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President's Malaria Initiative

Malaria Operational Plan (MOP)

Zambia

FY 2012

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ABBREVIATIONS

ACT – artemisinin-based combination therapy
AIDS – Acquired Immuno-Deficiency Syndrome
AL – artemether-lumefantrine
ANC – antenatal care
BCC – behavior change communication
CDC – U.S. Centers for Disease Control and Prevention
CHAZ – Churches Health Association of Zambia
CHW – community health worker
CMMB – Catholic Medical Mission Board
COMBOR – Community Malaria Booster Response
CSH – Communication Support for Health
DDT – dichloro-diphenyl-trichloroethane
DfID – Department for International Development
DHS – Demographic and Health Survey
DHMT – district health management team
DHO – District Health Officer
EMLIP – Essential Medicines/Malaria Logistics Improvement
EPI – expanded program on immunizations
FANC – focused antenatal care
FY – fiscal year (October 1 – September 30 for USG)
GHI – Global Health Initiative
GRZ – Government of the Republic of Zambia
HIV – Human Immunodeficiency Virus
HMIS – Health Management Information System
HSSP – Health Services and Systems Program
IEC – information, education, communication
IMCI – integrated management of childhood illnesses
IPTp – intermittent preventive treatment in pregnancy
IMaD –improving malaria diagnostics project
IRS – indoor residual spraying
ITN – insecticide-treated net
IVM – integrated vector management
M&E – monitoring and evaluation
MACEPA – Malaria Control and Evaluation Partnership in Africa
MIS – Malaria Indicator Survey
MOH – Ministry of Health
MOP – Malaria Operational Plan
MPR – Malaria Program Review
MSL – Medical Stores Limited
NAC – National HIV/AIDS/STI/TB Council
NHC – neighborhood health committee
NMCP – National Malaria Control Program
NGO – non-governmental organization
OTSS – outreach training and support supervision
PCV – Peace Corps Volunteer
PEPFAR – President’s Emergency Plan for AIDS Relief
PLWHA – People Living With HIV/AIDS

PMI – President’s Malaria Initiative
PRA – Pharmaceutical Regulatory Authority
PRISM – Partnership for Integrated Social Marketing
RBM – Roll Back Malaria
RDT – rapid diagnostic test
IRS IQC 2 TASK ORDER 4 – Indoor Residual Spraying Indefinite Quantity Contract
SMAG – Safe Motherhood Action Groups
SP – sulfadoxine-pyrimethamine
TDRC – Tropical Disease Research Centre
TWGs – Technical Working Groups
UNICEF – United Nations Children’s Fund
USAID – United States Agency for International Development
USG – United States Government
WHO – World Health Organization
ZAC – Zambia Anglican Council
ZISSP – Zambia Integrated Systems Strengthening Program

EXECUTIVE SUMMARY

In May 2009, President Barack Obama announced the Global Health Initiative (GHI) a comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the United States Government will help partner countries improve health outcomes, with a particular focus on improving the health of women, newborns and children. The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, and tuberculosis.

In December 2006, Zambia was selected for the five-year, \$1.2 billion, President's Malaria Initiative (PMI) to rapidly scale-up malaria prevention and treatment interventions in high-burden countries in sub-Saharan Africa. Since then, Zambia has received approximately \$79 million in PMI funding.

Although there are clear signs of improvement, malaria continues to be a major cause of morbidity and mortality in Zambia and control of the disease is one of the government's highest priorities. The most up-to-date information on nationwide coverage of malaria prevention and control measures in Zambia comes from the 2010 Malaria Indicator Survey (MIS), and shows progress in recent years. More than 64% of households own at least one insecticide-treated net (ITN), and 50% of children under five years of age had slept under an ITN the previous night. Almost 73% of households owned at least one ITN or were sprayed with an insecticide in the previous 12 months. Seventy percent of pregnant women took two or more doses of intermittent preventive treatment in pregnancy (IPTp).

The Fiscal Year (FY) 2012 PMI funding for Zambia complements the National Malaria Control Program (NMCP) 2006-2010 Strategic Plan and is based on PMI experiences in the first four years of PMI support. A planning visit took place in April 2011 with representatives from USAID and the Centers for Disease Control and Prevention who met with the NMCP, the World Bank, World Health Organization, UNICEF and a variety of other partners involved in malaria prevention and control in the country. This is the fifth Malaria Operational Plan for Zambia and describes proposed expenditures of \$24 million for fiscal year 2012 under PMI.

Insecticide-Treated Nets (ITNs). ITNs are a key part of Zambia's malaria control strategy and distribution has been rapidly scaled up through free rolling mass campaigns largely focused on a door-to-door distribution strategy. Despite continued supply of nets, a gap of more than three million ITNs is expected for 2013. PMI supports replacement nets at antenatal clinics and the level of support for FY 2012 is projected to be 880,000 ITNs. PMI will support the distribution of nets to antenatal care (ANC) clinics. Additionally, behavioral change and communication campaigns will promote ITN use at the community and national levels.

Indoor Residual Spraying. The NMCP has the goal of implementing an integrated vector management (IVM) strategy, with IRS and ITNs as the main vector-based interventions. The national strategy is to prioritize IRS to urban and peri-urban areas while ITNs will be focused in rural areas. PMI assists the NMCP to ensure that decisions to select areas for IRS are based on evidence of active malaria transmission. PMI does not support IRS in Lusaka as

evidence indicates very low/no transmission in urban areas of the city and other IVM strategies should be utilized. Over the last 12 months, PMI supported the development of IRS guidelines, ensured environmental compliance and assisted with training and spraying of 1.2 million structures in 35 districts, covering a population of 5.5 million people. PMI also supported environmental compliance inspections and the national entomology laboratory and insectary. Resistance against pyrethroids has been detected in several districts. PMI is working with the NMCP to develop an insecticide-resistance monitoring plan. In FY 2012 PMI will support IRS in 35 districts, covering approximately 1.2 million households/structures and protecting 5.5 million people. PMI will procure insecticides as well as support storage and pesticide waste disposal. PMI will work with NMCP on entomological monitoring and insecticide resistance management systems.

Intermittent preventive treatment in pregnancy. In spite of impressive gains in IPTp use, the 70% (MIS 2010) national average hides substantially lower rates in rural areas and among poorer women. Two major barriers to increasing two-dose IPTp coverage are SP stock outs, due to procurement issues and misuse of sulfadoxine-pyrimethamine (SP), and late attendance of women for ANC care. In FY 2011, data collection was completed for the sulfadoxine-pyrimethamine (SP) effectiveness and efficacy studies. In FY 2012, PMI will support training in IPTp in hard-to-reach rural areas as well as the distribution of guidelines, job aids and other tools designed to increase health worker compliance with IPTp guidelines and increase uptake of IPTp among pregnant women. Appropriate use of SP will be supported by health care worker training in appropriate diagnostic and treatment guidelines. To address the issue of late presentation to care, PMI will boost community-based and national-level communication activities and will engage Peace Corps to promote ANC attendance and demand for IPTp.

Case management – Diagnostics. NMCP Guidelines for the Diagnosis and Treatment of Malaria in Zambia recommend parasitological diagnosis, by microscopy or a rapid diagnostic test (RDT), for all suspected malaria cases where confirmatory capacity is available. To extend laboratory diagnosis to more peripheral levels, the NMCP has introduced RDTs in rural health centers and villages for use by community health workers (CHWs). PMI procured more than 4.7 million RDTs, 15 teaching microscopes, slides and immersion oil during the past year. With FY 2012 funding, PMI will procure about three million RDTs for distribution at all levels of the health system, including to CHWs. PMI will additionally strengthen supportive supervision, training and quality control of laboratory diagnosis as well as procure microscopes and supplies.

Case management – Treatment and Pharmaceutical Management. During 2010, NMCP issued new treatment guidelines for uncomplicated malaria. First and second line antimalarials remain the same. NMCP has been monitoring ACT efficacy and efficacy is still within acceptable limits. For severe malaria intramuscular quinine and referral remain the preferred course of action. Delays in procurements from donors have resulted in stock outs of ACTs and SP in peripheral facilities. DfID provided resources to USAID for the procurement of ACTs that helped alleviate stock outs. With FY 2012 funding PMI will purchase three million ACT treatment courses. Facility- and community-based case management will be supported through training, refresher training and supervision. An integrated IEC/BCC activity will be supported to encourage prompt care seeking. Drug efficacy monitoring will also be continued. The success of tests of two different supply systems encouraged the

NMCP to roll out a new national logistics and pharmaceutical management system. With FY 2012 funds PMI will support the roll out of the new system.

Monitoring and Evaluation. The NMCP is updating its monitoring and evaluation (M&E) plan for 2012 – 2015. All donors and technical agencies support one national M&E plan. PMI provides technical and financial support to the M&E plan and funds, along with other donors, the bi-annual MIS. Health information systems are being revamped and rolled out to provide more up to date data. A Malaria Program Review (MPR) was completed in 2011. The MPR assessed all aspects of the malaria program, including monitoring and evaluation, and made several recommendations that are supported by PMI. Final results of the MIS 2010 were made available by the NMCP in late 2010. Zambia continues to make significant advances in routine information systems. More than 1,500 facilities (out of 1,882) in all 72 districts are reporting quarterly malaria indicators.

Zambia conducts End Use Verification (EUV) each quarter. The EUV collects information on several malaria and non-malaria commodities, is integrated into regular M&E activities and is financed by several United States Government projects. A health facility survey is underway to collect data on case management in facilities as well commodity availability. In FY 2012 PMI will support the MIS 2012 and will continue surveillance in Lusaka and Kazungula.

BACKGROUND

1. GLOBAL HEALTH INITIATIVE AND THE PRESIDENT'S MALARIA INITIATIVE

Malaria prevention and control is a major foreign assistance objective of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the USG will help partner countries improve health outcomes, with a particular focus on improving the health of women, newborns and children. The GHI is a global commitment to invest in healthy and productive lives, building upon and expanding the USG's successes in addressing specific diseases and issues.

The GHI aims to maximize the impact the USG achieves for every health dollar it invests, in a sustainable way. The GHI will build on the USG's accomplishments in global health, accelerating progress in health delivery and investing in a more lasting and shared approach through the strengthening of health systems. Framed within the larger context of the GHI and consistent with the GHI's overall principles and planning processes, BEST (Best practices at scale in the home, community and facilities) is a USAID planning and review process that draws on our best experience in Family Planning, Maternal and Child Health and Nutrition to base our programs on the best practices to achieve the best impact.

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, and tuberculosis. The PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through FY 2014 and, as part of the GHI, the goal of the PMI has been adjusted to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by continuing to scale up coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

Zambia was selected as a PMI country in FY 2007. Large-scale implementation of ACTs and IPTp began in Zambia in 2008 and has progressed rapidly with support from PMI and other partners.

This FY 2012 Malaria Operational Plan (MOP) presents a detailed implementation plan for Zambia, based on the PMI Multi-Year Strategy and Plan and the National Malaria Control Program's (NMCP's) 5-Year Strategy. The MOP was developed in consultation with the NMCP, with participation of national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the National Malaria Strategic Plan (NMSP) and build on investments made by PMI and other partners to improve and expand malaria-related services, including the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) malaria grants. This document briefly reviews the current status of malaria control policies and interventions in Zambia,

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

2. MALARIA SITUATION IN ZAMBIA

Zambia has a population of approximately 13.4 million (2010 census), with nine provinces and 72 districts. Zambia's key health indicators are generally positive: under-five mortality has fallen from 191 per 1000 live births in 1992, to 168 per 1000 in 2002, and to 119 per 1000 in 2007 (2007 Demographic Health Survey - DHS). Eighty-five percent of children complete primary school and overall poverty has been declining. Despite these positive trends, Zambia continues to face major challenges. Sixty-eight percent of the population lives below the national poverty line. HIV/AIDS is a major problem for all sectors with an estimated 14% of adults infected. Maternal mortality continues to be high at 591 per 100,000 live births in 2007.



Malaria transmission in Zambia occurs throughout the year with the peak during the rainy season, between November and April. *Plasmodium falciparum* accounts for more than 90% of all infections. *Anopheles gambiae* and *An. funestus* are the major vectors. All nine provinces of Zambia are endemic for malaria with 90% of the population at risk. In the last five years, emerging evidence from routine information systems, national surveys, and focused studies have consistently shown declining malaria trends. This decline has motivated the NMCP to classify the country in three malaria epidemiological zones to better focus their efforts. These zones are based on the parasitemia rates documented in the 2010

MIS and fit what is known about malaria control in each area.

- **Zone 1:** Areas where malaria control has markedly reduced transmission and parasite prevalence in young children is less than 1% (Lusaka city and environs).
- **Zone 2:** Areas where sustained malaria prevention and control has markedly reduced transmission and parasite prevalence is at or under 10% in young children at the peak of transmission (Central, Copperbelt, Northwestern, Southern, and Western Provinces).
- **Zone 3:** Areas where progress in malaria control has been attained but not sustained and lapses in prevention coverage have led to resurgence of infection and illness, and parasite prevalence in young children exceeds 20% at the peak of the transmission season (Eastern, Luapula, and Northern Provinces).

The National Health Management Information System (HMIS) in 2009 reported over 3 million clinical and laboratory-confirmed cases of malaria and over 3,000 malaria deaths. Although this number represents a decline between 2000 and 2009, there was an increase in reported cases in Luapula, Northern and Eastern Provinces in 2009/2010. The 2010 Malaria Indicator Survey (MIS) also identified an increase in malaria parasitemia in children under

five years of age compared to the MIS 2008 from 10 to 16%, Severe anemia also increased from 4% to 9% from 2008 to 2010.

Zambia currently has two active Global Fund malaria grants: Round 4 (\$5.2 million) and Round 7 (\$13 million). The new Principal Recipient is the United Nations Development Program (UNDP). Changes in Principal Recipient from the Ministry of Health (MOH) in 2010 resulted in delays in fund disbursement. Round 4, Phase 2 has been signed and ends in April 2011. It will provide funding for ACTs and RDTs. Round 7, Phase 2 has not been signed. It will provide funds for ITNs and RDTs as well as M&E and training. Zambia received approval to apply for a Global Fund National Strategic Application in 2011. Delays in procurement of malaria commodities by the Global Fund (Round 4) continued due to the transfer of the role of Principal Recipient to the United Nations Development Program (UNDP) from MOH. Delays in World Bank disbursements because of inability to account for funds expended also caused funding problems in the 2010 IRS season. Other major donors include the Bill and Melinda Gates Foundation, through the Malaria Control and Evaluation Partnership in Africa (MACEPA), and the World Bank. MACEPA, established in 2004, is a nine-year, \$35 million project intended to demonstrate the impact of full implementation of malaria control interventions and establish a proven, flexible model for NMCP scale-up. MACEPA's support to the NMCP in Zambia includes technical assistance in several areas.

The World Bank designated Zambia a Malaria Booster Project Country and provided \$20 million for malaria control and prevention between 2006 and 2010. In 2009 the World Bank agreed to fund the Community Malaria Booster Response (COMBOR) for two years. This program funds community behavior change and communication (BCC) efforts that focus on malaria. Currently the World Bank is dispersing a \$30 million loan to Zambia for malaria interventions.

The WHO provides technical assistance to the malaria program in monitoring and evaluation (M&E), Integrated Management of Childhood Illnesses (IMCI) training, job aide development for community management through community health workers (CHWs), and microscopy quality assurance. UNICEF supports case management through IMCI training and supervision.

The United Kingdom's Department for International Development (DfID) has provided £7 million (about US \$10 million) to USAID for the procurement of malaria commodities during the calendar years 2010 and 2011. In late 2010, these funds were used to procure one million ITNs, over two million ACT treatments and over one million RDTs.

3. NATIONAL MALARIA CONTROL PROGRAM AND STRATEGY

The Zambian NMCP is finalizing the development of a National Malaria Strategic Program (NMSP) for 2011-2015 that will replace the NMSP for 2006-2010. The vision of the new Plan is to achieve progress towards a "malaria free Zambia" through equity of access to quality-assured, cost-effective malaria prevention and control interventions close to the household. The Strategic Plan aims to achieve the following three goals by 2015: 1) reduce malaria incidence by 75% of the 2010 baseline; 2) reduce malaria deaths to near zero and reduce all-cause child mortality by 20%; and, 3) establish and maintain five "malaria-free zones" in Zambia.

The NMCP and partners conducted a national malaria program review in 2010 which informed the new NMSP 2011-2015. PMI supported both the malaria program review and the development of the NMSP 2011-2015.

The NMCP aims to strengthen national, provincial, and district-level capacity to plan, manage, and implement malaria activities, address human resource needs, ensure that there is an established planning and forecasting framework for projecting funding needs and tracking health expenditures, develop capacity at all levels of the health systems to manage the storage and distribution of malaria commodities, and reinforce coordination among partners. In addition, the strategic plan notes the need to strengthen BCC for malaria prevention and treatment and the importance of establishing a robust surveillance, monitoring and evaluation framework.

Overview of the Health System

The Ministry of Health (MOH) is responsible for formulating health policy, planning, issuing policy guidelines, allocating funds and sourcing of key health inputs including drugs and equipment for service delivery. In addition, the MOH provides technical oversight for the implementation of health activities. A basic health care package of high-impact interventions, one of which is malaria, is offered through the public health system. Services included in this basic health care package are provided free-of-charge or on a cost-sharing basis depending on the location and level of the system. In rural and poor districts these services are free.

Government-run health facilities, which provide the majority of the health care in Zambia, operate at several levels, and malaria control interventions are delivered in all of them:

- Health posts and community outreach
- Health centers
- Level 1 hospitals, Level 2 hospitals, and Level 3 hospitals

At the provincial and district levels, Provincial Health Offices serve as an extension of the MOH. District Health Offices (DHOs) are commissioned by the MOH to provide services at the district level. The second- and third-level hospitals are referral or specialized hospitals; however, due to resource constraints there is generally a variation between what the levels are supposed to provide and what they actually do provide. Table B shows the breakdown by type of facility and provider.

Table B: Summary of Health Facilities by Type and Provider, Zambia, 2010

Facility Type	Total	Percentage of Facilities
Health Posts	275	15
Rural Health Centers	1,060	56
Urban Health Centers	436	23
Level 1 Hospitals	84	5
Level 2 Hospitals	21	<1
Level 3 Hospitals	6	<1
<u>Total</u>	1,882	100
Health Facilities By Provider		
MOH	1,490	79
Mission	121	7
Private	271	14
<u>Total</u>	1,882	100

Source: Ministry of Health, 2010

The DHO provides overall planning, coordination, and monitoring of malaria activities within their districts. Health posts are intended to cover 500-1000 households. Health centers, staffed by a clinical officer, nurse or environmental technicians serve a catchment area of 10,000 residents. In 2010, it was estimated that in urban areas, approximately 99% of households are within five kilometers of a health facility, compared to 50% in rural areas. Lusaka Province has the highest number of health facilities (279) followed by Southern Province (254) then by the Copperbelt (235). Luapula Province has the lowest number of health facilities (142).

Other than the MOH, Churches Health Association of Zambia (CHAZ), parastatal organizations, private clinics, and traditional healers also provide health care in Zambia. CHAZ has 135 affiliates representing 16 different churches, both Catholic and Protestant, with a majority of them based in rural areas of Zambia. The membership is comprised of hospitals, health centers, faith-based organizations and community-based programs. Altogether, these institutions are responsible for over 50% of formal health services in the rural areas of Zambia and about 30% of health care in the country as a whole. CHAZ also supports health programs, pharmaceutical services, and institutional development activities, and leverages resources for the collective procurement of drugs and other health-related commodities for its member facilities. Private mining companies provide preventive and curative medical services for their workers and families, as well as surrounding communities in some cases. Several of the larger mining companies, such as Konkola and Mopane Copper Mines, have been carrying out IRS for many years within and around their compounds.

4. CURRENT STATUS OF MALARIA INDICATORS IN ZAMBIA

Zambia continues to make progress in its fight against malaria. Data from the MOH Health Management and Information System revealed 60% reduction in hospitalization due to malaria and 66% reduction in malaria deaths in children under the age of five years from

2001 to 2008. Results from the MIS 2010 show substantial progress in several areas of malaria control. Table C shows a comparison of key indicators over the last decade.

In 2010:

- Sixty four percent of households owned at least one ITN, compared to 62% in 2008; among these households, 42% had members who slept under an ITN the previous night, compared to 34% in 2008;
- Fifty percent of children under age five years slept under an ITN the night before the survey, compared to 41% of these children in 2008; and 46% of pregnant women reported sleeping under an ITN the previous night, compared to 43% in 2008;
- Seventy percent of pregnant women reported taking two doses of IPT during their last pregnancy, compared to 66% in 2008; and,
- Seventy three percent of households were covered by at least one ITN or recent IRS, compared to 68% in 2008

In spite of important progress, the 2010 Malaria Indicator Survey (MIS) identified an increase in malaria parasitemia in children under five years of age compared to the MIS 2008. The MIS 2010 reports that 16% of children under five years had malaria parasitemia compared to 10% in the MIS 2008 and 22% in MIS 2006. Severe anemia increased from 4% to 9% from 2008 to 2010. Three provinces, namely Luapula, Northern and Eastern registered a notable increase in parasitemia and severe anemia in children under five years in the same period. Luapula and Northern Provinces also reported lower ITN ownership and use. Although Eastern Province maintained ITN coverage between 2008 and 2010, there have been reports of vector resistance to pyrethroids and carbamates. PMI has been working with NMCP, DfID, the World Bank and other stakeholders to prioritize ITN distribution to Northern & Luapula Provinces and manage the insecticide resistance by rotating the insecticides for indoor residual spraying.

Equity

Equity for the different malaria interventions is generally good. For example, ownership of at least one ITN is similar across all wealth quintiles, 62.9% in lowest quintile and 65.3% in highest quintile (MIS 2010). ITN use by children under five slightly favors the highest wealth quintiles, 51.4%, against 44.1% in the lowest wealth quintile.

Routine System Indicators

Similar to population-based indicators, several facility-based malaria indicators are steadily declining in Zambia. A comparison of in-patient records for the first quarters of 2000 and 2010 showed that reported anemia deaths in children under five declined by 58% and reported malaria deaths in all ages declined by 42%.

Table C: Values of Main Malaria Indicators Over the Last Decade					
Indicator	2001/02 DHS¹	2006 MIS²	2007 DHS³	2008 MIS⁴	2010 MIS⁵
Percentage of households with at least one ITN	14	NA	53	62	64
Percentage of households with at least one ITN per sleeping space	NA	NA	NA	33	34
Percentage of households receiving IRS in the previous 12 months among all households	NA	10	NA	15	23
Percentage of households covered by at least one ITN or recent IRS	NA	43	NA	68	73
Percentage of children under 5 years old who slept under an ITN the previous night	7	24	29	41	50
Percentage of pregnant women who slept under an ITN the previous night	8	25	33	43	46
Percentage of household members who slept under an ITN the previous night	NA	19	NA	34	42
Percentage of pregnant women who took any preventive antimalarial drug during pregnancy	36	85	87	88	89
Percentage of pregnant women who received two doses of intermittent preventive treatment during Pregnancy	NA	59	66	66	70
Percentage of children ages 0–59 months with severe anemia (Hb<8 g/dl).	NA	14	NA	4	9
Percentage of children ages 0–59 months with malaria parasitemia	NA	22	NA	10	16
Proportion of children under five years old with suspected malaria who received treatment with an ACT within 24 hours of onset of their symptoms		13%		8%	13%

1. Zambia Central Statistical Office, Zambia Central Board of Health, and ORC Macro. 2003. Zambia Demographic and Health Survey 2001–2002 .

2. Zambia Ministry of Health, 2006. Zambia National Malaria Indicator Survey 2006. Lusaka, Zambia: Ministry of Health.

3. Zambia Central Statistical Office, Zambia Ministry of Health, Tropical Diseases Research Centre, University of Zambia, and Macro International Inc. 2009. Zambia Demographic and Health Survey 2007. Calverton, MD, USA: CSO and Macro International Inc.

4. Zambia Ministry of Health, 2008. Zambia National Malaria Indicator Survey 2008. Lusaka, Zambia: Ministry of Health.

5. Zambia Ministry of Health, 2010. Zambia National Malaria Indicator Survey 2010. Lusaka, Zambia: Ministry of Health.

5. GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

The goal of PMI is to reduce malaria-associated mortality by 70% compared to pre-Initiative levels in the 15 original PMI countries. By the end of 2014, PMI will assist Zambia 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 6 months;
- 85% of women who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy;
- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria; and
- 85% of children under five with suspected malaria will have received treatment with ACTs within 24 hours of onset of their symptoms.

6. EXPECTED RESULTS - YEAR 5

Prevention:

- Purchase 440,000 replacement long lasting insecticidal nets (LLINs) and distribute these and other nets free-of-charge through ANC clinics, and the Zambian Anglican Council (ZAC), with assistance from Peace Corps Volunteers (PCV). This number of ITNs procured is not sufficient to cover the annual new births in Zambia. Support IRS in over 1.2 million targeted houses in 35 districts in Zambia, including the procurement of insecticides, personal protective equipment and other supplies, training of sprayers, and an environmental assessment; this is expected to protect over six million people.
- Seventy percent (70%) of women in each of the nine provinces who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy. PMI will achieve this by increasing the demand for and delivery of IPTp through strengthened focused antenatal care (FANC) and behavior change communication (BCC) campaigns at both the community and national levels.

Case Management:

- Procure over three million rapid diagnostic tests (RDTs) and improve laboratory diagnostic capacity, thereby assisting the NMCP in its goal of confirming every case of malaria before treatment. The estimated annual need in Zambia is 5.3 million RDTs.
- Expand malaria diagnostics support in all nine provinces by providing outreach training and supportive supervision in >100 health facilities. Procure three million ACT treatments to ensure a continuous supply to all public health care facilities.

- Train 2,160 community health workers (CHWs) in 27 districts in community-based malaria interventions. This work will provide CHWs with expertise in proper use of RDTs and the ability to administer ACTs as appropriate.
- Train 540 health workers in 27 districts in evidence-based clinical guidelines. PMI printed the new clinical guidelines and will use the new booklet in the planned trainings.

7. INTERVENTIONS – PREVENTION

7.1 Insecticide-Treated Nets

Background

Zambia has identified ITNs as a key part of its malaria control program and the distribution of ITNs has been rapidly scaled up through a free rolling mass-distribution campaign strategy which now in most locations includes delivery directly to each home. This strategy focuses on ensuring that each sleeping space in the household is covered by an ITN with an average of three nets per household. In addition, the overall net strategy in Zambia calls for strengthening routine distribution via FANC and Expanded Program of Immunizations (EPI) programs and supports national and community level BCC programs to increase utilization rates for both children under five and pregnant women. Smaller scale distribution occurs through an equity program that targets vulnerable groups such as orphans and people living with HIV/AIDS (PLWHA), the World Bank COMBOR program, and commercial sales. Table D shows estimates for the percentage of nets that are distributed through each program.

Zambia has been distributing nets since 2007 using a door-to-door distribution strategy in an effort to increase the usage of the nets being distributed. This strategy has worked well in several sub-Saharan African countries and the strategy will be continued for distributions in Zambia in 2011. CHWs, NHC members and other trained volunteers ensure that nets are hung properly and provide messages on malaria prevention and control at each household during the campaigns. Each volunteer is responsible for about 20 households in a village and visits each one several times during the year. Sleeping spaces and the number of people in each household are tabulated and the number of existing nets, types of net and the program and month when it was delivered are all collected in a database and used to better forecast areas of critical need.

The general strategy for ITNs in Zambia is combined with an overall approach to cover all Zambians with protective interventions against malaria. This is achieved through a combined effort of IRS in urban and peri-urban areas and ITNs in most rural areas. Planning for uniform coverage normally considers the extent to which ITNs and IRS activities are coordinated. Fiscal constraints make universal coverage with both ITNs and IRS unlikely. Specific ITN needs and gaps by districts are developed by considering a consistent set of criteria that includes:

- Population and household demographics by district
- Number of ITNs already received by district
- The extent of IRS operations within the district

- An emphasis on maximizing ITN availability in areas not covered by IRS
- An emphasis on prioritizing ITN distribution in high malaria transmission areas

To date this overall IRS/ITN strategy has worked well, with the MIS 2010 showing ITN ownership over 60% and utilization rates at 50% for children under five and 46% for pregnant women. The percentage of households covered by at least one ITN or recent IRS was 73% in 2010.

Zambia anticipates that universal coverage of nets will be achieved by the end of 2011 in Northern, Luapula, Eastern, North Western, Western, Southern Provinces and parts of the Central Province. The more populous provinces of Lusaka and Copperbelt will have mostly IRS, while rural areas will be covered with ITNs.

Table D: Distribution of ITNs in Zambia in 2010	
ITN distribution methods	Estimated percentage of nets distributed
Mass distribution of free nets	65%
Through ANC clinics and EPI programs	30%
Commercial sales	3%
World Bank COMBOR program	1%
Equity programs to vulnerable populations	1%
Total	100%

In calculating the net gap for Zambia the following data were considered:

Table E: ITNs distributed or pledged (2010-2012)	
Criteria	ITNs
2010 – ITNs distributed:	1,239,000
2011 – ITNs distributed or pledged to be distributed	3,654,000
2012 – ITNs pledged	
-Global Fund (R4, R7)	1,082,850
-PMI	541,185
-WB	1,000,000
TOTAL	2,624,035
Grand Total ITNs distributed or pledged (2010 - 2012)	7,517,035

The need for ITNs in Zambia in 2013 was calculated by considering a population growth rate at 2.8%, the average number of persons per household at 5, and the number of nets needed per household at 3. The ITN need calculated for 2013 was 8,473,717 and the estimated gap in coverage was nearly 1.0 million ITNs as shown in the Table F.

Table F: ITN gap in Zambia for 2013	
Criteria	2013
Population	14,122,861
Number of household (based on 5 persons per household)	2,824,572
Number of ITNs needed (based on 3 ITNs per household)	8,473,717

Number of ITNs distributed or pledged (2010-2012)	7,517,035
ITN gap expected	956,852

Net deterioration in Zambia is an area of concern. Specific discussions on the life of a net in Zambia were conducted by a PMI-funded social marketing program, the NMCP, and MACEPA, all of which have had extensive field experience with nets. From the ITN longevity study conducted by the Tropical Disease Research Center we expect that a typical polyester net in Zambia will last only one to two years.

The net gap calculated above of 957,000 ITNs assumes a net life of three years. The accelerated deterioration situation in Zambia, however, would indicate that ITNs do not last the full three years and a more realistic scenario would show a gap range of approximately 1 – 3 million ITNs in 2013.

Progress during last 12 months

PMI worked closely with DfID to assist in the procurement and distribution of 1.0 million ITNs. DfID chose to use PMI's procurement system rather than their own. Both parties have benefited from this encouraging partnership.

In addition to DfID nets, PMI procured 1.4 million nets using FY 2010 funds. A PMI bilateral partner distributed 900K of these nets through the Mama Safenite program targeting children under five, pregnant women and new mothers. The remaining nets are awaiting distribution in a rolling mass campaign slated for late 2011.

PMI supported the TDRC to conduct a study to determine the wear and tear on nets that have been distributed in Zambia in the last 2-3 years. The Tropical Disease Research Centre (TDRC) conducted a net deterioration study in 2010 in Zambia that examined over 700 polyester nets aged 27 to 44 months and analyzed the degree and size of holes in the nets. These data are not yet fully analyzed but initial indications are that nets at just over two years of age are seriously damaged and need to be replaced.

PMI supported the Catholic Medical Mission Board (CMMB) program through the Malaria Communities Program to promote the proper use of ITNs in three districts in the high transmission Luapula Province. Training of 164 community volunteers, 47 health care workers, and 34 traditional leaders was accomplished in 2010.

MACEPA prepared a pilot program to evaluate the cost benefit of door-to-door promotional activities to increase net hang-up and use; the Peace Corp conducted a series of focus groups with local-level personnel that analyzed barriers to net use.

Proposed activities with FY 2012 funding (\$3,610,000)

The PMI focus in FY2013 will be to procure replacement nets for ANC facilities to maintain a supply of nets for routine distribution. Efforts to move ownership and use of nets from relatively high levels evidenced in the MIS 2010 to the PMI/RBM targets will require continued strong BCC efforts to maintain momentum. Determining how to approach and

convince late adopters on the benefits of nets will be a focus of BCC efforts at the national and community levels.

Specifically, the PMI program will include:

- Procurement of approximately 400,000 replacement ITNs for routine distribution through ANC and Child Health clinics. These nets will be sufficient for a new cohort of pregnant women expected in 2013. Procurement of an additional 40,000 replacement ITNs for the ZAC which has a grassroots organization with the ability to supply nets in remote rural areas (\$2,420,000);
- Support the distribution of ITNs including provision of transportation to districts and to health facilities, as necessary (\$440,000);
- Support for a national BCC campaign to maintain the ownership and proper use of ITNs through national multi-media efforts and through BCC training and capacity building at the NMCP (\$200,000);
- Support for a community-based BCC campaign through non-governmental organizations (NGOs)/faith-based organizations to increase net ownership and use through a focus on “life matters” and integrating other health and nutritional messaging (\$500,000);
- Conduct Operational Research on net durability. With support from Peace Corps volunteers PMI will conduct operational research to study how long new ITNs last under everyday conditions in rural Zambia. PMI will work with a local bilateral partner or parastatal entity to provide logistical and analytic support for this project. (\$50,000); and,
- Support Peace Corps activities promoting ITN. Peace Corps Volunteers will be provided with BCC materials and trained to promote appropriate ITN use in their villages (no additional cost to PMI)

7.2 Indoor Residual Spraying

Background

The Zambian NMSP for FY 2011-2015 has the goal of achieving universal coverage with either IRS or ITNs as the main vector-based interventions. Primary objectives of the NMSP 2011-2015 include coverage of at least 85% of all targeted structures/households in low to high transmission zones by the end of 2011 with malaria case surveillance-driven IRS, and to have at least 80% of people living in malaria risk areas using appropriate malaria prevention and control interventions by 2015. NMCP views IRS as a cost-effective method for reducing transmission with a focus on: 1) controlling malaria in urban and peri-urban areas with high population density; 2) reducing peaks of transmission in areas of intense seasonal malaria; 3) preventing outbreaks in epidemic-prone areas; and, 4) eliminating new foci of re-infection in areas previously malaria-free. The national strategy is to prioritize IRS in urban and peri-urban areas as a cost-effective treatment of large numbers of high density households. Many

urban/peri-urban houses have plastered walls, where retention of insecticide is greater compared to rural thatched or mud/pole structures. IRS is also recognized as the only intervention available to manage insecticide resistance through rotation among different classes of World Health Organization's Pesticide Evaluation Scheme-approved insecticides, making entomological monitoring an indispensable component of an evidence-based IVM program.

The NMCP has responsibility for coordinating and managing the IRS program nationally; District Health Management Teams (DHMTs) are responsible for implementation in their districts, although the extent of decentralization of IRS to the DHMTs is being debated. Given the limited resources of each DHMT and the evidence-based selection of areas to be sprayed and insecticides to be used, central level planning and support to the DHMTs are essential to a successful IRS program. The PMI will continue to assist the NMCP to ensure that decisions to select areas for IRS are based on evidence of active malaria transmission using all available epidemiologic and entomologic surveillance data. PMI does not support IRS in Lusaka as evidence indicates very low/no transmission in urban areas of the city.

Progress during last 12 months

The NMCP, with PMI support, developed IRS guidelines, ensured environmental compliance and assisted with training to spray nearly 1.3 million structures in 54 districts, representing 89% of targeted homes and protecting over 5.5 million people in 2010.

PMI-funded support included: pre-, mid- and post-spray environmental compliance inspections to support the national IRS program in 53 Districts (excluding Lusaka); training of 190 supervisors, 2,205 spray operators, and an independent Zambian consultant and an Environmental Council of Zambia Officer in environmental compliance inspections; installation of equipment and purchase of reagents for the Zambia Bureau of Standards and training of staff in soil and food analysis for dichloro-diphenyl-trichloroethane (DDT) and DDT by-products; collection and storage of DDT solid waste from 15 districts for high temperature incineration in South Africa; maintenance of evaporation tanks for DDT liquid wastes; construction/maintenance of soak pits for pyrethroid liquid wastes; and assisting with maintaining the national entomology lab and insectary.

Ongoing resistance testing indicated a problem with high levels of resistance in *Anopheles gambiae s.l.* to DDT and pyrethroids in Ndola and other districts, and this information served as the basis for the changes in insecticide class. Carbamates will be deployed in the Copperbelt Province and Solwezi District in Northwestern Province due to the presence of high *An. funestus* and *An. gambiae* and detection of the *kdr* mutation in *An. gambiae s.s.* Carbamates will also be used in Northern and Luapula Provinces and Chongwe in Lusaka Province. Organophosphates (ACTELLIC 50EC that does not require weekly bio-monitoring of acetylcholinesterase levels in spray operators) will be deployed in Eastern Province (except for Katete, Petauke and Chadiza Districts), Luangwa in Lusaka Province and in Mumbwa and Kapiri Mposhi Districts in Central Province due to high levels of resistance in both *An. funestus* and *An. gambiae* and the detection of the *kdr* mutation in *An. gambiae s.s.* Etofenprox will be sprayed in Petauke, Katete and Chadiza because of the recent detection of carbamate resistance in *An. funestus* in these districts and lack of mono-oxygenase cross-resistance with this product. Pyrethroids will be used in the other IRS

monitoring and insecticide resistance surveillance. PMI supports the proposed change of policy to manage insecticide resistance by insecticide rotation informed by vector susceptibility testing while continuing IRS with pyrethroids in districts without evidence of resistance. PMI has allocated \$5,190,900 for commodity procurement and environmental management and \$3.1 million to pay back the Madagascar loan that was used to meet the insecticide budget shortfall for the 2011 spray season. The actual number of IRS districts that PMI will support will depend on the cost of insecticides selected..

- Procure insecticides and other IRS supplies/equipment for spraying approximately 1.2 million households, depending on the insecticides selected and associated costs and supporting environmental monitoring and environmental assessment. (\$8,317,600);
- Train, monitoring and evaluation, and BCC for IRS; pesticide storage, waste disposal; and establish insecticide resistance management system (\$1,250,000);
- Support of the insectary and entomological monitoring, Maintaining the operations of the insectary and work with NMCP to coordinate and facilitate entomological collections, analysis and interpretation and pesticide selection for vector control (\$50,000); and
- CDC technical assistance for entomological monitoring and insecticide resistance (\$24,200).

7.3 Intermittent Preventive Treatment of Malaria in Pregnant Women

Background

Intermittent preventive treatment of malaria in pregnant women with sulfadoxine-pyrimethamine (SP) was introduced as policy in Zambia in 2003 and is implemented by the MOH's Reproductive Health Services Unit with technical assistance from the NMCP as part of Focused Antenatal Care (FANC). The NMCP guidelines call for three doses of SP, with the first dose to be delivered at the first visit after the start of the second trimester (16 weeks), the second dose one month later, and the third one month after that. HIV-positive women on cotrimoxazole are excluded. FANC also includes ITN distribution, and is free at all MOH health facilities and at non-governmental health facilities participating in the CHAZ network. All ANC health workers nationwide received initial training on FANC, including IPTp, in 2003.

The goal of the PMI is that 85% of women (who have completed a pregnancy in the last two years) receive two or more doses of IPTp with SP. In the MIS 2010, 70% of mothers surveyed took the recommended two or more doses of IPTp, a slight increase from 66% in 2008. However, there were large disparities of coverage between provinces (lowest coverage in Luapula Province at 58% versus North-Western Province at 84%) and between women in urban and rural areas (79% vs. 66%, respectively).

A 2009 PMI-supported survey implemented by the Maternal and Child Health Integrated Program found that two major barriers to increasing two-dose IPTp coverage were SP stock outs and late presentation for ANC care. A 2008 assessment in Central and Eastern Provinces found that 95% of 54 facilities surveyed experienced a stock out of SP in the previous year. Stock outs of SP were reported throughout 2010 due to delays in MOH and Global Fund

procurements. Discussions at country, Washington and Geneva levels are underway to help resolve the delays. The bigger issue is the inappropriate use of SP for treatment of acute malaria which is a drain on SP supply. Unpublished chart reviews in one district, as well as NMCP observations, found that some healthcare workers give SP to patients with fever who test negative on RDTs, contrary to NMCP recommendations. Regarding late presentation to ANC, the 2007 DHS found that more than 90% of pregnant women attend ANC at least once with the median gestation age at the first ANC visit is 5.1 months. There are no data, however, on what percentage of women attend ANC at least twice after their 18th week which would be the window for administering IPTp. Women may also present late to ANC because of confidentiality issues namely, it is a cultural tradition in Zambia for women to not reveal their pregnancy until after they are showing.

Progress during last 12 months

The PMI has supported NMCP efforts to improve delivery of IPTp through FANC. Improved delivery of service requires both healthcare provider knowledge and the availability of SP for IPTp. PMI also supported a partner to train health care workers on providing ANC including IPTp in Luapula Province. To improve availability of SP for IPTp, PMI also invested in the improvement of the national logistics and pharmaceutical management system for malaria commodities (see Treatment and Pharmaceutical Management section).

To increase demand for IPTp, PMI supported BCC activities for FANC at the national and community levels. At the national level, the NMCP and partners are developing an integrated BCC campaign for malaria, maternal and newborn child health, and nutrition. Partners implemented a formative survey nationwide to inform the development of this national campaign that started July 2010. Community-level BCC activities included strengthening existing Safe Motherhood Action Groups and establishing new groups in 14 rural districts in Eastern and Central provinces. This activity involved training group members and providing them with toolkits on how to provide IEC/BCC for FANC and IPTp. Through the Malaria Communities Program, PMI supported a partner to implement IEC/BCC programs on ANC and IPTp in Luapula Province. A needs assessment is currently underway in 18 districts (2 districts in each province) to assess barriers to IPTp uptake to inform how best to target and develop specific BCC messages at the community-level for those districts.

A PMI-funded operations research project initially funded in 2007 on the efficacy of IPTp with SP and birth outcomes of women taking IPTp with SP has finished data collection. Data analysis is underway and results are expected to be disseminated in early fall 2011. A third-year Peace Corps volunteer served as the local Study Coordinator, demonstrating a successful partnership between PMI and Peace Corps.

Proposed activities with FY 2012 funding (\$746,000)

Although Zambia has relatively high levels of two-dose IPTp, this national average masks poor coverage in rural areas and in certain districts. Therefore, the NMCP would like to continue to increase the number of women who receive the recommended three doses. Interventions described below will target provinces with the lowest coverage of two-dose SP IPTp.

Proposed activities to address the issue of availability of SP and IPTp through FANC include:

- Train healthcare providers in the appropriate use of RDTs in order to discourage use of SP for negative RDTs and invest in the rollout of the drug distribution system (see Treatment section).
- Increase availability of good quality FANC with IPTp by training more healthcare workers in FANC and district-level staff in supervision of FANC services in the three provinces (Luapula, Southern & Northern) with the lowest IPTp uptake. Written guidelines, job aids and tools for supervision have already been developed based on needs assessments. Funding will support training and distribution of these materials (\$396,000).

NMCP and partners propose BCC activities, with an emphasis on interpersonal communications but also including mass media communications, to address the issue of women presenting late to ANC. While PMI has invested in IEC/BCC for IPTp in the past, the population of pregnant women to whom the messages target is dynamic, and requires a continued investment in order to increase demand for IPTp.

- Support roll out of a national-level integrated campaign on malaria, maternal and newborn health, and nutrition. Formative research is currently being done by partners for this campaign and will provide baseline information. Funding will include a post-campaign evaluation. Specific activities will include purchasing appropriate mass media airtime and print media. In Zambia the majority of households own a radio, making it an ideal tool for disseminating IPTp messages. The MIS 2010 reports that the most common source of general malaria messages for women aged 15-49 years are public health facilities, followed by radio, and then television. (\$100,000);
- Support community BCC campaigns including: training of more Safe Motherhood Support Groups on how to provide BCC for FANC and IPTp; provision of community-specific BCC messages through intrapersonal communications based on results of a planned needs assessment; evaluation of these campaigns by doing pre- and post-campaign surveys (\$250,000);
- Train Peace Corps volunteers on the types of malaria control interventions so that volunteers can provide intrapersonal communications at the village level on subjects such as IPTp. (see Capacity Building section);

8. INTERVENTIONS-CASE MANAGEMENT

8.1 Diagnosis

Background

Early diagnosis and prompt, effective treatment is a fundamental intervention for the management of malaria. WHO in 2009 recommended universal parasitological confirmation of all suspected malaria cases prior to treatment with an antimalarial drug because presumptive treatment of malaria results in over-diagnosis of malaria, poor management of

non-malarial febrile illness and wastage of costly ACTs. NMCP Guidelines for the Diagnosis and Treatment of Malaria in Zambia of 2003 revised in 2009/2010 recommend parasitological diagnosis, by microscopy or RDT, for all suspected malaria cases where confirmatory capacity is available. In 2010, HMIS data showed that 1,314,169 malaria cases were parasitologically confirmed out of 4,229,839 suspected malaria cases nationwide. The MIS 2010 reported an increase in the number of febrile children having a heel or finger stick from 10.9% in 2008 to 16.7% in 2010. Although microscopy is the gold standard of parasite-based diagnosis, the NMCP estimates that only 30% of health facilities have functional microscopy. Many health facilities in Zambia do not have laboratories and technicians due to a shortage of trained and qualified staff. NMCP and partners have been working to expand the role and availability of malaria diagnostic services through improvements in microscopy and introduction of RDTs where microscopy services are not available.

Malaria microscopy: The roll-out of ACTs for first-line treatment was accompanied by a plan for strengthening malaria microscopy at health facilities. Until 2006, laboratory technologists and technicians were the only cadres trained and legally authorized to perform malaria microscopic diagnosis. While medical officers and clinical officers receive some training in microscopy, they are unlikely to perform such testing because of their clinical responsibilities. Licensed laboratory technologists must complete a three-year training program. According to a human resource assessment conducted in 2008 by the MOH with support from the Clinton Foundation, only 417 laboratory personnel were reported in-post at MOH facilities against a total of 1,560 established posts. In 2006, training for a new cadre of specialist microscopists was initiated. Non-laboratory health workers were recruited from health facilities and attended an eight-week training course. Since then, 256 microscopists have been trained. The training materials and accompanying Laboratory Manual for Malaria Diagnosis were developed with TDRC. The training of microscopists has been discontinued because this cadre has not been incorporated in the new MOH structure.

In 2009, PMI supported the NMCP to train clinical and laboratory supervisors to perform outreach training and support supervision, using agreed upon curricula and training materials. PMI also facilitated the launch of regular clinical and laboratory support supervision and incorporation of quality assurance of both malaria microscopy and RDTs.

Rapid diagnostic tests: The NMCP strategic plan recommends two roles for RDTs; at rural health centers where microscopy is not available or functional; and by CHWs for community case management of malaria. Introduction of RDTs in rural health centers began in 2007 with support from the Global Fund. The NMCP staff developed standard operating procedures and training materials, conducted provincial training workshops for staff of MOH and CHAZ facilities, and provided districts with funding for district-level cascade training. At the health facility level, laboratory staff is responsible for ordering malaria diagnostic supplies on a monthly basis from the Medical Stores Limited (MSL) through the same channels as essential medicines. MSL sends out RDTs via a push system, sending out predetermined quantities of RDTs to rural health centers. As with drugs, stock outs of RDTs and diagnostic supplies do occur. In early 2009 PMI worked with NMCP to conduct a national quantification and forecasting exercise for antimalarial drugs and RDTs for the period 2009 to 2015. This exercise has improved commodity forecasting and availability and has been undertaken annually and with quarterly reviews. The key financiers of RDTs in Zambia are PMI, the Global Fund, and the World Bank.

As in many other countries, clinicians in Zambia do not always use the results of RDTs or microscopy to guide malaria treatment decisions. Many NMCP specialists and their partners report that health workers prescribe ACTs or SP in cases where laboratory diagnoses are negative. However, there is anecdotal evidence that health workers are slowly accepting RDT results and prescribing appropriately. The Zambia Integrated Management of Malaria and Pneumonia Study which was co-funded by PMI showed that, with effective supervision, CHWs were able to use RDTs effectively. NMCP, MACEPA and the Global Fund are supporting a study on adherence to malaria treatment protocols by clinicians and patients.

To increase access to timely diagnosis and treatment of malaria, the NMCP has been promoting community case management of fever with use of RDTs by CHWs. Legal standards in Zambia require that all diagnostic tests be performed by trained and certified laboratory staff in recognized health facilities. However, RDTs for HIV/AIDS have been authorized for use by community-based counselors and this has established a policy precedent which has facilitated the introduction of malaria RDTs at the community level.

In 2007, the NMCP procured 2 million RDTs through CHAZ to support the introduction of RDTs for accurate diagnosis at community level. The NMCP with assistance from the Malaria Consortium piloted the deployment of RDTs and ACTs through CHWs in two districts in 2008 and expanded these pilot sites to 27 districts by April 2011. The NMCP will evaluate the performance of these pilots to provide information to the Pharmaceutical Regulatory Authority and Medical Council of Zambia for possible nationwide expansion. Additionally, the current supply chain of RDTs from MSL has been expanded to include RDTs for community management of malaria.

Progress during last 12 Months

PMI has continued to support national annual and quarterly quantification reviews for antimalarial drugs and RDTs, which have led to improvements in the forecasting of these commodities. A quantification and forecasting exercise conducted in November 2010, estimated a national requirement of 5.3 million RDTs annually. This exercise was based on consumption data from 16 districts which are part of the essential medicines logistics improvement program (for details see section 8.3 on Pharmaceutical Management). This consumption data was then extrapolated to all the 72 districts of Zambia. Quantimed software was used to estimate program commodity requirements and calculate cost estimates. PMI procured a total of 4,187,100 RDTs. Of this quantity, 3,060,050 and 1,127,050 were to be delivered in 2010 and 2011 respectively. PMI reprogrammed savings of \$400,000 from FY 2009 and procured additional 576,900 RDTs to offset RDTs shortages caused by delayed Global Fund procurement of as well as the delayed World Bank procurement. In 2011, PMI will contribute 1,127,050 RDTs to the estimated RDT need of 5,308,985 whereas; DfID and the World Bank will procure 2,450,000 and 1,370,000 RDTs, respectively. A gap of 1,171,935 RDTs is anticipated if the Global Fund Round 4 Year 5 funding is delayed and Round 7 grant are not signed. The GF committed to the procurement of 3,955,783 RDTs in these grants.

In November 2010, NMCP and its partners conducted a malaria commodity quantification exercise, with assistance from PMI. It was estimated that \$7.25 million and \$3.9 million in RDTs will be required in 2012 and 2013, respectively. PMI will contribute \$2,250,000 worth

RDTs in 2012. At the moment, there are no other RDT procurement commitments for 2012 and 2013.

	2011	2012	2013
<u>Total Needs</u>	<u>5,308,985</u>	<u>5,297,465</u>	<u>5,297,465</u>
PMI	1,127,050	3,082,192	3,082,192
Global Fund Round 4 Year 5*	1,726,027		
Global Fund Round 7 Year 3*	2,229,756		
DfID	2,450,000		
World Bank	1,370,000		
<u>Total RDTs Available</u>		<u>3,082,192</u>	<u>3,082,192</u>
Gap (Surplus)	1,171,935	2,215,273	2,215,273

*Global Fund Round 4 Year 5 and Global Fund Round 7 Year 3 grants have not been signed.

The PMI has supported efforts to strengthen malaria diagnostic capacity in health facilities including provision for supervision, refresher training, and quality control/quality assurance of microscopy and RDTs. In 2010 and 2011, PMI continued to support NMCP in addressing identified in the 2008 needs assessment, the 2009 Outreach Training and Support Supervision (OTSS) workshop and the 2010 OTSS visits. As a result, 19 laboratory supervisors received refresher training in malaria microscopy and the correct use of RDTs to improve their own skills prior to the beginning of OTSS visits. PMI sponsored two national level laboratory personnel to attend a regional WHO Malaria Microscopy Accreditation Course. The second and third rounds of OTSS visits to 54 and 50 health facilities respectively showed progressive improvement. For instance, all health facilities had at least one laboratory technician and one clinician trained informally by OTSS supervisors in previous rounds; 84% and 92% of health facilities were able to correctly perform microscopy and RDTs respectively, in round three. PMI supported the OTSS training in 2011 for 22 clinicians and 39 laboratory staff from 27 health facilities in Lusaka District to support the active case detection being piloted in Lusaka.

To respond to the critical shortage of laboratory personnel in the public health sector, the Evelyn Hone College in Lusaka introduced a two-year certificate course for laboratory assistants in 2008. The first cohort of 25 trainees was expected to graduate in 2010. This program will supplement the three-year diploma course for laboratory technologists currently offered by the Evelyn Hone College, Biomedical Sciences College and a four-year degree course offered by the University of Zambia. These three institutions currently produce about 100 laboratory personnel annually. The shortage of laboratory personnel has been exacerbated by a rapid expansion program for health facilities. A total of 63 new hospitals and 226 health centers were constructed by 2010. This is an ambitious effort that is not adequately matched by increases in laboratory equipment and personnel. PMI procured 15 teaching microscopes, slides and immersion oil in 2011 but more microscopes, reagents and supplies will be needed to equip at least 40 new health facilities.

Proposed activities with FY 2012 funding (\$3,030,000)

The PMI views malaria laboratory diagnosis as a critical component of good case management. PMI will continue to work with NMCP and partners to expand the parasitological diagnosis of malaria, strengthen the outreach training and support supervision and establish quality assurance systems. Based on discussions with NMCP staff, other partners and gaps identified from the antimalarial quantification for 2009 to 2015, the following specific activities are proposed for FY 2012 PMI funding:

- Procure 3,082,192 RDTs to contribute to filling the gap of 5,297,465 tests needed for case management at health facilities and community during 2013 (\$2,250,000);
- Strengthen malaria diagnostic capabilities at the health center level. Strengthen capability by supporting continued implementation of a plan for quality assurance and quality control of malaria laboratory diagnosis, refresher training, printing and distribution of laboratory training materials and bench aids and supportive supervision of laboratory workers in malaria diagnosis. In addition, support training and supportive supervision of clinical workers to increase their confidence in, and use of, malaria test results to guide treatment. Evaluate changes in performance of and adherence to microscopy and RDTs to monitor effects of this investment (\$700,000);
- Procure 40 microscopes, slides and immersion oil for use in rural health centers (\$80,000)

8.2 Treatment

Background - Treatment

Treatment of uncomplicated malaria: The first-line drug for treatment of uncomplicated malaria in Zambia is artemether-lumefantrine (AL). In 2010, the NMCP's Case Management Technical Working Group completed the revision of the treatment guidelines. The NMCP will disseminate the new guidelines in 2011. The dissemination of these guidelines will provide an opportunity to review current approaches to treatment of malaria in Zambia. The health facility survey currently in the field will provide information on health worker performance in case management of malaria as well as health service preparedness for delivering quality care.

The NMCP conducted AL efficacy studies in 2005, 2008 and 2009 at seven sites in 2005, one site in 2008 and six sites in 2009. AL maintains good efficacy in Zambia. The efficacy estimate for 2005 was 98-100%. In 2008 the small sample size did not permit the calculation of efficacy rates. NMCP will complete a similar study, following WHO guidelines, in 2011.

Treatment of Severe Malaria: The NMCP treatment guidelines recommend parenteral quinine as the drug of choice for severe malaria. These guidelines recommend that patients with severe malaria receive pre-referral treatment with intramuscular quinine and then referral to a hospital or zonal health center equipped to manage severe malaria on an inpatient basis. The IMCI guidelines recommend that children with very severe febrile illness or severe pneumonia classifications should receive parenteral quinine and broad-spectrum antibiotics,

preferably penicillin and gentamicin, both for pre-referral and definitive treatment. Although intramuscular artemether and rectal artesunate are registered in Zambia and available at urban pharmacies and through some private clinical providers, the current treatment guidelines do not address their use.

Malaria Treatment in the Community and Private Sector: Zambia has a small private health sector that operates in larger towns and cities where the burden of malaria is lower than in rural areas. These providers, including private-for-profit health facilities such as private clinics, have been informed of the change in first-line treatment, and chloroquine was effectively phased out of wide-scale use. Antimalarial drugs available in private pharmacies include AL, quinine, SP, and artemisinin monotherapies.

ACTWatch began in Zambia in 2008. This project which is funded by Bill and Melinda Gates Foundation is designed to provide and promote evidence and recommendations for policy makers on methods to increase availability and decrease the consumer price of quality assured artemisinin-based combination therapies through the private sector. The project will run until 2012; results are not yet available.

A volunteer CHW workforce has been active in Zambia since the 1970s providing preventive services and community mobilization. To achieve high coverage of prompt, effective first-line treatment, especially in remote communities, the NMCP is gradually introducing AL to CHWs with the expansion of community IMCI. The strategic plan calls for CHWs to perform malaria RDTs and to administer AL to patients with positive tests. These policy initiatives calling for the expansion of ACT and RDT diagnosis by CHWs are under review by the Zambia Medical Council and the Pharmaceutical Regulatory Authority. As funding permits, NMCP would like to have CHWs active in malaria case management in all districts. The Malaria Consortium is conducting a Canadian International Development Association project to train CHWs in the diagnosis and treatment of malaria, pneumonia and diarrhea in all districts in Luapula Province over a 3-year period. The CMMB supports community-based BCC activities in three of the Luapula districts where the Malaria Consortium project is active.

Progress during last 12 Months

Stock outs of SP were reported in 2010. They occurred country-wide over two, one-month periods. There were also stock outs of at least two presentations of ACTs. A reason for the stock outs appears to be a combination of poor logistical and supply systems from districts to health facilities and limited procurement of commodities because of management problems with donor resources. There were substantial delays in planned Global Fund procurements of ACTs and SP. The new Principal Recipient UNDP recently signed Round 4 so it is hoped that deliveries of ACTs will begin again. DfID utilized PMI procurement mechanisms to purchase \$2.2 million of ACTs in early 2011. PMI purchased \$3 million of ACT treatments in 2011.

Quantifications conducted in 2010 and 2011 show the following expected needs and supply for ACTs and SP:

Table H: ACT and SP Treatment Course Gap Analysis for Jan 2011 – Dec 2013

ACTs		2011	2012	2013
Treatment Course Needs (Average \$1.10)		5,281,533	6,931,782	6,931,782
	PMI	1,547,844	1,781,585	
	Global Fund	2,254,545	0	
	UNITAID		3,100,000	
	DfID	4,110,372		
Carry over Treatment Courses			2,630,728	580,531
Total Available Treatment Courses		7,912,261	7,512,313	
(GAP)/Surplus		2,630,728	580,531	(6,351,251)

SP		2011	2012	2013
Treatment Needs (Average \$0.03)		8,000,000	8,224,000	8,454,272
	PMI	8,000,000	0	
	Global Fund	0	0	
	DfID	9,155,100	0	
Carry over Treatment Courses			9,155,100	931,100
Total Available Treatment Courses		17,155,100		
(GAP)/Surplus		9,155,100	931,100	(7,523,172)

Proposed activities with FY 2012 funding (\$4,260,000)

The NMCP has prioritized technical support for case management as an area that PMI should address. With FY2012 funding, PMI will work to increase prompt and effective treatment for uncomplicated malaria at the health facility level. PMI will also support efforts to provide malaria treatment at the community level utilizing CHWs.

PMI will:

- Purchase approximately 3 million treatment courses of AL for uncomplicated malaria. Quarterly quantifications will monitor the supply and demand closely to assure adequate AL is available throughout the year. PMI's contribution in conjunction with other donors should meet the 2013 demand (\$3,000,000);
- Strengthen facility- and community-based treatment with ACTs. Support refresher training and supervision of healthcare providers and CHWs in the diagnosis and treatment of malaria nationwide in the 27 districts our bilateral partner is operating in. This training will also include the importance of diagnostic testing in the diagnosis of malaria (\$650,000);

- Support national and community BCC campaigns to improve the proportion of people with suspected malaria who seek and receive effective diagnosis and appropriate ACT promptly through mass and print media, and community interpersonal approaches such as community drama as part of an integrated campaign covering ITNs, ACTs, and IPTp. Work with MOH and other stakeholders to develop evaluation approaches and methods during campaign design. The BCC contractors will implement the following activities to evaluate their campaigns (National level BCC = \$150,00; Community level = \$460,000 = \$610,000);
 - Through a bilateral partner, PMI will conduct a formal evaluation of the effectiveness, reach, and lessons learned of the national BCC campaign.
 - Work with MOH and other partners to determine appropriate BCC approaches and design, produce, and disseminate messages and materials based on existing evidence and additional formative research.
- Drug Efficacy Studies. WHO, NMCP and TDRC, conduct these studies biannually. In calendar year 2012, PMI, with FY 2011 funding, will support these studies at six sites to detect any problems with resistance to the first line antimalarial, using funds already available in the 2011 MOP.

8.3 Pharmaceutical Management

Background - Pharmaceutical Management

The Procurement Unit of the MOH oversees the overall supply chain management system and is responsible for supplying the national public health system with medicines, medical equipment, and supplies. The Procurement Unit coordinates with the NMCP on quantification, purchase, and distribution of antimalarial drugs, RDTs, laboratory equipment and supplies, ITNs, and other malaria-related commodities. Medications and other commodities are then distributed via one delivery system. Vendors deliver medicines and supplies for the public health system to the MSL warehouse in Lusaka. The central MSL warehouse is responsible for delivering commodities to provinces and districts around the country. No provincial or regional warehouses exist at present. Most essential medicines are distributed to districts and health centers via health center essential drug kits that include SP and quinine. Injectable quinine and other antimalarials drugs, such as AL, are supplied separately. The DHMTs are responsible for distributing these essential drug kits. Health facilities in turn supply CHWs with the appropriate medicines. All malaria drugs are dispensed free of charge in MOH facilities.

Quantification of antimalarials: The Procurement Unit and the Pharmacy Unit of the MOH share responsibility with the NMCP for forecasting needs for antimalarials and other malaria-related commodities. Annual forecasts of AL need are based on the actual number of malaria treatment courses used in the 16 districts with district-based commodity planners who document drug usage on a monthly basis.

Procurement: The Procurement Technical Working Group oversees the procurement process to ensure that it involves free and fair competition and that the medicines and supplies comply with international quality standards.

Since Zambia has no national quality control laboratory, several quality assurance mechanisms are used. First, bid documents must include an origin certificate issued by laboratories that are certified by accredited bodies acceptable to the MOH and included in the WHO certification scheme of pharmaceuticals in international commerce. Second, once received, samples of antimalarial drugs are sent to a private laboratory for testing. In addition, goods must have at least 75% of their shelf-life remaining at the time of arrival in the country to be accepted.

Distribution: Antimalarials, both those in the essential drug kit and those procured separately, are distributed to hospitals and health centers through a combination of “push” and “pull.” Each month, the MSL sends all hospitals and DHMTs a list of the items they have in stock. The kit system distributes kits for health centers with its own pre-defined set and quantity of essential medicines. In the 16 districts which now have commodity planners, the usage of commodities is fed back to MSL which customizes orders to each health facility in this district. Hospitals do not receive essential drug kits, and must request the quantities they need. Kits and any supplementary drugs are delivered directly to district health offices based on requests that are forwarded monthly from each DHMT.

Although CHAZ-managed mission hospitals and health centers also obtain antimalarial drugs from MSL, CHAZ operates an independent procurement system and maintains a stock of drugs in a central warehouse in Lusaka as a backup to MSL. Since overstocks and stock outs in CHAZ facilities occur with some regularity, health facilities within the CHAZ system will interchange drugs through their central warehouse.

Zambia has no computerized pharmaceutical logistics management information system except for a system devised exclusively for tracking antiretroviral drugs, which was set up with support from PEPFAR.

Pharmacovigilance: The pharmacovigilance system in Zambia is not well-developed. NMCP Treatment Guidelines include guidelines and a form for passive reporting data but only limited numbers of adverse drug reactions are reported through this system. NMCP has passed the pharmacovigilance function to the Pharmaceutical Regulatory Authority (PRA), which has the statutory mandate for this. PRA has integrated pharmacovigilance for HIV/AIDS, tuberculosis, the Expanded Program for Immunization, and malaria and developed guidelines. PRA has not been able to effectively perform the pharmacovigilance functions because of financial and human resource constraints.

Progress during last 12 Months

The supply chain management pilot conducted in 2008-2009 showed that placing a commodity planner in each district and customizing essential drug orders by health facility reduced stock-outs by 95%. This pilot was supported by USAID (funding from PMI, PEPFAR, FP, and MCH), the World Bank and DfID. The MOH has agreed to roll out the pilot, now known as the Essential Medicines Logistics Improvement Program (EMLIP), initially from 8 to 16 districts (USAID is supporting 8 of the 16 district planners) and

ultimately nationwide when MOH secures funding for the full supply of 75 essential medicines. Data from procurement planning and monitoring end-use verification shows continuous supply of ACTs. In addition, the 2010 Malaria Indicator Survey shows an increase from 13% in 2008 to 26% in 2010 in the percentage of febrile children taking the first line treatment, *Coartem*. The DfID gift of \$11 million for commodity procurement to USAID is evidence that the system has made great strides in improving commodity availability.

The stock out of commodities, particularly RDTs and SP appears to be a combination of poor logistical and supply systems from districts to health facilities and limited procurement of commodities due to delays in funding by the Global Fund and the World Bank because of management problems with donor resources.

Although the Principal Recipient for the Global Fund has changed from the MOH to UNDP, there are still problems with disbursements and procurements, forcing PMI to intervene with emergency procurements to avoid further stock outs.

Local contractors perform regular end use verification and lead quarterly quantification exercises. Because the quantification exercises now use actual consumption data the accuracy of forecasting has improved substantially.

Proposed activities with FY 2012 funding (\$1,000,000)

PMI will support the roll out of a robust supply chain and logistics management system when the MOH decides how best to implement the changes. With FY2012 funding, PMI will:

- Assist the MOH in the roll out of the national logistics and pharmaceutical management system for malaria commodities (\$1,000,000). This will include:
 - quarterly forecasting of antimalarial drug and RDT needs and gaps;
 - importing, quality control, storage, distribution, and inventory management down to the health facility level;
 - improving feedback and reporting on consumption/stocks from health facility to district and higher levels;
 - monitoring of implementation/evaluation of coverage;
 - continuing end-use verification/monitoring of availability of key antimalarial commodities at the facility level. Specifically, this will entail regular supervisory/monitoring visits to a sampling of health facilities to detect and trigger further action on the following critical areas: ACT (or other drug) stock outs; expiration dates of ACTs at health facilities; leakage; anomalies in ACT use; and verifying quantification/consumption assumptions;

9. INTEGRATION WITH OTHER GLOBAL HEALTH INITIATIVE PROGRAMS

9.1 Maternal and Child Health Services/Reproductive Health

Background

All current bilateral programs receiving Family Planning/Maternal & Child Health/nutrition (FP/MCH/N) funding through the USAID/Zambia health office are contractually mandated to seek integration and collaboration opportunities at the task level in their contracts. As such, partners are required to seek such opportunities and report on them as contractual deliverables.

Zambia's maternal mortality ratio has declined in from 729 in 2001-2002 to 591 per 100,000 live births in 2007 but still remains unacceptably high. More than 50% of deliveries occur in the absence of skilled birth attendants and the major causes of maternal mortality are postpartum hemorrhage, infection, and hypertensive disorders. Despite the fact that ANC coverage stands at 94%, only 19% of women have their initial prenatal visit in the first trimester of pregnancy. Only 51% of women have postnatal checkups within two days of delivery. Zambia has reduced its mortality in children under five from 168 in 2001-2002 to 119 per 1000 live births in 2007. The infant mortality rate also decreased from 95 to 70 per 1000 live births over the same period. More than 50% of the infant mortality is accounted for by neonatal deaths. The major causes of childhood deaths are malaria, respiratory tract infections, diarrheal disease, malnutrition, anemia, and HIV/AIDS.

PMI-supported malaria prevention and control activities have been implemented as part of integrated maternal and child health services and have made a significant contribution to strengthening capacity to deliver these services. Insecticide-treated nets are distributed principally through antenatal care and child health clinics or through the semi-annual child health week campaigns that include other interventions, such as vitamin A supplementation, vaccinations and deworming. Malaria prevention and treatment services are also implemented through integrated management of childhood illness programs. Community health work through Neighborhood Health Committees (NHCs) addresses aspects of family planning, maternal and child health, nutrition and malaria.

The MOH comprehensive roadmap for maternal, newborn and child health services provides for integrated planning and delivery of malaria prevention and treatment interventions. In many public health facilities, the same health care worker delivers all these services under a single roof.

Progress during last 12 months

In 2011 PMI facilitated formative research to inform the design and implementation of an integrated national campaign planned for July-August 2011 to raise awareness on malaria and Family Planning (FP)/Maternal Child Health (MCH) and nutrition. PMI and FP/MCH/N funds were used to support community level behavioral change communication programs promoting improved maternal and child health. Behavior change interventions, while thematically focused, adopt a holistic approach to family planning, nutrition, and maternal/child health as well as HIV and malaria. PMI provided technical assistance to the child health week campaign conducted in November 2010. This campaign included malaria prevention messages, vitamin A supplementation, vaccinations and deworming.

PMI along with FP/MCH/HIV funding continued to support the roll out of the new essential medicines logistics improvement program that has been shown to improve the availability of medicines.

PMI will, in 2011, support the NMCP to conduct an assessment of FANC, including IPTp status in 18 districts under malaria in pregnancy budget.\

Proposed activities with FY 2012 funding (funding covered in other sections)

In 2012, PMI will support the training for health workers in IPTp as an integral part of FANC in hard-to-reach rural areas. FANC services in Zambia include net distribution, IPTp, anemia prevention and prevention of mother to child HIV transmission interventions. PMI will support refresher training for 540 CHWs in the revised malaria training guidelines, FANC and MIP modules in the 27 selected districts. PMI will work with MOH to establish and/or reactivate safe motherhood action groups to conduct BCC to improve the uptake FANC, IPTp, and other maternal health services.

PMI will support MOH to train health facility service providers in the integrated management of childhood illness in 27 districts in order to assure that 80% of staff are able to provide quality child health services. In addition, PMI will support MOH to develop mentoring tools to guide supervisors to use when mentoring frontline health workers in services such as malaria, HIV, emergency obstetric and neonatal care, IMCI and family planning. Funding from PMI/FP/MCH/HIV will be used to strengthen provincial-level coordination to increase opportunities for smart integration and collaboration across programs and partners.

PMI will continue supporting the roll out of the essential medicines logistics improvement program and the child health week campaigns.

9.2 HIV/AIDS and Malaria

An estimated 14% of adults 15–49 years old in Zambia are infected with HIV. Infection rates are two times higher in urban areas than in rural areas with low population density. The National HIV/AIDS/STI/TB Council implements the National HIV/AIDS/STI/TB Strategic Plan for 2010 – 2015 and provides national leadership for coordinating and supporting planning, monitoring, and resource mobilization. The National Council has already drafted a National AIDS Policy and finalized a national monitoring and evaluation strategy.

Because of the potential interaction between HIV/AIDS and malaria and the overlap in target populations, the MOH recognizes the need for coordination between the NMCP and National HIV/AIDS/STI/TB Council. At the district and community levels, existing HIV/AIDS home-based care networks can be used to train volunteer healthcare workers on home management of malaria, and to promote distribution and hanging of ITNs. Antenatal services include care related to both malaria (SP IPTp and ITN distribution) and HIV (prevention of mother to child transmission of HIV, HIV testing, and linkages to care and treatment). Another area of common interest for both PMI and PEPFAR is the improvement of the supply chain management system to ensure the availability of these resources for the care of both malaria and HIV/AIDS patients.

PMI has provided support to help integrate malaria and HIV activities by continuing to support training and promotion of FANC and by providing technical assistance and funding to assist in finalization of the PEPFAR-funded SmartCare outpatient electronic medical records system.

In 2012, PMI will encourage the reinvigoration of provincial level partner meetings to maximize coordination among HIV and malaria partners, no costs are associated with this activity. PMI will collaborate with FANC providers to encourage early antenatal care to assure HIV testing and treatment and the provision of ITNs and IPTp in sufficient doses to prevent malaria in pregnancy. PMI will also work with the CDC/Zambia laboratory staff to ensure that IMAD activities to support quality microscopy also help improve the quality of tuberculosis microscopy. PMI will continue to explore the use of the new SmartCare outpatient to obtain malaria data on individual patients. This will add to other sources of surveillance data such as HMIS and MIS. PMI will also support the roll out of the new essential medicines supply chain management system beyond 16 districts to the entire country. This new system will ensure that malaria medications and RDTs as well as antibiotics and other HIV-related drugs are available to providers.

10. CAPACITY BUILDING AND HEALTH SYSTEM STRENGTHENING

Background

The NMCP is a department under the Directorate of Public Health and Research of the MOH that provides technical and management oversight to malaria activities in all public health facilities, as well as supporting and coordinating a wide range of partners, including research and training institutions. The NMCP has 10 professional staff members, including a Case Management Officer, Chief Entomologist, Chief Parasitologist, Malaria Epidemiologist, IEC/BCC, IRS, Surveillance and Information, and ITN Officers, a Medical Laboratory Technologist, and an Operational Research Officer. At the provincial and district level, Provincial Health Offices serve as an extension of the MOH, while the DHMTs have the fiscal authority to manage the district health centers and are the main implementers of the IRS program.

The NMCP staff is committed to scaling-up malaria control and prevention activities; however, they are overstretched and need further support to effectively supervise district-level activities and effectively coordinate the many partners contributing to malaria efforts in Zambia. In particular, the NMCP and partners recognize its need for additional coordination of IRS activities and advocacy and outreach efforts. The NMCP requires support to conduct district-level visits for supervision and program management which MACEPA and PMI are providing. PMI will use its new health systems strengthening partner to support the IRS and M&E programs. This partner will provide support for IRS training, mapping of households, entomology expertise and assistance for NMCP in gathering and analysis of malaria data.

Progress during last 12 months

The PMI Zambia team has been providing technical assistance and capacity building at the NMCP including M&E. Time spent at NMCP by PMI Resident Advisors will continue as a priority. The PMI Zambia team will continue to work closely with the Surveillance and Information Officer to help build capacity in M&E.

USAID recently awarded contracts for BCC, health systems strengthening, and social marketing activities. The new partners have formed close partnerships with civil society

organizations, including non-governmental organizations, community-based organizations, and faith-based groups in order to scale up the delivery of high-quality malaria prevention and treatment interventions. To enhance national capacity in this area, the PMI BCC contractor will support the NMCP in their national campaigns including campaigns on ITNs and IRS.

The WHO National Malaria Focal person provided technical leadership for conducting the 2010 national malaria program; development of the national malaria strategic plan for 2011-2015; and development of the national malaria monitoring and evaluation strategic plan for 2011-2015. He also provided technical support to the drafting team to conduct a comprehensive gap analysis, partner mapping, eventual production of a national concept paper and expression of interest for the National 2011 Strategic Application (NSA) and its presentation to the Country Coordinating Committee (CCM) for endorsement before transmission to the Global Fund Secretariat in Geneva. He provided technical support for the therapeutic efficacy testing; the 2010 Malaria Indicator Survey, the 2011 Health Facility Survey, and for the revision of 2010 national malaria treatment guidelines.

Proposed activities with FY 2012 funding (\$163,000)

- Due to delays in disbursement of funds through the Global Fund, the NMCP is experiencing gaps in resources to support training. PMI will support travel to international meetings and in-country training to ensure that NMCP staff can continue to learn and contribute to malaria control activities. Provide funds through a bilateral partner for NMCP staff travel and training. This will support NMCP staff to attend meetings such as the American Society for Tropical Medicine and Hygiene, regional M&E or commodity quantification workshops (\$25,000);
- Provide funds to support the WHO Malaria Focal Point Person based in Zambia at the request of the NMCP and the WHO Representative in Zambia for no more than three years. This key person provides important leadership in numerous areas of malaria control including strategic planning and M&E. This is the third and final year of PMI support (\$105,000);
- Peace Corps 3rd Year volunteers. Housing and travel for three PCVs to assist in malaria activities and operational research (\$30,000);
- Peace Corps Volunteer Training (\$3,000).

11. COMMUNICATION AND COORDINATION WITH OTHER PARTNERS

Background

In June 2006, the MOH signed a Memorandum of Understanding with all major bilateral and multilateral donors in Zambia, including USAID, to maximize opportunities for harmonization and alignment in the sector. This and other documents lay out principles of the GRZ-Cooperating Partner partnership, health sector coordination, and regular Cooperating Partners and GRZ's meetings and consultations. The MOH has appointed a Donor

Coordinator within the MOH Directorate of Policy and Planning who acts as the key link between all Cooperating Partners and the MOH. The MOH Donor Coordinator is invited to and attends, where possible, all key Partners' meetings in the sector. The Cooperating Partners meet monthly to discuss issues of mutual interest and share information. Since 2004, Health Sector partners have annually selected one Partner to act as a focal point for Partners' coordination in the sector. The coordination has included a three-partner mechanism (WHO, DfID and the Swedish International Development Agency) where the past, present and future Coordinators have regularly communicated, ensuring continuity and spreading the load of coordination. DfID and SIDA were the lead Coordinators in 2009 and 2010, respectively. USAID and PEPFAR represent the donors on the Global Fund Country Coordinating Mechanism.

The NMCP and its collaborating partners maintain regular communications and coordinate efforts through routine partners meetings and technical working groups on IRS, BCC, M&E, case management, ITNs and operational research. All partners contributed to the development of the Five-Year Strategic Plan and annual action plans. These mechanisms are functioning well in Zambia and provide a good forum for coordinating ongoing and new activities supported by USG funds through the PMI with other MOH activities.

Progress during last 12 Months

In an unusual bilateral collaboration, DfID made available £7 million to PMI, to help the MOH to respond to stock out of ITNs, antimalarial medicines and RDTs as well as scale up effective prevention and treatment interventions in 2010 and 2011. PMI, subsequently procured ACTs, RDTs, SP and one million ITNs in 2010. A PEPFAR implementing partner distributed these nets to the households and educated families on how to hang and use these nets. The nets were distributed in Luapula Province, where the Malaria Indicator Survey of 2010 showed that one in every two children under the age of five years was infected with malaria.

In February 2011, PMI met with local United Nations Development Program which is the current Principal Recipient of the Global Fund to collaborate on antimalarial commodities quantification, forecasting and procurement and agreed to hold such meetings on a quarterly basis.

In the last 12 months, the technical working groups on BCC, M&E, case management, ITNs and operational research were active and met regularly. PMI catalyzed the reactivation of the IRS TWG which subsequently met several times during the latter part of the year to discuss the emerging IRS insecticide resistance problem in Zambia and reached consensus on insecticide selection and quantifications for the 2011 spray season.

USAID took over the health sector lead donor coordinator role in 2011 until the revised Memorandum of Understanding between MOH and donors is negotiated and signed.

Proposed activities with FY 2012 funding (no additional cost to PMI)

PMI continues to work with NMCP and stakeholders to ensure that the TWGs meet regularly and also provide technical support to the TWGs. PMI will continue collaborating with DfID who have indicated interest to continue channeling their support to malaria control activities

in Zambia through PMI. PMI will also continue to hold quarterly meetings with UNDP. This is not cost to PMI.

12. PRIVATE SECTOR PARTNERSHIPS

Background

Since 2008, the NMCP has been expanding and strengthening employee-based schemes through the Zambia Business Coalition Against Malaria program. In addition, commercial sales of ITNs that are not subsidized are still an integral part of the ITN distribution program. The PMI is supportive of the NMCP's effort to promote the private sector assistance in development and distribution of interventions for malaria control. The NMCP has continued to collaborate with Konkola and Mopane Copper Mines in the Copperbelt and Zambia Sugar Company in Southern Province on the planning, implementation, monitoring and evaluation of IRS activities there. In 2010, Konkola Copper mines and Zambia Sugar sprayed 48,000 and 3,000 structures respectively.

Progress during last 12 months

PMI assisted NMCP to conduct pre-, mid-, and post-2010 spray environmental compliance inspections and IRS needs assessments for the 2011 campaign in all IRS areas, including areas covered by private mining companies and The Zambia Sugar Company. With FY 2011 funding, PMI provided 40,000 ITNs to ZAC for door-to-door hanging and distribution in the hard-to-reach rural districts of Zambia.

Proposed activities with FY 2012 funding (no additional cost to PMI)

PMI will, through the NMCP, continue collaborating with the mining companies and the Zambia Sugar Company in FY2012. PMI will provide 40,000 ITNs to ZAC for door-to-door hanging and distribution in the hard-to-reach rural districts of Zambia (at no cost to PMI for private sector collaboration, Section 7.1 Insecticide Treated Nets).

13. MONITORING AND EVALUATION PLAN

Background

Over the last five years the NMCP guided monitoring and evaluation activities with its National Malaria Prevention and Control Monitoring and Evaluation (M&E) Plan for 2006 – 2011. This costed plan was developed in partnership with stakeholders and received high marks from the Global Fund and others. Zambia is regarded as a good example of M&E of malaria activities and is cited by the 2009 World Malaria Report and the Global Fund's Impact Evaluation Report for the availability of high quality data on malaria control.

Along with the NMSP, the M&E Strategy for 2011 – 2015 is also being updated. The NMCP M&E strategy tracks all Roll Back Malaria-recommended indicators and was updated to conform with the January 2009 RBM-Monitoring and Evaluation Reference Group (MERG) recommendations. PMI has supported the NMCP in updating its overall

malaria control strategy as well as its M&E plan. Of concern to the NMCP is the need to plan for sustaining its success beyond the current availability of resources from partners.

Zambia cooperates with several M&E partners—all support one M&E plan and provide technical assistance and resources for M&E activities. Institutions such as MACEPA, the World Bank, UNICEF, WHO, and others support the implementation of the MIS and facility surveys, while other partners support more routine information systems. PMI provides technical and financial support to the MIS and will also support developing, implementing, and maintaining more routine systems for effective monitoring and evaluation of malaria control activities. PMI works together with MACEPA and other partners to fill M&E gaps and avoid duplication of effort.

Monitoring: An important source of data for routine monitoring of malaria is the National HMIS. The HMIS reports monthly on information from all public and mission health facilities and some private facilities. However, it does not include data from community health workers. Following an assessment of the HMIS in 2006, the European Union committed considerable financial and technical support to strengthening the HMIS under a three-year plan of action. Roll-out of the revised HMIS started in late 2007, and was fully operational in January 2009.

Information flows from the health facility to the district and provincial level before being transmitted to the HMIS group within the MOH. This reporting system also takes advantage of existing data flow for facility-based reporting through DHMTs. The HMIS collects data on suspected and confirmed cases of malaria, malaria case fatality rate (in hospitals), and stocks of medicines and supplies. Information is also collected on a regular basis on the therapeutic efficacy of antimalarial drugs. Ideally, this and monitoring of insecticide resistance would be part of routine monitoring activities that NMCP needs to conduct, but they are both considered operational research issues by the NMCP.

Evaluation: To evaluate malaria prevention and control activities in Zambia, nationally-representative surveys such as the DHS and the MIS are performed every two to five years. All-cause mortality in children under five is tracked using the DHS; the most recent DHS was conducted in 2007 and provides a baseline estimate of mortality at the start of PMI. The next DHS is scheduled for 2012. The 2007 DHS was conducted during the last month or two of the malaria transmission season and the beginning of the post-transmission season; a malaria module was included.

Nationwide MIS carried out in 2006, 2008 and 2010 have provided information on the coverage of the four major malaria interventions, malaria parasite prevalence, and the prevalence of anemia, and are useful for measuring changes over time in these indicators. Data from these MIS and DHS surveys will be used for the PMI impact evaluation in Zambia. The following table shows household and facility surveys implemented and planned from 2003 to 2013.

A number of other surveys and evaluations provide provincial, district, and community level data on malaria epidemiology in Zambia, and provide useful information on the progress of malaria control efforts. These include health facility surveys to assess health worker performance and the quality of health care, availability of health guidelines, personnel, and equipment, and household surveys to assess knowledge, attitudes, and practices related to

malaria. As part of routine supervisory visits to MOH facilities, checklists are also completed on health worker performance and other technical aspects of health care. These forms are forwarded to higher levels of the MOH, but the information they provide is not systematically tabulated or disseminated.

Table I: Household and Facility Surveys in Zambia, 2003 – 2013

Survey	Calendar/PMI Year										
	2003	2004	2005	2006	2007	2008 1	2009 2	2010 3	2011 4	2012 5	2013
DHS					X					(X)	
MIS				X		X		X		(X)	
RBM Baseline		X									
IMCI Health Facility Survey						X			X		
Service Provision Assessment			X								
WHO Service Availability Mapping				X							
Health Facility Survey				X							

Progress during last 12 months

With support from WHO, PMI, and other partners, the NMCP completed a Malaria Program Review (MPR). The MPR assessed all aspects of the malaria program, including monitoring and evaluation, and was conducted before the NMCP revised its strategic plans. The MPR gave M&E high marks but recommended that the NMCP’s surveillance plan be updated and surveillance data be reviewed according to the newly defined epidemiological zones. The MPR also recommended that quality and timeliness of HMIS data be enhanced and encouraged the use of phone technology for accelerating data transfer and compilation.

Zambia continues to make significant advances in routine information systems. More than 1,500 facilities (out of 1,882) in all 72 districts are reporting quarterly malaria indicators. The system reports out-patient and in-patient fevers attending health facilities, numbers of fevers tested and all confirmed malaria cases and in-patient deaths. Maps such as the one shown below can be constructed with data from routine systems.

End Use Verification. Zambia conducts a modified version of the End Use Verification (EUV) each quarter. The EUV collects information on several malaria and non-malaria commodities, is integrated into regular M&E activities and is financed by several USG projects. Although costs are higher than for regular EUV, PMI provides only 10% of total costs. Personnel from Provincial and District Health offices help conduct EUV visits. Finally,

EpiSurveyor software on mobile phones is used effectively to accelerate data collection, analysis and report generation.

Health Facility Survey. After a delay of one year, a health facility survey is now complete. A nationally representative sample of 180 health facilities of various types and ownership were visited. This survey is significant because it includes observation of case management and will provide a picture of how well malaria case management is being performed in health facilities. Additionally, the survey will be collecting data on availability of commodities and stocks outs as well information on the preparedness of health services to conduct appropriate case management. Data analysis is now underway.

Proposed activities with FY 2012 funding (\$362,100)

- Support Malaria Indicator Survey. PMI will likely support the next bi-annual MIS in 2012. The PMI team had proposed that the MOH and Central Statistical Office attach a malaria module with under 5 parasitemia and anemia testing to the planned DHS (which will occur also in 2012); however on August 11, 2011, the DHS Steering Committee decided not to include malaria or anemia testing in the 2012 survey. So PMI decided to support the MIS given that the DHS will not include a malaria module. PMI will only support one national survey in 2012 (\$200,000).
- Support surveillance in Lusaka and Kazungula. Both Lusaka and Kazungula have experienced dramatic drops in malaria incidence and they are entering a pre-elimination stage (<1 case per 1,000 population at risk). Surveillance will provide an early warning system to quickly identify malaria transmission. The system will include follow up of reported cases in health facilities as well as active case detection and treatment (\$100,000).
- Support M&E activities at NMCP with one full time staff located at NMCP. This person will assist M&E Officer with collating existing data, analysis of routine data reports, generation of quarterly M&E Newsletters, and dissemination of data to clinicians, public health staff and partners (\$50,000); and
- CDC Technical assistance on monitoring and evaluation (\$12,100).

14. STAFFING AND ADMINISTRATION

Two health professionals oversee the PMI in Zambia, one representing CDC and one representing USAID. All PMI staff members are part of a single inter-agency team led by the USAID health team leader. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, and managing collaborating agencies. The two resident advisors supervise day-to-day activities including all technical and administrative aspects of the PMI, 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 report to the USAID health team leader. CDC supervises the CDC staff person both technically and

administratively. PMI undertakes all technical activities in close coordination with the NMCP and other national and international partners, including the WHO, UNICEF, the Global Fund, World Bank, and the private sector. The staffing and administration budget for FY 2012 is \$1,187,100.

The USAID Mission Director approves locally hired staff that support PMI activities at USAID. 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.

16. TABLES/ANNEXES

- 16.1 Table 1 – Budget Breakdown by Partner
- 16.2 Table 2 – Planned Obligations
- 16.3 TDY – Schedule of Temporary Duty (TDY)

Table 1
President's Malaria Initiative - Country
(FY 2012) Budget Breakdown by Partner

Partner	Geographical Area	Activity	Budget (\$)	%
CSH	National	BCC for routine distribution	\$450,000	1.9%
Deliver Task Order #3	National	Procurement of ACTs, RDTs, Lab supplies, roll out of logistics system	\$8,750,000	36.5%
TBD	National	Guidance on diagnostics, implementation of QA lab diagnosis, training, purchase of slide sets	\$700,000	2.9%
PRISM	National	Support distribution of ITNs	\$440,000	1.8%
IRS IQC 2 TASK ORDER 4	35 Districts	Procurement of insecticides for IRS. Support environmental monitoring, insecticide resistance monitoring	\$8,317,600	34.7%
Peace Corps	District	Support distribution of ITNs	\$3,000	0.0%
USAID - for Peace Corps support	District	Support OR	\$30,000	0.1%
WHO – AFRO	NA	National Malaria Program Office	\$105,000	0.4%
ZISSP	National	Community BCC, implementation of IRS, strengthening FANC, community BCC for IPTp and case management, malaria case management training, drug efficacy, capacity building. Support MIS and surveillance.	\$3,881,000	16.2%
USAID - CDC Staff	NA	Personnel & TDYs	\$1,223,400	5.1%
TBD	NA	OR on ITN longevity	\$50,000	0.2%
Total			\$23,950,000	100%

Table 2
President's Malaria Initiative - Zambia
Planned Obligations for Year 5 (FY 2012) (\$24,000,000)

Proposed Activity	Mechanism	Budget		Geographical area	Description
		Total \$	Commodity \$		
PREVENTIVE ACTIVITIES					
Insecticide Treated Nets					
Procurement of LLINs	DELIVER Task Order #3	2,420,000	2,420,000	National	Procure approximately 400,000 replacement LLINs for routine distribution through ANC and child health clinics. Procure additional 40,000 for distribution by the Zambia Anglican Council.
LLIN Distribution	Partnership for Integrated Social Marketing (PRISM)	440,000	440,000	National	Support the distribution of LLINs, including transportation and other logistics, to districts and health facilities.
National BCC for net usage	Communication Support for Health (CSH)	200,000		National	National IEC/BCC for routine distribution
Community BCC for net usage	Zambia Integrated Systems Strengthening Program (ZISSP)	500,000		National	Community-based BCC campaign through NGOs/FBOs to increase net ownership and use
OR - Prospective study of ITN durability	TBD	50,000			Operations research to evaluate ITN longevity
SUBTOTAL ITNs		3,610,000	2,860,000		
Indoor Residual Spraying					

Procurement of IRS commodities and support to other components of the program.	IRS IQC 2 TASK ORDER 4	8,317,600	8,317,600	Up to 35 districts	Procure insecticides and other IRS supplies/equipment for spraying up to 1,200,000 households, pending selection of insecticide and associated costs. Support environmental monitoring and environmental assessment. (includes additional OP or carbamates) (This amount is added to remaining pipeline from FY 11). Pay back \$3.1 million loan to Madagascar. Loan was used to meet insecticide budget shortfall in 2011 spray season.
Implementation of IRS program, monitoring and evaluation, storage/incinerator, community sensitization, geocoding	ZISSP	1,250,000		35 districts	Training, monitoring and evaluation, and BCC for IRS; pesticide storage, waste disposal. (includes 50,000 for M&E position)
Entomological monitoring and insecticide resistance monitoring and support to insectary	ZISSP	50,000		35 districts	Support insectary and entomological monitoring
CDC technical assistance on entomological monitoring and insecticide resistance	CDC	24,200		NA	Provide technical assistance on entomological monitoring and insecticide resistance.
SUBTOTAL IRS		9,641,800	8,317,600		
Intermittent Preventive Treatment in Pregnancy					
Strengthening of FANC for IPTp	ZISSP	396,000		National	Strengthen FANC in existing provinces and expanding to all nine provinces, where IPTp uptake is low (training, coordination with PEPFAR where appropriate)
National IEC//BCC to increase demand for IPTp	CSH	100,000		National	National BCC campaign to increase ANC attendance and demand for IPTp
Community BCC to increase IPTp demand	ZISSP	250,000		National	Community-based BCC campaign through NGOs/FBOs
SUBTOTAL IPTp		746,000			
SUBTOTAL PREVENTIVE		13,997,800	11,177,600		
Case Management					
Diagnosis					
Procure rapid diagnostic tests	DELIVER Task Order #3	2,250,000	2,250,000	National	Procure approximately 3,000,000 RDTs for health facilities

Strengthen malaria diagnostic capabilities at the health center level	TBD	700,000		National	Review of guidance and use of diagnostic procedures, development and implementation of plan for quality assurance of lab diagnosis, quantification and training. Purchase WHO standard slide sets.(includes WHO accreditation training) + bench aids, manuals
Microscopes and reagents	DELIVER Task Order #3	80,000			Procure 40 microscopes to equip rural health centers
SUBTOTAL – Diagnosis		3,030,000	2,250,000		
Treatment & Pharmaceutical Management					
Procure ACTs	DELIVER Task Order #3	3,000,000	3,000,000	National	Procure ACTs for the treatment of malaria in facilities and communities
Strengthen facility- and community-based treatment with ACTs	ZISSP	650,000		National	Training, supervision support, to improve service delivery in health facilities including treatment of malaria, and to assist with roll-out into communities through CHWs (\$50,000 for NMCP supervision) (300,000 for facilities and 350,000 for CCM)
National BCC for ACT usage	CSH	150,000		National	National BCC campaign to increase ACT usage
Community BCC for ACT usage	ZISSP	460,000		National	Community-based BCC campaign through NGOs/FBOs
Roll out the national logistics and pharmaceutical management system for malaria commodities	DELIVER Task Order #3	1,000,000		National	Strengthen supply chain and logistics for all malaria commodities and essential drugs, including Pharmaceutical Regulatory Authority and the End Use Tool
SUBTOTAL - Treatment & Pharmaceutical Management		5,260,000	3,000,000		
SUBTOTAL CASE MANAGEMENT		8,290,000	5,250,000		
HIV & Malaria					
Continue LLIN distribution to PLWHA		0		National	Collaborate with MOH/NMCP's equity program funded by GFATM and PMI
Incorporate malaria BCC into HIV home-based care		0		National	Incorporate malaria BCC into HIV home-based care implemented by NGOs in support of equity program

Continue training and promotion of FANC		0		National	Continue training and promotion of FANC
SUBTOTAL HIV and Malaria		0	0		
Capacity building					
Fund training and travel to build capacity of NMCP staff	ZISSP	25,000		National	Fund travel and registration to international meetings such as MIM and ASTMH and regional trainings. Support strategy development.
Fund WHO in-country National Professional Officer	WHO - AFRO	105,000		National	Fund the salary and benefits for the WHO in-country post of the National Professional Officer for malaria for two years
Peace Corps 3rd Year Volunteer	USAID	30,000		NA	Housing and travel for three volunteers
Peace Corps Small Projects Assistance	Peace Corps	3,000		NA	Direct project assistance
SUBTOTAL Capacity Bldg		163,000	0		
Monitoring and Evaluation					
Support for either DHS or MIS	ZISSP	200,000		National	Fund one of two surveys for collecting malaria indicators
Surveillance in Lusaka and Kazungula	ZISSP	100,000		Lusaka and Kazungula districts	Continue active peri-urban surveillance.
Support M&E technical staff	ZISSP	50,000		NMCP	Support M&E activities at NMCP with one full time staff located at NMCP. This person will assist M&E Officer with collating existing data, analysis of routine data reports, generation of quarterly M&E Newsletters, and dissemination of data to clinicians, public health staff and partners
Technical assistance	CDC	12,100		NA	Technical assistance on monitoring and evaluation issues.
SUBTOTAL - M & E		362,100	0		
In-country Staffing and Administration					
In-country Staffing and Administration	CDC/USAID	1,187,100			Salary, travel and in-country support for resident advisors

SUBTOTAL - In-country Staffing	CDC/USAID	1,187,100	0		
GRAND TOTAL		24,000,000	16,427,600		

TDY

President's Malaria Initiative - *Country*

Schedule of Temporary Duty (TDY) for Malaria Operational Plan FY2012

Type of TDY	Number of TDYs	Name/Agency	Description	Dates	Cost/Source
Technical assistance	2	CDC	Technical assistance for entomologic monitoring and insecticide resistance	TBD	\$24,200/MOP 2012
Technical assistance	1	CDC	Monitoring and evaluation	TBD	\$12,100/MOP 2012