operations at a sufficient level. As a result, these “graduating districts” “graduated” in 2012 and will receive only minimal PMI support from micro-planning consultations, limited equipment supply, and technical assistance. While it is expected that the local government will pick up the remaining technical and financial aspects of the program in these graduated districts, this is yet to be seen and the overall effectiveness of the graduation approach is not yet known and needs further

evaluation. The graduated districts are currently in negotiation with their respective district councils to get government funding for IRS operations. In the event that the district councils fail to allocate funds and IRS operations are disrupted in transmission risk areas, PMI will advocate that the FMOH and Regional Health Bureaus intervene. PMI will continue monitoring malaria case load data in those districts through routine HMIS and epidemic surveillance sentinel sites. If there is a need, PMI will provide required assistance to implement malaria control activities in those districts through focal spraying, LLIN distribution, RDTs and malaria treatment. PMI will continue entomological monitoring in the graduated districts to monitor entomological impact.

Figure 4: Comparison of IRS Results (2008 – 2011)



In 2012, PMI aims to protect more than 1.5 million people living in the Oromia region by spraying approximately 500,000 structures in 36 districts and supporting the spraying of up to 512,357 additional structures in 24 graduated districts using both pyrethroids and carbamates as was done in 2011. Ten of the 36 districts where PMI will spray are new and are able to be sprayed due to freed-up resources as a result of district graduation.

Table 4: PMI Support for Graduated, Graduating and New Districts in 2012

Activities	Graduated districts (24)	Graduating districts (26)	New districts (10)
Number of structures	512,357	353,625	130,000
Micro-planning of IRS needs for 2012: in depth analysis of district-level data		✓	✓
Micro-planning of IRS needs for 2012: participation and possible facilitation of the process	✓		
Training workshops for IRS operations planning, implementation and monitoring, spray pump maintenance, poison control, environmental compliance		✓	✓
Assessment of insecticide and operational IRS equipment storages as well as soak pits	✓	✓	
Rehabilitation of insecticide and operational IRS equipment storages, or soak pits	✓	✓	
Construction of insecticide soak pits			✓
Procurement of operational IRS equipment: minor replacement of existing equipment	✓	✓	
Procurement of operational IRS equipment: full outfitting for district needs			✓
Technical assistance in planning IRS operations	✓	✓	✓
SBCC sensitization of target districts		✓	✓
Technical assistance in implementation and supervision of IRS operations		✓	✓
Financial support for IRS operations: per diem for spray personnel		✓	✓
Financial support for IRS operations: provision of transport costs		✓	✓
Implementation of environmental compliance monitoring	✓	✓	✓
Procurement and distribution of IRS insecticide to the targeted districts		✓	✓

Indoor residual spraying activities are fully integrated within the FMOH's 2011 – 2015 National Malaria Prevention and Control Strategy, and are fully coordinated with FMOH and ORHB in the implementation phases. PMI provides support to IRS operations at three levels in Ethiopia: national, regional and in selected, highly malarious zones of Oromia (*See Table 5*). At the national level, PMI participates in existing IRS working groups to support the FMOH in the development of guidelines, policies, and strategies, as well as by providing technical assistance for operations including provision of limited IRS equipment. President's Malaria Initiative also

supports specific training in IRS operations as well as ensuring environmental compliance, insecticide safety and performing entomological monitoring activities. At the regional (Oromia) level, PMI procures insecticides and equipment for IRS operations, supports annual IRS micro-planning and training workshops, and provides operational funds for implementation and supervision. In addition to technical support, PMI provided 5,000 sets of personal protective equipment (PPE) to the FMOH to strengthen environmental compliance efforts in areas outside of Oromia. A mid-spray environmental compliance inspection of the PMI program highlighted the success of environmental compliance practices at operational sites and storage facilities. In 2011, two mobile incinerators were procured to facilitate incineration of non-DDT IRS waste created by the spray program.

Table 5: Levels of PMI Support for IRS Activities in Ethiopia

<i>National Level</i>	<i>Regional (Oromia) Level</i>	<i>Targeted Zones</i>
<ul style="list-style-type: none"> - Policy technical assistance, including development, review, or modification of in-country guidelines; - Training workshop, e.g., spray pump maintenance; - Technical assistance in procurement of IRS equipment and environmental compliance; - Rehabilitation of Adama Malaria Reference Training Center. 	<ul style="list-style-type: none"> - Micro-planning to assist ORHB to assess IRS gaps and needs; - Training for spray pump maintenance; supervision of IRS activities; entomological monitoring; - Procurement of insecticide, operational funds; - Technical assistance in procurement of IRS equipment and environmental compliance. 	<ul style="list-style-type: none"> - Micro-planning to assess gaps and needs for IRS in PMI target districts; - Training for spray pump maintenance; supervision of IRS activities; <i>plus</i> spray operator training - Procurement of insecticide and IRS equipment; - Entomological monitoring; - Implementation and supervision of IRS operations; - Environmental compliance.

Strengthening and expansion of insecticide resistance monitoring is a critical area of PMI support to Ethiopia’s malaria control program. Insecticide resistance monitoring studies were started with four insecticide classes in 2008 in Oromia and showed high levels of vector resistance to DDT. Further studies in 2009 confirmed this widespread DDT resistance along with a reduced level of deltamethrin efficacy. Based on these results, the FMOH decided to discontinue the use of DDT in 2009 and made an interim decision to use deltamethrin for IRS. Insecticide resistance monitoring continued in 2010 and 2011 and results show a high level of vector resistance to a wider range of public health insecticides.

In 2011, PMI supported comprehensive susceptibility/resistance monitoring on seven insecticides representing each of the four classes of IRS insecticides in 15 sites across the country in collaboration with four local universities. The test results were in line with previous years’ results indicating resistance to DDT ranged from 22% to 100%; resistance to deltamethrin and

lambda-cyhalothrin ranged from 0% to 66%; and resistance to malathion and fenitrothion ranged from 0% to 20%. No resistance was found in 15 sites tested against propoxur, while unexpectedly high resistance was found to bendiocarb at one site (Guangua – epidemic prone area). These study results, together with results from WHO and EHNRI resistance monitoring, have resulted in the FMOH's decision to discontinue the use of deltamethrin for IRS beyond 2012, except to deplete the existing stocks in districts where deltamethrin is thought to be efficacious. Going forward, PMI will use the remaining stock of deltamethrin in areas that are known to be susceptible to resistance.

Based on all of the susceptibility study results, the FMOH in consultation with the IRS working group has decided to shift IRS to the carbamate class for 2012 spray operations for the national program. However, the selection of insecticides for IRS use will be determined annually based on the insecticide resistance patterns of the vectors, and other factors such as cost, availability, etc. The FMOH now acknowledges that a long-term insecticide resistance strategy is crucial to ensure continued efficacy of IRS in Ethiopia. A national strategy for insecticide resistance management is currently under development, involving a range of stakeholders.

Challenges, Opportunities and Threats

As indicated in the national strategic plan, many challenges and limitations exist surrounding future Ethiopia IRS operations. Among them are: epidemiological targeting of IRS to have the most impact; ensuring sustainability of the program; best use of limited portfolio of resources; re-plastering of houses after spraying resulting in decreased efficacy; and the need to improve pesticide management and environmental compliance. In addition, given the high level of insecticide resistance, the spray program will have to shift to more expensive classes of insecticides, which will hinder the program's ability to sustain and or scale up the program due to the limited funding available. Furthermore, it is not certain whether graduated districts would maintain IRS operations at previous levels.

Another major challenge is the presence of about 1,300 tons of obsolete insecticide (over 99% DDT) in more than 500 districts that will need a considerable level of financial and technical support to manage and/or dispose. At the national level, PMI has supported an assessment to establish the inventory of obsolete insecticides at the district, zonal and regional levels. Different options for the obsolete insecticides' final disposal have been under discussion with the FMOH and ORHB. Plans are already underway to transport the obsolete insecticides from their various storage locations to a secure, central facility while different methods for disposal are considered.

Plans and Justification

PMI will maintain the FY 2012 level of IRS support by working closely with the FMOH, ORHB and other partners. With FY 2013 funding, approximately 500,000 structures will be sprayed with full support from PMI in 36 districts, protecting a population of approximately 1.5 million people. In addition PMI will provide minimal support for IRS operations in the 24 graduated districts. PMI will continue to focus on high malaria burden districts in Oromia and support

environmental compliance activities, entomological monitoring in sentinel sites and insecticide resistance or susceptibility tests in selected sites.

Proposed activities with FY 2013 funding (\$8,230,000)

FY 2013 PMI support for IRS operations in Oromia will be at the same level as in FY 2012, i.e., targeting about 500,000 structures for full support and providing minimal support in 24 graduated districts for IRS operations. PMI and ORHB adopted approach of “graduation” is being implemented in 24 districts in the 2012 spray round and will be evaluated for its effectiveness. Based on feedback from graduated districts, evaluation of spray operations, discussions and priorities of ORHB to continue IRS implementation on their own and malaria case load, the graduation approach may be revisited.

President’s Malaria Initiative comprehensive support for IRS targeted districts in Oromia includes insecticide, operational funds, transportation, rehabilitation of district storage facilities, soak pits, personal protective equipment, environmental compliance, IEC and social mobilization, training on IRS techniques, and use and maintenance of spray pumps.

- **Procurement of insecticide** (\$4,500,000): The exact allocations and specifications of insecticides will be adjusted upon completion and review of the 2012 IRS activities and the insecticide policy decision of FMOH.
- **Indoor residual spray operations** (\$3,000,000): PMI will continue to support the ORHB in planning, implementation and evaluation of IRS in Oromia. With FY 2013 funding, PMI will provide full support for approximately 500,000 structures sprayed in 36 districts, protecting a population of approximately 1.5 million people, roughly the same as in 2012. In addition, PMI will provide minimal support for IRS operations in the 24 graduated districts. Based on the evaluation of 2012 operations and how effective the graduation approach is, the number of structures to be sprayed may be adjusted.
- **Indoor residual spray training** (\$100,000): PMI will support in-service training at federal and regional levels to increase the FMOH’s and ORHB’s capacity in planning and management of IRS operations, environmental compliance and poison control.
- **Entomological capacity-building and monitoring services** (\$400,000): Resistance monitoring will be carried out in 15 sites in different ecological zones of the country. This represents an increase of 10 sites from those included in entomological resistance monitoring in prior years. The rationale for this expansion being that these activities now represent one of PMI’s national-level activities rather than just being restricted to Oromia (see **Table 5**). Technical support will be provided to coordinate entomological monitoring activities implemented by the FMOH in sites outside of Oromia. Behavioral monitoring will be conducted to assess if vector behaviors change, especially early outdoor biting, in response to the changes in the insecticide used for IRS. Insecticide residual life monitoring to obtain evidence for the selection of best alternative insecticide also continues to be a priority activity.

- **Pesticide management** (\$200,000): PMI will support pesticide management of PMI-supported IRS operations in Oromia, and also pesticide management at the national level. Continued support will be provided for expansion of the SEA and improved pesticide management within the current IRS operations. Until an approach for final insecticide disposal is chosen, PMI will support the collection of insecticides from districts, zones and regional states and will support their storage at a central location. However, the FMOH insists on having the final disposal mechanism in place before the obsolete insecticides are collected and stored centrally.
- **Environmental compliance monitoring** (\$30,000): With FY 2013 funding, an external environmental compliance assessment of Ethiopia's IRS activities will be performed. Insecticide distribution, use, storage and disposal as well as insecticide tracking systems and/or tools will be monitored.

MALARIA IN PREGNANCY (MIP)

NMCP/PMI Objectives

Ethiopia has a relatively low ANC coverage rate compared to other countries in the region. The 2011 DHS indicated that for Ethiopia as a whole, only 34% of mothers received antenatal care from a health professional for their most recent birth in the five years preceding the survey, although this demonstrated an improvement from 28% noted in the 2005 DHS. One woman in every five (19 percent) made four or more antenatal care visits during the course of her pregnancy, up from 12 percent in 2005. The median duration of pregnancy at the time of the first antenatal visit is 5.2 months. Furthermore, although pregnant women are at greater risk of infection and disease, overall they represent a small proportion of the total number of malaria patients in Ethiopia. In a study by Newman, et al, a cross-sectional survey of placental parasitemia at a stable transmission site in Gambella Regional State noted 6.5% prevalence, whereas three other sites in unstable transmission settings noted only 2.5% prevalence. Because of the low prevalence of malaria infection during pregnancy, IPTp is not part of the Ethiopian National Malaria Prevention and Control Strategic Plan. Guidelines for malaria treatment including pregnancy are available at http://www.moh.gov.et/English/Resources/Documents/National%20malaria%20guidelines_2012.pdf. Adapting WHO guidance, these recommend oral quinine for uncomplicated *P. falciparum* malaria in the first trimester, and oral AL for second and third trimester. For uncomplicated mono-species *P. vivax* malaria, oral chloroquine is recommended, since *P. vivax* infections are currently considered to be chloroquine sensitive. For severe malaria, rectal artesunate stabilization and IV artesunate in hospitals is recommended.

Approaches used by the FMOH to target pregnant women are to (i) scale-up universal LLIN coverage and encourage households to have pregnant women (and children under five years of age) to use LLINs; and (ii) ensure availability of prompt diagnosis and treatment of clinical cases in pregnant women at health facilities. The LLIN replacement scheme proposed in the National Strategic Plans for Malaria Prevention and Control 2011-2015 is the policy framework for continuous LLIN distribution primarily through the HEP. Two methods have been proposed to reach pregnant women: (1) providing one LLIN to every newly pregnant woman in selected kebeles over a one-year period, or (2) providing LLINs to households with children and pregnant women not currently being protected with LLINs. Although the universal coverage strategy is to provide

two LLINs per household, the HEW must make sure that pregnant mothers and children less than 5 years of age have preferential access to LLINs. Increasing ANC coverage is also one of the FMOH's priorities, and is supported by USAID/Ethiopia MNCH, family planning and reproductive health funding.

Progress During the Last 12 Months

President's Malaria Initiative provided technical support to update the FMOH's malaria diagnosis and treatment guidelines that were published in early 2012. These contained recommendations regarding the use of anti-malarial drugs during pregnancy. SBCC messages and training in this regard are being formulated based on these guidelines.

Challenges, Opportunities and Threats

In Ethiopia, only 34% of women had received antenatal care from a skilled provider and only 10% were delivered by a skilled provider. The most important barrier to access to health services that women mentioned is taking transport to a facility, followed by lack of money and distance to a health facility according to the 2011 DHS. A major focus of ANC programs in Ethiopia are providing expanded access to quality healthcare through health centers and health posts, where PMI is supporting prompt access to diagnostic and treatment services for pregnant women. Furthermore, with supply chain weaknesses that often lack of LLINs at antenatal clinics, HEWs will play a key role in identifying and distributing LLINs to pregnant women in the communities.

Plans and Justification

President's Malaria Initiative continues to support FMOH policies that address pregnant women's special needs through malaria prevention and control, and improving prompt access to malaria diagnosis, and appropriate care and treatment services. Although IPTp itself is not part of the national strategic plan, in FY 2013, PMI will support maternal and perinatal protection from malaria with Focused Antenatal Care (FANC) Services and Safe Motherhood and Adolescent Reproductive Health through an emphasis on anemia management, distribution of LLINs during ANC visits, and the prompt diagnosis and management of acute malaria in pregnant women. To implement these activities, PMI has leveraged the resources of other GHI activities, particularly those supported by the PEPFAR and USAID/Ethiopia MNCH, family planning and reproductive health funds. This will focus on ensuring that health providers counsel mothers on early detection of anemia and fever, of the importance of iron and folate supplementation, as well as the importance of using a LLIN during pregnancy for the protection of the newborn. This activity will be closely coordinated with PMI support for case management supervision.

Proposed Activities with FY 2013 Funding (\$0, no additional funding required)

- **Expanding malaria in pregnancy services through safe motherhood and FANC:** (see SBCC and Treatment sections) PMI will continue to collaborate and coordinate activities with USAID/Ethiopia MNCH, family planning and reproductive health programs. PMI will ensure that malaria-specific updates for technical materials and guidelines are provided to other USG programs, including PEPFAR-funded activities focusing on the prevention of

mother-to-child-transmission of HIV (PMTCT). PMI will also support pre- and in-service training for management of acute malaria in pregnant women (see below).

CASE MANAGEMENT

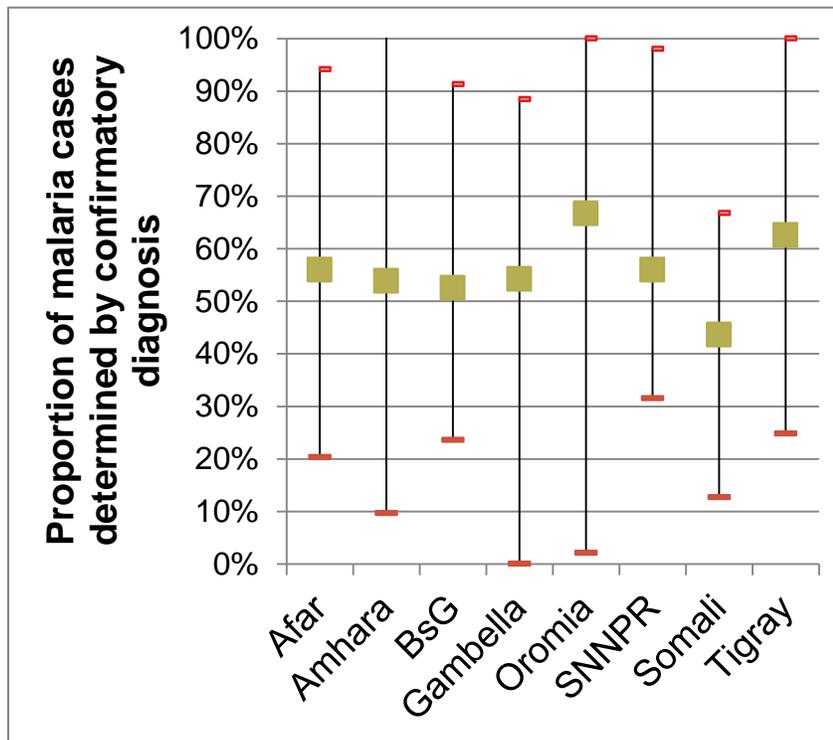
DIAGNOSIS

NMCP/PMI Objectives

In line with Ethiopia's long-standing policy that all patients with suspected malaria should receive a diagnostic test before treatment is prescribed, PMI has supported scale-up of quality-assured diagnostic testing at both facility and community-level since its launch in Ethiopia. At health centers, PMI has supported procurement of microscopes, lab supplies, and reagents, and is scaling-up quality assurance systems for malaria microscopy and RDTs. At the community level, support is being provided for procurement of RDTs and training and supervision of HEWs in iCCM of the sick child, including performance of RDTs for managing acute febrile illnesses.

Progress During the Last 12 Months

An analysis by UNICEF of PHEM data (figure below) indicates that Ethiopia has made significant progress in scaling-up diagnostic testing for malaria. From 44% to 67% of all malaria cases reported were confirmed by RDT or microscopy, with Oromia having the highest proportion of those tested.



PMI procured 55 microscopes and microscopy kits, which were provided to laboratories in Oromia, and to seven reference laboratories in other regional states. In addition, 3.2 million RDTs were procured and distributed to HEWs in Oromia and also filled gaps in RDTs other parts of the country.

Supportive supervision was provided to HEWs in 293 districts in six regional states. On-site supervision includes ensuring that HEWs (i) have enough RDTs and other supplies necessary to use RDTs at community-level; (ii) use RDTs correctly; (iii) adhere to national malaria case management guidelines, and provide the correct treatment to RDT-confirmed cases; (iv) correctly dispose of RDTs; and (v) correctly report number of suspected fever cases tested, diagnosed and treated.

President's Malaria Initiative is currently supporting supervision of 180 of the approximately 1157 health facility laboratories in all 17 zones of the Oromia. Fifty-one of these laboratories also have undergone blinded rechecking of clinical samples by the regional reference laboratories. Twenty-three of these 51 correctly interpreted more than 90% of blood slides on two successive rounds of cross-checking and have been "graduated", i.e., will no longer undergo blinded rechecking, but will continue to receive routine supervision.

In addition, training of laboratory supervisors was carried out at two regional reference labs in Amhara, and at the regional labs in Tigray, Dire Dawa and SNPPR. Those trained supervisors have now provided training and supervision to 30 facilities in Amhara, 20 in Tigray, 12 in Dire Dawa, and 20 in SNPPR.

Challenges, Opportunities and Threats

It has been recognized that there is insufficient human and financial resources to support blinded rechecking of blood slides for all health facilities at regional reference laboratories. Therefore, facilities that score greater than 90% on two successive rounds of rechecking will be considered "graduated", so that additional facilities can then undergo rechecking.

Progress has been made in expanding supportive supervision to more health facilities. Because of the very large number of health facilities in Ethiopia, only one-fifth of facilities in Oromia and a small number of facilities in other states are getting routine supervision for malaria diagnosis. PMI is exploring collaboration with PEPFAR to integrate supervision of malaria microscopy and RDTs into their supervision of laboratories in their focus areas. In addition, PMI will pilot the use of laboratory staff from graduated facilities to supervise nearby facilities that are not currently receiving supportive supervision.

Plans and Justification

In FY 2013, PMI will build on the progress to-date in scaling-up diagnostic testing for malaria and accelerate expansion of quality assurance systems to cover more than 200 facilities in Oromia. We will also expand our training and support to all regional laboratories, to include Gambella, Harari, and Benishangul-Gumuz. PMI will further expand supervision to laboratories sup-

ported by PEPFAR, by integrating malaria supervision modules into their supervision tools and by training their supervisors in malaria microscopy and performance of RDTs.

President’s Malaria Initiative will procure approximately 6 million RDTs, which will fully meet the requirements in Oromia and make a significant contribution to the requirements in the rest of the country, as projected using the forecast developed through a national level micro-planning (see Gap Analysis below). Additional microscopes, lab supplies, and reagents also will be procured and distributed to laboratories in Oromia.

President’s Malaria Initiative will continue its support of clinical oversight of malaria diagnosis and case management activities of HEWs, through an integrated supervision platform.

Table 6: RDT Gap Analysis 2014

	2014
Total number of suspected malaria fever cases (<i>Micro-planning data adjusted by a factor of 30% for epidemics, underreporting of negative cases and contingency</i>)	13,028,006
Total number of suspected malaria /fever cases after factoring the effect of vector control	11,073,805
Country target for diagnostic coverage (<i>Baseline 59% in 2011 from UNICEF Microplan Data</i>)	100%
Diagnostic coverage by microscopy (%)	25%
Diagnostic coverage by RDT (%)	75%
Total number of RDTs needed	8,305,354
RDTs needed in Oromia (assuming 1/3 of cases in Oromia)	2,768,451
PMI contribution	6,000,000

Proposed Activities with FY 2013 Funding (\$6,350,000)

- **Support for quality assurance system for microscopy and RDTs (\$900,000):** Technical and programmatic support to health facilities laboratories will be scaled up to more than 200 facilities in Oromia. Additionally operational support will be provided to all regional reference laboratories in Ethiopia as well as major regional hospitals. This will include support for refresher training, supervision, other QA/QC activities, and program monitoring. Training also will be provided to laboratory supervisors
- **Procurement of RDTs (\$4,800,000):** PMI will procure and distribute 6 million multi-species RDTs to health facilities and health posts. This will meet the projected needs in Oromia and make a substantial contribution to the country.
- **Procurement of lab equipment/supplies (\$650,000):** PMI will support further procurement of approximately 100 microscopes and 360 laboratory kits to provide essential supplies and reagents to laboratories that conduct malaria microscopy.

- **Provide supportive supervision to HEWs** (see Treatment section): Continued support will be provided for integrated supervision of HEWs, which will include observation of management of patients

TREATMENT

NMCP/PMI Objectives

One of the goals of the national strategic plan for malaria 2011-2015 is to treat all malaria cases with appropriate antimalarial drugs and manage all severe cases according to the new treatment guideline. Current treatment policy recommends AL and chloroquine as the first-line drug for the treatment of uncomplicated *P. falciparum* malaria and *P. vivax* malaria, respectively. For infants <5 kg of body weight and pregnant women in the first trimester, quinine should be administered. Rectal artesunate has been adopted as referral treatment for severe malaria at the health post level. intravenous/intramuscular artesunate (or IV/IM quinine if artesunate is not available) is recommended for treatment of severe cases at the health center and hospitals.

Progress During Last 12 Months

To date, PMI has procured 3.9 million AL treatment doses for Oromia. As part of the national support, PMI has also procured 3.6 million doses of chloroquine, 56,458 quinine doses, and 72,000 doses of rectal artesunate.

President's Malaria Initiative is working with ORHB, FMOH, and other implementing partners to support health worker training at both the health center and health post levels, including the roll-out of iCCM to community-level health posts in 283 districts in six regional states. PMI also will support an assessment of performance standards and the quality of the pre-service and in-service training; and support in-service training programs for clinical officers and HEWs through the Integrated Refresher Training Program, implemented by the FMOH, in collaboration with UNICEF.

President's Malaria Initiative is supporting District Health Office staff in monitoring and supervision of health centers, and supports health center staff in their monitoring and supervision of health posts. During the past year, 1,133 health centers and 2,654 health posts were supervised in 283 woredas. This supervision is being integrated into established, USAID/Ethiopia-supported family planning/reproductive health and MNCH activities. The supervision is ensuring that case management is implemented effectively and in-line with FMOH guidelines. PMI, along with other partners, is assisting in reviewing the quality and competency of the supervisors, and help to support refresher trainings and coaching, to further improve supervisors' capacity. This includes support to training materials and checklists as well as transportation and other costs to ensure the supervision is actually taking place. PMI has also supported a quantitative study to document the extent and nature of adherence to malaria treatment (including barriers and methods to improve adherence), which will help guide SBCC approaches.

Opportunities, Challenges and Threats

See the section under Diagnosis

Plans and Justification

In the face of the lower commitments from donors due to the economic crisis, especially the Global Fund, the gap of ACTs needed will increase from 2012 onwards which could severely undermine continued efforts. With FY 2013 funding, PMI is procuring 2.8 million AL treatments for Oromia and to fill gaps in other parts of Ethiopia. PMI will also procure chloroquine, quinine, and rectal and intravenous artesunate as part of its national support.

Table 7: Gap Analysis For ACTs, 2014

	2014
Total number of suspected malaria cases after the <i>(Micro-planning data adjusted by a factor of 30% for epidemics, underreporting of negative cases and contingency)</i>	13,028,006
Total malaria positive cases (assuming 100% diagnosis of suspected cases and 42% test positivity)	5,445,706
Total <i>P. falciparum</i> (70%)	3,811,995
Number of ACT treatment dose need (National)	5,870,437
Number of treatment dose need (Oromia)	1,406,774
PMI contribution	2,800,000

Table 8: Gap Analysis For Chloroquine, 2014

	2014
Total number of suspected malaria cases after the <i>(Micro-planning data adjusted by a factor of 30% for epidemics, underreporting of negative cases and contingency)</i>	13,028,006
Total malaria positive cases (assuming 100% diagnosis of suspected cases and 42% test positivity)	5,445,706
Total <i>P. vivax</i> (30%)	1,633,711
Number of chloroquine treatments dose need (National)	997,164
Number of chloroquine treatments dose need (Oromia)	311,029
PMI contribution (100%)	997,164

Proposed Activities with FY 2013 Funding (5,600,000)

- **Procurement of ACTs, chloroquine for *P. vivax*, pre-referral treatments and drugs for severe malaria** (\$5,000,000): PMI will support the procurement and distribution of approximately 3 million AL treatments to meet the needs for Oromia based on the district-level micro-plan as well as a contingency amount for national-level distribution by the FMOH to fill gaps in other parts of the country. PMI will support the procurement and distribution of the entire estimated national need for chloroquine (i.e., 2 million treatments) and other antimalarial drugs, including drugs for severe disease and pre-referral care (i.e., rectal and parenteral artesunate). Chloroquine, pre-referral treatment, and drugs for severe malaria will be tested for quality at accredited laboratories following standardized protocol prior to shipment to Ethiopia.
- **Support for supervision and monitoring of HEWs in providing malaria treatment** (\$600,000): Support to supervision and monitoring of malaria treatment at health centers and health posts, will be continued during FY 2013. This will include in-service training of health workers in reviewing new malaria case management guidelines, on-site supervision and ensuring that case management reporting is complete and accurate. This PMI support is integrated into a wider USAID/Ethiopia project platform focusing on MNCH, reproductive health and family planning, including iCCM activities, which is being implemented in 283 districts in six regional states (approximately a third of the country). Whether in the event of an ‘epidemic year’ or increased malaria morbidity and mortality, it is expected that the supervision and monitoring of case management activities will be sustained.
- **Social behavior change communication (SBCC) for case management** (no additional funding required): In conjunction with SBCC efforts for LLINs and IRS, PMI will continue to support the ORHB and FMOH to promote early care seeking, adherence to antimalarial drugs and other issues around case management, as part of a comprehensive capacity-building effort. Materials developed by PMI and the SBCC Task Force will be made available to the FMOH and other partners for roll-out in the other regional states.

PHARMACEUTICAL MANAGEMENT

NMCP/PMI Objectives

The NMCP and PMI have been working to address multiple supply chain problems within all layers of the national drug management system, including malaria commodity bottlenecks, stock-outs, and expiry. Since 2005, the FMOH developed a Pharmaceutical Logistics Management Plan (PLMP) and later created the PFSA. Through mostly PEPFAR and Global Fund support, the FMOH radically redesigned the governance, policies, and infrastructure of the existing logistics system, establishing drug distribution “hubs” to directly supply health centers, health posts, and hospitals. Because of its complexity and cost, the new pharmacy supply chain system was slowly implemented and essential malaria commodities are still being largely distributed through other parallel donor-supported systems. Up until 2012, PMI has imported and distributed most of its malaria commodities (including ACT’s) to the Oromia Regional State through UNICEF per FMOH guidance, to be consistent with and complementary to Global Fund processes.

With PMI support, UNICEF has also conducted annual malaria commodity micro-planning activities to gather district-level data about malaria commodity inventories and estimated future malaria commodity requirements along with malaria morbidity reports. PMI also has supported strengthening of PFSA. As the capacities within PFSA improve and as PFSA takes over more and more responsibilities for pharmacy supply chains in Ethiopia, PMI will transition to distribution of its commodities through this system. The Ethiopian, FMHACA is responsible for establishing and implementing quality assurance systems for the country, including drug registration, overseeing the safety of imported medicines, and post-marketing drug quality monitoring. PMI supports FMHACA to assess and monitor malaria post-market drug quality in Ethiopia.

Progress During the Last 12 Months

President's Malaria Initiative supported PFSA by embedding qualified personnel within their facilities, and providing resources for the development of standard operating procedures and forms for the quantification, requisition, drug exchange/transfer and management of malaria commodities. A new medication record form was also designed. In addition, PMI has improved malaria commodity management in a number of public health facilities, including 212 in Oromia and 77 in other Regional States. These included 39 Health Posts, 19 hospitals and 200 Health Centers through improved training and supportive supervision. Malaria drug management data is now reported bi-monthly for all these facilities, including data on availability and expiry of antimalarial drugs, staff availability and capacity, and accurate reporting of antimalarial drug consumption. The data allows for monitoring and tracking of PMI- and FMOH-supported distribution of malaria commodities to health facilities.

In support of the FMHACA, PMI conducted a rapid assessment of Ethiopia's pharmaceutical quality assurance system and established a post-marketing drug quality monitoring program in five locations in Oromia, including the establishment of drug testing mini-labs and the training of GoE staff on drug sampling and testing. The third round of drug sampling was completed and the laboratory confirmatory testing of the second round is ongoing. To date, the results of this monitoring program indicate that the number of antimalarial drugs available in the public and private sectors in Ethiopia is limited, with most drugs sampled passing the drug quality control testing. In FY 2012, PMI expanded the post-market drug quality monitoring program beyond Oromia (including establishing two additional sentinel locations) and further improved the regulatory capabilities of the FMHACA. PMI also ensured that the activities are coordinated with other USG implementing partners and in-country stakeholders in a context of a changing PLMP and the nascent establishment of the PFSA.

With PMI support, UNICEF facilitated micro-planning meetings with participants from all malaria-affected woredas and zones in Oromia annually since in 2009, and in all Regional States since 2011 to determine the requirements of ACT treatments and RDTs at the district level. The main purpose of these micro-plans was to develop a needs-based plan, where requirements are identified by staff at woreda (district) level, rather than the usual "top down" push system, where distributions are estimated at federal level (see Monitoring and Evaluation section). The micro-plan is continuously being updated when distributions of commodities to the zones and districts occur. The updated micro-plan is being shared with PMI implementing partners to inform them

when commodities will and should be available in the locations of implementation (e.g., health facilities). Partners then report back to PMI on commodity availability.

The ACT and RDT requirements were determined based on consumption records from previous years at health facilities and health posts level of each woreda. The micro-plan considered the numbers of newly constructed health facilities and those expected to be operational in the following year. The results have subsequently been used to estimate the needs of pediatric and adult tablets of chloroquine to treat *P. vivax* malaria, and to prioritize and rationalize malaria commodity distributions through the year, based upon updated available inventory of supplies and epidemiological reports of increased local malaria activity (such as “hot-spot” districts). In FY 2013, PMI will continue to support FMOH and all regional states in Ethiopia in this micro-planning process for malaria commodities that is now recognized as a best practice.

Challenges, Opportunities and Threats

Previous PMI funded pharmaceutical facility baseline assessment surveys and ongoing reports reveal continued supply chain problems for malaria drugs in all regional states. There continue to be focal shortages and stock-outs of ACTs (especially child doses) and chloroquine; expired drugs; weak inventory control tools; inadequate medication records; and poorly organized and inadequate storage facilities.

The large geographical areas with many remote regions and seasonal rains cause major challenges to maintaining malaria commodity supply chains. The emerging capacities of PFSA and FMHACA provides an opportunity to take on more responsibility for pharmacy supply chains and antimalarial drug quality monitoring in the future. Improving availability of malaria diagnostics from RDTs and microscopy promises to reduce ACT requirements. Threats include uncertainty in resources from the Global Fund which could impede progress in malaria control.

Plans and Justification

Strengthening pharmaceutical and malaria commodity supply chains will be a long term PMI requirement. The micro-planning process has been recognized as a best practice in Ethiopia to the extent that it was expanded beyond Oromia Region to include all of Ethiopia. Strengthening antimalarial drug management will also be needed throughout Ethiopia through a closer working relationship with PFSA. There will be an ongoing need to ensure quality of antimalarial drugs in Ethiopia to support quality malaria care and treatment in partnership with FMHACA.

Proposed Activities with FY 2013 Funding (\$950,000):

- **Strengthening of Antimalarial Drug Management:** (\$750,000) PMI will help sustain and expand the malaria drug management program from the present approximately 200 health centers covering approximately two-thirds of the malaria risk areas within Oromia to support for strengthening health systems and pharmacy logistics for the PFSA involving all regional states of Ethiopia. The program will continue to focus on:

- Improving the management of malaria commodities, including quantification, requisition, drug exchange/transfer, and expiry tracking/disposal;
 - Improving the storage, organization, and security of drugs within health facilities and zonal/districts;
 - Promoting the rational use of malaria drugs by training of PFSA and health facility level staff in drug management, as well as through on-site supervision; and
 - Implementing the PMI end-use verification program, ensuring that antimalarial drugs distributed through PMI funding support are available at facilities and reach beneficiaries.
- **Strengthening of drug quality monitoring:** (\$200,000) With FY 2013 funding, PMI will continue to sustain and further improve the Ethiopia FMHACA’s drug quality assurance program by:
 - Supporting post-marketing drug quality monitoring in a minimum of seven locations, including at least two that are outside of Oromia;
 - Improving the GoE’s existing drug registration program through training, updating tools and procedures, and short-term technical assistance;
 - Strengthening the GoE’s quality control laboratory; and
 - Improving data use and follow on regulatory measures.
- **Micro-planning surveys for estimating annual requirements and for assisting with distributions of malaria commodities:** (see M&E section) FY 2013 PMI funding support will continue for FMOH through UNICEF facilitated micro-planning meetings with participants from all malaria-affected woredas and zones in Ethiopia to determine the requirements of ACT treatments and RDTs at the district level.

MONITORING AND EVALUATION

NMCP/PMI Objectives

Epidemic Detection and Response

Malaria epidemics in Ethiopia have been documented since the 1930s. A catastrophic malaria epidemic in 1958 was responsible for an estimated three million clinical cases of malaria and 150,000 deaths. Since 1958, major epidemic years have occurred approximately every five to eight years. Guidelines for Malaria Epidemic Prevention and Control were updated in 2012 with support of PMI. The new guidelines detail the human vulnerability factors, including population movement, as well as meteorological factors, such as rainfall, temperature and humidity, that affect the occurrence of epidemics. The revised guidelines include setting detection thresholds at the health post level and strategies for mapping malaria micro-foci or micro-clusters.

Current methods for epidemic detection in Ethiopia rely on passive case detection of clinically diagnosed cases at health posts and health centers. In this system, the median weekly clinically diagnosed malaria cases over the previous five years are charted. Thresholds are set by either the third quartile (second highest number from the five previous years’ data for that week) or the previous year’s number of cases in that week multiplied by two. If the number of cases in a given

week exceeds the set threshold, the health worker is to report a potential epidemic. A rapid assessment team is then dispatched to confirm that an epidemic exists or is threatening, establish the cause and scale of the epidemic, and identify local capacity to deal with it. The guidelines recommend presumptive mass fever treatment with ACTs for fever cases if the test positivity rate is $\geq 50\%$. A stock of 20% of ACTs is to be held at the regional level for epidemic response. If there is potential for continued transmission, IRS will be implemented. For this reason, all districts with a potential for epidemics are advised to reserve a stock of insecticide for epidemic response and spraying operations would begin following either a three- or six-day training period for local spray operators.

In 2009, a PHEM system encompassing reporting from health posts, health centers and hospitals was established. It is envisaged that this weekly vertical reporting system will collect a range of malaria indicators. Malaria cases are reported by two age groups (less than five and more than five years of age) including clinical malaria (outpatient and inpatient), confirmed malaria by species, malaria in pregnancy, and severe malaria/anemia in those less than five years of age. This system is not yet fully operational at regional and national scale. Assuming that improved IRS coverage and LLIN use will reduce malaria transmission, the focus of malaria control will turn toward surveillance with the aim of halting ongoing transmission.

Monitoring & Evaluation

With PMI support, a National Malaria M&E Plan was recently developed. This plan aims to coordinate the collection, analysis, and management of malaria data to inform programmatic decisions and to assess whether the goals of the National Strategic Plan for Malaria Prevention and Control 2011 – 2015 (see Strategy section) are being achieved.

Currently, Ethiopia has a paper-based system of data collection at the health facility level; however, these information have not been used for decision-making and resource allocation at either the local, regional, or national level. Consequently, Ethiopia's FMOH is in the process of revising the HMIS. This revised HMIS, which includes a total of 106 indicators and is primarily supported via funds from PEPFAR and the Global Alliance for Vaccines and Immunization, aims to provide one standardized set of health indicators nationally. There are two malaria-specific indicators:

- Malaria cases reported per 1,000 population, disaggregated into clinical and confirmed cases, with the latter further disaggregated by species, i.e., *P. falciparum*/other, among:
 - o children <5 years of age, and
 - o people at least five years of age; and
- Malaria case fatality rate among:
 - o children <5 years of age [in-patients]
 - o people at least 5 years of age [in-patients]

Progress During the Last 12 Months

Epidemic Detection and Response

President's Malaria Initiative is providing support for the development of a strengthened Epidemic Surveillance and Response (ESR) system in Oromia at the community, district, zonal and

regional levels. In order to detect epidemics quickly, PMI has started supporting strengthening of the alert system and health worker trainings for early epidemic detection.

In line with the GoE's desire to develop a high-quality, broadly-based malaria detection, investigation and response system, PMI supported the development of a strengthened ESR system at selected surveillance sites in Oromia. Health facilities were purposefully selected based on the epidemiological profile of the catchment area and health facility personnel were trained in data collection and reporting malaria indicators beyond the limited indicators collected in the HMIS. Designated health facility personnel were trained in data collection and reporting. Data collection began in February 2010 at ten epidemic detection sites in Oromia Regional State centered around the primary health care unit (i.e., one health center and its surrounding five satellite health posts). By including the entire primary health care units, PMI is now collecting data from an entire population base of about 30,000 people from each primary health unit, simultaneously observing malaria morbidity from health posts and health centers. This approach has promptly detected nearly all important malaria events within these catchment areas, improving the context and information derived from the surveillance data over time.

The objective of this intervention is to understand how increases of malaria cases and epidemic outbreaks occur at the community and sub-community level, as well as piloting approaches to documenting this process prospectively (e.g., by equipping health posts with digitized maps where HEWs will be able to visualize occurrence of cases over time and encouraging HEW to use cell phones to inform fluctuations in malaria case load and/or outbreaks and facilitate resupply with malaria commodities). Work at the epidemic detection sites also is providing operational data, which will allow PMI to understand how health centers become gradually affected by increases in case numbers or epidemic outbreaks at community and sub-community level, including with regards to patient access and flow, use of commodities, and work load of health facility staff.

The sites' increased capacity in diagnostic testing, data collection, reporting, and analysis has enabled PMI and FMOH to monitor malaria trends prospectively, and yield a better understanding of malaria epidemiology as well as the burden it causes on the health system. Particularly, the data has confirmed the overall low incidence of severe malaria that is currently observed at facilities throughout Ethiopia. Approaches and tools developed under this activity (e.g., HEW mapping of cases at community level) will then be scaled-up to regional and national level through an integrated USAID/Ethiopia health project platform (see below). PMI support for these activities in FY 2012 detected four small malaria outbreaks, including a relapsing fever outbreak. The roll-out of SMS reporting at health post level to provide more robust, real-time data reporting has included all ten primary health units.

In addition to these activities, PMI is supporting a study to assess whether schools could be a platform for detecting epidemics. School absenteeism, along with other easily collected information, will be compared to information collected at the health facility and community level to determine whether they may serve as an early warning indicator of an epidemic in the surrounding community.

M&E

Malaria risk maps: Given the varying epidemiologic profile of Ethiopia, resource allocation for malaria prevention and control activities must be targeted strategically. Malaria risk mapping is critical to improve targeting PMI and other program resources, and to track progress at the community level. PMI supported the development of a detailed malaria risk map in Oromia, identifying areas at risk for malaria, including epidemic-prone areas, based on data available from cross-sectional school-based surveys. Due to the low malaria prevalence only a crude risk map could be developed so far. It is expected that further analysis of samples using serology as well as analysis of prospective health facility data will ensure the development of a risk map with greater resolution. Results are expected to be available from these studies by mid-2013.

Malaria Indicator Survey (MIS): PMI supported the 2011 MIS, which assessed coverage, access and use of malaria interventions. The final report is currently in draft and the preliminary results are available to partners (see Indicators section). PMI not only financially supported this activity, but also provided significant technical assistance in all areas including all PDA and analytic support. The results showed a continued low prevalence of malaria by microscopy at <1%.

Of note, EHNRI has established serology testing capacity at the national level. They are currently testing the samples collected from a school-based survey. Preliminary results show that microscopy prevalence ranged from 0-12%, but serologic prevalence provided more variability from 0-60%. Several sites with 0% microscopy prevalence had higher serologic prevalence and furthermore, sites with serology prevalence of 0% provides invaluable information about longer malaria exposure.

A DHS was completed early 2011 with results released in early 2012. This survey, though, did not include a malaria module.

Malaria Impact Evaluation: PMI is supporting an impact evaluation to determine impact of malaria control interventions since 2000 on malaria mortality and morbidity in Ethiopia. This analysis will consider all available data and contributions from all donors and the FMOH.

Malaria commodities micro-plans: PMI supported annual micro-planning meetings with participants from all malaria-affected woredas and zones in Oromia since 2009 and for all of Ethiopia since 2011 to determine the requirements of RDTs, ACTs, and LLINs at district level. This exercise also provides annual reports of malaria case data from district health officials. The main purpose of these micro-plans is to develop a “bottom-up” needs-based plan, where malaria commodity requirements are identified by staff at the district level based on practical needs backed up by credible malaria morbidity and malaria commodity consumption, expiry, and inventory reports, rather than the usual “top down” push system, where distributions are estimated at the federal level. The micro-plan is continuously being updated when commodities are distributed to the zones and districts. The updated micro-plan is being shared with PMI implementing partners to inform them when commodities will and should be available at health facilities, health posts, etc. Partners then report back to PMI on commodity availability. The micro-plan also considers the numbers of newly constructed health facilities and those expected to be operational in the next year. The micro-plan prioritizes and rationalizes malaria commodity distributions through

the year based upon an updated inventory of supplies and epidemiological reports of increased local malaria activity (such as “hot-spot” districts.)

Field Epidemiology and Laboratory Training Program: Ethiopia began its FELTP in October 2008 with technical assistance from CDC as a two year, full-time, postgraduate competency-based training program consisting of about 25% class work and 75% field residency. Trainees are closely supervised and provide epidemiologic service to the FMOH. Graduates of FELTP will receive a Master’s Degree in Public Health and Field Epidemiology. The program will join the African Field Epidemiology Network and work through the Ethiopian Public Health Association and EHNRI. In 2011, three Ethiopian FELTP residents supported a comprehensive evaluation of PMI’s ten epidemic detection sites. Several other malaria projects are planned for late 2012 with collaboration with FELTP residents. PMI plans to continue to provide three FELTP residents in FY 2013 with professional support, including malaria projects that will provide professional experience with training and educational value.

Challenges, Opportunities and Threats

Micro-plans, while very valuable, do not provide perfect estimates of resource and commodity requirements based upon the last year of data. Ultimately, in an epidemic-prone setting such as Ethiopia, redistribution of resources among or between districts may be needed to meet local needs that could not have been accurately forecasted from available data; such flexible redistribution plans or processes are typically not available. PFSA does not yet have the capacity to meet the dynamic demands of the malaria transmission season or to respond promptly to urgent malaria medication stock-outs.

In addition, most districts have inadequate epidemic preparedness plans and lack sufficient contingency funds to respond. Lack of skilled health personnel and poor coordination and management compounds the problem. Although District Health Offices and Zonal Health Bureaus are instructed by national guidelines to have a 10-15% stockpile of malaria commodities, this is often not feasible due to planning and funding restrictions or increased clinical demand for these supplies. The ability to detect and respond to epidemics is also restricted by the existing weak HMIS. Better tools including detailed topographical maps are needed to improve targeting of malaria resources.

Plans and Justification

President’s Malaria Initiative will continue to provide technical assistance in improving the overall surveillance systems, which includes the HMIS and the PHEM. However, as these systems are not yet fully functional, PMI will continue to support the ten epidemic detection sites in Oromia and provide technical assistance for the expansion to 40 more sites throughout the country using Global Fund support. Furthermore, PMI will continue to conduct annual national malaria commodities micro-plans which not only provides a bottoms-up commodities estimate from all malarious districts, but provides the most accurate and complete malaria morbidity data. PMI will continue to support nationally representative surveys to obtain key PMI coverage outcome indicators and explore other diagnostic tools e.g., serology to monitor progress in Ethiopia.

Proposed Activities with FY 2013 Funding (\$1,870,000):

- **Epidemic Detection and Surveillance Sites:** (\$300,000) PMI will continue to support the network of ten epidemic detection sites established in 2010 including enhanced surveillance and malaria epidemic detection capacities and weekly SMS-based reporting from health posts, and will provide additional technical assistance in expanding these capabilities to an estimated 48 additional Global Fund supported districts based upon FMOH and Regional Health Bureau priorities.
- The sites will continue to comprehensively enumerate malaria morbidity, epidemiology, and diagnostic tests results, and inform improvements in malaria surveillance. Additionally, sites will provide data on health service delivery and health systems, including health facility access, patient turnover and referral patterns, commodity availability and consumption. A comprehensive review of the epidemic detection site data and activities will be done again in FY 2013 once expansion other regional states has occurred.
- **Strengthening Routine Epidemic Detection and Surveillance:** (\$200,000) PMI will continue to strengthen the capacity of community-level HEWs and HEW supervisors to detect and respond to increases in malaria caseloads or epidemic outbreaks at the community level and HEW supervisor training, integrated supervisions and regular field visits. The support uses a large USAID/Ethiopia's health project platform integrating Health, PEPFAR, and PMI funds, including support for malaria case management supervision; the project is being implemented in 286 districts in six regional states (approximately a third of the country). The purpose of the activity is to strengthen surveillance in the health care delivery system as a whole, leveraging the project's reach and ability to communicate with regards to occurring epidemic outbreaks, thereby ensuring a timely response. When outbreaks are detected at community-level, PMI will ensure that ORHB, FMOH and EHNRI are notified, so that a coordinated response can be implemented. If new approaches to improve epidemic surveillance are found to be effective (e.g., mapping of malaria micro-clusters; school-based surveillance), this project platform will be used to scale-up these approaches to national level.
- **Malaria Indicator Survey:** (\$800,000) PMI will support a follow-up MIS in Ethiopia in 2014-2015. As with the MIS 2011, this survey will be nationally representative, but will oversample Oromia, to provide an Oromia-specific estimate.
- **Operations Research on Serologic Assessment of 2011 MIS Samples:** (\$70,000) An operations research proposal will be submitted to the PMI Operational Research Committee to conduct serology testing from the samples collected during the 2011 MIS to supplement cross-sectional malaria prevalence data provided from the 2011 MIS with longer term malaria exposure data. Serology has the advantage that it provides information about infections over several years whereas parasitemia provides information only about the current infection. Serology, especially age-adjusted serologic results would be a better measure to monitor progress over time in the Ethiopian context and to better target malaria interventions to areas of ongoing malaria exposure. This activity is contingent upon approval from the OR Committee.

- **National Malaria Commodities Microplan:** (\$350,000) In FY 2013, PMI will continue to support an annual malaria commodities' micro-plan for all of Ethiopia's regional states in FY 2013. It is the main malaria commodity planning, distribution and tracking tool for all PMI and non-PMI supported commodity procurements. Based on the prior 12-months malaria case data and commodity consumption, the micro-plan projects the 12-month, district-level needs and gaps of all main malaria commodities, including RDTs, ACTs, chloroquine, LLINs and insecticide. The micro-plan data will be used by the ORHB, other RHBs, FMOH and other stakeholders to procure and distribute these commodities; coordinate procurement and distribution with stakeholders; and enable the ORHB, FMOH and stakeholders to track the commodities' distribution through the following 12 months.
- **FELTP:** (\$150,000) The FELTP in Ethiopia was initiated in 2008 with an initial cohort of 13 trainees. The GoE has requested that the FELTP expand to accommodate 23 trainees annually. Substantial malaria projects involving FELTP residents began in 2011 in Ethiopia. PMI will continue to support at least three trainees who will focus their field training on malaria prevention and control, including malaria outbreak detection and response activities, and an evaluation of malaria surveillance efforts.

SOCIAL AND BEHAVIOR CHANGE COMMUNICATION (SBCC)

NMCP/PMI Objectives

Key objectives for SBCC are to increase community knowledge regarding malaria prevention, diagnosis, treatment, and control, especially relating to (i) the establishment of a culture of correct and consistent LLIN use; (ii) increased community awareness about the effectiveness of IRS and the need to reduce re-plastering of walls; and (iii) improved treatment-seeking behavior for fever.

Communications with families, community-based networks, and health posts are an essential component of PMI support of SBCC activities. The GoE has made a large investment in building and equipping health posts and training of HEWs, who are meant to focus on community health prevention services and messages. PMI-funded SBCC activities are supporting these HEWs with communications materials and training.

President's Malaria Initiative -funded SBCC activities began in FY 2009. SBCC is implemented as a unified element to support the ORHB Health Education Unit and the FMOH's Health Education Extension Center. SBCC activities provide malaria-specific materials through a wide range of community-based organizations, women's groups, churches, NGOs and other networks of civil society with materials and training. Several CBO networks work in the education and health sector, including the CORE Group (hosted by the Christian Relief Development Agency) and the Coalition against Malaria in Ethiopia (hosted by the Malaria Consortium).

Progress During the Last 12 Months

Since FY 2011, PMI has provided assistance to the GoE to carry out malaria behavior change communication activities. Working with the HEP, zonal and community health workers provide critical link to SBCC activities. PMI has provided funds for the HEWs to work with families at the village and community level under the Model Families Program to educate Ethiopian families to take specific actions to protect themselves against malaria. This program include community volunteers who work under direction from the local health workers support their communities, families, and schools to take actions necessary to prevent malaria.

President's Malaria Initiative Ethiopia Malaria Communities Program covers three zones of Oromia in 15 malaria prone districts in three zones of Oromia, targeting 1.8 million people. The target population includes 74,964 pregnant women, 292,357 under 5 children, and 2,000 PLWHA. This integrates community-based malaria programs with HIV/AIDS programs through community volunteers. The program focuses on training and capacity building of HEWs, CBOs, FBOs, Schools, Health Committees and other community groups on key malaria messages in Oromia region. Key messages on malaria are provided to communities through selected media including leaflets, flipcharts, billboards, school mini-medias, drama, home visits, peer education, religious leaders' educational programs, school malaria clubs and community malaria clubs.

Malaria LLIN hang up campaigns have been one of the important PMI supported projects closely tied to SBCC activities. The first PMI/Ethiopia bed net hang up campaign was conducted in 2010 in Dolo Mena, Oromia Regional State in partnership with the US military (CJTF-HOA.) A baseline assessment and one year post-hang-up assessment was done at Dolo Mena, Oromia between 2010 and 2011. LLIN ownership increased from 33% at baseline to 90.5% one year post hang up campaign. Owned LLIN nets were observed to be hanging in 46% percent of households at baseline and 69% at one year follow up. Of pregnant women surveyed one year post hang up in 2011, 42% had slept under an LLIN. These data suggest that bed net hang up projects in Oromia Region can increase LLIN availability and usage over baseline when measured at one year. Seven similar hang up campaigns have occurred since that time in partnership with CJTF-HOA, successfully hanging a total of over 200,000 nets in eight districts of Oromia Region.

Challenges, Opportunities and Threats

The recent Ethiopia 2011 DHS shows the level of exposure to mass media is low in Ethiopia. Only 22 % of women and 38 percent of men listen to the radio at least once a week. In addition 68 percent of women aged 15-49 and 54 percent of men in the same age group didn't have access to any of the three common media types (TV, Radio, or print).

Malaria SBCC message harmonization and standardization remains a challenge, as there is not an office within the FMOH that coordinates and provides professional leadership for these activities after the re-engineering process of the ministry occurred in 2010 . There is strong need to work at national level to produce messages according to the national standards. This can be achieved through SBCC technical working group (TWG) and bringing SBCC partners under the same platform.

The HEP at regional level offers a highly effective opportunity to provide nationwide information and conduct SBCC activities to improve LLIN use in nearly all malaria-endemic communities across Ethiopia. The main strategies for the HEP to increase use of LLINs include: 1) implementation of community-based social communication activities, including SBCC toolkits at focal discussion groups, antenatal care clinics, during EPI and EOS campaigns, special events, and at the household level; and 2) use of SBCC materials, such as posters, pamphlets and mass media systems as appropriate.

Plans and Justification

In FY 2013 malaria SBCC activities will be more integrated and coordinated with other health BCC activities like PMTCT, TB, FP/RH, MNCH, and nutrition programs through the intended umbrella SBCC- Health program. Increasing impact through strategic coordination and integration is one of the principles of GHI. Multiple stakeholders are involved in SBCC activities in Ethiopia. Through this SBCC program comprehensive coordination, integration and harmonization with other capacity development and health service quality improvement programs will be encouraged.

Social behavior change communication partners will review the choice of media channels based on evidence. Interpersonal communication such as entertainment education, using school, and religious institutions will be encouraged. Promotional efforts on consistent and proper ITN use will use alternative SBCC interventions that can reach target groups with no access to radio and television. Suggested interventions include video, school programs, and community meetings, as well as other creative methods. Focus will be put on strategies initiated by the communities themselves, i.e., through Health Development Armies (HDAs) and the Focal Parents program that is overseen by HEWs.

The HDAs is a new initiative for comprehensive health service delivery, extending even deeper into the community (as compared to HEWs) reaching every household for health services. One HDA leader is responsible for five households. Health extension workers are supervising HDAs activities. The potential benefit of HDA for malaria IEC/ BCC is enabling the communities to produce and sustain their own health through interpersonal health communication.

Social behavior change communication activities through mass media and rural communications campaigns, supporting community level change agents like HDAs, can be applied in an integrated fashion for the other interventions (e.g., ACTs, IRS). For communications activities related to RDTs and ACTs in particular, the grantee will work with health providers at different levels of the health system to strengthen their interpersonal communication skills. The SBCC strategy may follow any behavioral framework that is appropriate for the Ethiopia situation. An example of a framework that may offer a way to organize the SBCC approach is the so called “Essential Malaria Actions” which will also supplement the SBCC activities of HDAs and HEWs.

Proposed Activities with FY 2013 Funding (\$1,700,000)

PMI conducted a review of its strategy for roll-out of SBCC interventions. The most critical aspect of this review was the effort to ensure that SBCC activities have sufficient population coverage in Oromia to reach the PMI target of 85% coverage of the most vulnerable groups. This review was intended to focus on areas of coverage, targeting the areas in Oromia with the highest reported malaria prevalence. Given the remoteness of many of districts in Oromia, and low rates (23%) of radio use (EDHS 2011), PMI will seek to make use of interpersonal communication channels to deliver malaria messages and work through a wide range of implementing partners and in-country stakeholders including HEWs and HDAs at the community level. Additionally, PMI will continue to provide SBCC materials developed to other implementing organizations, so that reach of these materials can be maximized.

- **Social behavior change communication** (\$1,400,000): With FY 2013 funding, PMI will continue to support the implementation of malaria-specific SBCC messages through a range of different channels, including community conversations, house-to-house visits, school health programs, and limited mass media targeting specific groups, which will be tailored based on the assessment results. In FY 2013, PMI will continue to support the dissemination of those messages beyond Oromia into all regional states of the country and trainings on SBCC and developed materials will be given to FMOH staff from all regional states and zones as well as from partner organizations. Partners will be trained in the various SBCC approaches, how to disseminate the messages, and how to measure their impact in terms of malaria knowledge and behavior change.
- **SBCC – other platforms** (\$300,000): Materials that have been developed with PMI support will be translated into all major languages of Ethiopia, reproduced and disseminated through a variety of platforms, including local FBOs and CBOs, Peace Corps Volunteers, CJTF-HOA especially for LLIN hang up campaigns, other USAID/Ethiopia implementing partners, UNHCR, and the private sector (e.g., large scale commercial farms, whose work force is known to be affected by malaria).

CAPACITY BUILDING & HEALTH SYSTEMS STRENGTHENING

NMCP/PMI Objectives

Ethiopia faces many challenges related to human resources for healthcare, including the shortage of skilled health workers, high turnover and lack retention of health professionals in remote and inaccessible health facilities where malaria is prevalent. Decentralization of the health care system places an additional management burden on the Zonal and District Health Offices. While it is beyond the ability of PMI to address the system-wide capacity issues, there are areas within the NMCP where capacity can be strengthened, including through pre- and in-service refresher trainings in the Human Resources for Health (HRH) project.

Progress During the Last 12 Months

The FMOH Human Resources for Health (HRH) Strategy was released in June 2010. A comprehensive USAID/Ethiopia Health, AIDS, Population & Nutrition (HAPN) office-wide training and education project was developed and approved in response to this document after consultation with many donors and stakeholders. In early 2012, USAID awarded a project supporting the FMOH's HRH strategy, that included a total of \$2 million of PMI support from FY 2010 and FY 2011 funding.

This project is expected to improve pre- and in-service training structures for HEW's and other healthcare workers, to include best practices in malaria diagnosis and treatment. Through this project, PMI will collaborate with partners to strengthen the capacity of the ORHB and FMOH staff and others at the national, district and community levels to plan, implement, supervise, monitor and evaluate malaria prevention and control activities. Skills strengthening will address needs in human resources and financial management, information technology, and project management, as well as malaria-specific technical skills. PMI already allocated support in FY 2010 and FY 2011 to support this activity.

Challenges, Opportunities and Threats

There were unexpected delays for several years until FMOH finalized their HRH strategy, then delays in creating an integrated award through USAID that also met PEPFAR and USAID's broader health program needs.

Plans and Justification

Now that the FMOH has identified gaps and developed a comprehensive HRH strategy that includes staff retention plans and integrates well into its overall health strategies, PMI's role in supporting malaria related capacities within this structure has been clarified. While HRH needs in Ethiopia will be expected to be extensive and will require many years of support, PMI has deferred additional funding for this project from FY 2012 and FY 2013 budgets until this project is scaled up using the initial \$2 million in PMI investments remaining in the pipeline from previous years.

STAFFING AND ADMINISTRATION

Two expatriate health professionals (Resident Advisors) oversee PMI in Ethiopia: one representing CDC and the other USAID. Three Foreign Service Nationals (FSNs) were hired to support the PMI team: one Senior Malaria Advisor, one Malaria Advisor, and one Program Manager. Additionally, PMI shares a number of USAID/Ethiopia support staff with other USAID/Ethiopia offices, including the Financial Controller, the Executive Officer and drivers; PMI contributes its share to funding those supporting staff.

All PMI staff members are part of a single interagency team led by the USAID/Ethiopia Mission Director and the Chief of the USAID/Ethiopia Health Office. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with

national authorities, management of collaborating agencies and supervision of day-to-day activities. Candidates for these positions are evaluated and interviewed jointly by USAID and CDC. Both agencies are involved in hiring decisions, with the final decision made by the individual agency.

The PMI/Ethiopia team oversees all technical and administrative aspects of the PMI portfolio, including finalizing project design details, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, and reporting on results. Both Resident Advisors report to the USAID/Ethiopia Mission Director. The CDC Resident Advisor is supervised by CDC both technically and administratively, while the USAID Resident Advisor is supervised by USAID. All technical activities are undertaken in close coordination with the MOH and other national and international partners.

Proposed PMI activities with FY 2013 funding (\$2,200,000)

The current PMI staffing structure will continue in FY 2013. However, because of USAID/Ethiopia's move to the U.S. Embassy's compound, cross-cutting administrative costs increased. Costs for four CDC TDYs not covered by PMI core funds are also included.

Table I

**President's Malaria Initiative – Ethiopia
Year 6 (FY 2013) Budget Breakdown by Partner (\$37,000,000)**

Partner Organization	Geographic Area	Activity	Budget
CDC IAA		In-country staff; administrative expenses, TDYs	\$600,000
GEMS	Oromia	Environmental compliance activities	\$30,000
IRS 2 IQC Task Order 4	Oromia	Procurement of IRS equipment; IRS operations; Entomological monitoring and capacity-building; Pesticide management	\$3,700,000
Pathfinder IFHP	National	Provide systems support for ongoing supervision and monitoring of malaria treatment; epidemic surveillance and response	\$800,000
SIAPS	National	Strengthening of drug management system capacity	\$750,000
TBD	National	LLIN hang up-keep up campaigns	\$100,000
TBD	Oromia	Procurement of insecticides for IRS	\$4,500,000
TBD	Oromia/National	SBCC for LLINs, IRS, ACTs, case management	\$1,400,000
TBD	Oromia/National	APS for local implementation of BCC campaigns	\$300,000
TBD	Oromia/National	Support for QA system for malaria laboratory diagnosis	\$900,000
TBD	Oromia	Procurement of laboratory equipment/supplies	\$650,000
TBD	Oromia	Maintenance of epidemic detection sites	\$300,000
TBD	National	Malaria Indicator Survey	\$800,000
TBD	National	Support to conduct serology testing from the samples collected during the 2011 MIS	\$70,000
UNICEF	Oromia/National	Procurement and distribution of LLINs, RDTs, ACTs, chloroquine, pre-referral and severe antimalarial drugs; support for national commodities' micro-planning	\$20,150,000
USAID		In-country staff; administrative expenses; USAID TDY core-funded	\$1,750,000
USP PQM	National	Strengthen drug quality monitoring	\$200,000
Total			\$37,000,000

Table II
President's Malaria Initiative – Ethiopia
Planned Obligations for FY 2013 (\$37,000,000)

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
PREVENTIVE ACTIVITIES: INSECTICIDE TREATED NETS						
LLIN procurement and distribution	UNICEF	10,000,000	10,000,000	Oromia/National	Provide 2,500,000 free LLINs through health facilities, HEWs and other networks	
LLIN hang up-keep up campaigns	TBD	100,000	25,000	National	Implementation of selected LLIN hang-up campaigns through CJTF-HOA	
Subtotal		10,100,000	10,025,000			
PREVENTIVE ACTIVITIES: INDOOR RESIDUAL SPRAYING						
Insecticide procurement	TBD	4,500,000	4,500,000	Oromia	Procurement of insecticide for IRS activities	
IRS operations	IRS 2 IQC Task Order 4	3,000,000	250,000	Oromia	Training, implementation and supervision support for IRS operations targeting 500,000 structures; procurement of spray equipment and personal protective gear	
IRS training	IRS 2 IQC Task Order 4	100,000		National	Building the national capacity for IRS operations planning and management, environmental compliance and poison control	
Entomological monitoring and capacity-building	IRS 2 IQC Task Order 4	400,000		National	Sustaining capacity for entomological monitoring for vector control, including Adama training facilities	
Pesticide management	IRS 2 IQC Task Order 4	200,000		National	Support for comprehensive management of insecticide stocks and waste	
Environmental compliance monitoring	GEMS	30,000		Oromia	TA support for review of environmental compliance of PMI supported activities	
Subtotal		8,230,000	4,750,000			
						Page

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Reference
PREVENTIVE ACTIVITIES: SBCC						
SBCC for LLINs, IRS, ACTs, case management	TBD	1,400,000		Oromia/National	Training, dissemination and implementation of various SBCC approaches through a variety of platforms	
APS for local BCC implementation	TBD	300,000		Oromia/National	Training, dissemination and implementation of various SBCC approaches	
Subtotal		1,700,000				
PREVENTIVE ACTIVITIES: IPTp						
Malaria in pregnancy and IPTp		0		Oromia/National	Collaboration and coordination with USAID/Ethiopia MNCH, family planning and reproductive health programs.	
Subtotal Prevention		20,030,000	14,775,000			
CASE MANAGEMENT: DIAGNOSIS						
Support for QA system for malaria laboratory diagnosis	TBD	900,000	100,000	Oromia/National	Support RHB, EHNRI and RRLs to improve laboratory services and QA/QC for microscopy and RDTs at national and health facility level	
Procurement of RDTs	UNICEF	4,800,000	4,800,000	Oromia/National	Procurement and distribution of 6,000,000 RDTs to support FMOH/ORHB efforts to scale-up RDT use at the health facility level	
Procurement of laboratory equipment/supplies	TBD	650,000	650,000	Oromia	Procurement of laboratory equipment and supplies (e.g., microscopes), and including logistics systems support	
Subtotal		6,350,000	5,550,000			

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
CASE MANAGEMENT: TREATMENT						
Procurement of ACTs, chloroquine, pre-referral treatment and drugs for severe malaria	UNICEF	5,000,000	5,000,000	Oromia/National	Procurement of 2,800,000 ACT treatment dosages; 2,000,000 chloroquine treatment dosages; rectal and parenteral artesunate; as well as drugs for pre-referral and management of severe malaria to cover national needs	
Provide systems support for ongoing supervision and monitoring of malaria treatment	Pathfinder <i>IFHP</i>	600,000		National	Support for health worker supervision for management of malaria at district-level health centers and community-level health posts; collaboration with Zonal and District Health Offices	
Subtotal		5,600,000	5,000,000			
CASE MANAGEMENT: PHARMACEUTICAL MANAGEMENT						
Strengthening of drug management system capacity	<i>SIAPS</i>	750,000		National	Strengthening of drug management system, quantification and procurement; distribution management; and health facility drug availability and management	
Strengthen drug quality monitoring	USP <i>PQM</i>	200,000		National	Support to FHMACA for monitoring of post marketing anti-malarial drug quality regionally and nationally	
Subtotal		950,000				
Subtotal Case Management		12,900,000	10,550,000			

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
EPIDEMIC DETECTION AND RESPONSE						
Maintenance of Epidemic Detection Sites	TBD	300,000		Oromia	Maintain ten epidemic detection sites, reporting both district and community-level data on malaria morbidity and mortality, as well as data on occurrence of transmission microclusters, patient access, and commodity use	
Epidemic surveillance and response	Pathfinder <i>IFHP</i>	200,000		National	Support for ESR planning at district and zonal level; support for surveillance system; operational costs; reserve stocks for LLINs, RDTs and drugs budgeted in prevention and case management sections	
Subtotal		500,000				
MONITORING AND EVALUATION						
Malaria Indicator Survey	TBD	800,000		National	Support for implementation of Malaria Indicator Survey in 2011	
Serology Operations Research Activity	TBD	70,000		National	OR study to conduct serology testing from the samples collected during the MIS 2011	
National malaria commodities micro-plan	UNICEF	350,000		National	Expansion of yearly malaria commodity micro-plan as done in Oromia to other regional states of the country	
Field Epidemiology Training Program (FETP)	CDC <i>IAA</i>	150,000		National	Support for applied epidemiology and laboratory training for FMOH staff	
Subtotal		1,370,000				
Subtotal Epidemic Surveillance / Monitoring and Evaluation		1,870,000				

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
IN-COUNTRY MANAGEMENT AND ADMINISTRATION						
TDY	CDC IAA	50,000			4 two-week trips: one for sentinel site supervision, one for strategic guidance to epidemiological work, two for strategic guidance to entomological work	
In-country staff; Admin. Expenses	CDC IAA	400,000			Salaries, benefits of in-country CDC PMI staff (1)	
In-country staff; Admin. Expenses	USAID	1,750,000			Salaries, benefits of in-country USAID PMI staff (1 PSC / 3 FSNs); ICASS support of CDC PMI staff	
Subtotal Management Administration		2,200,000				
TOTAL		37,000,000	25,325,000		Commodities (68%)	