This Malaria Operational Plan has been endorsed by the President's Malaria Initiative (PMI) 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 INITATIVE

MALARIA OPERATIONAL PLAN (MOP)

ETHIOPIA

FY 2008

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ACRONYMS AND ABBREVIATIONS

ACT	Artemisinin-based Combination Therapy
AL	Artemether-Lumefantrine
AMREF	African Medical & Research Foundation
ANC	AnteNatal Care
ARV/ART	Anti-Retroviral/Ttherapy
BCC/IEC	Behavior Change Communication/Information Education Communication
CAME	Coalition Against Malaria in Ethiopia
CCM	Country Coordinating Mechanism
CDC	Centers for Disease Control and Prevention
CHW	Community Health Worker
CHP	Community Health Promoter
CRDA	Christian Relief Development Agency
CSHGP	Child Survival and Health Grants Program
DACA	Drug Administration and Control Authority
DALY	Disability Adjusted Life Years
DDT	Dichloro-Diphenyl-Trichloroethane
DFID	UK Department for International Development
DHS	Demographic and Health Survey
EDHS	Ethiopia Demographic and Health Survey
EHNRI	Ethiopian Health and Nutrition Research Institute
EPI	Expanded Program for Immunization
EPHTI	Ethiopia Public Health Training Initiative
ESHE	Essential Services for Health in Ethiopia
ESR	Epidemic Surveillance and Response
FANC	Focused Antenatal Care
FBO	Faith-Based Organization
FMoH	Federal Ministry of Health
FSN	Foreign Service National
FP/MNCH	Family Planning/Maternal, Neonatal and Child Health
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GOE	Government of Ethiopia
HEP	Health Extension Package
HEW	Health Extension Worker
HIPC	Highly-Indebted Poor Countries
HSDP	Health Sector Development Plan
HSEP	Health Service Extension Program
IDA	International Development Association
IM	Intra-Muscular (injections)
IMCI	Integrated Management of Childhood Illnesses
IPTp	Intermittent Preventive Treatment of pregnant women
IRS	Indoor Residual Spraying
ITN	Insecticide-Treated bed Net
IVM	Integrated Vector Management

LLIN	Long-Lasting Insecticide-treated bed net
MACEPA	Malaria Control and Evaluation Partnership in Africa
MCST	Malaria Control Support Team
MCH	Maternal and Child Health
MIP	Malaria in Pregnancy
MSF	Médecins Sans Frontières (Doctors Without Borders)
NGO	Non-Governmental Organization
OFDA	Office of Foreign Disaster Assistance
PBS	Protection of Basics Services program
PEPFAR	President's Emergency Plan For AIDS Relief
PLWHA	People Living With HIV/AIDS
PMI	President's Malaria Initiative
PMTCT	Prevention of Mother-To-Child Transmission
PPE	Personal Protective Equipment (for insecticide spray operators)
PSI	Population Services International
PVO	Private Voluntary Organization
QA	Quality Assurance
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test
RHB	Regional Health Bureau
RTI	Research Triangle Institute
SNNPR	Southern Nations, Nationalities and People's Region
SP	Sulfadoxine-pyrimethamine
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

EXECUTIVE SUMMARY

In June 2005, the United States Government (USG) announced a new five-year, $1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions in high-burden countries in sub-Saharan Africa. The goal of this Initiative is to reduce malaria-related mortality by 50% after three years of full implementation in each country. This will be achieved by reaching 85% coverage of the most vulnerable groups, children under five years of age, pregnant women, and people living with HIV/AIDS, incorporating proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated bed nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

Malaria is ranked as the leading communicable disease in Ethiopia, accounting for approximately 30% of the overall Disability Adjusted Life Years (DALYs) lost. Approximately 75% of the country is malarious with about 68% (50 million) of the total population of 73 million living in areas at risk of malaria (MOH, 2006). An estimated 9.5 million cases of malaria were reported annually between 2001-2005, with an annual average of 487,984 confirmed cases. Malaria causes approximately 70,000 deaths each year. Overall, malaria accounts for approximately 17% of outpatient consultations, 15% of admissions and 29% of in-patient deaths. However, as 36% of the population is out of reach of the health service coverage, these figures may underrepresent the true situation. The burden of malaria has been increasing due to a combination of large population movements, increasing large-scale epidemics, mixed infections of *Plasmodium vivax* and *P. falciparum*, increasing parasite resistance to malaria drugs, vector resistance to insecticides, low coverage of malaria prevention services, and general poverty. Outpatient consultations, inpatient admissions and all in-patient deaths have risen by 21-23% over the last five years.

PMI implementation will focus on the Oromia Region of Ethiopia. Malaria is considered to be the most important communicable disease in Oromia. Three quarters of the region, (242 of 261 *woredas* (districts) and 3932 of 6107 *kebeles*, the smallest administrative unit of Ethiopia similar to ward or a neighborhood), are considered malarious, accounting for over 17 million persons at risk of infection. There are 1.5 to 2 million clinical cases per year, with malaria accounting for 20-35% of outpatient consultations, and 16% of hospital admissions. Malaria deaths, at a rate of 18-30%, are the leading cause of all hospital deaths. This one region was selected because it has a high malaria burden and is relatively underserved compared to other regions.

A nationwide Demographic and Health Survey (DHS) carried out in 2005 showed that about 6% of the 15,000 households surveyed owned at least one mosquito net whether treated or untreated, but only 1.5% of children under five and 1.1% of pregnant women had slept under an ITN the previous night. About 6% of children under five with a fever in the previous two weeks had taken an antimalarial drug within 24 hours of the onset of fever. Only 28% of pregnant women attended an antenatal clinic. All of these rates were much lower in rural areas than in urban areas

Ethiopia has received two grants from the Global Fund to Fight AIDS TB and Malaria (GFATM) in Round 2 (for $73 million) and Round 5 (for $140 million). Despite a slow start and procure-

ment delays, there has been major progress, with a massive increase in ITN distributions, training of thousands of health workers, distribution of ACTs, and development of district epidemic preparedness plans. The Round 5 grant which commenced in December 2005, together with other net donations such as 3 million Long Lasting Insecticidal Nets (LLINs) from the Carter Center, continue this scaling-up process, with plans to deliver a total of 20 million LLINs to populations in malarious areas, for a ratio of two nets per household, by the end of 2007. Ethiopia has applied for a Round 7 Grant under the Rolling Continuation Channel. GFATM support also enabled large distributions of artemether-lumafantrine, 3.8 million doses in 2005, 5.2 million doses in 2006 and 4.1 million doses scheduled for 2007. There are also large distributions of Rapid Diagnostic Tests, (RDTs) with 1.7 million distributed in 2006 and 8 million scheduled to be distributed in 2007. For the moment, acute shortages of commodities is less an issue than access to care, appropriate use of malaria prevention and treatment measures, weak health systems and sustainability.

This PMI Year 1 Malaria Operational Plan for the Oromia region in Ethiopia was developed in close consultation with the Federal Ministry of Health, the Oromia Regional Health Bureau and with participation of many partners. The activities PMI proposes to support complement the Federal Ministry of Health National Malaria Strategic Plan, and build on investments made by the government and other partners. Ethiopia is also a focus country for the President's Emergency Plan for AIDS Relief (PEPFAR). The planning teams for both PEPFAR and PMI consulted with each other to ensure collaboration, including in the areas of pharmaceutical management, diagnostic services and health worker training. While the focus is on Oromia Region, many of the PMI investments will benefit the country as a whole. To achieve the goal and targets of the PMI in Ethiopia, the following major activities will be supported:

Insecticide-treated nets: Since 2005, 20 million LLINs have been distributed to 10 million households nationwide with support from GFATM. The goal is to provide 2 LLINs per household in the rural target populations, including 6.5 million LLINs in Oromia Region. PMI will provide an additional 700,000 free LLINs to build and supply ongoing, routine distribution systems as replacements and to fill gaps. In addition to free LLINs, PMI will continue to facilitate the development of a viable commercial market for the long-term access to LLINs. PMI will also provide support, through multi-channel BCC/IEC approaches, to improve correct and consistent use of LLINs in households. Operationally, these will be delivered through support to both the Regional Health Bureau and to complementary activities through networks of community-based organizations, including churches, schools, women and youth groups and other Non Government Organizations (NGOs).

Indoor Residual Spraying: PMI will support Ethiopia's long standing and extensive IRS program across a wide range of activities, including geographical reconnaissance, targeting, quantification, procurement and logistics, training, implementation and supervision, monitoring and evaluation. Monitoring and evaluation will be especially important and includes support for M&E for entomology, environmental compliance, and epidemiological impact. PMI will support the IVM framework to build capacity for zonal and *woreda* vector control specialists in rationalizing and optimizing the potential contributions of IRS, ITNs and larval control.

Intermittent preventive treatment of pregnant women: PMI will support the malaria in pregnancy activities, including improved pre-service training for management of acute malaria in pregnant women, support to anemia management, and the malaria components of the Focused Antenatal Care services (FANC) in Oromia Region. PMI will also work with the new USAID bilateral (which will include a focus on maternal and neonatal health) and PEPFAR to improve facility and community-based antenatal, safe motherhood and adolescent health activities as they relate to malaria.

Case Management: PMI will support the review of the current malaria diagnosis and treatment guidelines, including the role and value of RDTs. PMI is committed to strengthening diagnostic capacity, including supplies, training, supervision and quality assurance. Through partners, PMI will support pre- and in-service training of health providers as part of an integrated package of overall health services delivery with on-going supervision and support, as well as an evaluative component to ensure trainings are indeed affecting quality of care related to malaria. PMI will support the procurement and distribution of ACTs and other antimalarials (including drugs for severe disease and pre-referral care). Four of the ten anti-malarial drug efficacy monitoring sites throughout the country will be supported by PMI in Oromia Region. PMI will also support malaria logistics-related activities within the context of the broader, national "Pharmaceutical Management Master Plan". In conjunction with other BCC efforts, PMI will support the Regional Health Bureau and its expanding system of Health Extension Workers to promote early care seeking, adherence to antimalarials and other salient issues around case management. PMI will also support the Ethiopian drug administration and control authority to ensure all malaria products entering the country meet quality standards, and to track and report adverse drug reactions associated with malaria treatment.

Monitoring and Evaluation: There is a great need to improve data and information management for operations, including tracking of LLIN distributions, the location and current staffing of health facilities, IRS operations, stock reports, etc. While assisting with the new Health Management Information Systems (HMIS) roll-out to support the routine collection of facility-based data, PMI will establish a sentinel site system that will enable the Oromia region to capture indicators beyond routine data, and track morbidity and mortality to evaluate program effectiveness. An additional $300,000 has been budgeted for Oromia as part of a national Malaria Indicator Survey (MIS) to be conducted between October and December 2007. While being nationally representative, this proposed survey will over-sample in Oromia Region to provide regionally-representative data, serving as a baseline for PMI interventions.

The proposed FY08 PMI budget for Ethiopia is $20 million. Of this amount, approximately 31% will support procurement and distribution of ITNs, 19% for IRS, 31% for improved diagnosis, procurement and use of ACTs, 7 % for M&E with investments in malaria in pregnancy, community mobilization and administration making up the remaining 12%; 46% of the budget is for commodities.

PRESIDENT'S MALARIA INITIATIVE

In June 2005, the United States Government (USG) announced a new five-year, $1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions in high-burden countries in sub-Saharan Africa. The goal of this Initiative is to reduce malaria-related mortality by 50% after three years of full implementation in each country. This will be achieved by reaching 85% coverage of the most vulnerable groups---children under five years of age, pregnant women, and people living with HIV/AIDS---with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated bed nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

The President's Malaria Initiative (PMI) began in three countries in 2006: Angola, Tanzania, and Uganda. In 2007, four countries were added: Malawi, Mozambique, Senegal, and Rwanda. In 2008, eight additional countries, including Ethiopia (Oromia Region) were added to reach a total of 15 countries covered under the PMI. Funding began with $30 million in Fiscal Year (FY) 2006 for the initial three countries, $135 million in FY' 07, and will increase to $300 million in FY' 08, and reach $500 million in FY' 10 in 15 countries.

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

This document presents a detailed one-year implementation plan for the first year of the PMI in Oromia Region. It briefly reviews the current status of malaria control and prevention policies and interventions, identifies challenges and unmet needs if the PMI goals are to be achieved, and provides a description of planned Year One activities under the PMI. The document was developed in close consultation with the National Malaria Control Program, the Oromia Regional Health authorities, and with participation of many national and international partners involved in malaria prevention and control in the country. The total amount of PMI funding requested for the Oromia Region of Ethiopia is $20 million for FY 2008.

PMI IN ETHIOPIA, WITH FOCUS ON OROMIA REGION

Ethiopia differs from other PMI focus countries in several important ways.

Coverage Targets: PMI is focused on Oromia Region. While overall systems support will benefit the central management at the Federal Ministry of Health and the other regions, coverage targets will be for Oromia, the largest region, covering 27 million people, of which 68% are at risk for malaria.

Epidemics: Epidemics, which traditionally occur every five to eight years, are a hallmark of malaria in Ethiopia. The epidemic of 1950 is estimated to have caused 3 million cases and resulted in 150,000 deaths. Unstable and largely unpredictable malaria epidemiology makes surveillance, information management and logistics for vector control and pharmaceuticals of paramount importance.

Vulnerable Groups: Ethiopian adults, unlike their counterparts in more endemic areas, have relatively little protective immunity and are also *vulnerable* to malaria. For this reason, less chronic exposure among pregnant women shifts the emphasis to rapid diagnosis and treatment, rather than IPTp; among children under five acute attacks, rather than chronic exposure, may shift the pattern of morbidity from severe anemia to cerebral malaria.

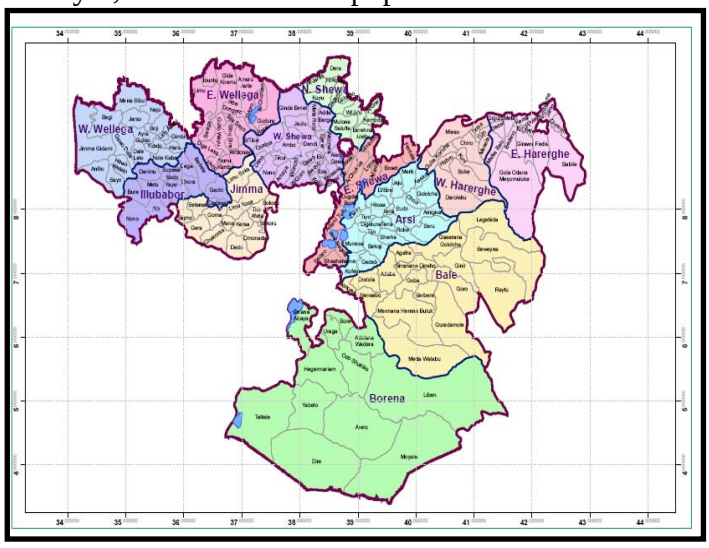
Case Management: *Plasmodium vivax* and *Plasmodium falciparum* comprise 40% and 60% of malaria infections respectively, This species mix vastly complicates clinical and laboratory diagnosis of malaria and drug treatment.

Emergencies: Epidemics, when they occur, are considered in the regular planning for vector control and drug quantification. Other situations of large sudden population movements may require additional measures such as insecticide treated plastic sheeting for emergency shelters, treated blankets, sheets, etc. There are opportunities for PMI to engage the Government of Ethiopia (GOE), the US Office of Foreign Disaster Assistance (OFDA), the United Nations High Commissioner for Refugees, and other emergency relief organizations working in these situations.

History: Ethiopia, Zimbabwe and South Africa were the only countries in Africa to embark on malaria eradication programs in the 1950s which was largely based on IRS. There remains a large, if now decentralized and aging, infrastructure for IRS, including the high capacity Adami Tulu pesticide factory. Ethiopia also has a long history as the WHO-supported regional malaria training center, with facilities based at Nazareth, in Oromia Region.

Health Infrastructure in Oromia: Ethiopia operates under a federal system of government. The country is divided into 11 regions and 611 *woredas* or districts. The federal government provides about $5 million annually in funding for malaria control activities. Both regions and districts have considerable autonomy in terms of resource mobilization, allocation of funds, and planning and implementation of health services.

Oromia Region, which was selected for support under the PMI, is shown in the maps below. The region has 281 *woredas* divided into 17 zones and 6 "special towns." According to 2004 Regional Health Bureau data, there are 21 hospitals, 178 health centers, 701 health stations and 917 health posts, operated by the government. In addition, there are 4 hospitals, 3 health centers, 80 health stations and 4 health posts operated by non-governmental organizations. There are also 4 hospitals, 2 health centers and 103 health stations under other governmental organizations and 6 nursing colleges in the region that offer a three year Diploma program. Their total annual enrollment has been tripled recently and each school admits a minimum of 250 students per year. Pharmaceutical retail outlets in the region include 46 pharmacies (government 10, and private 36), 117 drugs shops (government 4, private 113) and 1035 private or rural drug vendors that provide service in their respective areas. The health professional to population ratio is very low with one physician serving 68,951 people (WHO standard of 1: 10,000), and one nurse serving 9,309 people (WHO standard is 1:5,000). The total available hospital beds (government 2217 and NGO 340 Hospital beds) total approximately 2,547 with a bed to population ratio of 1:10,288 (WHO standard 1:3,000). The l health service coverage is also lower than most of other regions in Ethiopia. This low health service coverage in the region has contributed to low coverage in vital indicators such as vaccination and family planning. The health care delivery system has been re-organized from the previous 6 tier into a 4-tier system. The lowest tier in the system is the Primary Health Care Unit with one health center and 5 Health posts, designed to serve 25,000 people; the second tier is a district hospital to serve 250,000 people; third is a zonal hospital for 1,000,000 people; and the top tier is the specialized hospital for 5,000,000 people.



The health post, staffed by two Health Extension Workers (HEWs), provides preventive and limited curative health services. While intended to be mostly preventive, health posts are also currently providing curative services, including clinical diagnosis of malaria and treatment with artemether-lumefantrine. In some areas the HEW receives additional support for community mobilization through the USAID-supported project, "Essential Services for Health in "Ethiopia" (ESHE) "Community Health Promoter" or CHP. Whereas, the health center provides comprehensive primary health care services and backup to the health posts by accepting referral cases, the district and zonal hospitals provide secondary health care. Adama, Nekemte, Asella, Mettu and Ambo hospitals can potentially serve as specialized referral hospitals based on geographical suitability. Jimma Hospital, under the Ministry of Education, provides tertiary level health care for the city of Jimma and the surrounding population.

Malaria Situation in Ethiopia and Oromia Region: Malaria is the leading communicable disease in Ethiopia, accounting for approximately 30% of the overall DALYs lost. About 75% of the country is malarious with about 68% (50 million) of the total population of 73 million living in areas at risk of malaria (FMOH, 2006). Approximately 9.5 million cases of malaria were reported annually from 2001-2005 (range 8.4 – 11.5 million), with an annual average of 487,984 laboratory confirmed cases over the same period, range 392,419 to 591,442 (Fig. 1). Annual malaria mortality is about 70,000. Overall, malaria accounts for up to 17% of outpatient consultations, 15% of admissions, and 29% of in-patient deaths.

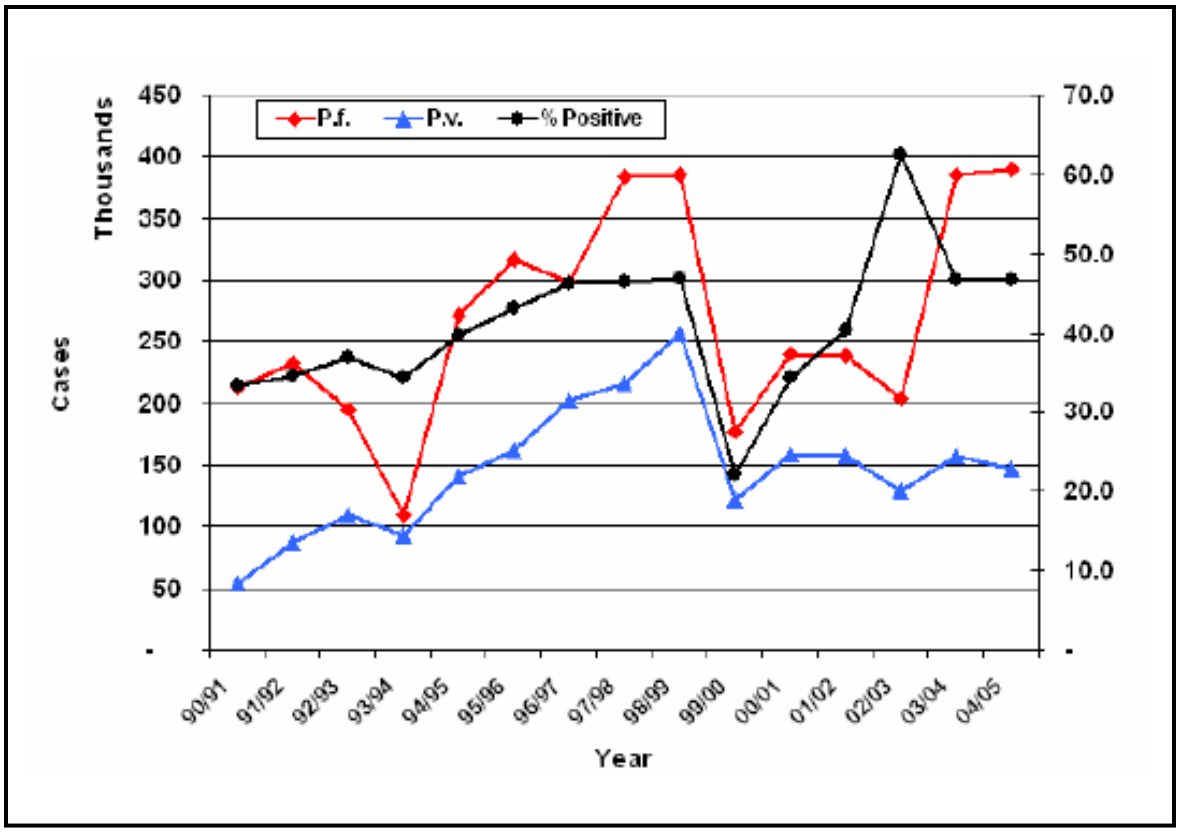


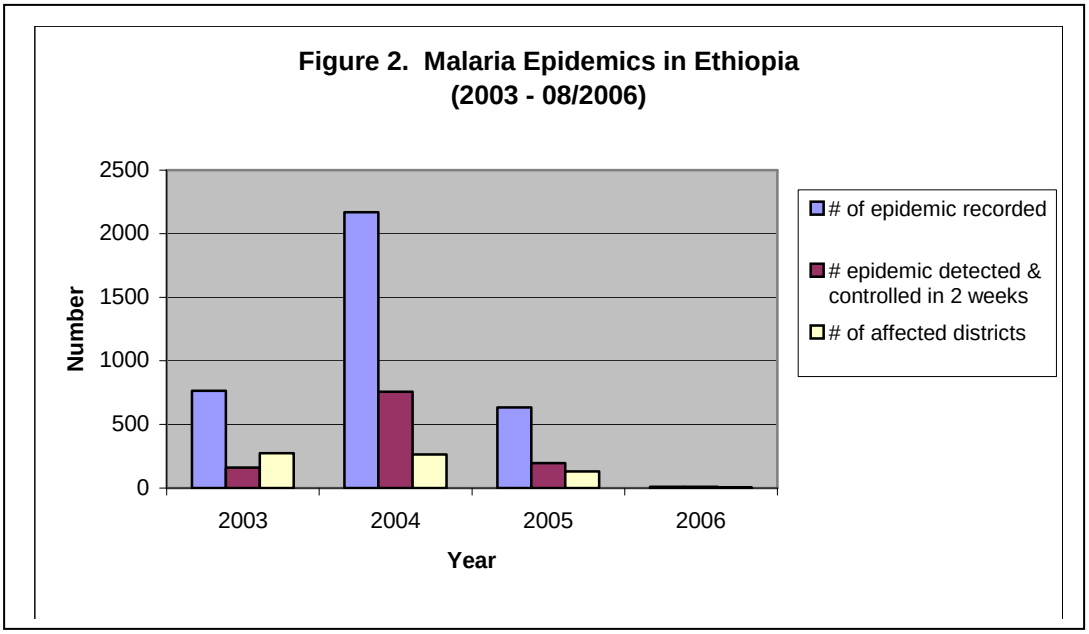
Figure 1. Annual confirmed malaria cases in Ethiopia

The burden of malaria has been increasing. Outpatient consultations, inpatient admissions and all-cause in-patient deaths have risen by about 23% over the last five years as shown in the following table. (**Table 1**).

Table 1. Health Facility based malaria morbidity, admissions and deaths

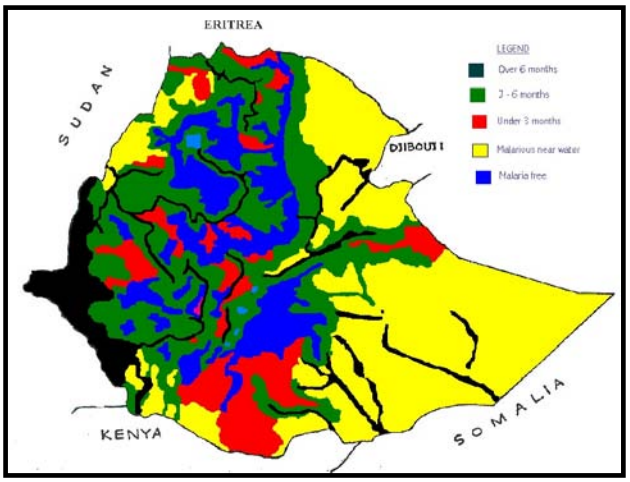
Year	Total Outpatient Visits	Clinical Malaria	(Percent)
2001	8,472,825	2,236,825	(26.4%)
2002	8,763,923	2,146,771	(24.5)
2003	9,246,457	3,062,391	(33.1)
Year	Total Admissions		
2001	193,064	1,5691	8.1
2002	157,847	2,3207	14.7
2003	243,807	3,9550	16.2
Year	Total Deaths		
2001	14,101	1,102	7.8
2002	8,677	1,379	15.9
2003	9,865	2,885	29.2

Malaria in Ethiopia is highly unstable, with epidemics every five to eight years. The western, central and eastern highlands, as well as the highland-fringe areas along the Rift Valley are especially vulnerable to epidemics. In all, more than half of the population lives in epidemic-prone areas. Epidemics seem to be intensifying and becoming more widespread. It is estimated that 48 epidemic episodes occurred between 1986 and 1993, with severe outbreaks occurring in 1988, 1991, 1992, 1998, 2003, 2004 and 2005. **Figure 2** shows the number of recorded outbreaks from 2003 to August 2006. The elevated transmission rates associated with epidemics in some localities seem to be sustained, indicating a shift towards higher levels of endemicity.



Malaria transmission is largely determined by climate and altitude. The major transmission occurs between September and December, following the rainy season from June to August. Certain areas, largely in the eastern part of the country, experience a second minor transmission period from April to May, following the short rains from February and March. Five main malaria eco-epidemiological strata are recognized in the country:

- Stable, year-round, transmission in the western lowlands and river basins areas of Gambella;
- Seasonal transmission in lowland areas below 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 above 2,500 meters.



Malaria transmission zones

Vectors: *Anopheles arabiensis*, a member of the *An. gambiae* complex, is the primary malaria vector, with *An. funestus*, *An. pharoensis* and *An. nili*, as secondary vectors. Sporozoite rates ranging up to 2.3% have been reported in *An arabiensis* which is more exophilic and exophagic compared to *An. gambiae* ss. Studies near Lake Zwai in Oromia Region captured 83% of *An. arabiensis* biting outdoors. Studies have shown a range of peak biting times for *An. arabiensis*, with one study near Lake Zwai, showing peak indoor biting between 18:00 and 20:00 while outdoor biting peaked between 22:00 and 24:00 hours. Although *An. arabiensis* is predominantly exophagic, it is estimated that 71% of the man-vector contact with this species occurs indoors. In southern Ethiopia, human biting peaked between 23:00 and 03:00 hours. Although *An. arabiensis* has been reported to prefer to feed on cattle, more than half of the *An. arabiensis* collected outside of houses in Konso District had fed on humans. Inside houses, *An. arabiensis* prefers to rest on thatched surfaces rather than mud walls. In Oromia, *An. arabiensis* rests outdoors in tree holes, ground holes and inside cattle sheds. Larvae are found in sunlit ground water pools including seepages below mini-dams as well as along the margins of lakes.

Anopheles pharoensis was found to have a sporozoite rate of 0.6% in a recent study conducted by the Oromia RHB. Because of this, and its high human biting rates (reaching a peak of 77 bites per person per night in November, during a longitudinal study near Lake Zwai in 1994), it is considered to be a secondary vector in the region. *An. pharoensis* is more exophilic than An. *arabiensis* with 92% of *An pharoensis* captured in outdoor landing catches. Peak biting occurs from 1800 to 2000. There is also significant DDT resistance among *An. pharoensis* in Ethiopia. Like *An. arabiensis*, the larvae of *An. pharoensis* are found in sunlit water, both in ground pools and along the margins of lakes. *An. funestus* is an important vector in other parts of Africa. While it can sometimes be largely eliminated by IRS, a study in central Oromia this year showed that it constituted 2.2% of the anophelines collected. *Anopheles nili* and *An. coustani* may be found in significant numbers in some regions of Ethiopia. It was noted that in Gambella Region, *An. nili* sometimes had sporozoite rates on a par with *An. arabiensis* and *An funestus*. Moreover, *An. nili* tends to bite indoors, but rests outdoors, making it less amenable to vector control operations.

History and Current Status of Malaria Control in Ethiopia: The Malaria Eradication Service was established in 1959. Ethiopia, along with Zimbabwe and South Africa were the only three countries in Africa to embark on an eradication effort. In 1976, as in many other countries, the Ethiopia program was converted 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 1990s, 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, collecting data on microscopically- confirmed cases in each sector.

Starting in 1993, a major reorganization and decentralization occurred and the vertical program began to be dismantled. Regions 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 reorganization of the Federal Ministry of Health (FMOH), malaria control became a 'team' under the Disease Prevention and Control Department rather than a separate department.

In 2000, the Roll Back Malaria (RBM) effort began in earnest in Ethiopia when the Government of Ethiopia (GOE) signed on to the Abuja declaration and its aims to increase coverage of interventions and reduce malaria mortality by half by 2010. A Malaria Control Support Team comprising representatives from the Ministry of Health, donors, and NGOs was formed to provide technical assistance and mobilize support for the government program. It is now called the Malaria and Other Vector Borne Diseases Prevention and Control Team.

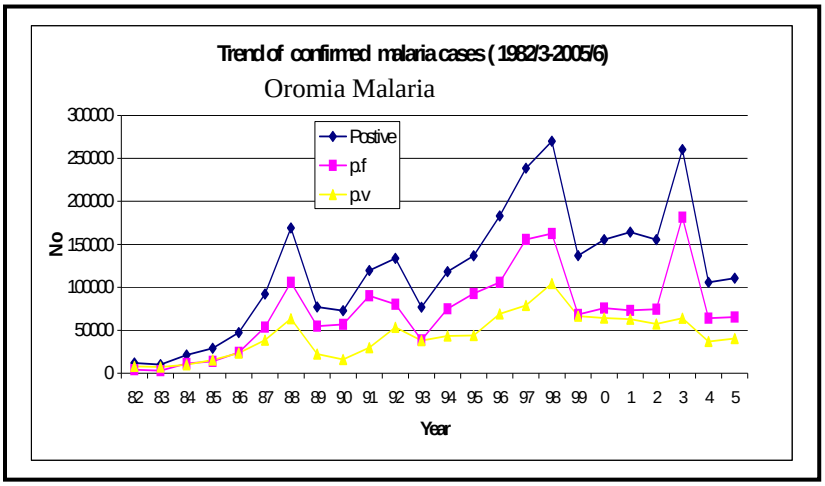
Ethiopia is the recipient of two grants from the GFATM in Round 2 (for $73 million) and Round 5 (for $140 million). Despite a slow start and severe delays in net procurement after the award of the GFATM Round 2 grant, major progress has been achieved since 2005. The recent large expansion of the program was recognized in the GFATM mid-year results report, "Investing in Impact" (GFATM, 2006), which described the distribution of two million ITNs in 2005, training of thousands of health workers, distribution of ACTs, and development of district epidemic preparedness plans. The Round 5 grant, which commenced in December 2005, together with other ITN donations such as those from the Carter Center, will continue this scaling-up process, with plans to cover all malarious areas with two ITNs per household by the end of 2007.

Malaria in Oromia Region: Malaria continues to pose a serious threat in Oromia. Three quarters of the region, 242 of 261 *woredas* and 3932 of 6107 *kebeles*, are considered malarious, accounting for over 17 million persons at risk of infection. There are 1.5 to 2 million clinical cases reported per year, with malaria accounting for 20-35% of outpatient consultations, and 16% of hospital admissions. At a rate of 18-30%, malaria is the leading cause of hospital deaths.

Oromia Health Profile

- Infant mortality 98/1000
- Under five mortality 142/1000
- Maternal mortality 871/100,000

The economic impact of malaria is far greater than for any other communicable disease. The region's economy is based on agriculture and peak malaria transmission coincides both with the planting and the harvesting season. Historically, malaria has forced people to heavily inhabit the less agriculturally productive highlands. As in the rest of Ethiopia, malaria is highly seasonal with great variation from year to year – generally leaving the population with little protective immunity.



At the regional governmental level, malaria is placed in the "Malaria and other Vector Borne Disease Control Department" and reports to the Deputy Head of the Regional Health Bureau. There are two "teams" within the department for "Malaria Epidemiology" and "Vector Biology and Control". At each zonal Health Department Office there is a "Communicable Disease Control" team with two malaria officers. There is also to be a "malaria team" at each of the *woreda* health offices. Challenges listed by the Regional Health Bureau include:

- **IRS**: shortage of skilled spray personnel; shortage of logistics, e.g. personal protective equipment (PPE), spray pumps and spares, and camping equipment; lack of operational funds in some districts; lack of vehicles; and high rates of replastering walls, especially during the Ethiopian New Year.
- **ITNs**: low utilization rates, maintaining high coverage; and mosquito resistance to pyrethroids.
- **Environmental management**: low community participation; identification and filling-in breeding sites; and poor documentation of impact.
- **Case management**: Low health service coverage and utilization; poor diagnosis and treatment.
- **Malaria epidemic prevention and control**: (based mostly on the use of normative charts tracking clinically diagnosed passive case detection at health centers) Lack of capacity; a poor surveillance system and no epidemic early warning system.

NATIONAL MALARIA CONTROL PLAN AND STRATEGY

In addition to the Oromia-specific Third Health Sector Development Plan (HSDP III) plan, there is a National 5-Year Strategic Plan for Malaria Prevention and Control for 2006-2010. The overall goal of the National Strategic Plan is a 50% reduction in malaria morbidity and mortality by the end of 2010. Objectives by the end of 2010 include:

- 100% access to effective and affordable antimalarial treatment;
- 100% coverage with at least two ITNs per household ;
- 60% coverage of villages targeted for IRS; and
- Detect and contain 80% of malaria epidemics within two weeks of onset.

National Policy and Guideline documents are available for vector control, including IRS, Treatment and epidemic preparedness.

Current Status of Malaria Indicators: A nationwide Demographic and Health Survey (DHS) carried out in 2005 showed that about 6% of the households in Ethiopia own a mosquito net whether treated or untreated; only 1% of households own more than one net. Estimates for Oromia were even lower, with, < 3% of households owning any kind of net, and only 0.5% with more than one net. Overall, urban households (11%) were more likely than rural households (5%) to own a net. During this survey, the estimates of ITN use were very low, as detailed in Table 2. In the survey of more than 10,000 children under 5 yrs, 18.7% had experienced fever within the previous two weeks (19% in Oromia). While fever is a common symptom of malaria onset, less than 1% of those surveyed had received an antimalarial drug within 48 hours. The rates for IPTp are also extremely low. IPTp is not part of the Ethiopia health policy. Note that since the time of this survey, ACTs have been introduced and there has been a large disbursement of ITNs. PMI plans a malaria indicator survey during the first quarter of FY08 to serve as a baseline.

Table 2. 2005 Demographic and Health Survey estimates of key malaria indicators

Indicator (%)	Nationwide DHS	Oromia
Household with bednet of any type	5.7 %	2.8 %
Household with ITN	3.4	1.9
Children under 5 years use bednet	2.3	1.0
Children under 5 years use ITN	1.5	0.4
Pregnant women use bednet	1.6	0.0
Pregnant women use ITN	1.1	0.0
Children under 5 with fever treated with an antimalarial drug within 48 hours	0.7	0.6
Pregnant women use any antimalarial in IPTp	4.4	1.5
Pregnant women use 2+ doses SP in IPTp	0.3	0.4

GOALS AND TARGETS OF THE PMI

The goal of PMI is to reduce malaria-associated mortality by 50% compared to pre-Initiative levels in PMI countries. By the end of 2010, PMI will assist the Oromia Region of Ethiopia to achieve the following targets in populations at risk for malaria:

- More than 90% of households with a pregnant woman and/or children under five will own at least one ITN;
- 85% of children under five will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses in geographic areas targeted for IRS will have been sprayed;
- 85% of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been sprayed with IRS in the last 12 months; (Note: because of the highly seasonal transmission, one spray round per year is enough to protect the community)
- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria; and
- 85% of children under five with suspected malaria will have received treatment with an antimalarial drug in accordance with national malaria treatment policies within 24 hours of onset of their symptoms.

Note: IPTp is not national policy in Ethiopia because of the unstable malaria transmission patterns, and is therefore not being tracked as a PMI target

EXPECTED RESULTS – YEAR ONE

Prevention:

- Nationwide since 2005, 20 million long-lasting ITNs (LLINs) will have been distributed to 10 million at-risk households, focusing on providing 2 LLINs per household in the rural target populations. This includes 6.5 million LLINs in Oromia Region. PMI will provide an additional 700,000 LLINs in Year One to build and supply an ongoing-routine distribution system as replacements and to fill gaps. There will also be $325,000 available to facilitate commercial sector collaboration, including support to targeted subsidized and free vouchers; and
- At least 85% of houses in districts targeted by the Oromia RHB and PMI for IRS in 220 Districts will have been sprayed (an additional 1 million residents will be protected by IRS).

Treatment:

- A quality control system to improve the accuracy and usage of microscopic diagnosis and RDTs will be developed and implemented.
- Malaria treatment with ACTs will have been implemented in all government health facilities in Oromia Region (covering 62% of the population living in malarious areas).

INTERVENTIONS

Insecticide-Treated Nets (ITNs)

Current Status, Challenges and Needs:

The 2005 DHS survey was carried out before the mass ITN distribution during the past two years. Therefore current ownership is expected to be significantly higher than the 3.4% noted in the 2005 DHS.

There have been a number of smaller ITN surveys by various partners since the 2005 DHS, however most of these surveys were concentrated in their respective target areas and are not regionally or nationally representative. Moreover, the surveys were conducted a few months after distribution of the ITNs, specifically in those areas that were targeted and therefore can not be considered representative of a national or Oromia regional survey.

Distribution Channels: Large-scale ITN distribution began in Ethiopia in 1998. Between 2000 and mid-2005, about 1.8 million nets were distributed by partners including UNICEF and WHO. The program raised national awareness but coverage was low compared to the large population at risk. Ethiopia embarked on an ambitious LLIN scale up starting with 2.5 million LLINs from the GFATM in 2005, with a target of 20 million LLINs to be distributed before the Ethiopian Millennium in September 2007 (two LLINs for each of the estimated 10 million households located in villages considered to be at risk for malaria). As of March 2007, approximately 20 million LLINs have either been distributed or are planned for distribution through partners including the Carter Center, the World Bank and the Global Fund. A total of 6,517,600 LLINs were distributed in Oromia. The goal is to distribute these LLINs before the Ethiopian Millennium in September 2007 to reach the target of 2 LLINs per household

Free LLIN Delivery: There are at least three main delivery channels for free LLINs in Ethiopia

- Enhanced Outreach Strategy (EOS): Part of a UNICEF-supported program, EOS targets over 10 million children and pregnant women with an integrated package of child survival strategies every six months. The package includes measles vaccination, vitamin A supplementation, de-worming, growth monitoring and LLINs. In 2006, 1.2 million LLINs were distributed through EOS and an additional 600,000 will be distributed through EOS campaigns scheduled for April to June 2007 in Somali, Afar and SNNPR regions;
- Routine distribution through health facilities, especially antenatal clinics; and
- Door-to-door distribution by HEWs and other community-based agents.

Distribution channels also include full-priced ITNs through the commercial sector, subsidized ITNs and LLINs through discount vouchers and social marketing. The mass free distributions are targeted to *kebeles* at risk for malaria, in general leaving the non-malarious urban areas for the commercial sector, targeted subsidies and social marketing. The FMOH has expressed hope that the commercial sector could remain engaged in order to provide one option for long-term

access to LLINs. As malaria burden decreases and household economies improve, certain *kebeles* could "graduate" from free to commercially available or socially marketed LLINs.

Commercial Sector and Subsidized ITNs and LLINs: The NetMark project, launched in Ethiopia in November 2004, is trying to expand sustained availability of ITNs and LLINs through the commercial sector. NetMark partnered with East African Group to launch the first Ethiopian branded ITN, *Selam Enkilf* (Peaceful Sleep). In June 2005, Petram entered the market and began distributing pre-treated nets from SiamDutch under the brand name, *WobaLba* (Protection). NetMark launched the targeted subsidies program in Amhara Region in April 2004, providing pregnant women with a voucher covering roughly 70%-90% (depending on the type of net purchased) of the price of an ITN from a retail outlet. In April 2006, the voucher program was expanded to Oromia Region and is now active in 81 sites (46 in Amhara and 35 in Oromia Regions). As of February 2007, 40,357 vouchers have been redeemed. Data from May 2006 indicated that 75% of NetMark partners' sales of ITNs in Ethiopia were at full price, while 25% were subsidized, i.e. the commercial sector sold three times as many ITNs at full price as through the vouchers.

Population Services International (PSI) is socially marketing LLINs with support from DFID through commercial retail outlets – sometimes the same outlet participating in the NetMark voucher program. PSI also distributes to local and international NGOs working in emergencies, such as in the Somali region of eastern Ethiopia. Over 300,000 ITNs were distributed through this channel in 2006.

Net Replacement: The strategy for replacing nets once high coverage is achieved is still being developed. As present, the plan is to utilize the HEWs, other community-based agents, and health facilities, especially antenatal clinics. Developing and supplying a robust routine system for continued LLIN access is an important, but underdeveloped area where PMI will play a critical role.

Net Type: The vast majority of nets distributed since 2005 are the Vestegaard-Frandsen white rectangular polyester LLINs (PermaNets®); when not available, conventional nets bundled with KO-Tab 123 insecticide treatment kits(approximately 1 million) have also been used, as well as nets bundled with conventional (not long-lasting) insecticides such as the regular KO Tab. The majority of nets acquired through the commercial sector, either subsidized or full-price are conical nets.

ITN Distributions since 2005

	Procured by:	National Total	Oromia Total
Total Population		77,000,000	25,817,132
Proportion of population at risk		68%	65%
Number of house holds (HH) at risk of malaria		10,472,000	3,356,227
Total number of ITNs required 2/HH		20,944,000	6,712,454
GF R2 Phase I	FMOH/UNICEF	2,725,500	656,500
GF R2 Phase II	UNICEF Copenhagen	3,600,000	1,260,000
GF R5,Y1	""	3,348,168	1,215,000
CIDA Canada/UNICEF	UNICEF Ethiopia	1,500,000	400,000
Japan/UNICEF	""	307,700	0
DFID/UNICEF	""	354,750	355,000
UNICEF	""	355,000	65,800
UNICEF	""	869,207	208,300
Japan/UNICEF (Olyset LLINs)	""	250,000	0
PSI/Free distribution	PSI/ Angarep	300,000	90,000
Carter Center	Carter Center/ Agarep	3,000,000	990,000
World Bank (PBS-1)		1,600,000	587,000
World Bank (PBS -2)	UNICEF Copenhagen	1,600,000	600,000
GF R5 Phase II		778,423	291,921
Total ITNs distributed and in pipeline (May2007)		20,588,748	6,719,521

LLIN Distribution and Projected Gaps: The following table, developed by the FMOH, UNICEF, and WHO, show the total number and source of LLINs distributed since 2000, the estimated loss per year, and after 2007, the projected gap from their target.

Summary of ITN distribution and projected gaps

Yr	UNICEF	GF 2	GF 5	WB	Carter Center	PSI	Total distributed	Loss	LLINs available	Gap
00	250,000	0	0	0	0	0	250,000	0	250,000	
01	280,000	0	0	0	0	0	280,000	-250,000	280,000	
02	320,000	0	0	0	0	0	320,000	-280,000	320,000	
03	430,000	0	0	0	0	0	430,000	-320,000	430,000	
04	550,000	0	0	0	0	30,000	580,000	-400,000	580,000	
05	670,000	2,500,000	0	0	0	100,000	3,270,000	-300,000	3,270,000	
06	1,000,000	3,825,500	1,155,000	0	0	300,000	6,280,500	-100,000	9,500,500	
07	1,357,000	0	2,971,591	3,500,000	3,000,000	200,000	11,128,591	-100,000	19,879,091	1,651,341
08	-	-	87 4,976	-	0	-	874,976	-100,000	20,704,067	1,429,217
09	-	-	2,171,528	-	0	-	2,171,528	-2616000	19,605,595	3,147,421
10	-	-	2,268,080	-	0	-	2,268,080	-5024400	15,593,175	7,796,926
11	-	-	0	-	0	-	0	-8902873	5,164,584	18,880,439
12	-	-	0	-	0	-	0	-699981	4,289,608	20,428,676

Before 2005, most nets were treated with the conventional KO Tab. In the absence of retreatment, this resulted in 100% "loss" after one year. From 2005 onwards all nets were "Permanets®" with an assumed lifespan of three years. With a population growth rate of 300,000, additional malaria affected households per year (150,000 in Oromia) there will be a national LLIN gap of about 1.4m in 2008 and, according to these estimates, a gap of 500,000 in Oromia.

Support to Community-Based Organizations and BCC/IEC: Communications and orientation with families and community-based networks will be an essential component of PMI support. Technically, the two major areas where PMI will focus its BCC/IEC efforts: prevention with LLINs; and care seeking/treatment. The second effort will be addressed in the section on case management.

Operationally, all BCC/IEC will be implemented as a unified element, including support to the RHB Health Education Unit. This activity will also channel significant support to community-based organizations, women's groups, churches, NGOs and other civil society networks. There are a number of community-based organization networks working in the education and health sector, including one hosted by the Christian Relief Development Agency (CRDA) and the US-based NGO Consortium, the CORE Group, and another, the "Coalition against Malaria in Ethiopia", or CAME, hosted by the Malaria Consortium.

While the rapid scale-up in LLIN distribution has been impressive, Ethiopia does not have a tradition of net use. For this reason, a strong BCC/IEC program is required to improve and maintain appropriate use**.** A survey conducted by NetMark during the rainy season (August/September) in 2004 of 1000 households, including 202 in Oromia region (80 urban Nazarath and 122 rural) indicated that in net-owning households nation-wide only 50% of children under five years slept under the net the night before (38% in Oromia Region); for pregnant women, among net-owning households nation-wide only 32% slept under the net/ITN the previous night (the figure was 43.5% for non-pregnant females and 35% for adult males) Efforts to improve usage have employed a mix of communication channels including mass communications (particularly radio), print media, interpersonal and participatory communication methods. Materials have been developed by NetMark, PSI and the African Medical & Research Foundation AMREF.

Taxes and tariffs: Ready-made nets, ITNs and LLINs had been subject to a 5% tariff rate and 0% VAT with United Nations Agencies and NGOs exempt. Insecticides for net treatment were taxed 10% tariff rate and 12% VAT but UN/NGOs are exempt. Polyester yarn was taxed at 34%. At a consultative meeting with Ministries of Finance and Health, manufacturers, retailers and other stakeholders held in August 2007, it was announced that the remaining 5% tariff on ITNs would be removed "in a matter of days" and the insecticide rate dropped from 10% to 5%. The meeting recommended total removal of taxes and tariffs on yarn, netting, dyes and other materials related to local manufacturing. The Ministry of Finance assured manufacturers that in the interim they will be able to apply for needs-based exemptions for any goods they import in this category.

Logistics/Procurement System: FMOH has requested that UNICEF undertake nearly all malaria control procurements on behalf of the government using GFATM Rounds 2 and 5 and World Bank funds, apart from initial LLIN procurements undertaken by FMOH. An additional eight million LLINs are under procurement or are currently being distributed, including three million by the Carter Center. Most ITNs have been imported into Ethiopia within six months of ordering, with some shipping times as short as three months. For large consignments (e.g. GFATM), containers have been shipped directly to the regional capital, reducing and simplifying storage and logistics.

UNICEF, USAID, and other partners are providing support to establish an improved procurement and logistics system, known as the Pharmaceutical Logistics Master Plan. The aim is to establish new distribution hubs that have supplies readily available on request from the *woreda* health offices. Supplies would no longer be stored at regional and zonal levels, eliminating two stages in the distribution chain. This should result in more efficient logistics and enable more of a "pull" system, based on actual *woreda* needs, rather than the current "push" system. A series of *woreda* level micro-planning meetings, with technical assistance from UNICEF, have been conducted to develop distribution, transport and human resource plans and finalize budgets.

UNICEF has supported the FMOH and RHB in the establishment of a national ITN database, recording the number of ITNs distributed in each village. This is possible in Ethiopia, since a substantial proportion of *kebeles* (except in some pastoralist areas) have well-established household registers and community recording systems. All families receiving ITNs are recorded in the *kebele*-based ITN register book. Most ITNs in a particular *kebele* will have been distributed at about the same time and thus are about the same age. These data (the *kebele*, number of nets, number of households, and date distributed) are then compiled by each *woreda* health office for all *kebeles* that received ITNs. They are then sent to the RHB and onto the federal level, where the records are entered in the national *kebele*-level ITN database. The ITN database is now being combined with the Health Services Expansion Program (HSEP) database that records health post data, information on the HEWs, and other logistical and health variables. This data base is not yet interfaced with a Geographic Information System (which would include altitude data), nor integrated with epidemiological data, nor IRS information. Nevertheless, it will serve as an excellent foundation to build and operations management and evaluation system as described below

<u>Proposed USG Component for LLINs and Community Mobilization</u>: ($6,375,000)

LLIN routine distribution: ($4,200,000) After the distribution of 6.5 million LLINs over the past two years, there will be a continued need for a routine supply of free LLINs due to population growth, gap filling and natural loss of current LLINs. PMI will procure 700,000 LLINs to feed into a nascent routine distribution system through health facilities,HEWs, schools, churches, NGOs, as well as PLWHA, food security, and other social welfare programs.

Commercial sector collaboration for LLINs: ($325,000) In addition to the free LLINs provided directly through facilities, HEWs and NGOs in the more rural parts of the region, PMI will continue to facilitate the development of a viable commercial market through targeted subsidies using vouchers, which in some areas may be a 100% subsidy – intended to target the delivery of the LLIN, reduce logistics burden on the public sector, and importantly, stimulate the retail sector to stock and sell LLINs. Approximately two thirds of this budget will be for the voucher program itself, with the other third for matching branded marketing and other methods for facilitating commercial sector collaboration. Vouchers and matching branded marketing will help ensure this channel remains open.

BCC/IEC and support to community mobilization: ($1,850,000) Recent LLIN distributions are a remarkable logistical achievement. Ensuring high utilization rates is the next step. As part

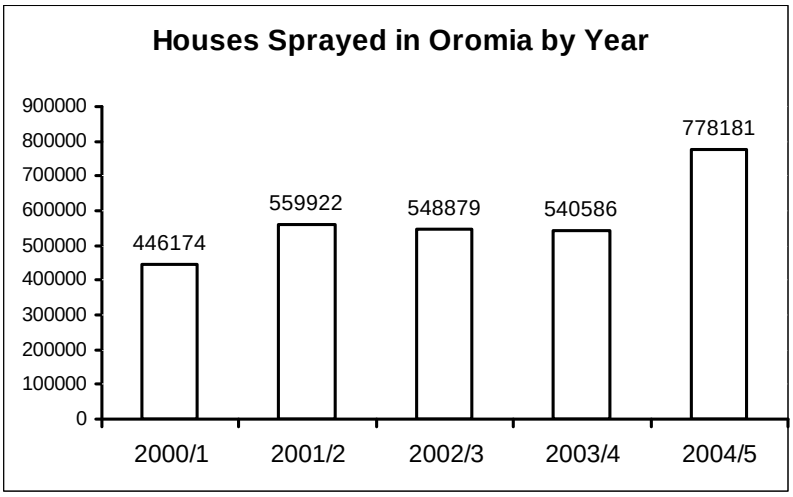
of unified communications and coordination effort through the public sector and networks of community-based organizations, PMI will provide support through a multi-channel BCC/IEC approach implemented at the community level to improve correct and consistent use of LLINs in households. Messages will include improved information and knowledge on the benefits of LLINs in malaria prevention, and improved awareness on ITN replacement. BCC/IEC will be packaged with other community-based activities and be delivered through the HEWs, CHPs, and other NGOs and community-based structures including churches and schools. PMI will support: first, capacity building and operational support to the RHB IEC unit**;** second, communications development, implementation and evaluation, and third, support to community-based organizations and NGOs working in conjunction with HEWs.

Indoor Residual Spraying (IRS)

Current Status, Challenges and Needs:

IRS has a long history in Ethiopia, and remains a key component of the national malaria control strategy. The National Five Year Strategic Plan for Malaria Control in Ethiopia (2001-2005) called for DDT to be used as the primary insecticide in IRS, (FMOH, 2006a). Where DDT resistance in the vector population has developed, malathion is used. At present, approximately 20% of malaria endemic areas receive IRS, but the GOE would like to increase this to 60% in each region. The Strategic Plan encourages institutions, including the Ministry of Defense,Ministry of Refugee Affairs, and commercial enterprises to develop the capacity and undertake IRS to protect their communities.

Following decentralization, IRS operations are implemented in *kebeles* selected within each *woreda*. Selection of *kebeles* for spraying is based on local knowledge using information on the history of malaria cases, altitude and the presence of nearby anopheline breeding sites with rainfall patterns being used to determine the number of annual spray rounds required. The same *kebeles* are often repeatedly selected for IRS because of continued high numbers of suspected malaria cases every year or proximity to a lake. It is believed that *An. pharoensis* and *An. arabiensis* breeding in lakes may be focal points for initiating epidemics when the rainy season begins, thereby allowing anopheline populations to spread..



Many targeted areas go unsprayed. In Oromia Region 220 of 281 *woredas* are considered at risk of malaria – either endemic or epidemic-prone. Of the 3,932 *kebeles* classified as malarious in Oromia in 2000, only 953 of the 1,407 *kebeles* designated to be sprayed were actually sprayed.

At the present time only DDT, and not malathion nor the pyrethroids are used in Oromia. Spraying is conducted by contract spray men (not women) following a six-day training. IRS squads consist of four spray men and a porter supervised, all supervised by a squad leader. Squad leaders may be either contract workers or employees of the district health department. Each *woreda* employs approximately five spray squads during a 50-day period immediately prior to the start of rainy season. Limited motorized transportation requires spray teams to camp in the vicinity of spray operations and to use mules when vehicles are unavailable. Ten to thirteen houses are sprayed per day by each sprayman using 8- liter Hudson X-Pert® sprayers. Costs associated with IRS are reported by the RHB to be approximately 20 to 30 Birr ($3-4) per house. This is far below the cost-per house in other PMI focus countries, which is closer to $15 per house. Because the reported cost per household appears to be unrealistically low, during this first year, PMI will plan with a cost estimate of $14 per house and later adjust downwards if necessary.

Challenges and limitations to IRS identified in the National Strategic Plan include the timing and quality of the spraying, development of resistance in vector populations, limited funds for insecticides, pumps, vehicles and operational funds, and re-plastering of houses. Environmental compliance in the storage and disposal of insecticides also needs significant support. Although the GFATM is providing funds for IRS training in 40 districts, there is a critical need for expansion of training for effective implementation and management. In order for districts to procure insecticides, the regions must deposit funds in national bank accounts prior to placing orders.

Insecticide Availability and Use: Ethiopia has a draft environmental impact assessment guideline for insecticides (EPA, 2004). Besides DDT, malathion is also used to a lesser extent in IRS. More than 3,000 tons of pesticides are imported annually, predominantly for agricultural use. From 1996 to 2002, Ethiopia imported or purchased 2,701 tons of insecticides and distributed 2,418 tons to regions or other institutions (PAN-UK, 2003); 90% of this insecticide was DDT. During this period, 7,401 tons of temephos were distributed for larval control. The quantity of insecticides used in Ethiopia from 2002 to 2004 is shown below.

Insecticide	Amount by Year	
	2002-2003	2003-2004
DDT 100%	5,680 kg	3,839 kg
DDT 75%	390,926 kg	357,872 kg
Malathion	52,216 kg	37,200 kg
Deltamethrin	45 kg	103 kg
Permethrin	268 L	244 L
Temephos	180 L	160 L

Adami Tulu Pesticide Processing Plant: Since 2001, the state-owned Adami Tulu pesticide processing plant in Oromia has formulated pesticides from imported raw ingredients, including DDT. The plant supplies DDT to the FMOH at a cost of 41 Birr/kg (approximately $4.65) Import duties and tariffs on insecticides are not paid by the Adami Tulu processing plant. The Adami Tulu plant also formulates malathion, endosulfan, diazinon, fenitrothion and dimethoate. Production capacity is presently limited to the formulation of 1,500 tons each of powder and liquid every year but capacity can be increased to 9,000 tons. The plant also has a quality control laboratory. While DDT is produced exclusively for malaria vector control, the remaining insecticides are provided for agricultural and veterinary uses; each insecticide targeted for specific

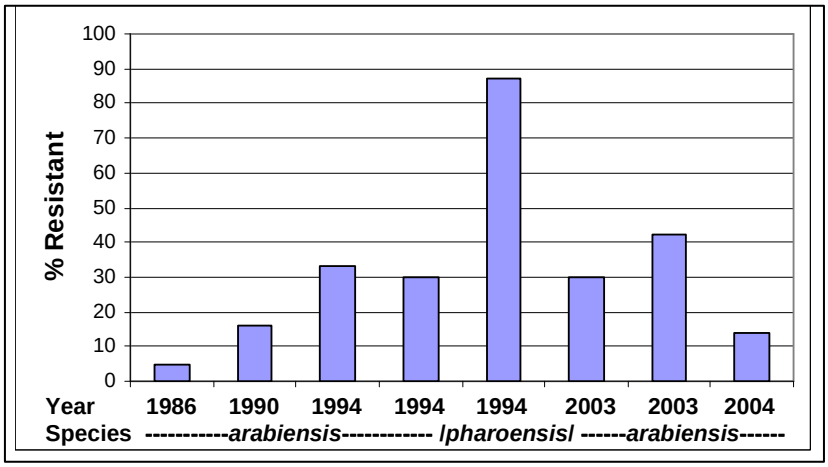
pests. Malathion is used for both mosquito and agricultural pest control. Insecticides produced at the Adami Tulu plant are presently not exported. Pyrethoids (permethrin and deltamethrin) are imported for mosquito net impregnation and are also used for tsetse fly..

The "Pesticide Action Network – UK" reported finding of significant "leakage" of DDT (re-packaged in small plastic bags) to shops and open markets for sale to farmers (PAN-UK, 2003). There is no insecticide disposal facility in Ethiopia and this reported DDT may come from old stockpiles in state and commercial farms as well or from the desert locust program and the malaria control program. Improved record keeping to prevent leakage as well as better personal protection for spray operators was recommended (PAN-UK, 2003; EPA, 2004). Inspection of a single agricultural supply store found a range of pesticides for sale including endosulfan, dicofol, profenolec, lambda cyhalothrin, diazinon, chlorphrifos and dimethoate, but not DDT.

The Adami Tulu plant has recently entered into an agreement with the Ethio-Japan Nylon Textile factory to produce insecticide for impregnating locally stitched mosquito nets using the Bayer technology for Dawa-Plus® nets with the technical support of the USAID-NetMark project. Production capacity of up to three million nets per year is anticipated at a cost of US$4.20 each.

Insecticide Susceptibility Studies: A total of 16 insecticide susceptibility tests using the standard WHO protocols and DDT diagnostic dosages were carried out from 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. Prevalence of resistance to 4% DDT in six more recent studies in Tigray Region ranged from 0% to 23% (average 3.5%). Resistance to DDT was more prevalent in SNNPR (average 20%) ranging from 13% in Jinka to 60% in Arba Minch. 76% of mosquitoes assayed in Gambella were also resistant to DDT between 1986 and 1990. Data on resistance of *An. arabiensis* and *An. pharoensis* to 4% DDT in Oromia Region are summarized in the figure above (data cited in Graves, 2006). DDT resistance in *An. arabiensis* ranged from 5% to 33%. Studies in Metehara and Melka-Worer in Oromia Region found 30% and 42% of *An. arabiensis*, respectively, were resistant to DDT while 87% of *An. pharoensis* were resistant to DDT in 1994. However, *An. pharoensis* was reported to be completely susceptible to malathion. Resistance status will be a critical factor in pesticide choice in the different areas to be sprayed.

Anopheles resistance to DDT in Oromia Region, 1986 -2004



Resistance to pyrethroids is also focal; 100% of mosquitoes were susceptible to 0.5% permethrin and 0.05% deltamethrin in Awassa, Anduse and Sabure (unpublished data, 2004), but 25% of *An*

arabiensis in Metehara were resistant to permethrin (Balkew et al., 2003). The FMOH is currently conducting insecticide susceptibility tests in eight sites in four regions.

Optimization and Rationalization of Vector Control: In addition to IRS, the FMOH and RHB expend considerable efforts on larval control, targeting 25% of vector breeding grounds for removal by community participation and 75% of positive 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 schemes areas. Environmental management is the main vector control strategy in most urban areas of Oromia. Between 1995 and 1998, up to 461,288 square meters of breeding sites were annually filled and between 500,000 and 1.5 million square meters of breeding sites were drained by volunteers in Tigray Region. In Oromia, more than 500,000 square meters of breeding sites were either filled or drained. Environmental management is the main vector control strategy in most urban areas of Oromia. In spite of these considerable efforts, there is very little capacity to effectively target, monitor, and evaluate the program. The FMOH and RHB recognize the challenge of determining the productivity of suspected breeding sites and the lack of good documentation of the impact of the larval control efforts. The RHB has also identified low community participation as a challenge to the larval control efforts. In Year 1, PMI will not support procurement and application of larvicides, but will building entomological monitoring capacity to help optimize and rationalize vector control investments. This capacity building is being implemented within the framework of "Integrated Vector Management" or IVM. As described below, the former WHO-supported Africa-regional malaria training center is in the city of Adama (Nazarath) in Oromia Region, two hours drive from Addis Ababa. This training center has a relatively functional insectary, classrooms and laboratory for both entomological and parasitological training. The center also serves as the reference laboratory for microscopy quality assurance in the Region.

Proposed USG Component: ($3,775,000)

The Ethiopia IRS program is extensive and in need of support across a wide range of activities, including: geographical reconnaissance; targeting; quantification; procurement and logistics, training; implementation and supervision; and monitoring and evaluation. Monitoring and evaluation will be especially important and includes PMI support for M&E for entomology, environmental compliance, and epidemiological impact. PMI will support the IVM framework to build capacity for zonal and *woreda* vector control specialists in Oromia Region to rationalize effective combinations of proven vector control strategies.

Procurement of IRS Equipment: ($2,000,000) PMI will support the purchase of 1,200 spray pumps and 3,000 spare parts kits, personal protection and other minor equipment for 3,000 spray operators, DDT and possibly smaller stocks of malathion if this is warranted in Oromia Region.

IRS Operations: ($1,300,000) PMI will support RHB's planning, implementation and evaluation of IRS activities in Oromia. This first strategy is to improve targeting, mapping and information management related to IRS. The initial priority is to support implementation and supervision activities for the 15 zonal and 200 *woreda* offices, support environmental compliance, and support safe handling of pesticides by users. PMI will review current training materials and

methods and potentially adapt materials being developed regionally. BCC/IEC activities will focus on materials development, training and dissemination specific to IRS.

Entomological Capacity Building and Monitoring Services: ($375,000) Improving capacity for entomological monitoring, including insecticide resistance, targeting and evaluating impact of vector control operations is critical. PMI will support refurbishment of the Adama (Nazarath) training center, including the insectary and entomological laboratory with the understanding that GOE will be able to match funding for refurbishment and will also provide operational costs. This facility, once a WHO-supported training center for Africa, will be revitalized to support other regions of Ethiopia and possibly neighboring countries, including PMI focus countries. Entomological monitoring is in support of the IRS and ITN programs (including vector identification, insecticide resistance monitoring, and bioassays) and for monitoring and evaluating larval control operations, including identification and mapping productive vector breeding sites. Entomological monitoring of the IRS program will also evaluate the established strategy of "Barrier Spraying", where villages on the periphery of lakes with anopheline breeding receive annual applications of IRS to prevent the spread of vectors to the surrounding areas.

Quality Control and Environmental Compliance, including at the Adami Tulu Pesticide Plant: ($100,000) Ethiopia has been using DDT for 50 years. The parastatal Adami Tulu pesticide processing plant has the capacity to reformulate up to 9,000 tons of DDT per year. As both Ethiopia and the United States are signatories of the Stockholm Convention, PMI is committed to improving the safe formulation, use and disposal of DDT. PMI will support the existing quality control laboratory at the plant and costs for environmental assessments compliance, training, and support for safe handling, storage and transport of DDT. Technical assistance will be provided to explore collaboration with FAO, UNEP, the Global Environment Facility and others.

Malaria in Pregnancy Including Intermittent Preventive Treatment (IPTp)

Current Status, Challenges, and Needs:

Ethiopia has a relatively low antenatal care (ANC) coverage compared to other countries in the region. The 2005 DHS indicated that for Ethiopia as a whole, only 28% of mothers received antenatal care from heath professionals for their most recent birth in the five years preceding the survey. Only 12% of women made four or more antenatal care visits during their entire pregnancy, with a significant difference between urban (55%) and rural areas (8%). Only 6% make their first ANC visit before the fourth month. The data for Oromia Region are below the national average, with only 24.8% receiving antenatal care from a health professional (and only 0.6% from a Traditional Birth Attendant). The data for IPTp are even lower. According to the 2005 DHS, for Ethiopia as a whole, 4.4% took any antimalarial drug during pregnancy (2.1% SP), 0.5% received SP during an ANC visit (IPTp), and only 0.3% had two or more doses of SP. Oromia Region was close to this national average with 0.4% receiving IPTp and 0.4% receiving two or more doses. IPTp is not part of the Ethiopian National Malaria Control Strategy.

A 2001 study by Newman et al on the burden of malaria in pregnancy included two sites in Oromia Region, Nazareth, and Jimma which, along with a third site in Gondor, were classified as unstable transmission. These three were compared with Gambella, an area of stable malaria

transmission. The results showed that overall parasitemia was very low (1.8%, unstable transmission area and 10.4% stable transmission area), but that moderate anemia was 14.7% unstable transmission and 43% stable transmission, with severe anemia 1.5% unstable and 7.2% stable transmission area. Placental parasitemia was identified more frequently during deliveries at the stable transmission sites (12/185; 6.5%) than at unstable sites (21/833; 2.5%).

The FMOH has decided not to adopt IPTp for pregnant women for three reasons:

- The burden of disease is too low to merit universal IPTp. As shown in the study by Newman et al, among pregnant women in Oromia, the frequency of peripheral malaria parasitemia during a non-epidemic year is very low.
- As shown in the DHS, the very low ANC coverage rates (24.8% in Oromia) indicate that even if an IPTp policy were adopted, the number of women reached would be too low to have any meaningful impact.
- The FMOH is concerned that the rising resistance to SP for the treatment of children under five would diminish efficacy for IPTp.

Given this situation, the FMOH focuses more on scaling up universal ITN coverage and improving diagnosis and treatment of malaria in pregnant women.

Proposed USG Component: ($300,000; additional costs covered in case management)

While IPTp itself is not currently part of the Ethiopia malaria control strategy, it is important to engage pregnant women, both in terms of their own health and the health of their infants, and as an avenue for educating mothers and their families the risks of malaria in pregnancy, disease recognition, LLINs, and appropriate treatment. To that end, PMI will support these other aspects of the "Malaria in Pregnancy" package, including improved pre-service training for management of acute malaria in pregnant women, support to anemia management, and support the to the roll-out of Focused Antenatal Care services (FANC) in Oromia Region.

Expanding Malaria in Pregnancy Services Through Safe Motherhood and Focused Antenatal Care: ($300,000) PMI will support FANC, Safe Motherhood, and Adolescent Reproductive Health through an emphasis on anemia management integrating LLINs into ANC visits and the recognition and management of acute malaria in pregnant women. This will include ensuring that health providers counsel mothers on early detection of anemia and iron folate supplementation, as well as the importance of using a LLIN during pregnancy and after birth along. The program will also focus on protecting the newborn. PMI will support a policy review and training and supervision support at the zonal level. Along with the support for case management, there will be a focus on expanding and improving care for women with acute malaria.

Complementing these facility-based activities, PMI will work with the RHB and partners, including PEPFAR, NGOs and networks of civil society, for community outreach activities related to malaria and safe motherhood.

Diagnostics and Case Management

Diagnostics: Current Status, Challenges and Needs:

The mix of parasite species, all with different treatment regimens, and the unstable nature of malaria transmission is a unique feature of malaria in Ethiopia, demanding a special emphasis, and significant investment, on improved diagnostics.

The FMOH's objective is to ensure, by 2010, universal access for malaria diagnosis and treatment within 24 hours of onset of fever. Malaria diagnosis and treatment algorithms depend on the level of the four-tiered health care system. At the most peripheral level, the health post is staffed by HEWs; the next three levels are, in order, health centers, district hospitals, and finally, regional/referral hospitals. Laboratory-based diagnostic facilities are supposed to be available at all levels of the health care delivery system except at health posts. At the health posts, malaria diagnosis and treatment is primarily based on clinical signs and symptoms. In order to improve diagnosis and management of malaria cases in areas where laboratory-based diagnostic service are not available, RDTs will complement clinical diagnosis. At the health center level and above, microscopic examination of blood films is intended to guide treatment. This policy is not stratified by transmission intensity or patient age.

Laboratory-based diagnostic services are currently available to approximately 34% of the population served at health centers and hospitals. The service is expected to increase with expanding health services. From 2001- 2005, the annual average number of malaria cases reported through the HMIS system was 9.4 million while the annual average number of confirmed cases was about 500,000. Thus, laboratory confirmed malaria comprises less than 6% of all cases.

Diagnostics at Health Centers and Hospitals: The Ethiopia Health and Nutrition Research Institute (EHNRI) has been given the mandate to oversee microscopy quality assurance. Currently, there is no national, systematic evaluation of microscopic quality. In the Oromia regional level, one central laboratory at the Adama training site has been empowered with performing quality assurance for the districts within the region. Both positive and negative slides are sent periodically to this lab for review. Further investigation is required to determine whether or not this process has led to improvement in the quality of services being provided.

Diagnostics at Health Posts: Malaria diagnosis at the health post level is based on clinical assessment and/or results of RDTs. If RDTs are available, the results should guide clinical management. A positive RDT for *P. falciparum* results in a clear action whereas a negative RDT may result in referral, treatment with chloroquine, or examination for other causes of fever. There is no national policy for health post workers to follow IMCI guidelines. The lack of clarity around diagnosis and treatment algorithms at the health post, combined with the absence of essential IMCI drugs beyond oral antimalarials has lead to variation in practices for management of febrile illness at this level of the health care system. The current RDT used in Ethiopia is the Paracheck-Pf. There have been no systematic investigations assessing this tool's test characteristics and reliability under field conditions in Ethiopia. More important, there needs to be a review on how RDTs may or may not influence prescribing practices There is a gap in supply of RDTs for Oromia for 2008 with what is currently available from the Protection of Basic Services Pro-

gram (PBS). PMI will tentatively fill that gap, but upon review and policy clarification on their value in the program. This may entail additional operations research as the program develops.

Proposed USG Component: ($1,560,000)

A crucial component of effective case management is malaria diagnostic capability at all levels of the health care system. The PMI is committed to strengthening diagnostic capacity to support effective case management by ensuring that all the necessary components for accurate and reliable laboratory diagnosis of malaria exist in Ethiopia.

Laboratory Baseline Assessment: ($80,000) The Oromia Region's health infrastructure is currently undergoing rapid expansion under the sector-wide development plan. As such, it will be necessary to conduct a rapid assessment of lab capacity to determine the availability of lab equipment and trained personnel for microscopy (regional and district) with particular attention to unmet needs, quality and current effectiveness.

Policy Development for Diagnostics, especially RDTs: ($80,000) Building upon the laboratory baseline assessment, PMI will support the review of current policies and guidelines around malaria diagnostics, especially RDTs. As part of this undertaking, a stakeholder's forum will address diagnostic algorithms, appropriate selection of RDTs and implementation strategies with particular emphasis on the unique challenges presented by the epidemiology of malaria and the impact RDTs have on improving prescribing practices. A clear diagnostics policy will be the foundation for procurement, training, and quality assurance described below.

Support for Quality Assurance Aystems for Diagnostics: ($250,000) Quality assurance is a critical part of diagnostic services, especially for microscopy, but for the use of RDTs as well. PMI will assist with the development of a quality assurance plan for maintaining diagnostic quality over time. The Oromia region will establish a system of regular supervisory visits by laboratory experts at the appropriate level. PMI will work with EHNRI and a regional reference laboratory to establish a mechanism for delivery and cross-checking of a sample of slides. The laboratory network will also develop a system to ensure quality of diagnosis with RDTs through microscopic confirmation. In this as in other areas, PMI will work with PEPFAR where linkages already exist.

Procurement of RDTs: ($750,000) With the ultimate goal of all malaria cases being diagnosed by either microscopy or RDTs, there is gap in supply of RDTs for Oromia for 2008 with what is currently available from the Protection of Basic Services Program. Based upon the diagnostics policy review, including a review of the value of RDTs for improved prescribing practices, PMI will tentatively support the procurement and distribution of up to 600,000 test kits to complement those RDTs currently in the pipeline and funding available from other donors.

Procurement of Lab Equipment/Supplies: ($400,000). As part of the health care expansion, many former health stations will be upgraded to become health centers. This transition will necessitate the purchase of 100 microscopes and associated reagents to conduct microscopy. PMI will support the upgrading of these laboratories as guided by the rapid assessment.

Treatment: Current Status, Challenges, and Needs:

Plasmodium falciparum and *P. vivax* are the two dominant parasite species in Ethiopia with relative frequencies of 60% and 40%, respectively. In malaria epidemics, *P. falciparum* is the dominant parasite species causing severe illness and death. The high treatment failure rates of chloroquine for the treatment of uncomplicated falciparum malaria were documented through a nationwide study conducted in 1997/98. This led to a treatment policy change that recommended the use of sulfadoxine-pyrimethamine (SP) as the first line drug for the treatment of uncomplicated *falciparum* malaria and chloroquine for the treatment of *vivax* malaria.

At the time of its introduction, SP showed a treatment failure rate of only about 5%. However, in subsequent years, unpublished reports from isolated studies indicated higher treatment failure rates. Accordingly, a nationwide study on the therapeutic efficacy of SP for the treatment of uncomplicated falciparum malaria was conducted in 11 sentinel sites from October – December 2003. Results showed a mean treatment failure rate of 35.9% (range 21.7-53.4%) at 14-days follow-up and 71.8% (range 53.8 – 85.7, not PCR corrected) at 28-days follow-up. This level of treatment failure rate was higher than the cut-off point recommended by WHO for a treatment policy change. An *in vivo* therapeutic efficacy and safety study on artemether-lumefantrine (AL) was also conducted in 4 sites among 213 subjects. After a follow-up period of 14 days, no treatment failure cases and drug side effects were reported. There have been no additional *in vivo* clinical efficacy monitoring studies since 2004.

Guidelines: At the health post level, malaria is suspected when a patient has a fever or history of fever in the last 24 hours and lives in a malarious area or has traveled to a malarious area within the last 15 days. If 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 severe malaria is present, the current guidelines instruct the health worker to administer a first dose of intramuscular, (IM) or oral quinine and refer to the next level of the health system. If RDTs are available, the results should guide clinical management. A positive RDT for *P. falciparum* mandates clear action, but a negative RDT may result in referral, treatment with chloroquine or examination for other causes of fever. There is no national policy for HEWs to follow IMCI guidelines. While national guidelines recommend pre-referral quinine as above, this drug is not provided to the health extension worker at health posts. In epidemic affected areas, intramuscular is recommended for pre-referral treatment but is not currently available in country.

At the health center level and above, the first-line treatment of *P. falciparum* malaria is AL For infants less than five kg of body weight and pregnant women, oral quinine should be administered three times a day for seven days as the first-line treatment. For the treatment of malaria due to *P. vivax, P. malariae* or *P. ovale,* the first-line drug is chloroquine. In malaria-free areas and where compliance can be insured, in order to eliminate hypnozoite forms (relapsing stages) of *P.vivax* from the liver, primaquine may be administered daily for 14 days starting after chloroquine treatment is completed. However, the guidelines state that in malarious areas where there is a high risk of re-infection, the main purpose of treatment should be to bring about clinical cure rather than radical cure and administration of primaquine is not recommended. Parenteral qui-

nine is used for the treatment of severe and complicated malaria. There are detailed guidelines on patient management including salient clinical features and management of complications.

ACTs were introduced after the policy change was adopted in July 2004. The introduction of AL and the phasing out of the old drugs was estimated to take up to two years given the remaining supplies of SP and the initial limited supplies of the new drugs. SP was never removed from any level of the health system and is reported to remain widely in use.

Care Seeking Behavior: There are multiple data sources that attempt to capture the health seeking behavior of persons with illness. The 2005 DHS found that while 18.7% of children under five had experienced fever in the two weeks preceding the survey, only 3% of these received an antimalarial drug. In a household survey performed using the EPI two-stage cluster survey methodology in the Oromia region, while 71% of mothers recognized that fever was a warning sign that indicated a child should be taken to a health facility, fewer than 50% actually sought treatment for their child in the preceding two weeks when fever was present.

In addition, the 2004 household survey conducted by ESHE for Oromia indicated that of those households that accessed health services 12 months prior to the survey, 82% sought access at a fixed government facility (including slightly more than 10% sought service through health posts or outreach services), while 18% sought access through the private sector, (including 10% who went to an NGO service delivery site).

Training of Clinical Officers and HEWs for Diagnosis and Treatment: The Health Extension Program (HEP) was created under the Health Sector Development Program II (now HSDP III). This initiative plans to increase health coverage at the community level from 64% to 100% by 2009, primarily though building health posts each staffed by two HEWs. The Center for National Health Development in Ethiopia is in charge of overall training and implementation of this program. Currently there are 4,800 health posts but there are plans to expand this to a total of 15,000 posts among the 626 *woredas*. Each health post is intended to serve approximately 5,000 people. Of the planned 30,000 HEWs, there are currently 17,340 HEWs deployed throughout the country—representing 58% of the MOH target.

There are 36 technical/vocational training centers throughout the country that provide the one-year HEW training, including a practicum. Upon deployment, HEWs receive medical supplies, posters, curriculum, teaching materials, and lecture notes. Each HEW receives training in 16 "health packages" or thematic areas. On-the-job training, in-service training, and the development of updated guidelines take place at both the national and regional levels.

Microscopy is not available at health posts and there are inadequate supplies of RDTs. Therefore, most malaria cases are diagnosed by the HEW based on clinical grounds. This is particularly difficult in this environment where there is both *P. falciparum* (to be treated with ACTs) and *P.vivax* (to be treated with chloroquine). Referral systems are weak and pre-referral treatment is generally not available.

According to the HSDP III, in addition to the HEWs, 9,667 village malaria control workers have been trained to enhance community participation for prevention, including environmental man-

agement, ITNs and IRS. The Oromia RHB has developed a plan to expand this cadre to approximately 20 per *kebele*. The RHB is also planning two rounds of integrated refresher trainings as well as training of trainers.

Drug Supply: Ethiopia has received significant support through the Global Fund enabling a rapid roll-out of AL to all levels of the health system. GFATM Round two, Phase one includes $37.9 million and lifetime budget of $76.9 million, with $9 million for ACT procurement. GFATM Round five, phase one includes $59 million and Lifetime Budget of $40.6 million with $ 56.9 million for drugs. This translates to 3.8 million treatments of AL in 2005, 5.2 million treatments in 2006 and 4.1 million treatments scheduled for 2007. There are also large distributions of RDTs, with 1.7 million distributed in 2006 and 8 million scheduled to be distributed in 2007.

Proposed USG Component: ($4,710,000)

Procurement of ACTs, Pre-Referral Treatment and Drugs for Severe Malaria: ($1,500,000) Gap analysis for the Oromia Region indicates the total need to be approximately 500,000 courses of ACTs, plus drugs for 50,000 severe malaria cases and 50,000 courses of pre-referral drugs PMI will support the procurement and distribution of AL and other antimalarials (including drugs for severe disease and pre-referral care) in order to complement those currently in the pipeline and funding available from other donors.

Review and Update National Treatment Guidelines: ($75,000) PMI will support a review of the current malaria treatment guidelines. As part of this undertaking, a stakeholder's forum will address treatment algorithms, use of ACTs and other antimalarials as well as implementation strategies with particular emphasis on the unique challenges of the malaria epidemiology in Ethiopia. Topics for discussion include the use of ACTs in pregnant women, and artemisinin-derivatives for pre-referral treatment and for treatment of severe disease in health facilities.

Pre-service Training for Clinical Officers and Health Extension Workers: ($500,000) Ethiopian Public Health Training Initiative is providing pre-service training in five universities in Ethiopia for health officers. The training includes a malaria module for the diagnosis and management of malaria at the health center level. PMI will work with the RHB and FMOH to support training programs for strengthening capacity for malaria clinical management at both the health center and health post levels, including strengthening capacity to diagnose and treat malaria. Through its partners, PMI can support in-service training of health providers at the health center level, including nurses, health officers, lab technicians, and environmental health technicians and HEWs.

In-service Training for Clinical Officers and HEWs: ($530,000) Through the well-established Integrated Refresher Training Program, PMI will also support the FMOH and RHB for the in-service training programs for clinical officers and HEWs.. Part of this support will help the RHB efforts to use HEWs to strengthen the referral system. In-service training for HEWs will include communication and coordination of community-based organizations, including women's groups, churches, schools and NGOs. Under this element, PMI will also work with the RHB and FMOH

as they consider the role of traditional healers and the private sector in the diagnosis and treatment of malaria

Systems Support for Supervision and Monitoring of Malaria Treatment: ($1,075,000) Continual supervision and monitoring is key to improved clinical management. Like pre-service training and integrated refresher training, supervision is an area that had previously received technical support from the now ending USAID ESHE project, and is now in need of continued operational support. While more can be done to improve the system, there is urgent need for financial support to enable supervision visits in this very large region of 23 zones and more than 220 *woredas* at risk for malaria. PMI will support supervision and monitoring of *woreda* health office staff from the health centers and to the health center staff to health posts. This supervision will be closely integrated with other infectious disease programs to ensure all program may benefit from such hands-on support. The support to supervision will also provide a platform for monitoring and evaluating the rapid HEW expansion. In addition, PMI will support an assessment of performance standards and the quality of pre-service and in-service training.

Therapeutic Efficacy Monitoring: ($100,000) Antimalarial drug resistance is a leading threat to malaria control efforts. As resistance to antimalarial drugs spreads, malaria control programs and other concerned institutions need to be able to evaluate antimalarial drug efficacy in a way that provides timely, relevant, reliable, and understandable information. Data derived from these evaluations are essential not only for maintaining confidence that current treatment recommendations are adequate in relation to malaria patients' needs, but also, for generating convincing evidence that current treatment recommendations are in need of change. When such evaluations are conducted consistently over time and in a reasonable and representative selection of sites, programs should be able to monitor drug efficacy in a way that will allow changes in treatment recommendations or policies to be made early enough to minimize the impact of a failing treatment regimen. The unique context in Ethiopia may necessitate evaluating ACTs for the treatment of *P. falciparum* as well as the evaluation of ACTs and/or chloroquine for the treatment of *P. vivax*. It is envisioned that there will be 10 sites throughout Ethiopia, with four sites in Oromia Region supported by PMI

Evaluation of Adherence: ($80,000) The transition from SP to ACTs as first line treatment for uncomplicated *P. falicparum* malaria has made it a challenge to ensure a complete course of antimalarials is taken by the patient. The problems facing a change to a 3-day course from a single dose is compounded by the fact that ACTs often render the patient asymptomatic within the first 24 hours of therapy. PMI will support a quantitative study to document the extent of adherence and qualitative tools to explore issues related to poor adherence (including barriers and methods to improve adherence).

Strengthening of Drug Management System Capacity: ($600,000) PMI will provide support to the FMOH and RHB malaria program to procure, quantify and distribute malaria commodities. This support will be done in the context of the nascent national "Pharmaceutical Master Plan" which it self is receiving significant support from PEPFAR and other partners. Support to this element may include the placement of a resident advisor specifically to support malaria drug logistics management.

BCC/IEC for Case Management: (Refer to BCC/IEC and support to community mobilization above for inclusive budget) In conjunction with other BCC efforts for LLINs and IRS, PMI will support the RHB and FMOH to promote early care seeking, adherence to antimalarials and other issues around case management. As detailed in the BCC IEC section under LLINs, this will be part of a unified effort for capacity-building for the RHB Health Education Unit and HEWs to support their community activities, and for support to community-based organizations such as women's groups, traditional healers, churches, schools and NGOs

Strengthen Drug Quality Monitoring and Pharmacovigilance: ($250,000) PMI will support the Ethiopia Drug Administration and Control Authority (DACA) in its mandate to ensure all malaria products entering the country meet quality standards as well as ensuring drugs, once in-country, are of high quality. PMI will also support DACA in its effort to track and report malaria treatment associated adverse drug reactions as well as assist with improving dispensing practices in the public and private sectors.

Epidemic Preparedness and Response

Current Status, Challenges and Needs:

Malaria epidemics in Ethiopia have been documented since the 1930s. One of the most notable occurred in between June and December of 1958 and was responsible for an estimated 3 million clinical cases of malaria, 150,000 deaths, covering 100,000 square miles, between 1,600 and 2,150 meters elevation. Since 1958, major epidemics have occurred approximately every five to eight years. Guidelines for Malaria Epidemic Prevention and Control were published by the FMOH in November 2004. These guidelines detail the human vulnerability factors, including population movement as well as meteorological indicators such as rainfall, temperature and humidity. There is a great deal of work in the development of climate prediction models, but these models are not yet refined enough to be entirely reliable. In the interim, the FMOH and RHB stress early detection through data collected at the health facility.

Epidemic detection relies 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 is plotted on a graph. If the current week's numbers exceed the median of the past five years, 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 mass treatment with ACTs and chloroquine for fever cases. 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. DDT for epidemic response is obtained from stock held in the region (15% of DDT is theoretically held as a reserve each year) 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 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 partners. An effective communication and reporting system between various administrative levels is critical for an appropriate response.

Resources allocated for epidemic management are insufficient. Most districts have inadequate epidemic preparedness plans and lack sufficient contingency funds to respond. This prohibits effective management of epidemics particularly at the district level. 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 limitations of the health information system. Alternative systems may be explored, including schools and other networks in the community.

Proposed USG Activities: ($420,000)

PMI will provide support for the development of a strengthened Epidemic Surveillance and Response (ESR) system in Oromia Region at the *kebele*, *woreda*, zonal and regional levels. In order to detect epidemics quickly, PMI will support the strengthening of the alert system and health worker trainings for early epidemic detection. While related to the routine surveillance and health management information systems, the epidemic alert systems will require a different time frame and reporting structures for "detection" and contingency planning for the "response".

Epidemic Detection and Response: ($420,000) PMI will support planning at the *woreda*, zonal and regional levels for epidemic preparedness and response, and will also strengthen epidemic alert systems, including investigation of novel systems for epidemic detection such as school-based programs. Drugs, LLINs and other commodities for epidemic response are included in those other sections. During Year 1, funds are not programmed for the purchase of insecticide-treated tarpaulins, blankets, and bed-sheets; however, PMI will work with the OFDA and Ethiopian authorities to discuss their possible future use.

Monitoring and Evaluation

Current Status, Challenges and Needs:

Health Management Information System: The Health Management Information System (HMIS) in Ethiopia is now supported by several partners, draws data from routine services and provides sources for the national indicators published annually. Ethiopia revised the HMIS indicators of all disease programs in July 2006 through a process involving federal, regional, *woreda* health officials, and other partners. All data related to malaria morbidity and mortality at health facilities are sent to the district health office each month. These data are then sent to the zonal office, which in turn reports to the regional office where it is aggregated. It is unclear how much data is actually used for decision making and resource allocation. The weaknesses and strengths of the FMOH's M&E plan are also reflected in Oromia Region. Oromia RHB and malaria team does not have a separate M&E unit and most of the data are generated by individual activities and transmitted to the HMIS unit. The Regional HMIS office appears to have adequate computers for entering, storing and analyzing malaria data. However in order to collect and track data accurately, there is a need to strengthen the information technology infrastructure at the zonal level and below.

Household Surveys: To date, the only nationally-representative surveys with malaria information are the 2000 and 2005 Demographic Health Surveys. A National MIS survey is planned for

October 2007 in collaboration with the FMOH, WHO, UNICEF, The Carter Center, the Malaria Control and Evaluation Partnership in Africa (MACEPA**)** and other partners. PMI will provide support to enable a representative sample for Oromia Region to serve as a baseline for PMI activities.

Proposed USG Component: ($1,325,000)

PMI will support the development and implementation of the Oromia M&E plan that will be linked to the national structures. Support will include training on data management and utilization, support for the routine collection of facility based data, conducting special household surveys, and the establishment of sentinel sites.

Improve Recording and Reporting of Routine Malaria Service Utilization: ($175,000). The ability to accurately record and report routine data on case management is critical for improving resource allocation and providing the program with data for decision making. The HMIS is currently undergoing complete retooling with phased implementation in the Oromia region in 2008. PMI will contribute to implementing this change assisting with training at *woreda*, zonal, regional, and federal levels strengthening HMIS data entry, analysis and dissemination.. Strengthening the ability to track malaria cases will act as a positive catalyst for change for improving data management across the health sector.

Sentinel Site Development: ($350,000) While assisting with HMIS roll-out, PMI will also establish a sentinel site system of ten sites that will enable the Oromia region to capture malaria indicators beyond the routine indicators in the HMIS and track morbidity and mortality to evaluate program effectiveness.

Malaria Indicator Survey: ($300,000). PMI will support a Malaria Indicator Survey in Oromia Region in the first quarter of FY08. This will be part of a larger national survey involving UNICEF, WHO, The Carter Center and MACEPA. This survey will be nationally representative, but will over sample in the Oromia Region to provide regionally representative data, providing a baseline for PMI interventions as well guide program design necessary to achieve PMI's goals and targets.

Program Tracking Tools and Skills Strengthening ($500,000) Effective program management, especially in a region as large and heterogeneous as Oromia, requires improved quality and management of malaria-related data that is not collected as part of serial surveys or through points of service. These data include but are not limited to tracking LLIN distributions, the location and current staffing of health facilities, IRS operations, stock reports, etc. PMI will support the establishment of this database, the necessary information technology infrastructure and training, and ensure the information is used to guide program decision making. In order for data to be collected and utilized, PMI will support skills training on such topics on finance and human resource management, project management, computer skills, etc. for appropriate staff at each level.

HIV/AIDS and MALARIA

Current Status, Challenges and Needs:

Malaria and HIV are two important health issues facing Ethiopia. While biologic interactions between HIV and malaria are recognized, there are still untapped opportunities for programmatic synergies. Ethiopia is in a unique position to ensure synergies are maximized and any joint programming benefits those at most risk. PMI is currently working with PEPFAR colleagues, as they develop their Ethiopia "Country Operating Plans" to ensure our respective plans for 2008 complement and strengthen each other. While for PMI, these coordinated efforts will be specifically for Oromia, PEPFAR may be able to support some of these areas of common interest in other regions where they have a significant presence, such as Gambella Region.

Proposed USG Component: (Costs covered under other relevant sections)

Areas for potential harmonization with PEPFAR include:

- Coordination of laboratory support. Support for HIV/AIDS care often includes laboratory strengthening, especially for tuberculoses diagnostics. PMI will work with the RHB and its implementing partners to ensure this includes support for improved malaria microscopy;
- Support of front-line health worker training. As stated above, the rapidly expanding Health Extension Worker program is a major part of the FMOH and RHB strategy. PMI will work with PEPFAR to ensure training in differential diagnosis for febrile illnesses include malaria and HIV-associated opportunistic infections;
- Pharmaceutical logistics – While ARVs are currently being procured in a separate and parallel system, there may be lessons learned for antimalarial commodities. The ultimate goal should be integrated commodity management across the health sector;
- ANC clinics and community safe-motherhood programs – Where PMCT services are being delivered, these points of service should be model sites to support ITN distribution, anemia management and appropriate diagnosis and treatment of acute malaria. Malaria should also be included in advocacy and IEC messages for reproductive health and other life skills programs implemented in the community;
- LLINs for Persons Living with HIV/AIDS. LLIN coverage in Ethiopia is increasing rapidly PMI will support the RHB malaria program to work with Home-based Care programs for PLWHA and Orphan and Vulnerable Children programs, to ensure improved coverage and appropriate use of vulnerable populations;. LLINs will be a component of the Preventive Care package delivered through facilities and community groups to OVC and persons with HIV/AIDS.
- BCC/IEC for adolescent reproductive health and malaria, especially malaria in pregnancy. Just as HIV/AIDS programs seek to empower youth to take control of their lives vis à vis HIV, they should be empowered to take control of their lives vis à vis malaria. Further, the Ethiopian Orthodox Church will promote LLIN utilization through clergy while discussing HIV prevention and community care program;
- Incorporation of malaria-HIV/AIDS synergies in other regions. The presence of PEPFAR in other regions beyond Oromia offers an opportunity to harmonize many of the above activities throughout the country.

COMMUNICATION AND COORDINATION

The Malaria Control Support Team (MCST) is a technical group providing coordinated malaria technical support in Ethiopia. The primary task of this team is to support the FMOH and RHB by providing ongoing technical assistance, mobilization of resources, and supporting epidemic response prediction and preparedness. The group provides a joint forum to share duties and responsibilities, avoid duplication and discuss priorities. In addition to GFATM, WHO, UNICEF, World Bank, USAID and other bilateral cooperatives, the Malaria Control Support Team includes the Oromia RHB, the Malaria Consortium, and other NGOs, universities and The team is scheduled to meet monthly.

Proposed USG component: (no additional cost to PMI)

The PMI malaria advisors will become members of the Malaria Control Support Team. A large part of their work will be to coordinate investments and activities with the other partners and to actively try to engage more partners, especially civil society organizations, in the overall malaria control and community development efforts.

CAPACITY BUILDING WITHIN THE NATIONAL MALARIA CONTROL PROGRAM

As Oromia Region is the largest in Ethiopia, fulfilling adequate human resource needs has been a major challenge. For example, only one third of the positions needed for the logistics sector are filled. Decentralization of the health care system places an additional management burden on the zonal and *woreda* health offices.

While it is beyond the scope and the mandate of PMI to address the system-wide capacity issues there are areas *within* the malaria program where capacity can be strengthened. The following system-wide information is intended to provide a context to the malaria program activities.

Major constraints during the implementation of the first and second Health Sector Development Plan included the shortage of skilled health workers, high turnover and lack of motivation to retain health professionals in remote and inaccessible health facilities. Human resources are not evenly distributed in the different zones of the region, with severe shortages in the remote areas.

Training: There are six nursing colleges in the region providing training for a three-year diploma program. Each school admits a minimum of 250 students per year. The health professional to population ratio is 1 physician to 68,951 people which is lower than the WHO standard of 1: 10,000 for Africa; 1 nurse serves 9,309 people, also lower than the WHO standard of 1:5000 for Africa. The RHB has tried to increase the number of health professionals through trainings at the regional training centers and other colleges and universities. The RHB has a three-year human resource development strategy and has begun expanding enrollment in the six nursing colleges as well as in a private college. In the academic year 2005/2006 the number of nurses enrolled in the six nursing colleges was 1500, compared to just 500 in previous years. The RHB has also enrolled 100 medical students in the private college to address the shortage of physicians.

Staff Retention: The RHB has created a staff retention strategy and incorporated both financial and non-financial incentive mechanisms to encourage long-term staffing patterns. Each level provides extra benefits such as a salary top-up and/or doubling of in-service time at post depending on the location of the assignment (e.g. rural, remote village). The Carter Center is contributing through joint accelerated health training. Non-financial incentives also include provision of full infrastructure, supplies, etc. for health professionals (including HEWs) in remote postings.

Supervision: Supervision from the regional level down through the *kebele* 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 USG Component: (Costs covered in other sections)

Recognizing the scope and the mandate to directly support malaria interventions, PMI will collaborate with other partners to strengthen the capacity of the RHB staff and others at the national, *woreda* and *kebele* 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 the malaria-specific technical skills. In addition, PMI will work with the MOH and partners to help identify additional staffing resources to support the RHB's and NMCP's activities.

Through in-service training and quality assurance, PMI will help to keep health providers in their current positions and location. While the RHB will concentrate on staff retention plans and incentive structures, PMI will support quality training and follow up to identify bottlenecks in performance and identify strengths in implementation to continuously improve in-service and refresher trainings for malaria case management.

In FY08, PMI will place two technical experts from USAID and CDC and one National staff with offices in the RHB to assist with malaria activities. In addition to working closely with their RHB counterparts, they will coordinate with other malaria partners, especially other ministries, UNICEF, WHO, the private sector and civil society.

Key contributions will be made in training health workers and developing and strengthening capacity for supportive supervision. Support for training will include pre-service, in-service and refresher training of health workers in case management, laboratory diagnosis, IRS, commodity logistics, and interpersonal communication. In its first year, PMI will 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. MCH, HIV/AIDS, etc.). PMI will also work with partners to ensure that malaria prevention and control activities for the Oromia region are covered; while supporting this region, the country as a whole will benefit from the Initiative.

STAFFING AND ADMINISTRATION

Two new health professionals will be hired to oversee the PMI in Ethiopia, one representing CDC and one representing USAID. In addition, one or more Foreign Service Nationals FSNs

will be hired to support the PMI team. All PMI staff members will be part of a single inter-agency team led by the USAID Mission Director or his/her designee in country. The PMI team will share the responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, managing collaborating agencies and supervising day-to-day activities. Candidates for these positions will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

It is envisioned that these two PMI professional staff will work together to oversee all technical and administrative aspects of the PMI, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, and reporting of results. Both staff members will report to the USAID Mission Director or his/her designee. All technical activities will be undertaken in close coordination with the FMOH/RHB and other national and international partners, including the WHO, UNICEF, the GFATM, World Bank, and the private sector.

Locally-hired staff to support PMI activities either in Ministries or within USAID (for example, the contractor position to support sentinel site surveillance) will be approved by the USAID Mission Director. Because of the need to adhere to specific country policies and USAID accounting regulations, any transfer of PMI funds directly to Ministries or host governments will need to be approved by the USAID Mission Director and Controller.

ANNEXES

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Annex 2: Multi-Year Country Strategy and Plan

ANNEX 1

Table 1

President's Malaria Initiative – *Ethiopia*
Year 1 (FY08) Timeline of Activities

ACTIVITY	2007	2008											
	OCT-DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Hire PMI in-country staff													
Purchase commodities (ACTs; LLINs; RDTs, IRS equipment, diagnostic/lab equipment, pre-referral treatment severe malaria drugs, etc.)													
LLIN distribution and replacement													
Entomologic monitoring													
Quality control/ environmental compliance: Adami Tulu													
IRS training of sprayers and procurement													
IRS campaign													
Epidemic response detection													
Develop and disseminate messages for LLIN use													
Strengthen drug management system/ Master Plan													
Therapeutic Efficacy Monitoring													
Training in lab diagnostics and Health Extension Workers													
Supportive supervision for lab diagnostics and case management. Quality assurance for microscopy													
Establish 10 sentinel sites													
HMIS support													
Develop and disseminate BCC/IEC messages for net use, case management, ANC utilization, IRS													
skills strengthening for federal, regional, zonal and woreda program managers													

Table 2

President's Malaria Initiative – *Ethiopia*
Planned Obligations for FY08 ($20,000,000)

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
PREVENTIVE ACTIVITIES						
LLIN distribution	UNICEF	4,200,000	4,200,000	Oromia	Provide free LLINs through health facilities, HEWs and other networks	22
LLIN Commercial sector collaboration	NetMark and follow on	325,000	225,000	Oromia	Facilitate commercial sector involvement through communications, distribution, and expansion of retail outlets and targeted vouchers.	22
BCC/IEC for ITNs, ITNs and Case Management; and CBO support	HCP follow on	1,850,000		Oromia	Includes support to RHB IEC Unit; communications development, implementation/evaluation, and support (approximately half) for NGOs and other community-based organizations	22
Procurement of IRS equipment	IRS IQC	2,000,000	2,000,000	Oromia	Procurement of insecticides, spray equipment, and personal protective gear	26
IRS operations	IRS IQC	1,300,000		Oromia	Training, implementation and supervision support for IRS operations including capacity for targeting IRS, with GIS and other information management	26
Entomological Monitoring and capacity-building	IRS IQC	375,000	100,000	Adama	Build capacity for entomological monitoring for Vector Control, including Adama training facilities.	27
Pesticide management and environmental compliance	IRS IQC	100,000		Adami Tulu	Support environmental compliance incl. DDT distribution chain from Adami Tulu plant to final use and disposal	27
Subtotal Prevention		**10,150,000**	**6,525,000**			

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
MALARIA IN PREGNANCY						
Expanding malaria in pregnancy services through safe motherhood and focused antenatal care	New FP/MNCH procurement	300,000		Oromia	Support MIP components in FANC, Safe Motherhood and Adolescent Reproductive Health, including anemia management and LLINs.	28
SUBTOTAL: MIP		**300,000**				
CASE MANAGEMENT						
Laboratory baseline assessment	Diagnostics agreement	80,000		Oromia	Rapid assessment of lab capacity to determine availability of equipment and trained personnel (regional and district) incl. microscopy quality and effectiveness	30
Policy development for diagnostics, especially RDTs	Diagnostics agreement	80,000		Nation-wide	Support policy and guideline development	30
Support for quality assurance system for microscopy and RDTs	Diagnostics agreement	250,000	50,000	Oromia	Support RHB to improve laboratory services and quality assurance for microscopy and RDTs	30
Procurement of RDTs	Deliver	750,000	750,000	Oromia	Tentative, pending clarification of policy and impact	30
Procurement of lab equipment/supplies	Deliver	400,000	400,000	Oromia	Procurement of lab equipment and supplies including logistics systems support	30

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
CASE MANAGEMENT (continued)						
Procurement of ACTs, pre-referral treatment and drugs for severe malaria	UNICEF	1,500,000	1,500,000	Oromia	Procurement of ACT; rectal artesunate and severe malaria treatment and supplies, including $500k for buffer stocks	33
Review/update National Treatment Guidelines	WHO	75,000		National	Work with other partners to review and update	33
Pre-service training clinical officers and HEWs in diagnosis and treatment	Carter Center follow on	500,000		Oromia	Provide pre-service training to facility-based clinical officers and to Health Extension Workers for improved diagnosis and treatment including rational use of drugs	33
In-service training for clinical officers, HEWs	RHB	530,000		Oromia	Support to Integrated Refresher Training for HEW and clinical officer	33
Provide systems support for ongoing supervision and monitoring of malaria treatment	New FP/MNCH procurement	1,075,000		Oromia	Provide support for supervision from Health Center and woreda Health Officer for in-patient, out-patient and community-based management	34
Therapeutic efficacy monitoring	WHO	100,000	50,000	National and Oromia	*in vivo* monitoring in ten sites nationally - four sties in Oromia (completed in alternate years)	34
Evaluation of adherence	CDC IAA	80,000		Oromia	Operational research	34

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
CASE MANAGEMENT (continued)						
Strengthening of drug management system capacity	SPS	600,000		Oromia	Strengthening of drug management system- e.g. LMIS, quantification and procurement; distribution management, including national level in the context of the "Pharmaceutical Master Plan"	34
BCC/IEC for case management (note costs covered under ITNs)	HCP follow-on	Covered above in LLIN section		Oromia	In conjunction with other BCC and community-based activities, specifically for early care seeking, compliance etc.	35
Strengthen drug quality monitoring and pharmacovigilance	SPS	250,000		Oromia	Support of Drug Administration and Control Authority for drug quality and pharmacovigilance	36
SUBTOTAL: Case Mgmt.		**6,270,000**	**2,750,000**			

EPIDEMIC RESPONSE						
Proposed Activity	**Mechanism**	**Budget**	**Commodities**	**Geographic area**	**Description of Activity**	**Page Reference**
Epidemic detection and response	RHB/ FMoH	420,000		Oromia	Support for: EDR planning at woreda and Zonal level; support for surveillance system; operational costs; and reserve stocks for LLINs, RDTs and drugs budgeted in prevention and case management sections	36
SUBTOTAL: Epidemic Response		**420,000**	0			
MONITORING AND EVALUATION						
Improve recording and reporting of routine malaria service utilization	TASC3	175,000		Oromia	Improve recording and reporting of routine malaria service utilization	37
Sentinel site development	TASC3	350,000		Oromia	Establish 10 sentinel sites	37
Malaria indicator survey	RTI/Carter Center	300,000		Oromia	Malaria Indicator Survey	37
Program tracking tools and skills strengthening	TASC3	500,000		Oromia	Establishment of database, necessary IT infrastructure and training	37
SUBTOTAL: M&E		**1,325,000**				

Proposed Activity	Mechanism	Budget	Commodities	Geographic area	Description of Activity	Page Reference
IN-COUNTRY MANAGEMENT AND ADMINISTRATION						
TDY for ACT adherence study	CDC	30,000			Two, two week trips to provide technical assistance for the adherence study	
TDY for Treatment guidelines development	CDC	15,000			One two week trip to provide technical assistance for development of treatment policy guidelines, including RDTs	
TDY for Monitoring and Evaluation	CDC	30,000			Two two-week trips, one for sentinel site development and one for strategic guidance to epidemiological work	
TDY for Entomologic Support	CDC	30,000			two-two week trips to support development and implementation of entomological monitoring	
In-country staff; Admin. Expenses	CDC	700,000			Salaries, benefits of in-country PMI staff (1)	
In-country staff; Admin. Expenses	USAID	730,000			Salaries, benefits of in-country PMI staff (1 PSC/1 FSN), support staff (1 FSN), vehicle	
SUBTOTAL: Mgmt. and Admin.		**1,535,000**				
TOTAL		**20,000,000**			46% commodities	

Table 3

Ethiopia (Oromia) – Year 1 Targets
Assumptions and Estimated Year 1 Coverage Levels

Year 1 PMI Expected Results:

The goal of the PMI is to reduce malaria-associated mortality by 50% compared to pre-Initiative levels in PMI countries. By the end of 2010, the PMI will assist the Oromia region of Ethiopia to achieve the following targets in populations at risk for malaria:

- >90% of households with a pregnant woman and/or children under five will own at least one ITN;
- 85% of children under five will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses in geographic areas targeted for IRS will have been sprayed;
- 85% of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been sprayed with IRS in the last 12 months; (Note, because of the highly seasonal transmission, one spray round per year is enough to protect the community)
- 85% of women who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy; Note: for reasons described in the text, this target does not apply to Ethiopia.
- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria; and
- 85% of children under five with suspected malaria will have received treatment with an antimalarial drug in accordance with national malaria treatment policies within 24 hours of onset of their symptoms.
-

Assumptions:

Population of region (estimated): 26,553,000 (total population of Ethiopia is approximately 77.4 million)
- Pregnant women: 5 % of total population = 1,327,650 pregnant women
- Infants (children <1): _ 4_% of population = 1,062,120 infants (WHO estimate, 2005)
- Children <5: _ 19.5% _% of population = 5,177,835 children under five

Average number of malaria-like illnesses per year and cost per treatment (costs given are for Coartem):
- (%) Children <5: 19% 2 illnesses/year at $0.50 each
- (%) Older children/Adults: 76% 1 illnesses/year at $1.50 each

Cost of a LLIN (including distribution) = $5.00; average of 2.5 nets/household needed to cover all pregnant women and children under five in family

Cost of spraying a house with an average of 5 inhabitants = $15.00

Inter-vention	Needs for 100% Re-gional Coverage over 3 Years*	Needs for 85% Regional Coverage over 3 Years*	Annual Needs to Achieve 100% Regional Cover-age	Needs to Achieve Year 1 PMI Targets	Year 1 Contributions
IPTp	0 pregnant women x 2 treatments/woman = 1.2 million treatments/year x 5 years = 0 million treatments	0 million SP treat-ments	0 treatments	**Target:** 0 *% of pregnant women receive 2 doses of IPT* =	No SP needed, IPTp has not Been adopted as Ethiopian National policy
LLINs	5.53 million households x 2.5 nets/household x 3 years = 41.5 million nets	41.5 x 85% = 35.3 m LLINs	13.8 LLINs	**Target**: 35% *of children under 5 and pregnant women sleep under LLIN*	PMI will contribute 500,000 nets to address the need in Oromia By September 2007, contributions among partners and donors will achieve 2 nets per house hold nationwide
ACTs – children < 5 ACTs – older children/ adults **TOTAL**	5.1 million children under 5 x 2 episodes/year = 10.2 million treatments/year x 3 years = 30.6 million 19.9 m older children/adults x 1 episode/year =19.9 treatments/year x 3 years = 59.7 doses 90.3 treatments	30.6 m treat-ments x .85 = 26 m treatments 59.7 m treat-ments x .85 = 50.8 m treat-ments 76.8 m treat-ments	10.2 million treat-ments 19.9 treatments 30.1 m treatments	Target: 20% of children under 5 receive ACTs = 2.04 m treatments	PMI will procure 500,000 doses of Coartem GFATM and other donors are filling the remaining gap
IRS	5,200,000 structures x $14 hh x 3 years= 218.4 m	185.6 m	72.8 m	**Target**: *85% of targeted houses to be sprayed* 85,000 households to be sprayed	PMI is contributing $3,300,000 for the procurement of IRS and Operational costs.

Table 4

President's Malaria Initiative – Ethiopia
Year 1 (FY08) Budget Breakdown by Intervention ($20,000,000)

Area	Commodities $	(%)	Other $	(%)	Total $
Insecticide-treated Nets	$4,325,000	69%	$1,950,000	31%	$6,275,000
Indoor Residual Spraying	$2,100,000	54%	$1,775,000	46%	$3,875,000
Case Management (including diagnostics)	$2,750,000	44%	$3,520,000	56%	$6,270,000
Malaria in Pregnancy	$0	0%	$300,000	100%	$300,000
Epidemic Preparedness & Response	$0	0%	$420,000	100%	$420,000
Monitoring and Evaluation	$0	0%	$1,325,000	100%	$1,325,000
Administration	$0	0%	$1,535,000	100%	$1,535,000
Total	$9,175,000		$10,825,000		$20,000,000

Table 5

Year 1 (FY08) Budget Breakdown by Partner ($20,000,000)

Partner Organization	Geographic Area	Activity	Budge
FMOH/RHB	Oromia	Epidemic detection and response, Case management	$950,0
USAID/Ethiopia	Oromia	Staffing and administration, case management, ITNS, MIP, Monitoring and Evaluation	$5,780,0
CDC IAA	Oromia	Case management, Monitoring and Evaluation, IRS, staffing and administration	$985,0
UNICEF	Oromia	ITNs, case management	$6,350,0
WHO	Oromia	Case management	$175,0
USAID/W	Oromia	Case management, ITNs, IRS	$5,760,0
Total			$20,000,

ANNEX 2
Multi-Year Strategy and Plan: Ethiopia

GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

By the end of the project, reduce malaria-related mortality in Ethiopia by 50% when compared with pre-Initiative levels.

After three years of full implementation, the PMI will have provided resources to assist each country to attain the following targets in populations at risk for malaria:

- >90% of households with a pregnant woman and/or children under five will own at least one ITN;
- 85% of children under five will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses in geographic areas targeted for IRS will have been sprayed;
- 85% of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been sprayed with IRS in the last 6 months;
- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria; and
- 85% of children under five with suspected malaria will have received treatment with an antimalarial drug in accordance with national malaria treatment policies within 24 hours of onset of their symptoms.

PREVENTION ACTIVITIES

Control of malaria in pregnant women

While IPTp is not part of the Ethiopia National Malaria Control Program strategy, PMI will support other aspects of the "MIP Package" including improved case management for pregnant women suffering from acute malaria, access to LLINs, improved anemia management and support to the roll-out of Focused Antenatal Care services

PMI will include a focus optimizing the delivery of the full package of ANC services, including PMTCT links. PMI will support quality of services, improved monitoring and evaluation of MIP activities and additional refresher trainings as needed for health workers in MIP as part of comprehensive ANC refresher training. Supporting integrated supervision of ANC services could help build district capacity, motivate staff and improve quality of ANC services.

Continued emphasis on IEC/BCC messages is essential to ensure that women and their families are aware of the risks of malaria during pregnancy, to promote attendance at ANCs, improved nutrition etc.

Insecticide-treated nets (ITNs)

PMI will have to continue its work with partners to maintain high coverage of nets through various distribution channels and scaling up LLIN activities to achieve the objective of 85% ownership and use. In year 1 PMI will procure over 150,000 nets as replacement nets and provide $500,000 for the voucher scheme to "keep up" coverage, as well as related BCC/IEC activities. In following years, PMI will continue to support the dual strategy to effectively maintain high coverage in the region. PMI will continue to support BCC/IEC activities to increase and maintain high usage.

Indoor residual spraying (IRS)

Over the next three years, the focus for IRS activities will be on strengthening Federal, Regional, and district-level capacity to effectively target, implement, and monitor spraying operations and to build capacity for the safe and judicious use of pesticides, especially DDT. This will be done in the context of 'Integrated Vector Management', that is, the rationalization and optimization of vector control measures, alone or in combination. This will include a concerted effort to build capacity for entomological monitoring that can guide the IRS operations, and also rationalize the historical and very large efforts put into larval control.

CASE MANAGEMENT

The Three Year Strategy and Plan for PMI has been developed to support the Ethiopia malaria control strategy.

In order to support the use of ACTs nationally, PMI will coordinate with other donors (such as GFATM) to purchase and supply ACTs to all health facilities and to Health Extension Workers trained and authorized to provide ACTs.

PMI will continue to support BCC/IEC for early care seeking practices; train private providers and traditional healers (and other service points of delivery) in correct messaging for early referral and treatment; and look at care seeking patterns for other community based illness that have potential to save lives, e.g. pneumonia, and how malaria serves as a platform for overall strengthening of child health services.

PMI will support diagnosis of severe malaria and data collection to ensure accurate forecasting and supply of severe malaria drugs as well as assure proper treatment for malaria among pregnant women.

The three-year plan for reinforcing the laboratory diagnostic capacity for malaria will be to continued support for lab diagnostics refresher training, in-service training as well as the development of a quality assurance plan for the use of RDTs. PMI will review the lab supply status nationwide and analyze needs for procurement/replacement with other donors and the MOH.

EPIDEMIC SURVEILLANCE AND RESPONSE

Epidemic surveillance and response will be a major focus of PMI involvement in Ethiopia. PMI will concentrate on supporting Federal, Regional and district efforts to implement effective ESR and ensure judicious use of commodities for these situations. PMI will assist in monitoring of the situation to ensure that all levels will be able to respond appropriately. Managing and strengthening information and surveillance systems will be an important component to monitoring epidemics and ensuring timely responses. PMI will also consult with other in-country malaria partners, including UNICEF and WHO to ensure implementation of the long-term strategy for epidemic surveillance and response.

MONITORING AND EVALUATION PLAN

PMI will continue to focus on capacity in order to strengthen the quality and timeliness of data collection from the districts, sentinel sites, partners, and other relevant sources. The use of currently collected, routine data from existing systems such as the HMIS and the sentinel surveillance sites will be used for ongoing program monitoring and will continue through the subsequent years of PMI. A population based survey will provide information on impact of PMI will take place mid-term. Finally, discrete surveys or targeted evaluations related to activities in development (such as the use of RDTs, or an assessment of private sector use of ACTs) will be supported as needed. Throughout the Initiative PMI will support quality DSS routine monitoring, semi-annual partner review meeting for progress/process updates and joint planning/work planning among all PMI/FMOH/in-country partners with the RHB in the lead to ensure a unified and solid M&E plan and implementation.

SUSTAINABILITY PLAN

The three-year strategic plan for Ethiopia is designed to begin addressing the complex issues of long-term sustainability and building national capacity over time. The PMI's framework for sustainability addresses several components: technical and management capacity; cost recovery/financial strengthening; and human resources capacity focusing on supportive supervision.

The implementation of the PMI will result in the transfer of technical knowledge and skills to local partners including staff of the RHB, NGOs, community- and faith-based organizations, health workers, and private sector partners. PMI will continue its emphasis on training health workers and developing and strengthening capacity for supportive supervision through refresher training at all levels, as well as support the transition from malaria-specific to integrated supervision. PMI will ensure that other partners are involved such as WHO and UNICEF that assist the Regional Health Bureau.

PMI will help carry out the implementation of recommendations from the MOH to regarding the impact of free malaria-related commodity distribution on local funding of health staff. In addition, PMI will continue advocacy for other funding sources to complement a longer-term financial sustainability plan.

STAFFING AND ADMINISTRATION

Two new health professionals will be hired to oversee the PMI in Ethiopia, one representing CDC and one representing USAID. In addition, one or more Foreign Service Nationals FSNs will be hired to support the PMI team. All PMI staff members will be part of a single inter-agency team led by the USAID Mission Director or his/her designee in country. The PMI team will share the responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, managing collaborating agencies, and supervising day-to-day activities. Candidates for these positions will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

It is envisioned that these two PMI professional staff will work together to oversee all technical and administrative aspects of the PMI, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, and reporting of results. Both staff members will report to the USAID Mission Director or his/her designee. The CDC staff person will be supervised by CDC both technically and administratively. All technical activities will be undertaken in close coordination with the FMOH/RHB and other national and international partners, including the WHO, UNICEF, the GFATM, World Bank, and the private sector.

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

Table 1

Proposed Multi-Year Timeline of Coverage of Interventions*

Coverage Target	2005 DHS	Year 1	Year 2	Year 3 (etc.)	Final Evaluation
Proportion of households with a pregnant woman and/or children under five will own at least 1 ITN		50%	65%	80%	>90%
Proportion of pregnant women sleeping under an ITNs the previous night	0%	35%	50%	70%	85%
Proportion of children under five sleeping under an ITNs the previous night	0.4%	35%	50%	70%	85%
Proportion of children under five with fever in previous 2 weeks treated with ACTs within 24 hours of onset of symptoms	0.6%	20%	40%	65%	85%
Proportion of government health facilities have ACTs available for treatment of uncomplicated malaria	N/A	50%	65%	80%	>90%
Proportion of women who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy;	N/A	N/A	N/A	N/A	N/A
Proportion of households in geographical areas targeted for IRS that have been sprayed		85%	85%	85%	85%
Proportion of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been sprayed with IRS in the last 6 months		40%	55%	75%	85%

Note: MIS for baseline will be conducted first quarter FY08

Table 2

Illustrative 3-Year Budget and Expected Coverage Levels

PMI Targets: After three years of full implementation, the PMI will achieve the following targets in populations at risk of malaria in Oromia, Ethiopia:

i. 85% of children under five will have slept under an ITN the previous night;
ii. 85% of pregnant women will have slept under an ITN the previous night;
iii. 85% of pregnant women will have received two or more doses of SP for IPTp during their pregnancy;
iv. 85% of houses targeted for indoor residual spraying will have been sprayed;
v. 85% of children under five with suspected malaria will have received treatment with an antimalarial drug in accordance with national malaria treatment policies within 24 hours of the onset of their symptoms.

Assumptions:

Population of Oromia, Ethiopia (estimated): 26,553,000 million persons
Pregnant women: 5% of total population = 1,327,650 pregnant women
Children <5: 19.5% of population = 5,177,835 children under five
Infants (children <1): 4 % of population = 1,062,120 infants

Average number of persons per household = 5

Assume that 65% of total Oromia population is at risk of malaria = 17.3 m

Average number of malaria-like illnesses per year and cost per treatment with Coartem:
Children <5: 2 febrile episodes/year ($.050 per treatment)

Older children/adults: 1 malaria illnesses/year at (assume average of $1.50 per treatment)

Cost of IPTp with SP: $0. ($0.08 for each of the two treatments a woman will receive during her pregnancy)

Average household will require 2.5 ITNs to cover all children under five and pregnant women in the family
Cost of a long-lasting ITN = $5.00

Costs per person for epidemic preparedness, implementation support and USG implementation costs were taken from a detailed cost analysis prepared for previous PMI countries.

Item/Activity	Annual Cost per Person	Annual Cost	3-Year Total	Assumptions/Comments
Prevention – insecticide-treated nets		$12,250,000	$36,800,000	17.3 million population at risk of malaria = 3.36 million households x 2.5 nets/household x 85% coverage x $5.00/net. This assumes LLINs will provide protection for at least 3 years
Prevention – indoor residual spray-ing		$3,267,000	$9,801,000	IRS directly supported by PMI will target a population of 500,000, or 100,000 households in year one at a cost of $14.00 per household. PMI will also provide supplies, equipment and other support for other, Re-gional Health Bureau IRS activities
Treatment – malarial illnesses		$29,700,000	$88,122,500	Children under 5, 5.1m x 2 episodes/year x 85% = 8.67 m x $.50 = $4.34 m; Older children/adults 19.9 x 1 episode/year x 85% x $1.50 = $25.4m
Treatment – IPT for pregnant women		$0	$0	0 pregnant women x $0.20 per year x 85% coverage
Epidemic Preparedness	$.08	$1,380,000	$4,152,000	Based on detailed calculations from year 1 MOPs
Implementation Support	$0.92	$15,916,000	$47,748,000	Commodity management, human resources, supervision, training, social mobilization, etc
Monitoring and Evaluation		$1,325,000	$3,375,000	Directly from Ethiopia PMI M&E budget, assuming no cost sharing by other donors, one time cost of MIS at 300,000
Cost of Program		**$63,838,000**	**$189,998,500**	

USG Implementation Support Costs		$1,470,000	$4,410,000	Long-term expatriate advisors' salaries, benefits, travel; local staff; office supplies and equipment for PMI in-country office; TDY from CDC and USAID
Total funding needed (including USG program costs)		$65,308,000	***$194,408,500***	
Government of Ethiopia malaria budget		$0.0	$0.0	Costs covered in GFATM Rd 2 and Round 6.
GFATM Rd 2 Phase 2 and Rd 6 approved funding		$		Round two: Phase one $37,915,011 and Lifetime Budget of $76,875,212 out of which 9 million (USD) was reprogrammed for ACT procurement Round five: 2-Year Budget of $ 59,113829 and a Lifetime Budget of $ 140,687,413 with $ 68,488,393 for Commodities and products and $ 56,929,111 for Drugs Nationwide, not Oromia specific
Available funding from other sources			**$**	
PMI funds available (estimated):				Assumes PMI funding is divided between countries based roughly on their populations
Year 1		$20,000,000		Assumes 15 PMI countries
Year 2		$20,000,000		Assumes 15 PMI countries
Year 3		$20,000,000		Assumes 15 PMI countries
Years 1 through 3			**$60,000,000**	
Total Available funding			***$60,000,000***	
Remaining Gap			$**134,408,500**	**3-year shortfall to meet total need** Note: GFATM funds are not Oromia specific, therefore the breakdown of regional contributions cannot be calculated. However, PMI is working closely with GFATM to ensure that nationwide expenditures take into account regional plans for PMI in Oromia.