

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



## PRESIDENT'S MALARIA INITIATIVE



**PRESIDENT'S MALARIA INITIATIVE**

**Zambia**

**Malaria Operational Plan FY 2013**

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## 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.

PMI was launched in June 2005 as a five-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions in high burden countries in sub-Saharan Africa. In December 2006, Zambia was selected as a PMI country. Since then, Zambia has received approximately \$103 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 remains one of the government's highest priorities. The National Health Management Information System in 2011 reported more than 4 million clinical and laboratory-confirmed cases of malaria and more than 4,500 malaria deaths. Although the number of malaria cases decreased from 2000 to 2008, an increase was reported in 2010 in several provinces. 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), which 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) 2013 PMI funding for Zambia complements the National Malaria Strategic Program (NMSP) for 2011-2015. The plan is also based on PMI experiences in its first five years. A planning visit took place in May 2012 with representatives from USAID and the Centers for Disease Control and Prevention (CDC) who met with the National Malaria Control Program (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 sixth Malaria Operational Plan for Zambia and describes proposed expenditures of \$24 million for FY 2013 under PMI.

**Insecticide-treated nets:** In 2011, the NMCP distributed over 4 million nets through mass distribution campaigns and routine distribution at antenatal clinics (ANC) and Expanded Program on Immunization (EPI) clinics. Of all the nets that were distributed, approximately 1.7 million were purchased by PMI. PMI provided 900,000 ITNs to all districts nationwide for routine distribution at all ANC/EPI facilities. An additional 860,146 of PMI-funded nets were distributed through mass distribution campaigns. PMI strengthened its close partnership with the United Kingdom's Department for International Development (DFID) by assisting in the procurement—using DFID's funds—of nearly 1 million nets. PMI also supported an operations research project to examine ITN durability prospectively to better determine when ITNs should be replaced. Results are not yet available. In 2012, PMI procured 833,000 ITNs for ANC/EPI

distribution. An additional 80,000 ITNs were procured and provided to the Zambian Anglican Council for distribution along the Angolan and Namibian borders. With FY 2013 funding, PMI will focus on procuring 540,000 nets for routine distribution through ANC/EPI facilities, improving the proper and consistent use of nets, as well as completing the ongoing net durability study.

**Indoor residual spraying:** The NMCP plans to implement an integrated vector management 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 are focused in rural areas. PMI assists the NMCP in selecting areas for IRS based on evidence of active malaria transmission. Over the last 12 months, PMI ensured environmental compliance and assisted with training of spray operators who sprayed 1.2 million structures in 35 districts, covering a population of 6.2 million people. PMI also supported environmental compliance inspections and the national entomology laboratory and insectary. Resistance against pyrethroids, dichloro-diphenyl-trichloroethane (DDT) and carbamates has been detected in several districts. PMI worked with the NMCP to develop an insecticide-resistance monitoring plan. With FY 2013 funding, PMI will support IRS in 20 districts, covering approximately 800,000 households and protecting 4.1 million people. PMI will procure insecticides as well as support storage and pesticide waste disposal. PMI will work with NMCP to strengthen entomological monitoring and insecticide resistance management systems.

**Intermittent preventive treatment in pregnancy:** The NMCP's policy is that all pregnant women should receive at least three doses of sulfadoxine-pyrimethamine (SP) for intermittent preventive treatment in pregnancy (IPTp). 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 three-dose IPTp coverage are SP stockouts due to procurement issues, and late attendance of women at ANC. In 2012, PMI supported training of provincial- and district-level clinical care teams in providing supervision for IPTp, training of healthcare workers in IPTp, and behavior change communication (BCC) activities to encourage early ANC attendance and to improve SP uptake. With FY 2013 funding, PMI will continue its support of training of health workers in IPTp provision and supervision, and BCC activities related to malaria in pregnancy.

**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. In the last year, PMI has supported procurement and distribution of 3 million RDTs, and 40 microscopes, as well as the training of clinical and laboratory personnel in the use of these diagnostic tools, and training of national, provincial, and district level staff in providing outreach training and support supervision for quality assurance of malaria diagnostics. With FY 2013 funding, PMI will procure almost 3 million RDTs and 50 microscopes. PMI will continue to strengthen outreach training and support supervision of health workers, together with quality control of laboratory diagnosis.

**Case management – Treatment and Pharmaceutical Management:** During 2011, NMCP trained staff in the new treatment guidelines for uncomplicated malaria. NMCP has been

monitoring artemisinin combination therapy (ACT) efficacy which is still within acceptable limits. Delays in procurements from donors have resulted in stockouts of ACTs and SP in peripheral facilities. DFID provided resources to USAID for the procurement of 5.1 million ACTs that helped alleviate stockouts. With FY 2013 funding, PMI will purchase 4 million ACT treatments. Facility- and community-based case management will be supported through training and supervision. An integrated BCC activity will be supported to encourage prompt care seeking for fever.

In 2012, PMI continued to support strengthening of malaria commodities distribution at all levels through the nationwide rollout of the Essential Medicines Logistics Improvement Program (EMLIP, a program under which Medical Stores Limited, the national level warehouse, provides each participating health facility with commodities based on its actual consumption data). To date EMLIP has been rolled out to 20 districts. Rollout to the rest of the country is currently scheduled at one district per month with plans to implement EMLIP in seven additional districts by the end of the calendar year 2012. In addition, PMI continued to support the MOH in the forecasting and quantification of ACTs, ITNs, RDTs, and SP. With FY 2013 funds and in collaboration with the Ministry of Health (MOH), PMI will continue to support the nationwide rollout of the EMLIP system. In addition, PMI will provide support to increase MOH ownership and coordination of forecasting, quantification, and procurement planning for all malaria commodities.

**Monitoring & Evaluation:** Zambia has strong monitoring and evaluation activities. Every two years the NMCP conducts a Malaria Indicator Survey (MIS) to track the Roll Back Malaria population-based indicators. The last MIS, which PMI supported, was carried out during 2012. The National Management Health Information System, deployed nationally, is producing reports on a regular basis. The End Use Verification site visits are conducted quarterly and reports are disseminated and follow up actions conducted. A health facility survey was completed and results will be available in late 2012. Proposed activities with FY 2013 funding include: partly financing the 2014 MIS, continuation of the EUV site visits, continued surveillance in Lusaka, and beginning phone-based reporting in IRS districts. Additionally, resources will be made available to support NMCP with personnel, supervision visits, and training. Finally, two operations research activities are proposed: an evaluation of the patient referral system for severe malaria and a survey of net use practices.

**Behavioral Change Communication:** The NMCP has a well-defined and thoughtful BCC strategy. It clearly anticipates the challenges Zambia will face as it moves forward in malaria control. PMI will support NMCP's BCC strategy through integrated activities at national, community and individual levels for each malaria control intervention. PMI will support programs to increase use of prenatal services, to encourage use of nets every night year round, and to inform parents of the importance of seeking care quickly for febrile illnesses in children.

## ACRONYMS

ACT – artemisinin-based combination therapy  
AIDS – Acquired Immuno-Deficiency Syndrome  
AIRS – Africa IRS Project  
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  
CSH – Communication Support for Health  
DDT – dichloro-diphenyl-trichloroethane  
DFID – Department for International Development  
DHS – Demographic and Health Survey  
DHO – District Health Office  
EMLIP – Essential Medicines Malaria Logistics Improvement Program  
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  
IMaD – Improving Malaria Diagnostics Project  
IMCI – integrated management of childhood illnesses  
IPTp – intermittent preventive treatment in pregnancy  
IRS – indoor residual spraying  
ITN – insecticide-treated net  
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  
MSL – Medical Stores Limited  
NMCP – National Malaria Control Program  
NGO – non-governmental organization  
OTSS – outreach training and support supervision  
PEPFAR – President’s Emergency Plan for AIDS Relief  
PMI – President’s Malaria Initiative  
RBM – Roll Back Malaria  
RDT – rapid diagnostic test  
SMAG – Safe Motherhood Action Groups  
SP – sulfadoxine-pyrimethamine  
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  
WHOPES – World Health Organization Pesticide Evaluation Scheme  
ZAC – Zambia Anglican Council  
ZISSP – Zambia Integrated Systems Strengthening Project

# STRATEGY

## 1. Introduction

Zambia was selected as a President's Malaria Initiative (PMI) country in FY 2007. PMI has supported the scale up of all major malaria prevention, control, diagnosis and treatment modalities.

This FY 2013 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) 2011-2015 National Malaria Strategic Plan (NMSP). The MOP was developed in consultation with the NMCP, with participation of national and international partners involved in malaria prevention and control in the country. The proposed activities 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 and support by the United Kingdom's Department for International Development (DFID). This document 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 2013 activities.

## 2. Country Malaria Situation

Zambia has a population of approximately 13.4 million (2010 census), ten provinces, and 83 districts (the location and names of new districts are being finalized). Zambia's key health indicators are generally positive: under-five mortality has fallen from 191 per 1,000 live births in 1992, to 168 per 1,000 in 2002, and to 119 per 1,000 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. Also, 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 ten 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 rates. Because of this decline the NMCP classified the country in three malaria epidemiological zones to better focus their efforts. The NMCP used the parasitemia rates in the 2010 Malaria Indicator Survey (MIS) and what is known about malaria control in each area to establish these zones.

- 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 achieved 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, Muchinga, and Northern Provinces).

The National Health Management Information System (HMIS) in 2011 reported more than 4 million clinical and laboratory-confirmed cases of malaria and more than 4,500 malaria deaths. Although the number of malaria cases decreased from 2000 to 2008, there was an increase in reported cases in Luapula, Northern, Muchinga, and Eastern Provinces in 2009/2010. The 2010 Malaria Indicator Survey (MIS) also identified an increase in malaria parasitemia rates from 10% to 16% in children under five years of age compared to the MIS 2008. Severe anemia in the same age group also increased from 4% to 9% over the same time period.

Zambia currently has one active Global Fund malaria grant: Round 7 (\$13 million). The Principal Recipient is the United Nations Development Program (UNDP). Round 7, Phase 2 was signed in 2011. It will provide funds for insecticide-treated nets (ITNs) and rapid diagnostic tests (RDTs) as well as monitoring and evaluation (M&E) and training. Zambia submitted a Transitional Funding Mechanism (TFM) Global Fund application in 2012. This will hopefully provide long-lasting insecticide treated nets (ITNs) to meet needs in 2014. Other major donors include DFID, the Bill and Melinda Gates Foundation through the Malaria Control and Evaluation Partnership in Africa (MACEPA), and the World Bank. MACEPA provided \$35 million over nine years for technical support. Currently, the World Bank is finishing a \$30 million loan to Zambia for malaria interventions which ends in January 2013.

DFID is providing £17 million (about US \$26.7 million) to USAID for the procurement of malaria commodities during the calendar years 2012, 2013 and 2014. DFID also provided an additional \$1.95 million to procure artemisinin-based combination therapies (ACTs) and prevent a central warehouse stockout in 2012.

### **3. Country Health System Delivery Structure and MOH Organization**

The Ministry of Health (MOH) is responsible for planning, health 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 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 (district level)
- Health centers (district level)
- Level 1 hospitals (district level), Level 2 hospitals (provincial level), and Level 3 hospitals (central level)

At the provincial and district level, 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. Due to resource constraints, however, there is generally a variation between what the levels are supposed to provide and what they actually do provide. Table A shows the breakdown by type of facility and provider.

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
Total	1,882	100
<b>Health Facilities By Provider</b>		
MOH	1,490	79
Mission	121	7
Private	271	14
Total	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 500-1,000 households. Health centers, staffed by a clinical officer, nurse or environmental technician 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 (254), and then by the Copperbelt Province (235). Luapula Province has the lowest number of health facilities (142).

In addition to the MOH, the 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 (FBOs), 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. In addition, 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 indoor residual spraying (IRS) for many years within and around their compounds.

#### **4. Country Malaria Control Strategy**

The Zambian NMCP recently finalized a new NMSP for 2011-2015 to replace the plan for 2006-2010. The vision of the new NMSP 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 NMSP 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 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 system to manage the storage and distribution of malaria commodities; and reinforce coordination among partners. The plan seeks universal coverage with either an ambitious IRS program or ITNs. The plan also seeks to improve diagnostic testing capacity and quality as well as increase coverage of three doses of sulphadoxine-pyrimethamine (SP) for intermittent preventive treatment in pregnancy (IPTp). In addition, the plan notes the need to strengthen behavior change communication (BCC) for malaria prevention and treatment and the importance of establishing a robust surveillance, and monitoring and evaluation framework.

#### **5. PMI Goals, Targets and Indicators**

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 2015, 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; and
- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria.

## 6. Progress on Indicators to Date

Zambia continues to make progress in its fight against malaria. Data from the MOH's HMIS revealed a 60% reduction in hospitalization due to malaria and a 66% reduction in malaria deaths in children under the age of five years from 2001 to 2008. HMIS data showed an increase in cases in 2009-2011. Results from the 2010 MIS show progress in several areas of malaria control. Table B shows a comparison of key indicators over the last decade. The 2012 MIS results are not available at this time.

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 IPTp 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 this progress, the 2010 MIS identified an increase in malaria parasitemia in children under five years of age compared to the 2008 MIS. The 2010 MIS reported that 16% of children under five years had malaria parasitemia compared to 10% in the 2008 MIS and 22% in the 2006 MIS. 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 and Eastern Provinces and manage the insecticide resistance by rotating the insecticides for IRS.

<b>Table B: Indicator Results or Nationwide Surveys, 2001-2010</b>					
Indicator	2001/02 DHS <sup>1</sup>	2006 MIS <sup>2</sup>	2007 DHS <sup>3</sup>	2008 MIS <sup>4</sup>	2010 MIS <sup>5</sup>
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

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.

## **7. Other Relevant Evidence of Progress**

The NMCP completed a nationwide health facility survey in 2011. This survey will provide important data on case management and diagnostic testing from numerous health care facilities in Zambia. The report is expected in late 2012.

A program of active surveillance and active community case detection and laboratory confirmation in Lusaka District has shown low levels of transmission. Of the 104 index cases that had not traveled or had malaria in the month prior to testing, 3,419 persons were tested in their homes or nearby homes. Only 58 (1.7%) of these neighborhood members were positive by RDT. The success of this program has been evident in the decision of the district health officials to take over its funding. This surveillance activity has also been started in three other rural districts in the Southern Province in hopes of helping document elimination of malaria in five districts in Zambia by 2015. The Lusaka District surveillance system will likely serve as a model for all five districts slated for elimination by 2015.

## **8. Integration, Collaboration, Coordination**

The NMCP and its collaborating partners maintain regular communications and coordinate efforts through routine partners' meetings and technical working groups (TWGs) on IRS, BCC, M&E, case management, ITNs and operations research. All partners contributed to the development of the new 2011 – 2015 NMSP and annual action plans.

DFID renewed its Memorandum of Understanding with USAID/PMI to make available over \$2.5 million to PMI annually from 2012-2014, to help the MOH by providing ITNs, antimalarial and other essential medicines, and RDTs.

PMI met with World Bank staff this year to help ensure coordination of the upcoming IRS season and to assure that the roll out of the Essential Medicines Logistics Improvement Program (EMLIP) continues.

PMI met regularly with WHO, UNDP, MOH, and MACEPA staff to assist with completion of the 2011 – 2015 NMSP and the 2012 Global Fund TFM application.

In April 2012, PMI met with the leaders of the Isdell-Flowers Cross Border Initiative, Christian Aid, and ExxonMobil to encourage ongoing collaboration with private sector donors. PMI also participated in a round table with Bill Gates and senior Bill and Melinda Gates Foundation staff with MACEPA and the MOH to discuss the future of malaria control in Zambia and the region.

PMI met with colleagues in PEPFAR to discuss collaboration around laboratory training activities. Discussions have also been held to devise ways PEPFAR funds for PMTCT could be used to improve the availability of ITNs for women attending antenatal clinics. It may be feasible to use PEPFAR funds to purchase nets for couples who agree to participate in couples counseling and testing.

## **9. Challenges, Opportunities, and Threats**

There are a number of challenges faced by the NMCP as it seeks to control and eventually eliminate malaria in Zambia. Among them are the heavy dependence on donor funding, the unique problems presented by a changing malaria epidemiology, and specific challenges presented by the specific interventions.

Dependence on outside sources for most financing for malaria control leaves Zambia with little or no financing of its own for malaria activities. When funding from donors is interrupted or slowed, the precariousness of the malaria program is revealed by the occurrence of stockouts and the interruption of activities that result in recipients and patients not receiving the services they need (e.g. IPTp and IRS). Although many capital costs (e.g. ITNs) must still be borne by donors, at least initially, Zambia is now at a stage that it can begin financing parts of the national program. The country needs to develop a long-term financing plan using a mix of its own resources and donor inputs.

Zambia is moving into a new era of malaria control in which approaches and tools that have served well thus far to reach the current coverage levels will need to be revised to address the challenges of reaching the last mile. From dealing with late adopters of appropriate malaria behaviors to ensuring that commodities get to those hardest to reach, to developing monitoring and evaluation methods that provide accurate estimates in low prevalence settings, Zambia will need to maintain its gains while dealing with new scenarios.

The emergence of mosquito resistance to insecticides, uncertainty about the longevity of ITNs, and problems with SP efficacy are all important challenges that will also need to be addressed. These intervention-specific challenges are discussed in the intervention sections.

## **10. PMI Support Strategy**

PMI is investing heavily in IRS in Zambia. The decision to fund IRS is based on its importance to the NMCP and its high level of political commitment and interest by senior Government of Zambia officials. PMI support for the use of new insecticides provides a method of managing resistance by allowing mosquitoes time to become susceptible again after removing pressure from insecticides used for many years in Zambia. PMI is also supporting the ongoing monitoring of insecticide resistance as part of the integrated vector management program.

PMI and DFID will continue to support case management and diagnostics in Zambia given the lack of Global Fund support and the completion of the most recent World Bank funding mechanism in early 2013.

Zambia's strategy of eliminating malaria in five districts by 2015 will take substantial effort by all partners. PMI will continue to collaborate with the NMCP and MACEPA to support surveillance systems capable of careful and timely documentation of malaria in low-prevalence areas. This elimination effort will also include robust diagnostic and treatment capabilities.

## OPERATIONAL PLAN

### 1. Insecticide-Treated Nets

#### *NMCP/PMI Objectives*

Zambia’s ITN policy calls for universal coverage, which is defined as “ensuring that all sleeping spaces in all targeted households are covered by an ITN<sup>1</sup>” when funding is available. Operationally, this is defined as one ITN per sleeping space in rural areas and IRS in urban and periurban areas. Both will be provided in areas with high rates of malaria as funding permits. The NMCP’s goal is 80% of all residents will be using ITNs by 2015, as funding permits. In 2006, a policy decision was made to distribute only World Health Organization’s Pesticide Evaluation Scheme (WHOPES)-recommended long-lasting ITNs, which eliminated the need for re-treating nets. Initially, the ITN policy only targeted children under five and pregnant women, however this policy has now been expanded to include all sleeping spaces in a household. In order to achieve universal coverage, a number of delivery methods have been adopted. These include mass distribution of ITNs through door-to-door campaigns and routine distribution to pregnant women and children under five year through antenatal care (ANC) and Expanded Program of Immunization (EPI) clinics; all ITNs are distributed at no cost to the beneficiary. It is permissible under PMI priorities to provide ITNs to any person at risk for malaria in Zambia.

#### *Progress during the last year*

In 2011, the NMCP distributed over 4 million nets through mass distribution campaigns and through routine distribution at ANC and EPI clinics. Of all the nets that were distributed, approximately 1.7 million were purchased by PMI. Through mass distribution campaigns, 360,146 ITNs purchased by PMI were distributed in Copperbelt Province and 500,000 ITNs purchased by PMI were distributed in Eastern Province. PMI provided 900,000 ITNs to DHOs in all districts for routine distribution at all ANC clinics in support of the MOH’s Malaria in Pregnancy Program. The table below shows distribution by donor and mechanism in 2011.

<b>Donor</b>	<b>Mass Campaign Distribution</b>	<b>Routine ANC/EPI Distribution</b>	<b>Total</b>
World Bank	800,000		800,000
PMI	860,146	900,000	1,760,146
Global Fund	454,815		454,815
DFID	999,372		999,372
MACEPA	81,000		81,000
<b>TOTAL</b>	<b>3,195,333</b>	<b>900,000</b>	<b>4,095,333</b>

<sup>1</sup> National Malaria Control Program Strategic Plan for 2011 - 2015.

In 2012, PMI procured 833,000 ITNs for routine distribution. Distribution of these ITNs began in May/June of 2012. An additional 80,000 ITNs were procured by PMI and provided to the Zambian Anglican Council for distribution along the Angolan and Namibian borders.

Mass distribution campaigns were further supported through the use of community-based volunteers who provided information on correct and consistent use of ITNs, as well as demonstrating proper net usage at facility-level distribution points. Using PMI funding, 531 outreach workers were trained for this effort.

PMI strengthened its close partnership with DFID by assisting with the procurement of nearly one million nets using DFID funds. The PMI-DFID partnership is key to extending ITN coverage. This collaboration is expected to continue in the future.

PMI also supported an operational research project to examine ITN durability prospectively to better determine when ITNs should be replaced. ITNs distributed in 2011 in Northern and Luapula Provinces are being followed for both structural integrity and insecticide content for the next two years. Through this project, PMI strengthened its collaborations with the Peace Corps by engaging Peace Corps Volunteers both at the provincial and local level. A Peace Corps Response Volunteer, the first designated Peace Corps Malaria Coordinator in Zambia, manages this project. This project was launched February 2012 with training of the Peace Corps Volunteers with their Zambian counterparts and data collection is ongoing.

#### *Challenges, Opportunities, and Threats*

Funding constraints and uncertainty pose a major challenge to the availability of malaria commodities in general, including ITNs. If a recent Global Fund reprogramming request is approved, urgently needed ACTs will be purchased in place of ITNs which will result in an increased ITN gap in 2013.

*Anopheles* resistance to pyrethroids has been found in several provinces and PMI is supporting vector resistance monitoring (see IRS section for details). The efficacy of ITNs which exclusively use pyrethroids in the setting of vector resistance to pyrethroids is unknown. An in-country partner, Malaria Transmission Consortium, is currently doing a study to examine efficacy of ITNs alone, IRS with non-pyrethroids alone, and the combination of ITNs and IRS. Results of this study, anticipated to be available by the end of 2012, will help inform decisions of where to allocate ITNs.

In 2010, a PMI-supported ITN durability study found that ITNs as new as 27 months and as old as 44 months had similarly large total hole sizes, suggesting that net deterioration occurs much earlier than the assumed three-year lifespan. The current study of nets aged 12–36 months is expected to further inform the discussion of when nets should be replaced. The possibility of needing to replace an ITN more often has serious implications for determining the number of ITNs needed annually.

The NMCP is also concerned about the need to dispose of over 1.2 million ITNs that were distributed in 2010 and will need replacement in 2013. There are no guidelines for how to dispose of old nets.

### *Commodity Gap Analysis*

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

<b>Table D: ITNs distributed or pledged (2011-2013)</b>	
Criteria	LLINs
2011 – ITNs distributed:	4,095,333
2012 – ITNs distributed or pledged to be distributed	4,051,930
2013 – ITNs pledged	
PMI	540,000
DFID	200,000
GRZ/MOH	200,000
TOTAL	940,000
<b>Grand Total ITNs distributed or pledged (2011 - 2013)</b>	<b>9,087,263</b>

The need for ITNs in Zambia in 2014 was calculated by considering a population growth rate at 2.8% and the number of nets needed as one LLIN per 1.8 persons. The LLIN need calculated for 2014 was 9,435,508 and the estimated gap in coverage is nearly 5.7 million LLINs as shown in the Table F.

<b>Table E: ITN gap in Zambia for 2014</b>	
Criteria	2014
Total target population (all ages and genders)	14,616,106
LLIN Needs universal coverage of at risk population (via mass campaigns): 1 LLIN per 1.8 persons	8,120,059
LLINs for routine distribution to pregnant women through ANC clinics (4.5% of total population)	657,725
LLINS for routine distribution to infants (4.5% of total population through EPI clinics)	657,725
Total LLIN need in 2014	9,435,508
Already Distribute/Still Effective Nets in 2014*	2,823,660
Actual Need	6,611,848
Number of LLINS pledged for 2013	940,000
<b>Gap</b>	<b>-5,671,848</b>

\*Note: Calculated by the GRZ/MOH by incorporating net wastage of LLINs distributed through routine channels in 2011, 2012 and 2013 (8% year 1, 20% year 2, 50% year 3).

Zambia experienced malaria resurgence in 2010, when the incidence of malaria increased from 246 per 1,000 in 2009 to 330 per 1,000 in 2010 with corresponding rise in malaria-related deaths

(Malaria Programme Review 2010 (MPR 2010). Subsequently, a mass distribution campaign was conducted in 2011, as an immediate response to mitigate effects of the malaria upsurge. A mop-up campaign followed in 2012 to fill the LLIN gaps left in 2011. It is anticipated that by the end of calendar year 2012 there will be an adequate cumulative number of LLINs to meet all the LLINs needs in those areas targeted for LLINs (i.e., areas not covered by IRS). By 2014, the LLINs distributed in 2011 will no longer be effective and, if not replaced, the gap could translate into high numbers of malaria cases and deaths. As such, the next mass campaign is planned for 2014, to be followed with a mop-up campaign in 2015.

### *Plans and Justification*

With FY 2013 funding, PMI will focus on the procurement and distribution of nets to maintain a supply of nets for routine distribution through ANC/EPI facilities. Results from the on-going net durability study will be used to determine if it is necessary to adjust the number and timing of the procurement of replacement ITNs in order to maintain the trajectory needed to reach universal coverage.

Additionally, the MIS 2010 showed a gap between overall net ownership and use; while 64% of households owned at least one ITN, and of these households, only 42% of them had a member who slept under an ITN the night before. In order to improve ITN usage, PMI will continue to support BCC activities, prioritizing local over national activities (see BCC section). Also, to further target interventions to improve ITN use, an operations research project to examine barriers to ITN use, how ITNs are used, and how ITNs are cared for will be proposed. Districts being targeted for mass distribution of nets in FY 2013 will be examined.

Over the course of a year, a formative qualitative study using focus groups will be done to develop a questionnaire on ITN usage, the questionnaire will be implemented in the select districts, and based on the results of this survey, interventions to improve ITN use will be developed.

### *Proposed activities with FY 2013 funding (\$2,585,000)*

- Procurement of approximately 500,000 replacement ITNs for free routine distribution through ANC and EPI clinics. 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 (\$2,045,000);
- Support the distribution of ITNs including provision of transportation to districts and to health facilities, estimated at \$1/net (\$540,000);
- Support Peace Corps activities promoting ITN use. Peace Corps Volunteers will be provided with BCC materials and trained to promote appropriate ITN use in their villages (no additional cost to PMI);
- Peace Corps Volunteers will complete data collection for the ITN longevity study by April 2014 (no additional cost to PMI); and

- Support an operations research project on ITN use and care (see M&E section).

## **2. Indoor Residual Spraying**

### *NMCP/PMI Objectives*

The Zambian 2011-2015 NMSP has the goal of achieving universal coverage with either IRS or ITNs as the main vector-based interventions given current funding limitations. Primary objectives of the 2011-2015 NMSP include: covering at least 85% of all targeted structures/households in low to high transmission zones (IRS is targeted at high incidence areas) by the end of 2011, and having at least 80% of people living in malaria risk areas using appropriate malaria prevention and control interventions by 2015 (IRS or ITNs). 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. IRS is also recognized as the only intervention available to manage insecticide resistance through rotation among different classes of WHOPEs-approved insecticides, making entomological monitoring an indispensable component of an evidence-based program.

### *Progress during the last year*

The NMCP, with PMI support, developed IRS guidelines, ensured environmental compliance and assisted with training to spray nearly 1.2 million structures in 35 districts, representing 83% of targeted homes and protecting over 6.2 million people in 2011. The IRS program in Zambia targets only urban and peri-urban areas in each district. In each targeted community the goal is to spray at least 85% of the targeted homes. On average in 2011, PMI sprayed 44% of all the homes in each district. In addition to funding insecticides in 35 districts, PMI also funded: pre-, mid- and post-spray environmental compliance inspections to support the national IRS program in 53 districts; training of 105 supervisors and 1,783 spray operators; construction/maintenance of soak pits for pyrethroid liquid wastes; and assisting with maintaining the national entomology lab and insectary. In the 2011 spray season the NMCP with support from PMI and the World Bank sprayed in all 72 districts which it also plans to do in 2012.

Entomological monitoring for insecticide resistance in Zambia revealed high levels of DDT and pyrethroid resistance in 17 districts and carbamate resistance along the Zambia/Mozambique border. DDT and pyrethroids were used in Zambia prior to the 2011 spray season. In response to these findings the NMCP convened an Insecticide Resistance Technical Working Group which has been meeting since 2010. This group includes local entomologists as well as experts from USAID, CDC and the Liverpool School of Tropical Medicine and Hygiene. At the meeting in April 2012 the group decided on which insecticides to use in the 2012 IRS season.



Insecticide resistance is a major threat to the effectiveness of the IRS program in Zambia. The NMCP's ability to support the IRS program is questionable given that substantial increase in insecticide costs have not been matched by increased donor funding. Resistance to DDT, pyrethroids and carbamates has been detected in several parts of Zambia. Changing to more expensive insecticides such as long-acting organophosphates and carbamates increases the cost of the IRS program substantially. Resistance to pyrethroids also raises concern about ITN effectiveness given that pyrethroids are the only insecticide currently available for use in ITNs.

### *Commodity Gap Analysis*

Indoor residual spraying is one of the two main vector control interventions proposed by the NMCP, the other being ITNs. The NMCP goal is to spray over 85% of the IRS targeted structures in the urban and peri-urban areas targeted in each year's IRS program. It is likely that a similar gap will be present during the 2014 IRS season which will be funded by the 2013 MOP. Since the World Bank loan to Zambia ends in January 2013, a possible World Bank funding for the 2014 IRS season is not considered here. In addition, it must be noted that the Global Fund TFM application for 2013-2014 does not consider supporting the 2014 IRS season.

### *Plans and Justification*

PMI will focus its support of IRS in up to 20 districts, covering approximately 800,000 households/structures (85% of targeted structures) and protecting 4.1 million people in 2012. The MOH plans to spray in all districts in 2012. A long-lasting organophosphate will be deployed in the Copperbelt, Muchinga, and Eastern Provinces. Carbamates will be deployed in Luapula, Northern, and Copperbelt Provinces. Pyrethroids will be used in the IRS districts with no current evidence of resistance. Each year PMI funds between one-third and two-thirds of IRS expenses.

Areas for PMI assistance include: the elaboration of the IRS needs assessment showing the number of structures to be sprayed in each district; environmental monitoring and compliance; community sensitization; geocoding of structures to be sprayed; stores/insecticide management; procurement of insecticides, supplies and equipment; insecticide waste storage and disposal; and enhanced entomological monitoring and insecticide resistance surveillance. PMI supports the MOH policy to change the insecticide used for IRS based on evidence of vector resistance to insecticides. The actual number of IRS districts that PMI will support will depend on the cost of insecticides selected, the cost of implementation and the incidence of disease in the district.

The NMCP is using other partners for small scale larviciding projects in Lusaka and has not asked PMI for support.

### *Proposed activities with FY 2013 funding (\$7,224,200)*

- Procure insecticides and other IRS supplies/equipment for spraying approximately 800,000 households, depending on the insecticides selected and associated costs and supporting environmental monitoring and environmental assessment (\$5,300,000);

- Train spray operators, supervisors, drivers and storekeepers; monitoring and evaluation; BCC for IRS; pesticide storage; waste disposal; and pay for spray operations in PMI-funded districts; (\$1,750,000);
- Supporting the insectary and entomological monitoring in at least 20 districts per year, maintaining the operations of the insectary and work with NMCP to coordinate and facilitate the collection of entomological information, its analysis and interpretation to inform decision making in targeting vector control and pesticide selection for vector control; and continue insecticide resistance management (\$150,000); and
- Centers for Disease Control and Prevention (CDC) technical assistance for entomological monitoring and insecticide resistance (\$24,200).

### **3. Intermittent Preventive Treatment During Pregnancy**

#### *NMCP/PMI Objectives*

The NMCP has set a goal that all pregnant women attending ANC clinics receive at least two doses of SP for IPTp by 2015. National policy is for pregnant women to receive three doses of SP IPTp with the first dose starting after 16 weeks and subsequent doses spaced one month apart.

#### *Progress during the last year*

Focused antenatal care (FANC) is a comprehensive prenatal care package provided to pregnant women at ANC clinics that includes care related to malaria such as providing SP for IPTp, providing an ITN at the first ANC visit, and educating women on the importance of seeking care immediately for fever. FANC training and supervision is provided to healthcare workers via clinical care teams (CCTs) present in all districts and provinces nationwide. These teams consist of staff who are already part of the health system; a clinical care supervisor, and a community health worker coordinator. Provincial-level CCTs supervise and train district-level CCTs and health workers at district level facilities. District-level CCTs train and supervise health workers at the local facility level. PMI has supported the malaria in pregnancy component of FANC training for CCTs. In FY 2012, CCTs in all districts in Luapula and North-Western provinces (two provinces with malaria parasitemia among the highest in the country) received training in the supervision of FANC. Since their training, these CCTs have provided training to over 72 health workers.

The implementing partner rolling out FANC training of CCTs also conducted a nationwide rapid assessment of FANC to determine FANC training needs and to identify challenges to delivery and uptake of malaria in pregnancy interventions through FANC. The survey was conducted in two districts per province in 2011. The districts chosen had low IPTp uptake and high malaria parasitemias based on 2010 MIS data. Only 34% of the health care providers surveyed had received training in FANC in the last two years. The survey found that the main reason for health care providers not providing IPTp was stockouts of SP (64% of facilities surveyed had SP stockouts in the last quarter). Another important barrier to women receiving at least two doses of

IPTp was that 60% of women attended ANC clinic for the first time late in their pregnancy. Additionally, only 34% of the health care providers surveyed had received training in FANC in the last two years. This survey will serve as the basis of comparison for a future impact evaluation of this partner's activities.

Because the availability of SP is critical for IPTp, PMI invested in the roll out of the Essential Medicine Logistics Improvement Program (EMLIP) to improve distribution of malaria commodities (see Treatment and Pharmaceutical Management section).

National and local BCC related to malaria in pregnancy was also supported by PMI in FY 2012 (see BCC section). Also included in these activities is a formative research project regarding barriers to receiving SP for IPTp and results will be disseminated this year. National BCC efforts for MIP are part of a larger integrated campaign on maternal health and nutrition that disseminates messages through national radio and television spots encouraging early prenatal care, use of nets during pregnancy, and the importance of IPTp.

In FY 2012, 833,000 PMI-funded ITNs were provided for routine distribution to pregnant women attending ANC clinics (see ITN section for further details).

An operations research project regarding efficacy of SP for IPTp, supported by PMI funds previous to FY 2012, is almost complete. The birth outcomes portion of the study found that primigravid women taking at least two doses of SP had only half the risk of anemia (hemoglobin <11) compared to those who took less than two doses of SP. This benefit was not observed in multigravid women. Furthermore, no benefit was found for women of any gravidae for the outcomes of placental parasitemia or infant birth weight. These results have been shared with the NMCP and presented at an international conference. Results of the *in vivo* and resistance marker portions of the study are anticipated to be available in 2012.

### *Challenges, Opportunities, and Threats*

Frequent SP stockouts have been reported, and as found in the rapid assessment mentioned above, a majority of the facilities surveyed experienced stockouts in the three months prior to the survey. The reasons for these stockouts are twofold: 1) no SP supply at the central level, and 2) problems with distribution from central stores to the ANC clinics.

At the time of the MOP visit, SP was projected to stock out nationally in June 2012. SP, a relatively cheap antimalarial, costs about \$800,000 (1,863,432 SP doses needed in FY 2013) to meet the annual needs in Zambia. In previous years, the MOH provided for all SP needs. However, for 2012 the MOH had not set aside funds to procure SP, and there was no current or anticipated donor support for procuring SP. After meetings with PMI and partners, the MOH has again committed to procuring SP as needed. DFID has also agreed to procure 3,000,000 treatment courses of SP over the next two years through its Memorandum of Understanding with PMI.

Stockouts of SP in ANC clinics are common. However, the EMLIP was rolled out recently in select districts resulting in a reduction of stockouts of commodities such as SP in those districts.

PMI has an opportunity to improve SP availability with continued investments in the roll out of EMLIP (see Pharmaceutical Management for more information).

Another challenge in SP IPTp uptake is the cultural practice of not revealing a pregnancy until a woman shows obvious physical signs of being pregnant. This results in late presentation to ANC clinic. This cultural barrier will require continued BCC regarding IPTp.

Recent studies in Zambia and other sub-Saharan African countries suggest that SP is losing its effectiveness in IPTp. New drug combinations are being studied but results will not be available for one to two years. In the meantime, most countries, including Zambia, are continuing to use SP.

### *Plans and Justification*

The NMCP goal of 100% coverage with at least two doses of SP for IPTp was set based on the high average baseline coverage of 70% found in the 2010 MIS. In spite of the high coverage, there is a disparity of coverage between urban and rural women. The strategy to increase IPTp coverage includes targeting rural areas.

To strengthen delivery of care related to prevention and treatment of malaria in pregnancy, PMI will continue to support supervision and training of health center clinical staff in FANC through CCTs. Specifically, in the remainder of FY 2012 and for FY 2013, provincial-level and district-level CCTs in the remaining seven provinces will be trained. These 27 district-level CCTs will focus their initial training and supervisory visits on rural facilities where SP IPTp coverage is the lowest. Once training is complete, supportive supervision will be provided from the national level on an ongoing basis.

To improve patient knowledge and demand for prevention and treatment of malaria in pregnancy, PMI will continue to support national and local level BCC activities, with an emphasis on local BCC activities in rural areas (see BCC section).

### *Proposed activities with FY 2013 funding (\$396,000)*

- Provide supportive supervision to 27 district-level CCTs (in nine provinces). By FY 2013, it is anticipated that CCTs nationwide will have received initial training in FANC supervision and training. The next step is to continue to provide support to maintain good quality FANC supervision (\$346,000);
- National and community BCC efforts for MIP will include messages through national radio and television spots encouraging early prenatal care, use of nets during pregnancy and the importance of IPTp (see BCC section);
- Impact evaluation of BCC activities conducted to determine the usefulness of the techniques used (\$50,000).

## 4. Case Management

### Diagnostics

#### *NMCP/PMI Objectives*

In 2008, the MOH adopted a policy of universal laboratory diagnosis of malaria using microscopy or a rapid diagnostic test (RDT) (where microscopy is not available) prior to treatment. Microscopy is to be used where the equipment and trained staff are already present, otherwise RDTs should be used. By 2015, the NMCP aims to have all patients with suspected malaria undergo parasitological testing via microscopy, or an RDT, and all confirmed cases to receive early, effective treatment.

#### *Progress during the last year*

The NMCP, PMI, and partners have invested in three key areas related to malaria diagnostics: 1) procurement and distribution of diagnostic commodities; 2) training of clinical and laboratory personnel in the use of these diagnostic tools; and 3) training of national, provincial, and district level staff in providing outreach training and support supervision (OTSS) for quality assurance of malaria diagnostics.

PMI and partners were able to cover for all RDT needs in 2011. Specifically, PMI FY 2011 funds were used to purchase 3,000,000 RDTs out of the approximately 8,000,000 RDTs needed for use by health facilities and community healthcare workers (CHW) nationwide. An additional 3,000,000 RDTs are slated to be purchased this year with PMI FY 2012 funds. PMI furthered its partnership with DFID by using PMI procurement mechanisms to purchase 2,000,000 RDTs funded by DFID. Other donors provided the remainder of RDTs needed. Supply status of RDTs and future RDT needs were continuously assessed by quarterly quantification exercises led by the NMCP, with technical assistance from an implementing partner. Other diagnostic commodities purchased by PMI include 40 microscopes and reagents which are being used in health facilities with staff that have received training in malaria diagnostics. These diagnostic commodities were distributed from Medical Stores Limited (MSL) to the district level through the routine supply system for most districts, and for a few districts, via EMLIP.

To strengthen malaria diagnostic capacity at all levels, PMI has invested in training laboratory technicians and clinicians in malaria diagnosis, providing refresher training, and implementing a quality assurance program for malaria diagnostics. PMI supported the WHO accreditation of three laboratory technicians at the national level, bringing the total number of level two certified laboratory technicians in Zambia to four, building national microscopy expertise and capacity for training. At the provincial and district level, refresher diagnostic training was provided to 19 provincial level and 19 district level laboratory technicians.

To ensure quality of malaria diagnostics, PMI supported the OTSS program. In OTSS visits to local health facilities, provincial- and district-level supervisors use standardized checklists to observe use of RDTs and microscopy, recheck select malaria smears, and collect information on provider adherence to laboratory results and stockouts. These supervisors also provide on-site

training and corrective action as needed. In FY 2012, OTSS visits were done in an additional 55 health facilities. Since the beginning of the quality assurance program 3 years ago, a total of 114 health facilities and 1,004 health care workers will have received OTSS visits, the first year on a quarterly basis and thereafter semi-annually. The current goal of OTSS is to cover all 417 health facilities in the country that have a laboratory technician. Furthermore, to ensure that supervisors retain OTSS skills, OTSS refresher training was done for 18 laboratory technicians and 9 clinicians.

Findings of these OTSS visits were used to monitor the impact of the quality assurance program. Data collected were entered in a database that is managed by the NMCP and were used to track indicators measuring diagnostic capacity, target training, and allocation of diagnostic supplies. Differences in several indicators between the first and fourth OTSS visits were examined. This comparison showed the following improvements: the average percentage of microscopy tasks performed correctly increased from 66% to 80%; average percentage of RDT tasks performed correctly increased from 78% to 86%; health worker adherence to negative test results increased from 64% to 85% for RDTs and increased from 57% to 80% for microscopy; proportion of facilities that achieved a >85% concordance with supervisor slide readings increased from 74% to 85%; and facilities experiencing stockouts of malaria diagnostic supplies dropped from 87% to 24%. OTSS has improved provider adherence to malaria diagnostic guidelines.

A health facility survey which included compliance by providers with malaria diagnostic and treatment guidelines was conducted in 2011. The results are expected late in 2012. This survey will provide data on how often providers check for history of fever and perform malaria lab testing. The 2010 MIS showed that 16.7% of children who sought treatment for a fever episode had a heel or finger stick performed in a health care facility. Suspect malaria cases are defined as persons with a fever or recent history of fever.

#### *Challenges, Opportunities, and Threats*

Funding from other donors to purchase RDTs continues to be uncertain. If all projected donor contributions are received for 2013, almost all RDT needs will be met. For 2013, a delay in disbursement of funds or in procurement of commodities could jeopardize the RDT supply.

Quantification of RDT needs is often done in parallel by different partners, so it is difficult to get a true estimate of RDT needs. It has been proposed that the NMCP coordinate a quantification exercise for future RDT needs with participation from all relevant partners and donors so that all participants have a clear, uniform picture of future RDT needs.

The supply chain system continues to be a challenge in terms of getting RDTs from the central stores to district level (see Pharmaceutical Management section). Furthermore, health facilities are responsible for supplying CHWs with RDTs, and stockouts of RDTs have impeded this part of the supply chain.

Human resource shortages continue to be a challenge. A 2008 human resources assessment supported by the Clinton Foundation found that out of 1,500 health facilities, only 417 had laboratory technicians. Additionally, staff attrition and relocation resulting in untrained staff

replacing trained staff, while not quantified, certainly increases the needs for training and supervision.

### *Gap Analysis*

The gap analysis for RDTs was done based on consumption data in EMLIP districts (Table F). Projected needs over time decrease based on the assumption that malaria will decrease during this during frame.

<b>Need and Funding Source</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
RDT National Need	8,043,445	8,043,445	7,641,273	6,877,145
<b>Already committed</b>				
PMI	3,000,000	3,000,000	3,500,000	3,000,000
DFID	2,000,000	2,000,000		
Global Fund R7	3,600,000			
World Bank	2,000,000			-
Carry Over RDTs		2,556,555		
Total Available RDTs	10,600,000	7,556,555	3,500,000	
<b>Annual RDT Gap</b>	<b>2,556,555</b>	<b>(486,890)</b>	<b>(4,141,273)</b>	<b>(6,877,145)</b>

### *Plans and Justification*

To provide health care workers, laboratory technicians, and CHWs with the tools to diagnose malaria, PMI will continue to support the procurement of malaria diagnostic commodities. PMI will procure 3,500,000 RDTs for use in health facilities and by CHWs. Furthermore, 50 microscopes and associated reagents will be provided for use by trained laboratory technicians at facilities receiving OTSS. These microscopes will replace old and worn out microscopes in laboratories that already have trained microscopists or provide microscopes for new district hospital laboratories.

Outreach training and support supervision visits were found to improve quality of laboratory diagnosis of malaria, improve provider adherence to negative test results, and decrease frequency of stockouts of malaria diagnostic supplies in participating facilities. PMI and the NMCP will continue to support roll out of OTSS to additional facilities and refresher training for OTSS. To make laboratory training sustainable and to transfer skills to the NMCP, the NMCP proposes to have a local malaria microscopy course for provincial and district level staff. The best performers from this course will be supported towards WHO accreditation so that they may also provide microscopy training and validation.

*Proposed activities with FY 2013 funding (\$3,709,865)*

- Procure 3,500,000 RDTs to be used at health facilities and by CHWs to contribute towards filling the RDT need of 7,641,273 RDTs in 2014 (\$2,909,865);
- Strengthen malaria diagnostic capacity. These activities and funding will include: 1) one full time staff in Zambia; 2) travel costs in Zambia of several staff (typically two laboratory technicians and one clinician for one week every quarter) to rural districts far from Lusaka; 3) refresher training for 20 microscopists,; and 4) certification training of microscopists by the WHO (hopefully, the top eight microscopists will attend this training next year) (\$700,000); and
- Procure 50 microscopes and reagents to equip health centers with broken equipment and new hospitals that have trained microscopists (417 health facilities have laboratories with microscopy) (\$100,000).

Malaria Treatment

*NMCP/PMI Objectives*

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 dissemination of these guidelines in 2011 provided an opportunity to review current approaches to treatment of malaria with health care providers in Zambia. The health facility survey conducted in 2011 will provide information on health worker performance in case management of malaria as well as health service preparedness for delivering quality care.

Quinine is used to treat acute malaria in the first trimester of pregnancy. AL is used in the second and third trimesters.

The NMCP conducted AL efficacy studies in 2005, 2008, 2009, 2011, and 2012. AL maintains good efficacy in Zambia.

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 Integrated Management of Childhood Illnesses (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. Though current guidelines do not mention intravenous artesunate, the Case Management Technical Working Group has been begun discussing its 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 use of AL as first-line treatment. Antimalarial drugs available in private pharmacies include AL, quinine, SP, and artemisinin monotherapies.

A volunteer CHW workforce with an average of six weeks of formal training has been active in Zambia since the 1970s, providing preventive services and community mobilization. Trained CHWs use RDTs to diagnose malaria and treat positive persons with AL. The GRZ is reviewing its policy to expand coverage with this service, aiming to achieve universal access to community-based management of malaria. The Malaria Consortium is completing a project to train CHWs in the diagnosis and treatment of malaria, pneumonia and diarrhea in all districts in Luapula Province.

A new cadre of 300 community health assistants was deployed by the MOH in June 2012 after one year of training. This paid group will be equipped to diagnose and treat malaria, pneumonia, diarrhea, and other illnesses. Over time, this trained paid cadre may replace volunteer CHWs in Zambia.

#### *Progress during the last year*

Quarterly quantification exercises were carried out by the NMCP with support from PMI. In addition, PMI funded the training of 464 MOH health workers in the new case management guidelines. PMI also funded the training of 91 CHWs in addition to 74 supervisors and 32 trainers. PMI also funded one full-time faculty member in the new community health assistant training program for only one year. PMI purchased \$3,000,000 worth of ACTs in the last year.

#### *Challenges, Opportunities, and Threats*

An impending complete stockout of ACTs for July of 2012 caused by the cancellation of a UNITAID order was averted by prompt action by the Ministry of Health, PMI and DFID (see Pharmaceutical Management section).

The challenge with all CHWs is the lack of a supply chain that reaches the last mile and allows them to continue to diagnose and treat malaria after their training or project is completed.

#### *Commodity gap analysis*

Quantifications conducted in 2012 show the following expected needs and supply for ACTs in Table G. Needs for ACTs are calculated based on usage as documented in the 17 EMLIP districts.

	2012	2013	2014	2015	2016
<b>Funding Needs [\$]</b>	<b>*15,718,522</b>	<b>7,815,600</b>	<b>7,107,200</b>	<b>6,235,205,</b>	<b>4,802,387</b>
<u>Commitments</u>					
Global Fund	620,669	-	-	-	-
UNITAID-Donation	-	-	-	-	-
DFID	3,129,900	1,114,320	496,800	-	-
USG/PMI	3,958,820	3,006,100	-	-	-
Government of the Republic of Zambia	750,000				
<u>Total Commitments</u>	8,459,389	4,120,420	496,800	-	-
<b>Gap/Surplus</b>	<b>** (7,259,133)</b>	<b>(3,595,180)</b>	<b>(6,610,400)</b>	<b>(6,235,205)</b>	<b>(4,802,387)</b>

\*The 2012 need is this high because of the need to provide a nine month buffer stock in the pipeline.

\*\*There will be a funding gap of **\$7,259,133** for 2012 because UNITAID donated ACTs were cancelled.

### *Plans and Justification*

The NMCP has prioritized technical support for case management as an area that PMI should address. With FY 2013 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.

### *Proposed activities with FY 2013 funding (5,332,700)*

- Purchase approximately 4 million treatment courses of AL for uncomplicated malaria. Quarterly quantifications will monitor the supply and demand closely to ensure adequate AL is available throughout the year. PMI's contribution in conjunction with other donors should meet the 2013 demand (\$4,400,000);
- Strengthen facility- and community-based treatment with ACTs and support refresher training and supervision of healthcare providers and CHWs in the diagnosis and treatment of malaria in the 27 districts where the PMI bilateral partner operates. This refresher training will also include the importance of diagnostic testing in the diagnosis of malaria as well as treatment of severe malaria. Training in other districts will be conducted by the NMCP (\$847,700);
- Train clinicians in case management guidelines for uncomplicated and complicated malaria incorporating new guidelines for use of IV artesunate for severe malaria (\$35,000); and
- Support the production of new case management guideline documents as well as updated training materials when IV artesunate becomes the standard of care for severe malaria (\$50,000).

## Pharmaceutical Management

### *NMCP/PMI Objectives*

As part of the NMSP, the MOH aims to ensure the availability of adequate, quality, efficacious, safe, and affordable malaria commodities and consumables at all levels of service delivery through efficient and effective procurement and logistics management. Key strategies to achieve this objective include the following:

- strengthen planning and forecasting for malaria control commodities through the development and implementation of comprehensive annual commodities projections and procurement plans;
- strengthen systems for procurement and supply of malaria control commodities by improving linkages and coordination among the NMCP, the MOH and MSL;
- strengthen malaria commodity distribution at all levels through the nationwide rollout of the EMLIP;
- improve storage for malaria control commodities, at all levels;
- strengthen collaboration with partners involved in the procurement and distribution of malaria commodities;
- promote private sector participation;
- strengthen internal systems to ensure compliance with local and international regulatory frameworks in respect to procurement, usage and disposal of malaria commodities; and
- strengthen pharmacovigilance.

### *Progress during last year*

The Essential Medicines Logistics Improvement Program (EMLIP) is a demand driven system in which individual health facilities submit monthly reports on consumption of commodities to their respective DHOs. The DHOs in turn follow a predetermined fixed schedule for submission of reports to the Logistics Management Unit (LMU) housed at MSL. Data from each facility are entered individually and order quantities are determined by an automated system called the Supply Chain Manager Software. The MSL then packs the essential drugs, including antimalarials, for each facility. The EMLIP approach is based on evidence from a PMI-supported scientific trial. EMLIP implementation is funded by MOH and USAID (PMI. PEPFAR); UNICEF plans to support the Ministry of Health and the national Medical Stores Limited (MSL) with technical assistance in the national rollout of EMLIP. DFID funds essential medicines which must be in full supply for the EMLIP to function. Other stakeholders (e.g. UNDP, World Bank) are supportive of the implementation of EMLIP though they do not fund it.

During the past twelve months, EMLIP has been rolled out to four additional districts from the original 16, bringing the total to 20 districts. The implementation of EMLIP is expected to result in improved management and awareness of stock levels at health facilities through the mandatory submission of reports to the Logistic Management Unit at MSL. In addition, the stock status of EMLIP health facilities is expected to improve because consignments to health facilities are based on information received in monthly reports. Rollout to the rest of the country is

currently scheduled at one district per month with plans to implement EMLIP in seven new additional districts by the end of the calendar year 2012.

Under the leadership of the MOH, malaria partners successfully conducted an annual forecasting and quantification exercise for ACTs, ITNs, RDTs, and SP. The rollout of EMLIP strengthened this exercise through the availability of health facility data that was used to provide more accurate forecasts and quantifications. Quantification results identified funding gaps, which have been used by the MOH to mobilize funds. Regular quarterly meetings were held to re-visit quantification and forecasting data to ensure that it was up-to-date. Additional quarterly activities, included performing quarterly end use verification exercises, are conducted at health facilities to determine the type and number of patients treated with ACTs and SP.

### *Challenges, opportunities, and threats*

Stockouts of malaria commodities continue to be a problem at all levels of the supply chain. This is a result of both poor logistical and supply systems (particularly in non-EMLIP districts) and due to delays in funding from some donors.

In April of 2012, an unexpected cancellation of a UNITAID donation of ACTs valued at \$3.3 million dollars led to a projected central level stockout by the end of June of 2012. The UNITAID donation was cancelled because of a delay in signing an agreement with the Global Fund. This added to an already existing funding gap which would have led to stockouts by the end of the 2012 calendar year. In response to this earlier than expected and now larger gap in ACT availability, the MOH and partners were forced to identify a stop gap measure which included the following steps:

- DFID provided an additional \$1.95 million to assist in the immediate procurement of ACTs;
- PMI made available one million ACT treatments from its emergency to avert a projected June stockout;
- The GRZ identified \$753,000 to purchase additional ACTs to contribute to addressing the gap; this will be the first time the GRZ will procure ACTs since their introduction in 2004;
- UNDP identified GF cost savings (\$1.3 million) from previous ACT procurements which will be used towards addressing the ACT gap; and
- The MOH, through UNDP, requested that \$6.5 million in GF funds meant for ITN procurement be re-directed to procure ACTs.

Through the collaboration and coordination of malaria partners, a serious situation was averted; however, these steps only provide temporary ACT security. Long-term projections show that funding commitments that have been made thus far will not meet the ACT requirements over the next two to three years. In addition, by reprogramming Global Fund funds meant for nets for ACT procurement, long-term quantifications and projections now also show that there will be an ITN shortfall starting in 2013. This shortfall will still exist even if the Global Fund TFM application that was submitted for 3.7 million nets is approved. Any shortfalls in ITNs pose a threat to Zambia's progress towards meeting universal coverage goals. Further, current

commitments for RDTs are not adequate to meet Zambia's projected needs over the next two to three years. With no projected funding increases from current malaria partners, the GRZ will need to identify new sources of funding to ensure malaria commodity availability.

One positive development that occurred during the ACT crisis is that the GRZ, for the first time, provided funding for the procurement of ACTs. The GRZ has also indicated the intent to include ACTs as its own separate line item in the national budget request for 2013. In addition, the NMCP submitted a request for the procurement of SP, which was also projected to stock out at the central level by June. Faced with limited and in some cases shrinking donor resources, any increased commitment from the GRZ will be important in ensuring future malaria commodity availability and sustainability.

### *Plans and Justification*

In collaboration with the MOH, PMI will continue to support the rollout of a robust supply chain and logistics management system in collaboration with the MOH to improve the availability of malaria commodities at all levels of the health system. In addition, support will be provided to increase the MOH's ownership and coordination of forecasting, quantification and procurement planning for malaria commodities.

### *Proposed activities with FY 2013 funding (\$1,115,135)*

- Assist the MOH in the roll out of the national logistics and pharmaceutical management system which includes EMLIP (\$1,015,135); This will include:
  - quarterly forecasting of antimalarial drug and RDT needs and gaps in all districts;
  - importing, quality control, storage, distribution, and inventory management down to the health facility level in all districts;
  - EMLIP which includes improving feedback and reporting on consumption/stocks from health facility to district and higher levels;
  - monitoring of implementation/evaluation of coverage;
  - end-use verification/monitoring in a sample of all districts of availability of key antimalarial commodities at the facility level. Specifically, end use verification entails the regular supervisory/monitoring visits to a sampling of health facilities to detect: ACT (or other drug) stockouts; expiration dates of ACTs at health facilities; leakage; anomalies in ACT use by clinicians; and to verify quantification/consumption assumptions; and
- Conduct annual quality assurance supervisory visits by NMCP staff from the central to the district and health facility level to review and improve clinical care and drug stockouts (\$100,000).

## **5. Behavior Change Communication**

### *PMI/NMCP Objectives*

The NMCP has a written Behavior Change Communication strategy for 2011 – 2014. The strategy has clear behavior change objectives for each of the malaria control interventions and also identifies barriers to the desired behaviors as well as problem behavior that compete with the desired behaviors. Target audiences are also identified and measurable communication objectives are clearly stipulated. Finally, for each control intervention, messages are articulated and a media mix suggested. All institutions working on malaria in the public, private, and NGO sectors have been asked to follow the national strategy.

### *Progress during the last year*

PMI, through its contractors, has utilized a variety of interpersonal, mass-media, print, and community-level communications to create informed demand for malaria control. A social marketing strategy process refocused demand-generation activities using existing evidence from a 2010 survey and service statistics. Phone-in radio shows in six provinces were used extensively to generate discussion with the public about malaria prevention and treatment.

Community BCC activities for IPTp primarily consisted of expansion of Safe Motherhood Action Groups (SMAGs). SMAGs have been formed and trained in 18 districts over the last year and now exist in more than 50 districts. These groups have been trained in how to deliver BCC regarding staying healthy during pregnancy, including the importance of taking SP for IPTp, sleeping under an ITN, and seeking immediate care for fever.

### *Challenges, Opportunities and Threats*

As Zambia advances in its control of malaria, the behavioral issues it will encounter will be more and more complex and likely demand further investment to resolve them. Improving coverage of some interventions will likely slow down as early adopters of malaria interventions have already been reached while late adopters require additional and innovative convincing to adopt and maintain behaviors that, up to now, they have rejected. Late adopters may not be homogeneously distributed in the population and it will require special efforts to identify and reach them. This is especially true in the case of ITNs.

### *Plans and Justification*

All PMI indicators have human behavior components. They are dependent on the presence of the appropriate commodity and the right incentives and motivation of individuals to use those commodities. A mix of communication activities—mass media, community, and interpersonal—is necessary to inform, promote and maintain the desired behaviors. The mix of activities is dependent on the types of behaviors, barriers to behaviors, and whether the behavior has reached a critical mass in the population. However, in all cases communication activities need to be sustained or the behavior will dwindle over time, once the risk is perceived to have disappeared. The plans presented in this section are the best mix possible according to the state of the malaria

control in Zambia. Activities are presented by type of communication, but it should be understood that they are part of the mix to be applied to the different circumstances in the country. The 2014 MIS will be used to monitor the impact of these activities.

The NMCP believes that both national and community BCC activities are needed to change behaviors in malaria prevention and treatment. Each approach reaches different audiences. In terms of TV vs. radio, the evidence from the recent HIV campaign shows the penetration of TV in Zambia to almost be equal to radio. In fact, more people had seen television products than radio products. Seventy-three percent of respondents listen to radio and 78.3% watch TV at all, with 41.5% (radio) and 65.1% (TV) listening or watching on a daily basis. In urban areas, 80.3% listen to radio while 65.8% in listen in rural areas, and 92.1% of urban audiences watch TV while 64.5% watch in rural areas.

It is also worth noting that the malaria mass media approaches are not just blanket national strategies, but rather also utilize community radio stations as well, as an “in-between” strategy where messages can be locally tailored, translated, and thoroughly discussed as a complement to broader mass media and narrower community activities.

*Proposed activities with FY 2013 funding (\$1,660,000)*

- National BCC to maintain ownership and proper use of ITNs through national multi-media efforts. Net use lags behind ownership and needs both community and national efforts to achieve an increase. These resources for national-level activities are combined with other resources available to the NMCP. National activities will focus on least three groups; first, maintenance of appropriate behaviors in the population that is already exhibiting them; second, introduction of new cohorts to the desired behaviors; and, third reaching late adopters and those that are difficult to reach geographically (\$200,000);
- Community-based BCC through NGOs/FBOs to increase net ownership and use. Zambia has good ITN ownership and use indicators in the general population, but late adopters require a more focused and inter-personal approach. NGOs and FBOs will receive resources to develop and implement community-level BCC (\$500,000);
- National BCC to increase ANC attendance and demand for IPTp. Every year, there is a new cohort of primigravid women. Therefore, continued investment is required for outreach activities related to malaria in pregnancy. National BCC efforts for malaria in pregnancy are part of a larger integrated campaign on maternal health and nutrition that disseminates messages through national radio and television spots (\$100,000);
- Community-based BCC to increase ANC attendance and demand for IPTp. BCC activities through community groups (SMAGs) will be implemented to increase use of IPTp (\$250,000);
- National BCC campaign to increase ACT usage. Care seeking outside the home is relatively high in Zambia. Still, not all patients seek treatment at a health facility. Mass

media activities will promote early care seeking and treatment of malaria cases in children under five years of age (\$150,000); and

- Community-based BCC campaign through NGOs/FBOs to increase ACT usage. This activity has the same objectives as the national BCC campaign but its focus is on community-level activities support by NGOs/FBOs. The community BCC partner is only operating in 27 districts thus investments are needed at both the local and national level. (\$460,000).

## **6. Monitoring and Evaluation**

### *NMCP/PMI Objectives*

Over the last five years the NMCP guided monitoring and evaluation activities with its National Malaria Prevention and Control Monitoring and Evaluation Plan for 2006 – 2011. This costed plan was developed in partnership with stakeholders and received high marks from the Global Fund and others. PMI has supported the NMCP in updating its overall malaria control strategy as well as its M&E plan, and there is now a new draft M&E plan for 2012 – 2015. The NMCP M&E strategy tracks all Roll Back Malaria-recommended indicators.

PMI cooperates with several M&E partners all supporting one M&E plan. PMI provides 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 also supports implementing, and maintenance of more routine systems.

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. 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 District Health Management Teams. The HMIS collects data on suspected and confirmed cases of malaria, malaria case fatality rate (in hospitals), and stocks of medicines and RDTs. Information is also collected on a regular basis on the therapeutic efficacy of antimalarial drugs.

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; other child health indicators are also collected and will be used for impact evaluations. The most recent DHS was conducted in 2007 and provides a baseline estimate of mortality at the start of PMI. It was conducted during the last month or two of the malaria transmission season and the beginning of the post-transmission season. The next DHS is scheduled for 2013.

Nationwide MIS carried out in 2006, 2008, 2010, and 2012 (results pending) have provided information on the coverage of the four major malaria interventions, malaria parasite prevalence,

and the prevalence of severe anemia, and are useful for measuring changes over time in these indicators. PMI supported the 2008, 2010 and 2012 MIS's. Table H shows household and facility surveys implemented and planned from 2003 to 2014.

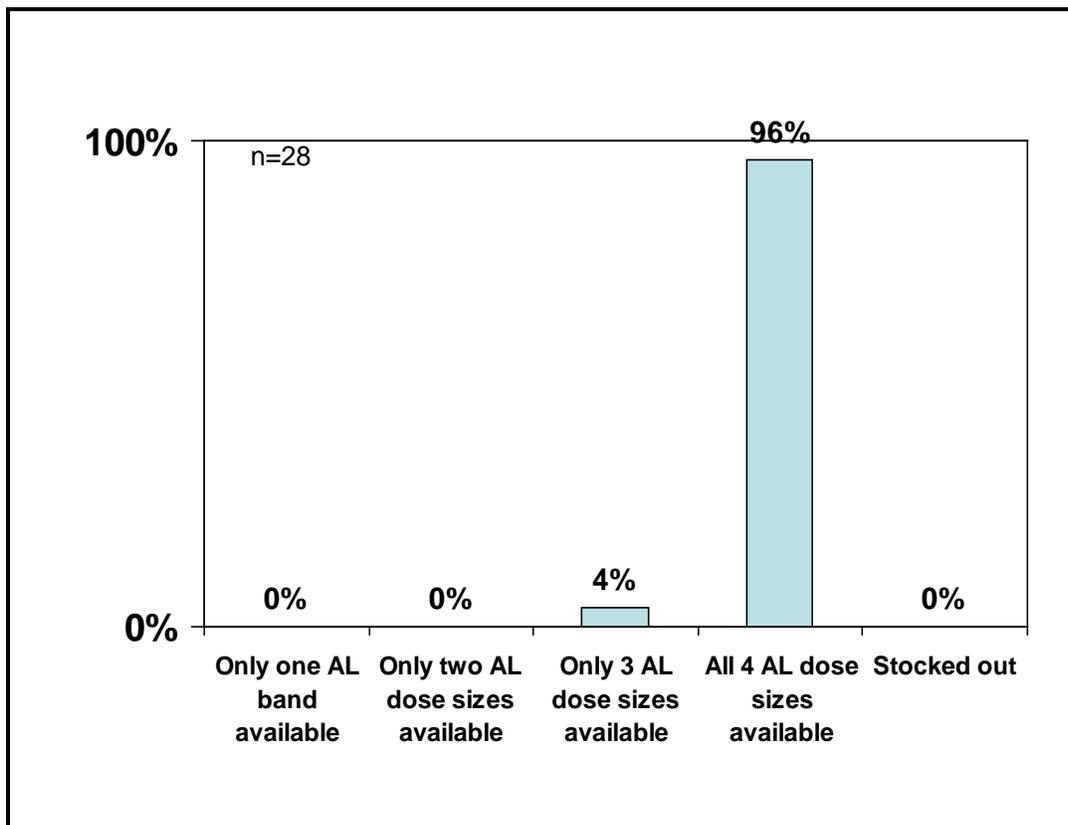
A number of other non-PMI financed surveys and evaluations provide additional provincial, district, and community level data on malaria epidemiology in Zambia, and provide useful information on the progress of malaria control efforts. These include health facility surveys to assess health worker performance 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.

Survey	Year											
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
DHS					X						X	
MIS				X		X		X		X		X
RBM Baseline		X										
IMCI Health Facility Survey						X						
WHO Service Availability Mapping				X								
Health Facility Survey			X	X					X			

*Progress during the last year*

End Use Verification: Zambia conducts the End Use Verification (EUV) surveys at 30 health facilities each quarter. The EUV collects information on several malaria and non-malaria commodities at the health facility level, 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. EpiSurveyor software on mobile phones is used effectively to accelerate data collection, analysis and report generation. Graphs like the one shown in Figure 2 can be developed with EUV data.

**Figure 2: Index of AL availability in health facilities of the MOH, EUV, 1st Quarter 2011 in 28 facilities surveyed**



Note: each band is a dose packet size.

Malaria Indicator Survey: PMI supported the implementation of a MIS in 2012 in collaboration with MACEPA and other donors. Results are not yet available.

Health Facility Survey: After a delay of one year, a health facility survey was completed in 2011. 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 collected data on availability of commodities and stockouts as well information on the preparedness of health services to conduct appropriate case management. The data analysis is underway. A basic report is expected in late 2012. This survey was funded by the World Bank and MACEPA with technical support from WHO and PMI.

Operational Research: PMI supported an operational research (OR) project on ITN durability that is currently ongoing (see ITN section). Additionally, results of the birth outcomes portion of an SP IPTp efficacy study have been disseminated to the NMCP and partners (see IPTp section).

Surveillance and Active Infection Detection: Surveillance in Lusaka District over year has identified 133 locally acquired malaria cases and tested over 4,300 persons in their homes and neighborhoods where only 1.7% of those tested by RDT were positive. This activity was initially

funded for five health centers. Since the district has taken over the operation of this activity in the original five clinics, PMI has been able to expand to five additional health centers. In Southern Province MACEPA and NMCP are doing mass test and treat activities up to three times per year. In over 300 facilities, health care workers are reporting malaria cases, lab testing, and drug availability by web-enabled cell phones on a weekly basis.

### *Challenges, Opportunities and Threats*

Areas in Zambia where malaria is declining pose an important challenge to M&E activities. As malaria prevalence declines, standard surveys will be less and less useful to detect, with appropriate accuracy, changes in malaria population-based indicators. Other methods for monitoring trends and impact—possibly more operationally complex and expensive—will need to be devised and implemented. Additionally, more attention and resources will need to be paid to HMIS as it will become the backbone information source as prevalence declines. These complexities notwithstanding, Zambia, given additional resources, can help demonstrate to other PMI countries how the M&E challenges of successful malaria control may be met.

An important challenge to M&E is the capacity of the HMIS system which uses an Access-based database. The MOH has indicated recently that it will migrate HMIS to District Health Information Software 2 (DHIS2), which has a more robust database application and will allow for internet access to the HMIS data. Other challenges include timeliness and completeness of HMIS data. These forms are forwarded to higher levels of the MOH, but the information they provide is not tabulated or disseminated in a timely manner. Prior to the 2013 MOP PMI will work with MOH staff to help create improved routine malaria reporting from DHIS2.

### *Plans and Justification*

Some of the proposed activities, such as support to MIS and surveillance in Lusaka, are a standard part or a continuation of M&E activities. Human resource support for M&E at NMCP and resources for training and supervision are also regular activities that have been supported in the past.

Two operational research (OR) projects are proposed. The first is an ITN use survey. The MIS 2010 showed a gap between overall net ownership; 64% of households owned at least one ITN, and of these households, only 42% had a member who slept under an ITN the night before. To further target interventions to improve ITN use, an operations research project to examine barriers to ITN use, how ITNs are used, and how ITNs are cared for will be proposed. The second proposed OR project is an evaluation of the patient referral system for severe malaria to inform recommendations for improvement of this system. The current NMCC strategic plan calls for an expansion of community-based diagnosis and treatment of malaria. For severe malaria, this strategy depends on community health workers being able to identify severe malaria, referring the patient, the patient following through with the referral, and the health facility providing adequate treatment. Furthermore, in the future, Zambia may consider introducing the WHO-recommended pre-referral treatment with rectal artesunate; however, this depends on a well-functioning referral system. These studies will be carried out under the leadership of NMCP with assistance from PMI partners as needed.

*Proposed activities (\$712,100)*

- Support the Malaria Indicator Survey in 2014. The MIS is a biannual survey that provides the NMCP with standard population-based indicators for monitoring and evaluating malaria interventions. This will be the fifth survey with standard methodology and malaria indicators. A data access agreement will be required for this funding to be released. The use of these funds may change if a decision is made not to conduct an MIS in 2014 (\$200,000);
- Support case-based surveillance in Lusaka without active case detection. Begin weekly cell-phone based reporting a confirmed malaria cases, malaria laboratory testing results, and drug availability in all health care facilities in the 20 PMI IRS districts to monitor the impact of IRS (\$250,000);
- Encourage the NMCP to support M&E activities with one full time staff located at NMCP. PMI will only support three years of funding for this position. This person will assist the 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 (no cost to PMI);
- Resources for central-level NMCC personnel to conduct and follow up data quality audits in all districts and provincial offices in one year. This activity entails visiting officers responsible for collecting, collating and reporting data from health facilities to higher levels of the health system and ensuring that appropriate quality procedures are followed. No other donors are currently funding this activity. (\$60,000);
- Training on M&E of information officers at district and provincial levels. To do initial and follow up of training of information officers to ensure that personnel are trained in all aspects of malaria M&E including use of data for decision making (\$40,000);
- CDC technical assistance in monitoring and evaluation. The purpose of this trip will be to evaluate the HMIS after migration of the HMIS to the District Health Information System 2.0 platform (\$12,100);
- Operational research on ITN use. Districts being targeted for mass distribution of nets in FY 2013 will be examined. Over the course of a year, a formative qualitative study using focus groups will be done to develop a questionnaire on ITN usage, the questionnaire will be implemented in the select districts, and based on the results of this survey, interventions to improve ITN use will be developed (\$50,000); and
- Operational research on evaluation of the patient referral system. As Zambia advances in malaria control, a functioning referral system will be a requirement for success. This evaluation will involve assessing the different levels of the system and how they function vis-à-vis each other (\$100,000).

## **7. Health System Strengthening and Capacity Building**

### *PMI/NMCP Objectives*

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, BCC, IRS, Surveillance and Information, an ITN Officer, 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 DHOs 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 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 the 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 partners for BCC, health systems strengthening, and social marketing activities 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 PMI-funded malaria focal person at the Zambia WHO Country Office provided technical leadership for the development of the 2010 national malaria program and the 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, and the writing of the Transitional Funding Mechanism Global Fund Application 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 2012 Malaria Indicator Survey and the 2011 Health Facility Survey, and for the revision of 2010 national malaria treatment guidelines.

PMI and Peace Corps have strengthened their partnership by jointly implementing an ongoing ITN durability study (see ITN section). A Peace Corps Response Volunteer, the first designated Peace Corps Malaria Coordinator in Zambia, manages this project. Over 35 Peace Corps Volunteers have been engaged at both the provincial and local level within the two provinces where the study is taking place. Additionally, the PMI Resident Advisor provides subject matter expertise to the Peace Corps Malaria Coordinator to educate Peace Corps Volunteers on malaria.

### *Challenges, Opportunities and Threats*

None

### *Proposed activities with FY 2013 funding (\$35,000)*

- 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); and
- Peace Corps Third Year volunteer. Housing and travel for one Peace Corps Volunteer to assist in malaria activities and operational research as a Third year or Response Volunteer (\$10,000).

## **8. Staffing and Administration**

Two health professionals oversee 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. Candidates for resident advisors positions (whether initial hires or replacements) will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

The two resident advisors supervise day-to-day activities including all technical and administrative aspects of 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. The CDC staff person is supervised by CDC both technically and administratively. All technical activities are undertaken 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. PMI funds part of support and accounting staff salaries at USAID/Zambia. The staffing and administration budget planned for FY 2013 is \$1,230,000.

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.

President's Malaria Initiative - *Zambia*

**Table 1**

(FY 2013) Budget

**Breakdown by Partner**

Partner	Geographical Area	Activity	Budget (\$)	%
CSSH	National	Community BCC level to increase usage of nets, IPTp and ACTS	\$450,000	1.9%
Deliver Task Order #7	National	Procurement of ACTs, RDTs, Lab supplies, roll out of logistics system	\$10,470,000	43.6%
IMaD Follow-On (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	\$540,000	2.3%
AIRS (IRS IQC 2 TASK ORDER 4 )	35 Districts	Procurement of insecticides for IRS. Support environmental monitoring, insecticide resistance monitoring	\$5,300,000	22.1%
USAID - for Peace Corps support	District	Support OR	\$10,000	0.0%
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.	\$4,878,700	20.3%
CDC IAA	NA	Entomologic monitoring and insecticide resistance	\$24,200	0.1%
USAID and CDC Staff	NA	Personnel & TDYs	\$1,242,100	5.2%
NMCP (TBD)	NA	OR on ITN longevity, OR on patient referral system, district and provincial data audits, training on M&E, QA, review of case management guidelines	\$385,000	1.6%
<b>Total</b>			<b>\$24,000,000</b>	<b>100%</b>

**Table 2**  
**President's Malaria Initiative – Zambia**  
**Planned Obligations for Year 6 (FY 2013) (\$24,000,000)**

Proposed Activity	Mechanism	Budget		Geographical area	Description
		Total \$	Commodity \$		
<b>PREVENTIVE ACTIVITIES</b>					
<b>Insecticide Treated Nets</b>					
Procurement of LLINs	DELIVER Task Order #7	2,045,000	2,045,000	National	Procure approximately 500,000 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)	540,000	540,000	National	Support the distribution of LLINs, including transportation and other logistics, to districts and health facilities.
<b>SUBTOTAL ITNs</b>		<b>2,585,000</b>	<b>2,585,000</b>		
<b>Indoor Residual Spraying</b>					
Procurement of IRS commodities and support to other components of the program.	AIRS	5,300,000	5,300,000	Up to 20 districts	Procure insecticides and other IRS supplies/equipment for spraying up to 800,000 households (includes organophosphates and carbamates), pending selection of insecticide and associated costs. Support environmental monitoring and environmental assessment.
Implementation of IRS program, monitoring and evaluation, storage/incinerator, community sensitization, geocoding of IRS target structures	Zambia Integrated Systems Strengthening Program (ZISSP)	1,750,000		20 districts	IRS training and supervision; monitoring and evaluation, and BCC for IRS; pesticide storage, waste disposal; funds to pay for spray operations in the PMI-funded districts

**Table 2**  
**President's Malaria Initiative – Zambia**  
**Planned Obligations for Year 6 (FY 2013) (\$24,000,000)**

Proposed Activity	Mechanism	Budget		Geographical area	Description
		Total \$	Commodity \$		
Entomological monitoring and insecticide resistance monitoring and support to insectary	ZISSP	150,000		NA	Support insectary and entomological monitoring at up to 20 sites once per year.
CDC technical assistance on entomological monitoring and insecticide resistance	CDC IAA	24,200		NA	Provide technical assistance on entomological monitoring and insecticide resistance.
<b>SUBTOTAL IRS</b>		<b>7,224,200</b>	<b>5,300,000</b>		
<b>Intermittent Preventive Treatment in Pregnancy</b>					
Strengthening supervision capacities of CCTs to support implementation of IPTp as part of FANC	ZISSP	396,000		National	Capacities to implement IPTp as part of FANC in provinces where CCTs have received training will be strengthened, and CCTs will receive this training in all ten provinces.
<b>SUBTOTAL IPTp</b>		<b>396,000</b>	<b>0</b>		
<b>SUBTOTAL PREVENTIVE</b>		<b>10,205,200</b>	<b>7,885,000</b>		
<b>Case Management</b>					
<b>Diagnosis</b>					
Procure rapid diagnostic tests	DELIVER Task Order #7	2,909,865	2,909,865	National	Procure approximately 3,500,000 RDTs for health facilities
Strengthen malaria diagnostic capabilities at the health center level	IMaD Follow on	700,000		National	Local malaria microscopy accreditation preparation course for provincial and district level. OTSS support. Build slide bank.
Microscopes and reagents	DELIVER Task Order #7	100,000		National	Procure 50 microscopes to equip rural health centers
<b>SUBTOTAL -- Diagnosis</b>		<b>3,709,865</b>	<b>2,909,865</b>		
<b>Treatment &amp; Pharmaceutical Management</b>					
Procure ACTs	DELIVER Task Order #7	4,400,000	4,400,000	National	Procure ACTs for the treatment of malaria in facilities and communities 4,000,000

**Table 2**  
**President's Malaria Initiative – Zambia**  
**Planned Obligations for Year 6 (FY 2013) (\$24,000,000)**

Proposed Activity	Mechanism	Budget		Geographical area	Description
		Total \$	Commodity \$		
Strengthen facility- and community-based treatment with ACTs; train staff in new case management guidelines	ZISSP	847,700		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 \$300,000 for CCM); Train health workers in new treatment guidelines (\$197,000).
Review of case management guidelines	NMCP	35,000		National	Review of case management guidelines for uncomplicated and complicated malaria
Printing of guidelines and updated training materials	ZISSP	50,000		National	Printing guidelines and new training materials
Quality assurance	NMCP	100,000		National	Visits from central level to health facilities in districts for QA
Roll out the national logistics and pharmaceutical management system for malaria and other commodities; includes EMLIP	DELIVER Task Order #7	1,015,135		National	Strengthen supply chain and logistics for all malaria commodities and essential drugs, including Pharmaceutical Regulatory Authority and the End Use Tool
<b>SUBTOTAL - Treatment &amp; Pharmaceutical Management</b>		<b>6,447,835</b>	<b>4,400,000</b>		
<b>SUBTOTAL CASE MANAGEMENT</b>		<b>10,157,700</b>	<b>7,309,865</b>		
<b>BCC</b>					
BCC for net usage (National)	Communication Support for Health (CSH)	200,000		National	National IEC/BCC for routine distribution

**Table 2**  
**President's Malaria Initiative – Zambia**  
**Planned Obligations for Year 6 (FY 2013) (\$24,000,000)**

Proposed Activity	Mechanism	Budget		Geographical area	Description
		Total \$	Commodity \$		
BCC for net usage (Community)	ZISSP	500,000		National	Community-based BCC campaign through NGOs/FBOs to increase net ownership and use
BCC to increase demand for IPTp (National)	CSH	100,000		National	National BCC campaign to increase ANC attendance and demand for IPTp
BCC to increase IPTp demand (Community)	ZISSP	250,000		National	Community-based BCC campaign through NGOs/FBOs
BCC for ACT usage (National)	CSH	150,000		National	National BCC campaign to increase ACT usage
BCC for ACT usage (Community)	ZISSP	460,000		National	Community-based BCC campaign through NGOs/FBOs
<b>SUBTOTAL BCC</b>		<b>1,660,000</b>			
<b>Monitoring and Evaluation/Operations Research</b>					
Support for MIS	ZISSP	200,000		National	Fund 2014 MIS
Surveillance in Lusaka and IRS Districts	ZISSP	250,000		Lusaka IRS districts	Continue case-based surveillance in Lusaka and start phone-based reporting in IRS districts.
District and provincial data audits	NMCP	60,000		NMCP	Resources for central level personnel to conduct and follow up data quality audits in all districts and provincial offices in one year
Training on M&E of information officers at district and provincial levels	NMCP	40,000		NMCP	Training of M&E information officers at district and provincial levels to improve quality and frequency of reporting
Technical assistance	CDC	12,100		NA	Technical assistance on monitoring and evaluation issues.
Operations Research – ITN use	NMCP	50,000		NA	To further target interventions to improve LLIN use, an operations research project to examine barriers to LLIN use, how LLINs are used, and how LLINs are cared for will be proposed.

**Table 2**  
**President's Malaria Initiative – Zambia**  
**Planned Obligations for Year 6 (FY 2013) (\$24,000,000)**

Proposed Activity	Mechanism	Budget		Geographical area	Description
		Total \$	Commodity \$		
Operations Research -- Referral System	NMCP	100,000		NA	Assess the different levels of the referral system and how they function and perform regarding management of malaria.
<b>SUBTOTAL - M &amp; E</b>		<b>712,100</b>	<b>0</b>		
<b>Health System Strengthening and Capacity Building</b>					
Support to training and travel of NMCP staff	ZISSP	25,000		National	Fund travel and registration to international meetings such as MIM, SARN, and ASTMH and regional trainings. Support strategy development.
Peace Corps 3rd Year Volunteer	USAID	10,000		NA	Housing and travel for one volunteer
<b>SUBTOTAL Capacity Building</b>		<b>35,000</b>	<b>0</b>		
<b>In-country Staffing and Administration</b>					
In-country Staffing and Administration	CDC/USAID	1,230,000		NA	Salary, travel and in-country support for resident advisors
<b>SUBTOTAL - In-country Staffing and Admin</b>		<b>1,230,000</b>	<b>0</b>		
<b>GRAND TOTAL</b>		<b>24,000,000</b>	<b>15,194,865</b>		

