

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



President's Malaria Initiative

Malaria Operational Plan (MOP)

Zambia

FY 2011

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ABBREVIATIONS

ACT – artemisinin-based combination therapy
AIDS – Acquired Immune Deficiency Syndrome
AL – artemether-lumefantrine
ANC – antenatal care
BCC – behavior change communication
CDC – U.S. Centers for Disease Control and Prevention
CHAZ – Churches Health Association of Zambia
CHW – community health worker
CMMB – Catholic Medical Mission Board
COMBOR – Community Malaria Booster Response
DDT – dichloro-diphenyl-trichloroethane
DfID – Department for International Development
DHS – Demographic and Health Survey
DHMT – district health management team
DHO – District Health Officer
EPI – expanded program on immunization
FANC – focused antenatal care
FY – fiscal year (October 1 – September 30 for USG)
GHI – Global Health Initiative
GRZ – Government of the Republic of Zambia
HH – household
HIV – Human Immunodeficiency Virus
HMIS – Health Management Information System
HSSP – Health Services and Systems Program
IDA – International Development Assistance
IEC – information, education, communication
IMCI – integrated management of childhood illnesses
IPTp – intermittent preventive treatment in pregnancy
IRS – indoor residual spraying
ITN – insecticide-treated net
IVCC – Innovative Vector Control Consortium
IVM – integrated vector management
LLIN – long-lasting insecticide-treated net
M&E – monitoring and evaluation
MACEPA – Malaria Control and Evaluation Partnership in Africa
MERG – Monitoring and Evaluation Reference Group
MIM – Malaria Institute Macha
MIS – Malaria Indicator Survey
MOH – Ministry of Health
MOP – Malaria Operational Plan
MSL – Medical Stores Limited
MTC – Malaria Transmission Consortium
NAC – National HIV/AIDS/STI/TB Council
NMCC – National Malaria Control Center

NGO – non-governmental organization
PCV – Peace Corps Volunteer
PEPFAR – President’s Emergency Plan for AIDS Relief
PLWHA – People Living With HIV/AIDS
PMI – President’s Malaria Initiative
PRA – Pharmaceutical Regulatory Authority
RBM – Roll Back Malaria
RDT – rapid diagnostic test
SEA – supplemental environmental assessment
SP – sulfadoxine-pyrimethamine
TDRC – Tropical Disease Research Centre
TWGs – Technical Working Groups
UNICEF – United Nations Children’s Fund
USAID – United States Agency for International Development
USG – United States Government
WHO – World Health Organization
ZABS – Zambia Bureau of Standards
ZAC – Zambia Anglican Council
ZIMMAPS – Zambia Integrated Management of Malaria and Pneumonia Study
ZISSP – Zambia Integrated Systems Strengthening Program

EXECUTIVE SUMMARY

Malaria prevention and control is a major foreign assistance objective of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a six-year, comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the United States will invest \$63 billion over six years to help partner countries improve health outcomes, with a particular focus on improving the health of women, newborns, and children.

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, and tuberculosis. PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through FY2014. Programming of PMI activities follow the core principles of GHI: encouraging country ownership and investing in country-led plans and health systems; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; implementing a woman- and girl-centered approach; improving monitoring and evaluation; and promoting research and innovation.

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 three 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 preliminary results of the 2010 Malaria Indicator Survey (MIS), and shows significant progress in recent years. According to the 2010 MIS more than 64% of households own at least one insecticide-treated net (ITN), compared with 62% (2008) and 39% (2006). Approximately 50% of children under five years of age slept under an ITN the previous night in 2010 compared to 41% (2008) and 24% (2006). Seventy percent (70%) of pregnant women took two or more doses of intermittent preventive treatment in pregnancy (IPTp) in 2010 compared to 66% in 2008. The improvements in malaria coverage indicators accompany important reductions in under five mortality rates from 168 per 1000 in 2001-02 to 119 per 1000 in 2007. Malaria parasitemia in children under five fell from 22% in 2006 to 10% in 2008, but then increased again to 17% in 2010. The prevalence of severe anemia (Hb<8g/dl) in children under five declined from 14% (2006) to 4.3% (2008), but then rose again to 9.2% (2010). The explanation for this upswing in malaria prevalence and anemia is not clear, but may be due to falling ITN coverage in several provinces.

The fiscal year (FY) 2011 Malaria Operational Plan (MOP) for Zambia was developed in close consultation with the National Malaria Control Center (NMCC) and with the participation of all national and international partners involved with malaria prevention and control in the country. While universal access to malaria prevention and treatment measures is the goal of most malaria control programs, pregnant women and children under five remain the focus of PMI efforts since they are the most vulnerable to malaria infection. The activities that PMI is proposing to support with FY 2011 funding fit in well with the 2006-2010 National Malaria Control Strategy and Plan

and build on investments made by PMI and other partners to improve and expand malaria-related services. The proposed FY 2011 PMI budget for Zambia is \$24 million.

The FY 2011 MOP was influenced by financing difficulties with Global Fund and World Bank resources. The Global Fund has suspended all disbursements from its grants due to problems with how funds were handled. A new Principal Recipient has been identified which will purchase life-saving commodities. However, no Global Fund disbursements have been made nor are expected in the near future. The World Bank has halted disbursements from current its loan for malaria until accounting irregularities are addressed. In addition, approval of a further \$30 million loan to support malaria activities over the next several years has also been jeopardized. PMI is working closely with its partners to address these problems and is mobilizing its resources to help fill funding gaps.

The activities proposed with FY 2011 funding are as follows:

Insecticide-treated nets (ITNs). The NMCC has adopted a goal of universal coverage with long-lasting ITNs, defined as one bed net for each sleeping space. The distribution of free ITNs has been rapidly scaled up through a rolling mass distribution campaign strategy and other smaller scale distributions. However, until adequate funds are available the program will focus on LLINs for communities that have not been included in the IRS program. During last year PMI procured 1.4 million ITNs. With FY 2011 funding, PMI will support the procurement and distribution of approximately 834,000 ITNs as well as promotional activities for their appropriate use. PMI will also continue to support the Zambian Tropical Disease Research Center (TDRC) on operations research to evaluate the longevity of ITNs under field conditions. PMI – Zambia is working closely with Peace Corps in the promotion of appropriate use of ITNs.

Indoor residual spraying (IRS). Zambia has a longstanding IRS program that has concentrated on urban areas and, with the support of mining companies, in those villages where their workers and their families live. Pyrethroids or DDT are used depending on the type of house construction. In 2009, PMI-supported IRS reached more than 6.5 million people in 36 districts. Instead of spraying all communities in a district; IRS is used only in areas where LLINs are not being distributed. Evidence of resistance to pyrethroids and DDT has emerged and is being intensively studied. With FY2011 funding, PMI will support IRS for 1.3 million structures in 35 districts. Additionally, PMI will support training, information, education and communication (IEC), entomological and epidemiological monitoring and establishment of an insecticide resistance management system. PMI will also support the strengthening of environmental management of pesticides.

Intermittent preventive treatment in pregnancy (IPTp). In spite of impressive gains in IPTp use, the 70% (MIS 2010) national average hides substantially lower rates in rural areas and among poorer women. 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. With FY 2011, PMI will support training in IPTp in hard-to-reach rural areas as well as the distribution of guidelines, job aids and other tools designed to increase health worker compliance with IPTp guidelines and increase uptake of IPTp among pregnant women. PMI will also boost community-based and national

level communication activities and will engage Peace Corps to promote ANC attendance and demand for IPTp. Finally, PMI will continue support to TDRC to evaluate the efficacy of sulfadoxine-pyrimethamine for IPTp in Zambia.

Case management – Diagnostics. Zambia has adopted a policy that recommends that all cases of suspected malaria be confirmed with 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. To extend laboratory diagnosis to more peripheral levels, the NMCC has introduced RDTs in rural health centers and villages for use by community health workers (CHWs). More than 2 million RDTs were purchased and distributed during the past year. With FY2011 funding, PMI will procure three million RDTs for distribution at all levels of the health system, including to CHWs. PMI will additionally strengthen supportive supervision, training and quality control of laboratory diagnosis.

Case management – Pharmaceutical management and treatment. Although in past years ACTs have been readily available in health facilities in Zambia, recent difficulties with donor funding are causing widespread stock outs of ACTs at all levels of the system. During the past year, PMI procured 173,000 ACT treatments and drugs for severe malaria. PMI, in collaboration with other donors, also supported a pilot of two different supply systems for pharmaceutical management. Results of the pilot indicate that facilities experienced fewer stock outs when they were allowed to order directly from Medical Stores Limited and received sealed packages for individual facilities. With FY 2011 funding, PMI procured and distributed 3 million ACT treatments for uncomplicated malaria. PMI will support the roll out of the new commodity supply system, along with PEPFAR and other partners. Additionally, PMI will support health worker training and supervision as well as behavior change and communication activities related to malaria case management at the community and facility level.

Monitoring and evaluation (M&E). PMI supports the NMCC national M&E strategy and seeks to fill gaps in funding from the government and other donors. Two national surveys were carried out during 2010 by NMCC and its partners. The 2010 MIS was partly funded by PMI. A national health facility assessment will provide information on the readiness of health facilities to provide malaria case management services. With FY 2011 funds, PMI will support the RBM /PMI impact evaluation and provide staff to NMCC to strengthen M&E. PMI is also supporting studies to monitor of the efficacy of the first-line antimalarial drug.

Health systems strengthening and integration. In line with GHI principles, PMI in Zambia is working on health system strengthening and integration activities. A recently concluded study on improving commodity logistics was implemented in collaboration with PEPFAR, World Bank and other partners and helped identify an improved system for distribution of all key health commodities, not just malaria commodities. The system will be rolled out throughout the country in all health facilities. PMI is supporting key technical staff in the NMCC in areas of IRS, IEC/BCC and M&E who after 2-3 years will be assimilated into the NMCC. PMI supports distribution of ITNs and IPTp as part of ANC services; and malaria case management as a component of the Integrated Management of Childhood Illness.

INTRODUCTION

Global Health Initiative

Malaria prevention and control is a major foreign assistance objective of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a six-year, comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the United States will invest \$63 billion over six years to help partner countries improve health outcomes, with a particular focus on improving the health of women, newborns and children. The GHI is a global commitment to invest in healthy and productive lives, building upon and expanding the USG's successes in addressing specific diseases and issues.

The GHI aims to maximize the impact the United States achieves for every health dollar it invests, in a sustainable way. The GHI's business model is based on: implementing a woman- and girl-centered approach; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; encouraging country ownership and investing in country-led plans and health systems; improving metrics, monitoring and evaluation; and promoting research and innovation.

The GHI will build on the USG's accomplishments in global health, accelerating progress in health delivery and investing in a more lasting and shared approach through the strengthening of health systems.

President's Malaria Initiative

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, maternal and child health, and tuberculosis. The PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through FY2014 and, as part of the GHI, the goal of the PMI is now to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by reaching 85% coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

This FY2011 Malaria Operational Plan presents a detailed implementation plan for the fourth year of PMI in Zambia, based on the PMI Multi-Year Strategy and Plan and the National Malaria Control Center's (NMCC's) 5-Year Strategy 2006-2010. It was developed in consultation with the Zambia NMCC, with participation of national and international partners involved with malaria prevention and control in the country— including the World Bank, World Health Organization (WHO), United Nations

Children’s Fund (UNICEF) and others. The activities that PMI is proposing build on investments made by PMI and other partners to improve and expand malaria-related services, including the World Bank and Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund). This document briefly reviews the current status of malaria control policies and interventions in Zambia, describes progress to date, identifies challenges and unmet needs if the targets of the NMCC and PMI are to be achieved, and provides a description of planned FY2011 activities. The total amount of PMI funding requested for Zambia in FY2011 is \$24 million.

MALARIA SITUATION IN ZAMBIA

Zambia is a land-locked country in southern Africa. It has a population of approximately 13.2 million (2010 population estimate). The country has nine provinces and 72 districts. Zambia’s key health indicators are generally positive: under-five mortality has fallen from 191 per 1000 live births in 1992, to 168 per 1000 in 2002, and to 119 per 1000 in 2007. Eighty-five percent of children complete primary school and overall poverty has been declining. Despite these positive trends, Zambia continues to face major challenges. Sixty-eight percent of the population lives below the national poverty line. HIV/AIDS is a major problem for all sectors with an estimated 14% of adults infected. Maternal mortality continues to be high at 591 per 100,000 live births in 2007.

Malaria transmission in Zambia occurs throughout the year with the peak during the rainy season, 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, including Lusaka.



The Health Management Information System (HMIS) in 2008 reported approximately 3 million clinically diagnosed cases of malaria. Although this number represents a decline between 2000 and 2008, 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 an estimated 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 reduces productivity through absenteeism and lowered output.

The preliminary report of the 2010 National Malaria Indicator Survey (MIS) indicates an increase in malaria parasitemia in children under five compared to the 2008 MIS. Thus far, the 2010 MIS reports an average of 16.9% under five parasitemia compared to 10% in the 2008 MIS and 22% in 2006 MIS. Severe anemia increased from 4.3% to 9.2%. NMCC is conducting a more detailed analysis of MIS data including a review of rainfall data. It is also increasing its surveillance of insecticide resistance to more locations.

Zambia currently has two active Global Fund malaria grants: Round 4 (\$43,495,326), and Round 7 (\$37,502,022). The Principal Recipients are the United Nations Development Program and the Churches Health Association of Zambia (CHAZ). Changes in Principal Recipients in 2009 resulted in delays in fund disbursement. Round 4, Phase 2 for \$16,547,268 has been signed.

Round 4 focused on the scale-up of long lasting insecticidal nets (LLINs), the introduction and scale-up of artemisinin-based combination therapy, and the reintroduction of indoor residual spraying. This grant 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 three million LLINs, nine million rapid diagnostic tests (RDTs) for diagnosis of malaria at both the community and facility levels, and expand information education and communication/behavior change communication (IEC/BCC) to increase and sustain high coverage with prevention and treatment interventions. However, several procurements are hold pending resolution of administrative irregularities with Global Fund resources.

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 NMCC scale-up. MACEPA's support to the NMCC in Zambia includes technical assistance in several areas.

The World Bank designated Zambia a Malaria Booster Project Country and provided \$20 million for malaria control and prevention between 2006 and 2010. In 2009, the World Bank agreed to fund the Community Malaria Booster Response (COMBOR) for two years. This program funds community IEC/BCC efforts that focus on malaria. Recently the World Bank and NMCC announced a \$30 million loan to Zambia for malaria interventions. Financial irregularities with current lending have led the World Bank to stop all disbursements and halt the processing of the \$30 million loan.

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 community health workers (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.

The United Kingdom's Department for International Development has recently made a "gift" of £7 million to USAID for the procurement of malaria commodities during the calendar years 2010 and 2011, These resources complement well PMI resources and will be administered by PMI.

NATIONAL MALARIA CONTROL PLAN AND STRATEGY

The Zambian NMCC has a well-conceived and ambitious Five-Year Strategic Plan for 2006 - 2010. The overarching goal of the strategy is to reduce malaria incidence by 75% by the end of 2010, ultimately contributing to the reduction of all-cause mortality by 20% in children under five. The specific objectives for the NMCC Action Plan for 2010 are:

- To ensure 100% coverage of three ITNs per household (in non-IRS districts) and at least 85% of people sleep under ITNs in homes that have at least one ITN 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 a package of interventions to reduce the burden of malaria in pregnancy by December 2010. The package of interventions will include three doses of IPTp, an ITN, and treatment of anemia;
- To ensure that at least 80% of patients with suspected malaria are appropriately diagnosed and treated within 24 hours of onset of symptoms by December 2010;
- To ensure that at least 80% of the general population has positive behavior to prevent malaria and seek care.

In 2010, NMCC will conduct a programmatic review and needs assessment to facilitate development of a new five-year national malaria strategic plan for the period 2011-2015. PMI will support NMCC in developing the new strategic plan.

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

Overview of the Health System

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

or on a cost-sharing basis depending on the location and level of the system. In rural and poor districts in Zambia, these services are free.

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

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

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

Facility Type	MOH	Private	Mission	Total	%
Health Posts	168	11	4	183	10.3
Health Centers	1270	85	113	1468	82.7
Level 1 Hospitals	44	6	42	92	5.2
Level 2 Hospitals	14	2	10	26	1.5
Level 3 Hospitals	5	0	0	5	0.3
Total	1501	104	169	1774	100

Source: JSI Master Health Facilities Database 2009

The DHMT provides overall planning, coordination, and monitoring of malaria activities within their districts. Health posts are intended to cover 500-1000 households and all households should be within five kilometers of a health facility. Health centers, staffed by a clinical officer, nurse or environmental technicians serve a catchment area of 10,000 residents. Each district is expected to have a hospital, staffed by one or more physicians; however, currently 13 districts have no hospital. The Mid-Term Review Report of 2008 of the National Health Strategic Plan 2006-2010 noted that although physical access to health facilities has improved through construction and commissioning of health facilities around the country, only 69% of the population live within 8 kilometers of a health facility.

CHAZ, parastatal organizations, private clinics, and traditional healers provide health care in Zambia in addition to the MOH. CHAZ has 135 affiliates representing 16 different churches, both Catholic and Protestant, with a majority of them based in rural areas of Zambia. The membership is comprised of hospitals, health centers, faith-based organizations and community based programs. Altogether, these institutions are responsible for over 50% of formal health services in the rural areas of Zambia and about 30% of health care in the country as a whole. CHAZ also supports health programs, pharmaceutical services, and institutional development activities, and leverages resources

for the collective procurement of drugs and other health-related commodities for its member facilities. Private mining companies provide preventive and curative medical services for their workers and dependants, as well as to surrounding communities in some cases. Several of the larger mining companies, such as Konkola and Mopane Copper Mines, have been carrying out IRS for many years within and around their compounds.

GOALS AND TARGETS

The goal of PMI is to reduce malaria-related mortality by 70% in the original PMI countries by 2015 when FY2014 funding will be fully implemented.

PMI will continue to 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;
- 80% of children under five will have slept under an ITN the previous night;
- 80% of pregnant women will have slept under an ITN the previous night;
- 80% of houses in geographic areas targeted for IRS will have been sprayed;
- 80% 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;
- 80% of women who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy;
- 80% of government health facilities have ACTs available for treatment of uncomplicated malaria; and
- 80% of children under five with suspected malaria will have received treatment with an ACT within 24 hours of onset of their symptoms.

CURRENT STATUS OF MALARIA INDICATORS

Estimates of malaria indicators are shown in Table B below. The most up-to-date but preliminary information on malaria control indicators comes from a nationally representative MIS that was carried out in 4,361 households in 66 of the 72 districts in the country during April-May 2010. Additional information on IRS coverage is tracked by the districts during each spray season. In addition to the indicators listed below, the 2010 MIS found that 34% of children under five had had a fever within the previous two weeks. Of these, 34% took an antimalarial drug, while 19% took an antimalarial drug within 24 hours of the onset of their symptoms. Preliminary results also show an increase in ITN coverage and usage but also in parasitemia and severe anemia in children under five compared to 2008 levels.

Table B: Current Status of Malaria Indicators, Zambia			
Indicator	2006 MIS	2008 MIS	2010 MIS
Proportion of households that have at least one ITN	NA	62%	66%
Proportion of children under 5 years old who slept under an ITN the previous night	24%	41%	50%
Proportion of pregnant women who slept under an ITN the previous night	25%	43%	46%
Percentage of children <5 with parasitemia	22%	10%	17%
Proportion of households with at least one ITN and/or sprayed by IRS in the last 12 months.	43%	66%	78%
Proportion of women who have completed a pregnancy in the last five years who received 2 or more doses of IPTp during that pregnancy	62%	66%	70%
Percentage of children <5 years with severe anemia (HB <8gms/deciliter)	13%	4%	10%

EXPECTED RESULTS -- YEAR FOUR

Prevention:

- Purchase 834,000 replacement LLINs and distribute these and other LLINs free-of-charge through antenatal care (ANC) clinics, the Zambian Anglican Council, and Peace Corps Volunteers (PCV);
- Support IRS in over 1.3 million targeted houses in 35 districts in Zambia, including the procurement of insecticides, personal protective equipment and other supplies, training of sprayers, and an environmental assessment; this is expected to protect over 6.5 million 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) and IEC/BCC campaigns at both the community and national levels.

Case Management:

- Procure three million RDTs and improve laboratory diagnostic capacity, thereby assisting the NMCC in its goal of confirming every case of malaria before treatment;
- Expand malaria diagnostics support in all nine Provinces by providing outreach training and supportive supervision in >100 health facilities;
- Procure three million ACTs to assure a continuous supply to all public health care facilities;
- Train 2,160 CHWs in 27 districts in community-based malaria interventions;
- Train 540 health workers in 27 districts in evidence-based clinical guidelines.

PREVENTION ACTIVITIES

Insecticide-Treated Nets

Background

Zambia has identified ITNs as a key part of its malaria control effort and the distribution of ITNs has been rapidly scaled up through a free mass distribution campaign strategy. This strategy focuses on ensuring that each sleeping space in the household is covered by an ITN. Nets are also distributed through antenatal care (ANC) and Expanded Program on Immunization (EPI) clinics as well as smaller distributions through an equity program that targets vulnerable groups such as orphans and people living with HIV/AIDS (PLWHA), the World Bank's COMBOR program, and commercial sales. The chart below estimates the percent of nets that are distributed typically through each program:

LLIN distribution methods	Estimated proportion of nets distributed
Mass distribution of free nets	60%
Through ANC clinics and EPI programs	30%
Equity programs to vulnerable populations	5%
COMBOR	3%
Commercial sales	2%
Total	100%

The strategy for LLINs distribution in Zambia is part of a larger plan to provide malaria prevention services to cover all Zambians. This will be achieved through IRS in urban and peri-urban areas and ITN distribution in rural areas.

ITN needs and gaps by districts are developed by considering a consistent set of criteria that includes:

- Population and household demographics by district
- Number of ITNs already received by district
- Coverage of IRS operations within the district
- Maximizing ITN availability in areas not covered by IRS
- Prioritizing ITN distribution in high malaria transmission areas

Calculating the need for nets in light of increasing IRS coverage in Zambia is complicated by the adoption of a policy of universal coverage where all persons at risk of malaria are to be protected. When calculating the overall ITN need in Zambia, the MOH/NMCC considers two different approaches: 1) if sufficient funds are available, they will pursue universal coverage where all households will receive at least three LLINs or 2) if less funds are expected, they will cover only houses not sprayed with IRS. The chart below outlines the two different approaches to calculating the net need in Zambia:

Category	Universal Coverage	ITN/IRS Coverage
Population estimate	13,200,000	13,200,000
Households (HH) @ 5.0 persons each	2,640,000	2,640,000
No. of HH covered by IRS per NMCC		977,500
Estimated No. of HH not covered by IRS per NMCC		1,662,500
LLIN Need at 3/HH	7,920,000	4,987,500

At the present time Zambia is pursuing a dual strategy to use IRS in urban and peri-urban areas and ITNs in the rural areas and/or in areas where it is difficult to conduct IRS operations. It is anticipated that a more detailed strategy between IRS and ITNs will be included in the next five-year National Malaria Strategic Plan. Until that strategy is fully implemented we assume that the need for nets will be based roughly on one third of the households in Zambia receiving an IRS application and two thirds of the households requiring nets. This assumption reveals that approximately 5 million nets are needed in Zambia to provide universal coverage with malaria vector protection.

The principal sources of LLINs to Zambia are the Global Fund and PMI. In 2008 and 2009, approximately 2.5 million nets were delivered to Zambia and an additional 2.7 million nets are expected from PMI and the Global Fund. The chart below outlines the need for LLINs for Zambia in 2011:

Table E: Expected LLIN gap in Zambia 2011		
Category	Detail	LLINs
Need for LLINs		4,987,500
Available LLINs in-country	Delivered in 2008 and 2009	2,559,023
Expected LLINs (2010/11)	PMI (FY10) 1,416,885	
	PMI (FY09) 400,000	
	Global Fund (R7) 909,630	
Total expected		2,726,515
New pregnant women/infant cohort 2011	Estimated at 4% of the population	528,000
Gap	(need – available – expected + new cohort)	229,962

We estimate that Zambia will have roughly a 230 thousand net gap in order to meet universal coverage targets by 2012. The World Bank is in a position to provide additional nets to Zambia through a special International Development Assistance (IDA) loan of \$30 million to meet any universal coverage gap, if needed.

By the end of 2011, all of the country's provinces will have benefited from a universal coverage campaign and PMI in FY2011 will focus on a new cohort of pregnant women and infants, replacement nets and to maintain a supply of nets to ANC clinics for routine distribution. We estimate this new need for nets beginning in the year 2012 will be approximately 3.0 million nets.

Progress During Last 12 Months

PMI supported the Tropical Disease Research Center (TDRC) to conduct a study to assess longevity of nets that have been distributed in Zambia during the last 2-3 years. To date, TDRC collected 650 nets out of a total 950 planned collection to determine the number of holes and their insecticide content. This study should be completed in late 2010, and will provide valuable information regarding the expected lifetime of nets in Zambia.

PMI supported the Catholic Medical Mission Board (CMMB) through the Malaria Communities Program to promote the proper use of LLINs in the high transmission Luapula Province. Training, implementation of IEC/BCC programs and ANC activities will focus on vulnerable populations with a full program of early intervention activities including proper and consistent LLIN use. Training of supervisors and CHW/volunteers will be conducted and radio spots will be aired in the area.

MACEPA is conducting a pilot program to evaluate the cost benefit of door-to-door promotional activities to increase net hang-up and use. The Peace Corps is conducting a

series of focus groups with local personnel to analyze barriers to net use. PMI will provide technical assistance to Peace Corps volunteers involved in health promotion activities and orient all new Peace Corps volunteers on malaria issues in Zambia.

With regard to commodities, PMI procured 400,000 LLINs from FY2009 funds and will procure an additional 1.4 million nets with FY2010 funds to be delivered late 2010 early 2011.

Proposed FY2011 Activities (\$6,287,700)

During FY2011 PMI will:

- Procure approximately 753,173 LLINs for routine distribution through ANC and child health clinics to replace worn-out nets and for a new cohort of pregnant women and infants. Procurement of an additional 80,000 LLINs for the Zambian Anglican Council for distribution in the Zambia-Namibia border areas where the Council has shown expertise in distributing nets to remote and hard to reach areas. (\$4,436,110);
- Support the distribution of LLINs including transportation to districts, estimated at \$0.50/net for all 780,000 nets, and transportation from the districts to health facilities, estimated at \$1.00/net for approximately 600,000 nets. (\$1,016,590);
- Support for a national IEC/BCC campaign to promote ownership and proper use of LLINs (\$375,000);
- Support for a community-based IEC/BCC campaign through non-governmental organizations (NGOs)/faith-based organizations to increase net ownership and correct use (\$460,000);
- Support Peace Corps volunteers to promote ITN use (no additional cost to PMI). Provide technical assistance and malaria commodities that are already part of quantification in the MOP.

Indoor Residual Spraying and Other Vector Control Measures

Background

The NMCC has an integrated vector management strategy with IRS and LLINs as the main interventions. The NMCC considers IRS as the most cost-effective method to control malaria transmission. Indoor residual spraying is conducted with the following goals: (1) to control epidemics in urban and peri-urban areas with high population density; (2) to reduce peaks of transmission in areas of intense seasonal transmission; (3) to prevent outbreaks in epidemic-prone areas; and (4) to eliminate new foci of infection in areas previously malaria-free. IRS is also the only intervention available to manage

insecticide resistance through rotation among different classes of WHO—approved insecticides.

The new strategy for malaria control in Zambia, which includes IRS and ITN options, is not yet complete. The NMCC shared with the MOP 2011 planning team an advance document that clarifies the NMCC's short- and long-term vision on ITNs and IRS. The immediate strategy calls for covering all homes in Zambia with IRS or ITNs. Universal ITN coverage is the ultimate goal but sufficient funding is not available for this through at least 2011. Currently, not all households in IRS-targeted districts are sprayed; only households in densely populated communities are targeted. The unsprayed households are prioritized for ITN distribution. PMI, beginning in 2010, will not support IRS activities in Lusaka, where malaria transmission is very low. It is more appropriate to support IRS in urban – peri urban areas of additional districts where there is currently no prevention activity, while PMI supports further strategic thinking and implementation in the NMCC such as helping NMCC use available scientific evidence to guide the dual application and expansion of IRS and/or ITN

The national strategy is to prioritize IRS in urban and peri-urban areas as a cost-effective treatment of large numbers of high-density households. Many urban/peri-urban houses have plastered walls, where retention of insecticide is greater compared to rural thatched or mud/pole structures. Rural structures are often abandoned and new huts built as frequently as every three to six months, especially in the vast wetland areas. Pyrethroids are therefore used on cement, plaster and painted walls, and dichloro-diphenyl-trichloroethane (DDT) in mud or pole/grass homes. An exception to the strategy is IRS in Kazungula district, a rural area with few modern structures. This district is part of a cross-border scheme with Namibia and Botswana, where malaria incidence has been kept low through effective, sustainable IRS campaigns.

The NMCC has responsibility for coordinating and managing the IRS program nationally; DHMTs are responsible for implementation in their districts, although the extent of decentralization of IRS to the DHMTs is being debated. Given the limited resources of each DHMT, evidence-based selection of areas to be sprayed and central-level planning and support to the DHMTs are essential to a successful IRS program. The PMI will assist the 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. Evidence indicates that urban Lusaka is a low-transmission area and integrated vector management (IVM) strategies other than IRS should be considered.

Progress During Last 12 Months

In 2009, the MOH, with PMI support, sprayed nearly 1.3 million structures in 36 districts, representing 90% of targeted homes and protecting over 6.5 million people.

Pre-, mid- and post-spray environmental compliance inspections for 2009 were conducted and the post-spray inspection identified problems with stock management and

a supply of DDT about to expire. Mop-up activities were implemented using DDT before expiration. Plans are in place to train stores keepers in management to improve skills, record keeping, and stock rotation to ensure timely use of supplies and minimize losses due to expiration.

PMI supported the training of personnel from NMCC, University of Zambia and Zambia Bureau of Standards (ZABS) in DDT sampling of soils and crops. 191 samples were collected before and 217 samples after the 2009 spray round. Testing has been delayed due to lack of capacity to conduct detailed analysis at the ZABS. The IRS contractor has procured the needed supplies and hired a consultant to train ZABS staff in DDT analysis. DDT waste from the 15 districts was collected and stored in Lusaka for repatriation to South Africa.

Field visits were conducted and data collected for the 2010 Supplementary Environmental Assessment (SEA) and the report was finalized in July 2010. The SEA identified inadequate storage facilities in most districts and recommendations were made to District Directors of Health to set money aside from their grants for construction of toilets and showers as well as storage facilities for IRS activities. A needs assessment for procurement of IRS commodities (insecticides and personal protection equipment) for 53 districts was completed. Ongoing resistance testing indicated a potential problem with high levels of resistance detected in *Anopheles gambiae s.l.* to DDT and pyrethroids in Ndola and Solwezi districts.

NMCC has not conducted coordinated and systematic pesticide resistance monitoring. In May 2010 our PMI in-country partner reported DDT and pyrethroid resistance by *Anopheles gambiae* in Ndola and Solwezi Districts. Resistance testing is being conducted (in an uncoordinated fashion) by several groups, including the Innovative Vector Control Consortium (IVCC), Malaria Transmission Consortium (MTC), Malaria Institute at Macha (MIM) and the TDRC, in selected sites, and there is additional evidence of *A. gambiae* resistance developing in these sites to both DDT and pyrethroids. PMI is working with NMCC, IVCC, MTC, TDRC and other stakeholders to develop an insecticide resistance management strategy for Zambia that will include insecticide rotation. Short-term technical assistance from PMI is planned for September 2010 to develop a plan for the strategy development. In the meantime, NMCC is forming an insecticide resistance monitoring “core” working group as a follow up action to a stakeholders meeting convened by MOH at the end of May 2010 to discuss resistance testing results reported by a PMI in-country partner.

Proposed USG Activities (\$6,550,000)

PMI will continue NMCC support to conduct IRS with procurement of insecticides, supplies and equipment to spray approximately 1.3 million households in 35 districts. NMCC capacity to conduct the following activities will be strengthened: needs assessment for additional districts; environmental monitoring and compliance (DDT sample collection and analysis); community sensitization; geocoding; storage/insecticide management; insecticide waste storage and disposal; costing for IRS in Zambia and

enhanced insecticide resistance surveillance. For the 2011 campaign, PMI will support IRS in 35 districts by:

- Procuring insecticide and other IRS supplies and equipment targeting 1.3 million households (\$3,800,000);
- Support to implementation of IRS program including training, monitoring and evaluation (logistics, geographic information systems, IRS, entomology and M&E staff hired under the new health systems strengthening bilateral partner), IEC/BCC for IRS, rehabilitation of storage facilities, waste disposal, entomological and epidemiological monitoring and establishment of insecticide resistance management system (\$2,700,000);
- Costing of IRS in Zambia. Because of the importance of IRS to the Zambia malaria control program and the need for detailed data as the program expands in additional urban and peri urban areas, the MOH/NMCC requests that PMI conduct a costing analysis of the IRS program in Zambia. The purpose of this evaluation is to provide a detailed understanding of the cost per household of providing indoor residual spraying in Zambia each year since PMI began funding IRS in 2008. This evaluation will provide an estimate of the annual costs of IRS as borne by the host country, the USG and local and international partners, including in-kind support. This project will use retrospective financial and economic data and will be conducted during a 4-6 week contract with an economist.

The reason for this costing evaluation is to help the MOH/NMCC plan and budget for its IRS expansion. The changes in cost over time will allow the MOH/NMCC to project future costs and ensure that adequate funds are available to support the increase in households sprayed. Even though the districts included in the IRS program and funded by donors may change over time, the Ministry needs this information to make prudent use of limited resources and to justify the requests for additional funds to support the IRS program, including the next Global Fund application. (\$50,000).

Intermittent Preventive Treatment of Pregnant Women

Background

IPTp with sulfadoxine-pyrimethamine (SP) was introduced as policy in Zambia in 2003. The 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 from IPTp who are HIV positive and on cotrimoxazole.

The MOH's Reproductive Health Services Unit implements IPTp as part of focused antenatal care (FANC) with technical assistance from the NMCC. FANC also includes

the distribution of free LLINs at all ANC clinics, as well as several other non-malaria interventions. The FANC approach attempts to ensure that pregnant women should make at least four ANC visits before delivery. ANC 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 and ANC providers nationwide received initial training.

The PMI and NMCC aim 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. In the preliminary 2010 MIS, 70% of mothers surveyed took the recommended two or more doses of IPTp, a slight increase from 66% in 2008. Despite the overall high national coverage of IPTp in 2010, certain provinces had lower coverage—for instance, Western Province recorded a corresponding IPTp uptake of only 34%; there were also substantial differences in coverage with two or more doses of SP between women in urban and rural areas (79% vs. 66%, respectively). Only 19% of women attend ANC in the first trimester; the median gestation age at the first ANC visit is 5.1 months.

A major challenge to improving IPTp coverage are SP stock outs due primarily to inaccurate quantifications of needs and problems with the drug delivery system. A 2008 assessment in Central and Eastern Provinces found that 95% of 54 facilities surveyed experienced a stock out of SP in the previous year. Stock outs of SP were reported throughout 2009 and early 2010 due to delays in MOH and Global Fund procurements. There are also reports of SP being used outside NMCC treatment guidelines for the treatment of fever in persons who test negative for malaria on RDTs, but have a high clinical suspicion for malaria.

Progress During Last 12 Months

IEC/BCC activities remain an integral part of the PMI and NMCC IPTp activities. PMI will help to expand training of health care providers and raise public awareness about the importance of IPTp nationwide. 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. In March 2010, the Public Affairs Office of the US Embassy taped a radio spot to emphasize malaria interventions, including ITNs, IPTp, and IRS; this was disseminated to all radio stations in Zambia.

Through the Malaria Communities Program, PMI supports the CMMB program to actively promote ANC and IPTp in Luapula Province. This program focuses on community and health care worker training, implementation of IEC/BCC programs, and ANC activities, including promotion of IPTp.

To improve performance of the supply chain and to better quantify consumption of SP, a quantification exercise was done to estimate SP needs. In 2009, \$50,000 of PMI funding was used to procure an emergency stock of 660,000 SP treatments.

With support from PMI, the Maternal and Child Health Integrated Program conducted a case study from August-November 2009 to assess malaria in pregnancy activities in Zambia. During this case study, a number of bottlenecks were identified, including weak linkage between the NMCC and the MOH programs responsible for reproductive health, lack of hemoglobin testing, stock outs of SP, shortages of LLINs for distribution through ANC clinics, late attendance at ANC clinics, weak supervision and human resource shortages. These findings will be used to strengthen malaria in pregnancy interventions in Zambia and to better adapt these activities to local situations.

In 2009, PMI provided support through the NMCC's operations research unit and the TRDC to conduct a study on the effectiveness and efficacy of SP for IPTp. The study aims to determine the therapeutic efficacy of SP IPTp in pregnant women and to determine the birth outcomes of women given IPTp, and to characterize resistance markers to SP in pregnant women. Initially funded in FY2007 and 2008, delays in developing a funding mechanism for the implementing partner slowed initiation of these projects, but the SP study began in December 2009. Through August 2010, a total of 92 women have been enrolled in the efficacy study (target enrollment 359), and 387 in the birth outcomes study (target enrollment has been revised to 462). Enrollment in the efficacy portion of the study has been slower than expected, in large part because the study limits enrollment to parasitemic women between 16-26 weeks gestation, which is earlier than most women seek ANC. Enrollment in the birth outcomes portion of the study has exceeded expectations; this part of the study should be completed by November 2010. Completion of the birth outcomes portion will allow for an increased focus on enrollment in the SP efficacy study. Other strategies to increase enrollment in the efficacy portion of the study, including campaigns to increase ANC attendance, are being developed. A third-year Peace Corps volunteer has served as local Study Coordinator since March 2010. SP resistance markers study continues on hold because of the costs associated with building the polymerase chain reaction capacity needed to complete this research.

The Peace Corps is conducting a series of focus group interviews with community leaders to analyze barriers to IPTp use and identify ways to increase demand for IPTp. The results are not yet available.

Proposed FY 2011 Activities: (\$1,250,000)

Although Zambia has relatively high levels of two-dose IPTp, this national average masks poor coverage in rural areas and therefore the MOH/NMCC would like to continue to increase the number of women who receive the recommended three doses. To increase this proportion, it is necessary that pregnant women attend ANC earlier in their pregnancy. Improving the demand for and delivery of ANC services in rural areas are goals of the ANC program. PMI will continue to support the MOH/NMCC in expanding their efforts to strengthen FANC and increase IPTp uptake focusing on needy, hard-to-reach rural areas. USAID/Zambia, in June 2010, signed a new contract for health systems

strengthening which will implement FANC, while IEC/BCC will be implemented by another newly engaged IEC/BCC contractor.

The technical approach to IEC/BCC for all malaria interventions, including FANC, will involve use of multiple channels and integration with IEC/BCC for nutrition, HIV/AIDS, maternal, neonatal, child health. The health systems strengthening project will focus on community based IEC/BCC whereas the IEC/BCC project will focus on national level IEC/BCC. A common theme for both projects is the appropriate integration of activities with MOH, other USG supported projects, other stakeholders, including the private sector. The new IEC/BCC contractor will prepare a monitoring and evaluation plan. The statement of work requires the contractor to monitor the impact of IEC/BCC activities on changes in knowledge, attitudes, behaviors and practices, and health status at the population level by collecting, analyzing and reporting data on indicators to be identified and included in their performance monitoring plan. Further, the IEC/BCC contractor will work closely with MOH and other stakeholders to use existing evidence and conduct formative research to design, pre-test, and produce evidence-based IEC/BCC approaches and materials.

Close collaboration with efforts to improve 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 and completing nationwide roll-out of these activities in FY 2011. Written guidelines, job aids and tools for supervision have already been developed. Funding will support training and distribution of these materials in selected needy areas. Activities include training of additional antenatal health service providers and district-level supervisors, 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 and IPTp through purchasing appropriate mass media 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. The MIS 2008 reports that the most common source of general malaria messages for women aged 15-49 years are public health facilities, followed by radio, television, friends/family and others. (\$150,000);
- 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 village level, by providing subject matter expertise (no additional funds required);
- Complete an operations research study on SP effectiveness for IPTp which includes evaluations of SP efficacy study and an assessment of birth outcomes. This will inform the NMCC's IPTp policies. CDC will work with MOH/NMCC's operations research unit and TDRC to complete this project (no additional funds required).

CASE MANAGEMENT

Malaria Diagnosis

Background

The NMCC Guidelines for the Diagnosis and Treatment of Malaria in Zambia have been revised but are yet to be finalized, printed and disseminated. The reasons for the delay are not clear. 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 IMCI algorithm, which has been modified to include RDTs or microscopy for the evaluation of a child with fever. According to the NMCC only 30% of health facilities have functional microscopy. Many health facilities in Zambia do not have laboratories and technicians due to a shortage of trained and qualified staff. 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 NMCC Action Plan for 2010 calls for expanding laboratory diagnostic capacity to 80% of the nation's 1,774 health facilities, a massive effort that is not currently fully funded.

Malaria microscopy: The roll-out of ACTs for first-line treatment was accompanied by a plan for strengthening malaria microscopy at health facilities. Until 2006, laboratory technologists and technicians were the only cadres trained and legally authorized to perform malaria microscopic diagnosis. While medical officers and clinical officers receive some training in microscopy, they are unlikely to perform such testing because of their clinical responsibilities. Licensed laboratory technologists must complete a three-year training program. According to a human resource assessment conducted in 2008 by the MOH with support from the Clinton Foundation, only 417 laboratory personnel were reported in-post at MOH facilities against a total of 1,560 established posts. In 2006, training for a new cadre of specialist microscopists was initiated. Non-laboratory health workers were recruited from health facilities and attended an eight-week training course. Since then, 256 microscopists have been trained. The training materials and accompanying Laboratory Manual for Malaria Diagnosis were developed with TDRC.

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

Rapid diagnostic tests: The 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 NMCC staff developed standard operating procedures and training materials, conducted provincial training workshops for staff of MOH and CHAZ facilities, and provided districts with funding for district-level cascade training. At the health facility level, laboratory staff is responsible for ordering malaria diagnostic supplies on a monthly basis from Medical Stores Limited (MSL) through the same channels as essential medicines. MSL sends out RDTs via a push system, sending out predetermined quantities of RDTs to rural health centers. As with drugs, stock outs of RDTs and diagnostic supplies do occur. PMI worked with NMCC to conduct a national quantification and forecasting exercise in early 2009 with follow up sessions in 2010 for antimalarial drugs and RDTs for the period up to 2015. This exercise has improved commodity forecasting and availability and will be undertaken annually and quarterly. The key financiers of RDTs in Zambia are PMI, the Global Fund, and the World Bank.

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

To increase access to timely diagnosis and treatment of malaria, the 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 NMCC procured two million RDTs through CHAZ to support the introduction of RDTs for accurate diagnosis at community level. The 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 21 districts by the end of 2009. The NMCC is evaluating the performance of these pilots to provide information to the Pharmaceutical Regulatory Authority and Medical Council of Zambia

for possible nationwide expansion. Additionally, the current supply chain of RDTs from MSL has been expanded to include RDTs for community management of malaria.

In March 2010, NMCC and its partners conducted a malaria commodity quantification exercise, with assistance from PMI. It was estimated that 5.3 million RDTs will be required in 2011. The PMI will support the procurement of about 3.1 million RDTs. The balance is expected to be procured from Global Fund Round 7, Years 1 and 2 funding.

Progress During Last 12 Months

PMI has continued to support national annual and quarterly quantification reviews for antimalarial drugs and RDTs, which have led to improvements in the forecasting of these commodities. The national requirement for RDTs in 2009 was estimated to be 4.8 million. Funding for the procurement of RDTs in 2009 included Global Fund Round 4 Phase 2 to the MOH/NMCC and CHAZ, as well as PMI. In 2009, PMI, at the request of NMCC, reprogrammed funds to procure a total of 2 million RDTs to avert an imminent stock out due to delays in procurement of RDTs financed by the Global Fund. In 2010, the national requirement of RDTs is estimated to be 5.3 million, of which PMI will procure 3.3 million. The World Bank is currently purchasing 1.3 million RDTs. PMI has further reprogrammed savings of \$400,000 from FY 2009 to procure additional RDTs. The Global Fund procurement of RDTs from Round 7 Year 1 (\$1.3 million) and Year 2 (\$1.4 million) is not expected to be concluded before 2011.

The PMI has supported efforts to strengthen malaria diagnostic capacity in health facilities including provision for supervision, refresher training, and quality control/quality assurance of microscopy and RDTs. Following an initial evaluation in August 2008 of diagnostic procedures, and diagnostic capacity and needs, PMI worked with NMCC and stakeholders to review technical guidelines. In 2009, PMI supported training of laboratory and clinical personnel in malaria diagnosis, quality control, quality assurance and outreach supervision. In December 2009, a malaria microscopy refresher training workshop was held for 18 provincial laboratory supervisors. Following this training, the provincial supervisors launched the first round of outreach training and support supervision aimed to provide on-the-job training, and identify and solve constraints to quality diagnostics, to 48 health facilities across all nine provinces. This outreach visit revealed that only a third of the facilities visited had at least one health worker who had received training in malaria diagnostics in the previous 12 months. Two thirds of these facilities were able to perform RDTs correctly but only 20% were able to perform microscopy correctly. Follow-up visits to provincial supervisors to go over issues identified during the last supervision.

Proposed FY 2011 Activities (\$2,900,000)

The PMI views malaria laboratory diagnosis as a critical component of good case management. 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 FY2011 PMI funding:

- Procure approximately 3 million RDTs for health facilities. PMI will work with NMCC to enhance supervision of health workers using RDTs, (\$2,250,000);
- Strengthen malaria diagnostic capabilities at the health center level. Strengthen capability by supporting continued implementation of a plan for quality assurance and quality control of malaria laboratory diagnosis, refresher training and supportive supervision of laboratory workers in malaria diagnosis. In addition, support training and supportive supervision of clinical workers to increase their confidence in, and use of, malaria test results to guide treatment. Evaluate changes in performance of and adherence to microscopy and RDTs to monitor effects of this investment. With current funding only 48 of the 1,700 health facilities have been covered. The additional resources will be used to reach additional facilities. (\$650,000).

Treatment & Pharmaceutical Management

Background - Treatment

Treatment of uncomplicated malaria: The first-line drug for treatment of uncomplicated malaria in Zambia is artemether-lumefantrine (AL). The Case Management Technical Working Group is reviewing the treatment guidelines. The NMCC hopes to disseminate the guidelines in late 2010 or early 2011. The health facility survey currently in the field will provide information on health worker performance in managing malaria.

The NMCC conducted AL efficacy studies in 2005, 2008 and 2009. AL maintains good efficacy in Zambia. A similar study, following WHO guidelines, is planned for 2010.

Treatment of Severe Malaria: The NMCC treatment guidelines recommend parenteral quinine as the drug of choice for severe malaria. These guidelines recommend that patients with severe malaria receive pre-referral treatment with intramuscular quinine and then referral to a hospital or zonal health center equipped to manage severe malaria on an inpatient basis. The IMCI guidelines recommend that children with very severe febrile illness or severe pneumonia classifications should receive parenteral quinine and broad-spectrum antibiotics, preferably penicillin and gentamicin, both for pre-referral and definitive treatment. Although intramuscular artemether and rectal artesunate are registered in Zambia and available at urban pharmacies and through some private clinical providers, the current treatment guidelines do not address their use.

The NMCC 2009 Action Plan called for improving the management of severe malaria by re-orientation of frontline health facility workers 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 that operates in larger towns and cities where the burden of malaria is lower than in rural areas. These providers, including private-for-profit health facilities such as private clinics, have been informed of the change in first-line treatment, and chloroquine was effectively phased out of wide-scale use. Antimalarial drugs available in private pharmacies include AL, quinine, SP, and artemisinin monotherapies. The NMCC and the United Kingdom's Department for International Development (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.

ACTWatch began in Zambia in 2008. This project is an evaluation of the ability of lay run drug shops to perform RDTs and prescribe AL in their local community. The project will run until 2012.

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 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 tests. These policy initiatives calling for the expansion of ACT and RDT diagnosis by CHWs are under review by the Zambia Medical Council and the Pharmaceutical Regulatory Authority. The Malaria Consortium is beginning a Canadian International Development Association project to train CHWs in the diagnosis and treatment of malaria and pneumonia in all districts in Luapula Province over a 3-year period. The CMMB supports community-based IEC/BCC activities in three of the Luapula districts where the Malaria Consortium project is active.

In response to the shortages of health workers at all service delivery levels, MOH has developed a National Community Health Worker (CWH) strategy to expand the currently available CHW cadre who will deliver essential and priority health services through a task-shifting approach.

The MOH is working with the Ministry of Education to set up satellite health posts near schools to provide health services to pupils, teachers and the community residing within a radius of 5 Km. This strategy will be supported by all stakeholders implementing community health interventions.

Background - Pharmaceutical Management

PMI and USAID (Family Planning and Maternal and Child Health funds) in collaboration with MOH, MSL, President's Emergency Plan for AIDS Relief (PEPFAR), World Bank and DfID has completed a year-long pilot of the logistics management (supply chain) systems for essential drugs, including antimalarials and RDTs. The pilot showed that having a commodity planner in the district decreased drug stock outs substantially.

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 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. Health facilities in turn supply CHWs with the appropriate medicines. All drugs are dispensed free-of-charge in MOH facilities.

Quantification of antimalarials: The Procurement Unit and the Pharmacy Unit of the MOH share responsibility with the 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 three 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 three million treatments of AL are needed annually. AL treatments are available in different packaging for different patient body weights. 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.

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

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

Distribution: Antimalarials, both those in the essential drug kit and those procured separately, are distributed to hospitals and health centers through a combination of “push” and “pull.” Each month, 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 stock outs in CHAZ facilities occur with some regularity, health facilities within the CHAZ system will interchange drugs through their central warehouse.

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

Pharmacovigilance: The pharmacovigilance system in Zambia is not well developed. The 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. 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 has developed appropriate guidelines. PRA has not been able to effectively perform the pharmacovigilance functions because of financial and human resource constraints.

Progress During Last 12 Months

Over the latter part of 2009 and the first quarter of 2010 stock outs of antimalarials were reported at all levels of the health care system. RDTs and SP were missing most frequently. ACT stocks of adult presentations are also stocked out.

A reason for the stock outs appears to be a combination of poor logistical and supply systems from districts to health facilities and limited procurement of commodities because of management problems with donor resources. Financing for procurement of ACTs, SP and RDTs from the Global Fund, although available, has not been mobilized because of on-going investigations into financial problems with Global Fund funds. Several corrective measures have been taken by the Global Fund, such as changing Principal Recipient and allowing the procurement of life-saving commodities. However, signing of the new agreement is not expected until September 2010 and procurements are greatly delayed.

PMI Zambia reprogrammed MOP 2010 funds to purchase ACTs because recent quantification exercises and forecasting indicated that there would be a gap in ACTs.

Proposed FY 2011 Activities: (\$5,760,000)

The NMCC has prioritized technical support for case management as an area that PMI should address. With FY2011 funding, PMI will work to increase prompt and effective treatment for uncomplicated malaria at the health facility level. PMI will also support efforts to provide malaria treatment at the community level utilizing CHWs. Since antimalarials, RDTs and other laboratory supplies are part of the essential drug system, PMI will support the roll out of a robust supply chain and logistics management system when the MOH decides how best to implement the changes. With FY2011 funding, PMI will:

- Strengthen facility- and community-based treatment with ACTs. Support refresher training and supervision of healthcare providers and CHWs in the diagnosis and treatment of malaria (\$1,000,000);
- Purchase approximately 3 million treatments of AL for uncomplicated malaria (\$3,000,000);
- Assist the MOH in the roll out of the national logistics and pharmaceutical management system for malaria commodities (\$1,000,000). This will include:
 - quarterly forecasting of antimalarial drug and RDT needs and gaps;
 - importing, quality control, storage, distribution, and inventory management down to the health facility level;
 - improving feedback and reporting on consumption/stocks from health facility to district and higher levels;
 - monitoring of implementation/evaluation of coverage;
 - continuing end-use verification/monitoring of availability of key antimalarial commodities at the facility level. Specifically, this will entail regular supervisory/monitoring visits to a sampling of health facilities to detect and trigger further action on the following critical areas: ACT (or other drug) stock outs; expiration dates of ACTs at health facilities; leakage; anomalies in ACT use; and verifying quantification/consumption assumptions;
- 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 mass and print media, and community interpersonal approaches such as community drama as part of an integrated campaign covering ITNs, ACTs, and IPTp (\$150,000); The new IEC/BCC contractor will implement the following activities to evaluate national campaigns;
 - Work with MOH and other stakeholders to develop evaluation approaches and methods during campaign design.
 - Select evaluation approaches based on what the MOH can implement in the future with their available resources, and the appropriateness in the context of MOH priorities and informational needs.

- Support the evaluation of campaigns for effectiveness, reach, and lessons learned.
- Work with MOH and other partners to determine appropriate IEC/BCC approaches and design, produce, and disseminate messages and materials based on existing evidence and additional formative research (if needed).
- Support a community-level IEC/BCC campaign through interpersonal and community-based approaches to encourage seeking ACT treatment within 24 hours of fever as part of an integrated campaign covering ITNs, ACTs, and IPTp that is consistent with the nationwide media campaign and other efforts of the MOH/NMCC (\$460,000);
- Drug Efficacy Studies. These studies are conducted annually by WHO, NMCC and TDRC. In 2011 they will be conducted at six sites, namely, Kapiri Mposhi, Chongwe, Mpongwe, Chipata, Mansa and Isoka. PMI will support the continuation of AL efficacy studies to detect any problems with resistance to the first line antimalarial (\$150,000).

CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING

The NMCC is a department under the Directorate of Public Health and Research of the MOH that provides technical and management oversight to malaria activities in all public health facilities, as well as supporting and coordinating a wide range of partners, including research and training institutions. The NMCC has 25 staff members, including a Case Management Officer, Chief Entomologist, Chief Parasitologist, Malaria Epidemiologist, IEC/BCC, IRS, Surveillance and Information, and ITN officers, a Medical Laboratory Technologist, and an Operational Research Officer. At the provincial and district level, Provincial Health Offices serve as an extension of the MOH, while the DHMTs have the fiscal authority to manage the district health centers, and are the main implementers of the IRS program.

Due to recent delays in disbursement of funds through the Global Fund, the NMCC will likely experience gaps in resources to support 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 NMCC 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 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 NMCC requires support to conduct district-level visits for supervision and program management which Global Fund and MACEPA are providing. PMI will support five full-time local staff under contract to a health system strengthening partner to work at NMCC supporting the IRS and M&E programs. These include an IRS officer, a geographical

information system expert, a logistics person, an entomologist, and an M&E specialist. All these bilateral staff will be involved in training Zambian staff in their area of expertise to improve sustainability of these programs and increase the capacity of national, provincial and district health officials. These positions will transition to NMCC staff by the end of the 2013 MOP. During this three-year transition period PMI Resident Advisors will work with NMCC to place these positions in the MOH establishment which will then allow them to be hired directly by the NMCC. Three years will be needed to allow the Ministry to establish the positions and identify funding to allow the positions to be filled.

The PMI Zambia team has been providing technical assistance and capacity building at the NMCC including M&E. Time spent at NMCC by PMI Resident Advisors will continue as a priority. The PMI Zambia team will continue to work closely with the Surveillance and Information Officer to help build capacity in M&E. The PMI health system strengthening contractor will be tasked with setting up the active case detection and response program for Lusaka and Kazungula as well as assisting the Surveillance and Information Officer with routine M&E activities. The response program will include focal testing for malaria and treating positives in neighborhoods around malaria cases. It may also include IRS in homes that have not been sprayed in the past six months or distribution of LLINs to homes around newly detected cases of malaria.

USAID recently awarded contracts for IEC/BCC, health systems strengthening, and social marketing activities. The new partners should 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 NMCC staff. This person will work for the IEC/BCC follow on contractor and will transition to NMCC staff by the completion of the 2013 MOP. As noted in the positions above, PMI will work with the Ministry to transition this position to a full time NMCC employee position during the transition period.

Table F: PMI-Funded Positions with Bilateral Contractors

Position Title	Program Area	Date to Start as NMCC Employee
IRS Officer	IRS	Oct 1, 2014
GIS Specialist	IRS	Oct 1, 2014
Logistics Specialist	IRS	Oct 1, 2014
Entomologist	IRS	Oct 1, 2014
M & E Specialist	M & E	Oct 1, 2014
IEC/BCC Specialist	IEC/BCC	Oct 1, 2014

Proposed FY 2011 Activities: (\$155,000)

- Work with other partners to ensure continued support to the NMCC to increase contract staff available to support efforts in critical areas as well as conduct supervisory activities at the district level. Support six full time local hire contract staff through partners to work at 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 (cost of IEC/BCC staff person is spread across all programs in IEC/BCC follow on). IRS and M&E staff funding noted in their respective sections;
- Provide funds through a bilateral partner for NMCC staff travel and training (\$50,000);
- Provide funds to support the WHO Malaria Focal Point Person based in Zambia at the request of the NMCC and the WHO Representative in Zambia. This support will be for only two years (\$105,000).

INTEGRATION WITH GLOBAL HEALTH INITIATIVE

HIV/AIDS and Malaria

An estimated 14% of adults 15–49 years old in Zambia are infected with HIV, including 16% of women and 12% of men. Infection rates are two times higher in urban areas than in rural areas with low population density. The National HIV/AIDS/STI/TB Council implements the National HIV/AIDS/STI/TB (Sexually Transmitted Infection/Tuberculosis) Strategic Plan for 2006 – 2010 and provides national leadership for coordinating and supporting planning, monitoring, and resource mobilization. The National Council has already drafted a National AIDS Policy and finalized a national monitoring and evaluation strategy. 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.

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

PMI has provided support to help integrate malaria and HIV activities, including LLIN distribution for persons living with HIV through the NMCC's equity program funded by the Global Fund, by incorporating malaria IEC/BCC activities into the equity program, by continuing to support training and promotion of FANC, and by providing technical assistance to assist in finalization of the PEPFAR-funded SmartCare system.

COMMUNICATION/COORDINATION WITH OTHER PARTNERS

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

In the last 12 months, most of the technical working groups (TWGs) were active and met. PMI and its implementing Partners will, in FY 2011, continue to work with NMCC and stakeholders to ensure that the TWGs meet regularly and also provide technical support to the TWGs.

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 the Government of the Republic of Zambia (GRZ)-Cooperating Partner partnership, health sector coordination, and regular Cooperating Partners and GRZ 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. USAID represents the donors on the Global Fund Country Coordinating Mechanism.

Private Sector Partnerships

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

Progress During Last 12 Months

PMI has provided technical support to the NMCC to coordinate the training and monitoring of spray operations for all IRS areas including those covered by the private sector. PMI assisted NMCC to conduct pre-, mid-, and post-2010 spray environmental compliance inspections and IRS needs assessments in the IRS areas covered by private mining companies and The Zambia Sugar Company. PMI/Zambia Resident Advisors have joined the Advisory Panel to the Zambia Malaria Control Policy Assessment project being led by the Institute for Health Metrics and Evaluation. This project which is funded by Bill and Melinda Gates Foundation is working with NMCC and the University of Zambia to improve the evidence available to decision-makers to reduce the burden of malaria in Zambia.

Proposed FY 2011 Activities (No additional cost to PMI)

PMI will continue collaborating with the mining companies and the Zambia Sugar Company in FY2011. In FY2011, PMI will work with Zambia Anglican Council (ZAC), a local non-governmental organization funded by Nets For Life, to help distribute 80,000 PMI-procured replacement ITNs. ZAC has, since 2004, been engaged in door-to-door hanging and distribution of ITNs in the hard-to-reach rural districts of Zambia.

MONITORING AND EVALUATION

Background

The NMCC and partners have developed a costed National Malaria Prevention and Control Monitoring and Evaluation Plan for 2006 – 2011, which establishes clear goals, objectives and indicators for program monitoring and evaluation. The Global Fund Monitoring and Evaluation System Strengthening Tool gave an overall grade of almost 85% to Zambia for a “completed and mostly completed” M&E plan—one of the highest of all Global Fund countries. The NMCC M&E strategy tracks all RBM-recommended indicators and was updated to conform with the January 2009 RBM-Monitoring and Evaluation Reference Group (MERG) recommendations. PMI has supported the NMCC in updating its overall malaria control strategy as well as its M&E plan. Of concern to the NMCC is the need to plan for sustaining its success beyond the current availability of resources from partners.

Zambia cooperates with several M&E partners—all support one M&E plan and provide technical assistance and resources for M&E activities. Institutions such as MACEPA, the World Bank, UNICEF, WHO, and others support the implementation of the MIS, facility surveys, etc., while other partners support 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 and evaluation of malaria control activities.

Monitoring: An important source of data for routine monitoring of malaria is the National HMIS. The HMIS reports monthly on information from all public and mission health facilities and some private facilities. Following an assessment of the HMIS in 2006, the European Union committed considerable financial and technical support to strengthening the HMIS under a three-year plan of action. Roll-out of the revised HMIS started in late 2007, and was fully operational in January 2009.

Information flows from the health facility to the district and provincial level before being transmitted to the HMIS group within the MOH. This reporting system also takes advantage of existing data flow for facility-based reporting through DHMTs. The HMIS collects data on reported cases of malaria, malaria case fatality rate (in hospitals), and stocks of medicines and supplies. Information is also collected on an annual basis on the therapeutic efficacy of antimalarial drugs. Ideally, this and routine monitoring of insecticide resistance which is done annually in rotating selected sites 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. All-cause under-five mortality is tracked using the Demographic and Health Survey (DHS); the most recent DHS was conducted in 2007 and provides a baseline estimate of mortality at the start of PMI. The next DHS is scheduled for 2012. The 2007 DHS was conducted during the last month or two of the malaria transmission season and the beginning of the post-transmission season; a malaria module was included.

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

A number of other surveys and evaluations provide provincial, district, and community level data on malaria epidemiology in Zambia, and provide useful information on the progress of malaria control efforts. These include health facility surveys to assess health worker performance and the quality of health care, availability of health guidelines, personnel, and equipment, and household surveys to assess knowledge, attitudes, and practices related to malaria. As part of routine supervisory visits to MOH facilities, checklists are also completed on health worker performance and other technical aspects of health care. These forms are forwarded to higher levels of the MOH.

Zambia is regarded as a good example of M&E of malaria activities and is cited by the 2009 World Malaria Report and the Global Fund's Impact Evaluation Report for its availability of strong M&E data on malaria control efforts.

Table G: 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								
IMCI Health Facility Survey						X		Planned		
Service Provision Assessment			X							
WHO Service Availability Mapping				X						
Health Facility (HSSP)				X						

Progress to Date

Malaria Indicator Survey: The NMCC, with support from several partners, including PMI, implemented its third national MIS in April and May, 2010. The survey includes collection of biomarkers (anemia and parasitemia) and will provide an update to the 2008 MIS. Preliminary results of the survey are detailed earlier in this document.

Malaria Health Facility Survey: Again, with support from several partners including WHO, MACEPA and PMI (technical assistance only), the MOH is implementing a national level health facility survey. The survey will determine the level of preparedness of health facilities to deliver general health services with a specific focus on malaria. The survey includes checking the conditions of health facilities, inventories of key child commodities (including malaria commodities) and services and observation of case management. Results will be available after the MIS results. This survey is a follow up to a 2006 survey.

A revised and updated HMIS has been deployed throughout the country. Data from 2009 are available in draft form.

Proposed FY2011 Activities (\$150,000)

- PMI impact evaluation. In collaboration with international and national organizations PMI will conduct an evaluation of the impact on under-five child

mortality of malaria interventions implemented by the NMCC and partners. The evaluation will be implemented through an in-country partner (\$50,000);

- Staff at NMCC to strengthen M&E activities. Provide on-site M&E expert through health systems strengthening partner to support monitoring and evaluation activities at NMCC (\$50,000);
- Surveillance in Lusaka and Kazungula. The PMI will continue to support 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 that might include focal IRS and/or LLIN distribution, active case finding, and treatment of any cases found (no cost);
- Technical assistance to finalize SmartCare module. The MOH has identified SmartCare as its principal Electronic Health Record. It has been used for HIV care until now when it is being enhanced for use in routine outpatient (OPD) care. PMI has had extensive input into the malaria portion of the OPD module. The OPD module will be piloted later this year and will provide valuable patient level data on malaria patients seen in pilot sites. These data will include patient demographics, symptoms, laboratory testing, diagnosis and treatment. This system will help PMI to track malaria cases seen in health centers in a more timely and complete fashion than the routine HMIS data (\$50,000).

STAFFING AND ADMINISTRATION

Two health professionals oversee the PMI in Zambia, one representing CDC and one representing USAID. All PMI staff members are part of a single inter-agency team led by the USAID health team leader. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, and managing collaborating agencies. The two resident advisors supervise day-to-day activities including all technical and administrative aspects of the PMI, finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, and reporting of results. Both staff members report to the USAID health team leader. CDC supervises the CDC staff person both technically and administratively. All technical activities are undertaken in close coordination with the NMCC and other national and international partners, including the WHO, UNICEF, the Global Fund, World Bank, and the private sector. The staffing and administration budget for FY 2011 is \$947,300.

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

President's Malaria Initiative - Zambia
Planned Obligations for Year 4 (FY 2011) (\$24,000,000)

Proposed Activity	Mechanism	Budget		Geographical area	Description
		Total \$	Commodity \$		
PREVENTIVE ACTIVITIES					
Insecticide Treated Nets					
Procurement of LLINs	DELIVER Task Order #3	4,436,110	4,436,110	National	Procure approximately 753,173 replacement LLINs for routine distribution through ANC and child health clinics. Procure additional 80,000 for distribution by the Zambia Anglican Council.
LLIN Distribution	Partnership for Integrated Social Marketing (PRISM)	1,016,590	1,016,590	National	Support the distribution of LLINs, including transportation and other logistics, to districts and health facilities. Including \$26,590 for distribution through MIP.
National IEC//BCC for net usage	Zambia Behavioral & Social Change Communication Program (ZBSCCP)	375,000		National	National IEC/BCC campaign to encourage ownership and proper use of ITNs
Community IEC/BCC for net usage	Zambia Integrated Systems Strengthening Program (ZISSP)	460,000		National	Community-based IEC/BCC campaign through NGOs/FBOs to increase net ownership and use
Community IEC/BCC for net usage	Peace Corps	0		Selected districts	Community-based IEC/BCC to promote correct net usage
SUBTOTAL ITNs		6,287,700	5,452,700		
Indoor Residual Spraying					

Procurement of IRS commodities and support to other components of the program.	RTI	3,800,000	3,500,000	35 districts	Procure insecticides and other IRS supplies/equipment for spraying 1,300,000 households. Support environmental monitoring and environmental assessment. Costing of IRS in Zambia.
Implementation of IRS program, monitoring and evaluation, storage/incinerator, community sensitization, geocoding	ZISSP	2,700,000		35 districts	Training, monitoring and evaluation, and IEC for IRS; pesticide (DDT) storage, waste disposal. Support entomological monitoring, and establish insecticide resistance management system.
Costing of IRS	RTI	50,000		National	Calculate the cost of IRS operations in Zambia.
SUBTOTAL IRS		6,550,000	3,500,000		
Intermittent Preventive Treatment in Pregnancy					
Strengthening of FANC for IPTp	ZISSP	900,000		National	Strengthen FANC in existing provinces and expanding to all nine provinces, where IPTp uptake is low (training, coordination with PEPFAR where appropriate)
National IEC//BCC to increase demand for IPTp	ZBSCCP	150,000		National	National IEC/BCC campaign to increase ANC attendance and demand for IPTp
Community IEC/BCC to increase IPTp demand	ZISSP	200,000		National	Community-based IEC/BCC campaign through NGOs/FBOs
Community IEC/BCC to increase IPTp demand	Peace Corps	0		Selected districts	Community-based IEC/BCC
SUBTOTAL IPTp		1,250,000	0		
SUBTOTAL PREVENTIVE		14,087,700	8,952,700		
Case Management					
Diagnosis					
Procure rapid diagnostic tests	DELIVER Task Order #3	2,250,000	2,250,000	National	Procure approximately 3,000,000 RDTs for health facilities

Strengthen malaria diagnostic capabilities at the health center level	IMaD	650,000		National	Review of guidance and use of diagnostic procedures, development and implementation of plan for quality assurance of lab diagnosis, quantification and training. Purchase WHO standard slide sets.
SUBTOTAL -- Diagnosis		2,900,000	2,250,000		
Treatment & Pharmaceutical Management					
Strengthen facility- and community-based treatment with ACTs	ZISSP	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
Procure ACTs	DELIVER Task Order #3	3,000,000	3,000,000	National	Procure ACTs for the treatment of malaria in facilities and communities
Roll out the national logistics and pharmaceutical management system for malaria commodities	DELIVER Task Order #3	1,000,000		National	Strengthen supply chain and logistics for all malaria commodities and essential drugs, including Pharmaceutical Regulatory Authority and the End Use Tool
National IEC/BCC for ACT usage	ZBSCCP	150,000		National	National IEC/ BCC campaign to increase ACT usage
Community IEC/BCC for ACT usage	ZISSP	460,000		National	Community-based IEC/BCC campaign through NGOs/FBOs
Drug efficacy studies	ZISSP	150,000		Selected districts	Conduct drug efficacy studies in six sites
SUBTOTAL - Treatment & Pharmaceutical Management			3,000,000		
SUBTOTAL CASE MANAGEMENT		8,660,000	5,250,000		
		5,760,000	HIV & Malaria		
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
SUBTOTAL HIV and Malaria		0	0		
Capacity building					
Fund training and travel to build capacity of NMCC staff	ZISSP	50,000		National	Fund travel and registration to international meetings such as MIM and ASTMH and regional trainings. Support strategy development.
Fund WHO in-country National Professional Officer	TBD	105,000		National	Fund the salary and benefits for the WHO in-country post of the National Professional Officer for malaria for two years
SUBTOTAL Capacity Bldg		155,000	0		
Monitoring and Evaluation					
PMI Impact Evaluation	TBD	50,000		National	Fund PMI Impact Evaluation activities in Zambia
Staff at NMCC to strengthen M&E activities	ZISSP	50,000		National	Provide on-site staff to support M & E activities at NMCC
Surveillance in Lusaka and Kazungula	ZISSP	0	0	Lusaka and Kazungula districts	Continue active surveillance.
Technical assistance to finalize SmartCare module	CDC	50,000		National	Technical assistance to finalize SmartCare outpatient care module
SUBTOTAL - M & E		150,000	0		
In-country Staffing and Administration					
USAID and CDC staff and associated administrative expenses	USAID/CDC	580,000		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 evaluation of Lusaka surveillance system and other technical support
SUBTOTAL - In-Country Staffing		947,300	0		
GRAND TOTAL		24,000,000	14,202,700		

**President's Malaria Initiative - Zambia
Year 4 (FY 2011) Budget Breakdown by Partner (\$24,000,000)**

Partner	Geographical Area	Activity	Budget (\$)
USAID Deliver TO 3	National	Procurement of LLINs budget, RDTs and microscopes and supplies; strengthen supply systems	\$10,686,110
RTI	35 districts	Procure IRS-related commodities	\$3,850,000
ZISSP	National/community	Conduct IRS; Community BCC for ITNs, IPTp, ACTs and IRS; Strengthen community-based treatment with ACTs	\$5,970,000
ZBSCCP	National	IEC/BCC activities in support of ACTs, IPTp, ACTs	\$675,000
PRISM	National	LLIN distribution	\$1,016,590
USAID/CDC	National	PMI USAID and CDC in-country staffing, SmartCare, CDC TDY	\$997,300
IMaD	National	Strengthen malaria diagnostic capabilities	\$650,000
TBD		Impact evaluation	\$155,000
Total			\$24,000,000