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# **PRESIDENT'S MALARIA INITIATIVE**

## **Malaria Operational Plan (MOP)**

**ZAMBIA**

**FY 2010**

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## **ABBREVIATIONS and ACRONYMS**

ACT – artemisinin-based combination therapy  
AIDS – Acquired Immuno-Deficiency Syndrome  
AL – artemether-lumefantrine  
ANC – antenatal care  
BCC – behavior change communication  
CDC – U.S. Centers for Disease Control and Prevention  
CHAZ – Churches Health Association of Zambia  
CHW – community health worker  
CP – cooperating partner  
DDT – dichloro-diphenyl-trichloroethane  
DfID – Department for International Development  
DHS – Demographic and Health Survey  
DHMT – district health management team  
EPI – expanded program on immunizations  
FANC – focused antenatal care  
FY – fiscal year  
GRZ – Government of the Republic of Zambia  
HIV – Human Immunodeficiency Virus  
HMIS – Health Management Information System  
HSSP – Health Services and Systems Program  
IEC – information, education, communication  
IMCI – integrated management of childhood illnesses  
IPTp – intermittent preventive treatment in pregnancy  
IMaD –improving malaria diagnostics project  
IRS – indoor residual spraying  
ITN – insecticide-treated net  
IVM – integrated vector management  
LLIN – long-lasting insecticide-treated net  
MACEPA – Malaria Control and Evaluation Partnership in Africa  
MERG – Monitoring and Evaluation Reference Group  
MIP – malaria in pregnancy  
MIS – Malaria Indicator Survey  
MOH – Ministry of Health  
MOP – Malaria Operational Plan  
MSL – Medical Stores Limited  
NAC – National HIV/AIDS/STI/TB Council  
NMCC – National Malaria Control Center  
NGO – non-governmental organization  
PCV – Peace Corps Volunteer  
PDA – personal digital assistant  
PEPFAR – President’s Emergency Plan for AIDS Relief  
PHO – Provincial Health Office  
PLWHA – People Living With HIV/AIDS  
PMI – President’s Malaria Initiative

RBM – Roll Back Malaria  
RDT – rapid diagnostic test  
RTI – Research Triangle International  
SMAG – Safe Motherhood Action Group  
SP – sulfadoxine-pyrimethamine  
SWAp – Sector Wide Approach  
TDRC – Tropical Disease Research Centre  
TOT – training of trainers  
UNICEF – United Nations Children’s Fund  
USAID – United States Agency for International Development  
USG – United States Government  
WHO – World Health Organization  
ZIMMAPS – Zambia Integrated Management of Malaria and Pneumonia Study

## EXECUTIVE SUMMARY

In December 2006, Zambia was selected as one of the final eight countries in a five-year, \$1.2 billion initiative to rapidly scale-up malaria prevention and treatment interventions in high-burden countries in sub-Saharan Africa. Since then, Zambia has received \$14.879 million and \$14.9 million in years one and two, respectively. This is the third Malaria Operational Plan (MOP) for Zambia and describes expenditures of \$25.6 million for fiscal year 2010 (FY 2010) under the President's Malaria Initiative (PMI)

Although there are clear signs of improvement, malaria continues to be a major cause of morbidity and mortality in Zambia and control of the disease is one of the government's highest priorities. According to reports from the Ministry of Health, there were approximately 3 million cases of malaria in Zambia in 2008. The most up-to-date information on nationwide coverage of malaria prevention and control measures in Zambia comes from the 2008 Malaria Indicator Survey, and shows significant progress in recent years. More than 62% of households own at least one insecticide-treated net (ITN), and 41% of children under five years of age had slept under an ITN the previous night. Almost 66% of households owned at least one ITN or were sprayed with an insecticide in the previous 12 months. Sixty-six percent (66%) of pregnant women took two or more doses of intermittent preventive treatment in pregnancy (IPTp). Children under five with severe anemia (Hb <8g/dl ) decreased by 69% (from 13.8% to 4.3%). Similarly, parasitemia in the same age group decreased by 54%, from 22% to 10%.

The FY2010 PMI funding for Zambia complements the National Malaria Control Center (NMCC) 2006-2010 Strategic Plan and malaria programming progress and PMI experiences in years one and two. A MOP planning visit took place in June 2009 with representatives from USAID and the Centers for Disease Control and Prevention who met with the MOH/NMCC, the World Bank, World Health Organization, UNICEF and a variety of other partners involved in malaria prevention and control in the country.

**Insecticide Treated Nets.** Although there are important improvements in ITN ownership and use, there are still significant geographical differences. Zambia has a policy of universal coverage with ITNs (defined as three nets per household). To achieve this goal the following approaches will be used: mass distributions of free ITNs, distribution to children and pregnant women and children under five through ante-natal clinics and the expanded program on immunizations, an equity program for vulnerable populations and promotion of commercial sales. During 2009, the MOH/NMCC will be distributing approximately 3.2 million long-lasting insecticidal nets (LLINs) with funding and support from the Global Fund, World Bank, PMI and Malaria Control and Evaluation Partnership in Africa.

To achieve universal coverage, an additional 2.8 million LLINs will be required in 2010. During FY 2010, PMI will procure 1,600,000 LLINs and provide logistical and distribution support as well as behavioral change communication interventions at the community and national level. PMI will also continue to support operations research to clarify issues about the longevity of ITNs in Zambia.

**Indoor Residual Spraying (IRS).** The MOH/NMCC has a longstanding and recently intensified IRS program that has traditionally concentrated on urban areas and, with support of mining concerns, in villages where mine workers have their homes. Pyrethroids or DDT is used depending on type of local construction. With PMI support, MOH/NMCC has sprayed 1.1 million structures in 36 districts of the country's 72 districts reaching a population of more than 5 million people—this represents over 90% of targeted structures. In FY 2010 PMI will support the expansion of IRS to 54 districts targeting 1,800,000 structures. IRS will be contingent on the development of an evidence-based IRS strategy. IRS in Lusaka and Kazungula, will be dramatically reduced due to low levels of malaria transmission in these areas and in its place, an enhanced surveillance system will be set up to detect increased transmission and of the potential need for focal IRS. PMI will ensure that IRS policy considers ITN distribution and insecticide resistance.

**Intermittent Preventive Treatment in Pregnancy (IPTp).** MOH/NMCC policy calls for three doses of sulfadoxine-pyrimethamine (SP) starting at the 16<sup>th</sup> week of pregnancy as part of the Focused Antenatal Care (FANC) package. In spite of impressive gains in IPTp use, national averages hide substantial differences in rural areas and among poorer women. Reports also indicate that women often leave health facilities without receiving IPTp; arrive too late in their pregnancies to complete the full course of IPTp; or have concerns about the safety of medications during pregnancy. Refresher training in FANC in low performing districts was conducted during 2008 and there are plans to expand it to other areas. During FY 2010, PMI will support refresher training in IPTp in four remaining provinces (out of nine provinces) and distribution of guidelines, job aids and other tools designed to increase health worker compliance with IPTp guidelines and increase uptake of IPTp among pregnant women. PMI will also boost community-based and national level communication activities and will engage Peace Corps to further IPTp objectives in communities.

**Case Management – Diagnostics.** Zambia has recently adopted a policy that recommends that all suspected malaria—including in children under five—be confirmed with either microscopy or a rapid diagnostic test (RDT). Training and reference materials for laboratory diagnosis have been updated, including the Integrated Management of Childhood Illness protocol; however only 30% of health facilities have a functional microscope and there is a dearth of trained microscopists. To extend laboratory diagnosis to more peripheral levels, the MOH/NMCC has introduced RDTs in rural health centers and villages for use by community health workers (CHWs). With support from the Global Fund Round 4 grant, RDTs have been rolled out since 2007 and are now present in all facilities without microscopy and in 14 districts (out of 72) through CHWs. To date, PMI has provided 2,889,000 RDTs. According to recent quantifications, approximately 5,000,000 RDTs will be needed in 2010. The Improving Malaria Diagnostics Project has been engaged to evaluate current diagnostic procedures and capacity and provide technical and training support. In FY 2010, PMI will provide 3.3 million RDTs together with 30 microscopes and diagnostic supplies and will strengthen diagnostic capabilities through quality assurance, refresher training and supportive supervision.

**Case Management – Pharmaceutical Management and Treatment.** PMI, in collaboration with other donors, is supporting a pilot of two different supply systems for pharmaceutical management to determine which one is better suited for the Zambian context. Quantification

exercises indicate Global Fund will cover all ACT needs through 2010. Although an adequate supply of ACTs exist in country, some health facilities are experiencing stockouts. Data from recent surveys show that care seeking for fever is still far from ideal in children under five. Preliminary results from PMI-supported operations research show that CHWs are capable of using RDTs and correctly treating uncomplicated malaria and pneumonia. Additional research carried out by the MOH/NMCC to test the viability of CHWs confirmed these findings and has motivated MOH/NMCC to roll out the approach to 14 districts (out of 72). In FY 2010, PMI will support health worker training in malaria case management and supervision and we will continue to support the strengthening of supply chain management. These activities will be complemented by national and community-based behavioral change and communication activities.

**HIV/AIDS and Malaria.** An estimated 14% of the population of adults between 15 and 49 years old are infected with HIV in Zambia. One such overlap is the potential of 18,500 HIV/AIDS community volunteers than can and have been used for malaria control activities—providing home-based management of malaria and delivering bed nets to people living with HIV/AIDS. Additional overlap and synergy occurs in the joint support to improve the essential drug system. At no additional cost to PMI, activities supported by the Global Fund and the President's Emergency Plan For AIDS Relief include the distribution of LLINs to people living with HIV/AIDS, promotion through HIV/AIDS volunteers of MOH/NMCC's equity program and provision of technical assistance and training with FANC training modules. In 2010 PMI will provide 100,000 LLINs to this group of orphans and vulnerable children.

**Monitoring and Evaluation (M&E).** PMI supports the MOH/NMCC's M&E Plan. Many of the MOH/NMCC's M&E needs are satisfied by the Malaria Control and Evaluation Partnership in Africa (MACEPA) project. MACEPA's support to the MOH/NMCC in Zambia includes technical assistance for monitoring and evaluation of malaria interventions including biannual MISs, geocoding for the IRS program, support for emergency procurement and distribution of LLINs in 2006, an integrated IEC/BCC/advocacy initiative, and program support that includes information technology, infrastructure, and staff training opportunities.

There are several-large scale surveys that provide information on intervention coverage, impact on all-cause mortality of children under five years of age and health facility performance. Additionally, sentinel site surveillance, health information systems and a myriad of smaller data collection efforts and research complement data needs. For FY 2010, PMI will support: 1) implementation of a Malaria Indicator Survey in 2010; 2) hiring of additional M&E staff for MOH/NMCC; 3) sentinel site surveillance; and, 4) an enhanced malaria surveillance system and rapid IRS response in Lusaka and Kazungula.

The proposed FY 2010 PMI budget for Zambia is \$25.6 million. Of this total, 44% is programmed for purchase and distribution of LLINs, 24% for indoor residual spraying, 22% for diagnostics and case management, 5% for IPTp, 4% for in country administration, 1% for monitoring and evaluation. Approximately 66% of the budget is for commodities.

## **PRESIDENT'S MALARIA INITIATIVE**

In late June 2005, the United States Government (USG) announced a new five-year, \$1.2 billion initiative to scale-up malaria prevention and treatment interventions in fifteen high-burden countries in sub-Saharan Africa. The goal of this Initiative is to reduce malaria-related mortality by 50% in PMI countries. This will be achieved by reaching 85% coverage of the most vulnerable groups – children under five years of age and pregnant women– with proven preventive and therapeutic interventions, including artemisinin-based combination therapy (ACT), insecticide-treated bed nets (ITNs), intermittent preventive treatment in pregnancy (IPTp), and indoor residual spraying (IRS).

The President's Malaria Initiative (PMI) began in three countries in 2006: Angola, Tanzania, and Uganda. In 2007, four countries were added: Malawi, Mozambique, Senegal, and Rwanda. In 2008, Zambia and seven other countries were added to reach a total of 15 countries. Funding began with \$30 million in Fiscal Year (FY) 2006 for the initial three countries, increased to \$135 million in FY 2007 and to \$300 million in FY 2008 and FY 2009, and increased to \$500 million in all 15 countries in FY 2010.

In implementing the PMI, the USG is committed to working closely with host governments and within existing national malaria control plans. Efforts are coordinated with national and international partners, including the Global Fund, the Roll Back Malaria (RBM) Partnership, the World Bank's Malaria Booster Program, the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), and non-governmental and private sectors, to ensure that investments are complementary and that PMI, Abuja targets, RBM and Millennium Development Goals are achieved. Malaria Operational Plans (MOPs) for the PMI are highly consultative and are developed in collaboration with the national malaria control program and other partners.

This document presents a detailed one-year implementation plan for the third year of the PMI in Zambia. Commodities are planned for an 18-month period. The document briefly reviews the current status of malaria control and prevention policies and interventions, identifies challenges and unmet needs if the goals of the PMI and Ministry of Health (MOH)/National Malaria Control Center (NMCC) are to be achieved, and provides a description of planned Year 3 activities under the PMI. The document was developed in close consultation with the MOH/NMCC and with participation of most national and international partners involved in malaria prevention and control in the country. The total amount of PMI funding requested for Zambia is \$25.6 million for FY 2010.

## **MALARIA SITUATION IN ZAMBIA**

Zambia is a land-locked country in southern Africa that is bordered by Malawi, Mozambique, Zimbabwe, Namibia, Botswana, Angola, Democratic Republic of Congo, and Tanzania. It has a population of approximately 12.9 million (population estimate 2009), 45% of whom are below the age of fifteen. The country is divided into nine provinces and 72 districts. Zambia's key development trends are generally positive: under-five mortality has fallen from 191 per 1000 live

births in 1992, to 168 per 1000 in 2002, and to 119 per 1000 in 2007. 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, down from 16% in 2002. Maternal mortality continues to be high, though much improved, at 591 per 100,000 live births in 2007 compared to 729 in 2002. Literacy rates remain low among females and rural dwellers.

Malaria transmission in Zambia occurs throughout the year with the peak during the rainy season, which occurs between November and April. *Plasmodium falciparum* accounts for more than 90% of all infections. *Anopheles gambiae* is the major malaria vector. All nine provinces of Zambia are endemic for malaria with 90-100% of the population at risk. Unstable malaria transmission occurs in the districts on the higher altitude plateau,

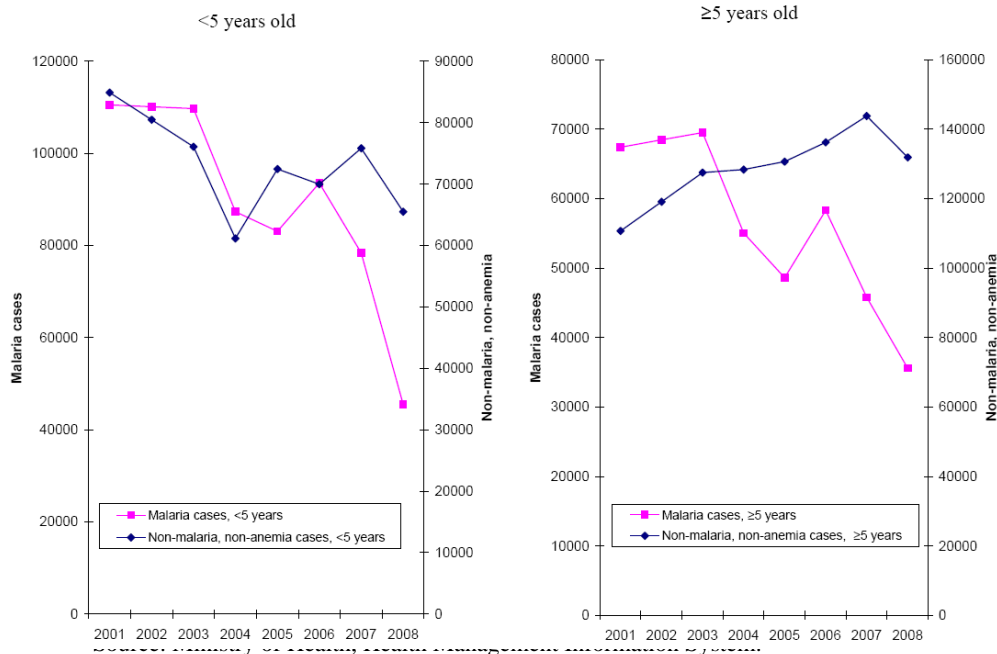
specifically Mpika, Serenje, Mkushi, Kapiri Mposhi, Chibombo, Mazabuka, Monze, Choma, and Lusaka. This is due to breaks in transmission of malaria during the cold, dry season, resulting in lowered malaria immunity, unstable transmission, and predisposition to outbreaks.

Approximately 3 million clinically diagnosed cases of malaria were reported through the Health Management Information System (HMIS) in 2008--this represents over a 30% decline from 2007. This figure overestimates the number of true malaria cases at the health facility level due to lack of diagnostic confirmation; it also does not count many cases at the community level which go unreported. The 2008 National Malaria Indicator Survey (MIS) showed an improvement in malaria parasitemia in children under five compared to the 2006 MIS – 10% vs. 22% and severe anemia – 4% vs. 13%.

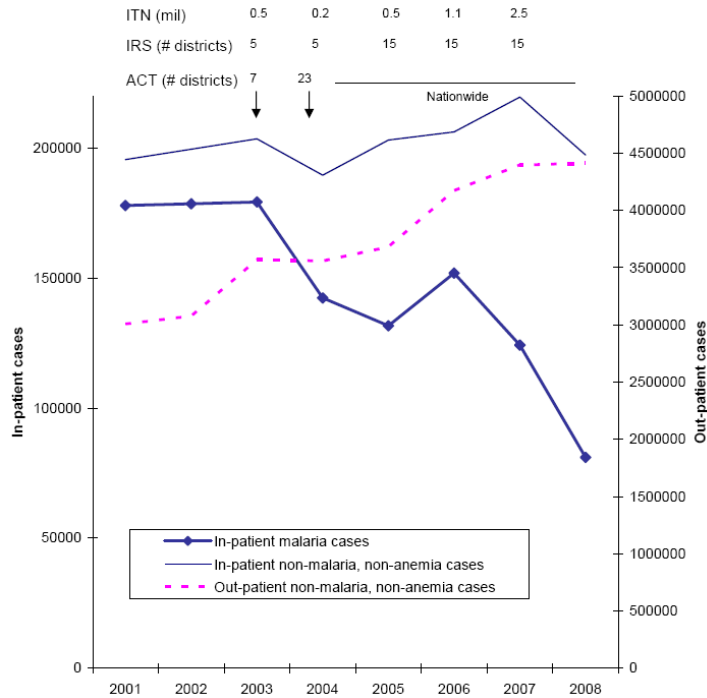
Zambia was the first country in tropical Africa to adopt ACT with artemether-lumefantrine (AL) in 2003 for first-line treatment of malaria; sulfadoxine-pyrimethamine (SP) is still recommended as an alternative first-line treatment in patients who cannot tolerate AL, those weighing less than 5 kg, when and where AL is unavailable. Treatment of malaria during the second and third trimester of pregnancy is with SP, however, this policy is currently being reviewed.

As seen in Figures 1 and 2 below, the number of malaria cases reported in Zambia declined substantially from 2000 to 2008. However, malaria still accounts for 45% of outpatient visits, 45% of hospital admissions, 47% of overall disease burden among pregnant women, and 50% of disease burden among children under-five years of age. Malaria also has a serious economic impact on Zambia, accounting for 6.8 million Disability Adjusted Life Years, lost. This is higher than the figure for acute respiratory infections (5.4 million) or HIV/AIDS (3.2 million). Malaria's high morbidity has decreased productivity through absenteeism and lowered output.

**Figure 1: Trends in reported in-patient malaria and non-malaria, non-anemia cases 2000-2008**



**Figure 2: Trends in In-Patient/Out-Patient Cases Seen in Public Health Facilities**



Source: Ministry of Health, Health Management Information System.

Zambia currently has two active Global Fund malaria grants: Round 4 (\$43,495,326), and Round 7 (\$37,502,022). Round 1 was officially completed in early 2009. The Principal Recipients of monies are the MOH and the Churches Health Association of Zambia (CHAZ). Round 4, Phase

2 for \$16,547,268 has been signed. The Round 7 grant was approved in November 2007 for \$37,502,022 and will continue through 2012; it has been signed but the money has not been dispersed. A Round 9 application was submitted to obtain funding to meet an anticipated gap in funding for a planned IRS scale-up to 54 and ultimately all 72 districts. The total requested for Round 9 is \$55 million over five years.

Rounds 1 and 4 focused on the scale-up of LLINs, the introduction and scale-up of ACTs, and the reintroduction of IRS. These grants funded the majority of the public sector ACTs and a substantial portion of the LLINs. With Round 7 funding, Zambia plans to procure and distribute 3 million LLINs, 9 million rapid diagnostic tests (RDTs) for diagnosis of malaria at both the community and facility levels, and expand information education and communication/behavior change and communication (IEC/BCC) to increase and sustain high coverage with prevention and treatment interventions.

Other major donors include the Bill and Melinda Gates Foundation, through the Malaria Control and Evaluation Partnership in Africa (MACEPA), and the World Bank. MACEPA, established in 2004, is a nine-year, \$35 million project intended to demonstrate the impact of full implementation of malaria control interventions and establish a proven, flexible model for national malaria control program scale-up. MACEPA's support to the MOH/NMCC in Zambia includes technical assistance for monitoring and evaluation of malaria interventions including biannual MISs, geocoding for the IRS program, support for emergency procurement and distribution of LLINs in 2006, an integrated IEC/BCC/advocacy initiative, and program support that includes information technology, infrastructure, and staff training opportunities. MACEPA also initiated the "Learning Community" in 2007, based in Lusaka, Zambia, which will work in up to five African countries to advance the scale-up of malaria control and prevention through a dynamic model of technical support and shared learning. In 2010, the MOH/NMCC in collaboration with MACEPA, the PMI and the World Bank will conduct the 3<sup>rd</sup> Zambia MIS. MACEPA worked closely with MOH/NMCC to conduct the first two surveys in 2006 and 2008.

The World Bank designated Zambia a Malaria Booster Project Country and planned to provide \$20 million for malaria control and prevention between 2006 and 2010. Due to rapid scale up, \$15 million was spent by the end of 2007, and \$5 million was spent in 2008. Approximately \$4.8 million will be available to support the MOH/NMCC in 2009. Funds will be used to support IRS training and operational costs. It will also fund LLIN procurement, active case detection, RDT procurement and community health worker (CHW) training. At present the Government of the Republic of Zambia (GRZ) is not planning to request any additional funding from the World Bank. GRZ feels that malaria funding from donors and from GRZ is sufficient to address the needs of the country.

The WHO provides technical assistance to the malaria program. Areas of support include monitoring and evaluation (M&E), integrated management of childhood illnesses (IMCI) training, job aide development for community management through CHWs, and microscopy quality assurance. UNICEF procures ACTs, supports case management through IMCI training and supervision, and assists in ITN mass distribution and re-treatment. Table A shows the areas of support of the different partners.

**Table A: Key Donor Roles: Areas of Support to MOH/NMCC Program**

Program Area	PMI	Global Fund Rounds 1, 4 & 7	World Bank	MACEPA	WHO	UNICEF
ITNs	X	X	X	X		X
IRS	X	X	X	X		
IPTp	X					
Diagnostics	X	X	X		X	
ACTs	X	X				X
IEC/BCC	X	X	X	X		X
M&E	X	X	X	X	X	
Health Systems Strengthening	X	X	X		X	X
Program Management	X	X	X	X	X	

## NATIONAL MALARIA CONTROL PLAN AND STRATEGY

The Zambian National Malaria Control Center has a well-conceived and ambitious Five-Year Strategic Plan for 2006 - 2010 that builds on the National Malaria Strategic Plan (NMSP) for Malaria Control developed by the national RBM Partnership with the MOH/NMCC. The Plan shows considerable commitment to rapid scale-up of malaria interventions and has the overarching goal of reducing malaria incidence by 75% by the end of 2011, ultimately contributing to the reduction of all-cause mortality by 20% in children under five. The specific objectives for the NMCP Action Plan for 2010 are:

- To ensure that at least 80% of people sleep under ITNs in eligible areas of every district (non beneficiaries to IRS) by December 2010;
- To ensure that at least 85% of the targeted structures in the 54 districts are covered by IRS by December 2010;
- To ensure that at least 80% of women have access to the package of interventions to reduce the burden of malaria in pregnancy by December 2010. The package of interventions will include a full three-dose course of IPTp, an ITN, and treatment of anemia;
- To ensure that at least 80% of malaria patients receive early diagnosis and prompt, effective treatment within 24 hours of onset of symptoms;
- To ensure that at least 80% of general population has knowledge, positive attitudes and skills to prevent malaria and seek care.

In 2010, MOH/NMCC will conduct a programmatic review and a needs assessment to facilitate the development of a new five-year national malaria strategic plan that will replace the current plan that expires in 2010. PMI will support MOH/NMCC in developing the new plan.

The MOH/NMCC seeks to strengthen the national-, provincial-, and district-level capacity to plan, manage, and implement malaria programs, address human resource needs, ensure that there is an established planning and forecasting framework for projecting funding needs and tracking health expenditures, develop capacity at all levels of the health systems to manage the storage and distribution of malaria commodities, and reinforce coordination among partners. In addition, the plan notes the importance of robust IEC/BCC efforts to increase awareness and demand for malaria control and treatment services among households.

In order to further increase access to artemether-lumefantrine (AL), a phased implementation plan has been initiated to provide rapid diagnosis and treatment of malaria through community case management of malaria using community health workers. The MOH/NMCC’s strategy is to strengthen community management through orientation of community health workers who have already been trained on community IMCI to correctly use RDTs and ACTs and initiate referral in severe cases. As of June 2009, 14 districts had begun community case management. The plan is to expand this to 28 districts by the end of 2009.

### Overview of the Health System

Since 1992, the GRZ has been implementing health sector reforms aimed at decentralizing health service delivery to the district and hospital levels and focusing on preventive rather than curative care. The reforms have focused on improving primary health care and implementing a basic health care package of carefully selected high-impact interventions offered through the public health system. This package has ten priority areas—one of which is malaria. Services included in this basic health care package are provided free-of-charge or on a cost-sharing basis depending on the location and level of the system. In rural and poor districts in Zambia, these services are free.

The MOH provides the technical and management oversight of all public health facilities. At the provincial and district levels, Provincial Health Offices (PHOs) serve as an extension of the MOH while the District Health Management Teams (DHMTs) have the fiscal authority to manage the health centers and are the main implementers of the IRS program.

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

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

**Table B: Summary of Existing Health Facilities in Zambia, 2008**

Facility Type	GRZ	Private	Mission	Total	%
Health Post	161	8	2	171	11
Rural Health Center	930	22	77	1,029	66
Urban Health Center	206	53	6	265	17
Level 1 Hospital	39	4	29	72	4.6

**Table B: Summary of Existing Health Facilities in Zambia, 2008**

Facility Type	GRZ	Private	Mission	Total	%
Level 2 Hospital	13	5	3	21	1
Level 3 Hospital	5	0	0	5	0.3
Total	1,354	92	117	1,563	100

**Source:** MOH, Health Facilities in Zambia, A listing of Health Facilities According to levels and Locations for 2008. Directorate of Planning and Development; HMIS Unit. February 2008

The DHMT provides overall planning, coordination, and monitoring of malaria activities within their districts. Ideally, a health post should cover 500-1000 households and all households should be within five kilometers of a health facility. Three thousand health posts are planned nationwide, but only 161 are currently commissioned. Health centers, staffed by a clinical officer, nurse or environmental technicians, are to serve a catchment area of 10,000 residents. Each district should have a hospital, staffed by one or more physicians; however, currently 19 districts have no hospital. The Mid Term Review Report of 2008 of the National Health Strategic Plan 2006-2010 noted that although physical access has improved through some constructions, and commissioning of health facilities around the country, only 69% of the population live within 8 kilometers of a health facility.

Other than the MOH, CHAZ, parastatal organizations, private clinics, and traditional healers also provide health care in Zambia. According to a World Bank assessment, CHAZ provides as much as 30% of overall health care in Zambia through a network of 129 functional units across the country (including 32 mission hospitals, 69 mission-affiliated rural health centers, and 28 church-based community health programs). CHAZ also supports health programs, pharmaceutical services, and institutional development activities, and leverages resources for the collective procurement of drugs and other health related commodities for its member facilities. Private mining companies provide preventive and curative medical services for their workers and dependants, as well as surrounding communities in some cases. Several of the larger mining companies, such as Konkola Copper Mining, have been carrying out IRS for many years within and around their compounds.

## **CURRENT STATUS OF MALARIA INDICATORS**

Estimates of malaria indicators are listed in Table C below. The most up-to-date information on malaria control indicators comes from a nationally representative MIS that was carried out in 4,405 households in 71 of the 72 districts in the country in April-May 2008. Although the data was collected after the major malaria transmission season, these results are being compared to results from the 2006 MIS which was implemented the same time of year as the 2008 MIS. Therefore, trends can still be observed. Zambia's malaria indicators are approaching international targets with only prompt treatment of fever lagging behind. Additional information on IRS coverage is also tracked by the districts during each spray season. In 2008, the MOH/NMCC focused its IRS activities on 36 of the country's 72 districts. In addition to the indicators listed below, the 2008 MIS found that 28% of children under five had had a fever within the previous two weeks. Of these, 43% took an antimalarial drug, while 29% took an antimalarial drug within 24 hours of the onset of their symptoms. Of those children under five

that received an antimalarial within 24 hours of onset of symptoms, 15% received SP, and 8% received AL.

<b>Indicator</b>	<b>2006 MIS</b>	<b>2008 MIS</b>
Proportion of households that have at least one ITN	NA	62%
Proportion of children under 5 years old who slept under an ITN the previous night	24%	41%
Proportion of pregnant women who slept under an ITN the previous night	25%	43%
Proportion of houses in geographic areas targeted for IRS that were sprayed	(2007) 94%	92%
Proportion of households with at least one ITN and/or sprayed by IRS in the last 12 months.	43%	66%
Proportion of women who have completed a pregnancy in the last two years who received 2 or more doses of IPTp during that pregnancy	62%	66%
Proportion of children under five years old with suspected malaria who received treatment with an ACT within 24 hours of onset of their symptoms	13%	8%

## **GOAL AND TARGETS OF THE PRESIDENT’S MALARIA INITIATIVE**

The goal of PMI is to reduce malaria-related mortality by 50% in PMI countries in the most vulnerable groups—children under five years of age and pregnant women. By the end of 2010, PMI will assist Zambia to achieve the following targets in populations at risk for malaria:

- >90% of households with a pregnant woman and/or children under five will own at least one ITN;
- 85% of children under five will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses in geographic areas targeted for IRS will have been sprayed;
- 85% of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been sprayed with IRS in the last 6 months;
- 85% of women who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy;
- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria; and

- 85% of children under five with suspected malaria will have received treatment with an ACT within 24 hours of onset of their symptoms.

## **EXPECTED RESULTS – YEAR THREE**

### Prevention:

- Purchase 1.6 million LLINs and help distribute these and other LLINs through antenatal care (ANC) clinics, Peace Corps Volunteers (PCV), and local volunteers providing services to persons living with HIV/AIDS, orphans, vulnerable children and youth;
- Support IRS in over 1 million targeted houses in 54 districts in Zambia, including the procurement of insecticides, personal protective equipment and other supplies, training of sprayers, and an environmental assessment; this is expected to protect over 5,000,000 people;
- Seventy percent (70%) of women in all nine provinces who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy. This will be achieved by increasing the demand for and delivery of IPTp through strengthened focused antenatal care (FANC).

### Case Management:

- Procure 3.3 million RDTs and improve laboratory diagnostic capacity, thereby assisting the MOH/NMCC move toward its goal of confirming every case of malaria before treatment;
- Conduct refresher training for 36 laboratory personnel and clinicians from the Provincial Health Office and DHMTs to perform outreach training and supportive supervision of health facilities;
- Train 560 CHWs in 15 districts in community-based management of malaria with an estimated population of 2.5 million persons;
- Train 540 health workers in evidence-based clinical guidelines.

## **INTERVENTIONS – PREVENTION**

### **Insecticide-Treated Nets**

#### Background

Zambia has identified LLINs as a key part of its malaria control strategy and is working to scale-up operations for universal coverage. Universal coverage in Zambia is defined as three nets per household. The principal methods of distribution to reach universal coverage are:

- Mass distribution of free nets;
- Distribution of free nets to pregnant women and children under five through ANC clinics and through the Expanded Program for Immunization (EPI);
- An equity program to provide free LLINs to vulnerable populations;
- Commercial sales of LLINs;
- Distribution of free LLINs by other partners in rural areas.

Mass campaigns are designed to increase nationwide access to ITNs by distributing free nets to all ITN eligible areas with the aim of delivering three nets per household. Distributions in mass campaigns are normally targeted at hard to reach areas with high malaria incidence. The campaigns are micro-planned at the central level in collaboration with PHOs and DHMTs with the actual distribution conducted by the DHMTs.

ITN distributions through ANC/EPI clinics are routine programs targeting pregnant women and children under five. Nets are given free of charge and the program is often referred to as the “malaria in pregnancy” (MIP) program and is known to local Zambians as the “Mama Safenite®” net program. The District Directors of Health manage the program with the PHOs playing a supervisory role.

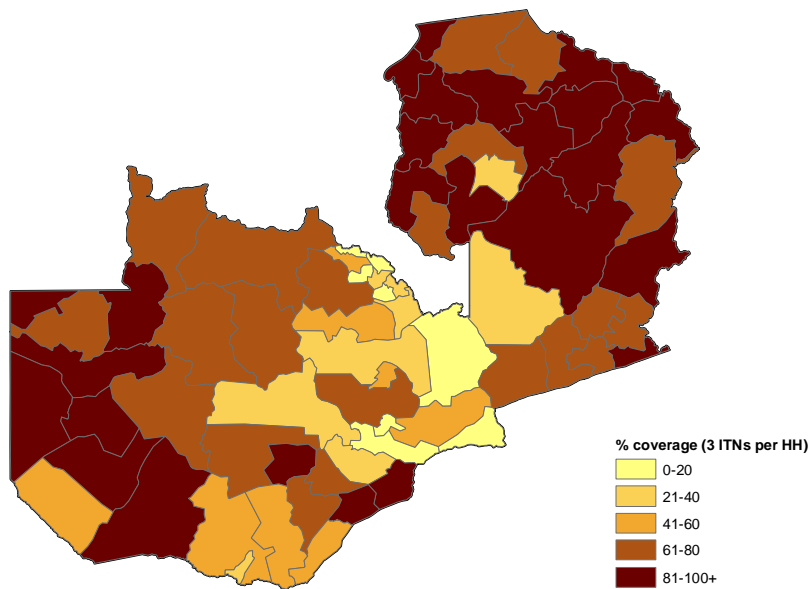
Distribution through the Equity program has been a part of recent distributions as a way to provide ITNs to particularly vulnerable groups such as orphans and vulnerable children, PLWHA and their caregivers, refugees, and other vulnerable groups.

Commercial sales in Zambia represent a relatively small quantity, with between 20,000 – 50,000 nets sold annually. It is generally accepted that the commercial market needs to continue and be promoted to ensure long-term access of LLINs and replacement of old nets. Other nets distributed in Zambia are through school participation in commemorative days, employer-based schemes, and other public/private activities.

The PCVs in Zambia are a major force that helps increase awareness of and promote the proper use of LLINs at end-of-the-road locations that are often missed by other organizations. These difficult-to-reach places are key to malaria control in Zambia as they may well be the last reservoir of the malaria parasite. PCVs link malaria with other key health interventions such as TB, HIV/AIDS, reproductive health, and nutrition so that isolated communities receive a comprehensive package of health information. PCVs also speak the local language, understand the culture, and are part of the communities. PMI is leveraging this asset to further expand the LLIN message. PCVs will receive LLINs from stocks purchased by PMI.

Zambia has accurate records of net distribution for the past several years and a fully functioning net mapping system that allows the MOH/NMCC to determine where and when nets were distributed. This system is especially helpful in developing strategies for net replacement activities. Figure 3 shows the percent of universal ITN (three nets per household) coverage by district.

**Figure 3: ITN Distribution 2006 - 2008**



Source: National Malaria Control Centre, ITN Database. Numerator: All ITNs distributed to date per district; Denominator: 3\* estimated household count per district

The priority focus of the MOH/NMCC for 2010 with regard to ITNs will be to:

- Sustain and increase coverage
  - Distribution of ITNs through all four principal distribution strategies
  - Cover gaps in all nine provinces (aim to achieve 100% coverage)
  - Replace worn out ITNs
  - Establish sustainability programs through multiple distribution channels
- IEC/BCC
  - Identify and implement most effective strategies to increase utilization rates
  - Strengthen linkages with partners to curb abuse of ITNs.
- Strengthen coordination of all partners implementing ITN activities

#### Progress During Last 12 Months

In 2007, 3.4 million ITNs were distributed in six of the nine provinces. The focus of distributions in 2007 was a mass campaign of free nets and an attempt was made to reach end of the road areas that have a high malaria incidence. Another campaign was planned in 2008 for the remaining three provinces, but was cancelled due to a delay in Global Fund Round 7 disbursements. In addition to mass distribution, routine distribution of free ITNs occurred via ANC/EPIs targeting pregnant women and children under five.

The results of the 2007 activities are reflected in the 2008 MIS which indicated that household ownership of at least one ITN in Zambia is relatively high at 62%. Despite this positive

indication of success there are still some concerns particularly in the area of utilization where, nationally only 41% of children under five slept under an ITN the previous night (when only households that own at least one ITN are considered then the percentage is 52%). Regionally, Western Province had a very low ITN ownership rate of 34% and a very low utilization of children under five sleeping under an ITN at 20%. Another area of concern is that there are increasing anecdotal reports of rapid deterioration of ITNs in Zambia with some indication that nets may only last one or two years. In some cases bed net damage occurs when they are tucked under sleeping mats that are laid on floors. The MOH/NMCC is planning to address this issue through a replacement strategy that will be part of the 2010 program.

The 2009 net campaign is planned for the spring of 2009 with 3.2 million LLINs to be provided by various donors:

<b>Donor</b>	<b>LLINs</b>
Global Fund (MOH/NMCC)	1,954,982
Global Fund (CHAZ)	530,000
World Bank	300,000
PMI (FY 2008 funding ) through ANCs	325,000
MACEPA	53,600
<b>Total</b>	<b>3,163,582</b>

Source: National Malaria Control Center

This 2009 campaign will be a targeted mass distribution in the three provinces of Copperbelt, Central and Lusaka. As in 2007, additional nets distributed routinely through ANC/EPI facilities and IEC/BCC campaigns will be conducted at both the national and community levels to encourage ownership and use.

To determine how Zambia is positioned to attain its universal coverage target of three nets per household by the end of 2010, a net gap analysis was conducted. The need, based on the population and estimated number of households, the availability of nets from manufacturer's deliveries, the planned or committed nets for the 2009 campaign, and the replacement requirements all combined to yield an ITN gap of approximately 2.8 million.

<b>Category</b>	<b>Information</b>
2010 projected population	13,200,000
Persons per household	6.0
Estimated number of households	2,212,000
LLINs needed (at 3 LLINs per household)	6,636,000
Available nets (delivered 2006-2008)	4,703,792
Nets planned or committed for the 2009 campaign	3,203,582

Replacement requirements (replacing 2006 and 2007 deliveries)	4,032,673
Net gap (Need – available – planned + replacement)	2,761,299

Source: National Malaria Control Center

Note: Other methods of gap analyses can be conducted but there is a consistent theme in all analyses that a net gap does exist for Zambia to attain universal coverage in the 2010-2011 timeframe of approximately 2-3 million nets.

Zambia, through PMI support and others, has an effective IEC/BCC program that includes broadcast on national radio and television, community health information brochures, posters, handouts and skits, and focuses separate activities at the national and community level. These efforts have resulted in a high ITN ownership rate in Zambia but work still needs to be done on improving utilization rates.

#### Proposed FY 2010 Activities (\$11,210,000)

By the end of 2009, all of the country’s provinces will have benefited from mass distribution campaigns, and PMI will focus in FY 2010 on the routine supply of LLINs through the ANC distribution channel and on replacement nets. The PMI will also support IEC/BCC efforts at the national and community levels—including one-on-one interactions--to increase ownerships and proper use.

Specifically, the PMI FY 2010 program will include:

- The procurement of approximately 1,600,000 LLINs for distribution throughout Zambia. Of these, 800,000 LLINs will be for distribution through the (“Mama Safenite”) program through ANC and child health clinics, 100,000 LLINs for the Peace Corps and other groups working with vulnerable cohorts, and 700,000 LLINs for replacement of nets that have been in use for 3-4 years (\$9,500,000);
- Support the distribution of LLINs , including provision of transportation to districts (\$800,000);
- Support for a national IEC/BCC campaign to promote ownership and proper use of LLINs (\$400,000);
- Support for a community-based IEC/BCC campaign through non-governmental organizations (NGOs)/faith-based organizations to increase net ownership and use (\$500,000);
- Community IEC/BCC for proper net usage. A community level approach for correct net usage to be enhanced by the PCVs in Zambia (no additional funds required);
- Operations research on ITN durability. A study conducted by the Centers for Disease Control and Prevention (CDC) to further identify the specific life of typical nets in Zambia in order to refine a replacement strategy (\$10,000).

## **Indoor Residual Spraying and other Vector Control Measures**

### Background

The MOH/NMCC utilizes an integrated vector management (IVM) strategy with IRS and LLINs as the main interventions. Evidence continues to accumulate suggesting very low-transmission in urban Lusaka, and other IVM strategies should be considered to replace or augment IRS. The MOH/NMCC IRS efforts have targeted urban and peri-urban areas. There are several advantages to this strategy, including cost-effective treatment of large numbers of households concentrated in relatively small areas. Many of these urban/peri-urban households have modern plastered walls, where retention of insecticide is likely to be greater compared to rural thatched or mud/pole walled structures. Rural structures are often abandoned and new huts built as frequently as every three to six months—especially in the vast wetland areas of Zambia. The IRS program in the Kazungula District, a rural area with very few modern structures, is an exception to the peri-urban/urban strategy. This district was selected as part of a cross-border scheme with Namibia and Botswana, where malaria incidence has been kept low through IRS campaigns.

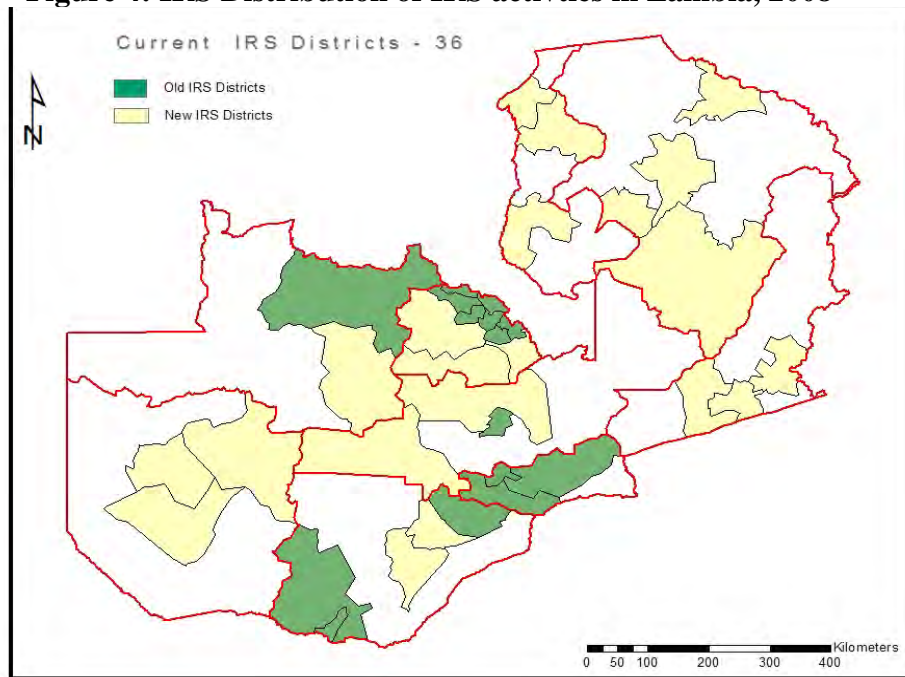
The insecticides used in the IRS program are pyrethroids (deltamethrin, lambda-cyhalothrin or alpha-cypermethrin) on cement plaster and painted walls and dichloro-diphenyl-trichloroethane (DDT) for mud or pole/grass walled homes. The MOH/NMCC has responsibility for coordinating and managing the IRS program nationally; DHMTs are responsible for implementation in their districts. Given the limited resources of each DHMT, evidence-based selection of areas to be sprayed and central level planning and support to the DHMTs are essential to maintain a successful IRS program. The PMI will assist the MOH/NMCC to ensure that decisions to select new areas for IRS are based on evidence of active malaria transmission using all available epidemiologic and entomologic surveillance data.

As transmission of malaria decreases in Zambia, especially in areas with interrupted transmission such as urban Lusaka and Kazungula districts, the MOH/NMCC is considering long-term, evidence-based IRS strategies. The MOH/NMCC plans to establish pilot programs in urban Lusaka and Kazungula using an enhanced, case-based surveillance system to inform IRS activities. When a case of locally-transmitted malaria is identified, a team will be deployed to implement malaria control activities including focal IRS and/or LLIN distribution, active case finding, and treatment of any cases found. The PMI Team is committed to assisting the MOH/NMCC in developing this surveillance-based rapid response strategy to transition from and capitalize on the recent success of IRS.

### Progress During Last 12 Months

With PMI support, the Government of Zambia expanded the IRS program to 36 districts spraying over 1.1 million structures protecting over 5 million people in 2008 (figure 4). Each province has a minimum of two districts conducting IRS activities; in Copperbelt Province all districts conduct IRS.

**Figure 4: IRS Distribution of IRS activities in Zambia, 2008**



Over 90% of the approximately 1.1 million structures targeted were sprayed in 2008.

Traditionally, one training-of-trainers (TOT) workshop has been conducted each year prior to the IRS campaign. However, with the scale up to 36 districts in 2008, three TOT workshops were held. Each district sent four representatives resulting in the training of approximately 150 master trainers. Workshop emphasis was on selection of local spray operators, IRS campaign ground rules, and the need for community sensitization. Cascade training of spray operators has been initiated in all 36 IRS districts. All spray operators underwent pre- and post-tests to gauge their performance.

A geocoding training workshop was held in Chipata for seven new IRS districts. The objective of the workshop was to provide districts with skills to use personal digital assistants, or PDAs, for the management of geographic information related to IRS. The workshop also attracted participants from Ethiopia, Tanzania and Zimbabwe. During the year, seven new districts (Chipata, Mansa, Choma, Mongu, Kasama, Mumbwa and Kapiri Mposhi) and four old districts (Ndola, Kitwe, Kazungula and Lusaka) had their household structures geo-referenced. Only 40% of households in Lusaka were geo-referenced.

In 2009, PMI will consolidate IRS activities in the current 36 districts through procurement of insecticides through Research Triangle International's IRS Indefinite Quantity Contract, implementation and technical support, and environmental assessments and safeguards. PMI has also invested in improving entomologic capacity at the MOH/NMCC because there is currently no monitoring of the re-introduction of DDT, no systematic studies on vector resistance or susceptibility to insecticides were conducted. Entomological monitoring is an indispensable component of an evidence-based IRS program. With the goal of conducting resistance

monitoring in the future, an insectary has been established at the MOH/NMCC with PMI support and local anophelines are being reared. MOH/NMCC staff and University of Zambia and Liverpool School of Tropical Medicine entomologists provide additional support. Innovative Vector Control Consortium (funded by Bill and Melinda Gates Foundation) reported that recent WHO diagnostic assays carried out at five sentinel sites in Zambia showed reduced mortality in *Anopheles funestus* to DDT (95%) in Kafue and reduced mortality to deltamethrin (92%) in Mumbwa. All other sites tested showed 100% mortality for *Anopheles funestus* and *Anopheles gambiae* for both insecticides. It further noted that due to the effectiveness of the vector control program in the area the number of mosquitoes caught and tested was low.

Issues associated with insecticide storage, safety, and disposal of waste continue to be a concern. The MOH/NMCC and NGO partners are focusing on the process of improving or upgrading storage facilities and management of the runoff. DDT spraying will be limited to the existing 15 districts with pyrethroids used as the IRS program expands. The disposal of DDT sachets and packets, requires incineration at temperatures above 900° C in a specialized incinerator. The MOH/NMCC, the Environmental Council of Zambia, PMI and its implementing partners are coordinating the repatriation of DDT waste to South Africa, in compliance with the Basel Convention. Incinerating of waste in copper mine smelter furnaces, which meet the temperature requirement, is being assessed.

Proposed FY 2010 Activities: (\$6,250,000)

PMI will support MOH/NMCC plans for strategic application of IRS in low transmission areas and capitalize on the success of insecticide-based interventions. Pilot programs in urban Lusaka and Kazungula will be established, based on increased surveillance followed by confirmation of local transmission, active case finding, treatment of cases, and deployment of a team to conduct focal IRS and/or LLIN distribution.

PMI's support for the MOH/NMCC expansion of IRS to 54 districts is contingent upon an evidence-based LLIN/IRS strategy. PMI will work with NMCC to promote the development of such a strategy. PMI will readjust activities and funding according to the new strategy.

PMI will work with NMCC to develop a resistance management program that includes entomological surveillance, insecticide resistance testing and insecticide rotation.

For the 2010 campaign, PMI will, contingent upon a LLIN/IRS strategy, support IRS in 54 districts by:

- Procurement of insecticide and other IRS supplies and equipment sufficient to spray 1,800,000 structures (\$4,000,000);
- Implementation of IRS program, M&E, environmental assessment, and storage/incineration; (\$2,000,000);
- Establishing enhanced surveillance and a focal IRS-based response capability in urban Lusaka and Kazungula districts (\$250,000).

## Intermittent Preventive Treatment in Pregnancy

### Background

IPTp with SP was introduced as policy in Zambia in 2003 and became standard practice in 2004. The MOH/NMCC guidelines call for three doses of SP, with the first dose to be delivered at the first visit after the start of the second trimester (16 weeks), the second dose one month later, and the third one month after that. The guidelines exclude women who are HIV positive and on cotrimoxazole from receiving IPTp with SP.

The MOH's Reproductive Health Services Unit implements IPTp as part of Focused Antenatal Care (FANC) with technical assistance from the NMCC. The FANC approach emphasizes that women should make at least four visits prior to delivery and is free at all MOH health facilities as well as at non-governmental health facilities participating in the CHAZ network. A national FANC and IPTp orientation training package was developed in 2003 prior to PMI and ANC providers nationwide received initial training. ANC health workers are trained to dispense IPTp under direct observation. Besides IPTp, FANC includes the distribution of free LLINs at all ANC clinics, as well as several other non-malaria specific interventions.

The PMI and the NMCC aims to increase the percentage of women (who have completed a pregnancy in the last two years) covered by two or more doses of IPTp with SP. The 2008 MIS revealed that relatively good coverage of two-dose IPTp has been achieved. Sixty-six percent of mothers surveyed in 2008 took the recommended two or more doses of IPTp compared to 62% in 2006. IPTp coverage estimates by province from the 2006 and 2008 MIS are listed in the Table F below. Despite high coverage of IPTp, certain provinces had decreased coverage of IPTp between 2006 and 2008. There are also substantial gaps in IPTp coverage (2 or more doses) between women in urban and rural areas (75% vs. 62%, respectively). There is no data that explains this difference SP IPTp coverage in rural versus urban areas.

Province	Percentage of mothers who took 2+ doses of IPTp	
	2006 MIS	2008 MIS
Central	54.4	68.5
Copperbelt	69.7	83.3
Eastern	60.3	62.3
Luapula	66.9	65.8
Lusaka	53.5	73.7
Northern	71.9	68.3
North-Western	83.0	72.4
Southern	63.4	58.2
Western	47.1	34.4
Overall	61.9	66.1

Source: Malaria Indicator Surveys for 2006 and, 2008,

The MOH/NMCC and its partners feel that the key to improving IPTp coverage with 2 doses of SP is to address patient knowledge, attitudes, and practices regarding IPTp in order to increase demand for IPTp.. A rapid assessment of health facilities in Central and Eastern Provinces was done in 2008 and found that while 96% of surveyed facilities offered IPTp, a smaller percentage of women (69% and 62% for Central and Eastern Provinces, respectively) reported receiving two or more doses of SP for IPTp in the 2008 MIS. It is a common perception that many women attend ANC only once or present for their first visit too late to accommodate all the recommended services, but there is no data available that addresses this issue. Reasons for refusal of SP include concern about side effects, reluctance to take medicines during pregnancy, local practices that included using antimalarial medications as abortifacients and lack of clean water or cups for dispensing SP.

Other challenges in improving IPTp coverage is limited SP availability due to use of SP for treatment of suspected malaria outside of MOH/NMCC treatment guidelines which contributes to stockouts, inaccurate quantifications of need, and problems in the drug delivery system. There are reports of SP being used for the treatment of fever in persons who test negative for malaria on RDTs, but have a high clinical suspicion for malaria. Using SP outside of guidelines also makes quantification of SP needs difficult as SP needs are estimated using census data on numbers of births projected for each district and the number of children <5kg. The MOH purchases SP using these quantifications, however, these numbers are thought to be an underestimate of the true needs. A recent quantification of SP needs by USAID/Deliver suggests that additional procurements are required in 2009 to avoid stockouts. The SP supply at ANC clinics is also limited by the drug delivery system. SP is distributed in the routine drug kits supplied to health facilities by the Central Medical Stores and from emergency procurements. A rapid assessment of ANC clinics found that 95% of facilities surveyed reported stockouts occurring between July 2007 and July 2008.

The MOH/NMCC has identified several key steps for improving demand for and delivery of IPTp during ANC visits in its 2008 Action Plan and its Five-year Strategic Plan for 2006-2010. Activities identified in the plan include refresher training of FANC providers, implementation of district-level supervision, and IEC/BCC. Despite its national policy status and the development of a strategic plan, there are insufficient government or donor resources to support the FANC strategy nationwide.

#### Progress During Last 12 Months

A rapid assessment of all health facilities in Central and Eastern provinces was done by MOH/NMCC during 2008 to determine: 1) whether healthcare providers were knowledgeable about IPTp and FANC and providing these services appropriately; 2) factors that impede appropriate delivery of care; and 3) whether mothers are receiving appropriate information on prevention of malaria in pregnancy. As detailed above, the rapid assessment found that while a majority of sites offered IPTp with SP, the uptake of IPTp by women was low. The assessment concluded that the key to improving coverage of IPTp is to address knowledge, attitudes, and practices of pregnant women in regards to IPTp. Furthermore, the assessment found that a woman's decision to seek ANC is heavily influenced by their male partners and that educating

men on the importance of FANC is needed.

In early 2009, FANC refresher training for healthcare providers was completed in all districts of Central and Eastern Provinces, the two provinces where low uptake of IPTp was recorded in the 2006 MIS. Plans have been made to expand this training in all districts of three additional provinces (Northern, Southern, and Western) with low and in some cases, decreasing, IPTp coverage according to the 2008 MIS.

The MOH/NMCC along with partners, have implemented national and community IEC/BCC activities to increase demand for ANC services, including IPTp. Messages regarding IPTp and FANC have been developed and disseminated via national television and local and national radio. An IEC/BCC communications “tool kit” was developed with FANC being one of several malaria-related messages. These kits have been distributed through IEC/BCC trainings in 32 districts across all 9 provinces. On the local level, over 600 members of Safe Motherhood Action Groups in 14 districts of two provinces have been trained in IEC/BCC for FANC. FANC information has been incorporated into male health kits to improve male partners’ knowledge of FANC. PCVs have also increased awareness of IPTp in remote areas through community-level educational activities on FANC and malaria. The implementing partner for IEC/BCC activities (includes not just IPTp but other malaria control activities) are currently evaluating the impact of their activities.

To improve performance of the supply chain, a quantification exercise was done to estimate need for SP. Additionally, two drug distribution strategies are being piloted. See “Pharmaceutical Management” for details.

PMI financial support has been provided for two separate operations research projects. The first project, implemented by the University of Zambia and the MOH/NMCC in 2008, is a study examining the impact of MIP interventions, including SP for IPTp and is expected to be completed in 2009. The study’s objectives include documentation of the malaria burden among pregnant women in Zambia, the impact of SP IPTp and ITNs on malaria burden among pregnant women in Zambia, and to document markers for SP resistance among women studied. This information will be used to inform the MOH/NMCC of the impact of their MIP program as a whole.

A second project was developed by the MOH/NMCC and the CDC to provide data to the MOH/NMCC to make informed SP IPTp policy decisions, and aims to evaluate SP IPTp efficacy and effectiveness and its correlation with SP resistance markers. Approved and funded in FY 2007 and 2008 by PMI, this project was delayed due to challenges in developing a funding mechanism for the implementing partner. The funding mechanism is now in place and the project is scheduled to begin September 2009 and is expected to be complete by the end of 2010. One of the three components of this study involves using PCR to monitor resistance markers for SP in plasmodium found in blood samples of patients. This aim of section of the study was to correlate prevalence of resistance markers in the population to SP IPTp effectiveness. If a certain prevalence of SP resistance markers is found to correlate to SP IPTp failure, then measuring SP resistance markers in the general population could be a useful tool to monitor when SP IPTp policies need to change. This was put on hold because of the costs associated

with building PCR capacity needed for the study. While TDRC has experience with PCR for SP resistance markers, they did not have the capacity for resistance marker monitoring on a larger scale. However, implementation of this component of the study has the advantage of developing PCR capacity at TDRC. Since TDRC is the MOH's research arm that works closely with NMCC, this PCR capacity would be maintained by TDRC and would benefit the NMCC. PCR capacity is cross-cutting for malaria in that it can be used not just for drug resistance monitoring, but also insecticide resistance monitoring in mosquitoes. Additional funds are being requested to implement the PCR component of the IPTp study.

Proposed FY 2010 Activities: (\$1,350,000)

Zambia has relatively high levels of two-dose IPTp, but the MOH/NMCC would like to increase the number of women who receive the recommended three doses. To increase this proportion, it is recognized that pregnant women must attend ANC earlier in their pregnancy. Interventions to improve the demand for and delivery of ANC services in rural areas are expressed goals of the ANC program. Refresher training on FANC for healthcare providers has already been done in two provinces with resources already available to expand this to three other provinces. PMI will support the MOH/NMCC in expanding their efforts to strengthen FANC and increase IPTp uptake in the four remaining provinces. IEC/BCC activities to improve IPTp uptake also require continued investment as community-level activities are being rolled-out. Close collaboration with efforts to improve the supply chain management for malaria treatment commodities is essential to ensure adequate supplies of SP and micronutrients for FANC. PMI will support these goals by:

- Strengthening of FANC for IPTp. Expanding activities to strengthen FANC in four provinces, completing nationwide roll-out of these activities in FY 2010. Written guidelines, job aids and tools for supervision have already been developed. Funding will go towards implementing training activities and distribution of these materials in the four provinces. Activities include training of additional antenatal health service providers and district-level supervisors, the provision of written guidelines, job aids, and tools for district-level supervision of antenatal care service delivery, and quality control (\$900,000);
- Increasing national demand for IPTp. Continue to support a national IEC/BCC campaign to increase demand for ANC services generally and IPTp through purchasing national radio and television airtime, and print media (this is part of an integrated IEC/BCC campaign covering ITNs, ACTs, and IPTp). As with many other health behaviors, awareness of the need for IPTp should be sustained over the long run. In Zambia the majority of households own a radio, making it an ideal tool for disseminating IPTp messages (\$100,000);
- Increasing community-level demand for IPTp. Support roll-out of a community IEC/BCC campaign through district-level training on IEC/BCC and provision of toolkits, training of Safe Motherhood Action Groups on FANC and IPTp, and other community-based approaches to increase demand for IPTp (integrated campaign covering ITNs, IRS, ACTs, and IPTp, and ANC campaign that includes IPTp) (\$200,000);

- Providing support to the Peace Corps for education on increasing IPTp at the grass roots level, by providing subject matter expertise. (no additional funds required);
- Complete an operations research study on SP effectiveness for IPTp. Evaluating the efficacy and effectiveness of SP IPTp in pregnant women, will inform the NMCC's SP IP IPTp policies. Furthermore, an investment in the resistance markers component of this study will develop the PCR capacity of TDRC and NMCC. Additional funds are requested for purchasing PCR machines, lab commodities, processing of samples, and training of laboratorians. CDC will work with MOH/NMCC's operations research unit and Tropical Disease Research Center (TDRC), an additional implementing partner, to complete this project (\$100,000).

## **INTERVENTIONS – CASE MANAGEMENT**

### **Diagnostics**

#### Background

The MOH/NMCC Guidelines for the Diagnosis and Treatment of Malaria in Zambia have been revised and are being finalized. These guidelines recommend parasite-based diagnosis for all populations in all settings. Children under five years of age are to be evaluated, classified, and treated according to the algorithm of the IMCI, which has been modified to include RDTs or microscopy for the evaluation of a child with fever. The MOH/NMCC Action Plan for 2009 indicates that only 30% of health facilities have functional microscopy. It should also be noted that many health facilities in Zambia do not have laboratories and technicians due to a shortage of trained and qualified staff. MOH/NMCC and partners have been working to expand the role and availability of malaria diagnostic services through improvements in microscopy and introduction of RDTs where microscopy services are not available. The revised HMIS will, from 2009, provide data on the proportion of malaria cases that are confirmed either by RDT or microscopy. The MOH/NMCC Action Plan for 2010 calls for expanding laboratory diagnostic capacity to 80% of the nation's 1,563 health facilities, a massive effort that is not currently fully funded.

***Malaria microscopy:*** Roll-out of ACTs for first-line treatment was accompanied by a plan for strengthening malaria microscopy at health facilities. Until recently, laboratory technologists and technicians were the only cadres trained and legally authorized to perform malaria microscopic diagnosis. While medical officers and clinical officers receive some training in microscopy, they are unlikely to perform such testing because of their clinical responsibilities. Licensed laboratory technologists must complete a three-year training program. According to a human resource assessment conducted in 2008 by the MOH with support from the Clinton Foundation, only 417 laboratory personnel were reported in-post at GRZ facilities against a total of 1,560 established posts. In 2006, training for a new cadre of specialist microscopists was initiated in order to address this critical staffing gap. Non-laboratory health workers were recruited from health facilities and attended an eight-week training course in Lusaka before returning to their posts. Since then 234 microscopists have been trained. The training materials and accompanying Laboratory Manual for Malaria Diagnosis were developed with Tropical

Disease Research Centre (TDRC). These materials are comprehensive and technically appropriate with respect to preparation of stain, care, and maintenance of microscope and related supplies, as well as standard operating procedures for preparing, examining and reporting blood slide results. Efforts to integrate the training with training on microscopy for tuberculosis, urine, and stool have not been successful due to challenges in coordinating these activities. The planned training of 280 more microscopists in 2008 with financial support from Global Fund Round 7 funds has not yet taken place. There are no plans for certification and deployment of this cadre.

IMaD will, in September 2009 support the MOH/NMCC to conduct training of clinical and laboratory supervisors to perform outreach training and support supervision, using agreed curricula and training materials. IMaD will also facilitate regular clinical and laboratory support supervision and incorporate quality assurance of both malaria microscopy and RDTs using agreed protocols.

**Rapid diagnostic tests:** The MOH/NMCC strategic plan recommends two roles for RDTs; at rural health centers where microscopy is not available or functional; and by CHWs for community case management of malaria. Introduction of RDTs in rural health centers began in 2007 with support from the Global Fund. The MOH/NMCC staff developed standard operating procedures and training materials, conducted provincial training workshops for staff of GRZ and CHAZ facilities, and provided districts with funding for district-level cascade training. At the health facility level, laboratory staff are responsible for ordering malaria diagnostic supplies on a monthly basis. These orders are transmitted and shipments are received from the Medical Stores Limited (MSL) through the same channels that are used for essential medicines. MSL also sends out RDTs via a push system, sending out predetermined quantities of RDTs to rural health centers. As with drugs, stockouts of RDTs and diagnostic supplies do occur. The USAID | Deliver Project conducted a national quantification exercise in early 2009 for anti malarial drugs and RDTs for the period 2009 to 2015. This has improved commodity forecasting and availability. RDTs for rural health centers are currently being purchased with support from Global Fund and PMI.

As in many other countries, clinicians in Zambia do not always use the results of RDTs or microscopy to guide malaria treatment decisions. Many MOH/NMCC specialists and their partners report that health workers prescribe ACTs or SP in cases where laboratory diagnoses are negative. However, there is anecdotal evidence that health workers are slowly accepting RDT results and prescribing appropriately. A recent study by ZIMMAPS has shown that, with effective supervision, CHWs were able to use RDTs effectively. PMI, through its implementing partners, will continue health care education to ensure that test results are being utilized properly. The PMI and other MOH/NMCC partners are committed to ensuring that use of RDTs is rational and that test results lead to proper treatment.

To increase access to timely diagnosis and treatment of malaria, the MOH/NMCC has been promoting home-based management of fever with use of RDTs by CHWs. Legal standards in Zambia require that all diagnostic tests be performed by trained and certified laboratory staff in recognized health facilities. However, RDTs for HIV/AIDS have been authorized for use by community-based counselors and this has established a policy precedent which has facilitated the introduction of malaria RDTs at the community level. In 2007, the MOH/NMCC procured 2

million RDTs through CHAZ to support the introduction of RDTs for accurate diagnosis at community level. The MOH/NMCC with assistance from the Malaria Consortium piloted the deployment of RDTs and ACTs through CHWs in two districts in 2008 and expanded these pilot sites to a total of 14 districts by June 2009 and plans to cover 28 districts by the end of 2009. The MOH/NMCC also plans to evaluate the performance of these pilots to provide information to the Pharmaceutical Regulatory Authority and Medical Council of Zambia for possible nationwide expansion of this model over the next two years. Additionally, the current supply chain of RDTs from MSL will be expanded to include supply of RDTs to CHWs after the legal standards and required policies are changed.

About 5 million RDTs will be needed in 2010, according to a malaria commodity quantification exercise conducted in January 2009 by the MOH/NMCC and its partners, with assistance from PMI-supported Deliver Project. PMI will support the procurement of about 3.3 million RDTs. The balance is expected to be procured from Global Fund Round 7 funding.

#### Progress During Last 12 Months

PMI supported a national quantification exercise in early 2009 for anti malarial drugs and RDTs for the period 2009 to 2015. This has contributed to improvements in the forecasting of ACTs and RDTs. The national requirement for RDTs in 2009 is 4.8 million. The funding sources for the procurement of RDTs in 2009 include Global Fund Round 4 Phase 2 to the MOH/NMCC and CHAZ, as well as PMI. The PMI FY 2008 funds were used to procure 660,000 RDTs in February 2009 for use in rural health facilities where microscopy is not available to support MOH/NMCC efforts to promote parasite-based diagnosis to guide ACT use. The PMI, at the request of MOH/NMCC, reprogrammed FY 2009 funds originally planned for the procurement of ACTs to supplement the RDTs budget line to purchase additional 1,250,000 RDTs because of an overabundance of ACTs and anticipated stockouts of RDTs. These RDTs arrived in August 2009.

The RDTs are distributed using the same supply system used for ACTs and other essential drugs. PMI is currently collaborating with MOH, MSL, President's Emergency Plan for AIDS Relief (PEPFAR), World Bank and the Department for International Development (DfID) to pilot logistics management systems for essential drugs, including antimalarials and RDTs, across the country. The pilot will compare the two logistics models to the control group so as to choose which one would be applied to the whole country. In the first model – the district will remain a stockholding point; MSL will supply a consolidated order to every month to the district store; a commodity planner, employed by MSL, will be deployed to selected districts without pharmacist or pharmacy technologist to support supply function; based at the respective district, the commodity planner will work closely with the district health teams. In the second model – the selected district stores will convert to cross-docking (i.e. pass through); these will not store their own products; MSL will supply products packed for individual health facility in the district; A commodity planner will be deployed to elected districts stores with no pharmacist or pharmacy technologist. All pilot sites will involve the use of new ordering and stock management systems based on issues data from health facility storerooms to the dispensing areas. A stocktaking exercise and training of trainers has been conducted in the pilot sites the pilot is underway.

The PMI has contracted Improving Malaria Diagnostics (IMaD) to strengthen malaria diagnostic capacity in health facilities including the use of RDTs. IMaD has been working with MOH/NMCC to put in place provisions for supervision, refresher training, and quality control and quality assurance of blood slide microscopy and RDTs. Following an initial visit in August 2008 to evaluate current diagnostic procedures, diagnostic capacity and needs, IMaD worked with MOH/NMCC to conduct a stakeholders meeting in April 2009 to review technical guidelines in preparation of training of laboratory and clinical and personnel in malaria diagnosis, quality control, quality assurance and outreach supervision. This training is scheduled to begin in August 2009.

#### Proposed FY 2010 Activities (\$2,842,700)

Accurate diagnosis is critical to target antimalarial drugs to infected patients and reduce the unnecessary use of these drugs that occurs when patients are presumptively treated for malaria. Both microscopy and RDTs have a role to play in a well-functioning diagnostic program but both require considerable attention to supply chain management, initial and refresher training, quality assurance, and supervision. The PMI views malaria laboratory diagnosis as a critical component of good case management. An initial evaluation of diagnostic capacity and needs was completed in FY 2008. Activities based on the results of this evaluation such as training and quality control have been initiated in FY 2009, and will continue into FY 2010. The PMI will continue to support these activities to strengthen laboratory diagnosis in MOH facilities with laboratories. The MOH/NMCC conducts training and supportive supervision to ensure appropriate use of RDTs, and has identified inconsistent RDT supply as an issue and key factor preventing their appropriate use; therefore, PMI will continue to address this in Year FY 2010.

Based on discussions with MOH/NMCC staff, other partners and in keeping with the antimalarial quantification for 2009 to 2013, the following activities are proposed for FY 2010 PMI funding:

- Procure approximately 3.3 million RDTs for health facilities PMI will work with NMCC to enhance supervision of health workers using RDTs. A rapid evaluation of current RDT use will be conducted to inform RDT, deployment, supervision and training, (\$2,382,700);
- Procure 30 microscopes and associated supplies; A recent estimate by NMCC has determined that there is dearth of microscopes in facilities that should have them and as part of their deployment plan NMCC has formally asked PMI to help procure microscopes, (\$60,000);
- Strengthen malaria diagnostic capabilities at the health center level. Strengthen capability by supporting continued implementation of a plan for quality assurance and quality control of malaria laboratory diagnosis, support refresher training and supportive supervision of laboratory workers in malaria diagnosis, support training and supportive supervision of health workers to increase their confidence in, and use of, malaria test results to guide treatment; evaluate changes in performance of and adherence to

microscopy and RDTs to monitor effects of investment, and work with the MOH/NMCC and other partners to train additional personnel on malaria diagnostics (\$400,000).

## **Pharmaceutical Management and Treatment**

### Background

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

With financial support from PEPFAR, PMI, DfID, World Bank and USAID (Family Planning and Maternal and Child Health funds), Zambia has the potential to improve the essential drug system. The PMI is contributing to this improvement to assure that life-saving antimalarials are available when needed at all levels of the health care system. A pilot one-year supply chain pilot evaluation (described above with malaria diagnostics) will be completed in early 2010. Lessons learned from the pilot and from the quantification, procurement and delivery of antiretroviral drugs (ARVs) will be used to improve the overall pharmaceutical management system in Zambia.

***Quantification of antimalarials:*** The Procurement Unit and the Pharmacy Unit of the MOH share responsibility with the MOH/NMCC for forecasting needs for antimalarials and other malaria-related commodities. Annual procurements of AL are based on the estimated number of malaria cases in Zambia, derived from HMIS data and projections based on assumptions about population catchment areas and expected health facility utilization. An estimated 3 million malaria cases are diagnosed (clinically or laboratory confirmed) at public health facilities each year, including about 500,000 cases in pregnant women and children weighing less than five kg who are not eligible for AL treatment. A projected 3 million treatments of AL will be needed annually. Since January 2007, the Procurement Unit has collected information from health facilities on AL consumption to forecast needs more accurately. The MOH recognizes the need for a detailed pharmaceutical management plan and has requested technical assistance to improve forecasting related to antimalarial drugs.

In April 2008, the MOH/NMCC with the support of PMI funding, conducted an inventory of existing stocks of AL and SP. Subsequently they conducted a quantification exercise in January 2009 in an effort to more accurately forecast antimalarial needs in Zambia (see Table G). In follow up to the quantification exercise, inventories and orders will be monitored quarterly to allow for adjustments.

<b>Table G: Estimated annual antimalarial drug needs and costs for 2008</b>				
<b>Drug</b>	<b>Tablet size</b>	<b>Cost</b>	<b>Annual estimated need</b>	<b>Annual cost</b>
Artemether-lumefantrine	20mg/120 mg	\$1.28*	2,139,919	\$2,739,096
Quinine (tablets)	300 mg	\$0.036	6,413,183	\$230,874
Quinine (ampoules)	300 mg	\$0.16	1,737,840	\$278,054
SP 3-tablet course	500mg/25 mg	\$0.04	5,351,238	\$214,049

*\*Average costs of the four different pre-packaged dosages for the different age and weight groups.*

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

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

For the essential drug kits, suppliers put in a tender bid to supply all of the medicines (includes SP and quinine) and commodities included in the two kinds of kits, assemble the kits and deliver them to the MSL. In the past the medical kits were funded primarily by the Dutch Government and the Japan International Cooperation Agency, but the most recent procurement was made from Mission Pharma with funds in the Direct Supply Budget Line, a sort of pooled fund to which partners contribute. The Procurement Unit procures all other antimalarial drugs, including AL, independently. For 2008, the MOH procured 3.13 million AL treatments from all sources. Taking into account Global Fund allocations over the coming years, the estimated needs described above, and the recent ACT quantification exercise, the MOH/NMCC believes it has all AL needs covered and has asked that PMI not procure ACTs in 2010.

**Distribution:** Antimalarials, both those in the essential drug kit and those procured separately, are distributed to districts primarily through a “push” system. Distribution to hospitals and health centers is through a combination of “push” and “pull.” Each month, the MSL sends all hospitals and DHMTs a list of the items they have in stock. The kit system distributes kits for health centers with its own pre-defined set and quantity of essential medicines. Hospitals do not receive essential drug kits, and must request the expected quantities of commodities they receive.

Kits and any supplementary drugs are delivered directly to district health offices based on requests that are forwarded monthly from each DHMT.

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

Zambia has no computerized pharmaceutical logistics management information system except for the system devised exclusively for tracking antiretroviral drugs, which was set up with support from Deliver project through PEPFAR. Other assessments of availability and stockout times of first-line antimalarials as well as anecdotal evidence from informants interviewed suggest that stockouts of antimalarials in hospitals and health centers continue to occur. Deliver staff is performing quarterly end use verification of PMI antimalarials.

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

**Malaria Treatment:** Zambian policy recommends AL as first-line treatment of malaria, however there are some situations where SP is still being used as first-line treatment, such as the treatment for uncomplicated malaria in children under five kg and pregnant women in their 1<sup>st</sup> trimester. SP is also an alternative first-line treatment in patients who cannot tolerate AL or where AL is unavailable. Barriers to using AL as a first-line drug are stockouts and the need for more provider training. At a recent meeting of the NMCC Case Management Technical Working Group, it was decided that it is acceptable to use of AL in the 2<sup>nd</sup> and 3<sup>rd</sup> trimesters of pregnancy.

Although training and initial supplies of ACTs have been rolled out in all 72 districts, availability of AL has been limited by inadequate forecasting, procurement, and stocks management practices. The 2006 MIS found that only 13% of children under five years old with a febrile illness received AL. This proportion fell to 8% in the 2008 MIS; the decrease was not statistically significant. In the 2009 quantification exercise and forecast it was determined that with current Global Fund and other donor commitments there will be sufficient AL in Zambia in 2010 to avoid stockouts if it is ordered and delivered in a timely manner.

Provider training has been conducted on the proper use of AL, but refresher training is needed. The broadest coverage of training activities has been achieved through MOH/NMCC and PMI

supported training workshops at the provincial and district levels. Additional trainings also occurred at the district level earlier in the phased introduction of AL, however, resources for refresher training and supportive supervision from district and provincial officials are still inadequate.

***Treatment of Severe Malaria:*** The MOH/NMCC treatment guidelines recommend parenteral quinine as the drug of choice for severe malaria and that children identified at peripheral levels of the health system should be given pre-referral treatment with intramuscular quinine and referred to a hospital or zonal health center equipped to manage severe malaria on an inpatient basis. The IMCI guidelines recommend that children with very severe febrile illness or severe pneumonia classifications should receive parenteral quinine and broad spectrum antibiotics, preferably penicillin and gentamicin, both for pre-referral and definitive treatment. Although intramuscular artemether and rectal artesunate are registered in Zambia and available at urban pharmacies and some private clinical providers, their role is not specifically addressed in the current treatment guidelines.

The MOH/NMCC 2009 Action Plan calls for improving the management of severe malaria by re-orientation of frontline health facility workers on dangers on danger signs of severe malaria and triage, emergency assessment and treatment, and updating the pre-service curriculum for nurses and doctors on new malaria treatment guidelines, including management of severe malaria.

***Malaria Treatment in the Community and Private Sector:*** Zambia has a small private health sector with facilities and pharmacies that operate 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, were informed of the change in first-line treatment, and chloroquine was effectively phased out of wide-scale use. Antimalarial drugs available in private pharmacies include AL, quinine, SP, and artemisinin monotherapies. The small private pharmacy sector does not impact the supply of ACTs in Zambia. The MOH/NMCC and DfID with the World Bank have proposed initiatives to incorporate a subsidized AL product into the private-for-profit pharmacies in urban areas as proposed by the Affordable Medicine Facility for malaria, a multicountry project. A DfID/World Bank funded pilot will assess the viability of this approach in 24 districts. PMI is not involved in this pilot.

A volunteer CHW workforce has been active in Zambia since the 1970s. They provide preventive services and community mobilization. To achieve high coverage of prompt, effective first-line treatment, especially in remote communities, the MOH/NMCC is gradually introducing AL to CHWs with the expansion of community IMCI. The strategic plan calls for CHWs to perform a malaria RDT and to administer AL for patients with positive RDTs. These policy initiatives calling for the expansion of ACT and RDT diagnosis by CHWs are under review by the Zambia Medical Council and the Pharmaceutical Regulatory Authority. A recent study, the Zambia Integrated Management of Malaria and Pneumonia Study (ZIMMAPS), by Boston University in Chikankata looked at the use of ACTs, RDTs and amoxicillin by CHWs in caring for febrile children <5 years old. It demonstrated good compliance and outcomes in the intervention group where RDTs, ACTs and antibiotics for pneumonia were used by CHWs. The published results of this study are likely to be available by year's end. It is expected that the

results will support the MOH's plans to continue rolling out CHW diagnosis and treatment of malaria in Zambia. USAID/Washington PMI core funds supported this project.

### Progress During Last 12 Months

In conjunction with DfID and the World Bank, PMI will help fund an ongoing supply chain management pilot to evaluate the methods of improving drug ordering and inventory monitoring. The supply chain includes SP, ACTs and RDTs. As discussed above, quantification exercises were completed in January, March and September 2009 to better forecast needs for malaria drugs and RDTs;

Boston University and the MOH/NMCC Operations Research Unit completed the ZIMMAPS at the end of 2008. It studied the effectiveness and feasibility of integrated management of fever (malaria and pneumonia) at the community level using CHWs with the aid of RDTs and treatment drugs (AL or amoxicillin). Preliminary results were shared with the MOH/NMCC and at an international conference. Final results are currently being prepared for dissemination to the MOH/NMCC and to other partners;

The MOH/NMCC has completed pilots in Livingstone (with support from the Malaria Consortium and the Medical Research Council) and Milenge Districts looking at the use of RDTs and ACTs by CHWs. These pilots demonstrated that CHWs can appropriately diagnose and treat malaria. CHW training has now been rolled out to a total of 14 districts in Zambia;

Since recent quantification exercises and forecasting indicated that there would be no gap in ACTs, funds for ACTs were reprogrammed for the purchase of RDTs. RDTs were identified as a critical need by the MOH/NMCC.

### Proposed FY 2010 Activities: (\$2,650,000)

The MOH/NMCC has specifically prioritized technical support for case management as an area that PMI should address. In the third year of the PMI, the Initiative 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. There will be sufficient ACTs in 2010 from the Global Fund such that PMI will not need to procure ACTs. Since antimalarials, RDTs and other laboratory supplies are part of the essential drug system, building a robust logistics and supply management system will help prevent future stockouts and overstocking. PMI will continue to work with the MOH, World Bank and DfID to strengthen the supply chain and logistics management systems with the ultimate objective of developing a sustainable, unified system. With FY 2010 funding, PMI will:

- Support refresher training and supervision of healthcare providers and community healthcare workers in diagnosis and case management of malaria (\$1,000,000);
- Work with other partners to provide assistance to the MOH/NMCC to strengthen the national logistics and pharmaceutical management system for antimalarial drugs and laboratory supplies. The current pilot of novel approaches to improve the essential drug system will be completed in early 2010 and PMI will support the implementation of the

best approach as agreed upon by all the participants. This will include the following assistance and advice (\$1,000,000):

- conduct quarterly forecasting of antimalarial drug and RDT needs and gaps;
- importing, quality control, storage, distribution, and inventory management down to the health facility level;
- improving feedback and reporting on consumption/stocks from health facility to district and higher levels;
- monitoring of implementation/evaluation of coverage; and
- end-use verification/monitoring of availability of key antimalarial commodities at the facility level. Specifically, this will entail regular supervisory/monitoring visits to a sampling of health facilities and to detect and trigger further action on the following critical areas: ACT (or other drug) stockouts; expiration dates of ACTs at health facilities; leakage; anomalies in ACT use; and verifying quantification/consumption assumptions;
- PMI will continue to work with the MOH/NMCC to encourage use of AL as first-line treatment of malaria in non-pregnant persons, children over 5 kg, and women in their 2<sup>nd</sup> and 3<sup>rd</sup> trimesters of pregnancy.
- Support a national IEC/BCC campaign to improve the proportion of people with suspected malaria who seek and receive effective diagnosis and appropriate ACT promptly through radio and TV ads, print media, and community interpersonal approaches such as community drama (integrated campaign covering ITNs, ACTs, and IPTp) (\$150,000);
- Support a community-level IEC/BCC campaign through interpersonal and community-based approaches to encourage seeking ACT treatment within 24 hours of fever (integrated campaign covering ITNs, ACTs, and IPTp) that is consistent with the nationwide media campaign and other efforts of the MOH/NMCC (\$500,000).

## **HIV/AIDS AND MALARIA**

### Background

An estimated 14% of adults 15–49 years old in Zambia are infected with HIV. It is estimated that 16% of women and 12% of men are currently HIV infected. Infection rates are two times higher in urban areas than in rural areas with low population density.

The National HIV/AIDS/STI/TB Council (NAC) implements the National HIV/AIDS/STI/TB (Sexually Transmitted Infection/Tuberculosis) Strategic Plan for 2006 – 2010 and provides national leadership for coordinating and supporting planning, monitoring, and resource mobilization. The NAC has already drafted a National AIDS Policy and finalized a national monitoring and evaluation strategy. Currently, it coordinates 14 technical working groups and provides support to nine Provincial AIDS Task Forces and 72 District AIDS Task Forces.

This strategic plan is supported by PEPFAR, Global Fund and other donors. PEPFAR is specifically supporting the prevention, care, and treatment of people living with HIV/AIDS through a multi-sectorial approach. In 2008, the PEPFAR program had \$270 million for this effort in Zambia. As mandated by the U.S. Congress, PEPFAR funding is broken down

approximately in the following manner: 55% for treatment, 15% for palliative care, 20% for prevention, and 10% for orphans and vulnerable children. Zambia also has Rounds 1, 4, and 8 HIV/AIDS Global Fund grants, totaling \$116 million, of which \$81 million has been dispersed.

In light of the potential interaction between HIV/AIDS and malaria and the overlap in target populations, the MOH recognizes the need for the MOH/NMCC and NAC to coordinate. The MOH/NMCC Strategic Plan notes that, particularly at the district and community level, existing networks of HIV/AIDS home-based care networks should be utilized. This network of 18,500 volunteers is present in 52 districts across all 9 provinces. In many communities the volunteer healthcare worker providing home-based HIV/AIDS care is the same person who receives training on home management of malaria through the MOH/NMCC's program. This network has also distributed and hung ITNs.

Programmatic overlap also occurs with ANC. FANC is a model of care that integrates all antenatal services including care related to malaria (SP IPTp and ITN distribution) and HIV (prevention of mother to child transmission of HIV, HIV testing, and linkages to care and treatment). As a result, both PMI and PEPFAR have provided technical support, training, and supplies to improve the quality and uptake of ANC services.

Another area of common interest for both PMI and PEPFAR is the improvement of the essential drug system. There is a single integrated distribution system for both drugs like ACTs and antiretrovirals and commodities such as RDTs for both HIV and malaria. Improvement of the supply chain of drugs and commodities would ensure the availability of these resources for the care of both malaria and HIV.

#### Progress During Last 12 Months

A cadre of volunteer healthcare workers providing HIV/AIDS home-based care have distributed and hung LLINs and have provided education on LLIN use. Plans have been made for procurement of nets outside of PMI resources to be distributed by the HIV home-based care network of healthcare workers.

Several collaborative activities between the PMI and PEPFAR have taken place in the past year. Training of healthcare workers in FANC, which includes both malaria and HIV content, has been completed in 2 provinces (see IPTp section). Another activity common to both PMI and PEPFAR is supporting the improvement of the national essential medicine delivery system. (See the "Pharmaceutical Management" section for more details.)

In terms of monitoring and evaluation, SmartCare is a PEPFAR-supported activity that has the potential to create a national electronic medical record system. A malaria module was developed with technical assistance from PMI and MOH/NMCC. Smart Care is a potential approach to obtaining patient-level data at a select number of health care facilities that routine sentinel surveillance will not provide. No PMI funds will be used for the SmartCare program, but technical assistance continues to be provided as necessary for malaria-related issues.

### Proposed FY 2010 Activities (\$0)

- Continue LLIN distribution for people living with HIV through the MOH/NMCC's equity program funded by the Global Fund and the PMI (Funding and details indicated in the ITN section);
- Incorporate malaria IEC/BCC in activities of the HIV home-based care implemented by NGOs in support of the MOH/NMCC's equity program (no additional funds required);
- Continue to support training and promotion of FANC (See IPTp section for details);
- Provide technical assistance as needed to assist in finalization of the PEPFAR-funded SmartCare malaria module (no additional funds required).

### **CAPACITY BUILDING WITHIN NATIONAL MALARIA CONTROL PROGRAM AND COLLABORATION WITH CIVIL SOCIETY ORGANIZATIONS**

The NMCC is a department under the Directorate of Public Health and Research of the MOH that provides technical and management oversight of all public health facilities, as well as supporting and coordinating a wide range of partners, including research and training institutions. There are 33 staff members within the MOH/NMCC, including a Case Management Officer, Chief Entomologist, Chief Parasitologist, Malaria Epidemiologist, IEC, IRS, Surveillance and Information, and ITN officers, a Medical Laboratory Technologist, and an Operational Research Officer. At the provincial and district level, Provincial Health Offices serve as an extension of the MOH, while the DHMTs have the fiscal authority to manage the district health centers, and are the main implementers of the IRS program.

Due to recent funding delays by the Global Fund the NMCC will likely experience gaps in training. PMI will support travel to international meetings and in-country training to assure that NMCC staff can continue to learn and contribute to malaria control activities.

The MOH/NMCC central 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 MOH/NMCC and partners recognize its need for additional staff to support coordination of IRS activities and advocacy and outreach efforts. MACEPA and PMI both provide support to IRS activities. In addition, the MOH/NMCC requires support to conduct district-level visits for supervision and program management which Global Fund and MACEPA are providing. PMI supports four full time local staff under contract to a health system strengthening partner to work at MOH/NMCC supporting the IRS program. These include an IRS officer, a GIS expert, a logistics person and an entomologist.

The PMI Zambia team has been providing technical assistance and capacity building at the MOH/NMCC including M&E. This includes the recent Implementation Letter to improve malaria reporting in the HMIS by strengthening sentinel sites in their routine reporting of

confirmed malaria cases (see Monitoring and Evaluation Plan for further details). Time spent at MOH/NMCC by PMI Resident Advisors will continue as a priority. Office space is still not available for the PMI team. The PMI Zambia team will continue to work closely with the Surveillance and Information Officer to help build capacity in M&E. PMI will support one local hire contract staff to work at MOH/NMCC supporting its M&E activities. This health system strengthening contractor will be tasked with setting up the active case detection and response program for Lusaka and Kazungula after decreasing IRS in these districts as well as assisting the Surveillance and Information Officer with routine M & E activities.

The current USAID grants/cooperative agreements for IEC/BCC, health systems strengthening, and social marketing activities will be re-competed and awarded in late 2009. The new partners will be encouraged to form 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 PMI will support the hiring of one local contract IEC/BCC specialist to assist current MOH/NMCC staff and the IEC/BCC follow on with this important activity.

Proposed Activities: (\$250,000)

- Strengthen NGO capacity for malaria programming. PMI will provide support to an umbrella NGO or group of NGOs to enhance local NGO and FBO capacity to program malaria activities. This NGO or NGOs will work with community-based NGO organizations to support their malaria IEC/BCC activities (\$50,000);
- Work with other partners to ensure that continued support is provided to the MOH/NMCC to increase contract staff available to support efforts in critical areas as well as conduct supervisory activities at the district level. Resident Advisors to spend significant time at MOH/NMCC to assist in capacity building. Support six full time local hire contract staff through partners to work at MOH/NMCC thus building local capacity in malaria control in the areas of M&E, IRS, and IEC/BCC. The Zambia PMI team will work with NMCC to develop a plan to transition these six staff to NMCC funding by the last year of the new health systems strengthening and IEC/BCC partner contracts in 2013 (\$100,000).
- Provide funds through a bilateral partner for NMCC staff travel and training (\$100,000).

## **COMMUNICATION AND COORDINATION**

The MOH/NMCC and its collaborating partners maintain regular communications and coordinate efforts through routine partners' meetings and technical working groups around support for specific interventions or activities. All partners contributed to the development of the Five-Year Strategic Plan and annual action plans. These mechanisms are functioning well in Zambia and provide a good forum for coordinating ongoing and new activities supported by USG funds through the PMI with other GRZ activities.

This year the MOH/NMCC took advantage of the MOP planning visit to again call together partners and start planning for 2010. Also in 2008, the MOH/NMCC Coordinator asked a small group of key partners (WHO, UNICEF, MACEPA, World Bank, and PMI) to meet with her monthly to help guide the development of the next Three-Year Malaria Business Plan.

The sector-wide approach (SWAp) in Zambia is the key coordinating mechanism in the health sector. The SWAp mechanisms include both written agreements on roles and responsibilities as well as an agreed-upon set of consultative meetings at various levels throughout the calendar year. In June 2006 the MOH signed a Memorandum of Understanding with Cooperating Partners, including USAID, to maximize opportunities for harmonization and alignment in the sector. This and other documents lay out principles of GRZ-Cooperating Partner partnership, health sector coordination, and regular Cooperating Partners and GRZ's meetings and consultations. The MOH has appointed a Donor Coordinator within the Directorate of Policy and Planning who acts as the key link between all Cooperating Partners and the MOH. The MOH Donor Coordinator is invited to and attends, where possible, all key Partners' meetings in the sector. The Cooperating Partners meet monthly to discuss issues of mutual interest and share information. Since 2004, Health Sector partners have annually selected one Partner to act as a focal point for Partners' coordination in the sector. The coordination has included a three-partner mechanism (WHO, Department for International Development (DfID) and the Swedish International Development Agency) where the past, present and future Coordinators have regularly communicated, ensuring continuity and spreading the load of coordination. DfID is the lead Coordinator in 2009.

## **PRIVATE SECTOR PARTNERSHIPS**

The MOH/NMCC has established that sustainability of programs is central to their overall strategy in combating malaria. In this regard, in 2008 and continuing in 2009 the MOH/NMCC is expanding and strengthening employee based schemes through the Zambia Business Coalition Against Malaria program. In addition, commercial sales of ITNs that are not subsidized are still an integral part of the ITN distribution program. The PMI is firmly supportive of the MOH/NMCC's effort to promote the private sector assistance in development and distribution of interventions for malaria control. The MOH/NMCC has continued to collaborate with Konkola Copper Mines in the Copperbelt and Zambia Sugar Company in Southern Province on the planning, implementation, monitoring and evaluation of IRS activities. PMI, through HSSP, has provided technical support to MOH/NMCC to coordinate the training and monitoring of spray operations for all IRS areas including those covered by the private sector. The PMI team met with a local NGO CHAMP which works on public-private partnerships to begin a dialogue about expanding those efforts in 2010.

## MONITORING AND EVALUATION PLAN

### Background

The MOH/NMCC and partners have developed a costed National Malaria Prevention and Control Monitoring and Evaluation Plan for 2006 – 2011, which established clear goals, objectives and indicators for program monitoring and evaluation. The Global Fund Monitoring and Evaluation System Strengthening Tool has given an overall grade of almost 85% to Zambia for a “completed and mostly completed” monitoring and evaluation plan—one of the highest of all Global Fund countries. The MOH/NMCC recognizes that its M&E plan will need to be updated in light of its success in controlling malaria in Zambia. As mentioned in the previously, PMI will support MOH/NMCC in the upgrading of its overall malaria control strategy as well of its M&E plan. Of concern to the MOH/NMCC is the need to plan for sustaining its success beyond the current availability of resources from partners.

The MOH/NMCC M&E strategy tracks all RBM-recommended indicators and has been recently updated to conform with the newest RBM-Monitoring and Evaluation Reference Group (MERG) recommendations (Jan 2009). All-cause under five mortality is tracked using the Demographic and Health Survey (DHS) the last of which was conducted in 2007 (another is scheduled for 2012). Additionally, there is a myriad of provincial, district and community level data and research provide information on changes in malaria epidemiology in Zambia.

Zambia is an example excellent cooperation between M&E partners—all support one M&E plan and provide technical assistance and resources for M&E activities. Institutions such as MACEPA, the World Bank, UNICEF, WHO and others support the implementation of the MIS, facility surveys, etc., while other partners support the more routine information systems. PMI provides technical and financial support to some of the large-scale surveys (e.g. MIS, DHS), and will also support developing, implementing, and maintaining more routine systems for effective monitoring of malaria control activities.

*Monitoring:* Information for routine monitoring of malaria efforts comes from three major sources:

1. The National HMIS is a comprehensive system that reports on information monthly from all public and mission health facilities and some private facilities. Information is collected on reported cases of malaria, malaria case fatality rate (in hospitals), and stocks of medicines and supplies. Information flows from the health facility to the district and provincial level before being transmitted to the HMIS group within the MOH. In 2006, a major assessment of the HMIS funded by the European Union found that while it was functional at all levels of the health system and that data collection and reporting tools are in place in all health facilities and district offices, the quality of data is not checked, reporting tends to be irregular, and most staff are not adequately trained in HMIS procedures. This has resulted in a lack of confidence in the data reported by the HMIS and the development of parallel systems for diseases, such as malaria and HIV/AIDS. Following this assessment, the European Union committed considerable financial and technical support to strengthening the HMIS under a three-year plan of action. Roll-out of the revised HMIS started in late 2007. It was fully operational in January 2009;

2. Because of weaknesses in the HMIS reporting at the district level, the Integrated Disease Surveillance and Response system was instituted in 2006 in all 72 districts to provide monthly information on notifiable diseases. This data collection system has also been modified to report on additional malaria indicators, including antimalarial drug and ITN stocks, the percentage of pregnant women and children under five who slept under a bed net the previous night, and the percentage of children under five with fever who received appropriate antimalarial treatment within the last 24 hours. This interim measure has come to an end now that the revised HMIS is fully operational; and

3. The Malaria Information System was established by the MOH/NMCC in 2000 because of the weaknesses and lack of some malaria-specific information from the HMIS. This sentinel malaria surveillance system operates in all health facilities in ten largely rural districts (at least one district in each of the nine provinces) and reports on a monthly basis on malaria cases confirmed by laboratory test, cases of anemia in children under five, malaria in pregnancy, children and pregnant women sleeping under an ITN, and stockouts of antimalarial drugs. The MOH/NMCC acknowledges that the quality and regularity of reporting under this system is quite variable from site to site. Since 2005, the Global Fund has provided some of the funding for this system. In conjunction with a recent directive from the Permanent Secretary in the Ministry of Health, this system is being phased out and replaced by the new HMIS.

With World Bank Malaria Booster Program funding, a plan of action has been developed for harmonizing and strengthening existing malaria data collection and reporting systems, together with those systems that have the potential to report on malaria-specific indicators within the revised Zambian HMIS. For the malaria component of the HMIS, the aim is for a system that will allow reporting to multiple donors and funding sources under a single national monitoring and reporting system. Standard malaria indicators have been identified through several consensus processes, including the development of the Millennium Development Goals indicators, the National Malaria Strategic and Monitoring and Evaluation Plans for 2006-2011, and the National Health Strategic Plan and the Fifth National Development Plan Monitoring and Evaluation Framework. The key indicators chosen are also in line with recommendations of the RBM MERG. Information collected will include malaria incidence rate (clinical diagnosis and laboratory-confirmed cases), malaria case fatality rate, numbers of women receiving one, two, and three doses of IPTp, as well as information on ITNs distributed, bed nets retreated, and IEC materials disseminated. Monitoring of IRS will be conducted by the MOH/NMCC.

This upgraded reporting system will take advantage of existing data flow for facility-based reporting through DHMTs. The roll out of this was completed at the beginning of 2009. At the direction of the Permanent Secretary of the MOH, vertical surveillance systems are to be phased out. Hence, the new HMIS will replace the Malaria Information System in 2009.

Information is also collected on a regular basis on the therapeutic efficacy of antimalarial drugs. Ideally, this and routine monitoring of insecticide resistance would be part of routine monitoring activities that MOH/NMCC needs to conduct, but they are both considered operational research issues by the MOH/NMCC.

*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. The last DHS was conducted in 2007 and results are available. This survey had a malaria module and covered the last month or two of the malaria transmission season and the initial months of the post-transmission period; this 2007 DHS provides the baseline estimates of all-cause under-five mortality. A nationwide MIS carried out in 2006 provided baseline information on the coverage of the four major malaria interventions, malaria parasite prevalence, and the prevalence of anemia. A follow up MIS was conducted April-May 2008 and provides the most up-to-date information for these indicators and allows for comparison of trends. Both the MIS (2006 and 2008) and the DHS (2007) will provide coverage estimates as well as all-cause mortality (DHS only) to be used for PMI evaluation in Zambia.

In addition to these standardized nationwide surveys, a variety of other, usually smaller, surveys and evaluations have been carried out over the past five years that provide useful information for the MOH/NMCC. 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, malaria parasite prevalence, and the prevalence of anemia. The MOH/NMCC is planning to conduct another health facility survey in late 2009. As part of routine supervisory visits to MOH facilities, checklists are also completed on health worker performance and other technical aspects of health care. These forms are forwarded to higher levels of the MOH, but the information they provide is not systematically tabulated or disseminated.

Zambia is one of the in-depth focus countries in Africa for the impact evaluation for malaria, HIV/AIDS, and TB which the Global Fund is conducting with other partners (WHO, MACEPA, UNICEF). Work on this began in 2007 and data analysis and writing has been completed and a draft report is available. Zambia is regarded as a good example of monitoring and evaluation of malaria activities and is cited in the report for its excellent work.

### Progress During Last 12 Months

The MOH/NMCC M&E activities produced significant amounts of data during 2008. Starting with a follow up MIS, conducted in April-May 2008, to reports from several research activities and partners, MOH/NMCC has substantial amounts of up-to-date and high quality data for its monitoring and evaluation activities.

A key activity during 2008 was the implementation of a national MIS. A report is available ([www.nmcc.org.zm](http://www.nmcc.org.zm)) and it includes estimates for coverage of the main malaria control interventions, and estimates of anemia and parasitemia in children <5 years old. All MIS indicators, with the exception of ACT use, show positive trends and indicate that Zambia is well on its way to controlling malaria. The MOH/NMCC has taken the additional step of implementing regional MIS workshops to share experiences, disseminate the data and develop strategies to deal with problem areas. PMI supported the MIS with funds and MACEPA technical assistance.

Another important M&E activity carried out in 2008 was the roll out of the HMIS and updating of indicators, data collection forms and training. These updates focus on including “confirmatory” results of diagnostic tests and upgrading case management data. As of January 2009, MOH personnel in all 72 districts had been trained in the new HMIS. The MOH/NMCC is also working on enhancing the quality, timeliness and completeness of data from the HMIS. This activity, carried out with support from the Center for International Development of Harvard University, has already yielded valuable data. A preliminary analysis conducted in conjunction with WHO shows decreases of 54% in the number of cases in outpatient facilities and 66% reduction in in-patient malaria specific mortality—exceeding the Abuja targets. Although these data are yet to be verified, it is encouraging that most reports, whether they are small research efforts or large surveys, indicate a generally positive trend.

The MOH/NMCC recognizes that beyond the enhanced HMIS there is a dearth of facility-based data (e.g. health worker performance, compliance with recommendations, appropriate counseling). Consequently, MOH/NMCC is working with several partners (e.g. UNICEF, WHO, MACEPA) to field a health facility survey. A recent health facility survey by the Integrated Management of Childhood Illness program helped clarify some of the issues in facility-based management of malaria. The IMCI health facility survey was conducted in October 2008, just before the rainy season, and involved visits to 94 health facilities in 11 districts nationwide as well as 130 health workers. Out of 163 children under five whose case management was observed during the survey, 67% were classified as having malaria. Unfortunately, several of the malaria case management indicators showed serious deficiencies.

To better coordinate M&E activities internally and with partners the MOH/NMCC has instituted regular M&E meetings and quarterly meetings with partners through an M&E technical working group. These meetings provide excellent opportunities for sharing of information, shaping M&E activities and obtaining feedback and financial support for M&E. With a similar purpose, the MOH/NMCC is planning to re-institute an M&E newsletter and work with provincial and district levels to ensure that data is not only generated in a timely manner but that it is also used to make opportune programmatic decisions.

Although other funding agencies support surveys such as the MIS and DHS that can provide information to demonstrate progress towards PMI targets, data from these surveys are available only every two to three years, or less frequently. Comparable data will not be available until the next MIS in 2010 and the next DHS in 2012. In order to advocate for malaria control resources and monitor implementation more timely information is needed that reflect immediate progress towards PMI goals. Through PMI funding, plans have been made with an implementing partner for enhanced health facility surveillance using several health facilities as sentinel sites with the goal of having useful data by January 2010. This sentinel site surveillance will provide facility-specific, monthly information. Through discussions with the MOH/NMCC and the implementing partner, sentinel sites have been chosen for enhancement of HMIS reporting. Due to the time required to set up a funding mechanism for the implementing partner, progress on this project has been delayed until recently and implementation is planned for fall of 2009.

**Table H: Household and Facility Surveys in Zambia, 2003 - 2012**

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

Note: Items in parenthesis are planned activities

Proposed FY 2010 Activities (\$250,000)

The PMI support will build upon and complement what has already been developed and accomplished by the MOH/NMCC and its partners, and will fill identified gaps in the MOH/NMCC Plan. The surveys currently in place are sufficient to examine progress towards PMI targets over the course of a few years, but support is needed to integrate a health facility surveillance system within existing systems to provide more timely information. Furthermore, as discussed in the IRS section, an enhanced malaria surveillance system will be developed for Lusaka and Kazungula districts where malaria transmission has been interrupted. Recently the MOH has proposed a pilot of a new Health Demographic Surveillance System begin in 2010. Overall, the successful implementation of the MOH/NMCC's M&E plans has depended heavily on technical support from partners, and developing M&E capacity in terms of personnel within the MOH/NMCC is vital to the sustainability of their M&E activities. After consultation with the MOH/NMCC staff and other partners, the PMI proposes to support the MOH/NMCC's monitoring and evaluation efforts by:

- PMI will support the implementation of the MIS in 2010. As in previous years, other partners will contribute resources to the effort so that the financing and implementation burden is shared. (\$200,000);
- Staff at MOH/NMCC to strengthen M&E capacity (\$50,000); PMI will support the placement of an experienced professional within the MOH/NMCC to enhance local M&E capacity.
- Establish an enhanced malaria surveillance system in Lusaka and Kazungula districts to identify areas needing a focal response (as described in IRS section);
- Complete the development of a health-facility based sentinel site surveillance system that will use sites contributing to the HMIS. PMI funds will go towards strengthening the performance and quality of data collection, reporting, analysis, and dissemination to ten sentinel districts. This support will include development of 20 sentinel sites within these districts to participate in health facility surveillance activities. This funding will support

several staff to travel and provide supervision as well as support data clean up and merging of data from each site. Expected outcomes of this investment is a fully running sentinel site surveillance system led by the MOH/NMCC and TDRC that provides reliable, monthly data on progress towards the NMSP and PMI goals to the MOH/NMCC and the PMI team. These data are expected to be used to make data-driven programmatic decisions. (no additional funds required);

- Monitoring of IRS activities and coverage achieved during the 2009 and 2010 spray seasons will be accomplished by GIS mapping of households sprayed as well as weekly and monthly IRS reports. This monitoring process, including the roll-out of GIS mapping to other districts is incorporated into the implementation plan for IRS (see IRS section above). (no additional funds required).

## **STAFFING AND ADMINISTRATION**

Two health professionals have been hired to oversee the PMI in Zambia, one representing CDC and one representing USAID. All PMI staff members are part of a single inter-agency team led by the USAID health team leader. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, managing collaborating agencies, and supervising day-to-day activities. The candidates for these positions were evaluated and/or interviewed jointly by USAID and CDC, and both agencies were involved in hiring decisions, with the final decision made by the individual agency.

These two PMI professional staff work together to oversee all technical and administrative aspects of the PMI, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, and reporting of results. Both staff members 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 MOH/NMCC and other national and international partners, including the WHO, UNICEF, the Global Fund, World Bank, and the private sector.

Locally-hired staff that support PMI activities either in Ministries or in USAID are approved by the USAID Mission Director. Because of the need to adhere to specific country policies and USAID accounting regulations, any transfer of PMI funds directly to Ministries or host governments will need to be approved by the USAID Mission Director and Controller.

## **TABLES**

- Table 1 – Timeline of Activities
- Table 2 – Planned Obligations
- Table 3 – Budget Breakdown by Intervention
- Table 4 – Budget Breakdown by Partner
- Table 5 – TDY Table

**Table 1**  
**President's Malaria Initiative – Zambia**  
**Year 3 (FY 2010) Timeline of Activities**

Activity	2009	2010											
	Oct-Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Procure LLINs													
Distribute LLINs through ANCs													
Procure IRS commodities													
Conduct IRS campaign													
Roll out of FANC for IPTp													
Procure RDTs													
Procure microscopes and supplies													
Strengthen malaria diagnostic capacity													
Strengthen facility and community-based treatment with ACTs													
Strengthen supply chain management													
Support MIS 2010													
Hire staff at NMCC to strengthen M&E activities													
Establish an enhanced surveillance system in Lusaka and Kazungula													
Support to NGOs/CBOs for community based awareness raising and IEC for ITNs and case mgmt.													
Comprehensive malaria IEC/BCC													

**Table 2**  
**President's Malaria Initiative - Zambia**  
**Planned Obligations for Year 3 (FY 2010) (\$25,000,000)**

Proposed Activity	Mechanism	Budget		Geographical area	Description
		Total \$	Commodity \$		
<b>PREVENTIVE ACTIVITIES</b>					
<b>Insecticide Treated Nets</b>					
Procurement of LLINs (18 month budget)	DELIVER Task Order #3	9,500,000	9,500,000	National	Procure approximately 900,000 LLINs for routine distribution through the ANC and child health clinics and to Orphans and Vulnerable Children (link to PEPFAR) providers and mass distribution in Lusaka. Procure at an additional 700,000 LLINs for replacement.
LLIN Distribution	Social Marketing follow-on	800,000	800,000	National	Distribution of LLINs, including transportation and other logistics
National IEC/BCC for net usage	BCC follow-on	400,000		National	National IEC/BCC campaign to encourage ownership and proper use of ITNs
Community IEC/BCC for net usage	HSS follow-on	500,000		National	Community-based IEC/BCC campaign through NGOs/FBOs to increase net ownership and use
Community IEC/BCC for net usage	Peace Corps	0		District	Community-based IEC/BCC to promote correct net usage
ITN durability operations research	CDC	10,000		National	Supplies to complete study
<b>SUBTOTAL ITNs</b>		<b>11,210,000</b>	<b>10,300,000</b>		
<b>Indoor Residual Spraying</b>					
Procurement of IRS-related commodities 18 month budget	IRS IQC Global Task Order	4,000,000	4,000,000	54 districts	Procure insecticides and other IRS supplies/equipment for spraying 1,800,000 structures
Implementation of IRS program, monitoring and evaluation, environmental assessment, storage/incinerator	HSS follow on	2,000,000		54 districts	Training, monitoring and evaluation, and IEC for IRS; environmental assessment, entomological monitoring, pesticide (DDT) storage, waste disposal
Establish a focal, surveillance-based IRS capability in Lusaka and Kazungula	HSS follow on	250,000	250,000	Lusaka district	On call IRS team to spray area around confirmed malaria cases in urban Lusaka and Kazungula

<b>SUBTOTAL IRS</b>		<b>6,250,000</b>	<b>4,250,000</b>		
<b>Intermittent Preventive Treatment in Pregnancy</b>					
Strengthening of FANC for IPTp	HSS follow-on	900,000		9 Provinces	Strengthen FANC in existing provinces and expanding to all nine provinces, where IPTp uptake is low (training, coordination with PEPFAR where appropriate)
National IEC//BCC to increase demand for IPTp	BCC follow-on	150,000		National	National IEC/BCC campaign to increase ANC attendance and demand for IPTp
Community IEC/BCC to increase IPTp demand	BCC follow-on	200,000		National	Community-based IEC/BCC campaign through NGOs/FBOs
Community IEC/BCC to increase IPTp demand	Peace Corps	0		National	Community-based IEC/BCC
Complete operations research on SP effectiveness	TDRRC	100,000		National	Evaluate efficacy and effectiveness of SP for IPTp
<b>SUBTOTAL IPTp</b>		<b>1,350,000</b>	<b>0</b>		
<b>SUBTOTAL PREVENTIVE</b>		<b>18,810,000</b>	<b>14,550,000</b>		
<b>Case Management</b>					
<b>Diagnosis</b>					
Procure rapid diagnostic tests for 18 months	DELIVER Task Order #3	2,382,700	2,382,700	National	Procure approximately 3,300,000 RDTs for health facilities
Procure microscopes and supplies	DELIVER Task Order #3	60,000	60,000	National	Purchase 30 microscopes and supplies
Strengthen malaria diagnostic capabilities at the health center level	IMaD	400,000		National	Review of guidance and use of diagnostic procedures, development and implementation of plan for quality assurance of lab diagnosis, quantification, training
<b>SUBTOTAL – Diagnosis</b>		<b>2,842,700</b>	<b>2,442,700</b>		
<b>Treatment &amp; Pharmaceutical Management</b>					
Strengthen facility- and community-based treatment with ACTs	HSS follow-on	1,000,000		National	Training, supervision support, to improve service delivery in health facilities including treatment of malaria, and to assist with roll-out into communities through CHWs

Strengthen the national logistics and pharmaceutical management system for malaria commodities	DELIVER Task Order #3	1,000,000		National	Strengthen supply chain and logistics for all malaria commodities and essential drugs, including Pharmaceutical Regulatory Authority and the End Use Tool
National IEC/BCC for ACT usage	BCC follow-on	150,000		National	National IEC/ BCC campaign to increase ACT usage
Community IEC/BCC for ACT usage	HSS follow-on	500,000		National	Community-based IEC/BCC campaign through NGOs/FBOs
<b>SUBTOTAL - Treatment &amp; Pharmaceutical Management</b>					<b>0</b>
<b>SUBTOTAL CASE MANAGEMENT</b>		<b>5,492,700</b>	<b>2,442,700</b>		
		<b>2,650,000</b>			<b>HIV &amp; Malaria</b>
Continue LLIN distribution to PLWHA		0		National	Collaborate with MOH/NMCC's equity program funded by GFATM and PMI
Incorporate malaria IEC/BCC into HIV home-based care				National	Incorporate malaria IEC/BCC into HIV home-based care implemented by NGOs in support of equity program
Continue training and promotion of FANC		0		National	Continue training and promotion of FANC
Technical assistance to finalize SmartCare module		0		National	Technical assistance to finalize SmartCare module
<b>SUBTOTAL HIV and Malaria</b>		<b>0</b>	<b>0</b>		
		<b>0</b>			<b>NGO Collaboration &amp; Capacity building</b>
Strengthening of NGO capacity in Zambia for Malaria programming	TBD	50,000		National	Funding for NGO to strengthen NGO capacity in malaria
Fund training and travel to build capacity of NMCC staff	HSS follow on	100,000		National	Fund travel and registration to international meetings such as MIM and ASTMH and regional trainings. Support strategy development.
<b>SUBTOTAL - NGO &amp; Capacity Bldg</b>		<b>150,000</b>	<b>0</b>		
					<b>Monitoring and Evaluation</b>
Support the MIS (2010)	HSS follow-on	200,000		National	Technical and financial support to conduct the 2010 MIS

Staff at NMCC to strengthen M&E activities	HSS follow-on	50,000		National	Provide on site staff to support M & E activities at NMCC
Establish an enhanced surveillance system in Lusaka and Kazungula to identify areas needing a focal response	HSS follow-on	0		Lusaka and Kazungula District	Training of health staff on use of smartphone technology and reporting and to include purchase of equipment
Complete sentinel surveillance system		0		National	Finalize sentinel surveillance with NMCC
<b>SUBTOTAL - M &amp; E</b>		<b>250,000</b>	<b>0</b>		
<b>In-country Staffing and Administration</b>					
USAID and CDC staff and associated administrative expenses	TDRC USAID/CDC	530,000		N/A	Support for USAID resident PMI advisor, includes all logistical expenses, salary, and benefits.
FSN staff and other in-country administrative expenses	USAID	331,000		N/A	Support for USAID FSNs and to cover other administrative expenses related to PMI such as ICASS, support staff, travel, fuel costs, office equipment, vehicle maintenance, etc.
Technical assistance visits	CDC	36,300		N/A	Three short term TA visit from CDC for entomology, M&E and OR
Technical assistance visits	USAID				Three short term TA visit from USAID
<b>SUBTOTAL - In-Country Staffing</b>		<b>897,300</b>	<b>0</b>		
<b>GRAND TOTAL</b>		<b>25,600,000</b>	<b>16,992,700</b>		

**Table 3**  
**President's Malaria Initiative – Zambia**  
**Year 3 (FY 2010) Breakdown by intervention**

<b>Area</b>	<b>Commodities</b>	<b>%</b>	<b>Other</b>	<b>%</b>	<b>Total</b>	<b>%</b>
ITNs	10,300,000	92%	910,000	8%	11,210,000	44%
IRS	4,250,000	68%	2,000,000	32%	6,250,000	24%
IPTp	0	0%	1,350,000	100%	1,350,000	5%
Case Management Diagnosis	2,442,700	86%	400,000	14%	2,842,700	11%
Case Management Treatment & Pharm Mgm't	0	0%	2,650,000	100%	2,650,000	10%
HIV & Malaria	0	#DIV/0!	0	#DIV/0!	0	0%
NGO & Capacity Building	0	0%	150,000	100%	150,000	1%
M&E	0	0%	250,000	100%	250,000	1%
In-Country staff	0	0%	897,300	100%	897,300	4%
<b>GRAND TOTAL</b>	<b>16,992,700</b>	<b>66%</b>	<b>8,607,300</b>	<b>34%</b>	<b>25,600,000</b>	<b>100%</b>

**Table 4**  
**President's Malaria Initiative - Zambia**  
**Year 3 (FY 2010) Budget Breakdown by Partner (\$25,600,000)**

<b>Partner</b>	<b>Geographical Area</b>	<b>Activity</b>	<b>Budget (\$)</b>
USAID   Deliver TO 3	National	Procurement of LLINs (18 month budget), RDTs and microscopes and supplies; strengthen supply systems	<b>\$12,942,700</b>
IRS IQC Global Task Order	54 districts	Procure IRS-related commodities	\$4,000,000
HSS Follow On	National/community	Conduct IRS; Community BCC for ITNs, IPTp, ACTs and IRS; Strengthen community-based treatment with ACTs	\$5,500,000
BCC Follow On	National	IEC/BCC activities in support of ACTs, IPTp, ACTs	\$900,000
Social Marketing Follow On	National	LLIN distribution	\$800,000
TDRC	National	Finalizing IPTp operations research	\$100,000
USAID/CDC	National	PMI USAID and CDC in-country staffing & ITN durability OR	\$907,300
IMaD	National	Strengthen malaria diagnostic capabilities	\$450,000
<b>Total</b>			<b>\$25,600,000</b>

**Table 5**  
**President's Malaria Initiative – Zambia**  
**Schedule of Temporary Duty (TDY) for Malaria Operational Plan 2010**

Type of TDY	Number of TDYs	Name/Agency	Description	Dates	Cost/Source
MOP activity-specific	1 TDY	CDC	Provide supervision for completion of an IPTp OR and for implementation of sentinel site surveillance	TBD	\$12,1000 FY 10 MOP budget
MOP activity-specific	1 TDY	CDC	Provide entomologic support/training	TBD	\$12,1000 FY 10 MOP budget
MOP activity-specific	1 TDY	CDC	Provide technical support for sentinel surveillance	TBD	\$12,1000 FY 10 MOP budget
General program support	2 TDY	USAID	Provide general technical assistance	TBD	PMI USAID HQ Budget
MOP Planning	2 TDY	CDC	MOP 2011 development	TBD	PMI CDC HQ Budget
MOP Planning	2 TDY	USAID	MOP 2011 development	TBD	PMI USAID HQ Budget