

This Malaria Operational Plan has been endorsed by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. If any further changes are made to this plan, it will be reflected in a revised posting.



PRESIDENT'S MALARIA INITIATIVE

MALARIA OPERATIONAL PLAN (MOP)

**ETHIOPIA
FY2012**



TABLE OF CONTENTS

	ACRONYMS AND ABBREVIATIONS	3
A.	EXECUTIVE SUMMARY	4
B.	INTRODUCTION	7
B.1.	Global Health Initiative	7
B.2.	President's Malaria Initiative	7
C.	MALARIA SITUATION	8
C.1.	The Changing Ethiopian Context	8
C.2.	Health Infrastructure in Ethiopia and Oromia	9
C.3.	Malaria in Ethiopia and Oromia	11
C.4.	History and Current Status of Malaria Control in Ethiopia	12
C.5.	Rationale for Current Allocation of Control Interventions	14
D.	NATIONAL MALARIA CONTROL PLAN AND STRATEGY	14
E.	CURRENT STATUS OF MALARIA INDICATORS	15
E.1.	Malaria Indicator Survey 2007	15
E.2.	Health Facility Surveys 2007 – 2010	17
E.3.	Epidemic Detection Sites 2010 – 2011	18
F.	GOALS AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE	18
G.	EXPECTED RESULTS –FY2012	19
H.	INTERVENTIONS: PREVENTION	19
H.1.	Insecticide-treated Nets	19
H.2.	Indoor Residual Spraying	22
H.3.	SBCC and Support to Community-Based Organizations	29
H.4.	Malaria in Pregnancy Including Intermittent Preventive Treatment	31
I.	INTERVENTIONS: CASE MANAGEMENT	32
I.1.	Diagnostics	32
I.2.	Pharmaceutical Management	33
I.3.	Treatment	35
J.	INTERVENTIONS: EPIDEMIC SURVEILLANCE AND RESPONSE	38
J.1.	Epidemic Detection and Response	38
K.	MONITORING AND EVALUATION	41
L.	INTEGRATION WITH OTHER GLOBAL HEALTH INITIATIVE PROGRAMS	43
L.1.	Maternal, Neonatal and Child Health, Family Planning, Reproductive Health	43
L.2.	PEPFAR	44
L.3.	Neglected Tropical Diseases	45
M.	CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING	45
N.	COMMUNICATION AND COORDINATION WITH OTHER PARTNERS	46
O.	STAFFING AND ADMINISTRATION	47
P.	TABLES	49
	Table I: Budget Breakdown by Partners	49
	Table II: Planned Obligations FY12	50

ACRONYMS AND 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
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
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
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

A. EXECUTIVE SUMMARY

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

The President's Malaria Initiative (PMI) is a core component of the GHI, along with health programs for HIV/AIDS and tuberculosis. PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through FY2014. 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.

In 2007, Ethiopia became one of the PMI focus countries, and in June 2010 it was chosen to be one of the first eight 'GHI Plus' countries. 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 78 million lives in areas at risk of malaria. According to Ethiopia's Federal Ministry of Health (FMOH), in 2009/2010, malaria was the leading cause of outpatient visits and health facility admissions, accounting for 14% of reported outpatient visits and nearly 9% of admissions. Malaria was also among the ten leading causes of inpatient deaths among children under five years of age. Because a large proportion of the population does not have access to health care services, these figures probably under-estimate the true burden of malaria in the country.

PMI support to malaria prevention and control in Ethiopia began in FY2008 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 \$41 million annually to malaria control efforts during the last four years. In addition, Ethiopia has received three malaria grants from the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund). 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 2007, showed a rapid increase in the household insecticide-treated net (ITN) coverage from 6% to 66% in the targeted malarious areas since 2004. However, the survey also showed that Oromia was lagging behind the country's other regional states in key malaria intervention indicators. For example, in Oromia in 2007 only 41% of households were shown to own one or more ITNs; and only 29% of pregnant women and 24% of children under five years of age had slept under an ITN the previous night. On the positive side, the prevalence of malaria parasitemia was shown to be <1% in 2007. While this figure could be the result of the scale-up of malaria interventions, it needs to be interpreted with caution. Historically, Ethiopia has experienced cycles of malaria epidemics every five to eight years, with the last nationwide epidemic in 2003. The low malaria prevalence observed in the MIS 2007 may simply reflect the low transmission characteristics of non-epidemic years, and the burden of malaria infection may be actually substantially higher than has been detected by recent surveys.

This PMI Year 5 (FY2012) Malaria Operational Plan for Ethiopia was developed in June 2011 in close consultation with the FMOH, the Oromia Regional Health Bureau (ORHB) and with participation of in-

country partners. The activities PMI proposes for FY2012 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 to the remainder of the country in FY2011 and will continue these activities in FY2012. The proposed FY2012 PMI budget for Ethiopia is \$36.9 million. Outlined below are the FY2012 budget's major components, which envisage sustaining and expanding PMI support to ongoing activities:

Insecticide-treated Nets (ITNs): Between 2005 and 2009, approximately 20 million long-lasting ITNs (LLINs) were distributed nationwide with support from the Global Fund, including 6.5 million LLINs in Oromia. The MIS 2007 showed that LLIN ownership increased to 66% in areas targeted for distribution. By the end of 2011, the FMOH plans to distribute an additional 15 million free LLINs throughout Ethiopia in another mass national campaign hoping to get closer to the RBM LLIN coverage target of 85%. PMI is procuring 3.2 million LLINs with FY2011 funding to contribute to this effort. An additional 1.9 million LLINs will be procured with PMI FY2012 funding to further support Ethiopia's national campaign. PMI LLINs will be delivered through ORHB channels and through networks of community-based (CBOs), faith-based (FBOs) and other non-governmental organizations (NGOs). 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, which estimates district and community-level LLIN needs and gaps.

Indoor Residual Spraying (IRS): In FY2011, 960,000 structures were sprayed and more than 4 million residents protected with PMI-supported IRS. In addition, PMI support of insecticide resistance monitoring from 2008 to 2011 has now demonstrated widespread resistance to DDT, leading the Government of Ethiopia to pursue alternative insecticides for its next round of IRS. With FY2012 funding, PMI will continue to support 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 procurement, distribution and storage systems, training and supervision of spray personnel and appropriate pesticide management, entomological monitoring, and environmental compliance. PMI will support spraying for 960,000 household structures in 50 districts of Oromia with high malaria transmission, protecting an estimated 4 million residents. PMI also will continue to support the national Integrated Vector Management (IVM) framework to build capacity for 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 usage among pregnant women, and prompt diagnosis and treatment of clinical cases when they occur. In FY2012, PMI will support maternal and child health issues through an integrated approach to fever management at the community level by supporting integrated community case management (iCCM) training programs for health extension workers (HEWs).

Case Management: With previous PMI support, 3.2 million rapid diagnostic tests (RDTs), 3.9 million treatments of artemisinin-based combination therapies (ACTs) and 3.9 million treatments of chloroquine were procured and distributed. An additional 1.6 million RDTs, 4.5 million ACT treatments and 4 million chloroquine treatments are being procured with FY2011 funds. PMI assisted the FMOH in updating the national malaria diagnosis and treatment and epidemic detection and control guidelines, including the role and value of RDTs, rectal artesunate, and intravenous artesunate. PMI is committed to continuing its

support to quality-assured diagnostic testing for malaria, including provision of supplies, training, supervision and implementation of quality assurance/quality control (QA/QC) systems to improve the quality and accuracy of case management of fever. PMI is also strengthening the pharmaceutical management system, including procurement, warehousing, and delivery of malaria commodities within the national Pharmaceutical Logistics Master Plan (PLMP). In conjunction with other SBCC efforts, PMI is supporting the ORHB and its expanding system of HEWs to promote early care-seeking behavior and adherence to antimalarial 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 antimalarial drug efficacy monitoring sites throughout the country are being supported by PMI in Oromia. With FY2012 funding, PMI will procure and distribute 6 million multi-species RDTs, 4.5 million ACT treatments, 4 million chloroquine treatments (for treatment of *Plasmodium vivax*), together with drugs for severe disease and pre-referral care.

Epidemic Surveillance / Monitoring and Evaluation: There is an urgent need to improve data and information management for operations in Ethiopia, including tracking both the malaria burden and malaria-related commodities and operations. To improve routine surveillance, PMI is assisting the FMOH in the rollout 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 FY2012 funding, this support will be sustained, together with efforts to monitor malaria morbidity and mortality and availability of malaria commodities at the health facility 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. PMI is currently supporting with FY2011 funding a pilot assessment of school-based surveillance as an early warning system for malaria epidemics. In FY2012, 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 at the Ethiopian Health and Nutrition Research Institute.

Health Systems Strengthening and Integration: As one of the eight 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) which has established 15,000 health posts that offer curative and preventive services for a range of conditions, including malaria, at the community level. With FY2012 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, which prior to PMI had not been carried out for many years. Lastly, PMI is leveraging support through PEPFAR, to strengthening laboratory diagnosis of malaria, in conjunction with strengthening of laboratory capacity to diagnose tuberculosis and HIV infections.

B. INTRODUCTION

B.1. Global Health Initiative

The GHI is a global commitment to invest in healthy and productive lives, building upon and expanding the USG's successes in addressing specific diseases and issues. The GHI model is based on: implementing a woman- and girl-centered approach; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; encouraging country ownership and investing in country-led plans and health systems; improving metrics, monitoring and evaluation; and promoting research and innovation.

The GHI builds upon previous USG accomplishments in global health, while accelerating progress in health delivery and investing in a more lasting and shared approach through the strengthening of health systems. In June 2010, Ethiopia was designated as a GHI focus country, further emphasizing country ownership, collaboration, integration and sustainability.

B.2. President's Malaria Initiative

PMI is a core component of the GHI, along with other health programs, addressing HIV/AIDS, tuberculosis, and neglected tropical diseases. PMI was launched in June 2005 as a five-year, \$1.2 billion initiative to rapidly scale-up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. The 2008 Lantos-Hyde Act authorized USG malaria funding for PMI through FY2014 with the goal adjusted to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by reaching 85% coverage of the most vulnerable groups, i.e. children under five years of age and pregnant women, with proven preventive and therapeutic interventions, including ACTs, ITNs, IPTp, and IRS.

In implementing PMI, the USG is committed to working closely with host governments and their existing national malaria control strategies and plans. Efforts are coordinated with other national and international partners, including Global Fund, Roll Back Malaria (RBM), the World Bank, the World Health Organization (WHO), the United Nations International Children's Emergency Fund (UNICEF) and the non-governmental and private sectors, to ensure that malaria investments are complementary and that RBM and Millennium Development Goals are achieved. Country assessment and planning activities for PMI, as well as subsequent evaluations, are highly consultative and held in collaboration with the FMOH and in-country partners.

This FY2012 MOP is a detailed, one-year plan for the fifth year of PMI in Ethiopia. This document builds on the previous MOPs available on the PMI website (www.pmi.gov). The FY2012 MOP briefly reviews the current status of malaria in Ethiopia; outlines current prevention and control policies and interventions; identifies challenges and unmet needs to achieve PMI goals; reviews PMI activities from prior years; and describes activities to be supported by PMI in Year 5, in particular the continued expansion of specific activities beyond Oromia to other regional states. The MOP FY2012 was developed in close consultation with the Government of Ethiopia's FMOH, ORHB and with participation of many national and international in-country malaria partners. The total amount of FY2012 PMI funding requested for Ethiopia is \$36,900,000.

C. MALARIA SITUATION

C.1. The Changing Ethiopian Context

Previous MOPs 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 HEP; the importance of diagnostics given the presence of both *P. falciparum* and *P. vivax*; 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. While it is just one of nine regional states, Oromia comprises one third of both the country's land mass and population (29.4 million). Oromia is both the largest and, by most health indicators, the most underserved regional state in Ethiopia. In the fifth year, PMI commodity and operations support will continue to concentrate primarily in Oromia. However, PMI support will expand nation-wide by filling commodity gaps and supporting planning, training and use of strategic information. Besides strengthening these national level supports, PMI will also support the FMOH-led roll-out of iCCM in target districts throughout the country. Integrated community case management is believed to have had a significant impact in disease-related morbidity and mortality in children under five years of age across the county, which will greatly contribute to the achievement of Millennium Development Goal 4.

Diagnostics and the treatment of malaria and pneumonia: The HEP is a cornerstone of the FMOH's malaria policies. There have been two significant policy changes to refine the diagnosis and treatment of fevers in Ethiopia. First, HEWs now have been supplied with multi-species RDTs that can diagnose both *P. falciparum* and *P. vivax*, and have stocks of chloroquine for the treatment of *P. vivax* (which was previously often treated with artemether-lumefantrine (AL)). Second, HEWs are now able to treat suspected pneumonia cases with the antibiotic 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 treatment of fever at the community level.

Entomological monitoring and insecticide selection: With support from PMI, Ethiopia was able to greatly expand 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, resistance to pyrethroids 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.

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 year occurring in 2003. The MIS 2007 indicated that parasite prevalence (as measured by microscopy) in Ethiopia and Oromia was 0.7% and 0.3%, respectively. While this could indicate that the FMOH-led scale-up of malaria prevention and control interventions may have had an impressive impact on malaria morbidity and mortality, the data has to be interpreted with caution. The MIS 2007 was a cross-sectional survey in a country where transmission is known to vary spatially and temporally: a low prevalence at the time of the survey could have missed an upsurge in cases in the months before or after the survey. While no epidemics were reported in 2006 or 2007, several small outbreaks have been reported in 2008 through 2011. According to the latest FMOH data for 2009/2010, malaria is again the most common cause of outpatient visits and health facility admissions in the country. The unstable and largely unpredictable epidemiology of malaria in Ethiopia makes accurate surveillance as well as information and logistics management for antimalarial

commodities of paramount importance.

C.2. Health Infrastructure in Ethiopia and Oromia

Ethiopia operates under a federal system of government. Administratively, the country is divided into regional states, zones, districts (*woredas*) and communities / municipalities (*kebeles*) (**Figure 1**).

Oromia has 304 districts divided into 18 zones and 9 ‘special towns’ (**Figure 2**). 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 6-tiers into a 4-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 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.

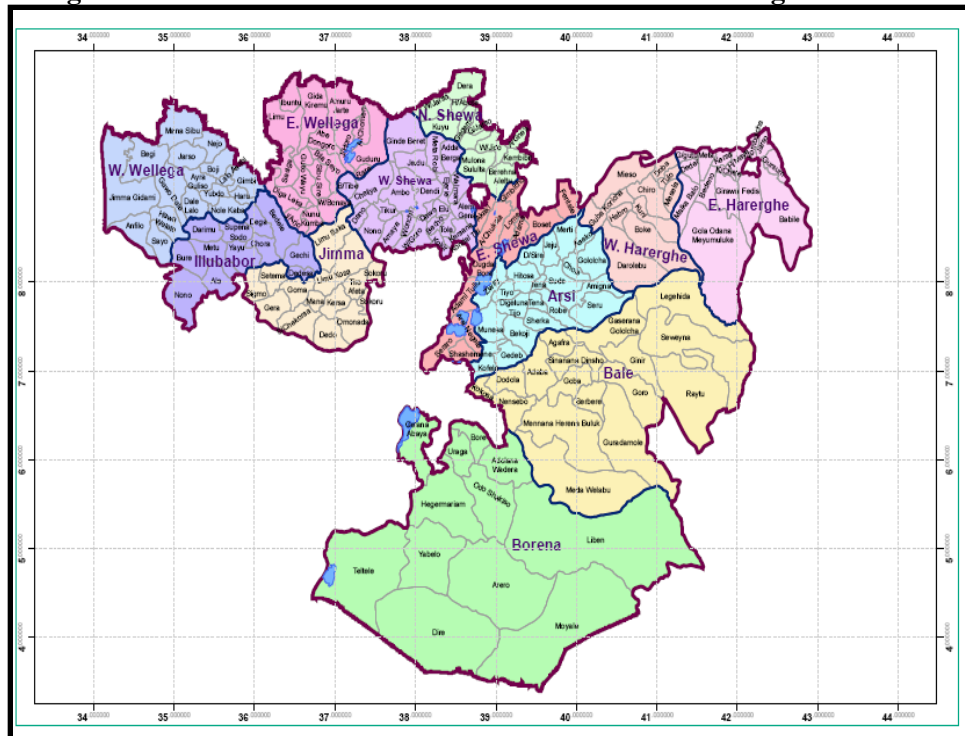
The typical health post is staffed by two HEWs providing health care service delivery on 16 selected health packages, including one on malaria [<http://cnhde.ei.columbia.edu/training/index.html>]. HEWs are paid FMOH staff; they have a high school diploma, and usually originate from the communities they serve. The HEWs focus on preventive services, except for malaria and mild pneumonia where they are expected to provide curative services, namely to confirm diagnosis with an RDT and provide patients with AL (for *P. falciparum*) or chloroquine (for *P. vivax*). Severe malaria cases are to be referred to the next appropriate health facility. HEWs now are being trained in iCCM, which will enable them to identify and treat children with pneumonia, uncomplicated malaria, and non-bloody diarrhea, and will also teach them to identify and refer appropriately children with severe illness. HEWs are also expected to supervise seasonal activities, such as SBCC activities and mass vaccination campaigns, participate in surveys and a range of other community health activities that may include malaria-related interventions. Additionally, HEWs have become more directly involved in managing IRS operations in their communities (e.g. by supervising 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.

Figure 1. Administrative Regional States and Zones of Ethiopia.



Regional states are in different colors, zones in same colors. Ethiopia has 9 Regional States; additionally there are 2 ‘City Councils’ (i.e. Addis Ababa, Dire Dawa).

Figure 2. Administrative Zones and Districts of Oromia Regional State.



Administrative zones of Oromia are in different colors, districts in same colors. Oromia has 18 zones and 9 ‘Special Towns’, and 304 districts including towns.

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.

C.3. Malaria in Ethiopia

Epidemiology: 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 two decades 48 ‘epidemic episodes’ have occurred, with large epidemics in 1988, 1991, 1992, 1998, 2003, 2004 and 2005.

In Ethiopia, malaria transmission is largely determined by climate and altitude. Most of the transmission occurs between September and December, after the main rainy season from June to August. Certain areas, largely in the western and eastern part of the country (including parts of Oromia) experience a second minor 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 Benishan-Gul 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.

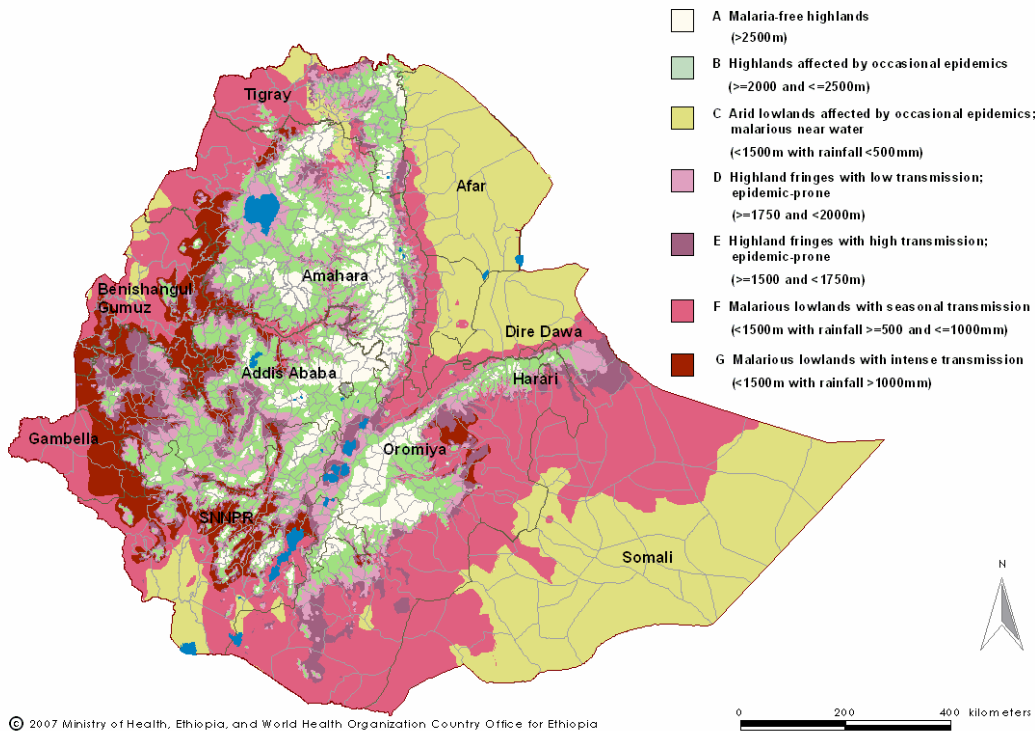
Additional stratification can be done based on annual rainfall (**Figure 3**).

Burden of Disease: Despite the low parasite prevalence, 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.

Overall, according to the FMOH’s 2009/2010 report, malaria accounts for up to 14% of outpatient consultations (the leading cause of outpatient consultations) and 9% of health facility admissions. About 75% of the geographic area of the country has malaria transmission (defined as areas <2,000 m), with about 68% (i.e. 54 .2 million) of the country’s total population living in these areas. The FMOH estimates that there are 5 – 10 million clinical malaria cases each year. However, of these, only one million are reported at the national level, with 462,623 (55.84%) examined and 256,487 (23.68%) confirmed positive by a diagnostic test in 2009/2010. The completeness of this report, though, is questionable. According to FMOH reports, approximately 70,000 people die of malaria each year in Ethiopia.

Compiling highly accurate malaria estimates is a challenge. In a country with a weak health information system, the few data which are available are often unreliable and likely to overstate malaria burden, as most cases are diagnosed solely on clinical grounds and only a small percentage of those with fever will have malaria. Recent surveys (see **section E**), appear to indicate a drop in malaria morbidity and mortality. This may be explained by climatic factors or by the aggressive scale-up of malaria interventions. 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 Southern Nations, Nationalities, and People’s (SNNP), Amhara, Tigray and Oromia Regional States in 2008, 2009, 2010 and early 2011.

Figure 3. Distribution and Seasonality of Malaria in Ethiopia.



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%. *Anopheles 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. *Anopheles pharoensis* is widely distributed in Ethiopia and has shown high levels of insecticide resistance, but its role in malaria transmission is unclear. *Anopheles 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 MOP FY2008. However, insecticide resistance among these vectors has become an important issue, with implications for vector control strategies (see **section H.2**).

C.4. History and Current Status of Malaria Control in Ethiopia

1959 – 2003: In 1959, the Malaria Eradication Service was established with funding support by USAID. Ethiopia, along with Zimbabwe and South Africa, were the only three countries in Africa to embark on a malaria eradication effort in line with the Global Malaria Eradication Efforts spearheaded by WHO. In 1976, as in many other countries, the country shifted from an ‘eradication’ program to a ‘control’ program known as the National Organization for the Control of Malaria and Other Vector-Borne Diseases. Until the early 1990’s, malaria control was organized by *sectors*, with a sector covering about two to five districts or 75,000 to 150,000 people. Sector Malaria Control Offices were responsible for Malaria Detection and Treatment Posts in each sector, which collected data on microscopically confirmed cases.

Starting in 1993, a major reorganization and decentralization occurred within the FMOH, and the vertical

NMCP was dismantled. The Regional States took over responsibility for many aspects of the program, and malaria control (including vector control) was integrated with other parts of the health system. In a subsequent FMOH reorganization, malaria control became a 'team' (i.e. the Malaria and Other Vector-Borne Disease Team) under the FMOH's Disease Prevention and Control Department, rather than a separate department.

In 2000, the GoE became a co-signatory of the Abuja Declaration and committed itself to the declaration's aims to increase coverage of malaria interventions and reduce malaria mortality by half by 2010. A Malaria Control Support Team (MCST) comprising representatives from the FMOH, donor and international organizations (e.g. UNICEF, WHO), and NGOs was formed to provide technical assistance and mobilize support for the government program.

The era of the Global Fund: Ethiopia has been the recipient of three grants from the Global Fund: Round 2 (2002 - 2008; \$73 million), Round 5 (2005 - 2010; \$140 million) and Round 8 (2008 – 2013; \$276 million). Ethiopia was unsuccessful in its application for Global Fund Round 10 and plans to apply for funds again in Global Fund Round 11.

Since 2005, more than 20 million ITNs (largely LLINs) have been distributed throughout Ethiopia; most of these LLINs were replaced between 2010 and 2011. Millions of RDTs and treatments of ACTs have been provided to health facilities, including peripheral health posts, in an effort to increase access for timely diagnosis and treatment. IRS activities have also increased with many more districts in malaria epidemic-prone areas covered by IRS. The impressive scale-up of activities has also resulted in other agencies, including UNICEF, the World Bank, the Carter Center, providing additional resources to support scale-up of malaria control interventions.

This scale-up of malaria interventions is probably the largest of its kind in sub-Saharan Africa and came with a heavy price tag. To sustain current efforts and achieve national coverage, the GoE's Global Fund Round 8 proposal projects that, in addition to Global Fund support until 2013, it will need more than \$150 million annually for procurement and distribution of necessary commodities from 2009 onwards.

Organization of the NMCP in Ethiopia: Until 2009, the NMCP in Ethiopia was staffed by members of the Malaria and Other Vector-borne Diseases Team and in the FMOH's Communicable Disease Prevention and Control Department. The team's responsibilities included overall coordination of malaria and other vector-borne diseases control at the national level, identification of implementation capacity gaps for Regional Health Bureaus (RHBS) and provision of training, formulation and dissemination of malaria national policy and technical guidelines, oversight of policy implementation, monitoring and evaluation (M&E) of impact of operational program activities, and advocacy for malaria as a priority disease.

In 2009, the GoE completed a business process re-engineering exercise (BPR) that resulted in the re-organization of ministries and agencies according to eight core processes. Following this re-engineering exercise, the NMCP and Communicable Disease Prevention and Control Department have been absorbed into Directorates, with most malaria activities being implemented by the Directorate for Disease Prevention and Promotion and the Directorate of Medical Services.

The recent RBM-led Malaria Program Performance Review report indicated that there are several key functions critical to malaria prevention and control that are currently not being fully addressed. The review recommended that the federal level leadership consider how to complement the existing system, ensuring that the unmet federal responsibilities are addressed efficiently with staff empowered with authority, responsibility, and accountability for decision-making. At the regional state level, malaria control oversight and support are organized differently in different regional states, either as a department,

a team or a group of experts under a Communicable Disease Department or Office.

In Oromia, malaria and other vector-borne diseases are organized as a department with two teams, the Malaria Diagnostics and Epidemiology Team and the Vector Biology and Control Team; staff in this department reports to the Deputy Head of the ORHB. The department is responsible for coordination of malaria and other vector-borne control activities in Oromia, including planning, implementation and M&E, and support to capacity building of the Zonal and District Health Offices. Oromia maintained a malaria prevention and control entity under the Health Promotion and Disease Prevention Core Process of the BPR. Recently, the ORHB upgraded malaria control to sub-process level to further strengthen authority and accountability of the unit. How this upgrading would affect the district and zone level structure is not clear yet. In Oromia, at the zonal level, two experts are expected to work on malaria and other vector-borne diseases under the Communicable Disease Team of the Zonal Health Department, one for malaria diagnosis/epidemiology and one for entomology/vector control. These two staff serve as backstops for district malaria control activities, liaising directly with the district malaria control program and the region, ensuring the availability of human resources, equipment and supplies in districts as well as coordinating resources of different malaria stakeholders operating in the zone. Although there used to be a 'Malaria Team' at each of the District Health Offices, the GoE's BPR has abolished these positions, with six persons at district level responsible for all health issues, including malaria. Programmatic challenges listed by the RHBs include shortages of appropriate health professionals to fully staff the program, high staff turnover, less attention to M&E, and downgrading, in some areas, of the malaria management structure to a level which will impede the successful implementation of malaria program activities.

C.5. Rationale for Current Allocation of Control Interventions

For FY2012, PMI is continuing to sustain activities initiated and supported in the prior four years, and adapting to the changing context of malaria in Ethiopia (see **section C.1.**). The PMI budget for Ethiopia for FY2012 is expected to be \$36.9million, an increase from FY2008 (\$19.8 million), FY2009 (\$19.7 million) and FY2010 (\$31 million), but a small decrease from FY11 (\$40.9 million). Given the GoE's unsuccessful efforts to obtain additional Global Fund support in 2009 and 2010 and the growing requirements for LLINs, insecticide, RDTs and ACTs from 2011 onwards, PMI support for malaria commodities in FY2012 will increase. After the massive scale-up of LLINs and ACTs through a still-developing health sector infrastructure, there is also a large emphasis on improved targeting of interventions, supervision and M&E, logistics information management, and SBCC to ensure those commodities reach the populations intended and are used appropriately.

D. NATIONAL MALARIA CONTROL PLAN AND STRATEGY

The overall framework of the national malaria control strategy is set forth in the GoE's Health Sector Development Plan (HSDP) (2011 – 2015). Ethiopia recently developed a five-year National Strategic Plan for Malaria Prevention and Control (2011 – 2015). This strategic plan was developed following the MIS 2007, 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 recently developed 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.

National diagnosis and treatment, vector control and other malaria policy and guideline documents are available at: [http://www.moh.gov.et/index.php?option=com_remository&Itemid=47&func=select&id=13].

In the new strategic plan, community empowerment and social mobilization are given top priority among malaria control strategies following the MIS 2007, 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 human cases to identify the sources of infection and limit further transmission.

E. CURRENT STATUS OF MALARIA INDICATORS

E.1. Malaria Indicator Survey 2007

The 2007 MIS surveyed key malaria interventions, treatment-seeking behavior, anemia prevalence in children <5 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 for PMI activities. Field work was carried out from October to December 2007. The survey results were stratified by regional states, altitude (with communities <2,000 meters considered 'malarious'), and districts designated for NMCP targeting.

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. **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).

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

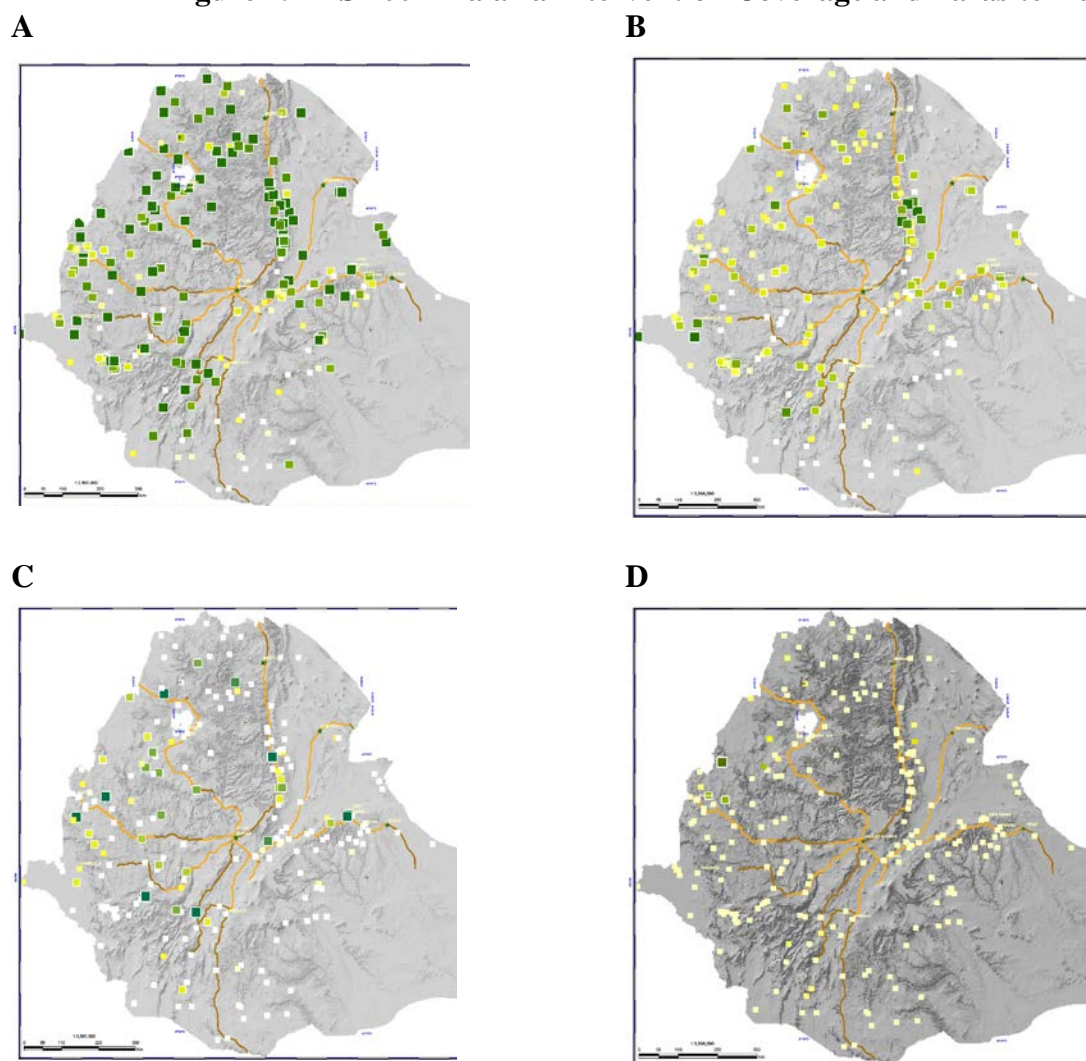
<i>Indicator</i>	<i>DHS 2005</i>	<i>MIS 2007</i>		
	<i>National</i>	<i>National (< 2,000 m)</i>	<i>National (≤ 2,500 m)</i>	<i>Oromia (≤ 2,500 m)</i>
Percent households with at least one LLIN	3.4	65.3	53.1	41
Percent households with more than one LLIN	-	36.6	29.5	21.4
Percent children < 5 years of age sleeping under an ITN the previous night	1.6	41.5	33.1	24.3
Percent pregnant women sleeping under an ITN the previous night	1.1	42.7	35.2	25.6
Percent households reporting indoor residual spraying in the past 12 months	2.3	20.0	14.2	12.5
Percent children < 5 years of age with fever in past two weeks	-	24.0	22.3	21.5
Percent children with fever who took antimalarial drugs	0.7	11.9	9.5	6.6
Percent who took an antimalarial drug same or next day	-	4.8	3.9	1.3
Percent children with fever who sought treatment from facility/provider same/next day	-	16.3	15.4	16.4
Malaria prevalence by microscopy <i>P. falciparum</i> (%)	-	0.7	0.5	0.1
Malaria prevalence by microscopy <i>P. vivax</i> (%)	-	0.3	0.2	0.2

Note: A follow-up MIS is scheduled for 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>DHS 2005</i>	<i>National</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

Figure 4. MIS 2007 Malaria Intervention Coverage and Parasitemia.



Note. A: ITN coverage in Ethiopia: Percentage of households in enumeration areas owning at least one ITN. B: ITN use in Ethiopia: Percentage of households in enumeration areas using at least one ITN. C: IRS coverage in Ethiopia: Percentage of households in enumeration areas sprayed with a residual insecticide in the 12 months preceding the survey. D: Distribution of *Plasmodium* infection in Ethiopia: Percentage of surveyed individuals in enumeration areas positive for *P. falciparum* or *P. vivax* by microscopy examination.

The MIS 2007 also showed the gaps in the scale-up of malaria interventions, clearly indicating needs for 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); (iii) substantially increase access as well as use of malaria case management services; and (iv) increase community knowledge of malaria manifestations, prevention and control (Figure 4).

E.2. Health Facility Surveys 2007 – 2010

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 in children < 5 years old were 73% for 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 by 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, the findings' 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.

E.3. Epidemic Detection Sites 2010 – 2011

Since April 2010, PMI has supported ten epidemic detection sites in Oromia (see also **section J.2.**). These ten sites are primary health care units, i.e. health centers and their satellite community-level health posts, serving approximately 250,000 people.

In the past year, 80,855 patients attended health services at these sites. Of these, 32,266 patients were tested for malaria, 7,649 (23.7%) of which had a confirmatory diagnosis for either *P. falciparum* (54%) or *P. vivax* (46%). The overall incidence of severe malaria was 28 /7,649 (<0.4%); no deaths due to malaria were reported. Three malaria epidemics were detected (using standard WHO criteria): one due to *P. falciparum* and two due to *P. vivax*. Review of district-level patient data also showed that, on average, 64% of all malaria cases at district level are seen at health posts rather than health centers.

F. GOALS AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

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);

- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria; and
- 85% of children <5 years of age with suspected malaria will have received treatment with an ACT in accordance with national malaria treatment policies within 24 hours of onset of their symptoms.

G. EXPECTED RESULTS – FY2012

To achieve results and to ensure that activities are implemented effectively, FY2008 direct implementation activities (e.g. IRS, SBCC, malaria laboratory diagnosis) were largely focused on a selected number of highly malarious zones within Oromia: East Shoa, Arsi, West Arsi, Jimma and West Hararge. With FY2009 funding, focus on these areas was continued, with many activities expanding to additional zones and districts within Oromia. With FY2010 funding, there was further expansion of activities to additional zones and districts within Oromia, with some national-level activities, including chloroquine procurement and distribution (for treatment of *P. vivax* infection). With FY2011 and FY2012 funding, PMI expanded its support to other regional states for selected commodity support as well as for nationwide support for planning, training and use of strategic information.

With FY2012 funding, the expected results of PMI will include the following:

Prevention

- 1.9 million LLINs will be procured and distributed free of charge through multiple channels. As detailed below in the LLIN gap analysis (**Table 3**), the additional 3.4 million LLINs already procured and distributed in PMI Years 1-4 will have significantly improved LLIN coverage in Oromia. Distribution of LLINs will be linked to improved tracking and program information management at district, zone and regional level;
- 960,000 structures (approximately 650,000 households) will be sprayed in 50 districts of five administrative zones (East Shoa, Arsi, West Arsi, West Hararge and Jima), the same number targeted in FY2011. This will result in 4 million people protected with IRS. The exact number of targeted households will be adjusted during the regional and district IRS micro-planning and will depend on epidemiological and program data available at that time;

Case Management

- PMI will support the procurement and distribution of 6 million multi-species RDTs. This investment will be linked to close monitoring of their exact use and value to the program;
- 4.5 million ACT treatments and pre-referral and severe malaria drugs for the treatment of falciparum malaria as well as 4 million chloroquine treatments for vivax malaria will be procured and distributed. The primary focus for commodity distribution will be Oromia. Distribution to other regional states to fill commodity gaps will be determined in consultation with the FMOH.

H. INTERVENTIONS: PREVENTION

H.1 Insecticide-treated Nets

Background

LLINs distribution and projected gaps: The 2007 MIS results indicate that in malarious areas, 66% of households have at least one ITN (**Figure 4**) and confirmed that the average household includes 4.5

members sharing 1.8 sleeping spaces, confirming that the target of supplying each household with two family-sized LLINs should be adequate to attain universal coverage. The difference between the 66% LLIN coverage determined by the 2007 MIS and the target universal coverage could be due to a number of factors:

- At the time of the 2007 MIS (i.e. end of 2007) only about 16.7 million LLINs had been distributed; after complete distribution of LLINs, coverage is estimated to have reached about 78%;
- The original demographic data (e.g. household size; population spread) used to estimate the number of households in malarious areas in 2005 appear to have under-estimated the true situation, according to recent population census survey data. The FMOH now estimates that there are 11 million households in malarious areas, not the 10 million previously estimated;
- A proportion of LLINs distributed in 2005 and 2006 are likely to have deteriorated to the point where owners no longer used them. Observations through field visits and by partners in Ethiopia estimate physical loss rates of around 10% in the first year (with geographical variations), including loss due to ‘leakage’ of LLINs outside the target areas.

The LLINs distributed by the FMOH since 2005 were distributed through a variety of channels, with the majority delivered for free through stand-alone campaigns and through the integrated Expanded Program on Immunization and the Enhanced Outreach Strategy (biannual campaigns of vitamin A supplementation, de-worming, immunizations and nutrition screening). With the current high LLIN coverage rates in communities, new distribution strategies are required to provide LLINs to households not previously covered (due to population growth or resettlement) and replace ‘lost’ LLINs no longer providing protection (i.e. due to wear and tear or loss of insecticidal residual activity).

Mechanisms for LLIN distributions are largely through campaigns, including distributions during emergencies such as floods, droughts, epidemics and conflicts. The core approach for LLIN distribution is to integrate in the future with the expanding HEP to ensure a continuous supply of LLINs at the village level for the coming years, with HEWs and their network of Voluntary Community Health Workers (VCHWs) identifying families in need of having their LLINs replaced. HEWs have LLIN registers with information on when and how many LLINs were previously provided to each household in their villages. The information is then forwarded to the national HEP database managed at FMOH and RHB level.

Between FY2008 and FY2010, PMI procured 3.4 million LLINs, which were distributed primarily through the HEWs in Oromia. Distribution of LLINs was based on an Oromia-wide micro-plan developed by PMI in collaboration with UNICEF and the ORHB. This micro-plan includes district and kebele level data about number of reported malaria cases and key malaria commodities including ACTs, chloroquine, LLINs and insecticide (see **section J.2.**). For LLINs, each micro-planning meeting included records of the number of LLINs previously distributed that were more than three years old and which need to be replaced. The micro-plan projects the 12-month need and gap of LLINs based on district-level malaria and LLIN data. Thus, the number of replacement LLINs in all malaria-affected kebeles was calculated. 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-plan data now serves as a model ‘best practice’ for other regional states, as it helped streamline and coordinate the commodity procurement and distribution process as well as allow for tracking of commodity distributions. It also allows other in-country stakeholders to fill in ad hoc commodity gaps. For example, in 2009, the ORHB and UNICEF used the micro-plan to distribute, with PMI support, 475,000 LLINs in Oromia procured by the World Bank.

Registration for commercially-imported LLINs: In January 2008, the 5% tariff on ITNs was removed. However, none of the WHO Pesticide Evaluation Scheme (WHOPES) approved LLINs are registered for commercial importation and sale by local retailers. Efforts will be made to engage the national regulatory authorities to enable broader access to LLINs for those individuals and organizations – primarily in urban and peri-urban areas not targeted for the mass free distributions – who may want to purchase their own nets.

Progress During Last 12 Months

With PMI support, 1.8 million LLINs procured at the end of 2010 were distributed to 71 districts of Oromia. Additionally, in May 2010, 35,000 LLINs were distributed by a U.S. Army Civil Affairs Team (Combined Joint Task Force for the Horn of Africa) to a population of 93,000 in Dollo Mena District, Bale Zone, Oromia. With assistance by local volunteers, the Civil Affairs Team helped to properly install nets in the sleeping areas of all households, which was complemented by comprehensive SBCC messaging on the correct use of LLINs. A pre- and post-hang-up survey was carried out to assess the added value of the hang-up campaign in terms of household malaria knowledge and LLIN use; data are currently being analyzed.

There will be an estimated national LLIN gap of about 6.75 million in 2012, including an estimated a gap of 2.4 million for Oromia. The 1.9 million LLINs PMI will procure and distribute in FY2012 will significantly contribute toward closing the gap for 100% LLIN coverage in Oromia (**Table 3**).

Table 3: FY 2012 Ethiopia LLIN Gap Analysis.

Data Inputs	National
At-Risk Population (2007 Estimates)	54,124,492
Expected annual population growth	2.7%
Targeted average number of persons per net*	2.35
Total number of LLINs needed	23,031,699
Distributed LLINs	
Distributed LLINs in 2010	13,238,661
Distributed LLINs in 2011 to date	3,445,200
LLINs pledged to be distributed in 2011	5,000,000
Pledged LLINs	
LLINs pledged to be distributed in 2012	Unknown
LLIN Need Calculation for 2013	
Population at risk in 2013	58,628,011
Total number of LLINs needed	24,948,090
Viable Nets from Previous years (3 year durability). (Assumes 20% ITN loss at 24 months post distribution, per the Harmonization Working Group recommendation)	19,036,129
Nets in-country	19,036,129
ITNs gap	5,911,961

* The FMOH target is to cover all households in malarious areas with, on average, two LLINs per household.

Proposed PMI activities with FY2012 funding (\$10,100,000)

- **Procurement and distribution of LLINs** (\$10,000,000): Due to the pressing need to cover the LLIN gap from 2009 onwards, PMI will increase its support for procurement and distribution to 1.9 million LLINs with FY2012 funding. PMI will distribute LLINs to the district level, with ORHB ensuring transport of LLINs to kebeles in collaboration with other stakeholders (e.g. PMI implementing partners or CJTF-HOA). Once delivered to kebeles, LLINs will be distributed by HEWs through a range of distribution channels including kebele-level campaigns and house-to-house visits. In addition to the LLIN procurement and distribution, PMI also will collaborate with the FMOH and other in-country stakeholders to develop an LLIN replacement strategy.
- **Hang-up campaigns** (\$100,000): In FY2012, PMI will continue to support ad hoc LLIN hang-up campaigns in selected districts, with districts being selected following discussions with the ORHB and CJTF-HOA. Selection criteria will include districts' current LLIN coverage and use, geographical location and accessibility of districts. 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.

H.2. Indoor Residual Spraying

Background

IRS has a long history in Ethiopia, and remains a key component of the national malaria control strategy. As detailed in previous MOPs, DDT was the primary insecticide for IRS from the start of the program through 2009, except in some areas where malathion was sporadically used. Following the decentralization of the vertical malaria control program, IRS operations are now implemented in communities targeted for spraying within each district rather than at the sector level (groups of 2-8 districts). Selection of communities for spraying is based on the history of malaria cases, altitude, and the presence of nearby anopheline breeding sites and agriculture and water development practices. The same communities are often repeatedly selected for IRS, because of continued high numbers of suspected malaria cases or other situations conducive to high transmission. It is believed that epidemics may be triggered when focalized *An. arabiensis* breeding in temporary rain pools and *An. pharoensis* breeding in lake margins and river beds spread with the onset of the rains.

Prior to PMI funding to Ethiopia, many targeted areas went unsprayed. For example, of the 3,932 kebeles classified as malarious in Oromia in 2007, only 953 of the 1,407 kebeles targeted to be sprayed were actually sprayed, mostly because of a lack of operational funds. In FY2011, it is expected that the number of villages covered by IRS will increase for two reasons: (i) PMI will support spraying 960,000 structures (approximately 534,000 households); and (ii) increased efforts of the FMOH to provide operational funds to scale-up IRS coverage in targeted areas from 57% to 90% by 2013. Following the demonstration by PMI and WHO of high levels of DDT resistance throughout the country, the FMOH discontinued the use of DDT for IRS. Deltamethrin was used in 2010 and 2011, with carbamates currently recommended for IRS in areas of pyrethroid resistance and in areas where malaria outbreaks occur. The FMOH now acknowledges that a long-term insecticide resistance strategy is crucial to ensure continued efficacy of IRS in Ethiopia. Such strategy is being developed in collaboration with PMI and other in-country stakeholders, and is expected to be finalized by 2012.

Challenges and limitations to IRS identified in the national malaria strategic plan include the timing and quality of IRS, development of resistance in vector populations, limited funds for insecticides, pumps and spare parts, vehicles and operational expenses, re-plastering of houses after spraying, and need to improve

pesticide management and environmental compliance. Although the Global Fund supports FMOH-led IRS training in many of the targeted districts, there is a critical need to expand training for effective and environmentally compliant implementation of IRS.

Insecticide availability and use: Ethiopia has completed a Supplemental Environmental Assessment (SEA) for insecticides. In 2009, the SEA was expanded to include all four WHOPES-approved classes of insecticides (i.e., organochlorines, organophosphates, carbamates and pyrethroids). This will enable more flexible pesticide selection to mitigate the emergence of resistance.

Adami Tulu pesticide processing plant: Since 2001, the GoE-owned Adami Tulu Pesticide Processing Plant in Oromia has formulated pesticides, including DDT, from imported technical-grade active ingredients. In 2009, the plant began formulating deltamethrin 2.5% for IRS. Further, the plant completed preparation to formulate the carbamate, propoxur, and the organophosphate, fenithrothion, in 2010 with production of propoxur for a trial in 2011.

Insecticide susceptibility studies: As detailed in the previous MOPs, insecticide susceptibility tests were carried out between 1986 to 1995 in eight areas in the country. Resistance to DDT in six areas averaged 22% (range: 5% to 33%) with focal areas of high resistance to DDT. In 2007, 96% and 22% resistance to DDT was shown in Gibe river valley and around Sodore (East Shoa zone) of Oromia, respectively. Resistance to pyrethroids was reported as focal: 100% of mosquitoes were susceptible to 0.5% permethrin and 0.05% deltamethrin in Awassa, Anduse and Sabure, but 25% of *An. arabiensis* in Metehara were resistant to permethrin.

Strengthening and expansion of insecticide resistance monitoring is a critical area of PMI support. With that support, insecticide resistance monitoring studies were started on four insecticide classes in 2008 in five sites in Oromia. High DDT resistance in the local populations of *An. arabiensis* was observed at five sites in Oromia in 2008; there also appeared to be decreased susceptibility to deltamethrin. Based on these preliminary results, the FMOH recognized the need to intensify and expand testing nationwide. PMI supported resistance monitoring in ten sites in Oromia and WHO organized resistance monitoring in nine sites in five other regional states in 2009. In 2010, PMI supported resistance monitoring in 15 sites including 4 sites in regions outside Oromia. From 2008 to 2010, resistance to DDT ranged from 15% to 100% in 35 sites; there is some indication that resistance is associated with areas that had been continuously exposed to DDT. Deltamethrin resistance ranged from 5% to 76% in 20 sites, with resistance being greater than 20% in 12 sites. Resistance to malathion ranged between 1% and 60% in 17 sites, with greater than 20% resistance in four sites. Bendiocarb resistance ranged between 0% and 48% in 17 sites, with two sites reporting greater than 20% resistance. Resistance to lambda-cyhalothrin ranged between 6-65% in 13 sites with 7 sites reporting greater than 20%. No resistance was found against pirimiphos-methyl in four sites.

While the epidemiological significance of these test results is not yet known, the FMOH decided to discontinue using DDT. An interim decision was made to use deltamethrin for 2010 IRS activities in areas where resistance to deltamethrin is low or unknown. For epidemic response and areas with high deltamethrin resistance, bendiocarb was recommended. In addition, residual efficacy tests were conducted on deltamethrin wettable powder and water dispersible granule, bendiocarb wettable powder and pirimiphos-methyl capsule suspension in 2010 to assist in the selection of the best candidate insecticide. However, limited sample size and inconsistency in the test results over different months necessitated further work to gather more reliable information.

Larval source management: In addition to IRS, the FMOH and ORHB have spent considerable efforts on larval control, targeting 25% of vector breeding grounds for elimination by community participation, with the remaining 75% of breeding sites to be treated with insecticides (usually the organophosphate insecticide, temephos) by trained health workers. Larval control has been implemented in several areas

including urban and semi-urban areas, refugee camps, development projects and irrigation areas. Environmental management had been the main vector control strategy in most urban areas of Oromia, despite any documented evidence of efficacy. In Oromia, between 2002 and 2007, more than 900 km² of breeding sites were either filled or drained. In spite of these efforts, there has been very little capacity to effectively target, monitor and evaluate these activities.

The FMOH and ORHB recognize the challenge of determining the productivity of breeding sites and documenting the impact of larval control. The ORHB has also identified low community participation as a barrier to larval control efforts. Responding to this need, the USAID IVM project supported an assessment visit in September 2008 to evaluate the feasibility of larval control in Oromia. The main habitats sampled during this visit were valley bottoms of Welenchiti, the sugar plantations in Wonji and the pits, pools and ponds in rural Zuway. Although malaria prevalence is likely to be high around the bottom valleys of Welenchiti, it was deemed logistically difficult to control larvae in such large flooded areas. On the other hand, the sugar estate and Zuway had small-sized breeding sites which were readily accessible. Another potential site for larval source reduction is near the Gilgel Gibe hydroelectric dam, in the south west part of Oromia, which is wetter and has longer lived breeding sites.

The need to evaluate larval source management has become more urgent with the need to respond to the challenge of insecticide resistance in adult mosquitoes (see above). The FMOH's decision to include larval source reduction and environmental management in the new 2011 guidelines for community-level HEWs argues the need for evidence to determine where this may or may not be effective. It is envisaged that PMI support and technical assistance from CDC and collaborating Ethiopian universities will be able to conduct these necessary evaluations.

Progress During Last 12 Months

PMI's IRS activities are fully integrated within the FMOH's National Malaria Prevention and Control Strategy 2011 – 2015, and are fully coordinated with FMOH and ORHB. PMI provides support to IRS operations at three levels in Ethiopia: national, regional and in selected, highly malarious zones and districts of Oromia (**Table 4**). At the national level, PMI participates in existing 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 IRS equipment, personal protective equipment, training in IRS operations as well as ensuring environmental compliance, insecticide safety and entomological monitoring. In Oromia, PMI procures insecticides and equipment for IRS operations, supports annual IRS micro-planning and training workshops, and provides operational funds for implementation and supervision.

From FY2008 to FY2010 PMI provided Oromia and FMOH with IRS equipment, operations and environmental compliance (including construction of soak pits and rehabilitation of selected districts' storage facilities for IRS materials). In FY2011, PMI began supporting IRS at two levels (partial and full) in Oromia. Districts that have received PMI support for two or more years will be supported partially (termed as 'graduating' districts) while districts that received only two years or less of PMI support will be fully supported. The rationale is that 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.

Table 4. 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 / provide partial 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.

Although PMI-supported entomological monitoring activities are focused on 30 target districts, they are representative of the entire Oromia Regional State, and complement activities that the FMOH will initiate in all other regional states of the country with Global Fund support. Before PMI began work in Ethiopia, there was no routine entomological monitoring at the regional state or national levels. The assessments conducted between 2008 and 2010 were led by staff from the PMI implementing partner with technical support from PMI and CDC and included field staff from the districts. Laboratory testing for resistance was conducted through an agreement with faculty from the Pathobiology Department of Addis Ababa University.

In FY2009 and FY2010, PMI purchased 1,555 spray pumps and spare part kits, personal protection and other minor equipment (e.g. camping equipment) for 1,841 spray operators for IRS activities in 30 districts of five administrative zones (i.e. East Shoa, Arsi, West Arsi, West Hararge and Jima) that historically accounted for 40% of the malaria in Oromia. Recent reports indicate a shift of malaria burden from Eastern Oromia zones to Western Oromia zones where PMI IRS support has been limited. The ORHB 2009/2010 annual report showed that 42% of confirmed malaria cases are in the four Western Oromia zones (Jima, Iluababora, West and East Wollega). In response to this shift in malaria epidemiology, PMI-supported IRS expanded to 20 more districts in FY2011 in Western Oromia (Iluababora, East and West Wollega).

In FY2011, in addition to filling the gaps of IRS materials for graduating districts, PMI supported the purchase of IRS materials for the 20 new districts. Moreover, 5,000 sets of personal protective equipment were procured for other regional states' IRS programs through FMOH. For the 2011 spray round, bendiocarb was procured from the FY2010 budget for use where deltamethrin resistance was high and/or in response to epidemics. As malaria epidemics requiring IRS has not been seen so far, bendiocarb will be used in September 2011 IRS operations while FMOH-supplied deltamethrin will be used for the June 2011 spray round. Based on the shift from DDT to other insecticides, evaporation tanks constructed to contain DDT waste in previous years were modified to soak pits with new soak pits constructed in new districts targeted for IRS by PMI. At present a total of 102 soak pits are operational for environmental compliant practices. A mid-spray campaign environmental compliance inspection highlighted the need for improved storage facilities at the district level, separate training for storekeepers, and stronger supervision. Accordingly, rehabilitation of 50 district storage facilities, including those in the 20 new districts added in FY2011, was completed.

The FY2010 IRS target was 600,000 household structures, but when spraying took place in these districts, 670,221 structures were found. Of these, 646,619 (96.5%) were sprayed protecting just over 2.1 million residents. Training of IRS trainers was provided to 259 persons who in turn trained 1,841 spray operators and 1,144 door-to-door mobilizers. PMI support significantly increased the structures sprayed and population protected in the target zone districts in 2008, 2009 and 2010 when compared to the spraying activities conducted by the ORHB in 2007 (Figure 5 and Table 5). In addition to the districts where PMI provided the complete costs and management of the IRS operations in FY2009 and FY2010, the ORHB used insecticide supplied by USAID/Ethiopia, but provided its own equipment and operational costs to spray an additional 1.5 million structures, protecting nearly five million persons in Oromia. In FY2011, the IRS target was over 960,000 household structures for both new and graduating districts to protect about 4 million people.

Figure 5. Household structures sprayed and population protected in 2008 (ORHB) and 2009 - 2010 (PMI).

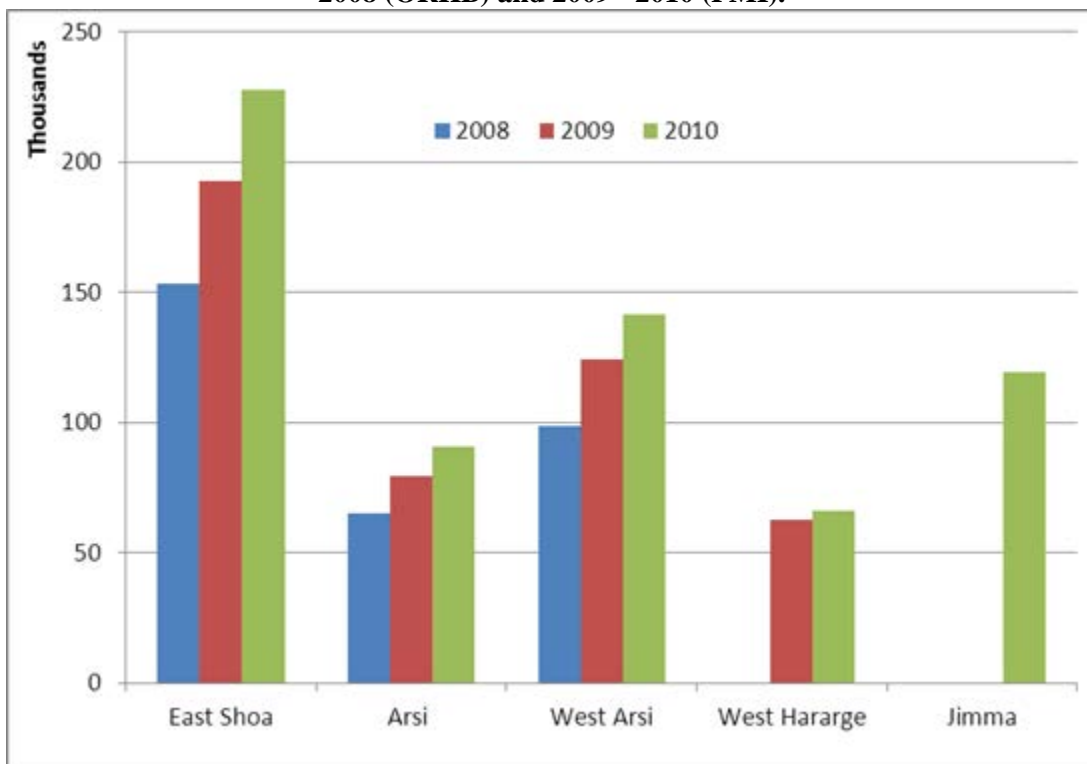


Table 5. Comparison of household structures sprayed FY2008 – 2010.

Zone	District	FY2008		FY2009		FY2010	
		HH structures sprayed *	Coverage (%)	HH structures sprayed *	Coverage (%)	HH structures sprayed **	Coverage (%)
East Shoa	Adama	22192	84	28,061	93.3	29667	95.0
	Adea	12535	97.4	20,685	93.4	23377	96.9
	Adami Tulu	18514	93.5	29,822	92.4	38766	96.9
	Akaki	6087	96	13,752	96.9	14080	98.1
	Boset	23569	94.9	21,365	91	23925	99.1
	Bora	10052	90.2	12,797	88.8	16770	98.0
	Dugda	14749	87.3	17,654	89.1	17476	88.3
	Fentale	9848	68.4	15,017	76.5	19265	90.3
	Gimbichu	ND	ND	2,410	99.6	2490	99.4
	Lume	14959	93.1	10,995	65	17082	92.0
	LibenChukala	20715	92.4	20,251	91.9	24923	100.0
	Zone Total	153220	89.51	192,809	88.7	227,821	95.7
Arsi	Dodota	17027	96.3	18,727	95.1	20955	98.3
	Jeju	18578	96.1	12,566	97.3	14186	99.8
	Merti	7872	97.8	15,564	91.5	17729	98.0
	Sire	8460	96.4	8,825	94.7	9621	94.8
	ZuwayDugda	12955	92.6	23,891	93.9	28301	97.5
Zone Total	64892	95.68	79,573	94.3	90,792	97.1	
West Arsi	ArsiNegele	36252	93.8	34,406	96.8	35952	98.2
	Shashamene	22798	91.9	41,306	96.4	28565	95.0
	Shala	21602	99.1	22,583	91.4	27926	94.2
	Siraro	18065	89.1	26,188	90.4	35085	95.1
	Wondo	ND	ND	ND		13843	95.7
Zone Total	98717	93.54	124,483	94.2	141371	95.9	
West Hararge	Miesso	ND	ND	24,282	91.8	22714	89.4
	Chiro	ND	ND	25,745	94.2	30887	96.2
	Anchar	ND	ND	12,510	97.6	12554	96.6
Zone Total	-	-	62,537	93.9	66155	93.8	
Jimma	Sokoru	ND	ND	ND	ND	15,446	99.0
	Omo Nada	ND	ND	ND	ND	28,600	97.8
	TiroAfeta	ND	ND	ND	ND	22,155	99.4
	Kersa	ND	ND	ND	ND	22,161	95.7
	SekaChokorsa	ND	ND	ND	ND	17,897	98.9
	ShebeSombo	ND	ND	ND	ND	13,056	99.7
Zone Total	-	-	-	-	119,315	98.2	
Grand Total		316829	91.96	459,402	91.8	646,619	96.5

Note. ND, districts were not targeted for PMI-supported IRS activities.

Proposed PMI activities with FY2012 funding (\$10,010,000)

FY2012 PMI support for IRS operations in Oromia will be at the same level as in FY2011, i.e. targeting about 960,000 structures. PMI and ORHB have already adapted a new approach of “graduation.” After receiving support during three rounds of spraying, 24 districts (see **Table 5**) with sufficient technical expertise, and possessing adequate environmental compliance facilities, storage, equipment and supplies, will only receive partial PMI support in 2011. Eventually, these districts will “graduate” (based on discussions and priorities of ORHB) to continue IRS implementation on their own, i.e. with regular ORHB and minimum PMI support. PMI support will be limited to insecticide, microplanning, M&E,

environmental compliance, IRS equipment gap filling and training. This will allow PMI support to expand to new districts and zones in Oromia. As there is a shift from DDT to other more costly classes of insecticides, more funding is required for insecticide procurement. Training on IRS techniques, environmental compliance and use and maintenance of spray pumps will be provided to districts receiving comprehensive support for IRS operations. The effectiveness of IRS operations in partial and fully supported districts will be evaluated by the end of September where modifications might be made to determine the level of support required for each component.

- **Procurement of insecticide** (\$3,810,000): The exact allocations and specifications of insecticides will be adjusted upon completion and review of the FY2011 IRS activities and the insecticide policy decision of FMOH.
- **IRS operations** (\$5,100,000): PMI will continue to support the ORHB in planning, implementation and evaluation of IRS in Oromia. The target number of structures in districts provided full support will be approximately 600,000, roughly the same as FY2011. Based on the evaluation of FY2011 operations and how effective the partial support works, the spraying of an additional 360,000 structures could be supported by the process of graduation.
- **IRS training** (\$100,000): PMI will support in-service training at federal and regional levels to increase the FMOH's and RHB'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 seven ecological zones of the country. This represents an increase in the number of sites included in entomological resistance monitoring from prior years, the rationale for this being that these activities now represent one of PMI's national-level activities rather than just being restricted to Oromia (see **Table 4**). Additionally, five of the fifteen sites have been monitored for insecticide resistance in prior years and, thus, would allow to monitor resistance over time rather than just cross-sectionally. Activities will be implemented by the PMI implementing partner with assistance from Addis Ababa University, Jimma University, Dilla University, Gondar University, and in coordination with EHNRI. Technical support will be provided to coordinate entomological monitoring activities implemented by the FMOH in sites outside of Oromia (which are supported by Global Fund Round 8 funding). 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 is also a priority activity.
- **Pesticide management** (\$600,000): PMI will not only support pesticide management of PMI-supported IRS operations in Oromia, but also pesticide management at national level. Continued support will be provided for expansion of the SEA and improved pesticide management within the current IRS operations. At national level, PMI has supported an assessment to establish the inventory of obsolete insecticides at district, zonal and regional level, and over 900 tons of insecticide (over 99% DDT) were found. Different options for the insecticides' final disposal are currently under discussion with the FMOH and ORHB. Until an approach for final insecticide disposal is chosen, PMI will support the collection of insecticides from districts, zones and regional states and support their storage at a central location.

H.3. SBCC and Support to Community-Based Organizations

Background

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.

PMI-funded SBCC activities began in FY2009. 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).

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.

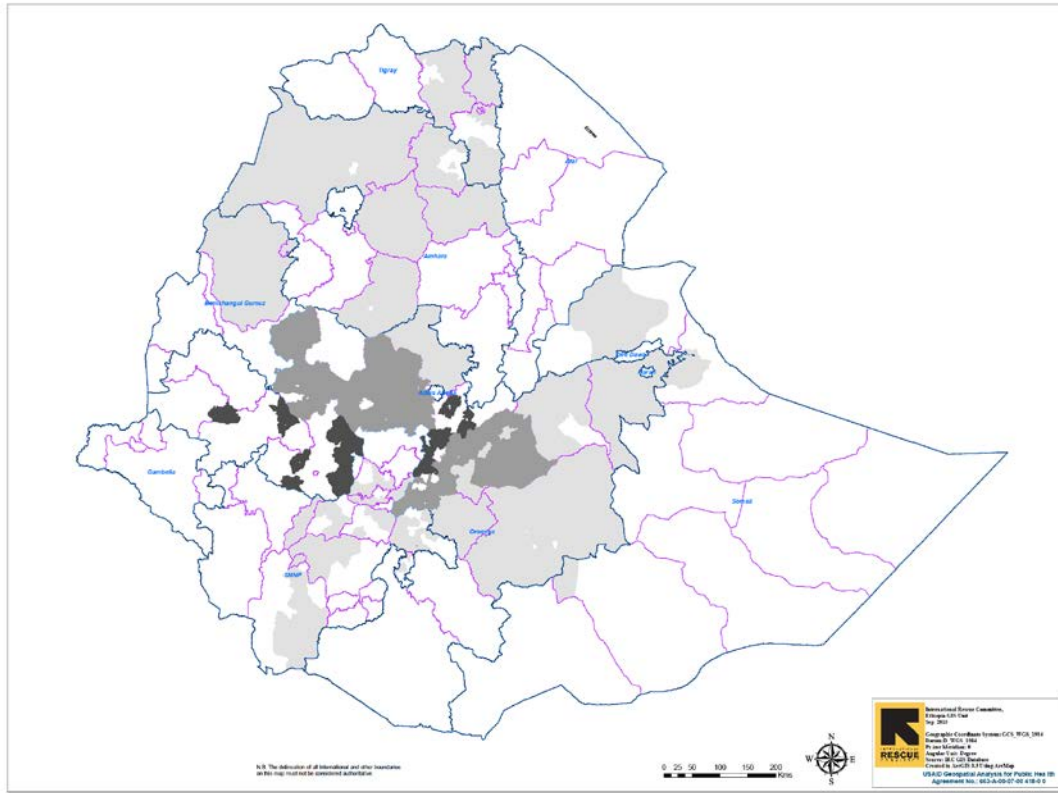
The 2007 MIS showed moderate use of LLINs (at altitudes <2,000m, 60% of children and 66% of pregnant women in houses that owned at least one ITN slept under the net the previous night; similarly, at altitudes <2,000m) (see **section E**). In a separate household survey, LLIN use was shown to be significantly associated with whether households had been sprayed with insecticide, received LLINs for free, LLIN age and shape. Thus, for example, use of LLINs was 1.6-fold (95% C.I. 0.6 – 3.4) greater in households that owned conical nets compared to those that owned rectangular nets. Nets that were paid for were more likely to be used than free nets (76% vs. 63%), and net-owning households that had their house sprayed in the past year were more likely to have had at least one person sleep under a net the previous night than households that had not been sprayed (81% vs. 70%).

To date, efforts to improve LLIN use have employed a mix of communication channels, including mass communications (particularly radio), print media, inter-personal and participatory communication methods. SBCC materials for malaria have been developed by a range of in-country partners.

Progress During Last 12 Months

In FY2009, PMI supported the formation of a malaria SBCC stakeholder partnership (i.e. the Malaria BCC Task Force), which works with stakeholders on SBCC message harmonization and standardization of operational and research protocols. Through a series of meetings, the task force developed and agreed to four essential malaria actions for a person to take. PMI-funded collection of baseline data on the gaps in malaria SBCC information in Oromia; developed malaria SBCC training materials; and finalized a strategy for large-scale roll-out of those malaria SBCC activities. The strategy combines various SBCC approaches, including mass media, group discussions, and community conversations targeting either communities as a whole, individual households or specific target groups (e.g. school children), and is currently being implemented in more than 201 districts of Oromia as well as 172 districts in regional states outside of Oromia (**Figure 6**). Materials developed with PMI funding are also being used by other USAID/Ethiopia implementing partners, as well as Peace Corps Volunteers, CJTF-HOA (see **section H.1.**), USAID/Ethiopia implementing partners and UNHCR.

Figure 6. Geographical coverage of PMI-supported SBCC activities.



Note. Light grey areas: SBCC activities are integrated into a project platform implementing maternal, newborn and child health; family planning; and reproductive health activities at community health post level. Medium and dark grey areas: SBCC activities are implemented through a combination of community conversation, household-level visits and focus group discussions. All areas are reached by SBCC messages disseminated via mass media.

Proposed PMI activities with FY2012 funding (\$1,700,000)

PMI is currently conducting a review of its strategy for roll-out of SBCC interventions. The most critical aspect of this review is 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 is 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 the reported high rates of radio use, PMI will seek to make use of radio programs to deliver malaria messages and work through a wide range of implementing partners and in-country stakeholders to deliver those messages. Additionally, PMI will continue to provide SBCC materials developed to other implementing organizations, so that reach of these materials can be maximized.

- **SBCC (\$1,500,000):** With FY2012 funding, PMI will continue to support the implementation of malaria-specific SBCC messages through a range of different channels, including mass media, community conversations and house-to-house visits, which will be tailored based on the assessment that is currently ongoing. In FY2012, 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 (see below). 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** (\$200,000): 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, 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),

H.4. Malaria in Pregnancy Including Intermittent Preventive Treatment (IPTp)

Background

Ethiopia has a relatively low antenatal care (ANC) coverage rate compared to other countries in the region. The DHS 2005 indicated that for Ethiopia as a whole, only 28% of mothers received care from a health professional for their most recent birth in the five years preceding the survey. Only 12% of women made four or more ANC visits during their entire pregnancy and only 6% make their first ANC visit before the fourth month. Furthermore, although pregnant women are at greater risk of infection and disease, overall they do not represent a sufficiently large proportion of the total number of malaria patients to warrant specific targeting of interventions. Hence, IPTp is not part of the Ethiopian National Malaria Prevention and Control Strategic Plan.

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; (ii) ensure availability of prompt diagnosis and treatment of clinical cases in pregnant women at health facilities. Increasing ANC coverage is also one of the FMOH's priorities, and is an endeavor which is supported by USAID/Ethiopia MNCH, family planning and reproductive health funding – clearly, this also would result in more pregnant women having access to malaria prevention and control interventions. Diagnostic and treatment guidelines for Ethiopia are expected to be updated and released in late 2011, and these will contain recommendations regarding the use of antimalarial drugs during pregnancy. SBCC messages in this regard will be formulated based on these guidelines.

Progress During Last 12 Months

Although IPTp itself is not part of the national strategic plan, in FY2012 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 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 President's Emergency Plan for AIDS Relief (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 and for the newborn. This activity will be closely coordinated with the PMI support for case management supervision (see **section I.1**).

Proposed PMI activities with FY2012 funding (\$0, no additional funding required)

- **Expanding Malaria in Pregnancy services through safe motherhood and Focused Antenatal Care:** 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). Funding for malaria in pregnancy activities is included in **sections H.3.** and **I** of the MOP.

I. INTERVENTIONS: CASE MANAGEMENT

I.1. Diagnostics

Background

Ethiopia has moved quickly in the last few years to scale-up diagnostic testing for malaria at all levels of the public sector, with the goal of achieving universal diagnostic testing for all cases of suspected malaria. Particular focus has been placed on training HEWs to use multi-species RDTs (CareStart) at the community level and strengthening laboratory services at hospitals and health centers. This has been a high priority for the FMOH and OHRB because prevalence of malaria is low and decreasing and because both falciparum and vivax malaria are common. PMI has provided significant support for the procurement of RDTs, microscopes and lab commodities, for training of laboratory staff and HEWs, and for quality assurance activities at laboratories and health posts.

Progress During Last 12 Months

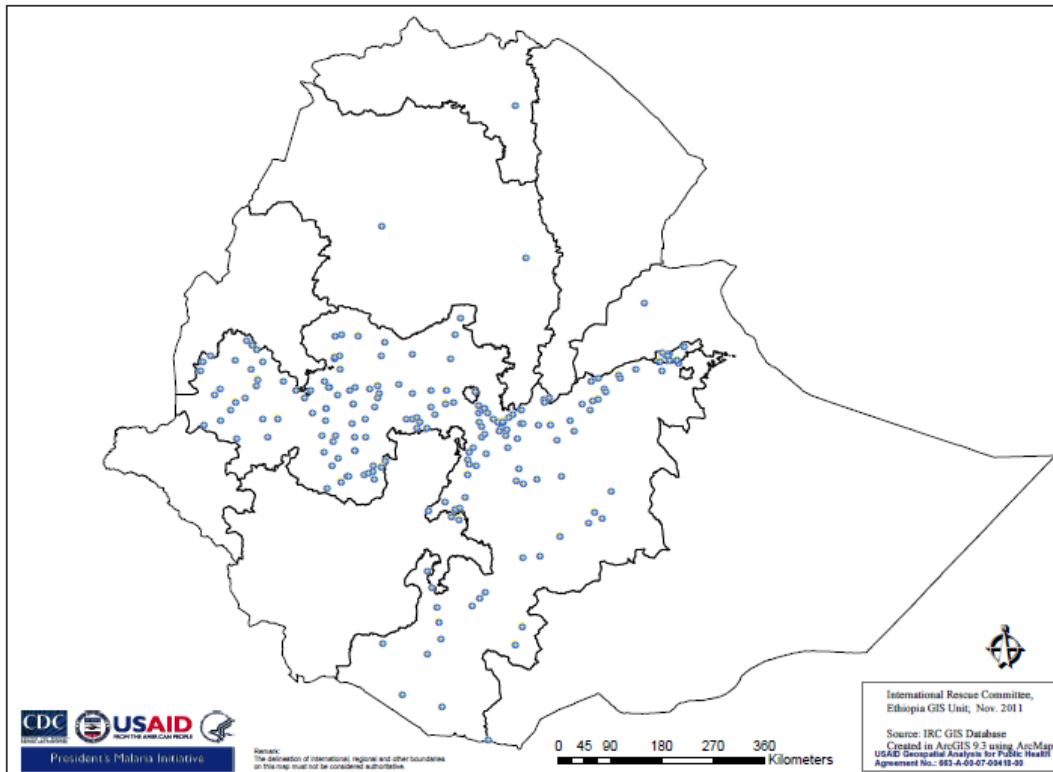
Following on the development and dissemination in 2009 of a National Diagnosis and Monitoring Policy Guideline, standardized training materials for laboratory staff, and quality assurance guidelines, PMI in the last year has supported the training of 167 laboratory technicians and 210 clinical staff in malaria diagnosis and the implementation of quality assurance activities and fever case management at 183 health facilities in all 17 zones in Oromia (**Figure 7**). QA activities also have expanded to 12 health facilities in Dire Dawa. Supported facilities have received new microscopes and centrifuges (for micro-hematocrit measurement), as needed, and updated laboratory registers. Their facilities are receiving regular technical supervision, to monitor the performance of the laboratory staff and the adequacy of the facilities and equipment. Supervision is carried out using standardized checklists and focuses on real-time problem-solving when deficiencies are identified. The first post-implementation assessment has shown that among the 51 facilities assessed, the accuracy of microscopic diagnosis improved from 64% before training to 87%. In addition, PMI has expanded support to strengthen regional reference laboratories in 8 regional states, including all three regional reference laboratories in Oromia, (Adama, Jimma and Nekemte).

PMI also has supported integrated training and supervision of HEWs in 286 woredas in 6 regional states in the management of fever and the performance of multi-species RDTs. 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. PMI also provided financing for the procurement and distribution of 3.2 millions multi-species RDTs to district level for use by HEWs in Oromia.

Proposed PMI activities with FY2012 funding (\$5,300,000)

In FY2012, PMI will accelerate scale-up of QA activities to additional laboratories in Oromia and also support strengthening of additional regional laboratories throughout the country. PMI also will procure RDTs and laboratory equipment and supplies to meet the needs of these commodities in Oromia.

Figure 7. Geographical coverage of PMI-supported, health facility-based malaria laboratory diagnosis strengthening activities.



Note. Each dot represents a health facility. At least one health facility in each malaria-endemic district of Oromia is being supported by PMI to strengthen malaria laboratory diagnosis. PMI also support the network of regional reference laboratories in regional states outside of Oromia.

Requirements for RDTs are based on the annual micro-planning activity in Oromia, where each district examines surveillance and consumption data from previous years to project requirements for the coming year. In addition, PMI will continue its support of clinical supervision of diagnosis and case management activities of HEWs.

- **Support for QA system for malaria laboratory diagnosis** (\$700,000): FY2012, PMI will accelerate scale-up of QA activities to additional laboratories in Oromia and continue to strengthen regional laboratories throughout the country. Support will be provided for training and supervision of laboratory staff, as well as technical support to regional reference laboratories.
- **Technical assistance for QA for malaria diagnosis** (\$30,000): Technical support and oversight from international experts in malaria laboratory diagnosis will be provided to the implementing partner in Ethiopia to assure that internationally-accepted best practices are being implemented and that diagnostics strengthening activities are of the highest possible quality. This will include technical assistance for the development of a standardized blood slide bank, which will be used for training and external quality assurance activities.
- **Procurement of RDTs** (\$4,000,000): Approximately 6 million multi-species RDTs will be procured and distributed to health facilities, specifically health posts. As determined through an extensive malaria commodity micro-planning exercise (see **section J.2.**). This will meet the entire projected needs for Oromia. Additionally, PMI will provide an allocation of RDTs to the FMOH to fill gaps in

RDT requirements in other parts of Ethiopia. RDTs will be tested for quality at accredited laboratories following standardized protocol prior to shipment to Ethiopia.

- **Procurement of laboratory equipment/supplies** (\$570,000): PMI will support further procurement of 250 laboratory kits to provide essential supplies and reagents to laboratories that conduct malaria microscopy. In addition, based on an assessment that will take place in those facilities that will be added to receive PMI support in FY2011, 100 additional microscopes will be procured for those facilities that lack one that is functional.
- **Support ongoing supervision and monitoring of HEWs in delivery of malaria diagnostic services** (no additional funding required - costs covered in **section I.3.**): Integrated training and supervision of HEWs will be continued in 286 districts in 6 regional states of the country, and include monitoring the operational performance of RDTs (see case management section).

I.2. Pharmaceutical Management

Background

To address the multiple problems observed in all layers of the national drug management system (e.g. commodity bottlenecks, stock-outs, expiry), the FMOH, in 2005, developed a PLMP and later created the Pharmaceutical Fund and Supply Agency. Under this new plan, there was a radical redesign of the governance, policies, and infrastructure of the existing logistics system, including the establishment of drug distribution “hubs” to directly supply health centers, health posts, and hospitals. Because of its complexity and cost, the new system has been slowly implemented and essential commodities are still being distributed based on existing donor-supported systems.

For malaria, UNICEF still procures and distributes the bulk of malaria commodities (i.e. ACTs, chloroquine, RDTs, and LLINs), including those funded by the Global Fund and PMI. For Oromia, UNICEF also supports the annual quantification of malaria commodity needs to the district level through a series of zonal level micro-planning meetings where malaria commodities’ consumption, needs and gaps are discussed and which results in the region-wide malaria commodity micro-plan. Based upon the success of PMI-supported annual malaria commodity micro-planning exercises in Oromia since 2009, micro-planning activities are now recognized by FMOH as an Ethiopian best practice. Annual malaria commodity micro-plans for the other Ethiopian regional states will be completed by mid-2011, thereby assisting FMOH malaria program planning and policies. PMI will continue to provide technical and program support to FMOH for the malaria commodity micro-planning process in FY2012.

The Ethiopia FMHACA (formerly known as Drug Administration Control Authority) 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.

Progress During Last 12 Months

In late 2008, PMI funded a situational analysis of malaria, tuberculosis, and HIV drugs in all regional states, with a special focus on Oromia. For malaria, there were serious shortages and stockouts of ACTs (especially child doses) and chloroquine; expired drugs; weak inventory control tools; inadequate medication records; and poorly organized and inadequate storage facilities. Based on this assessment, PMI supported the development of standard operating procedures and forms for the quantification, requisition, drug exchange/transfer and management of malaria commodities. A new medication record was also designed.

In addition, PMI began improving malaria commodity management in 66 health centers and 20 health posts in Oromia through improved training and supervision. From FY2009 to FY2011, PMI expanded this malaria commodity management program to 200 health centers and additional health posts. Malaria drug management data is now reported bi-monthly for all facilities, including 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 Ethiopia 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 first and second 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 / products available in the public and private sectors in Ethiopia is limited, with most drugs sampled passing the drug quality control testing. In FY2011, PMI consolidated 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 Pharmaceutical Fund and Supply Agency.

With PMI support, UNICEF facilitated micro-planning meetings with participants from all malaria-affected woredas and zones in Oromia in 2009, 2010, and 2011 to determine the requirements of ACT treatments and RDTs at 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 **section J.2.**). 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 so as 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 if commodities are available or not.

The ACT and RDT requirements were also 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 next 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 FY2012, 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.

Proposed PMI activities with FY2012 funding (\$900,000):

- **Strengthening of antimalarial drug management** (\$750,000): PMI will help sustain and expand the malaria drug management program from the present ~200 health centers covering approximately two-thirds of the malarious areas within Oromia to support for strengthening health systems and pharmacy logistics for the Pharmaceutical Fund and Supply Agency 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 central-level Pharmaceutical Fund and Supply Agency and health facility level staff in drug management, as well as through on-site supervision;
 - 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** (\$150,000): In FY2012, 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.

I.3. Treatment

Background

In Ethiopia, *P. falciparum* and *P. vivax* are the two dominant malaria species. Overall *P. falciparum* accounts for about 60% of the malaria, is implicated most often in epidemics and is responsible for most severe illness and death. Current treatment policy recommends AL as the first-line drug for the treatment of uncomplicated *falciparum* malaria and chloroquine for the treatment of *vivax* malaria. For infants <5 kg of body weight and pregnant women in the first trimester, oral quinine should be administered.

At the health facility level, malaria is suspected when a patient has a fever or history of fever in the last 24 hours and lives in or has travelled to an area with malaria transmission within the last 15 days. If microscopy (at health centers and hospitals) or RDTs (at health posts) are available, diagnostic testing results should guide clinical management (see **section C.1.**). If microscopy or RDTs are not available, the health worker is instructed to assess for signs and symptoms of severe malaria. If these danger signs are absent, the guidelines recommend treatment with AL. If danger signs are present, the current guidelines instruct the health worker to administer rectal artesunate, a first dose of intramuscular artemether, or injectable quinine or artemether, and refer the patient to the next level of the health system.

Because of poor access to health care, the FMOH embarked on an ambitious HEP in 2005, primarily funded by the GoE, the Global Fund, the Global Alliance for Vaccines and Immunization, and World Bank. The HEP was established to provide universal health coverage to the population of Ethiopia through building community-level health posts each staffed by two, paid HEWs. Between 2005 and 2009 about 15,000 health posts were built and staffed with 30,000 HEWs (see **section C.2.**).

Microscopy is not available at health posts and HEWs confirm suspected malaria cases using RDTs. Depending on the RDT result, cases are then treated with either AL or chloroquine (see above). Until recently, stock-outs of RDTs were common, and a substantial proportion of malaria cases were still clinically diagnosed and presumptively treated by the HEWs. Referral systems are weak and pre-referral treatment was not yet available as of mid-2011. Since early 2011, the FMOH has begun to roll out a new policy to allow HEWs to follow newly updated iCCM algorithms, an adaptation of Integrated Management of Neonatal and Childhood Illness guidelines that have been proven to be beneficial in other countries. This integrated clinical algorithm allows HEWs to provide antibiotics within health posts to persons with clinical signs of pneumonia.

Despite Global Fund support, the national and Oromia ACT gap will increase from 2011 onwards, and could severely undermine the continued efforts of the GoE to achieve its goal of universal access to time-

ly diagnosis and treatment of malaria as well as efforts to respond to epidemics. With FY2012 funding, PMI will focus its resources on filling the gap for ACTs at the national level.

Progress During Last 12 Months

To date, PMI has procured 3.9 million AL treatment doses, 3.9 million doses of chloroquine and 56,458 quinine doses for severe malaria. With FY2011 funding, PMI is procuring 4.5 million AL and 2 million chloroquine treatments. PMI has also supported the revision of existing malaria treatment guidelines. As part of this undertaking, the MCST will address treatment algorithms, use of ACTs and other antimalarial drugs, as well as implementation strategies with particular emphasis on the challenges of malaria epidemiology in Ethiopia, including periodic malaria outbreaks. Topics to be addressed include the use of ACTs in pregnant women, and artemisinin derivatives for pre-referral treatment and for treatment of severe disease in health facilities.

PMI is working with the 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. PMI also will support an assessment of performance standards and the quality of the pre-service and in-service training; support in-service training programs for clinical officers and HEWs through the well-established Integrated Refresher Training Program, which is implemented by the FMOH, in collaboration with UNICEF.

PMI is supporting District Health Office staff in monitoring and supervision of health centers, and support health center staff in their monitoring and supervision of health posts. 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 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/qualitative 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.

Proposed PMI activities with FY2012 funding (\$5,690,000)

- **Procurement of ACTs (\$4,000,000):** PMI will support the procurement and distribution of 4,500,000 AL treatments to meet the AL need 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.
- **Procurement of chloroquine for *P. vivax*, pre-referral treatments and drugs for severe malaria (\$1,000,000):** PMI will support the procurement and distribution of the entire estimated national need for chloroquine (i.e. 4 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.
- **Glucose-6-phosphate dehydrogenase (G6PD) deficiency study (\$90,000):** G6PD deficiency is the most common enzyme deficiency worldwide and exposure to certain drugs (e.g. primaquine) can cause a drug-induced oxidative hemolysis in G6PD deficient patients. There is limited data on the prevalence of G6PD deficiency in Ethiopia, but a 1989 WHO Working Group reported very low

prevalence of 0.5-2.9%. Since no G6PD screening tests are available in Ethiopia, primaquine, the only drug currently available to treat *P. vivax* hypnozoites, is not being frequently used in Ethiopia due to concerns of potential adverse events. In late 2011, Ethiopia will be conducting a MIS (see **section J.2.**) where dried blood spots will be collected. A selected sub-sample of dried blood spots from this nationally representative survey will be used to determine the national prevalence of G6PD deficiency using molecular screening methods. If the deficient variant is determined to be African A (-), then a primaquine regimen of 45mg once a week for 8 weeks can be used without prior testing, which will have major programmatic implications for the management of *P. vivax* hypnozoites and *P. falciparum* gametocytes.

- **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 FY2012. This will include in-service training of health workers in up-to-date malaria case management guidelines, on-site supervision and ensuring that case management reporting is complete and accurate (see **section I.1**). 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 286 districts in 6 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.
- **SBCC for case management** (no additional funding required - costs covered in **section H.3.**): 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.
- **Case management pre-service training** (No additional funding required in FY2012): PMI will support integrated pre-service training of various cadres of health workers. Training will focus on the clinical and laboratory management of malaria (see **section M.**).

J. INTERVENTIONS: EPIDEMIC SURVEILLANCE AND RESPONSE

J.1. Epidemic Detection and Response

Background

Malaria epidemics in Ethiopia have been documented since the 1930’s. One of the most notable occurred between June and December 1958 and 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 published by the FMOH in November 2004 and are currently being updated with support of PMI. The new guidelines detail the human vulnerability factors, including population movement as well as meteorological indicators such as rainfall, temperature and humidity that affect the occurrence of epidemics. The revised guidelines include setting 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 in that week. 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 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.

Depending on the scale of the epidemic, additional spray pumps may be borrowed from neighboring districts, but, in general, spray operators are contracted locally. If the magnitude of the epidemic is beyond the capacity of the region, the FMOH can declare a national epidemic and request support from international communities and partners.

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. The ability to detect and respond to epidemics is also restricted by the weak health information system. Recording and reporting school absenteeism to the nearest health facility on regular basis might provide evidence as to the burden of disease, and potentially the burden of malaria, in the community. 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.

In 2009, a Public Health Emergency Management 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 (under five and over five years of age) including clinical malaria (outpatient and inpatient), confirmed malaria by species, malaria in pregnancy, and severe malaria/anemia in those under five years of age. By 2011, this system was 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. To this end, the recently developed FMOH National M&E Plan aims to achieve a high quality, broadly based malaria infection detection, investigation and response surveillance system and improve the detection and timely response to malaria epidemics and further reduce malaria transmission.

Progress During Last 12 Months

PMI 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.

Epidemic Detection and Surveillance Sites. In line with the GoE's desire to develop a high quality, broadly based malaria infection detection, investigation and response system, PMI supported the development of a strengthened ESR system 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 responsible were trained in data collection and reporting.

Data collection began in February 2010 in 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 five entire primary health care units in the total of ten epidemic detection centers, 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 should detect nearly all malaria health events within these catchment areas, improving context of the surveillance data over time.

The objective 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 to understand how health centers become gradually affected by increases in cases 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 (see **section E.3**). It is envisaged that 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 FY2011 detected four small malaria outbreaks, including a relapsing fever outbreak. In partnership with the FELTP, a comprehensive review of the epidemic detection site data and activities was completed in FY2011 to determine how PMI will support this activity in the future; .This evaluation confirmed the detection of two malaria outbreaks at the time of the survey, and documented that these data were used for action. The malaria register completion rate was high (i.e. few blank fields), and data entry accuracy from registers to the database was reasonably high and laboratory registers complete. The field support provided by the implementing partner was thorough and of high quality. The community data collected by HEWs was of high quality, easy to validate, and was actively used by the HEWs to inform their communication and outreach activities. There were more difficulties in interpreting health center data due to clinical complexities and apparent conflicting priorities compared with completing less inclusive HMIS forms. The ongoing roll-out of SMS reporting at health post level for this system is expected to provide more robust, real-time data reporting. The FMOH has asked PMI for assistance to expand the PMI epidemic detection site approach in Oromia to 40 additional, Global Fund-supported epidemic detection sites outside of Oromia.

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.

Proposed PMI activities with FY2012 funding (\$500,000)

- **Epidemic Detection and Surveillance Sites** (\$300,000): PMI will continue to support the network of 10 epidemic detection sites established in 2010. 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 FY2012 to determine how PMI will support this activity in the future.

- **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 6 regional states (approximately a third of the country). The health centers and health posts that the project supports are not epidemic detection sites. 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.

K. MONITORING AND EVALUATION

Background

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 **section D.**) are being achieved.

Currently, Ethiopia has a paper-based system of data collection at the health facility level; however, little information is actually 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 Health Management Information System (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:
 - children <5 years of age, and
 - people at least five years of age; and
- Malaria case fatality rate among:
 - children <5 years of age [in-patients]
 - people at least 5 years of age [in-patients]

Progress During Last 12 Months

Monitoring and evaluation is a core component of PMI. All PMI implementing partners submit a comprehensive performance monitoring plan with their annual work plans, outlining activities and the respective input, output and impact indicators. Additionally, PMI supported a number of complementary activities to monitor and evaluate the reach and impact of the FMOH and PMI supported malaria interventions.

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.

ITN database: PMI supported the development of an ITN tracking system in order to effectively track ITN distributions. This is closely related to the regional and district level malaria commodity micro-planning and supply chain strengthening efforts supported by PMI. Although this database is Oromia-specific, the model developed is available for application throughout Ethiopia.

Malaria Indicator Survey: PMI supported the 2007 MIS, which assessed coverage, access and use of malaria interventions. Although a DHS was scheduled for early 2010, implementation was postponed until early 2011. The timing of the DHS did not correspond to the major malaria transmission season, and together with other in-country stakeholders and PMI, the FMOH decided to carry out a separate MIS in late 2011.

Malaria commodities' micro-plan: PMI supported micro-planning meetings with participants from all malaria-affected woredas and zones in Oromia in 2009, 2010, and 2011 to determine the requirements of RDTs, ACTs and LLINs at district level. 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, rather than the usual “top down” push system, where distributions are estimated at federal level. 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 if commodities are available or not. Commodity requirements are determined based on health facility consumption records from previous years in each woreda. The micro-plan also considered 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. The FELTP is 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. A steering committee has been operational since then, training modules are being developed for each course, and an Ethiopian Program Director and other key staff were hired in 2008. Initial field sites will be Addis Ababa and Oromia. The program will join the African Field Epidemiology Network, through which it can exchange experiences and collaborate with similar programs of other countries in the region. In 2011, three Ethiopian FELTP residents supported a comprehensive evaluation of PMI's ten epidemic detection sites (see above). PMI plans to continue to provide three FELTP residents in FY2012 with professional support, including malaria projects that will provide professional experience with training and educational value.

Proposed PMI activities with FY2012 funding (\$500,000)

PMI plans to strengthen and support malaria M&E activities in Oromia as well as nationally. These activities will result in improved information regarding the current status and tracking of trends in the overall malaria situation and a variety of indicators of PMI components, both at the population level and facility level.

National malaria commodities micro-plan (\$350,000): In FY2012, PMI will continue to support the development of an annual malaria commodities' micro-plan. However, unlike in previous years where the micro-plan was developed for Oromia only, the micro-plan will be expanded to all of Ethiopia's regional states in FY2012. 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.

Field Epidemiology and Laboratory Training Program (\$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. PMI will continue to support at least 3 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.

L. INTEGRATION WITH OTHER GLOBAL HEALTH INITIATIVE PROGRAMS

L.1. Maternal, Neonatal and Child Health, Family Planning, Reproductive Health

Background

Following the first National Family Fertility Survey conducted in 1990, the USG started supporting the delivery of key MNCH, family planning and nutrition (MNCH/FP/N) 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. The maternal and child health/family planning/nutrition interventions target 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 eleven 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.

In Ethiopia, the USG has been the principal donor supporting MNCH, family planning and nutrition over the past 18 years and has worked with civil society, social marketing and public sectors to promote family planning services. USG support includes technical assistance, contraceptive provision, improvement of logistics, promotion of social marketing for contraceptive distribution and franchising, improvement of service delivery, pre-service and in-service training, policy dialogue, behavior change communication, addressing harmful traditional practices, and fistula. Most of this support is being implemented through the HEWs at community-level.

Proposed PMI activities with FY2012 funding (No additional funding required)

- **SBCC:** PMI and USG agencies will coordinate SBCC activities to increase preventive and curative malaria and MNCH/FP/N interventions using a range of different community-based and non-community-based approaches. Community-based, malaria-specific SBCC messages (developed with PMI support) aim to increase service attendance as well as strengthen MNCH/FP/N service delivery in communities of Oromia and other regional states. This will ensure increased coverage and reach of malaria interventions supported by PMI.
- **Pre- and in-service training of health professionals:** Currently, pre- and in-service training of health workers in Ethiopia is being implemented on an *ad hoc* basis, depending on programmatic needs and funding. In 2012, it is anticipated that pre-training needs of all health teams of the USAID/Ethiopia Health, AIDS, Population and Nutrition (HAPN) office will be integrated, including funds from PMI, PEPFAR and Health, Population and Nutrition (see **section L.**). It is envisaged that this will strengthen service delivery by providing trainees with a comprehensive platform of theoretical and practical knowledge as well as standardize training systems and approaches.
- **iCCM:** After the USG successfully piloted pneumonia treatment by HEWs at the community level, multi-donor advocacy led to FMOH adoption of iCCM, which includes malaria diagnosis and treatment. iCCM of childhood illnesses has the potential to save thousands of children's lives. With PMI support, implementing partners work with the FMOH in over 286 districts to train approximately 13,000 HEWs to use the multi-species RDTs, so that HEWs will be able to differentiate malaria from other causes of fever. With the recent new guidance allowing HEWs to administer cotrimoxazole for pneumonia, the USG is developing new curricula, conducting training and increasing the FMOH capacity to implement and supervise the iCCM approach at the community level. As many children

are not taken to health centers or hospitals for treatment, the rollout of iCCM is expected to contribute to significant reductions in the mortality of children aged under five years over the next few years.

L.2. President's Emergency Plan for AIDS Relief

Background

PMI is working with PEPFAR, as they develop their Ethiopia FY2012 Country Operational Plan 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 PEPFAR support previously (e.g. laboratory infrastructure).

Proposed PMI activities with FY2012 funding (No additional funding required)

- **SBCC:** PMI and PEPFAR will coordinate SBCC activities to increase preventive and curative malaria and HIV/AIDS interventions using a range of different community-based and non-community-based approaches. With PEPFAR, community-based, malaria-specific SBCC messages (developed with PMI support) aim to increase ANC attendance as well as strengthening ANC/PMTCT service delivery in communities of Oromia and other regional states. This ensures increased coverage and reach of malaria in pregnancy interventions supported by PMI.
- **Coordination of laboratory support:** PMI is building upon the existing structures and mechanism that have been developed and established through PEPFAR and Global Fund support. Columbia University is leading the implementation of both malaria and HIV/AIDS laboratory activities with both PMI and PEPFAR support. These laboratory activities will also leverage USAID/Ethiopia funding for tuberculosis diagnosis and laboratory strengthening. Such coordination will prevent development of parallel systems, materials and fragmentation of laboratory services to support vertical program activities as well as maximize the USG's investments.
- **Pre- and in-service training of health professionals:** Currently, pre- and in-service training of health workers in Ethiopia is being implemented on an *ad hoc* basis, depending on programmatic needs and funding. In 2011, it is anticipated that pre-service needs of all health teams of the USAID/Ethiopia's HAPN office will be integrated, including funds from PMI, PEPFAR and Health, Population and Nutrition (see **section L.**). It is envisaged that this will strengthen service delivery by providing trainees with a comprehensive platform of theoretical and practical knowledge as well as standardize training systems and approaches.
- **Pharmaceutical systems strengthening:** PEPFAR has been supporting the development of the country-wide PMLP as well as several activities strengthening procurement, delivery, storage, dispensary and tracking of HIV and non-HIV drugs. PMI is building upon these activities so as to be able to track antimalarial drugs within the existing system, ensuring that approaches are not duplicated.
- **Policies and guidelines:** PMI has developed, modified or updated several of the in-country malaria and HIV guidelines and strategies in FY2011 with regards to malaria/HIV case management. It is envisaged that future respective policies and guidelines will continue to include biological as well as programmatic information and guidance for malaria and HIV/AIDS (e.g. for case management of malaria as a co-infection in HIV/AIDS patients).

L.3. Neglected Tropical Diseases

Background

Several neglected tropical diseases are prevalent in Ethiopia, including soil-transmitted helminths, filariasis, leishmaniasis, onchocerciasis, schistosomiasis, and trachoma. While up-to-date information exists for some of the diseases because of operational program activities by either the FMOH or in-country stakeholders (e.g. Carter Center), data for others 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. 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 an impact on these other vector-borne diseases.

PMI supported the development a malaria risk map for Oromia using data from school-based malaria surveys. Leveraging additional funding support from the Wellcome Trust, school children were also surveyed for helminths. Survey results in 83 schools showed that 34% of fecal samples were positive for hookworm; co-infection with soil transmitted helminths and *Plasmodium* was rare occurring in only 21 children (0.25%). It is anticipated that the results of that survey will also be used to develop a risk map for helminths.

Proposed USG component for FY2012 (no additional funding required)

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

M. CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING

Background

Ethiopia faces many challenges related to human resources for healthcare, including the shortage of skilled health workers, high turnover and lack of motivation to retain health professionals in remote and inaccessible health facilities. 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.

The FMOH Human Resources for Health Strategy was released in June 2010. A comprehensive USAID/Ethiopia Health, AIDS, Population & Nutrition (HAPN) office-wide training and education project is in the late stages of formulation in response to this document and after consultation with many donors and stakeholders.

Staff retention: The ORHB has created a staff retention strategy, incorporating both financial and in-kind incentives. The scheme is categorized through a geographic stratification. Each level provides a top-up salary and/or doubling of in-service time at post depending on the geographic strata (e.g. rural, remote village). Non-financial, in-kind incentives include provision of full infrastructure and housing supplies for health professionals, including HEWs, in remote places.

Supervision: Supervision from the top level down to the community level is weak due to shortages of human and financial resources. Practical training in supervisory skills can be improved. There is also a

lack of skilled experts in malaria vector control at the regional and zonal levels.

Proposed PMI activities with FY2012 funding (see section I.3.)

Together with funds from PEPFAR, Health, Population and Nutrition, PMI will contribute support to malaria-related training within the USAID/Ethiopia Human Resources for Health project expected to be awarded sometime in FY2012. 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 has already allocated support in FY2010 and FY2011 to support this activity.

Through pre-service and in-service training and quality assurance, PMI will help keep health providers in their current positions and location. While the RHBs will concentrate on staff retention plans and incentive structures, PMI will support quality training and follow-up to identify strengths and weaknesses in health worker performance.

In FY2009, FY2010, and FY2011 PMI's implementing partners placed technical experts of implementing partners in the ORHB (either at regional, zonal or district level) to assist with malaria activities. It is envisaged that this support will continue in FY2012. In addition to working closely with their RHB counterparts, these and the PMI staff will coordinate with other malaria partners, especially other GoE ministries, UNICEF, WHO, the private sector and civil society. Examples of this support include technical assistance and funding for iCCM activities, where PMI supported the training of HEWs in iCCM. Support for training also includes pre-service, in-service and refresher training of health workers in case management, laboratory diagnosis, IRS, commodity logistics, interpersonal communication and supervision. With FY2012 funding, PMI will continue to focus its assistance on malaria-specific supervision and work with other partners to ensure that this supervision is integrated with other supervision activities (e.g. HIV/AIDS).

N. COMMUNICATION AND COORDINATION WITH OTHER PARTNERS

Background

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 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 became members of the MCST in FY2008.

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. The Technical Advisory Committee represents a technical core of the MCST which advises the FMOH on policy and program implementation issues, provides technical assistance on an *ad hoc* basis, and has assisted with malaria program integration issues. Currently, PMI is co-chairing this Committee.

Progress to date of PMI supported activities

PMI has also been instrumental in the development and finalization of four Global Fund proposals (Round 7, 8 and 10, and Round 2 Rolling Continuation Channel) as well as the development and updating of in-country guidelines and strategies. PMI's ongoing technical assistance to the FMOH and the Technical Advisory Committee in assisting in the preparation of a Round 11 grant application will be crucial for the future success of malaria prevention and control efforts in Ethiopia.

In addition, PMI supported 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, control and avoid duplication of efforts and waste of resources.

Proposed PMI activities with FY2012 funding (no additional funding required)

Activities started in FY2008 will continue to be implemented through FY2012. These will further strengthen in-country coordination through semi-annual PMI implementing partner planning and progress report workshops for each major set of PMI activities outlined in the MOP. FMOH and RHB officials are also invited to these meetings. These workshops will ensure that (i) materials, guidelines, policies, strategies are reviewed, updated, modified and/or developed; (ii) activity progress, needs and gaps are discussed; (iii) an activity plan for the next year is developed based on needs and gaps identified as well as based on availability of PMI funding; (iv) partners' roles and responsibilities are defined; and (v) partners consensus and buy-in is assured. It is believed that this approach will foster strong coordination and collaboration between partners, optimal benefit and impact for FMOH and NMCP, as well as avoid duplication of malaria prevention and control activities.

O. 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 FY2012 funding (\$2,200,000)

The current PMI staffing structure will continue in FY2012. 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.

P. TABLES

Table I

**President's Malaria Initiative – Ethiopia
Year 5 (FY2012) Budget Breakdown by Partner (\$36,900,000)**

Partner Organization	Geographic Area	Activity	Budget
AED <i>C-Change</i>	Oromia/National	SBCC for LLINs, IRS, case management	\$1,800,000
CDC IAA		In-country staff; administrative expenses, TDYs	\$600,000
Columbia University <i>ICAP</i>	Oromia/National	Support for quality assurance system for microscopy and RDTs	\$700,000
JSI <i>Deliver</i>	Oromia	Procurement of laboratory equipment and supplies	\$570,000
TBD	Oromia	Support for quality assurance system for microscopy and RDTs	\$30,000
SIAPS	National	Strengthening of drug management system capacity	\$750,000
Pathfinder <i>IFHP</i>	National	Provide systems support for ongoing supervision and monitoring of malaria treatment; epidemic surveillance and response	\$800,000
IRS 2 IQC Task Order 4	Oromia	Procurement of IRS equipment; IRS operations; Entomological monitoring and capacity-building; Pesticide management	\$6,200,000
<i>Tbd</i>	Oromia/National	Procurement of insecticides; G6PD deficiency study	\$3,900,000
UNICEF	Oromia/National	Procurement and distribution of RDTs, ACTs, chloroquine, pre-referral and severe antimalarial drugs, LLINs; support for national commodities' micro-planning	\$19,350,000
University of North Carolina <i>MEASURE III</i>	Oromia	Training Zonal Health Officers in data management; sentinel site maintenance; program tracking tools and skills strengthening;	\$300,000
USAID		In-country staff; administrative expenses; USAID TDY core-funded	\$1,750,000
USP <i>PQM</i>	National	Strengthen drug quality monitoring	\$150,000
Total			\$36,900,000

Table II

**President's Malaria Initiative – Ethiopia
Planned Obligations for FY2012 (\$36,900,000)**

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 1,900,000 free LLINs through health facilities, HEWs and other networks	22
LLIN hang up-keep up campaigns	FHI <i>C-Change</i>	100,000	25,000	National	Implementation of selected LLIN hang-up campaigns through CJTF-HOA	22
Subtotal		10,100,000	10,025,000			
PREVENTIVE ACTIVITIES: INDOOR RESIDUAL SPRAYING						
Procurement of insecticide	<i>Tbd</i>	3,810,000	3,810,000	Oromia	Procurement of insecticide for IRS activities	28
IRS operations	IRS 2 IQC Task Order 4	5,100,000	300,000	Oromia	Training, implementation and supervision support for IRS operations targeting 960,000 households; top-up procurement of spray equipment and personal protective gear	28
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	28
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	28
Pesticide management	IRS 2 IQC Task Order 4	600,000	100,000	National	Support for comprehensive management of insecticide stocks and waste	28
Subtotal		10,010,000	4,210,000			

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
PREVENTIVE ACTIVITIES: SBCC						
SBCC for LLINs, IRS, case management	FHI <i>C-Change</i>	1,500,000		Oromia/National	Implementation of various SBCC approaches; collaboration with RHB, HEC and in-country partners; sub-awards to NGOs, CBOs, FBOs	30
SBCC for LLINs/ACTs management (other platforms)	FHI <i>C-Change</i>	200,000		Oromia/National	Training and dissemination of developed SBCC through variety of platforms, including Peace Corps Volunteers, CJTF-HOA, USAID/Ethiopia implementing partners, UNHCR and private sector	31
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.	31
Subtotal Prevention		21,810,000	14,235,000			

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
CASE MANAGEMENT: DIAGNOSIS						
Support for QA system for malaria laboratory diagnosis	Columbia University <i>ICAP</i>	700,000	50,000	Oromia/National	Support RHB, EHNRI and RRLs to improve laboratory services and QA/QC for microscopy and RDTs at national and health facility level	33
Technical assistance for QA system for malaria diagnosis	TBD	30,000		Oromia/National	TDYs for technical assistance of main PMI-supported malaria diagnostic activities	33
Procurement of RDTs	UNICEF	4,000,000	4,000,000	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	33
Procurement of laboratory equipment/supplies	<i>JSI Deliver</i>	570,000	570,000	Oromia	Procurement of laboratory equipment and supplies (e.g. microscopes), and including logistics systems support	33
Subtotal		5,300,000	4,620,000			
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	35
Strengthen drug quality monitoring	<i>USP PQM</i>	150,000		National	Support to FHMACA for monitoring of post marketing anti-malarial drug quality regionally and nationally	35
Subtotal		900,000				
CASE MANAGEMENT: TREATMENT						
Procurement of ACTs, pre-referral treatment and drugs for severe malaria	UNICEF	4,000,000	4,000,000	Oromia/National	Procurement of 4,500,000 ACT treatment dosages; rectal artesunate and severe malaria treatment and supplies	37

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
Procurement of chloroquine, pre-referral treatment and drugs for severe malaria	UNICEF	1,000,000	1,000,000	National	Procurement of 4,000,000 treatment dosages of chloroquine as well as drugs for pre-referral and management of severe malaria to cover national needs	37
G6PD deficiency study	<i>tbd</i>	90,000		National	Operational research study to assess prevalence of G6PD deficiency in Ethiopian population	37
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	37
Subtotal		5,690,000	5,000,000			
Subtotal Case Management		11,890,000	9,620,000			

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
EPIDEMIC SURVEILLANCE / MONITORING AND EVALUATION: EPIDEMIC DETECTION AND RESPONSE						
Maintenance of Epidemic Detection Sites	UNC <i>MEASURE III</i>	300,000		Oromia	Maintain 10 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	40
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	40
Subtotal		500,000				
EPIDEMIC SURVEILLANCE / MONITORING AND EVALUATION: MONITORING AND EVALUATION						
Malaria Indicator Survey	<i>Malaria Consortium</i>	0		National	Support for implementation of Malaria Indicator Survey in 2011	41
School based surveillance	<i>Malaria Consortium</i>	0		National	Operational research to assess the efficacy and feasibility of using school as sites to monitor malaria transmission and occurrence of epidemic outbreaks	41
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	42
Field Epidemiology Lab Training Program (FELTP)	CDC/IAA	150,000		National	Support for applied epidemiology and laboratory training for FMOH staff	42
Subtotal		500,000				
Subtotal Epidemic Surveillance / Monitoring and Evaluation		1,000,000				

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, two for strategic guidance to epidemiological work, one for strategic guidance to entomological work	47
In-country staff; Admin. Expenses	CDC IAA	400,000			Salaries, benefits of in-country CDC PMI staff (1)	47
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		36,900,000	23,855,000		Commodities (64.65%)	