

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

PRESIDENT'S MALARIA INITIATIVE

Malaria Operational Plan (MOP)

ZAMBIA

FY 2009

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EXECUTIVE SUMMARY

In December 2006, President George W. Bush announced that Zambia had been selected as one of the final eight countries in a five-year, \$1.2 billion initiative to rapidly scale-up malaria prevention and treatment interventions in high-burden countries in sub-Saharan Africa. Malaria is a major cause of morbidity and mortality in Zambia and control of the disease one of the government's highest priorities. According to reports from the Ministry of Health (MOH), there were approximately 4.3 million clinically diagnosed cases of malaria in Zambia in 2007.

The most up-to-date information on nationwide coverage of malaria prevention and control measures in Zambia comes from the 2008 Malaria Indicator Survey (MIS), and shows significant progress in recent years. More than 70% of households own at least one insecticide-treated net (ITN), and 47% of children under five had slept under an ITN the previous night. Approximately 60% of pregnant women took two or more doses of intermittent preventive treatment in pregnancy (IPTp). However, the survey revealed a decrease in the percentage of children under-five being treated with an ACT within 24 hours of onset of fever, from 13% to 8%.

Zambia was the recipient of Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) malaria grants from Round 1 and Round 4, totaling over \$82 million. Both grants suffered major delays in disbursements due to a change in the Principal Recipient from the Central Board of Health to the MOH. Phase II of the Round 4 grant has been signed. Zambia was successful in their Round 7 Global Fund malaria grant for \$37.5 million (over 5 years), and is now waiting fund disbursement. Zambia also received support through the newly established UNITAID initiative to fill gaps in ACTs which will address a significant portion of their ACT needs in the coming years. The World Bank, through its Malaria Booster Program, is supporting the NMCC with indoor residual spraying (IRS), supply chain management and health systems development. United Nations Children's Emergency Fund (UNICEF) has been a major supporter of ITN distribution and the World Health Organization (WHO) is a leading source of technical assistance to the MOH/National Malaria Control Center (NMCC). Excellent opportunities also exist for partnering in malaria control efforts with large mining companies, such as Konkola Copper Mines. Other major donors include the Bill and Melinda Gates Foundation, through the Malaria Control and Evaluation Partnership in Africa (MACEPA) and the Japan International Cooperation Agency (JICA).

The Year 2 PMI Operational Plan for Zambia complements the MOH/NMCC 2006-2010 Strategic Plan and is based on Year 1 PMI progress and experiences. A planning visit took place in May 2008 with representatives from USAID and the Centers for Disease Control and Prevention (CDC) who met with the NMCC, the World Bank, the Global Fund, WHO, UNICEF and other partners involved in malaria prevention and control in the country.

The following table outlines the proposed targets and expected outcomes for Year 1 PMI activities in Zambia:

| Proposed Year 1 Targets | Expected Results after 1 Year of Implementation (March 2009) |
|---|--|
| 4,000,000 ITNs distributed of which 400,000 will be provided by PMI | By March 2009, it is expected that 4,015,000 ITNs will have been distributed of which PMI will have contributed 400,000 |
| 2,800,000 residents (700,000 PMI-supported households) protected by IRS in 15 districts | It is expected that 3,600,000 residents will have been protected by IRS supported by PMI which began in September 2008 |
| 4,300,000 treatments of ACTs will be purchased and distributed of which 390,000 will be provided by PMI | By March 2009, it is expected that 4,700,000 treatments of ACTs will have been purchased and distributed of which 390,000 from PMI |
| 795,000 RDTs distributed of which 645,000 will be provided by PMI | By March 2009, it is expected that 2.5 million RDTs will have been purchased and distributed of which 645,000 from PMI |

To achieve the goals and targets of the MOH/NMCC and PMI in Zambia, the following major activities will be supported during Year 2:

Insecticide-treated nets: Zambia has a multi-pronged approach to ITN distribution, including regional mass campaigns to distribute free long-lasting ITNs (LLINs), provision of free LLINs to pregnant women and children under five through antenatal care clinics (ANCs), an equity program to provide free LLINs to vulnerable populations such as orphans and vulnerable children, people living with HIV/AIDS, and the poorest of the poor, and the sale of ITNs through the commercial sector. Although household ownership of ITNs is relatively high in Zambia, and usage rates are improving, in Year 2, PMI will procure approximately 400,000 LLINs for distribution through ANCs to support the NMCC goal of 100% of households owning three ITNs. PMI will also continue to support national and community-based information, education, and communication/behavior change communication (IEC/BCC) campaigns to increase demand for, and correct usage of, LLINs.

Indoor residual spraying: Zambia has a well-established IRS program with 657,695 of 700,000 targeted households in 15 of the country's 72 districts, being sprayed by PMI (94% coverage) in 2007, protecting about 30% of the total population from malaria. The government wants to expand IRS to 36 of the country's 72 districts in 2008, and, with Year 1 funds, PMI is spraying in 15 of these districts, targeting 900,000 households. The remaining 21 districts are being supported by the World Bank, with limited technical assistance provided by PMI. In Year 2, PMI will continue to support IRS activities in the 15 districts by procuring insecticides and equipment and by supporting an environmental assessment, training of sprayers, monitoring and evaluation, provision of appropriate storage and waste disposal of insecticides. As IRS and LLIN programs are expanded, PMI will assist the MOH/NMCC to insure that decisions to select new areas for interventions are based on evidence of active malaria transmission.

Case management: Although clinical diagnosis is currently the basis for malaria treatment for patients of all ages at a majority of health facilities in Zambia, NMCC guidelines recommend laboratory diagnosis for any patient with suspected malaria at hospitals and rural health

centers where laboratory diagnostic services are available. The MOH/NMCC and partners have been working actively to expand the role and availability of malaria diagnostic services through improvements in microscopy and introduction of rapid diagnostic tests (RDTs) where microscopy services are not available. To support efforts to increase diagnostic capacity and quality, PMI will continue to invest in RDTs and help strengthen quality assurance of, and capacity for, microscopic and RDT diagnosis in health facilities. Most needs for ACTs and laboratory diagnostic commodities are already met by the Global Fund, therefore PMI will procure an additional 390,000 treatments and support strengthening the supply chain and logistics systems for malaria drugs to ensure reliable access and a steady supply. To ensure that ACTs are properly used and improve the quality of malaria treatment, PMI will support training and supervision at the health facility level. Finally, PMI will support increased demand for and correct use of ACTs through national and community-based IEC/BCC campaigns.

Intermittent preventive treatment of pregnant women: Despite high IPTp coverage levels, the 2008 MIS showed gaps in two-dose IPTp coverage among poorer women, and women in rural areas. In order to increase demand for IPTp in these areas, PMI will support the continued strengthening of focused ANC in two provinces where uptake of IPTp is low as well as the expansion of these efforts to three additional provinces. PMI will also support community-based and nationwide IEC/BCC efforts around malaria in pregnancy.

Monitoring and evaluation: The PMI in Zambia includes a strong monitoring and evaluation component to measure progress toward the project goal and targets, and identify and correct problems in program implementation, and is coordinated with the NMCC and other partners to share resources, to ensure that gaps are filled, and to standardize data collection and reporting. In the second year, PMI will continue to provide support to twenty existing sentinel sites that will provide timely, health-facility based data on malaria morbidity and mortality.

The proposed FY09 PMI budget for Zambia is \$14.7 million. Of this amount, 24% will support procurement and distribution of ITNs, 21% procurement of ACTs and improved case management, 37% IRS, and 6% malaria in pregnancy activities. More than 2% will support monitoring and evaluation. Approximately 45% of the total budget will be spent on commodities.

ABBREVIATIONS and ACRONYMS

ACT – artemisinin-based combination therapy
 AIDS – Acquired Immuno-Deficiency Syndrome
 AL – artemether-lumefantrine
 ANC – antenatal clinic
 AS – artesunate
 BCC – behavior change communication
 CBO – community-based organizations
 CDC – U.S. Centers for Disease Control and Prevention
 CHAZ – Churches Health Association of Zambia
 CHW – community health worker
 DALY – disability-adjusted life year
 DfID – Department for International Development
 DHS – Demographic and Health Survey
 DHMT – district health management team
 EPI – expanded program on immunizations
 FANC – focused antenatal care
 FBO – faith-based organization
 FP – family planning
 Global Fund – Global Fund to Fight AIDS, Tuberculosis, and Malaria
 GRZ – Government of the Republic of Zambia
 HIV – Human Immunodeficiency Virus
 HMIS – Health Management Information System
 HSSP – Health Services and Systems Program
 IEC – information, education, communication
 IMCI – integrated management of childhood illnesses
 IPTp – intermittent preventive treatment of pregnant women
 IQC – indefinite quantity contract
 IRS – indoor residual spraying
 ITN – insecticide-treated net
 JICA – Japan International Cooperation Agency
 JSI – John Snow Institute
 LLIN – long-lasting insecticide-treated net
 MACEPA – Malaria Control and Evaluation Partnership in Africa
 MCH – maternal and child health
 MIP – malaria in pregnancy
 MIS – Malaria Indicator Survey
 MOH – Ministry of Health
 MSL – Medical Stores Limited
 NAC – National HIV/AIDS/STI/TB Council
 NMCC – National Malaria Control Centre
 NGO – non-governmental organization
 PEPFAR – President’s Emergency Plan for AIDS Relief
 PLWHA – People Living With HIV/AIDS
 PMI – President’s Malaria Initiative

RBM – Roll Back Malaria
RDT – rapid diagnostic test
RHS – reproductive health services
RTI – Research Triangle Institute
SFH - Society for Family Health
SP – sulfadoxine-pyrimethamine
SPA – Sector Programme Assistance
SWAp – Sector Wide Approach
TDRC – Tropical Disease Research Centre
UNICEF – United Nations Children’s Fund
USAID – United States Agency for International Development
USG – United States Government
WHO – World Health Organization

THE PRESIDENT'S MALARIA INITIATIVE

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

The President's Malaria Initiative (PMI) began in three countries in 2006: Angola, Tanzania, and Uganda. In 2007, four countries were added: Malawi, Mozambique, Senegal, and Rwanda. In 2008, Zambia and seven other countries were added to reach a total of 15 countries covered under the PMI. Funding began with \$30 million in FY06 for the initial three countries, increased to \$135 million in FY07 and to \$300 million in FY08 and FY09, and is expected to increase to \$500 million in FY10.

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

This document presents a detailed implementation plan for the second year of the PMI in Zambia. It briefly reviews the current status of malaria control and prevention policies and interventions, identifies challenges and unmet needs if the goals of the PMI are to be achieved, and provides a description of planned Year 2 activities under the PMI. The document was developed in close consultation with the Ministry of Health/National Malaria Control Centre (MOH/NMCC) and with participation of national and international partners involved in malaria prevention and control in the country. The total amount of PMI funding requested for Zambia is \$14.7 million for FY 2009.

MALARIA SITUATION IN ZAMBIA

Zambia is a land-locked country in southern Africa that is bordered by Malawi, Mozambique, Zimbabwe, Namibia, Botswana, Angola, Democratic Republic of Congo, and Tanzania. It has



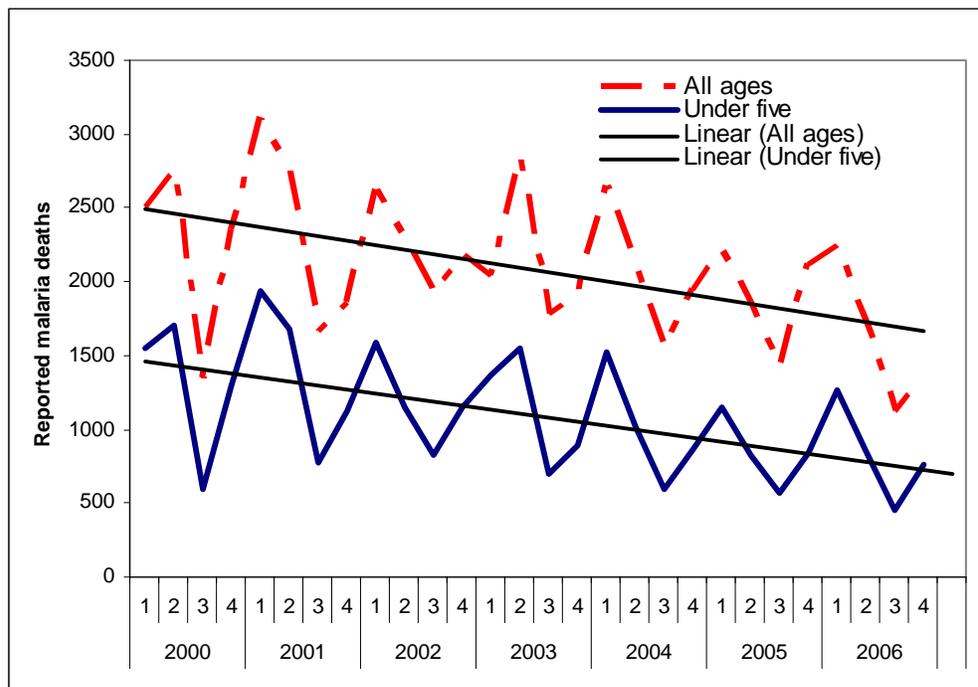
a population of approximately 12 million, 45% of whom are below the age of fifteen. Zambia's key development trends are generally positive: under-five mortality has fallen from 191 per 1000 in 1992 to 168 per 1000 in 2002 to 119 per 1000 in 2007, 85% of children complete primary school, and overall poverty has been declining. Despite these positive trends, Zambia continues to face major challenges. Sixty-eight percent of the population lives below the national poverty line. HIV/AIDS is a major problem for all sectors with an estimated 14% of adults infected, down from 16% in 2002. Maternal mortality continues to be high, though much improved, at 442 per 100,000 live births and literacy rates remain low among females and rural dwellers.

Malaria transmission in Zambia occurs throughout the year with the peak during the rainy season, which occurs between November and April. *Plasmodium falciparum* accounts for more than 90% of all infections. *Anopheles gambiae* is the major malaria vector. All nine provinces of Zambia are endemic for malaria with 90-100% of the population at risk. Unstable malaria transmission occurs in the districts on the higher altitude plateau, specifically Mpika, Serenje, Mkushi, Kapiri Mposhi, Chibombo, Mazabuka, Monze, Choma, and Lusaka. This is due to breaks in transmission of malaria during the cold, dry season, resulting in lowered malaria immunity, unstable transmission, and predisposition to outbreaks.

Approximately 4.3 million clinically diagnosed cases of malaria were reported through the Health Management Information System (HMIS) in 2007, this represents over a 10% decline from 2006. This figure overestimates the number of true malaria cases at the health facility level due to lack of diagnostic confirmation; it also underestimates the cases at the community level which go unreported. The 2008 National Malaria Indicator Survey (MIS) showed an improvement in malaria parasitemia compared to the 2006 MIS in children under-five – 10% vs. 22% and severe anemia – 4% vs. 13%. Luapula Province had the highest percentage of children under five with malaria parasites (30%), followed by Northern Province (17%) and Eastern Province (16%), while Lusaka, Western and Southern provinces had the lowest (2%, 3%, and 7%, respectively). Zambia was the first country in tropical Africa to adopt ACT with artemether-lumefantrine (AL) for first-line treatment of malaria; SP is still recommended as an alternative first-line treatment in patients who cannot tolerate AL, those weighing less than 5 kg, when and where AL is unavailable, and for routine use in IPTp. The MIS 2008 also revealed that 28% of children under five had a fever in the last two weeks, but only 66% sought treatment from a facility/provider the same or next day.

As seen in the figure below, the number of malaria cases reported in Zambia declined in 2007. However, malaria still accounts for 45% of outpatient visits, 45% of hospital admissions, 47% of overall disease burden among pregnant women, and 50% of disease burden among children under-five years of age. Malaria also has a serious economic impact on Zambia, accounting for 6.8 million Disability Adjusted Life Years, or DALYS, lost. This is higher than the figure for acute respiratory infections (5.4 million) or HIV/AIDS (3.2 million). The high morbidity levels have contributed to decreased productivity through absenteeism and lowered output.

Trends in reported malaria deaths 2000-2006 – (Source HMIS)



Zambia currently has three malaria grants approved from the Global Fund: Round 1 (\$39,273,800), Round 4 (\$43,495,326), and Round 7 (\$37,502,022). The Principal Recipients are the MOH and the Churches Health Association of Zambia (CHAZ). Round 4, Phase 2 for \$16,547,268 has been signed. The Round 7 grant was approved in November 2007 for \$37,502,022 and will continue through 2012; it is expected to be signed by the end of 2008. There are early discussions regarding a Round 9 application to meet an anticipated gap in funding for the planned IRS scale-up.

The first two grants focused on the scale-up of LLINs, the introduction and scale-up of ACTs, and the reintroduction of IRS. Round 1 was more commodities-focused, while Round 4 had a greater balance between funding for commodities and operational costs and included integrated vector management. These grants funded the majority of the public sector ACTs and a substantial portion of the LLINs. With Round 7 funding, Zambia plans to procure and distribute 3,144,815 LLINs, 9 million rapid diagnostic tests (RDTs) for diagnosis of malaria

at both the community and facility levels, and expand IEC/BCC to increase and sustain high coverage with prevention and treatment interventions.

Other major donors include the Bill and Melinda Gates Foundation, through the Malaria Control and Evaluation Partnership in Africa (MACEPA), the World Bank, and the Japanese International Cooperation Agency (JICA).

MACEPA, established in 2004, is a nine-year, \$35 million project intended to demonstrate the impact of full implementation of malaria control interventions and establish a proven, flexible model for national malaria control program scale-up. MACEPA's support to the MOH/NMCC in Zambia includes technical assistance for monitoring and evaluation of malaria interventions including biannual Malaria Indicator Surveys and geocoding for the IRS program, support for emergency procurement and distribution of LLINs in 2006, an integrated IEC/BCC/advocacy initiative, and program support that includes information technology, infrastructure, and staff training opportunities. MACEPA also initiated the Learning Community in 2007, based in Lusaka, Zambia, which will work in up to five African countries to advance the scale-up of malaria control and prevention through a dynamic model of technical support and shared learning. In 2008, MACEPA, in collaboration with the NMCC, carried out the Malaria Indicator Survey.

The World Bank designated Zambia a Malaria Booster Project Country and planned to provide \$20 million for malaria control and prevention between 2006 and 2010. Due to rapid scale up, \$15 million was spent by the end of 2007, and the remaining \$5 million will be expended in 2008. The project has three major components: strengthening the health system to improve service delivery (supports the IRS campaign and the procurement and distribution of LLINs); Community Malaria Booster Response (COMBOR) provides small grants to communities to scale-up malaria control; and funding to strengthen the capacity of the MOH/NMCC (technical leadership and coordination). The Bank has additional malaria funding that includes a \$7 million grant from Russia that will support expansion of IRS into 21 new districts, and \$3 million from the Department for International Development (DfID) to pilot the redesign of the peripheral supply chain distribution system (from District Health Office to Health Center) in collaboration with the PMI-funded JSI/Deliver Project.

The JICA has donated 366,000 LLINs that are being distributed to pregnant women through ANCs by the Society for Family Health (SFH). However, it is unclear how much support JICA will provide towards malaria control activities in the future.

The WHO provides technical assistance to the malaria program. Areas of support include M&E, IMCI training, job aide development for community management through CHWs, and microscopy quality assurance. UNICEF procures ACTs, supports case management through IMCI training and supervision, and assists in ITN mass distribution and retreatment.

| Program Area | Key Donor Roles: Areas of Support to NMCC Program | | | | | |
|------------------------------|---|-------------------------|--------|-------------------|-----|--------|
| | Global Fund Rounds 1, 4 & 7 | World Bank ¹ | MACEPA | JICA ² | WHO | UNICEF |
| ITNs | X | X | X | X | | X |
| IRS | X | X | X | | | |
| IPTp | | | | | | |
| Diagnostics | X | | | | X | |
| ACTs | X | | | | | X |
| IEC/BCC | X | X | X | | | X |
| M&E | X | | X | | X | |
| Health Systems Strengthening | X | X | | | X | X |
| Program Management | X | X | X | | X | |

NATIONAL MALARIA CONTROL PLAN AND STRATEGY

The Zambian National Malaria Control Program has a well-conceived and ambitious Five-Year Strategic Plan for 2006 - 2010 that builds on the National Malaria Strategic Plan (NMSP) for Malaria Control developed by the national RBM Partnership with the MOH. The Plan shows considerable commitment to rapid scale-up of malaria interventions and has the overarching goal of reducing malaria incidence by 75% by the end of 2011, ultimately contributing to the reduction of all-cause mortality by 20% in children under five. The specific targets for December 2008 outlined in the National Malaria Control Program Action Plan for 2008 include:

- 1) 100% of households in all eligible areas have at least three ITNs with 85% utilization rates;
- 2) At least 85% of people sleep in sprayed structures in eligible areas (approximately 1,600,000 households) of the 36 selected districts, an upward revision from the 15 initially planned districts in the 2006-2010 NMSP;

¹ In 2008 the World Bank is supporting the expansion of IRS in 21 new districts this year. It is unknown if this will continue beyond 2008. The WB is also piloting the redesign of a peripheral supply chain distribution system.

² Currently JICA's support to malaria in 2009 is unclear.

- 3) At least 80% of women have access to the package of interventions to reduce the burden of malaria in pregnancy. The package of interventions will include a full three-dose course of IPTp, an ITN, and treatment of anemia;
- 4) At least 80% of suspected malaria patients are correctly diagnosed; and
- 5) At least 80% of malaria patients in all districts receive prompt and effective treatment according to the current drug policy within 24 hours of onset of symptoms.

The 2008 Action Plan seeks to strengthen the capacity and enhance performance for scale-up for impact (SUFU) through conducting a comprehensive programmatic and strategic plan review, needs assessment, and development of a technically sound, operationally feasible SUFI business plan.

The National Malaria Control Plan also addresses the need to strengthen national, provincial, and district-level capacity to manage, plan, and implement malaria programs, address human resource needs, ensure that there is an established planning and forecasting framework for projecting funding needs and tracking health expenditures, develop capacity at all levels of the health systems to manage 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.

MOH/NMCC and partners are convinced that providing AL in health facilities alone would not achieve high enough coverage with prompt, first-line treatment, especially in remote communities. The strategy of the NMCC is to strengthen community management through orientation of the 5,040 community health workers who have already been trained on c-IMCI to correctly use RDTs and ACTs. The phased introduction of RDTs and ACTs at the community level has been delayed. As of November 2008, 11 districts had begun community management.

Overview of the Health System

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

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

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

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

Summary of Existing Health Facilities in Zambia

| Type/Level | Total |
|----------------|--------------|
| Hospitals | 99 |
| Level 1 | 76 |
| Level 2 | 18 |
| Level 3 | 5 |
| Health Centers | 1,215 |
| Urban | 232 |
| Rural | 983 |
| Health Posts | 104 |
| Total | 1,418 |

Source: Health facility Census 2005

The DHMT provides overall planning, coordination, and monitoring of malaria activities. Ideally, a health post should cover 500-1000 households and all households should be within five kilometers of a health facility. Three thousand health posts are planned nationwide, but only 20 are currently commissioned. Health centers, staffed by a clinical officer or nurse, are to serve a catchment area of 10,000 residents. Each district should have a hospital, staffed by one or more physicians; however, currently 19 districts have no hospital.

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

CURRENT STATUS OF MALARIA INDICATORS

The most up-to-date information on malaria control indicators comes from a nationally representative MIS that was carried out in 4,507 households in 70 of the 72 districts in the country in April-May 2008, just following the major malaria transmission season. Preliminary estimates of malaria control indicators are below. In addition to the figures below, it should be noted that the MOH/NMCC has focused its IRS activities on 15 of the country's 72 districts. In those districts, 94% of all target urban and periurban households had been sprayed in the previous 12 months. Twenty-eight percent of children under five had had a fever within the previous two weeks. Of these, 43% took an antimalarial drug, while 29% took an antimalarial drug within 24 hours of the onset of their symptoms. Twenty-one

percent of treated children received SP, and 13% received artemether-lumefantrine (AL, Coartem[®]).

| Estimates of Malaria Indicators: 2006 & 2008 Zambia MIS | | |
|---|-------------|-------------|
| Indicator | 2006 | 2008 |
| Proportion of children under five years old with fever in the last two weeks who received treatment with an antimalarial according to national policy within 24 hours of onset of fever | 37% | 29% |
| Proportion of children under five years old with fever in the last two weeks who received treatment with an ACT within 24 hours of onset of fever | 13% | 8% |
| Proportion of households with at least one ITN | 44% | 57% |
| Proportion of children under 5 years old who slept under an ITN the previous night | 23% | 38% |
| Proportion of pregnant women who slept under an ITN the previous night | 24% | 40% |
| Proportion of women who received 2 or more doses of IPTp during their last pregnancy in the last 2 years | 62% | 60% |

GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

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

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

EXPECTED RESULTS – YEAR TWO

Prevention:

- PMI will support IRS of approximately 900,000 targeted households in 15 districts in Zambia through the procurement of insecticides, personal protective equipment and other supplies, training of sprayers, and an environmental assessment; this is expected to protect about 3,600,000 people;
- Purchase 400,000 long-lasting insecticide-treated nets and help distribute these and other LLINs for the malaria in pregnancy program through ANC clinics and with other donor purchases to bring nationwide, household ownership of three or more ITNs to 100%; and
- Expand training in focused antenatal care including coverage of three doses of SP for pregnant women in three additional provinces;

Case Management:

- Purchase 312,500 treatments of AL to bring nationwide coverage of children under five with an ACT to 70%;
- Procure 550,000 RDTs and improve laboratory diagnostic capacity – thereby assisting the NMCC move toward its goal of confirming every case of malaria before treatment;
- Strengthen the logistics and commodity delivery systems; and
- Improve clinical treatment and laboratory diagnosis through expanded training at the district level.

INTERVENTIONS: PREVENTION

Insecticide-Treated Nets

Current Status, Challenges, and Needs

Zambia has identified ITNs as a key part of its malaria control strategy and is working to scale-up coverage. The ITN program objective is to ensure that 100% of the households in Zambia have at least three ITNs with at least 85% utilization rate. In 2007, 3.4 million nets were distributed through various strategies and by different partners in line with the 2006-2010 National Malaria Strategic Plan (NMSP). Six provinces were targeted and 80% coverage targets with three or more nets per household were met in three of the six provinces. In 2008, the ITN program is planning to cover the remaining three provinces, namely, Copperbelt, Lusaka, and Central, and reach 100% coverage in the earlier six provinces. The initial focus will be on households that are not targeted for IRS

Main sources of LLINs in 2007¹

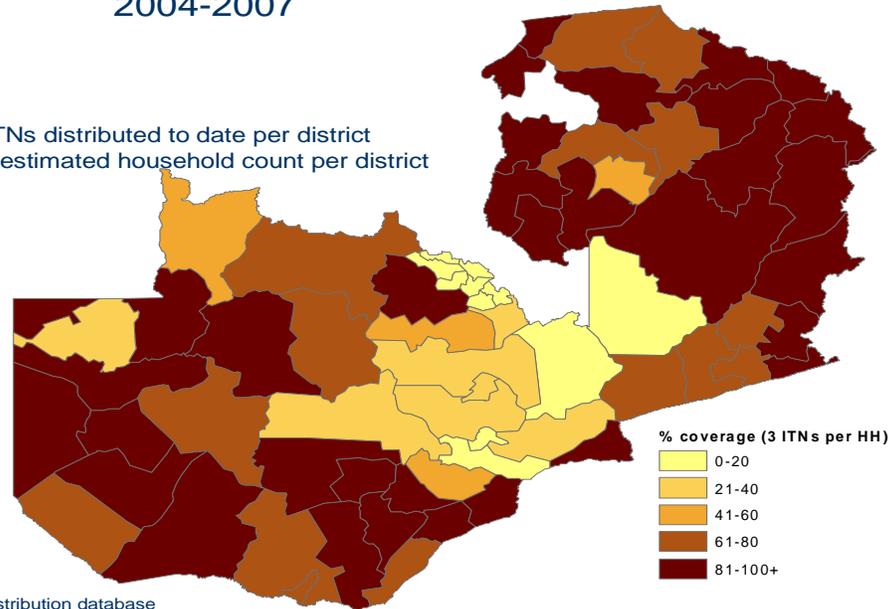
| Source | Quantity of LLINs procured |
|---------------|-----------------------------------|
| Global Fund | 1,082,000 |
| World Bank | 1,080,000 |

¹ 2008 National Malaria Control Action Plan. Actions for Scale-Up for Impact on Malaria in Zambia, in Support of the National Malaria Strategic Plan 2006-2010.

| | |
|-------------------|-----------|
| PMI/PEPFAR/RAPIDS | 505,000 |
| JICA | 392,500 |
| USAID/SFH | 322,348 |
| UNICEF | 16,500 |
| MACEPA | 18,000 |
| Total | 3,416,348 |

Zambia ITN Distribution – All programmes 2004-2007

Numerator: all ITNs distributed to date per district
Denominator: 3*estimated household count per district



Source: NMCC, ITN distribution database

According to the 2008 MIS, 60% of households nationwide own at least one ITN and 30% of households have more than one ITN; rural and urban populations have similar levels of ITN ownership (58% of urban and 60% of rural households, respectively, own at least one ITN). Ownership varies greatly by geographic region.

Net ownership is increasing rapidly, and utilization is improving as well. The MIS 2008, carried out just after the rainy season, found that 38% of children under five slept under an ITN the previous night (versus 23% in 2006). There are slight geographical and urban-rural differences in utilization, with usage among children under five in urban areas (36%) slightly lower than that in rural areas (39%). Regional usage in children varied from 10% in the Western Province to 64% in the Northern Province.

Net Distribution Strategies:

To ensure that at least 100% of all households in all areas have at least three ITNs with 85% utilization rate, the NMCC has adopted a four-pronged net distribution strategy:

- Mass distribution of free nets;
- Distribution of free nets to pregnant women and children under five through ANC/EPI;

- An equity program to provide free LLINs to vulnerable populations such as households with orphans and vulnerable children, people living with HIV/AIDS, and the poorest of the poor;
- Commercial sales of LLINs

2008 LLIN distribution program

| Approach | Target population | 2008 Target areas | Number of nets to be procured | Funding partner |
|---------------------------------------|--|---|-------------------------------|---------------------|
| Mass distribution | All households | 3 provinces (Copperbelt, Lusaka, Central) | 3,000,000 | Global Fund |
| Malaria in pregnancy/ANC distribution | Pregnant women and children under five | ANC clinics nationwide | 400,000 | PMI |
| Equity | Vulnerable populations | 62 districts | 90,000 | Global Fund |
| Commercial sales | Those who can afford nets | Urban centers | 25,000 | Global Fund |
| | | Urban centers | Sold in shops and markets | Commercial partners |

Mass campaigns: As a means of rapidly scaling-up LLINs nationally, MOH/NMCC has conducted regional mass distribution campaigns of free LLINs to all households. In 2007, 3.4 million LLINs were distributed mostly through mass distribution. In general, these mass campaigns have targeted those areas that were not receiving IRS. In 2008, the ITN program is planning to cover the remaining three provinces, namely, Copperbelt, Lusaka, and Central, and reach 100% ownership in the earlier six provinces. PMI procured 78,315 LLINs that were distributed free to the North-Western Province to help reach the 100% target.

Distribution through ANCs: The second major distribution method of LLINs in Zambia is the distribution of free LLINs through ANC clinics targeting pregnant women and children under five, often referred to as the “malaria in pregnancy” (MIP) program. This program, implemented for the MOH/NMCC by the Society for Family Health (SFH) with support from USAID, provides LLINs under the brand name “Mama Safenite®.”

This program originally sold the Mama Safenite® nets for 3000 kwacha (about \$0.75 each). However, in 2007 the MOH/NMCC made a policy decision to provide free LLINs at ANCs. These nets are now procured through JSI/Deliver and SFH continues to distribute them to the districts through its national distribution network. SFH estimates that its distribution costs are approximately \$0.50 per net. At the district level, the DHMT is responsible for the distribution of these nets to the ANCs and SFH also provides some support in this effort.

This program is accompanied by a mass media/IEC campaign to increase the utilization of these nets and the broader use of ITNs generally. SFH uses communication tools such as radio, posters, community drama focusing on mosquito-avoidance, and correct and consistent

usage. In 2008, this program will receive approximately 400,000 LLINs from PMI for distribution. PMI plans to provide funding for 400,000 LLINs in 2009 as well.

Equity program: The third distribution channel is the “Equity Program” which was started in 2003 as a means of increasing access to ITNs for particularly vulnerable groups such as orphans and vulnerable children, people living with HIV/AIDS (PLWHA) and their caregivers, refugees, and other vulnerable groups. In 2007, this program saw an enormous expansion through a World Vision-led consortium of NGOs supporting HIV/AIDS home-based care that distributed and hung approximately 500,000 free LLINs provided by PMI, to vulnerable populations using its network of over 13,000 home-based care volunteers. In 2008, the program will distribute 25,000 LLINs using funding from Global Fund.

Commercial sales: The fourth distribution method is via the commercial sector. While not as vibrant as in other countries, the commercial sector in Zambia sells about 35,000 LLINs a year. The major commercial partners are Melcome Marketing and EcoZed Limited. Long-lasting ITNs are sold for about 35,000 kwacha (about \$10). It is generally accepted that the commercial market needs to continue and be promoted to ensure long-term access of LLINs and replacement of old nets.

Finally, there are other minor distribution outlets for nets including employer-based programs, distribution for use in health facilities, school health programs, mining companies, etc. Currently, these programs make up a very small percentage of the total number of nets distributed.

Taxes, tariffs, and type of net

Regardless of the distribution channel used, the GRZ has eliminated all taxes and tariffs on ITNs and net retreatment kits. This policy has helped reduce the price of ITNs in the commercial sector and has helped reduce administrative costs associated with the ANC distribution program. The national policy also endorses the use of LLINs. Only WHO recommended LLINs are permitted in Zambia which today include the following brands: Permanet®, Olyset®, Inceptor®, Duranet® and Netprotect®. The MOH/NMCC policy specifies that the net material should be at least 100 deniers as 70 denier netting tears more easily.

NMCC 2008/2009 priority areas

- Finalization and dissemination of National ITN Guidelines
- Re-treatment: 2008 could be the last year of this program (World Bank will provide 500,000 kits)
- Sustain coverage
 - Distribution of ITNs through all four strategies
 - Cover gaps in 6 provinces (aim to achieve 100% ownership of 3 or more nets)
 - Replace worn out ITNs (estimate 500,000 but DHMTs to conduct needs assessment)
 - Strengthen the Community Malaria Booster Response activities (implementation, monitoring and evaluation)
- Establish sustainability programs through multiple distribution channels
- IEC/BCC

- Identify and implement most effective strategies to increase utilization rates
- Strengthen linkages with partners to curb abuse of ITNs.
- Strengthen coordination of all partners implementing ITN activities (DHMTs to hold technical working group meetings quarterly)

Projected ITN need, 2008-2010

To reach the MOH/NMCC new coverage target of 100% of households owning at least three nets, approximately seven million ITNs must be in circulation in Zambia. In 2008, mass distributions efforts are expected to focus on Copperbelt, Central, and Lusaka Provinces while other distributions will be through the MIP program. A gap analysis done by the NMCC indicated that there will be a need of 1,400,000 LLINs (including replacement nets) for 2009. However, the 2008 MIS indicated that only 28% of households nationwide own more than one net. This indicates that the NMCC gap analysis is not necessarily accurate and that a more refined approach is needed in order to determine what the exact needs are for a given year. The PMI team will work with the NMCC and its partners to ensure that better ITN information is available, to better rationalize procurement decisions and net distribution.

Information, Education, and Communication (IEC) for ITNs

Although net utilization rates are improving, there continues to be a need for a comprehensive and sustained national IEC/BCC campaigns on the correct and consistent use of ITNs. Currently, most IEC/BCC campaigns in the areas of net ownership are in conjunction with an event such as a mass distribution campaign or World Malaria Day. This is a high priority in the NMCC Action Plan and, in recent years, the MOH/NMCC, with the support of the USAID-funded NGO Health Communications Partnership, has tried to strengthen this part of its program and has recently issued its malaria communications strategy which outlines the approaches and messages it will take to improve the utilization of ITNs.

At the community level, Peace Corps Volunteers (PCVs) will increase awareness of proper ITN use in areas not currently served by other USG partners. Through the Community Action for Health Project (CAHP), 34 PCV will expand the capacity of neighborhood health committees, community based organizations, and other local institutions to provide accurate information on malaria prevention and treatment. At the same time, they will link malaria with other key health interventions such as TB, HIV/AIDS, reproductive and child health, and nutrition so that communities receive a comprehensive package of health information. Since PCV in other sectors rely on CAHP's PCV to assist in malaria prevention activities, there is an opportunity to reach over 100 communities not currently supported through PMI. PCV also speak local languages, understand the culture, and are part of these communities. All of these assets will enable PMI to improve the lives of Zambians living in rural areas.

IEC/BCC activities are key components of the Zambia program. The NMCC insists that all IEC/BCC activities of the various partners (including PMI) are coordinated through them and that the respective plans are vetted with NMCC staff before they are implemented. The PMI will fund specifically IEC/BCC for ITNs, ACTs and IPTp, while the NMCC will provide support for the BCC component of the IRS program. Also, PMI staff are active participants in the IEC/BCC Technical Working Group, which the NMCC actively coordinates to assure all IEC/BCC funding is well utilized.

Proposed USG Component: (\$3,476,000)

By 2008, most of the country's provinces would have benefited from mass distribution campaigns, and PMI will focus in 2009 on contributing to a steady supply of LLINs through the routine ANC distribution channel, while supporting efforts to increase demand for, and correct usage of, LLINs. The PMI will contribute to increased ownership and correct usage of nets by:

- Procuring approximately 400,000 LLINs for distribution through the ANC (“Mama Safenite”) program (\$2,400,000);
- Supporting the distribution of these nets, including provision of transportation to districts (\$500,000) Note: This is less than was budgeted in the FY2008 MOP since it is assumed that the MOH/NMCC will gradually take on this responsibility and the distribution system will improve.
- Supporting a national IEC/BCC campaign with the assistance of an NGO to increase the demand for, and the correct and consistent use of, ITNs. This campaign will look at reasons why nets are not being used and reach targeted populations through radio and television advertisements, print media, and community interpersonal approaches, such as community drama (this effort is part of an integrated IEC/BCC campaign covering ITNs, ACTs, and IPTp) (\$200,000);
- Supporting non-governmental organizations (NGOs) and FBOs that work at the community-level through interpersonal and community-based approaches to encourage the correct and consistent use of LLINs (integrated campaign covering ITNs, ACTs, and IPTp) that is consistent with the nationwide media campaign and other efforts of the MOH/NMCC (\$313,000);
- Providing support to the Peace Corps for promoting correct ITN use at the grass roots level through their CAHP (\$13,000); and
- Conducting a net bioassay and durability operational research study in association with the CDC to provide a scientific basis for net replacement including assays of pesticide persistence and quantification of holes in ITNs collected. This project will provide information on net durability to the PMI and NMCC so that we may more accurately estimate the number and cost of nets required for replacement of existing nets that are no longer effective. This project is planned to begin in late 2008 pending approval from the PMI Operations Research Committee. (\$50,000).

Indoor Residual Spraying and other Vector Control Measures

Current Status, Challenges, and Needs

Indoor residual spraying (IRS) in the major urban and peri-urban areas of Zambia was re-established in 2003 after a hiatus of thirty years. The success of the IRS program implemented by Konkola Copper Mines, which began in 2001 and significantly reduced morbidity and mortality in mining towns in the Copperbelt Province, provided much of the impetus for the MOH and NMCC to re-instate the IRS program in Zambia.

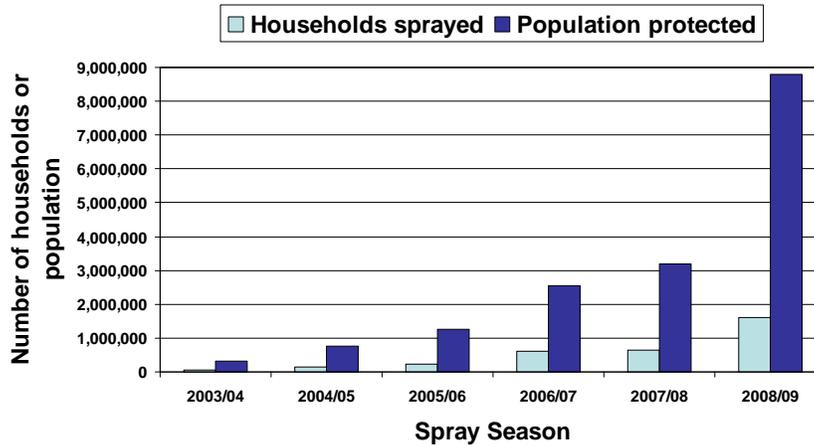
The Zambian NMCC vector control strategy is dependent on decreasing the number of infective bites from the malaria vector to reduce disease transmission, in addition to an effective treatment policy. In this regard, the program has embarked on an Integrated Vector Management (IVM) strategy with Indoor Residual House Spraying (IRS) and Insecticide Treated Nets (ITNs) as the main interventions with larviciding and Environmental Management (EM) as supplementary interventions. To this effect, entomological monitoring of the vector control interventions is an indispensable component of an evidence based implementation of the IVM approach. As evidence continues to accumulate suggesting that urban Lusaka is a low-transmission area, other IVM strategies should be conducted instead of IRS, which should only be used in higher transmission areas. The PMI Team is committed to assisting the MOH/NMCC in developing long-term strategies for the IRS program in the coming year.

The predominant vector in Lusaka Province and the southern areas of Zambia is *Anopheles arabiensis*, with increasing proportions of *An. gambiae* s.s. in the northern higher rainfall districts (500 mm in southern Zambia versus 1,200 mm in northern Zambia). *Anopheles funestus* is an important vector near the many bodies of water (rivers, reservoirs, lakes, swamps) throughout Zambia, and is responsible for perennial year-round malaria transmission. In contrast, *An. arabiensis* and *An. gambiae* s.s. densities rise after the cool dry season, initially in areas near water, and then widely across most areas, peaking during the rainy season from November to April. Near perennial water, these “rainy season” vectors supplement transmission of malaria by *An. funestus*. Thus, IRS ideally should be conducted starting from September to December, before and at the beginning of the rainy season.

The national strategy has been to prioritize IRS to urban and peri-urban areas. There are several advantages to this strategy, including large numbers of households concentrated in relatively small areas, making logistics simpler. Many of these urban/peri-urban households have modern plastered walls, where retention of insecticide is likely to be greater compared to rural thatched or mud/pole walled structures. Rural structures are often abandoned and new huts built as frequently as every three to six months, especially in the vast wetland areas of Zambia. An exception to the peri-urban/urban strategy is the IRS program in the Kazungula district, a rural area with very few modern structures. This district was selected as part of a cross-border scheme with Namibia and Botswana, where malaria incidence has been kept low through effective, sustainable IRS campaigns. The insecticides used in the IRS program are deltamethrin, lambda-cyhalothrin, and alpha-cypermethrin for use on cement plaster and painted walls of modern houses, and dichloro-diphenyl-trichloroethane (DDT) for mud or pole/grass walled homes.

The MOH/NMCC has responsibility for coordinating and managing the IRS program nationally; DHMTs are responsible for implementation in their districts, 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 maintain a successful IRS program. The PMI will assist the MOH/NMCC to ensure that decisions to select new areas for IRS are based on evidence of active malaria transmission using all available epidemiologic and entomologic surveillance data.

IRS Coverage Targets 2003-2009



Progress to date

By the end of the spraying campaign in April 2007, 592,346 households had been sprayed, with 85% coverage of targeted houses. The denominator used for IRS coverage is the number of eligible households in a selected area, although these areas are yet to be fully mapped. Eligible areas are defined using the following criteria: occupied houses, population density, and capacity to handle effective operations in conformity with national IRS guidelines. The MACEPA and the USAID bilateral project NGO, Health Systems and Services Project (HSSP), are currently supporting a geographical information system (GIS) mapping program.

In the 2007/8 season, over 657,695 households were sprayed on time and prior to the peak malaria transmission period, with a remarkable 93% coverage. Strong partnership support continued with World Bank and USAID procuring insecticides, pumps, personal protective and other equipment. A “training of trainers” workshop was successfully conducted for 60 participants targeting district and provincial personnel, followed by cascade trainings of 1,300 spray operators in the 15 IRS districts. Structures in eleven IRS districts were geo-coded (households mapped): Solwezi (North-Western Province); Chililabombwe, Chingola, Kalulushi, Luanshya, and Mufulira in the Copperbelt Province; Kabwe (Central Province); Kafue and Chongwe in Lusaka Province; Mazabuka and Livingstone in Southern Province. A post-spray meeting was conducted with an attendance of 60 participants. The IEC package-material and information management systems were standardized and a needs assessment was conducted in 36 districts being considered for expanded IRS coverage in the 2008 spray season. Challenges during recent IRS activities included inadequate transport and storage facilities, a delay in

procurement of spray pumps, and inadequate district supervision and community sensitization for IRS activities.

Number of Households Sprayed in 2005-2008

| District | 2005/6 | 2006/7 | 2007/8 |
|-----------------|----------------|----------------|----------------|
| Chililabombwe | 11,189 | 4,823 | 6,242 |
| Chingola | 4,569 | 4,635 | 10,167 |
| Chongwe | 6,417 | 15,398 | 20,417 |
| Kabwe | 19,366 | 28,157 | 36,867 |
| Kafue | 8,997 | 15,702 | 21,820 |
| Kalulushi | 6,151 | 10,741 | 15,087 |
| Kazungula | 4,682 | 16,470 | 23,634 |
| Kitwe | 35,061 | 56,427 | 63,691 |
| Livingstone | 31,448 | 29,882 | 22,571 |
| Luanshya | 8,624 | 21,355 | 23,618 |
| Lusaka | 42,195 | 217,870 | 300,334 |
| Mazabuka | 6,067 | 30,425 | 14,188 |
| Mufulira | 11,250 | 12,184 | 15,460 |
| Ndola | 30,425 | 59,771 | 65,640 |
| Solwezi | 10,318 | 14,037 | 17,959 |
| Private sector* | | 54,469 | |
| TOTALS | 236,759 | 592,346 | 657,695 |

*This represents spraying through mining companies and Zambia Sugar Company

During the 2008/9 campaign, PMI will continue to support the IRS program in the current 15 districts. The NMCC is expanding IRS in the 2008/9 spray season to 21 additional districts (36 total) and 1,600,000 eligible structures with funding from other donors. This is a change from the original planned scale up by 7 additional districts. USAID has committed to procuring the insecticide (both DDT and pyrethroids) through RTI's IRS Indefinite Quantity Contract (IQC) for the campaign in the 15 districts, and continued implementation and technical support. Funding is still needed for additional environmental assessments and environmental safeguards. Prior to the re-introduction of DDT, no baseline studies on either vector resistance or susceptibility to DDT or the existence of DDT in the environment were conducted. Without such data, it will be difficult to determine if DDT resistance is rising as a result of IRS. Also, the lack of baseline data on the existence of DDT in the environment prior to its reintroduction will make leakage monitoring difficult.

Issues associated with insecticide storage, safety, and the disposal of waste need to be addressed. In some districts, appropriate storage and shower facilities for spray personnel do not exist; and the runoff from the protective equipment is not being managed adequately. The MOH/NMCC has begun to address this issue, and USAID NGO partners, RTI and HSSP are in the process of determining how to expand and refurbish structures so that they meet legal standards and guidelines. Storage facilities were upgraded in 2007/08 but there is a need for additional refurbishments in 2008/09.

The DDT and insecticide waste is also a problem. In order to appropriately dispose of the sachets and packets, they need to be incinerated at temperatures above 900° C in a specialized incinerator. In May 2008, the manufacturer transported the DDT waste for final disposal by incineration in South Africa in compliance with Basel Convention.

The PMI has two partners responsible for the implementation of the IRS campaign. The RTI is responsible for the procurement of pesticides, conducting environmental assessments and refurbishing buildings as storage facilities, wash areas, evaporation tanks, soak pits and ablution blocks. The HSSP's role includes training and supervision of spray operator supervisors and procuring personal protective equipment.

The IEC/BCC activities associated with spraying campaigns are carried out by the NMCC, using their plans and strategies. All NMCC partners, including PMI, are aware of these strategies and apply them to their respective IEC/BCC activities in the distribution of nets and drugs, as well as in training and related malaria prevention and control activities.

Proposed USG Component: (\$5,500,000)

For the 2009/10 campaign, PMI will support IRS in the current 15 districts by:

- Procurement of insecticide for the 2009/2010 IRS program targeting 900,000 households (\$3,400,000) utilizing an NGO; and
- Contributing to implementation costs of, and technical assistance to, the IRS program, including training of spray operators, support for transportation and logistics during the spray campaign, procurement of personal protective equipment and other IRS-related commodities, support for epidemiological and entomological surveys, insecticide resistance surveys, continued support to ensure environmental safeguards are in place, DDT baseline studies, refurbishment of storage facilities, and waste disposal in conjunction with an NGO (\$2,100,000). Resources from the GRZ and other donors are expected to support full implementation costs. Because of low transmission rates in Lusaka, PMI will use its scale up funds in 2009 to support the increase of IRS in districts with higher rates of malaria parasitemia.

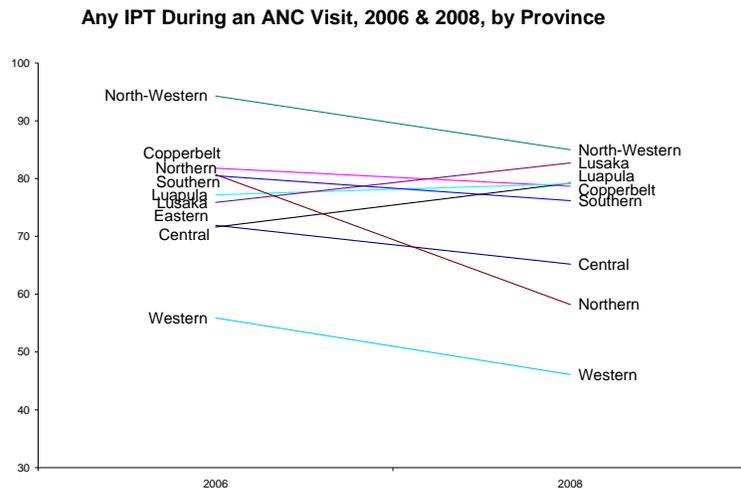
Intermittent preventive treatment in pregnant women (IPTp)

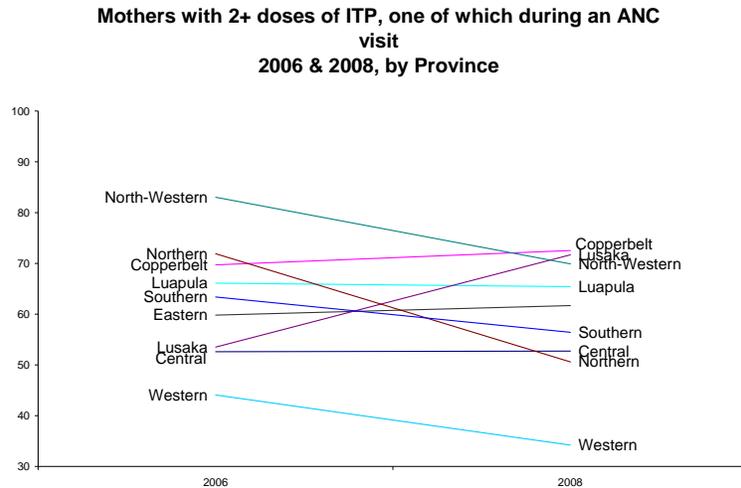
Current Status, Challenges, and Needs

IPTp was introduced as policy in Zambia in 2003 and became practice in 2004. The MOH/NMCC guidelines call for 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 later. Within the MOH Reproductive Health Services (RHS) unit, IPTp has been incorporated into the national strategy of Focused Antenatal Care (FANC); however, roll-out of this strategy has not been well funded. Relatively good coverage of two-dose IPTp has already been achieved. Based on nationally representative figures on IPTp coverage from the 2008 MIS, 60.3% of mothers took the recommended two or more doses of IPTp. The IPTp coverage (as provided during ANC visits) by province from the 2006 and 2008 MIS are listed in the table below. Despite high coverage of IPTp, certain provinces had relatively lower

coverage of IPTp during ANC visits, and substantial gaps in two- and three-dose IPTp coverage were apparent among poorer women and women in rural areas. To address this, efforts to improve FANC have been implemented in the Central and Eastern provinces with plans to expand these efforts to other provinces. Additionally, the MOH/NMCC has identified several key steps for improving demand for and delivery of IPTp during ANC visits in its 2008 Action Plan and its Five-year Strategic Plan for 2006-2010.

| Province | Percentage of mothers who took any IPT during an ANC visit | | Percentage of mothers who took 2+ doses of IPT at least one of which was during an ANC visit | |
|---------------|--|----------|--|----------|
| | 2006 MIS | 2008 MIS | 2006 MIS | 2008 MIS |
| Central | 71.9 | 65.2 | 52.6 | 52.7 |
| Copperbelt | 81.8 | 78.7 | 69.7 | 72.5 |
| Eastern | 71.6 | 79.1 | 59.8 | 61.6 |
| Luapula | 77.2 | 79.1 | 66.1 | 65.5 |
| Lusaka | 75.9 | 82.7 | 53.5 | 71.8 |
| Northern | 80.7 | 58.2 | 71.9 | 50.9 |
| North-Western | 94.3 | 85.4 | 83.0 | 70.1 |
| Southern | 80.5 | 76.2 | 63.4 | 56.4 |
| Western | 55.9 | 45.7 | 44.1 | 33.7 |





The MOH/NMCC and RHS Unit have a good collaborative relationship. The MOH RHS Unit implements IPTp with technical assistance from the NMCC. The MOH/NMCC technical guidelines have been incorporated into RHS programs. There is, however, need for improved communication and reporting on the implementation and delivery of IPTp, and collection and management of information that could help improve coverage. IPTp, like all antenatal services, is delivered free-of-charge at all GRZ health facilities as well as at nongovernmental health facilities participating in the CHAZ network, which are generally considered MOH facilities. ANC health workers are trained to dispense the treatment under direct observation. The SP for IPTp is available in the routine drug kits supplied to health facilities by the central medical stores and from emergency procurements. It is generally available but the quantities of SP in the kits and emergency procurements are usually based more on its use for malaria treatment than on the needs for IPTp. The MOH/NMCC specialists described some stock outs and difficulty getting SP from the pharmacy to the ANC for IPTp, but this has not been well documented. Anecdotal reports from Medical Stores Limited (MSL), the parastatal entity that receives and distributes medicines and laboratory supplies, describe a history of a 1 year stock out of SP in the central supply. A recent quantification of SP needs by JSI/Deliver suggests that additional procurements are required in 2008 to avoid stockouts. These quantification assumptions will be challenged if providers continue to use SP over AL in treating acute malaria in non-pregnant adults.

All antenatal care services, including IPTp, free LLINs, voluntary counseling and testing for HIV, prevention of mother to child transmission of HIV, syphilis testing and treatment, micronutrient supplementation, and pregnancy monitoring and delivery counseling are integrated and implemented under the RHS Unit of the MOH. The FANC approach emphasizes that women should make at least four visits prior to delivery. While MOH/NMCC specialists are confident that IPTp has been incorporated into this approach, their awareness of the day-to-day management of the intervention and its delivery is more limited.

IPTp doses are recorded in designated columns on the ANC register and the patient-held ANC card. Unfortunately, these data are not reported up the system through the routine HMIS, but some routine coverage data are available through the MOH/NMCC's sentinel reporting districts and through biennial MISs.

Despite its national policy status, there has been a substantial lack of government or donor resources to support the roll-out of the FANC strategy nationwide. No systematic qualitative or health facility assessments of IPTp or antenatal care services were available to MOH/NMCC. Most MOH/NMCC and RHS technical experts agree that increasing the demand for ANC services (including prevention and treatment of malaria) will be important for achieving higher IPTp coverage goals. The MOH/NMCC is also focused on improving the proportion of women who receive the recommended three doses of IPTp. It is a common perception that too many women attend only ANC once or present for their first visit too late to accommodate all the recommended services. Other commonly voiced concerns include reluctance of women to take medicines during pregnancy, specific fears about SP as a strong drug likely to cause extensive side effects, local practices that included using antimalarial medications as abortifacients, and problems with providing clean water or cups for dispensing IPTp at ANC sites.

There are no recent data available on the efficacy of SP as a treatment for malaria infection in pregnant women or on the impact of IPTp on malaria in pregnancy outcomes such as placental parasitemia, birth weight or maternal and newborn anemia. Methods are needed to assess and monitor the efficacy and effectiveness of SP IPTp in the face of increasing resistance of *P. falciparum* to SP. SP resistance has the potential to compromise the usefulness of SP IPTp in reducing the risks of malaria in pregnancy. In addition, correlating *in vivo* results of SP as IPTp in pregnant women with information on the prevalence of *dhfr* and *dhps* mutations that confer resistance to SP may provide a laboratory marker that can be tracked to follow SP effectiveness in this population.

Progress to Date

Activities have been initiated to strengthen FANC in the Eastern and Central provinces covering all 14 districts in both provinces, where low uptake of IPTp was recorded in the 2006 MIS. Training for FANC health care facilities in these two provinces will be conducted after a needs assessment by and NGO Health Systems Strengthening Partnership. An implementation plan has been developed which includes adaptation of written guidelines, job aids, and tools to be used for training of personnel in FANC delivery, district-level supervision of ANC delivery, and quality control. This will be conducted by the health systems partner.

The NMCC along with their implementing partners, are working on national and community IEC/BCC activities to increase demand for ANC services, including IPTp. The NMCC has been collaborating with national television and radio stations through other messaging campaigns for IRS and ITNs. These collaborations will be a key in national-level dissemination of messages regarding ANC services. These messages are currently in development. Additionally, to increase nationwide capacity for IEC/BCC activities, four of nine provinces received training in community IEC/BCC through DHMTs. After receiving this training, each district developed IEC/BCC work plans to be funded by the NMCC.

Community-led IEC/BCC is a key component of the NMCC's Communications Strategy which aims to reduce malaria morbidity and mortality through advocacy and promotion of

positive behavior change. With assistance from USAID, the NMCC held a 3-day workshop that brought together diverse stakeholders and district health teams (DHTs) from 32 districts where services are limited and malaria incidence is high. At this workshop, ideas and operational methods for IEC/BCC were shared among attendees, which will lead to the development of a community-led approach for IEC/BCC. The PMI will support the implementation of this strategy to ensure messages for malaria prevention and treatment are disseminated in hard-to-reach areas. Additionally, community radio stations were trained in malaria-relevant messaging which included IPTp to ensure media messages are accurate and promote behavior change.

Peace Corps Volunteers (PCV) will also increase awareness of IPTp in areas not currently served by USG partners. This activity is linked to the IEC/BCC ITN activity which PCV will be undertaking in 2008. As previously described, PCV will strengthen the capacity of local organizations including neighborhood health committees to provide accurate information on malaria prevention and treatment.

Operations research was planned to examine the efficacy of SP as IPTp. Financial support has been provided for two separate projects. The first project, implemented by the University of Zambia and the NMCC in 2008, is an ongoing study examining the impact of MIP interventions, including SP for IPTp. While not a standard efficacy study, it will provide data on birth outcomes and SP resistance markers in women who undergo standard ANC MIP services. This information can then be used to inform the NMCC of the impact of their MIP program. This study is projected to finish by December 2008. Through this study, the University of Zambia and TDRC will develop the capacity to do placental histology and polymerase chain reaction testing for SP resistance markers, which will be useful for a second project examining SP efficacy and effectiveness for IPTp, which is currently being planned by the NMCC and CDC.

This second project was developed by the NMCC and the CDC, and aims to evaluate SP IPTp efficacy and effectiveness and its correlation with SP resistance markers. Already approved by the PMI operations committee, a protocol has been written for an evaluation of the efficacy of SP as IPTp (as observed in an *in vivo* study in pregnant women) and its correlation with SP resistance markers. Next steps include submission of the protocol to institutional review boards and preparation and training of collaborators on implementation of the evaluation. This project is expected to be complete by the end of 2009. Findings from this project are expected to provide data to the NMCC to make informed IPTp policy decisions.

Proposed USG Component: (\$849,000)

Zambia has relatively high levels of two-dose IPTp; however, the MOH/NMCC would like to increase the number of women who receive the recommended three doses. To increase this proportion, it is recognized that pregnant women must attend ANC earlier in their pregnancy. Interventions to improve the demand for and delivery of ANC services in rural areas and among younger first-time mothers and poorer households are expressed goals of the ANC program. Support for a nationwide roll-out and an assessment of FANC are noted in the MOH/NMCC's Action Plan for 2008. Besides continuing and expanding activities to strengthen FANC in the Central and Eastern provinces, PMI will expand efforts to increase

uptake of IPTp in three additional provinces shown to have relatively lower IPTp coverage in the 2008 MIS through the assistance of an NGO. Close collaboration with efforts to improve the supply chain management for malaria treatment commodities is essential to ensure adequate supplies of SP and micronutrients for FANC. There is also a need to monitor SP's effectiveness as the drug of choice for IPTp. In the second year, PMI will support these goals by:

- Strengthening FANC in Northern, Southern and Western provinces where uptake of IPTp is relatively lower (based on coverage data from the 2008 MIS). This involves expansion of activities currently being done in Central and Eastern provinces, including training of additional antenatal health service providers and district-level supervisors, the provision of written guidelines, job aids, and tools for district-level supervision of antenatal care service delivery, and quality control (\$550,000);
- Continuing to support a national IEC/BCC campaign to increase demand for ANC services generally and IPTp in particular through radio and television spots, print media, and community interpersonal approaches such as community drama (this is part of an integrated IEC/BCC campaign covering ITNs, ACTs, and IPTp) (\$100,000);
- Supporting non-governmental organizations (NGOs) and FBOs that work at the community-level through interpersonal and community-based approaches to increase demand for IPTp (integrated campaign covering ITNs, ACTs, and IPTp) that is consistent with the nationwide media campaign and other efforts of the MOH/NMCC (\$137,000);
- Providing support to the Peace Corps for education on increasing IPTp at the grass roots level (\$12,000); and
- Complete an operations research study on SP effectiveness for IPTp, a priority in the MOH/NMCC Action Plan. This will provide an opportunity to evaluate the relative efficacy and effectiveness of SP IPTp in pregnant women to the prevalence of resistance markers to SP. CDC will work with MOH/NMCC's operations research Unit to implement this protocol (\$50,000).

INTERVENTIONS: CASE MANAGEMENT

Malaria diagnosis

Current Status, Challenges, and Needs

The NMCC Guidelines for the Diagnosis and Treatment of Malaria in Zambia released in 2003 recommend parasitological diagnosis for all patients with suspected malaria at hospitals and health centers that have laboratory facilities. Clinical diagnosis is recommended where laboratory facilities and staff are not available as an interim measure until malaria diagnostic services are rolled out to all health facilities. Children under five years of age are to be evaluated, classified, and treated according to the algorithm of the Integrated Management of Childhood Illness (IMCI). In spite of these recommendations, clinical diagnosis based on fever or history of fever within the previous 48 hours remains the basis for malaria treatment for patients of all ages at many health facilities in Zambia. The NMCC Action Plan for 2007

indicates that only 38% of patients with malaria have access to laboratory diagnostic services. It should also be noted that many health facilities in Zambia do not have laboratories and technicians due to a shortage of trained and qualified staff. Since the Guidelines were issued, however, MOH/NMCC and partners have been working to expand the role and availability of malaria diagnostic services through improvements in microscopy and introduction of RDTs where microscopy services are not available. No national level statistics are available on the proportion of malaria cases that are diagnostically confirmed either by RDT or microscopy. The NMCC Action Plan for 2008 calls for ultimately expanding laboratory diagnostic capacity to 80% of the nation's 1,418 health facilities, a massive effort that is not currently funded.

Malaria microscopy: Roll-out of ACTs for first-line treatment was accompanied by a plan for strengthening malaria microscopy at health facilities. Since 2006, 234 microscopists have been trained. Through financial support from Global Fund Round 7 funds, there are plans to train 280 more microscopists. The training materials and accompanying Laboratory Manual for Malaria Diagnosis were developed with TDRC. These materials are comprehensive and technically appropriate with respect to preparation of stain, care, and maintenance of microscope and related supplies, as well as standard operating procedures for preparing, reviewing and reporting blood slide results. This training is to be integrated with training on microscopy for TB, urine, and stool. Provisions for supervision, refresher training, and quality control of blood slide microscopy are not currently in place.

Licensed laboratory technicians must complete a three-year training program. According to the Draft Human Resource Strategic Plan for the Health Sector, 2006 to 2011, only 100 laboratory technologists and 292 laboratory technicians were reported in-post at GRZ facilities in 2005. Until recently, laboratory technologists and technicians were the only cadres trained and legally authorized to perform malaria microscopic diagnosis. While medical officers and clinical officers receive some training in microscopy, they are unlikely to perform such testing because of their clinical responsibilities. In 2006, training for a new cadre of specialist microscopists was initiated in order to address this critical staffing gap. Non-laboratory health workers are recruited from health facilities and attend an eight-week training course in Lusaka before returning to their posts. The first cohort of 19 graduated in 2006. The NMCC Action Plan for 2008 calls for 30 more staff to be trained this year. Plans for certification and deployment of this cadre are not clear. Refresher training and/or supervision of health facility laboratory workers has been planned but is not currently implemented.

The MOH/NMCC specialists and partners regard the quality of blood slide microscopy as relatively good. An MOH/NMCC OR activity in 2007 reported that routine microscopy correctly identified about 80% of malaria cases compared with a reference diagnosis. Adequate supplies of materials and reagents for malaria microscopy are usually available but stock outs do occur.

Rapid diagnostic tests: The MOH/NMCC has conducted an evaluation of more than ten RDTs for malaria and recommended several for use in Zambia. The MOH/NMCC has also developed general requirements for RDT procurements: (1) comprehensive kits based on the identification of Pf HRP2; (2) cassette format; (3) individual packaging, and (4) bulb or loop

applicators for sampling the appropriate quantity of whole blood. To date, the MOH/NMCC has had the most experience with the MAL Pf[®] (ICT Diagnostics, RSA), Visitect Malaria[®] (Omega Diagnostics, UK) and ParaCheck[®] (Orchid Diagnostics, India) products. SD Bioline was recently evaluated and approved for use in Zambia. Of these, MAL Pf is primarily used. The MOH/NMCC strategic plan recommends two roles for RDT diagnostics: at rural health centers where microscopy is not available or functional, and through CHWs where ACTs will be made available.

Introduction of RDTs in rural health centers began in 2007 with support from the Global Fund. The MOH/NMCC staff developed standard operating procedures and training materials, conducted provincial training workshops for staff of GRZ and CHAZ facilities, and provided districts with funding for district level cascade training. At the health facility level, laboratory staff are responsible for ordering malaria diagnostic supplies on a monthly basis. These orders are transmitted and shipments are received from the MSL through the same channels that are used for essential medicines. MSL also sends out RDTs via a push system, sending out predetermined quantities of RDTs to rural health centers. As with drugs, stock outs of RDTs and diagnostic supplies are relatively common. Current RDT needs for rural health centers are not well quantified. RDTs for rural health centers are currently being purchased with support from Global Fund and PMI.

As in many other countries, clinicians in Zambia do not always use the results of RDTs or microscopy to guide malaria treatment decisions. Many MOH/NMCC specialists and their partners report, anecdotally, that health workers prescribe ACTs or SP in cases where laboratory diagnoses are negative. Because of these reports the health systems partner¹ in Zambia will continue its provider education to ensure that test results are being utilized properly. The PMI and other MOH partners are committed to ensuring that use of RDTs is rationale and that test results lead to proper treatment. The current implementing partner's efforts appear successful in the targeted districts with improved performance.

To increase access to timely diagnosis and treatment of malaria, the NMCC plans to promote home management of malaria (HMM) with use of RDTs by community health workers (CHW). 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 has been authorized for use by community-based counselors and this will establish a policy precedent that is expected to facilitate the introduction of malaria RDTs at the community level. In 2007, the MOH/NMCC procured 2,000,000 RDTs through CHAZ, a Global Fund Principal Recipient, which will support the introduction of RDTs for accurate diagnosis at community level. The MOH/NMCC with assistance from the Malaria Consortium is piloting the deployment of RDTs and ACTs through CHWs in two districts (Livingstone and Milenge) so far, with plans to expand these pilot sites to a total of nine districts by the end of 2008. The MOH/NMCC also plans to evaluate the performance of these pilots to provide information to the Pharmaceutical Regulatory Authority and Medical Council of Zambia for possible nationwide expansion of this model over three years. Beyond this pilot phase, funding for CHW training and roll-out is being identified. Additionally, since the current supply chain

¹ The current USAID/Zambia health systems component will be recompeted in 2009.

distributes RDTs from MSL to health facilities, it may be expanded to include distribution of RDTs to CHWs. This decision will be made after the legal standards and required policies are changed.

The MOH/NMCC estimates that they will need 3 million RDTs annually, based on the numbers of clinically diagnosed malaria cases from the 2006 HMIS data. However, this projected need for RDTs has not been well quantified and is not based on recent data. Two million RDTs are expected to be purchased with the final distribution of Global Fund Round 4 money. In 2009, the NMCC expects to procure 2 million RDTs through Global Fund Round 7 and PMI will procure 550,000.

Progress to Date

To support NMCC efforts to use confirmed malaria diagnosis to guide ACT use, FY 2007 funds were used to procure 979,000 RDTs in early 2008 for use in rural health facilities where microscopy is not available.

The PMI has identified IMA_D to strengthen malaria diagnostic capacity in health facilities including the use of RDTs. An initial visit to evaluate current diagnostic procedures, diagnostic capacity and needs took place in August 2008. Following this evaluation, plans will be made for training personnel in malaria diagnosis, quality control, and supervision.

The RDTs are distributed using the same supply system used for ACTs. The JSI/Deliver has evaluated this supply system and is currently piloting systems for ACT distribution at three sites. It is expected that improvements in the supply system for ACTs will also benefit RDT distribution. To strengthen the supply chain in regards to RDTs specifically, JSI/Deliver is planning to conduct a series of meetings with the MOH/NMCC and districts to better understand their needs and issues with the current RDT distribution system. The JSI/Deliver then plans to develop and test an improved supply chain model.

Proposed USG Component: (\$700,000)

Accurate diagnosis is critical to target antimalarial drugs to infected patients and reduce the unnecessary use of these drugs that occurs when patients are presumptively treated for malaria. Both microscopy and RDTs have a role to play in a well-functioning diagnostic program but both require considerable attention to supply chain management, initial and refresher training, quality assurance, and supervision. The PMI views malaria laboratory diagnosis as a critical component of good case management. It is expected that an initial evaluation of diagnostic capacity and needs will be completed in FY2008. Activities based on the results of this evaluation such as training and quality control are also expected to be initiated in FY2008, continuing into FY2009. The PMI will continue to support these activities to strengthen laboratory diagnosis in MOH facilities with laboratories. The MOH/NMCC conducts training and supportive supervision to ensure appropriate use of RDTs, and has identified inconsistent RDT supply as an issue and key factor preventing their appropriate use; therefore, PMI will continue to address this in Year 2.

Based on discussions with MOH/NMCC staff, other partners and the 2008 NMCC Action Plan, the following activities are proposed for Year Two PMI funding:

- Procure approximately 550,000 RDTs for health facility diagnosis (\$400,000); and
- Strengthen malaria diagnostic capabilities at the health center level (\$300,000), including:
 - Support implementation of a plan for quality assurance and quality control of malaria laboratory diagnosis;
 - Support initial and refresher training and supportive supervision of laboratory workers in malaria diagnosis;
 - Support training and supportive supervision of health workers to increase their confidence in, and use of, malaria test results to guide treatment with the assistance of a partner NGO;
 - Evaluate changes in performance of and adherence to microscopy and RDTs to monitor effects of investment.
 - Work with the MOH/NMCC and other partners to train additional personnel on malaria diagnostics;

The above diagnostics activities are in line with the NMCC guidelines for the diagnosis and treatment of malaria.

Pharmaceutical Management and Treatment

Current Status, Challenges, and Needs

Structure of the pharmaceutical management system: The Procurement Unit of the MOH, which reports to the Directorate of Technical Services, has primary responsibility for supplying the national public health system with medicines, medical equipment, and supplies. More specifically, this group is responsible for forecasting drug, equipment, and consumable needs, and for supervising the procurement of all health-related commodities as well as overseeing the overall supply chain management system. The MSL, a parastatal organization 98% owned by the GRZ, is responsible for customs clearance, central warehouse storage, and delivery of all these commodities to the district level. In 2004, Crown Agents was awarded a contract to manage MSL, but the Procurement Unit remains closely involved in overseeing MSL activities. The MSL relies on the Procurement Unit to know exactly what shipments of goods will arrive on what date. The Procurement Unit is supposed to coordinate with the MOH/NMCC on issues related to the quantification, purchase, and distribution of antimalarial drugs, RDTs and other laboratory equipment and supplies, ITNs, and other malaria-related commodities.

Medicines and supplies for the public health system are delivered to the MSL warehouse in Lusaka. The MSL warehouse is just now having air conditioning installed so that temperature sensitive drugs and supplies can be protected from the extreme heat. This same temperature control is not available during shipment to districts or during local storage in most cases. Although consideration has been given to establishing provincial or regional warehouses, none exist at present. The central MSL warehouse delivers medicines and other medical

equipment and supplies directly to 140 drop-off points around the country, including MOH and Mission hospitals, and each of the 72 district health offices. The DHMTs are then responsible for distributing medicines and supplies to each health center and health post within their district. Where CHWs operate, health facilities supply them with the appropriate medicines, which are contained in an essential medicines kit designed for use at the community level. All drugs are dispensed free-of-charge in MOH facilities, though in urban areas patients pay for visits to outpatient clinics. One of the major challenges for the procurement and logistics system in Zambia is the rapid turnover of workers.

With financial support from PEPFAR, PMI, DfID, World Bank and USAID (FP and MCH funds), we have the potential to improve the essential drug system in Zambia. The PMI is contributing to this improvement to assure that life-saving antimalarials are available when needed at all levels of the health care system. Lessons learned from the quantification, procurement and delivery of ARVs will be used to improve the overall pharmaceutical management system in Zambia.

Quantification of antimalarials: The Procurement Unit and the Pharmacy Unit of the Directorate of Clinical Care and Diagnostic Services of the MOH share responsibility with the NMCC for forecasting the quantity of antimalarials (and other malaria-related commodities) that will be needed to evaluate and treat the expected number of cases in the public health system. The Zambian National Formulary Committee decides which drugs should be included in the Essential Drugs List and reviews this list every two years.

According to the Procurement Unit, annual procurements of AL are calculated 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. Currently, it is estimated that 4.3 million malaria cases are diagnosed (clinically or laboratory confirmed) at a public health facility each year, including about 500,000 cases in pregnant women and children weighing less than five kg who are not eligible for AL treatment. Thus, the projected 3.8 million treatments (minus the number of cases in pregnant women and children less those who are not eligible for AL) almost certainly underestimate the true annual need for AL in Zambia. Since January 2007, information is being collected by the Procurement Unit from health facilities on AL consumption to forecast needs more accurately. The MOH recognizes the need for a detailed pharmaceutical management plan and has requested technical assistance to improve forecasting related to antimalarial drugs.

In April 2008, MOH/NMCC with the support of JSI/Deliver with PMI funding conducted an inventory of existing stocks of AL and SP. Subsequently they conducted a quantification exercise in May 2008 in an effort to more accurately forecast the needs in Zambia. Inventories and orders will be monitored quarterly to allow for adjustments.

Estimated annual needs for other antimalarial drugs are based on amounts issued by the MSL in previous years include: SP (500mg/25mg), 3.6 million tablets; quinine sulfate (300mg), 8 million tablets, and quinine hydrochloride (600mg/2ml), 300,000 ampoules.

The recent inventory and quantification exercise was used to estimate antimalarial drug needs for 2008. This is based on an estimate of 6,842,076 malaria cases and takes into account drugs

already in the pipeline. Gaps will be filled by funding from UNITAID (\$2.8 million) and the MOH through Global Fund (\$3.2 million).

Estimated annual antimalarial drug needs and costs for 2008

| Drug | Tablet size | Cost | Annual estimated need | Annual cost |
|-------------------------|-------------|---------|-----------------------|-------------|
| Artemether-lumefantrine | 20mg/120 mg | \$1.28* | 6,842,076 | \$8,757,857 |
| Quinine (tablets) | 300 mg | \$0.036 | 9,200,000 | \$331,200 |
| Quinine (ampoules) | 300 mg | \$0.16 | 0 | NA |
| SP 3-tablet course | 500mg/25 mg | \$0.034 | 2,800,000 | \$95,200 |

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

Most essential medicines are distributed to districts and health centers through an essential drug kit system. Currently, SP and quinine tablets are included in the health center kits, while injectable quinine and other antimalarials drugs are purchased separately. SP can be ordered separately by health facilities. SP is considered a 2nd line drug except in the 2nd and 3rd trimester of pregnancy, in children weighing less than five kg, and with a known intolerance to AL.

Procurement: The procedures of the MOH Procurement Unit are in accordance with the Zambia National Tender Board and appear to be compliant with enforced and well-established international standards. Using central funds, the Procurement Unit is responsible for procuring the health center essential drug kit, which contains a set quantity of quinine and SP tablets, as well as all other parenteral antimalarial drugs used in the public health system for second-line treatment, severe malaria, malaria in pregnancy, IPTp, and other malaria-related equipment and commodities, including ITNs. The kit for CHWs is prepared at MSL. The Procurement Technical Working Group oversees this process to ensure that it involves free and fair competition and that the medicines and supplies comply with international quality standards.

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

The procurement and importation process in Zambia can be long and complicated because of problems with planning, tendering, and monitoring of procurements; however, the situation has improved with the posting of a World Bank-funded procurement specialist to the MOH Procurement Unit. Although the Procurement Unit should order medicines and supplies through one large annual tender, this rarely happens as partial funding becomes available intermittently throughout the year. A World Bank supported quantification exercise was

completed in April 2008. A workshop was held in May 2008 to review what has been learned and to determine how to proceed. PMI funds in Year One helped pay for this evaluation and plan to improve the supply chain of essential drugs, including ACTs. The DfID and the World Bank have proposed a pilot to look at the usefulness of having a supply chain person located in each District in an effort to improve quantification and prevent stockouts of essential drugs.

For the essential drug kits, suppliers put in a tender bid to supply all of the medicines and commodities included in the two kinds of kits, assemble the kits and deliver them to the MSL. In the past the medical kits were funded primarily by the Dutch Government and JICA, but the most recent procurement was made from Mission Pharma with funds in the Direct Supply Budget Line, a sort of “common fund” to which partners contribute. The Procurement Unit procures all other antimalarial drugs, including AL, independently. For 2007, 3.8 million AL treatments were procured with Global Fund funding from the WHO Malaria Medicines and Supply Service. The Global Fund and PMI are supporting AL procurement. Taking into account Global Fund funding over the coming years and the estimated needs described above, the NMCC has asked that PMI procure 400,000 ACTs in 2009. Specific ACT gaps are being estimated at this time.

Distribution: Antimalarials, both those in the essential drug kits and those procured separately, are distributed to districts primarily through a “push” system. Distribution to hospitals and health centers is through a combination of “push” and “pull.” Each month, the MSL sends all hospitals and DHMTs a list of the items they have in stock. The kit system distributes two different kits, one for health centers and one for CHWs, each 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 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 anti-retroviral drugs, which was set up with support from JSI/Deliver through PEPFAR. Other assessments of availability and stockout times of first-line antimalarials as well as anecdotal evidence from informants interviewed suggest that stockouts of antimalarials in hospitals and health centers are fairly common. Stockouts of malaria medications appear to be less common in the past year but no specific data are available. The recent quantification exercise and inventory (April 2008) suggest the pipeline for the 15-24 kg AL dose is only three months from being stocked out.

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 developed guidelines. PRA has not been able to effectively perform the pharmacovigilance functions because of financial and human resource constraints. The WHO has also conducted at least one training workshop in pharmacovigilance specifically for antimalarial drugs.

Malaria Treatment: Approximately 4.3 million cases of malaria were reported through the Zambian HMIS in 2007. This is almost certainly an underestimate since many patients seek care from community and private sector sources which do not report through the HMIS. Zambia was the first country in tropical Africa to adopt ACT with AL for first-line treatment of malaria (chloroquine was used previously).

While Zambian policy recommends AL as first-line treatment of malaria, there are some situations where SP is still being used as first-line treatment. Because of the lack of safety data and/or appropriate dosing formulations of AL, SP is still recommended as the first-line treatment for uncomplicated malaria in children under five kg and pregnant women in their 1st trimester. SP, which is also used routinely for IPTp, is an alternative first-line treatment in patients who cannot tolerate AL or where AL is unavailable. The barrier to using AL as a first-line drug is largely due to stockouts and, in some instances, the need for more provider training. PMI will continue to work with the NMCC to encourage use of AL as first-line treatment of malaria in non-pregnant persons, children over 5 kg, and women in their 2nd and 3rd trimesters of pregnancy.

Although training and initial supplies of ACTs have been rolled out in all 72 districts, availability of first-line treatment has been limited by inadequate forecasting, procurement, and stocks management practices. The 2006 MIS found that 13% of children under five years old with a febrile illness received AL. This proportion decreased to 8% in the 2008 MIS. Of those children treated with an anti-malarial, twenty-one percent received SP, and 13% received AL (Coartem[®]). It is expected that in 2009 the Global Fund will procure 7.1 million AL treatments and that PMI will purchase 400,000 AL treatment courses. The challenge to making ACTs available in health facilities is to improve the forecasting and distribution of ACTs via the national logistics and pharmaceutical system.

Provider training has been provided on the proper use of AL, but refresher training is needed. The broadest coverage of training activities has probably been achieved through MOH/NMCC-supported training workshops at the provincial level. Additional trainings also occurred at the district level earlier in the phased introduction of AL. However, resources for refresher training and supportive supervision from district and provincial officials are still inadequate.

Treatment of Severe Malaria: The MOH/NMCC treatment guidelines recommend parenteral quinine as the drug of choice for severe malaria and that children identified at peripheral levels of the health system should be given pre-referral treatment with intramuscular quinine and referred to a hospital or zonal health center equipped to manage severe malaria on an inpatient basis. The IMCI guidelines recommend that children with very severe febrile illness

or severe pneumonia classifications should also receive parenteral quinine and broad spectrum antibiotics, preferably penicillin and gentamycin, both for pre-referral and definitive treatment. Although intramuscular artemether and rectal artesunate are registered in Zambia and available at urban pharmacies and some private clinical providers, their role is not specifically addressed in the treatment guidelines.

The MOH/NMCC 2008 Action Plan calls for improving the management of severe malaria by training health care workers on danger signs of severe malaria and triage, emergency assessment and treatment.

Malaria Treatment in the Community and Private Sector: Use of the formal and informal private sector for malaria treatment in Zambia is common, especially in the larger towns and cities, where private health facilities and pharmacies operate and publicly procured AL has not been made available to them. These providers, including private for-profit health facilities, were informed of the change in first-line treatment, and chloroquine was effectively phased out of wide-scale use. Currently, commercial preparations of AL can retail at up to \$10.00 or more per complete adult treatment. A variety of alternative more affordable antimalarial drugs are available in private pharmacies including quinine, SP, and artemisinin monotherapies. The MOH/NMCC and DfID with the World Bank have proposed initiatives to incorporate a subsidized AL product into the private-for profit health sector in urban areas as proposed by the Affordable Medicine Facility for malaria (AMFm). A DfID/World Bank funded pilot will assess the viability of this approach in the coming year in 24 districts. No funds from PMI will be used for this pilot.

A volunteer CHW workforce has been active in Zambia since the 1970s. In addition to providing preventive services and community mobilization, CHWs are supplied with essential medicines kits. The MOH/NMCC and partners are convinced that providing AL in health facilities alone will not achieve high enough coverage of prompt effective first-line treatment, especially in remote communities. The MOH/NMCC plans to introduce AL into CHW kits in a coordinated effort with the expansion of community IMCI. The strategic plan calls for CHWs to provide AL after performing a malaria RDT. 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. Currently a study by Boston University in Chikankata is looking at the use of ACTs, RDTs and amoxicillin by CHWs in caring for febrile children <5 years old. This is funded by USAID/Washington core funds. The NMCC is also conducting pilots in Livingstone (with support from the Malaria Consortium) and Milenge Districts looking at the use of RDTs and ACTs by CHWs. It is planned to increase this pilot to a total of nine districts in 2008.

Proposed USG Component: (\$2,428,000)

The MOH/NMCC has specifically prioritized technical support for case management as an area that PMI should address. In the second year of the PMI, the program will focus on increasing prompt and effective treatment for uncomplicated malaria at the health facility level. In later years, PMI will consider supporting efforts to provide malaria treatment at the community-level and in the private sector and improving the treatment of severe malaria. There may be a small shortfall in ACT procurement despite expected Global Fund support

because of the timing of arrival of funds and procurement. Additionally, there is still a need to strengthen the supply chain and logistics management systems. Since anti-malarials, RDTs and other laboratory supplies are part of the essential drug system, building a robust logistics and supply management system will help prevent future stock-outs. Currently, Zambia has a 'push' system with little or no inventory management. PMI is already working with the World Bank and DFID to make improvements in the system that will be sustainable. An early outcome of this collaboration is a quantification and forecasting exercise which will continue with pilots of novel approaches to improve the essential drug system, with the ultimate objective of developing a unified system, in conjunction with the MOH and its partners. JSI/DELIVER is in the process of developing a monitoring and evaluation plan with relevant indicators to track ACTs and RDTs right down to the health facility level as part of the proposed end-use verification/monitoring of availability of key anti-malarial commodities at facility level. The PMI will respond to these needs by:

- Procuring supplemental supplies of AL to partially offset projected shortfalls of 3,000,000 treatment courses based on planned procurements through Global Fund and other sources and ensure that ACTs are available at rural health centers (\$400,000);
- Supporting refresher training and supervision at rural health centers, including support to MOH/NMCC to complete an initial assessment of provider training needs, develop and test appropriate training materials and job aids, design and implement a comprehensive training curriculum in support of malaria treatment; assist MOH/NMCC to evaluate and revise materials for the supportive supervision of health care providers who diagnose and treat malaria; and especially support diagnosis and treatment of children with possible malaria including training of health care providers in the treatment of pediatric malaria (\$770,000);
- Working with other partners to provide assistance to the MOH/NMCC to strengthen the national logistics and pharmaceutical management system for antimalarial drugs and laboratory supplies. This will include assistance and advice related to (\$1,000,000):
 - forecasting of antimalarial drug and RDT needs and gaps;
 - importing, quality control, storage, distribution, and inventory management down to the health facility level;
 - improving feedback and reporting on consumption/stocks from health facility to district and higher levels;
 - monitoring of implementation/evaluation of coverage; and
 - end-use verification/monitoring of availability of key antimalarial commodities at the facility level. Specifically, this will entail regular supervisory/monitoring visits to a random sampling of health facilities and regional warehouses to detect and trigger further action on the following critical areas: ACT (or other drug) stockouts; expiration dates of ACTs at health facilities; leakage; anomalies in ACT use; and verifying quantification/consumption assumptions.
- Supporting a national IEC/BCC campaign to improve the proportion of children with suspected malaria who seek and receive effective diagnosis and appropriate ACT promptly through radio and TV ads, print media, and community interpersonal approaches such as community drama (integrated campaign covering ITNs, ACTs, and IPTp) (\$100,000);

- Supporting NGOs and FBOs that work at the community-level through interpersonal and community-based approaches to encourage seeking ACT treatment within 24 hours of fever (integrated campaign covering ITNs, ACTs, and IPTp) that is consistent with the nationwide media campaign and other efforts of the MOH/NMCC (\$137,000);
- Complete the study to demonstrate the effectiveness and feasibility of integrated management of fever (malaria and pneumonia) at the community level using CHWs with the aid of RDTs and treatment drugs. The Zambia Integrated Management of Malaria and Pneumonia Study (ZIMMAPS) of Boston University and the MOH/NMCC Operations Research Unit should end in late 2008 (no additional funds will be required).

HIV/AIDS and MALARIA

Current Status, Challenges, and Needs

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

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

This strategic plan is supported by PEPFAR, Global Fund and other donors. PEPFAR is specifically supporting the prevention, care, and treatment of people living with HIV/AIDS through a multi-sectoral approach. In 2006, the PEPFAR program had \$149 million for this effort. As mandated by the U.S. Congress, PEPFAR funding is broken down approximately in the following manner: 55% for treatment, 15% for palliative care, 20% for prevention, and 10% for orphans and vulnerable children. Zambia also has a Round 1 and Round 4 HIV/AIDS Global Fund grants, totaling \$116 million, of which \$81 million has been dispersed.

In light of the potential interaction between HIV/AIDS and malaria and the overlap in target populations, the MOH recognizes the need for the NMCC and NAC to coordinate. The NMCC Strategic Plan notes that, particularly at the district and community level, existing networks of HIV/AIDS home-based care networks should be utilized. The LLIN distribution program launched by the World Vision-led consortium of home-based care NGOs, mentioned in the ITN section, is an example of such coordination. This program leverages existing structures to effectively distribute LLINs.

The PMI/PEPFAR teams will also work closely together in other areas of programmatic overlap. The JSI/Deliver, which is examining supply chain issues for ACTs and RDTs, is

evaluating the utility of the current ARV and HIV rapid test supply chain system as a possible option for distribution of ACTs and RDTs. It is expected that a unified delivery system will result from funding improvements in the essential drug system. In terms of monitoring and evaluation, the Smart Card is a PEPFAR-supported activity that has the potential to create a national medical record for patients with HIV/AIDS. A malaria module is being developed that will hopefully be in place in 2009 and make patient-level data available for monitoring and evaluation purposes. As sentinel surveillance activities have evolved, the Smart Card is a potential approach to obtaining patient-level data at a select number of health care facilities that routine sentinel surveillance will not provide. No PMI funds will be used for the Smart Card program. Future areas for collaboration include FANC, monitoring and evaluation, and diagnostics.

Progress to Date

The ANC services incorporate both HIV/AIDS and malaria services. Both PMI and PEPFAR have provided technical support, training, and supplies to improve the quality and uptake of ANC services. Specifically, PMI supports IPTp, procurement and distribution of ITNs to pregnant women through the MIP program, and improved detection and case management of malaria in infants and young children. The PEPFAR supports improvement of ANC for PMTCT as well as infant follow-up, early HIV/AIDS diagnosis, and linkages to care and treatment.

Through the above-mentioned World Vision-led consortium of home-based care NGOs, in 2007 approximately 500,000 LLINs were distributed by 15,000 caregivers in 52 of the 72 districts. Distribution of LLINs benefited not only people living with HIV/AIDS but other households affected by HIV/AIDS that the community deems vulnerable. The NMCC plans to provide LLINs directly to World Vision to continue this activity.

Proposed FY 2009 Activities: (no additional cost to PMI)

- Continue LLIN distribution for people living with HIV through the NMCC's equity program funded by the Global Fund¹.
- Incorporate malaria intervention IEC/BCC in activities of the HIV home-based care NGOs in support of the NMCC's equity program.
- Continue collaborative activities in ANC services.
- Provide technical assistance as needed to assist in development of the Smart Card malaria module. This activity is fully funded by PEPFAR.

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

The NMCC is a department under the directorate of Public Health and Research of the MOH that provides technical and management oversight of all public health facilities, as well as

¹ 2008 National Malaria Control Action Plan. Actions for Scale-Up for Impact on Malaria in Zambia.

supporting and coordinating a wide range of partners, including research and training institutions. There are 33 posts within the NMCC, including a Case Management Officer, Chief Entomologist, Chief Parasitologist, Malaria Epidemiologist, IEC, IRS, and ITN officers, a Medical Laboratory Technologist, and an Operational Research Officer. At the provincial and district level, Provincial Health Offices serve as an extension of the MOH, while the DHMTs have the fiscal authority to manage the district health centers, and are the main implementers of the IRS program.

The NMCC central staff is committed to scaling-up malaria control and prevention activities; however, they are overstretched and need further support to effectively supervise district-level activities and effectively coordinate the many partners contributing to malaria efforts in Zambia. In particular, the NMCC and partners recognize its need for additional staff to support coordination of IRS activities and advocacy and outreach efforts. As a result, MACEPA and PMI will assist with 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.

The PMI/Zambia team has been providing technical assistance and capacity building at the NMCC including M&E and the sentinel site-based Malaria Information System. The time spent at NMCC will increase as office space becomes available within the coming year. The NMCC is also attempting to hire additional staff to support M & E efforts. The PMI/Zambia team will continue to work closely with the Surveillance and Information Coordinator to help build capacity in M & E.

The NGO current partners implementing for IEC/BCC, health delivery and systems strengthening, and social marketing activities will be recompeted and awarded in 2009. The new partners will be encouraged to form close partnerships with civil society organizations, including non-governmental organizations, community-based organizations, and faith-based groups in order to scale up the delivery of high-quality malaria prevention and treatment interventions.

Proposed USG Component: (no additional cost to PMI)

- Work with other partners to ensure that continued support is provided to the NMCC to increase staff available to support efforts in critical areas as well as conduct supervisory activities at the district level. Resident Advisors to spend significant time at NMCC to assist in capacity building.

COMMUNICATION AND COORDINATION

The MOH/NMCC and its collaborating partners maintain regular communications and coordinate efforts through routine partners' meetings and technical working groups around support for specific interventions or activities. All partners contributed to the development of the Five-Year Strategic Plan and annual Action Plans. These mechanisms are functioning well in Zambia and provide a good forum for coordinating ongoing and new activities supported by USG funds through PMI with other GRZ activities. In October 2007, MOH/NMCC

convened its partners to review progress on the 2007 Malaria Action Plan that resulted in a Progress Report with recommendations. A second partner meeting occurred in December 2007 to prioritize activities, identify gaps in funding, and develop the 2008 National Malaria Control Action Plan. This year the NMCC took advantage of the MOP planning visit to again call together partners and start planning for 2009. Also in 2008, the NMCC coordinator has asked a small group of key partners (WHO, UNICEF, MACEPA, World Bank, and PMI) to meet with her monthly to help guide the development of the next Three Year Malaria Business Plan.

The sector-wide approach (SWAp) in Zambia is the key coordinating mechanism in the health sector. The SWAp mechanisms include both written agreements on roles and responsibilities as well as an agreed-upon set of consultative meetings at various levels throughout the calendar year. In June 2006 the MOH signed a Memorandum of Understanding with Cooperating Partners, including USAID, to maximize opportunities for harmonization and alignment in the sector. This and other documents lay out principles of GRZ-CP partnership, health sector coordination, and regular Cooperating Partners and GRZ-Partners' 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 CP and the MOH. The MOH Donor Coordinator is invited to and attends, where possible, all key Partners' meetings in the sector. The CPs meet monthly to discuss issues of mutual interest and share information. Since 2004, Health Sector partners have annually selected one Partner to act as a focal point for Partners' coordination in the sector. The coordination has included a three-partner mechanism (WHO, DfID, and the Swedish International Development Agency) where the past, present and future Coordinators have regularly communicated, ensuring continuity and spreading the load of coordination. WHO is the lead Coordinator in 2008. In FY 2009 no PMI funds will be used to support the district basket or pooled funding.

PRIVATE SECTOR PARTNERSHIPS

The NMCC has established that sustainability of programs is central to their overall strategy in combating malaria. In this regard in 2008 and continuing in 2009 the NMCC is expanding and strengthening employee based schemes through the Zambia Business Coalition Against Malaria program. In addition, commercial sales of ITNs that are not subsidized are still an integral part of the ITN distribution program. The PMI is firmly supportive of the 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 Copper Mines in the Copperbelt and Zambia Sugar Company in Southern Province on the planning, implementation, monitoring and evaluation of IRS activities. PMI through HSSP has provided technical support to NMCC to coordinate the training and monitoring of spray operations for all IRS areas including those covered by the private sector.

MONITORING AND EVALUATION PLAN

Current Status, Challenges, and Needs

The MOH/NMCC and partners have developed a National Malaria Prevention and Control Monitoring and Evaluation Plan for 2006-2011, which establishes clear goals, objectives, and indicators for program monitoring and evaluation. Other partners already cover most of the costs of monitoring and evaluation. The PMI's key evaluation indicators for coverage of malaria control interventions and all cause child mortality can be tracked through existing plans of MOH/NMCC and partners which include Malaria Indicators Surveys in 2006, 2008, and 2010, and the Demographic and Health Survey (DHS) completed in 2007. Because these surveys are already planned and supported, MOH/NMCC has requested PMI support in developing, implementing, and maintaining more routine systems for effective monitoring of malaria control activities.

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

1. The National HMIS is a comprehensive MOH system that reports on information quarterly from all public and mission health facilities and some private facilities. Information is collected on reported cases of malaria, malaria case fatality rate (in hospitals), and stocks of medicines and supplies. Information flows from the health facility to the district and provincial level before being transmitted to the HMIS group within the MOH. In 2006, a major assessment of the HMIS funded by the European Union found that while it was functional at all levels of the health system and that data collection and reporting tools are in place in all health facilities and district offices, the quality of data is not checked, reporting tends to be irregular, and most staff are not adequately trained in HMIS procedures. This has resulted in a lack of confidence in the data reported by the HMIS and the development of parallel systems for diseases, such as malaria and HIV/AIDS. Following this assessment, the European Union committed considerable financial and technical support to strengthening the HMIS under a three-year plan of action. Roll-out of the revised HMIS started in late 2007, but will not be fully operational until sometime in late 2009;
2. Because of weaknesses in the HMIS reporting at the district level, the Integrated Disease Surveillance and Response (IDSR) system was instituted in 2006 in all 72 districts to provide monthly information on notifiable diseases. This data collection system has also been modified to report on additional malaria indicators, including antimalarial drug and ITN stocks, the percentage of pregnant women and children under five who slept under a bed net the previous night, and the percentage of children under five with fever who received appropriate antimalarial treatment within the last 24 hours. This interim measure will come to an end when the revised HMIS is fully operational; and
3. The Malaria Information System was established by the MOH/NMCC in 2000 because of the weaknesses and lack of some malaria-specific information from the HMIS. This sentinel malaria surveillance system operates in all health facilities in ten largely rural districts (with one in each of the nine provinces) and reports on a monthly basis on malaria cases confirmed by laboratory test, cases of anemia in children under five, malaria in pregnancy, children and pregnant women sleeping under an ITN, and stock outs of antimalarial drugs. The MOH/NMCC acknowledges that the quality and

regularity of reporting under this system is quite variable from site to site. Since 2005, the Global Fund has provided some of the funding for this system.

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

This upgraded reporting system will take advantage of existing data flow for facility-based reporting through DHMTs. The roll out of this will be completed by the end of 2008. Between 2007 and 2009, while the National *HMIS* is being revised and upgraded, the existing Malaria Information System will continue to provide monthly information. Data will be collated, analyzed, and reported by district. In addition, the NMCC will produce an annual report on the progress of malaria prevention and control operations.

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

Evaluation: The major sources of information for evaluation of malaria prevention and control activities in Zambia are nationally-representative surveys, such as the DHS and the MIS, which are performed every two to five years. The last DHS was conducted in 2007 and complete results will be available in late 2008. This survey had a malaria module and covered the last month or two of the malaria transmission season and the initial months of the post-transmission period; this 2007 DHS provides the baseline estimates of all-cause under-five mortality. A nationwide MIS carried out in 2006 provided baseline information on the coverage of the four major malaria interventions, malaria parasite prevalence, and the prevalence of anemia. The MIS conducted April-May 2008 provides the most up-to-date information for these indicators. Both the MIS (2006 and 2008) and the DHS (2007) will provide coverage estimates to be used for PMI evaluation in Zambia.

In addition to these standardized nationwide surveys, a variety of other, usually smaller, surveys and evaluations have been carried out over the past five years that provide useful information for the NMCC. These include health facility surveys to assess health worker

performance and the quality of health care, availability of health guidelines, personnel, and equipment, and household surveys to assess knowledge, attitudes, and practices related to malaria, malaria parasite prevalence, and the prevalence of anemia. As part of routine supervisory visits to MOH facilities, checklists are also completed on health worker performance and other technical aspects of health care. These forms are forwarded to higher levels of the MOH, but the information they provide is not systematically tabulated or disseminated.

Zambia is one of the in-depth focus countries in Africa for the impact evaluation for malaria, HIV/AIDS, and TB which the Global Fund is conducting with other partners (WHO, MACEPA, UNICEF). Work on this began in 2007 and data analysis and writing are currently underway. A report of these results will be available for the GF Board meeting in November. The country now has an "Impact Evaluation Platform" which has been set up for the evaluation and is expected to continue after the present evaluation.

Progress to Date

The 2008 MIS was conducted in April-May 2008. Although PMI support for the 2008 MIS was not originally planned for FY2008, \$100,000 was made available to complete this survey in order to measure PMI progress towards its targets. The MIS data includes estimates of the coverage of malaria control interventions, and estimates of anemia and parasitemia in children <5 years old. A detailed report of the results of the 2008 MIS is expected to be completed in September 2008.

Although other funding agencies support surveys such as the MIS and DHS that can provide information to demonstrate progress towards PMI targets, data from these surveys are available only every two to three years, or less frequently. Comparable data will not be available until the next MIS in 2010 and the next DHS in 2012. In order to advocate for malaria control resources, more timely information is needed that reflect immediate progress towards PMI goals. Through PMI funding, plans are underway for enhanced health facility surveillance using several health facilities as sentinel sites with the goal of having useful data by January 2009. This sentinel site surveillance will provide facility-specific, real-time information. Through discussions with the NMCC and the implementing partner, sentinel sites will be chosen in existing Malaria Information System sentinel districts. Next steps include the development of a health facility surveillance plan with the intention of incorporating this system into pre-existing data collection systems such as those used by the Malaria Information System.

Proposed USG Component: (\$300,000)

The MOH/NMCC and its partners have made excellent progress during the past two to three years in developing the National Malaria Monitoring and Evaluation Plan 2006-2011, a unified plan for malaria program monitoring at the community, health facility, and district levels. This plan is well funded by other partners such as MACEPA and World Bank, and has provided good quality, up-to-date information related to coverage of all major malaria prevention and treatment measures through the 2008 MIS. Complete results from a 2007 DHS survey with a malaria module are expected to be released in December 2008.

Nationwide information on coverage with ITN, IPTp, and ACTs will be obtained from periodic, large-scale surveys, such as the DHS and MIS. To complement these data, hemoglobin levels in pregnant women and children under five and malaria parasitemia in a sample of children under five will also be measured during the survey. The number of houses in areas targeted by the MOH/NMCC for IRS in Zambia during Year Two will depend on the detailed mapping of provinces and districts where spraying will be conducted in 2009. Once that information is available, the proportion of targeted houses that were sprayed can be calculated from IRS weekly and monthly field records.

The PMI support will build upon and complement what has already been developed and accomplished by the NMCC and its partners, and will fill identified gaps in the MOH/NMCC Plan. Although PMI and NMCC coverage targets differ slightly (85% vs. 80%), this is not a major issue. The surveys currently in place are sufficient to examine progress towards PMI targets over the course of a few years, but support is needed to integrate a health facility surveillance system within existing systems to provide more timely information. In 2008, TDRC will work with the NMCC to develop 20 sentinel sites (two in each of the existing ten sentinel districts). After consultation with the MOH/ NMCC staff and other partners, the PMI proposes to support the MOH/NMCC's monitoring and evaluation efforts by:

- Completing the development of a health-facility based sentinel site surveillance system that will be integrated into the current Malaria Information System. PMI funds will go towards strengthening the performance and quality of data collection, reporting, analysis, and dissemination from the existing ten sentinel districts that comprise the Malaria Information System. This support will include development of 20 sentinel sites within these districts to participate in health facility surveillance activities. This funding will support two full time staff to travel and provide supervision as well as support data clean up and merging of data from each site. Expected outcomes of this investment is a fully running sentinel site surveillance system led by the NMCC and TDRC that provides reliable, monthly data on progress towards the NMSP and PMI goals to the NMCC and the PMI team. These data are expected to be used to make data-driven programmatic decisions. (\$300,000).

STAFFING AND ADMINISTRATION

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

These two PMI professional staff work together to oversee all technical and administrative aspects of the PMI, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, and reporting of results. Both staff members report to the USAID health team leader. The CDC staff person is supervised by CDC both technically and administratively. All technical activities are undertaken in close coordination with the MOH/NMCC and other national and international partners, including the WHO, UNICEF, the Global Fund, World Bank, and the private sector.

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

Table 2

**President's Malaria Initiative - Zambia
Planned Obligations for FY09 (\$14,700,000)**

| Proposed Activity | | Budget (commodities) | Geographic Area | Description of Activity | Page Number Reference |
|---|----------------------------|---------------------------------|----------------------------|--|--------------------------------------|
| PREVENTIVE ACTIVITIES | | | | | |
| ITNs | | | | | |
| Procurement of LLINs | DELIVER Task Order #3 | 2,400 (2,400) | National | Procure approximately 400,000 LLINs for distribution through the ANC/EPI Program | 22 |
| LLIN Distribution | Social Marketing follow-on | 500 | National | Distribution and promotion of LLINs, including transportation and other logistics | 22 |
| National IEC//BCC for net usage ¹ | BCC follow-on | 200 | National | National IEC/BCC campaign to increase net usage | 22 |
| Community IEC/BCC for net usage | BCC follow-on | 313 | National | Community-based IEC/BCC campaign through NGOs/FBOs | 22 |
| Community IEC/BCC for net usage | Peace Corps | 13 | National | Community-based IEC/BCC to promote correct net usage | 22 |
| Operations research on durability and longevity of ITNs | CDC | 50 | National | Operations research to determine insecticide efficacy and net durability under normal use conditions | 22 |
| IRS | | | | | |
| Procurement of IRS-related | RTI | 3,400 | 15 districts | Procure insecticides (Icon and Fendona,) | 26 |

¹ National IEC/BCC and community IEC/BCC activities are integrated across prevention, treatment, and malaria in pregnancy activities. These activities will include comprehensive national media as well as household-level efforts to promote demand for, and correct use of, ITNs, ACTs, and IPTp. The activities are broken down in this table and throughout this document for the purposes of presenting financial investments by intervention area. The total investment in NGOs/FBOs for this activity is shown below under Capacity Building.

| Proposed Activity | | Budget (commodities) | Geographic Area | Description of Activity | Page Number Reference |
|--|--|--------------------------|--|--|-----------------------------|
| commodities ¹ | | (3,400) | | and other IRS supplies/equipment | |
| Implementation of IRS program, monitoring and evaluation, environmental assessment, storage/incinerator ² | HSSP and Health Delivery & Systems follow on | 2,100 | 15 districts | Training, monitoring and evaluation, and IEC for IRS; environmental assessment, entomological monitoring, pesticide (DDT) storage, waste disposal | 26 |
| IPTp | | | | | |
| Strengthening of FANC for IPTp | Health Delivery & Systems follow-on | 550 | 5 Provinces | Strengthen FANC in existing two provinces and expanding to three more, where IPTp uptake is low (training, coordination with PEPFAR where appropriate) | 31 |
| National IEC//BCC to increase demand for IPTp | BCC follow-on | 100 | National | National IEC/BCC campaign to increase ANC attendance and demand for IPTp | 31 |
| Community IEC/BCC to increase IPTp demand | BCC follow-on | 137 | National | Community-based IEC/BCC campaign through NGOs/FBOs | 31 |
| Community IEC/BCC to increase IPTp demand | Peace Corps | 12 | National | Community-based IEC/BCC | 31 |
| Complete SP efficacy in pregnant women OR study | TDRC | 50 | Selected district with input from NMCC | SP efficacy study | 31 |
| SUBTOTAL: Preventive | | 9,825 (5,800) | | | |
| CASE MANAGEMENT ACTIVITIES | | | | | |

¹ PMI will contribute \$3,400,000 for the procurement of IRS commodities. Other donors, such as the World Bank and Global Fund, as well as the Zambian Government, are expected to contribute to the expansion of the IRS program that will go beyond the 15 original districts.

² PMI will contribute \$2,100,000 to implementation costs of the IRS program. Other donors, such as the World Bank and Global Fund, as well as the Zambian Government, are expected to contribute to these non-commodity costs as well in order to fully support Zambia's 15-district IRS program.

| Proposed Activity | | Budget (commodities) | Geographic Area | Description of Activity | Page Number Reference |
|--|--|---------------------------------|----------------------------|---|--------------------------------------|
| Diagnosis | | | | | |
| Procure rapid diagnostic tests | DELIVER Task Order #3 | 400 (400) | National | Procure approximately 550,000 RDTs for use in health facilities | 35 |
| Strengthen malaria diagnostic capabilities at the health center level | IMaD | 300 | National | Review of guidance and use of diagnostic procedures, development and implementation of plan for quality assurance of lab diagnosis, quantification, training | 35 |
| Pharmaceutical Management and Treatment | | | | | |
| ACT procurement | DELIVER Task Order #3 | 400 (400) | National | Procurement of <i>Coartem</i> | 41 |
| Strengthen facility- and community-based treatment with ACTs | Health Delivery & Systems follow-on | 770 | National | Training, supervision support, to improve service delivery in health facilities including treatment of pediatric malaria, and to assist with roll-out into communities through CHWs | 41 |
| Strengthen the national logistics and pharmaceutical management system for malaria commodities | DELIVER Task Order #3 | 1,000 | National | Strengthen supply chain and logistics for all malaria commodities and essential drugs, including Pharmaceutical Regulatory Authority | 41 |
| National IEC/BCC for ACT usage | BCC follow-on | 100 | National | National IEC/ BCC campaign to increase ACT usage | 41 |
| Community IEC/BCC for ACT usage | BCC follow-on | 137 | National | Community-based IEC/BCC campaign through NGOs/FBOs | 42 |
| SUBTOTAL: Case Management | | 3,107 (800) | | | |
| MONITORING AND EVALUATION | | | | | |
| Strengthen Sentinel Sites for | TDRC | 300 | 10 sites | Strengthen performance and quality of | 49 |

| Proposed Activity | | Budget (commodities) | Geographic Area | Description of Activity | Page Number Reference |
|--|-------|---------------------------------|--|--|--------------------------------------|
| monitoring malaria morbidity and mortality | | | | data collection, reporting, analysis, and dissemination (hospital and outpatient data on malaria-related cases and fatalities) | |
| SUBTOTAL: M&E | | 300 (0) | | | |
| IN-COUNTRY MANAGEMENT AND ADMINISTRATION | | | | | |
| USAID staff and associated administrative expenses | USAID | 407 | N/A | Support for USAID resident PMI advisor, includes all logistical expenses, salary, and benefits. | 49 |
| CDC staff and associated administrative expenses | CDC | 563 | N/A | Support for CDC resident PMI advisor, includes all logistical expenses, salary, and benefits. | 49 |
| FSN staff and other in-country administrative expenses | USAID | 445 | 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. | 49 |
| Technical assistance visits | CDC | 53 | N/A | Short term TA from CDC for entomology, M&E and OR | 58 |
| SUBTOTAL: Management. and Administration | | 1,468 (0) | | | |
| GRAND TOTAL | | 14,700 (6,600) | <i>Commodities represent 45% of total budget</i> | | |

Table 3
President's Malaria Initiative – Zambia
Year 2 (FY09) Budget Breakdown by Intervention (\$14,700,000)

| Area | Commodities \$ (%) | Other \$ (%) | Total \$ |
|-----------------------------------|--------------------|--------------------|---------------|
| Insecticide-treated Nets | 2,400 (69%) | 1,076 (31%) | 3,476 |
| Indoor Residual Spraying | 3,400 (62%) | 2,100 (38%) | 5,500 |
| Case Management | 800 (26%) | 2,307 (74%) | 3,107 |
| Intermittent Preventive Treatment | 0 (0%) | 849 (100%) | 849 |
| Monitoring and Evaluation | 0 (0%) | 300 (100%) | 300 |
| Administration | 0 (0%) | 1,468 (100%) | 1,468 |
| Total | 6,600 (45%) | 8,100 (55%) | 14,700 |

Table 4**Year 2 (FY09) Budget Breakdown by Partner (\$14,700,000)**

(Once the FY09 Implementation Plan is approved and contracts/grants cooperative agreements awarded, all other partners will be listed here)

| Partner Organization | Geographic Area | Activity | Budget |
|--|------------------------|--|---------------|
| DELIVER | National | Procurement of LLINs | 2,400 |
| | | Procurement of RDTs | 400 |
| | | Procurement of AL | 400 |
| | | Strengthening supply chain management | 1,000 |
| RTI | 15 districts | Procurement of IRS-related commodities | 3,400 |
| BCC follow-on with sub-grants to NGOs/FBOs | National | National IEC/BCC Campaigns: ITNs, ACTs, IPTp | 400 |
| | | Community IEC/BCC | 587 |
| TDRC | Selected districts | Operations research: SP efficacy in pregnant women | 50 |
| | Twenty sites | Strengthen/expand sentinel sites | 300 |
| Social Marketing follow-on | National | Routine distribution of LLINs through ANC | 500 |
| Health Delivery & Systems follow-on | National | Facility- and community-based health worker training, supervision and roll-out | 770 |
| | 5 Provinces | Strengthening of FANC in two provinces and expanding to five, where IPTp uptake is low and | 550 |
| HSSP | 15 districts | Support for IRS implementation | 2,100 |
| IMaD | National | Strengthen diagnostics quantification, laboratory workers' training | 300 |
| Peace Corps | National | Community IEC/BCC for ITNs and IPTp | 25 |
| Staffing & Admin | National | Staffing + CDC TDYs and TA including the net bioassay and durability study | 1,518 |