

PRESIDENT'S MALARIA INITIATIVE
Malaria Operational Plan — Year Three (FY08)

ANGOLA

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ABBREVIATIONS

ACT — artemisinin-based combination therapy
AL — artemether-lumefantrine
ANC — antenatal clinic
AQ — amodiaquine
AS — artesunate
CDC — Centers for Disease Control and Prevention
DDT — dichloro-diphenyl-trichloroethane
FBO — faith-based organization
Global Fund — Global Fund to Fight AIDS, Tuberculosis, and Malaria
GRA — Government of Republic of Angola
IEC — information, education, communication
IMCI — integrated management of childhood illnesses
IPTp — intermittent preventive treatment for pregnant women
IRS — indoor residual spraying
ITN — insecticide-treated net
JICA — Japanese International Cooperation Agency
LLIN — long-lasting insecticide-treated net
MERG — Monitoring and Evaluation Reference Group
MESST — Monitoring and Evaluation System Strengthening Tool
MICS — Multiple Indicator Cluster Survey
MIS — Malaria Indicator Survey
MoH — Ministry of Health
NEDP — National Essential Drug Program
NMCP — National Malaria Control Program
NGO — non-governmental organization
OVC — orphans and vulnerable children
PMI — President’s Malaria Initiative
PMTCT — prevention of mother to child transmission
PSI — Population Services International
PVO — private voluntary organization
RBM — Roll Back Malaria
RDT — rapid diagnostic test
RFA — request for application
RTI — Research Triangle Institute International
SP — sulfadoxine-pyrimethamine
UNDP — United Nations Development Program
UNICEF — United Nations Children’s Fund
USAID — United States Agency for International Development
USG — United States Government
WHO — World Health Organization

EXECUTIVE SUMMARY

In June 2005, Angola was selected as one of the first three countries in the President's Malaria Initiative (PMI). The goal of this Initiative is to rapidly scale up malaria prevention and treatment interventions in 15 high-burden sub-Saharan African countries and reduce malaria mortality by 50% by 2010.

Implementation of large-scale malaria control activities in Angola faces serious challenges. Angola's health infrastructure was severely damaged during the civil war and it is estimated that only about 30% of the population has access to government health facilities. Malaria is a major health problem, accounting for an estimated 35% of the overall mortality in children under five, 25% of maternal mortality, and 60% of hospital admissions for children under five. Malaria transmission is highest in northern Angola, while southern provinces have highly seasonal or epidemic malaria.

The most up-to-date information about nationwide coverage of key malaria prevention and control measures comes from a Malaria Indicator Survey conducted in 2,566 households between November 2006 and April 2007. According to this survey, 28% of households nationwide owned one or more insecticide-treated nets (ITNs), and 18% of children under five and 20% of pregnant women had slept under an ITN the night before the survey. The proportion of children under five with fever treated with artemisinin-based combination therapy (ACT) within 24 hours of the onset of illness and the proportion of pregnant women receiving two doses of intermittent preventive treatment (IPTp) were 1.5% and 2.5%, respectively, but it should be noted that both of these interventions were only adopted in 2005 and have not yet been implemented nationwide. Before the PMI-supported indoor residual spraying (IRS) campaigns in southern Angola in 2006 and 2007, no large scale IRS had been carried out in Angola for more than 10 years.

Angola is finishing Phase I of a 3-year, \$38 million malaria grant from the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund). A decision on a third year (Phase II) is expected in September 2007. Angola has submitted a Round 7 grant proposal of \$78 million over five years. UNICEF and the World Health Organization have been major sources of technical assistance to the National Malaria Control Program (NMCP). An effective partnership with ExxonMobil has resulted in a \$1 million grant to USAID to further PMI objectives in Angola in both 2006 and 2007.

Proposed Year 2 results and progress thus far are shown in the following table:

Proposed Year 2 Results	Expected Results After 2 Years of Implementation (March 2008)
A total of 1.2 million <u>additional</u> LLINs will have been distributed by partners to families with children under five and/or pregnant women.	As of 1 September 2007, 967,000 LLINs had been distributed by partners. PMI is procuring an additional 270,000 LLINs. This activity is on track to meet its target.
Approximately 700,000 residents (140,000 houses) of 3 southern provinces will have been protected by IRS.	613,000 residents (110,000 houses) had been protected by IRS in 3 southern provinces. More than 85% of houses targeted for IRS were sprayed.

Proposed Year 2 Results (cont)	Expected Results After 2 Years of Implementation (March 2008) (cont)
ACTs will have been implemented in all 59 MoH priority municipalities.	2.1 million (1.1 million by PMI) artemether-lumefantrine treatments procured. As of 1 September 2007, ACT implementation is underway in 107 (65%) of the 164 municipalities in the country.
IPTp with sulfadoxine-pyrimethamine (SP) will have been implemented in all 59 MoH priority municipalities.	Sufficient stocks of SP for IPTp already in country; as of 1 September 2007, IPTp implementation is underway in 107 (65%) of the 164 municipalities in the country.

The Year 3 PMI Malaria Operational Plan for Angola was based on progress and experiences from Years 1 and 2, and a planning visit carried out in June 2007 by representatives from USAID, the Centers for Disease Control and Prevention (CDC), and the Angolan NMCP with participation of other major partners working on malaria in country. The planning visit took place at the same time as a Roll Back Malaria team was in country to assist the NMCP in preparing a Global Fund Round 7 proposal and the PMI Year 3 budget, and activities are designed to complement activities proposed under the Round 7 grant.

Indoor residual spraying: Before PMI began work in Angola, no large-scale IRS had been conducted by the NMCP for more than 10 years. Activities supported by PMI in Angola during the past 12 months include spraying of 110,000 houses, protecting a total population of more than 613,000 in three southern provinces, Huila, Cunene, and Namibe. More than 85% of the houses targeted for spraying were sprayed. In addition, ACTs are already available in these three provinces and ITN ownership rates are expected to increase rapidly over the next 12 months.

During Year 3, IRS will be continued in the southern province of Huila, which reports the most cases of malaria among the southern provinces and discontinued in Cunene and Namibe Provinces. An emergency stock of insecticides and ACTs will be based in the capital of Huila Province. Indoor residual spraying will be initiated in Huambo Province, the second most malarious province in the country. During Year 3, it is expected that a total of 120,000 households will be protected by IRS, benefiting an estimated 600,000–700,000 residents.

Insecticide-treated nets: Insecticide-treated net ownership rates in Angola were estimated to be 11% when PMI began. During Year 2, PMI procured about 270,000 long-lasting ITNs (LLINs) for distribution nationwide to pregnant women and children under five. These LLINs will be delivered free of charge through antenatal and immunization clinics, building upon the mass LLIN distribution during the nationwide vaccination campaign conducted in July 2006. To complement this free distribution, approximately 80,000 subsidized or full-cost LLINs were socially marketed through health facilities and markets in the capital Luanda. Other partners are providing approximately 1 million LLINs.

With poverty so widespread in Angola, PMI will continue to support the existing Ministry of Health (MoH) strategy of providing 80% of nets free of charge to highly vulnerable groups, with the remainder at full cost or highly subsidized through the commercial market in urban areas to those who can afford them. During Year 3, approximately 2.3 million LLINs will be procured by all partners; 440,000 will be contributed by PMI for free distribution through antenatal and immunization clinics, with another 70,000–80,000 sold at full-cost or subsidized prices in urban

areas. These efforts are expected to bring household ownership of one or more ITNs to greater than 70%.

Intermittent preventive treatment of malaria in pregnancy: Only about 40% of women in Angola attend antenatal clinics during their pregnancy. Implementation of IPTp in Angola began in May 2006 together with the roll out of ACTs. During Year 2, PMI is supporting the scale up of IPTp, including health worker training and information, education, and communication to promote IPTp, together with ACT implementation in up to five provinces through non-governmental organizations (NGOs). As of September 2007, more than 1,100 health workers had already been trained in IPTp. Together with other partners, IPTp has now been implemented in more than 100 of 164 municipalities nationwide. The PMI will continue this support during Year 3. Efforts will also be made to increase antenatal clinic attendance at existing health facilities and raise levels of IPTp coverage by distribution of free ITNs to pregnant women through these clinics. This is expected to increase coverage of pregnant women with two doses of IPTp to 35% nationwide.

Case management: Although artemether-lumefantrine (AL) was approved as first-line treatment of uncomplicated malaria in Angola in October 2004, the new policy only began to be implemented in May 2006 in MoH facilities. Because of the limited access of the population to government health facilities in the rural areas of most provinces, during Year 1 and 2, PMI has focused its efforts on the rollout of ACTs through NGOs and faith-based organizations (FBOs) that have a presence in each province. During Years 1 and 2, PMI is supporting the introduction of AL in up to five provinces. This has been accompanied by technical assistance to the Essential Drugs Program and the NMCP to strengthen the pharmaceutical management system at the national, provincial, and health facility levels; development of training materials and guides in Portuguese; and training of health workers. In collaboration with other partners, AL therapy has now been implemented in more than 400 health facilities in 107 of the 164 municipalities in 13 of the 18 provinces; and 1,700 health workers were trained. Currently, an average of 100,000 AL treatments is being administered per month. During Year 3, the scale up of ACTs will be continued through working with NGOs/FBOs in 3–4 additional provinces. By the end of the year, it is expected that ACTs will be implemented in all 18 provinces covering an estimated 35% of the population.

Monitoring and evaluation: The PMI Angola Malaria Operational Plan includes a strong monitoring and evaluation component to measure progress against the project goal and targets and identify and correct problems in program implementation. A nationwide Malaria Indicator Survey was carried out between November 2006 and April 2007 with support from PMI and the Global Fund. This survey was aimed to provide baseline data on coverage with ITNs, IPTp, and ACTs; and prevalence of anemia and parasitemia, together with an estimate of malaria-related mortality using verbal autopsies. During Year 3, PMI will work with the NMCP, Global Fund, and other partners to develop a comprehensive, costed national plan for monitoring and evaluation to which all donors can contribute and establish a network of sentinel site for surveillance of malaria morbidity and mortality in health facilities.

The proposed FY08 PMI budget for Angola is \$19.0 million. Of this amount, 43% will support malaria diagnosis and procurement and roll out of ACTs, 25% insecticide-treated nets, 11% IRS, 6% monitoring and evaluation, and 3% IPTp. More than 51% of the total will be spent on commodities.

PRESIDENT’S MALARIA INITIATIVE

The goal of the President’s Malaria Initiative (PMI) is to reduce malaria-related mortality by 50% by the end of 2010. This will be achieved by reaching 85% coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

Angola was one of the first three countries selected for PMI. Following approval of the PMI Year 1 Malaria Operational Plan by the Interagency Steering Group in December 2005, control activities got off to a rapid start with an IRS campaign covering more than 100,000 households in two southern provinces. Distribution of 826,000 free long-lasting ITNs (LLINs), of which PMI contributed 420,000, was carried out as part of a nationwide measles immunization campaign in July 2006. Large-scale implementation of ACTs and IPTp began in mid-2006 and is progressing rapidly with support from PMI (FY07 funding) and other partners.

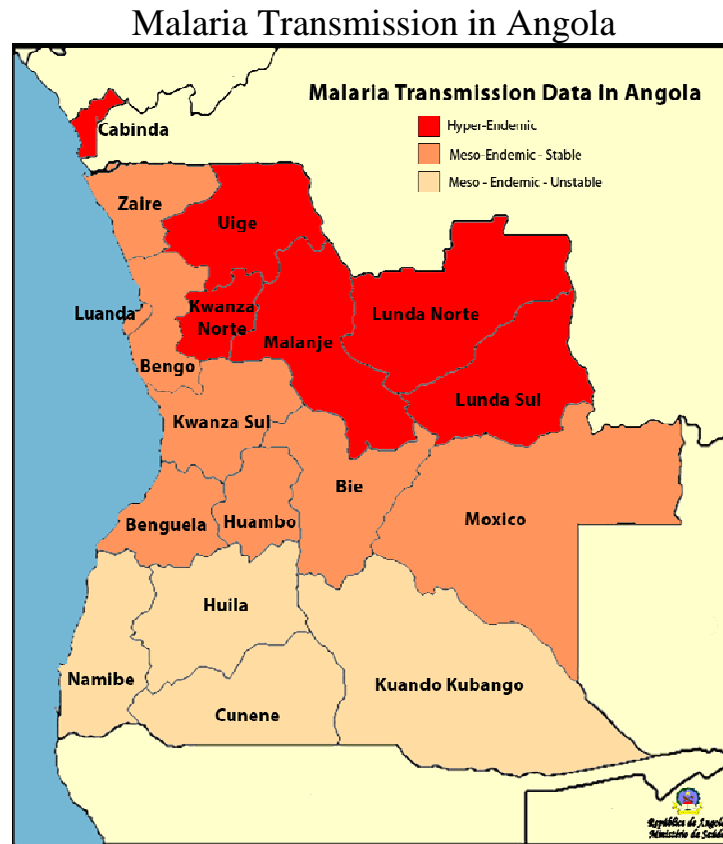
This FY08 Malaria Operational Plan presents a detailed implementation plan for the third year of PMI in Angola, based on the PMI 5-Year Strategy and Plan. It was developed in close consultation with the Angolan National Malaria Control Program (NMCP), with participation of national and international partners involved with malaria prevention and control in the country, and at the same time that the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) Round 7 malaria proposal was being drafted. The activities that PMI is proposing to support fit in well with the National Malaria Control Plan and build on investments made by PMI and other partners to improve and expand malaria-related services. This document briefly reviews the current status of malaria control policies and interventions in Angola, describes progress to date, identifies challenges and unmet needs if the targets of PMI are to be achieved, and provides a description of planned Year 3 activities.

MALARIA SITUATION IN ANGOLA

Angola recently emerged from almost three decades of civil war that severely damaged its development, particularly the health sector. The country has an approximate population of 16 million people in 18 provinces and 164 municipalities (districts). It is estimated that 80% of the health facilities were damaged or destroyed during the war and that the existing health system covers only about 30% of the Angolan population. Although a major health facility building program is underway, the remaining health infrastructure is limited by a lack of qualified and motivated health staff outside the capital, weak drug and medical supply and management systems, poor data quality and analysis, and a weak primary health care network. The mortality rate for children under five is one of the highest in the world, 250 deaths per 1,000 live births, and maternal mortality is estimated to be 1,280 per 100,000 live births.

Malaria is hyper-endemic in northeastern Angola and Cabinda Province. The central and coastal areas are largely meso-endemic with stable transmission. The four southern provinces bordering Namibia have highly seasonal transmission and are prone to epidemics. In the north, the peak malaria transmission season extends from March to May, with a secondary peak in October/November. *Plasmodium falciparum* is responsible for more 90% of all infections. The primary vectors in the high transmission areas are the anthropophilic, endophilic, and endophagic

Anopheles gambiae ss and *An. funestus*. *Anopheles melas*, which favors brackish water habitat, can be an important vector in coastal areas. *Anopheles pharoensis* can be a secondary vector where present. The exophilic and zoophilic behavior of *An. arabiensis* limits its role in malaria transmission. The extent of malaria transmission in Luanda City is uncertain; while anophelines are abundant in some peripheral areas, only small numbers have been collected in surveys carried out during the rainy season in central areas of the city.



Malaria is reported by the Ministry of Health (MoH) to account for 35% of the overall mortality in children under five, 25% of overall maternal mortality, and is the cause of 60% of hospital admissions for children under five and 10% for pregnant women. Before 2007, the Government of Angola (GRA) had targeted 59 of the 164 districts in the country, which account for 70% of the total country's population, as priority areas for improving health care. In January 2007, a decision was made to scale up malaria control efforts throughout the country.

Funding of malaria control activities

Angola is nearing the end of Phase I of its \$38 million Round 3 Global Fund grant. Price-Waterhouse-Coopers is the Local Funding Agent and United Nations Development Program (UNDP) is the Principal Recipient, with World Health Organization (WHO), United Nations Children's Fund (UNICEF), Population Services International (PSI), and the NMCP as sub-recipients. Performance during Phase I has been mixed. The distribution of ITNs through health facilities, large-scale campaigns, and social marketing has generally gone well, but the roll out of ACTs through MoH health facilities was much slower than expected. A decision on approval of Phase II (approximately \$13 million over one year) is expected in September 2007. Angola was unsuccessful in its Round 5 and Round 6 Global Fund grant proposals. In fact, for Round 6,

Angola's Country Coordinating Mechanism was found to be noncompliant with Global Fund guidelines, and the proposal was never formally reviewed. Since that time, the Country Coordinating Mechanism has been re-structured under a new constitution and a Round 7 proposal for \$78 million over five years prepared and submitted in July 2007 with the assistance of the Roll Back Malaria (RBM) harmonization Working Group. The MoH is proposed as the Principal Recipient of the Round 7 grant application and, if selected, a Program Management Unit for the Global Fund grant will be established in the Ministry.

CURRENT STATUS OF MALARIA INDICATORS

When PMI began work in Angola in December 2005, no accurate, up-to-date information on nationwide coverage of key malaria prevention and control measures was available. To provide the NMCP with information on the status of their control efforts and to establish a baseline for the PMI in Angola, a nationwide Malaria Indicator Survey (MIS) was conducted between November 2006 and April 2007 with PMI and Global Fund support. This was the first nationwide health survey in more than 20 years in Angola.

Although the MIS was carried out approximately nine months after PMI-supported IRS began in southern Angola and three to four months after the large-scale measles-ITN campaign, this survey represents the only available information on baseline coverage for the four major areas of intervention as of early 2006. At the time the survey was conducted, ACT and IPTp implementation had not really begun, so the figures reported for proportion of children under five receiving an ACT and proportion of pregnant women receiving two doses of IPTp can be considered accurate baselines for PMI. In the case of ITNs, where a large-scale distribution campaign had occurred several months prior to the survey, families interviewed were asked specifically when they had received their bednets and an adjustment was made in the calculations to take campaign nets into account in estimating the baseline ownership of bednets. The following table shows the baseline figures for the major indicators being used by PMI:

PMI Baseline Information	
Indicator	2006–2007 MIS
Households with at least one ITN	28%*
Children under five years old who slept under an ITN the previous night	18%
Pregnant women who slept under an ITN the previous night	20%
Women who received two or more doses of IPTp during their last pregnancy in the last two years	2.5%
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	1.5%
Targeted houses adequately sprayed with a residual insecticide in the last 12 months	85%**

* The estimated baseline before the 2006 measles-ITN mass campaign was 11%

** Estimate obtained from IRS activity report

GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

Although it is reported that 100% of Angola's population is at risk of malaria, malaria transmission is expected to be low or non-existent in the heavily urbanized areas of the capital, Luanda, where 20–25% of the country's population resides. Thus, until more definitive information becomes available, it is reasonable to assume that about 85% (or around 13.6 million people) of the population of approximately 16 million is at risk of malaria.

The PMI goal is to reduce malaria-associated mortality by 50% compared with pre-PMI levels by the end of 2010.

The PMI will assist the GRA to achieve the following targets in populations at risk of malaria:

1. More than 90% of households with a pregnant woman and/or child under five will own one or more ITNs;
2. 85% of children under five will have slept under an ITN the previous night;
3. 85% of pregnant women will have slept under an ITN the previous night;
4. 85% of houses in geographic areas targeted for IRS will have been sprayed;
5. 85% of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been protected by IRS¹;
6. 85% of women (in areas determined to be appropriate for IPTp use) who have completed a pregnancy in the last two years will have received two or more doses of sulfadoxine-pyrimethamine (SP) for IPTp during that pregnancy;
7. 85% of government health facilities will have ACTs available for the treatment of uncomplicated malaria; and
8. 85% of children under five with suspected malaria will have received treatment with an ACT within 24 hours of the onset of their symptoms.

EXPECTED RESULTS — YEAR THREE

By the end of Year 3 of PMI in Angola (31 March, 2009), the following targets will have been achieved:

Prevention:

- A total of 2,300,000 additional free LLINs will have been distributed by different NMCP partners (with 440,000 contributed by PMI) to children under five and pregnant women. An additional 50,000 full-cost or highly-subsidized LLINs will have been distributed in Luanda and other urban areas with PMI support. This is expected to bring household ownership of one or more ITNs to 70% nationwide;
- At least 85% of houses targeted for IRS in Huila Province will be covered in a third annual round of spraying and IRS will be initiated in Huambo Province, one of the most malarious provinces in the country. A total of approximately 100,000 households will be sprayed, benefiting more than 500,000 residents;

¹ Since transmission in southern Angola is highly seasonal, spraying will be done within three months before the malaria transmission season.

- Epidemic response capacity will be established in Namibe and Cunene Provinces, as part of a transition from IRS to increased LLIN coverage and improved case management in these areas;
- Intermittent preventive treatment of pregnant women with SP will have been implemented in at least 90% of government hospitals and health centers in all 18 provinces. In Huambo Province and up to nine other provinces (to be selected), IPTp will have been implemented in at least 90% of all governmental and nongovernmental health facilities. This is expected to increase IPTp coverage with two doses of sulfadoxine-pyrimethamine (SP) to 35% of all pregnant women nationwide.

Treatment:

- Malaria case management with ACTs will have been implemented in at least 90% of government hospitals and health centers in all 18 provinces. In Huambo Province and up to nine other provinces (to be selected), ACTs will have been implemented in at least 90% of all governmental and nongovernmental health facilities. This is expected to increase ACT coverage to 35% of all children under five nationwide.

PREVENTION ACTIVITIES

General Epidemiology/Entomology — Targeting Use of IRS and ITNs

The risk of malaria transmission in the more highly urbanized areas of Luanda, where 20–25% of the total population of Angola resides, may be so low that malaria prevention measures, such as ITNs, IRS, and IPTp, are not warranted. A preliminary entomologic survey carried out in April–May 2006 (peak malaria transmission season) in five of the nine districts that make up Luanda, found no anopheline mosquitoes and no suitable breeding sites. The same may be true of some areas in the four southern provinces of Namibe, Huila, Cunene, and Cuando Cubango, which have a history of highly seasonal or epidemic malaria.

While the NMCP has trained entomology staff, they have only limited laboratory and insectary facilities in Luanda and nothing at the provincial level. The NMCP staff also lack transport and funding to make regular field visits to monitor mosquito densities or insecticide resistance.

Progress to Date:

To remedy the lack of up-to-date entomologic information in Angola and to target the use of IRS and ITNs in the most cost-effective fashion, CDC and Research Triangle Institute International (RTI), a U.S.-based non-profit NGO, together with the NMCP, began systematic entomologic monitoring in the city of Luanda and the southern provinces of Huila, Cunene, and Namibe in February 2007. The field work and initial processing of mosquitoes is being carried out by NMCP entomology personnel who make monthly collections. Between January and June 2007, only 15 *Anopheles* mosquitoes together with more than 7,000 *Culex* and *Aedes* specimens were collected during surveillance of 220 houses in nine municipalities of Luanda. In Huila, Cunene, and Namibe Provinces on the other hand, NMCP staff collected 317 *Anopheles* mosquitoes together with more than 1,200 *Culex* and *Aedes* specimens from homes during the same period.

To strengthen entomologic capacity within the NMCP, PMI set aside funds in both Years 1 and 2 to refurbish and re-equip an insectary and train entomologists in new approaches to vector taxonomy and identification, and insecticide-resistance testing using the bottle test developed by CDC. These activities had to be delayed until a site for the insectary and laboratory could be identified, reliable technical staff found, and mosquito surveillance capability demonstrated. These problems have now been resolved and work on the laboratory/insectary is expected to be completed in early 2008. In addition, NMCP staff will be invited to a lusophone training workshop planned for Maputo, Mozambique to standardize entomologic methods and ensure consistency among countries and comparability in the type of information collected.

Upon completion of the insectary, laboratory, and training; NMCP staff will assume responsibility for identifying the species of all anophelines captured and determining the malaria sporozoite rates and insecticide resistance status. In the interim, the NMCP is submitting dried mosquito specimens to CDC for species confirmation and malaria infection status. In late May, CDC received 196 anopheline specimens collected in Luanda, Huila, Namibe, and Cunene. Species identification is being confirmed using morphologic and molecular methods. The infectious status of all female anophelines is being determined using the *P. falciparum* malaria sporozoite enzyme-linked immunosorbent assay.

During 2008, the entomologic surveys described above will be continued to gain a better understanding of the epidemiology of malaria in the greater Luanda area and the four southern provinces, but the preliminary results suggest that the density of anopheline mosquitoes may be too low to sustain regular transmission. If this is borne out by ongoing surveys, IRS would certainly not be warranted in central Luanda and more attention may need to be paid to prompt and accurate laboratory diagnosis and appropriate treatment of suspected cases than to prevention measures.

A parallel epidemiological survey was planned for Luanda and the southern provinces using Year 1 (FY06) and Year 2 (FY07) PMI funds. The objective was to collect information on the number of clinical and laboratory-confirmed malaria cases in a subset of health facilities in the same areas where the entomological surveillance is taking place. After discussions within the PMI Angola country team and with PMI monitoring and evaluation (M&E) staff, this activity has been modified to expand its scope within the city of Luanda up to 20 health facilities with follow up of patients with laboratory-confirmed malaria to determine their travel history in the weeks before the onset of their illness. This will allow an estimation of the proportion malaria patients who probably acquired their infections outside the capital area. Epidemiologic data on malaria cases in the southern provinces will be collected through this proposed sentinel site surveillance system as well.

Planned Year 3 PMI Activities: (\$135,000)

The PMI-supported entomologic surveys led by the NMCP and CDC, with logistic and supervisory support from RTI, will be continued in Luanda and selected districts representative of the southern, and, possibly, central provinces. This information will make it possible to target, in a more rational and cost-effective fashion, the use of IRS and ITNs in these areas. These baseline data will also be helpful in evaluating the effectiveness of future interventions directed against the mosquito vector and/or parasite.

As a better understanding is gained of the epidemiology and transmission of malaria in Angola and the impact of control activities can be assessed, a decision will be made on the most effective and cost-effective approach for using ITNs in combination with IRS.

Planned activities during Year 3 are as follows:

1. Continue studies of the risk of malaria transmission in the city of Luanda, Huila, Cunene, and Namibe Provinces in the south, to allow better targeting of IRS and ITN distribution. This will include identifying the anopheline mosquito vectors and their seasonal abundance until a total of 12 months from the initial collection. This activity is expected to end by March 2007 in the mentioned areas. With the start of IRS in Huambo Province in 2008, it will be necessary to start this entomological surveillance in this province for at least 12 months, encompassing both rainy and dry seasons at selected sites. Baseline insecticide-resistance data will be collected using the CDC bottle bioassay. Data will be analyzed together with the NMCP and will provide a clear picture of transmission patterns in the selected areas (\$55,000);
2. Strengthen capacity within the NMCP for entomologic monitoring of vector populations and insecticide resistance in areas where LLINs and/or IRS are used. Training in physiological resistance testing by bottle bioassay will be provided by CDC after the insectary and laboratory in Luanda have been completed and a susceptible mosquito colony established (\$80,000); and
3. Complete work on a written, sustainable malaria vector control plan with appropriate objectives and targets together with the NMCP, PMI in-country staff, CDC entomologists, and other partners (no additional cost to PMI).

Insecticide-Treated Nets

The NMCP ITN strategy supports a market segmentation approach, consisting of free distribution of nets to pregnant women and children under five, subsidized distribution to the general population, and commercial sector distribution in urban areas. In August 2007, the MoH issued guidance that all nets distributed through government health facilities will be free-of-charge to the recipient. Consequently, about 80% of all nets in Angola will be distributed free, with the remaining 20% sold at a subsidized or full price. Because of very low re-treatment rates for conventional nets, the GRA encourages the distribution of LLINs. The GRA has agreed to waive taxes and tariffs on antimalarial drugs and ITNs; a decree has been signed by the Minister of Health and, while accepted in principle, is awaiting approval by the council of ministers.

People living with HIV/AIDS are also at increased risk from malaria. Voluntary testing and counseling centers established by the National Institute for the Fight Against AIDS offer an excellent opportunity to link distribution of ITNs and IPTp to services for the prevention of mother to child transmission (PMTCT). The HIV/AIDS prevalence in adults is estimated to be about 2.5% in Angola but it is considerably higher along the northern and southern borders with Zaire and Namibia, where the prevalence reaches 10–11%.

Distribution of ITNs presents a special challenge in rural Angola because of limited infrastructure and the high cost of transportation. The estimated cost of \$10 per LLIN used in this Malaria Operational Plan is based on UNICEF experience in Angola over the last 2–3 years and is considerably higher than in most other countries. It is made up of \$5.64 for the net; \$1.49 for in-country transportation; \$2.42 for technical support and M&E; and \$0.45 for overhead.

Progress to Date:

A nationwide measles immunization campaign, which included delivery of oral polio vaccine, vitamin A, and antihelminthics, took place in July 2006. Approximately 826,000 LLINs; donated by UNICEF/Global Fund, PMI (420,000 nets), and ExxonMobil; were distributed in conjunction with this vaccination campaign. ITN distribution focused on seven provinces with hyperendemic or mesoendemic malaria (Cabinda, Zaire, Malanje, Moxico, Lunda Norte, Lunda Sul, and Uige). One ITN was provided free to each child under five coming for immunization. Based on a report by the consortium of partners responsible for the campaign, an estimated 85% of targeted children under five in the seven provinces received an LLIN. In addition to the ITNs distributed during the measles campaign, during the past year, PSI distributed in the greater Luanda area a total of 106,000 subsidized ITNs through antenatal clinics (ANCs) and full-cost ITNs through local markets.

To ensure that messages related to proper hanging, care, and use of ITNs were appropriately emphasized as part of the information, education, and communication (IEC) component of the immunization campaign, PSI (with funding provided under the \$1 million ExxonMobil grant to USAID–Angola to further PMI objectives) carried out pre- and post-campaign promotion and IEC related to ITNs. Results of the recent national MIS (conducted between November 2006 and April 2007) indicate that nationwide, approximately 28% of households own at least one ITN, and that, in hyperendemic areas targeted during the measles–ITN campaign, this rises to 51%. The 28% figure represents an increase in ITN ownership of 17% above the estimated ITN ownership rate at the time PMI activities officially began in Angola in late 2005.

As part of the Round 3 Global Fund grant, UNICEF has distributed approximately 967,000 LLINs through August 2007 to all provinces except Benguela and Bie through ANCs and outreach programs. In addition 100,000 nets have been donated by the World Food Program and 150,000 by the Japanese International Cooperation Agency (JICA) for Benguela Province. In Year 2 of PMI, 270,000 LLINs are being procured for routine free distribution at the provincial level to children under five through child health clinics and to pregnant women through ANCs. In addition, PSI has received \$200,000 in PMI funding to support the distribution of subsidized and full-cost LLINs in the greater Luanda area.

Planned Year 3 PMI Activities: (\$4,915,000)

Since poverty is so widespread in Angola, PMI will continue to support the existing MoH strategy of providing nets free of charge to vulnerable groups (pregnant women, children under five, and persons living with HIV/AIDS), but will also support distribution of subsidized and full-cost nets in the private sector of urban areas. The goal of this market segmentation approach is to ensure that free ITNs go to the neediest populations, while persons who can afford to pay some or all of the cost of an ITN do so.

Outside Luanda, it is estimated that only 30% of the population has access to health facilities. Since net distribution through immunization and ANCs will only reach a small proportion of the population, PMI will also support net distribution through child health days and similar outreach activities to ensure high net coverage of pregnant women and children under five. In particular,

in the two provinces where IRS will be discontinued in late 2007, Cunene and Namibe, PMI will make use of all available approaches to rapidly achieve high coverage of the population. The PMI will also work with the MoH and other U.S. Government (USG) programs to improve integration of services with the National AIDS Program and ensure that malaria interventions, such as LLINs and IPTp, are included among the services offered to infected women.

Due to very low net re-treatment rates, priority under PMI will be given to the purchase of LLINs. Since most conventional bed nets distributed before 2004 in Angola are now at least three years old, efforts to retreat those nets would probably not be cost-effective. For ongoing monitoring of ITN distribution, information will be collected quarterly on the number and type of ITNs distributed by all partners and the provinces covered by these activities.

Planned activities during Year 3 are as follows:

1. Purchase and distribute approximately 440,000 LLINs. These are to be added to the LLINs provided by other partners in Angola: 600,000 from “Malaria no More,” a U.S.–based NGO; 420,000 from JICA; 645,000 from Phase 2 of the Global Fund Round 3 grant (if approved); and 200,000 from the MoH. The focus will be on distribution of LLINs to pregnant women and children under five, through routine channels, such as ANC, child health clinics, and regional or provincial health days (\$4,415,000);
2. Continue to support the purchase and distribution of subsidized LLINs through community-based organizations and full-cost nets through commercial sources in urban and periurban areas of Angola, where residents are better able to afford the cost of an ITN. This activity will also include general support to IEC related to ITNs nationwide (\$500,000);
3. Work with the MoH and the Global AIDS Program to ensure that all patients attending AIDS treatment centers receive a free LLIN at the time of one of their clinic visits. It is estimated that 5,000 LLINs will be distributed through this approach. (No additional cost as these ITNs will be purchased as part of activity #1 above); and
4. Support efforts of the MoH and other partners to improve ANC utilization rates through improved service delivery and IEC, with the aim of increasing outlets for free ITN distribution (Note: this will also facilitate improved IPTp coverage, diagnosis and treatment of acute malaria in pregnant women, and monitoring of interventions related to malaria in pregnancy). In Huambo and the other provinces where PMI is or will be directly supporting ACT and IPTp roll-out through NGOs/FBOs, PMI will also support IEC related to the correct care and use of ITNs (No additional cost; IEC covered elsewhere in this plan, page 26).

Indoor residual spraying

Before PMI and Global Fund began supporting large-scale IRS in the three southern provinces of Huila, Cunene, and Namibe in December 2005 and January 2006, experience with IRS in Angola had been limited to a few small spraying efforts carried out by NGOs, primarily in Huambo and Zaire Provinces. The National Malaria Control Strategy for 2008–2012 supports the use of IRS with synthetic pyrethroid insecticides for malaria prevention. Although the GRA has banned the use of dichloro-diphenyl-trichloroethane (DDT), this is under evaluation by the MoH and an exception could be made along the Angolan-Namibian border, as the Namibian National Malaria Control Program currently relies on DDT for IRS. The Angolan NMCP is open to a trial of DDT in this area to assess the effectiveness and practicality of using it on a larger scale. Several

provincial governments, including Benguela, Cabinda, Malanje, and Luanda, are currently using their own funds to carry out vector control operations, consisting of IRS, ultra-low volume fogging, and larval control.

Experience with IRS has grown considerably in Angola over the past two years. At the same time, the WHO approach to IRS in Africa has changed from a focus on epidemic-prone and urban areas to recommending spraying in more highly endemic areas to take full advantage of this very effective prevention measure. With the accumulating evidence from southern Angola that levels of transmission in the four southern provinces are for the most part very low, the NMCP and PMI have been discussing whether IRS is really the best approach to malaria prevention in these areas, and the NMCP has expressed interest in targeting IRS activities to more highly endemic areas of the country. Before this can be done and spraying curtailed in the south, however, an alternative plan will have to be developed to ensure that any potential increase in transmission is rapidly detected and dealt with.

Insecticides are not subject to tariffs in Angola, but a clearing agent's fee must be paid at the port of entry.

Progress to Date:

From November 2006 through March 2007, a second round of IRS was completed in Huila, Cunene, and Namibe Provinces covering more than 110,000 houses and protecting approximately 640,000 persons. Approximately 85.1% of the houses targeted for spraying were sprayed, indicating very high levels of community acceptance. It is estimated that an additional 100,000 residents who live in central Lubango City benefited from this spraying, which was conducted in a cordon around the city. More than 500 local men and women were hired and trained as spray operators and 78 as supervisors. An additional 14 technical personnel were trained in bioassay methods for monitoring the efficacy of IRS.

Lambda-cyhalothrin (ICON[®] wettable powder) was the insecticide used in all three provinces. More than 300 Hudson backpack sprayers, replacement parts, insecticide, and protective gear remaining after the 2006–2007 IRS campaign have been securely stored in a 40-foot metal container in Lubango, the capital of Huila Province, until the next round of spraying. Entomologic surveillance of malaria risk in Luanda and Huila Province is already underway as described above (page 11). As part of these surveys, entomologic capacity within the NMCP is being strengthened.

Planned Year 3 PMI Activities: (\$2,150,000)

Indoor residual spraying is included in the National Malaria Strategic Plan for 2008–2012. With the relatively low risk of malaria in the southern provinces of Huila, Cunene, and Namibe, the NMCP has agreed that ITNs might be a more cost-effective means of preventing malaria. For this reason, PMI and the NMCP decided to cease IRS in Cunene and Namibe Provinces and invest in ITN distribution. In addition, PMI will work with the NMCP to improve ITN coverage and use, and malaria case management in these provinces.

Planned activities during Year 3 are as follows:

1. Assist the NMCP with a third year of spraying with lambda-cyhalothrin covering approximately 100,000 households in Huila Province in southern Angola. A newer, and

longer-lasting formulation of the lambda-cyhalothrin insecticide, ICON CS[®], will be used (no additional cost for PMI);

2. Introduce large-scale IRS in Huambo Province in central Angola, which reports the second highest number of malaria cases reported annually (the city of Luanda reports the highest number of cases annually in Angola, but many of these cases may be acquired elsewhere). Huambo Province has a meso-endemic/stable transition area in central Angola with a less dispersed population. An estimated 60,000 households will be sprayed. This will involve procurement of insecticide, sprayers, protective equipment and supplies, establishment of storage facilities, mapping of areas to be sprayed, and hiring and training of local staff in IRS operations, in addition to pre- and post-campaign surveys. The IRS is expected to take place from December 2007 to February 2008. The districts and areas to be sprayed will be decided in coordination with the NMCP and provincial authorities based on information from the pre-campaign entomologic studies (total cost for IRS in both Huila and Huambo Provinces: \$2,150,000); and
3. In the provinces of Cunene and Namibe, where IRS campaigns have been conducted for the past two years, assist the NMCP in transitioning from an IRS-based prevention approach to high LLIN coverage, together with strengthened malaria case detection and epidemic response capabilities. This will include strengthening laboratory diagnosis of malaria, weekly reporting of cases, development of district-level epidemic response plans, and stockpiling of drugs, insecticides, and spraying equipment to deal with potential increases in cases (cost covered under IRS and LLIN procurement above).

Intermittent preventive treatment of pregnant women

Intermittent preventive treatment of pregnant women with two doses of SP was approved as a national policy in September 2004. Implementation in MoH facilities began in a phased fashion in May 2006 and has now been expanded to all provinces, mostly provincial capitals, in the country. The policy currently applies to the entire country, including the city of Luanda and the epidemic-prone areas in the south.

The major challenge to scaling up IPTp in Angola is the very low ANC attendance rate. It is believed that only about 40% of pregnant women living in Luanda attend an ANC at least once and attendance rates are probably lower in rural areas. Another problem is the shortage of funds for supportive supervision of health workers.

Progress to Date:

Because of the limited reach of MoH facilities outside Luanda and major urban centers and the very slow roll out of ACTs and IPTp through public health facilities with Global Fund support, PMI, in collaboration with the NMCP, has chosen to support scale up of ACTs and IPTp through local NGOs/FBOs who have a strong presence in these areas. This approach was piloted in Huambo Province in 2006 through an grant awarded to a British NGO, Mentor. A total of 1,102 health workers and provincial officials have been trained in malaria case management, diagnosis, and the use of IPTp. As part of this effort, manuals, guidelines, and training materials for antimalarial drug management in Portuguese were developed and field tested. As of September 2007, Mentor is supporting 41 health facilities in five of the 11 districts in Huambo Province. A new Request for Applications (RFA) to expand this work to additional 3–4 provinces through other NGOs/FBOs was announced in July 2007 using PMI Year 2 funds. A decision on the applications is expected by the end of September 2007.

According to the NMCP, between May 2006 and April 2007, more than 65,000 women received a second IPTp dose under directly observed treatment. This data, however, only covers the initial nine provinces in which ACT and IPTp implemented began and where a regular reporting system on drug usage and IPTp uptake was already established. In order to improve reporting on IPTp, a new ANC register and an updated ANC card, which will allow collection of information on IPTp and ITNs, have been recently designed and are to be implemented in some provinces.

Coordination of malaria in pregnancy activities with maternal health services is improving with the hiring of a National Program Officer for IPTp, as part of the Maternal and Child Health Department staff. The MoH and the Global Fund have purchased sufficient quantities of SP to cover all needs for IPTp during 2007–2008.

Planned Year 3 PMI Activities: (\$500,000)

During Year 3, PMI will continue to place a high priority on strengthening overall antenatal care in Angola, including prevention, diagnosis, and treatment of malaria in pregnant women. Studies have shown that introduction of an integrated package of antenatal services in health facilities can result in a significant increase in ANC attendance. In areas where health care delivery is currently being provided by NGOs/FBOs, an opportunity exists to significantly increase access to IPTp through PMI. Providing free LLINs, IPTp, and improved malaria case management, together with IEC messages about malaria prevention and treatment in pregnancy, through NGOs/FBOs should increase demand for ANC services and ultimately improve the delivery of malaria interventions.

Efforts will also be made to ensure that pregnant women have access to prompt and accurate diagnosis, and appropriate therapy when they present with symptoms suggestive of malaria. Since improving ANC attendance alone is unlikely to reach sufficient numbers of pregnant women to attain the PMI target of 85% coverage with IPTp, PMI will begin to explore alternative approaches, such as working with community-health workers and NGOs/FBOs, for reaching pregnant women. These may include distribution of IPTp through community health workers at village level, mobile clinics, and other innovative approaches.

Planned activities during Year 3 are as follows:

1. Continue to support NGO/FBOs to introduce IPTp with SP (together with ITN distribution and improved case management for pregnant women) through ANCs in Huambo Province, in three to four new provinces to be added during Year 2, and in up to four additional provinces in Year 3 using NMCP–approved training, IEC materials, and monitoring guidelines. These activities will be closely linked to the implementation of AL in the same health facilities. (\$500,000; funding for these activities will be linked to that for ACT implementation by NGOs/FBOs to lower costs [page 26]); and
2. Work with the NMCP, Maternal and Child Health Department of the MoH, and other partners to identify alternative approaches, such as working with community health workers, to reach pregnant women with IPTp and develop plans to field test one or more of these methods (no additional funding).

CASE MANAGEMENT

Malaria diagnosis

The treatment of malaria in most MoH facilities in Angola is based on clinical diagnosis. Malaria microscopy is only available in hospitals and larger health centers and the quality of those diagnoses varies considerably from one facility to the next. Rapid diagnostic tests (RDTs) are used in some health facilities supported by NGOs. The NMCP proposes to make malaria microscopy available for the diagnosis of patients with fever and suspected malaria in all health facilities with a laboratory and electricity. As yet, there is no firm written national policy about the use of RDTs, but it is expected that their use would be reserved for situations where microscopic diagnosis is not available. To improve malaria case management and avoid unnecessary prescription of AL, the NMCP had been recommending that all patients (including children under five) with symptoms suggestive of malaria have a laboratory test before treatment.

Progress to Date:

In mid-2007, with assistance of the two PMI in-country advisors, a new National Malaria Control Strategy (2008–2012) was announced that included a major change in NMCP policy related to malaria diagnosis. According to the new strategy, children under five with symptoms suggestive of malaria will be treated presumptively (based on symptoms alone). Older children and adults will need to undergo a laboratory test before treatment is administered. This brings Angola in line with WHO recommendations about the use of laboratory diagnosis for malaria.

Considerable progress has also been made during the last year in strengthening malaria laboratory diagnosis in Angola. The PMI, with technical assistance from CDC, has begun working with the NMCP and National Institute of Health as part of a comprehensive effort to strengthen MoH capabilities in malaria diagnosis nationwide. This includes a training of trainers course for laboratory technicians in Luanda in September 2007, purchase of a 5-head training microscope, 25 additional microscopes for the central diagnostic laboratory in Luanda, and 25 microscopy kits (each containing sufficient supplies to diagnose 10,000 people). The cadre of expert microscopists will then be supported to carry out cascade training to lower levels to ensure that training is standardized throughout the country. CDC will also work with the NMCP to set up a quality control system for both RDTs and microscopy. Global Fund Round 3 has funded the training of 174 laboratory technicians and procured and distributed 60 microscopes and 100 microscopy “kits,” (each containing supplies for 10,000 diagnoses). The World Bank HAMSET Project has supported training of an additional 75 technicians and has budgeted \$75,000 for procurement of microscopes in 2007.

Experience with the use of RDTs for malaria diagnosis in Angola is gradually expanding. Global Fund Round 3 has procured and distributed more than 120,000 RDTs (Paracheck F[®]), while PMI Year 1 procured an additional 130,000 tests that are already in country. In addition, PMI Year 2 funds will be used to procure an 741,000 additional RDTs that will be used to accompany the scale up of AL implementation.

Pharmaceutical management

The MoH pharmaceutical management system is very weak. Many of the essential entities and processes required for ensuring access to safe, effective, and affordable quality medicines in Angola, such as a national drug registration and pharmacovigilance systems, do not exist or are non-functional and procurements are often delayed. Quantification of drug needs is complicated by a lack of reliable data on malaria morbidity or antimalarial drug consumption. The four National Hospitals in Luanda, provincial hospitals, and provincial governments receive their budgets directly from the general budget and can use these funds to purchase medicines. In addition, lower-level health facilities supplement their MoH stocks with locally-available medicines purchased using funds generated from service fees, but there are no controls over the quality of drugs purchased from these private sector vendors.

No formal distribution plan for essential medicines currently exists, probably contributing to the periodic shortages of these drugs. Storage facilities for medicines at the provincial level are often inadequate and do not exist at the municipal level. Essential medicines, including some antimalarials (currently amodiaquine and quinine), are provided in kits. Health facilities receive a given number of kits according to expected utilization of services, which is based on past drug distribution, rather than actual drug consumption. The European Union, through its Programa de Apoio ao Sector de Saúde, signed an agreement in June 2007 with the MoH for 10,500 Essential Drugs kits.

Although logistics remain problematic due to the state of the country's roads and communications systems, Angola's road, rail, and telecommunications infrastructure is being rapidly rebuilt. Lack of reliable transportation between national to provincial depots is one of the challenges faced by National Essential Drug Program (NEDP). Transport is typically contracted to private companies but, due to the lack of funds, the MOH has not been able to maintain contracts with these companies. In order to address this problem, the NEDP has been discussing the possibility of using transportation services that are contracted by UNICEF and have them paid for in advance for a certain number of deliveries to the provinces.

Progress to Date:

During the past year, PMI, through the Rational Pharmaceutical Management Plus Project, has been working closely with the National Essential Drug Program (NEDP) and NMCP to strengthen the existing malaria drug quantification, distribution, storage, and monitoring system. New procedures have been established to monitor ACT consumption and allow re-supply based on reported consumption. Beginning in February 2007, this new system was piloted in health centers and the provincial drug warehouse of Huambo Province with an initial training of 36 provincial and district health workers. Since the Rational Pharmaceutical Management Plus Project does not have permanent staff in Angola, PMI funded a British NGO, Mentor, to follow up on the training and oversee ongoing implementation of AL in the province. Working together with the NMCP and NEDP, training manuals in Portuguese have been developed, field tested, and made available to the NEDP and partners for widespread use. These included guidelines in managing stocks of antimalarials at the health facility level; managing antimalarials at the provincial warehouse level; and monitoring and supervision of antimalarial use by health workers.

The initial training course, training manuals, and approach to ACT roll out in Huambo Province were seen as a success by the NMCP and NEDP, and it was agreed that a similar approach should be followed in other provinces. Consequently, PMI and the European Union co-funded a second training of 45 trainers from all 18 provinces in the country. Training of provincial-level health care providers and pharmacy staff has now been carried out in five provinces with cascade training of health workers in health centers and health posts. In addition, the Rational Pharmaceutical Management Plus Project provided technical assistance to inventory and stock management practices at the central medical store in the capital Luanda, Angomedica.

Malaria treatment

Although AL and AS-AQ were approved as joint first-line drugs for uncomplicated malaria in Angola in October 2004, the new policy only began to be implemented in May 2006 in MoH facilities. Implementation of ACTs has proved to be one of the biggest challenges of the NMCP. The initial plan was to roll out ACTs in a selected group of health facilities in the 59 targeted districts in nine provinces (Huambo, Luanda, Bengo, Cabinda, Kwanza Sul, Kwanza Norte, Malange, Uige, and Zaire). Because of limited stocks of AL, the drug was to be prioritized to children under five. Implementation proceeded very slowly. Training on the new drug policy (together with instruction in malaria diagnosis and IPTp) was conducted by a team from the NMCP which began in Luanda and then moved from province to province giving one-week training courses. Except in Luanda, where staff from all MoH facilities were trained, training was limited to staff from provincial government from health facilities located in the provincial capital. By December 2006, training had been completed in nine provinces. It is expected that the ACTs, mainly AL, will be implemented in all provinces, at least in their provincial capitals, by the end of 2007.

Another factor complicating the roll out of ACTs in Angola is that not all provinces and districts are using the same first-line drug for the treatment of uncomplicated malaria. In Benguela Province, where JICA planned their project before the Global Fund purchase of AL, AS-AQ is being implemented as the first-line drug. In Bie Province, where Medecins sans Frontieres had been implementing AS-AQ, the NMCP decided to continue with this combination until AL becomes available. In Zaire Province, AS-AQ has been used in three municipalities where Mentor has been working, but roll out of AL was going on concurrently in 16 health facilities in that province. In the provinces of Lunda Norte, Lunda Sul, and Moxico, the GRA is funding AS-AQ implementation until additional AL becomes available. The NMCP is currently considering the possibility of prioritizing the use of AL and discontinuing the use of the alternative first-line therapy, AS-AQ.

Although remaining stocks of chloroquine and AQ in MoH health facilities are thought to be low, it is still not clear how these drugs will be phased out as AL implementation proceeds. Similarly, no plan exists for phasing out chloroquine from the private sector, and virtually all malaria products, including AL and other ACTs, can be found in private pharmacies.

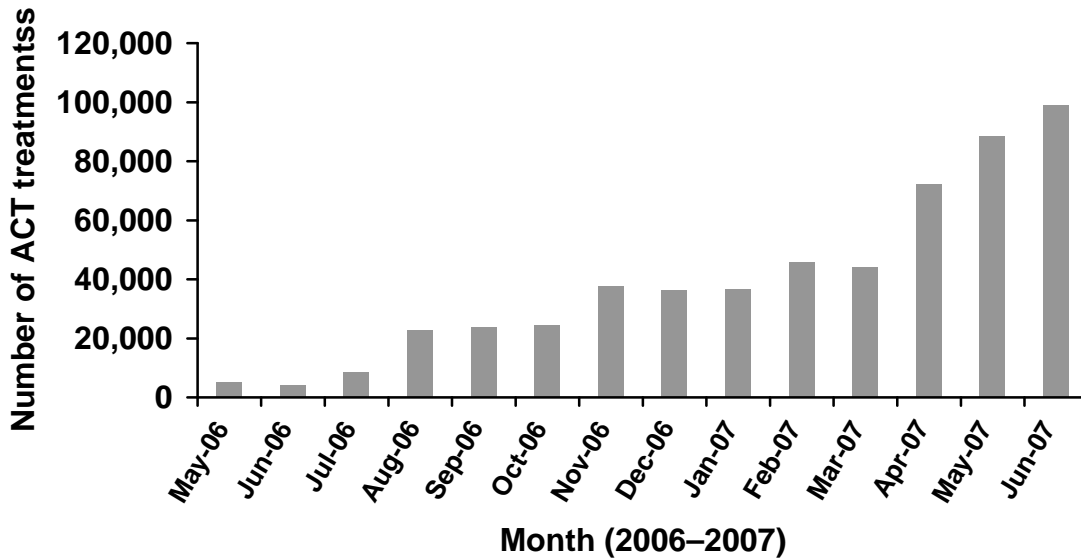
The MoH is buying 3 million ampoules of intravenous quinine and about 150,000 ampoules of intravenous artesunate for the treatment of severe malaria in health facilities. These amounts are expected to cover all needs for the next year. New NMCP treatment guidelines include the possibility of pre-referral treatment with rectal artesunate, but no plans have yet been made for implementation.

Progress to Date:

In January 2007, the NMCP made a change in its policy and extended treatment with ACTs to all age groups throughout the country and the speed of roll out of AL increased dramatically during the following seven months. As of September 2007, 107 of the 164 districts in the country had implemented ACT in at least some health facilities. This includes the initial nine provinces plus Huila, Namibe, Cunene, and Cuando Cubango. A total of 1,759 health workers have already been trained in malaria case management with ACTs and IPTp with SP in these provinces. This expansion is expected to cover the rest of the country before the end of 2007.

As part of the overall roll out of AL nationwide, the NMCP requested that PMI focus its efforts during Year 1 in Huambo Province, the province that reports the second highest number of malaria cases in the country. Luanda Province, where the capital is located reports the highest number of cases in Angola, but it is believed that many of those cases are actually acquired outside the city. Because of concerns about the poor access of local populations to MoH facilities outside the capital, Luanda, it was agreed that PMI would support implementation of AL through the existing NEDP and MoH systems, but with oversight by a locally established NGO. In January 2007, Mentor, an NGO with considerable experience in Angola, was awarded a grant to help speed up and expand implementation of AL and IPTp in Huambo Province. Mentor is working closely with the provincial staff, including the Provincial Malaria Officer, to improve pharmaceutical management and monitoring of drug stocks. Since the AL procured by PMI had not yet arrived in country, PMI negotiated an arrangement with the UNDP–Global Fund office to use AL procured by them to expand the roll out to all health facilities in Huambo Province. Thus far, Mentor has trained health workers in malaria case management in five municipalities, encompassing 41 health facilities. As described in the IPTp section, training in malaria in pregnancy is being carried out simultaneously. The PMI–supported training in pharmaceutical management, and the roll out of ACTs and IPTp in Huambo Province has been seen as a major success by the NEDP and NMCP. As a result, this approach has now been adopted nationwide.

At the same time, the system for monitoring the roll out of ACTs and IPTp has been greatly strengthened and National Program Officers at the provincial level are reporting on a monthly basis to the NMCP the number of patients receiving ACTs and IPTp. The following graph shows the dramatic increase in the number of ACT treatments administered monthly nationwide from May 2006 through June 2007:



Based on the positive experiences with the PMI-supported implementation of AL and IPTp by an NGO in Huambo Province, a second RFA has been released for support to ACT and IPTp implementation, and it is expected that, in September 2007, three to four new awards will be made to NGOs/FBOs to operate in additional provinces as part of the PMI Year 2 work plan. This was made possible by combining funds from Year 2 of PMI and the ExxonMobil donation to PMI. Additionally, several proposals are under consideration through the PMI Malaria Communities Program and it is hoped that at least one proposal from Angola will be recommended for funding. If this happens, it will further increase the number of NGOs expanding malaria control activities into underserved communities.

As part of the National Malaria Strategic Plan for 2008–2012, the NMCP has made the decision to support ACT use at the community level, although it is not clear how this will be accomplished since few areas have community health workers. The NMCP is also interested in a field trial of AL delivery through the private sector. In addition to an increased effort in training of health workers, there is a need to develop supportive supervision strategies, coordination of drug management, pharmacovigilance, and greater integration with Integrated Management of Childhood Illnesses (IMCI).

In the process of updating the National Malaria Strategic Plan (2008–2012) and its respective gap analysis, a refined ACT quantification and budgeting was carried out using the following assumptions: total population of 16 million, a malaria prevalence of 50%, health system coverage of 60% for Luanda and 40% for other provinces, and an average number of malaria episodes per age group varying according to endemicity level. This exercise led to the calculation of a total need of 5.8 million ACT treatments per year for the whole country.

The PMI procured a total of 587,520 AL treatments with Year 1 funds and will procure an additional 4.3 million treatments with Year 2 funds. Through Global Fund Round 3, WHO procured 1.1 million AL treatments in 2005. The Global Fund Round 3 Phase 2 grant does not include procurement of additional AL, but it will fund training in malaria diagnosis, ACT treatment, and IPTp. As evidence of its commitment to malaria control, the GRA has also agreed to begin purchasing 300,000 ACT treatments per year.

Estimated AL needs per year (2007–2008)

Patient weight	Age group	Blister type (tablets)	No. of blisters needed	Percent
5 to 14 kg	Under 3 years	1 x 6 tablets (6)	1,648,489	29
15 to 24 kg	4 to 8 years	2 x 6 (12)	1,116,374	19
25 to 34 kg	9 to 14 years	3 x 6 (18)	1,822,559	31
Above 34 kg	More than 14 years	4 x 6 (24)	1,228,122	21
Total			5,815,544	100

Planned Year 3 PMI Activities:

Diagnosis: (\$1,012,500)

With the cost of AL treatment 15–20 times higher than that of chloroquine, accurate diagnosis is critical to target the administration of AL to infected patients and reduce the unnecessary use of antimalarials that can occur when patients are presumptively treated for malaria. The PMI views malaria laboratory diagnosis as a key component of good case management and will continue to support strengthening of malaria diagnosis in both MoH facilities and those currently managed by NGO/FBOs.

Planned activities during Year 3 are as follows:

1. Work with the MoH and other partners to further update the official strategy and plan for the use of microscopy and RDTs at different levels of the health system and in different epidemiologic settings, e.g., children under five versus older children and adults; areas with seasonal transmission versus those with year-round transmission, etc. (no additional cost to PMI);
2. Conduct a full assessment of the status of malaria laboratory diagnosis in Angola to provide information on needs in terms of staffing, equipment, and training (\$100,000);
3. Purchase compound microscopes (n=43) malaria microscopy kits (n=43 kits, sufficient to diagnose 10,000 patients each) to supplement those procured through the Global Fund Round 3 phase 2 grant (\$200,000);
4. Purchase of approximately 500,000 RDTs (\$450,000);
5. Support laboratory training in malaria diagnosis and quality control. This effort began with the visit of the CDC consultant in Year 2 of PMI and will continue during Year 3 with the following:
 - Technical assistance visit by laboratory expert from CDC;
 - Support to on-the-job training for MoH laboratory workers in malaria microscopy and the use of RDTs;
 - Establish standardized training courses for new laboratory workers and refresher laboratory training;
 - Training of clinicians in the correct use and interpretation of malaria laboratory results and the need to adhere to those results when prescribing treatment; and
 - Develop and implement a plan for quality assurance of microscopy and RDT diagnosis, including regular supervisory visits, a systematic review of a predetermined percentage of positive and negative blood smears, and simultaneous

use of both tests in a small percentage of cases to check accuracy. As part of this activity, a system for monitoring the appropriate use of RDTs and microscopic diagnostic results will be set up in selected health facilities (\$262,500).

Pharmaceutical Management and Treatment: (\$7,275,000)

Ensuring prompt, effective, and safe ACT treatment to a high percentage of patients with confirmed or suspected malaria in Angola represents the single greatest challenge for the NMCP and PMI, given the weaknesses in the country's pharmaceutical management system and the poor access to health care. The complexity of AL implementation must not be underestimated with the short shelf-life of the drug (18–24 months), the high cost of ACTs in commercial markets in Angola (\$30–40 per treatment), the risk of counterfeits, and the high levels of coverage that need to be attained.

As both Global Fund and PMI plan to work within the existing MoH/NEDP system for the distribution of ACTs, it is important that weaknesses in that supply system be addressed as soon as possible. In addition, given the very low access to health care in Angola, PMI in collaboration with the Global Fund Round 7 grant, if approved, will also place a high priority on supporting NGO/FBOs to facilitate ACT implementation in areas that are currently underserved by the MoH. The NMCP estimates that approximately 50% of malaria cases are treated at either private clinics or at the community level. Therefore, PMI will work with the NMCP and other partners to begin exploring ways of engaging the private sector in increasing access to safe and effective treatment. This will be coordinated with efforts to improve case management and malaria prevention of pregnant women in ANCs within the same health facilities, and will include assistance with training and supportive supervision of health care workers, IEC, and M&E.

Due to the relatively low coverage of public health facilities in Angola, the Global Fund Round 7 in collaboration with PMI, plans to expand access to ACTs to children under five years old, through community-based approaches and the private sector. ACTs will be delivered through private sector clinics, pharmacies and NGO–managed community agents, based upon a national minimum standard. This program will include provider training, focusing on the appropriate diagnosis of fever, correct treatment, and prompt referral when danger signs are observed.

Planned activities during Year 3 are as follows:

1. Procure supplies of AL through a central mechanism and distribute through the NEDP system to MoH health facilities (\$4,000,000: \$3,500,00 to support public sector and \$500,000 for private sector supplies of AL);
2. Support a field trial of ACT implementation through the private sector. It is hoped that this initial experience will help planning of future expansion of ACTs in the private sector (\$500,000);
3. Together with the MoH, European Union, and other partners, continue to provide technical assistance to the MoH and NEDP at the central, provincial, and district levels in pharmaceutical management and implementation of ACTs that will address:
 - a. Importing, quality control, storage, and inventory management;
 - b. Coordination with the MoH on quantification and distribution;
 - c. Quality improvement in the context of a multi-donor and decentralized procurement system at all levels;
 - d. Appropriate use;

- e. Training and supportive supervision of health workers at provincial, district, and lower levels to ensure good ACT prescribing and dispensing practices;
 - f. IEC for patients;
 - g. Surveillance for adverse drug reactions and rapid response to reports/rumors of severe reactions;
 - h. Monitoring of implementation/evaluation of coverage;
 - i. Promotion of correct use of ACTs in the private sector through IEC efforts; and
 - j. Monitoring of antimalarial drug quality in the public and private sectors.
- This will be provided by an expert in pharmaceutical management based in country, as well as through short-term technical assistance visits (\$500,000);
4. Develop and implement together with the NMCP and other partners a unified, comprehensive IEC plan for ACTs, IPTp, and ITNs. This plan will include not only national- and provincial-level efforts to promote the use of ACTs, IPTp, and ITNs through television and radio, but will focus its efforts on the community-level and person-to-person health education and promotion. A package of messages to be used at the community level should be produced as a result of this activity (\$200,000);
 5. Continue to support ACT implementation (together with IPTp and distribution of LLINs) through national and international NGO/FBOs working in areas that are currently underserved by the MoH. This will include:
 - a. Continued support in up to five provinces (Huambo Province and the three to four provinces added under the Year 2 PMI RFA);
 - b. Expansion of ACT use in community-based health facilities in those same provinces;
 - c. Issuing of a new RFA further expanding this effort to three to four new provinces during Year 3 of PMI; and
 - d. Dissemination of messages on IEC/BCC related to ACTs, ITNs, and IPTp developed under item 4 described above.

The above activities will be done through continuation of the grant to NGOs/FBOs awarded in PMI Year 2 (\$2,075,000; this funding will be linked to similar funding for IPTp rollout to reduce costs [page 18]).

EPIDEMIC SURVEILLANCE AND RESPONSE

The four southern provinces of Namibe, Cunene, Huila, and Cuando Cubango bordering Namibia are regarded as epidemic-prone, but careful mapping of the epidemic risk in this area has never been carried out. The CDC and NMCP are currently carrying out an entomologic investigation of malaria transmission in this region to better understand the risk and seasonality of transmission. These studies will help inform the decision about the most appropriate malaria control approach for these areas: IRS, ITNs, a combination of both, or strengthening malaria surveillance and rapid response to meteorologic, epidemiologic, and/or entomologic conditions that indicate an impending increase in transmission.

The National Epidemiological Surveillance System collects weekly reports on clinically-diagnosed cases of malaria from the four epidemic-prone provinces in the south. Since not all districts report on a regular basis and there are delays in releasing reports to the NMCP, these data are of limited use for the detection and containment of epidemics. Although the National Malaria Control Strategy for 2008–2012 includes early detection and rapid containment of malaria epidemics as one of its objectives, district- and provincial-level epidemic control plans

do not exist and existing systems for epidemic detection and response are generally weak and poorly organized.

Progress to Date:

To provide up-to-date information on transmission of malaria in southern Angola, CDC and Research Triangle Institute International (RTI), a U.S.-based non-profit NGO, together with the NMCP, began systematic entomologic monitoring in the provinces of Huila, Cunene, and Namibe in February 2007. The field work and initial processing of mosquitoes is being carried out by NMCP entomology personnel who make monthly collections (See page 11 for results).

A supply of spray pumps, protective gear, and insecticide has been stored securely in a 40-foot container in Lubango, the capital of Huila Province. These materials can be used to conduct IRS in response to sudden increases in the anopheline mosquito population.

Planned Year 3 PMI Activities: (\$50,000)

Malaria epidemics in the four provinces bordering Namibia have the potential of causing considerably morbidity and mortality with very little warning. The single greatest obstacle to mounting an effective response to malaria epidemics in the four southern provinces is the lack of detailed and reliable epidemiologic and entomologic information about the geographic and seasonal risks of malaria there. This problem should be remedied by the ongoing entomologic investigations of malaria risk described above.

Planned activities during Year 3 are as follows:

1. Continue to maintain an epidemic response stockpile of antimalarial drugs, insecticides, spray pumps, and protective IRS gear at one (or at most two) provincial level sites in the four southern epidemic-prone provinces. Lubango, the capital of Huila Province, is an attractive site due to its central location and good roads to both Cunene and Namibe Provinces. A system for periodic rotation of consumables in this stockpile will also be developed (\$50,000); and
2. Continue studies of the risk of malaria transmission in Luanda City; Huila, Cunene, and Namibe Provinces in southern Angola; and start in Huambo Province to allow better targeting of IRS and ITN distribution and to monitor mosquito populations. This will include identifying the anopheline mosquito vectors and their seasonal abundance over a period of 12 months, encompassing both rainy and dry seasons at selected sites. Baseline insecticide-resistance data will be collected using the CDC bottle bioassay (costs covered under General Epidemiology/Entomology section, page 12).

CAPACITY BUILDING WITHIN THE NATIONAL MALARIA CONTROL PROGRAM

The NMCP suffers from a lack of trained staff and weak organizational and management capacity at all levels. With funds from Phase I of the Global Fund Round 3 grant, the NMCP has increased its capacity at national level through the recruitment of five National Programme Officers (NPOs), who provide technical support in the areas of M&E, finance, logistics, data management, and IPTp/IMCI. In response to the weak capacity at provincial level, 13 NPOs have been recruited with Global Fund support to enhance management and coordination of

malaria control at the provincial level by working within the Provincial Health Directorates. Provincial NPOs provide technical support on planning, capacity building, implementation, supervision, and M&E of the malaria control activities in their respective provinces. This strategy will be expanded to all 18 provinces using resources from Phase II of Global Fund Round 3, if approved.

At the municipal level, an existing staff member will be designated malaria focal point and trained to collect and report routine malaria surveillance data. This is included in the planned activities to be undertaken as part of Phase II of the Global Fund Round 3 grant, if approved, which will cover one more year.

Progress to Date:

The hiring of the two PMI Malaria Advisors in November 2006 and the improving in-country malaria partnership has helped to catalyze the NMCP. The two PMI advisors spend about 75% of their time at the NMCP offices. Thanks to their daily interaction with the NMCP Director and his staff and the efforts of major partners such as WHO, UNICEF, the UNDP/Global Fund, and several of the larger NGOs, major progress has been made during the last nine months. In-country PMI staff were able to work with NMCP to accomplish the following key activities:

1. Finalize a new costed National Malaria Strategic Plan for 2008–2012 in coordination with the NMCP. This document was used to develop a gap analysis that formed the basis for writing a very high quality and competitive Global Fund Round 7 proposal;
2. Assist in the development of the Global Fund Round 7 proposal together with staff from WHO, UNICEF, PSI, USAID Washington, and CDC Atlanta;
3. Carry out regular supervisory visits to the field. These visits were instrumental in drawing attention to the need for supportive supervision to complement the training activities that have been taking place. As a result, a more regular schedule of supervision by NMCP is now being implemented using standardized supervision tools;
4. Organize the first Malaria Partners' Forum in Angola. It is expected that this Forum will meet on a monthly basis to improve coordination among malaria partners in the country; and
5. Review of PMI and Malaria Communities Program applications to support NGOs/FBOs in malaria prevention and control activities in Angola.

Planned Year 3 PMI Activities: (\$250,000)

With its poor roads and communications and weak health infrastructure, efforts to improve malaria control operations in Angola will depend on a well-trained and active malaria staff at the provincial level. Unfortunately, due to its limited organizational and management capacity at all levels, the NMCP cannot function at its full capacity. While PMI will contract NGOs and FBOs to implement ACTs and IPTp and build management and M&E capacity at provincial and district health facilities, these groups are not well placed to provide the longer-term institutional management, coordination, planning and administrative capacity that is needed in the central and provincial-level malaria programs. For the support of PMI and other partners to have a lasting effect on malaria prevention and control activities in Angola, it will be crucial to address these problems.

During Year 3, the PMI will support: (\$250,000)

1. A needs assessment of the NMCP's capacity in planning, procurement, administration, and finance to strengthen the NMCP at both central and provincial levels. Based on the findings of the needs assessment, support will be provided to the NMCP at different levels to strengthen its administrative and management capacity (\$250,000).

COMMUNICATION AND COORDINATION

Coordination and communication among partners involved in malaria prevention and control in Angola has always been challenging. A Malaria Task Force was formed around the Global Fund proposal made up of MoH, WHO, UNICEF, PSI, and UNDP/Global Fund staff, but NGO/FBOs and other partners working on malaria usually do not participate. As part of the Task Force, malaria technical working groups exist, but in the past they have only met irregularly.

Progress to Date:

Communication and coordination among partners involved in malaria prevention and control in Angola has improved dramatically in the last 12 months. This is due to multiple factors, including increasingly strong leadership from the NMCP with greater willingness to ask for and accept assistance and advice, a growing sense of partnership among the key international and national organizations and groups supporting the NMCP, greater transparency in terms of funding and activities by all partners, and the catalytic effects of placing the two highly experienced PMI Malaria Advisors in the NMCP offices together with the move of several Global Fund-supported National Program Officers to the NMCP.

While much still remains to be done, the very competitive Global Fund Round 7 proposal prepared by the NMCP and its partners is a prime example of what can be accomplished by a strong and effective NMCP supported by a coalition of partners. The Malaria Partners' Forum made up of ten different partners, including UNICEF, WHO, NMCP, PMI, and various NGOs now holds regular monthly meetings to discuss progress and problems related to the implementation of different interventions. The Angolan Red Cross has been elected president and permanent secretary. The PMI; WHO; UNICEF; the HIV/AIDS, Malaria, Sexually-Transmitted Diseases, and Tuberculosis (HAMSET) Control Project; and NMCP have been elected as permanent secretaries. As part of this Forum, malaria technical working groups exist, but they do not meet on a regular basis. The PMI has set funds aside in Years 1 and 2 to hire a secretary for PMI in-country staff. It was hoped that this secretary could also help to organize the logistics of these meetings; however lack of office space at the NMCP has delayed hiring.

Planned Year 3 PMI Activities (no additional cost to PMI):

If the NMCP is to fulfill its leadership role in the malaria control effort in Angola, continuing efforts to improve communication and coordination among the variety of different groups involved in malaria activities in Angola will be needed. The success of the 2008–2012 National Malaria Control Strategy, Phase II of the Global Fund Round 3 grant (if approved), future Global Fund grants, and PMI in Angola will depend on a close and effective working relationship between the NMCP and its partners.

The Malaria Partners' Forum provides an ideal venue to share information with all other national and international partners and ensure good coordination of malaria control activities. The PMI, especially through its in-country staff, should support the partnership by providing administrative support to the regular meetings of the Forum, and participating actively in its various working groups.

Planned activities during Year 2 are as follows (no additional cost to PMI):

1. In-country PMI staff will continue to provide administrative support to the NMCP in the monthly meetings of the Malaria Forum, which should be made up of representatives of the NMCP, WHO, UNICEF, UNDP/Global Fund, private sector, NGOs/FBOs, and PMI;
2. Support and participate in working groups within the Malaria Forum on:
 - a. Surveillance and M&E;
 - b. Diagnosis and treatment;
 - c. Malaria in pregnancy;
 - d. Vector control;
 - e. Epidemic detection and response; and
 - f. Behavior change and communication.

PUBLIC-PRIVATE PARTNERSHIPS

Progress to Date:

Public-private partnerships are a highly attractive means of leveraging additional support and expertise for priority health programs. ExxonMobil, through its Africa Health Initiative and the ExxonMobil Foundation, has been a major contributor to malaria control efforts in Angola. In 2006 and 2007, Exxon Mobil has contributed \$1 million each year to boost malaria control efforts. In 2006, these funds were used to support social marketing of ITNs, IEC to promote increased demand for and correct usage of ITNs and the roll out of ACTs and IPTp, and drug distribution and pharmaceutical drug management. ExxonMobil 2007 funds are being used to support the scale up of malaria case management and IPTp in selected provinces where the government health infrastructure is weak, this is being done as part of a grant to support NGOs/FBOs.

Planned Year 3 PMI Activities: (No additional cost to PMI)

It is hoped that the ExxonMobil Foundation will continue to support the efforts of PMI in Angola in 2008 as well. If funding is available, it will be used to support activities related to ACTs, ITNs, and IPTp, especially in the provinces where these strategies had been initiated to avoid stock outs and strengthen existing systems. These activities will be planned and carried out in coordination with the NMCP, PMI, and other partners to ensure uniformity of approaches and avoid duplication and mixed messages.

Planned activities during Year 3 are as follows:

1. Offer technical assistance to develop plans and strategies to use funds donated by ExxonMobil and other private partners;
2. Oversee execution of activities under these private partners' grants and discuss opportunities for future funding to fill gaps in Global Fund and PMI support to the NMCP; and

3. Offer to provide technical reviews and/or assist with external evaluations of malaria-related proposals presented for funding to ExxonMobil/Esso-Angola and other partners.

MONITORING AND EVALUATION

Monitoring and evaluation strategies measure progress against project goals and targets to identify problems in program implementation, providing information to support program modifications. This is a critical component of malaria control and is given high priority within PMI. In Angola, rapid scale up of malaria prevention and control interventions, and the achievement of high coverage rates with ACTs, ITNs, IPTp, and IRS are common goals of the NMCP, Global Fund, and other national and international partners working on malaria as well as PMI.

The PMI evaluation framework is based on the goal of reducing malaria deaths by 50% and achieving 85% coverage targets with specific interventions over the course of the program. This framework is aligned with the standard methodology for malaria program evaluation that is being adopted and promoted by the Roll Back Malaria Partnership. Program evaluation will be based on coverage outcomes that will be measured at baseline, midpoint, and the end of the Initiative, and impact on mortality, which will be measured at baseline and the end of the Initiative. Information used to evaluate program outcomes and impact in PMI will be collected primarily through household surveys of a representative sample of the national population. All-cause mortality and malaria-specific mortality in children under five (collected through verbal autopsies) will be interpreted together with data on anemia, parasitemia, available information on malaria cases and deaths reported from sentinel health facilities, external factors (such as rainfall), and coverage indicators to account for changes in mortality at the population level that can be attributed to reductions in malaria over the course of PMI.

The PMI monitoring framework aims to complement and support the existing NMCP M&E efforts. The collection of this information is done by PMI in-country personnel so as to avoid an additional burden to NMCP staff. According to the PMI framework, specific activities are monitored on a regular basis to allow in-country program managers to assess progress and redirect resources as needed. Activities within the four main intervention areas, ITNs, IRS, IPTp, and case management with ACTs, will be tracked through periodic reports from groups providing commodities, health facilities, and international and local partners. Types of activities that will be monitored will include procurement and distribution of commodities, availability of commodities for prevention, diagnosis and treatment of malaria, health worker performance, IEC efforts, and supervision and training for healthcare workers. To supplement this information, targeted operational evaluations and record reviews may be required to answer specific questions or identify problems with program implementation.

Progress to Date:

The first nationwide health survey in more than 20 years in Angola was the MIS conducted in late 2006–2007 with funding from the PMI and Global Fund. A total of 2,566 households were surveyed. According to this survey, 28% of households nationwide owned one or more ITNs and 18% of children under five and 20% of pregnant women had slept under an ITN the night before the survey. The proportion of children under five with a fever treated with ACT within 24

hours of the onset of illness and the proportion of pregnant women receiving two doses of IPTp were 1.5% and 2.5%, respectively, but it should be noted that both of these interventions were only adopted in 2005 and have not yet been implemented nationwide. About 19% of children under five had malaria parasitemia and 3.6% had severe anemia (hemoglobin <10 g/dl). Information on the proportion of houses targeted for IRS that have been sprayed is collected and reported to the NMCP as part of routine IRS operations.

To complement the data on coverage of interventions from the MIS, malaria parasitemia and hemoglobin levels in children under five and pregnant women were measured concurrently. The standard methodology for an MIS does not include an estimation of mortality. In Angola, the most up-to-date mortality data was from the 2001 MICS. For this reason, the MIS in 2006–2007 was adapted to provide direct estimates of all-cause mortality rates in children under five for the period five years prior to the survey. In addition, baseline data on malaria-related mortality in children under five was collected through verbal autopsies.

The National Institute of Statistics is expected to conduct a third Multiple Indicator Cluster Survey (MICS) in May–June 2008, supported by UNICEF. The MICS will look at a broad range of health indicators, including malaria. The quantitative data garnered from the MICS will include coverage and use of LLIN, fever prevalence among children under five, and treatment of malaria. The PMI will contribute to this survey to obtain mid-point coverage data for ITNs, IPTp, and ACTs.

The NMCP has been working to establish a Malaria Sentinel Site Surveillance System, which is intended to support the larger National Epidemiological Surveillance System by collecting data on malaria morbidity and mortality from selected health facilities. Sentinel sites in health facilities make it possible to track changes in malaria-specific mortality, all-cause mortality, parasitemia, anemia, and coverage of malaria control interventions for the population who access those facilities. Such data can complement existing data sources, allowing program managers to monitor changes of disease over time and serving a vital role in M&E activities in support of the PMI.

In addition, there is in-country interest to support the National Epidemiological Surveillance System. The data management capacity of the NMCP has recently improved. The NMCP now has a full time M&E officer and data manager hired with Global Fund support. A supervision and reporting system have been put in place by this M&E officer to gather malaria indicators on a monthly basis, including data on malaria commodity consumption and malaria. The Global Fund Round 7 proposal, which focuses on building capacity in M&E at the municipal and provincial level, and in implementing regular data collection, is expected to complement PMI support in this area, if approved.

Planned Year 3 PMI Activities: (\$1,112,500)

1. Monitoring and Evaluation System Strengthening Tool: In line with RBM Partnership recommendations, PMI supports a single, harmonized national M&E plan for national malaria control programs. The PMI will support a workshop in late 2007 during which the NMCP and partners will use the Monitoring and Evaluation System Strengthening Tool (MESST) developed by Global Fund to assess the country's existing M&E system and help guide the NMCP and partners towards a unified plan (\$60,000);

2. 2006–2007 Malaria Indicator Survey: Some costs associated with the with final stages of data cleaning, analysis, and reporting for the 2006–2007 MIS were not covered with Year 2 PMI funds, including standardized coding for the verbal autopsies (\$265,000);
3. Standardized coding of verbal autopsies of 2006–2007 MIS: Information on verbal autopsy was collected as part of the 2006–2007 MIS but now needs to be coded and analyzed. It is crucial that this task be accomplished in a way to not only guarantee the quality of the analysis but also ensure harmonization with the recently developed verbal autopsy tools and international coding of diseases, ICD–10, that WHO is expect to publish by the end of 2007 (\$100,000);
4. 2008 Multiple Indicator Cluster Survey: The PMI will contribute to the MICS, which is planned for mid-2008 to obtain data on mid-term indicators for PMI (\$400,000);
5. Sentinel Site Surveillance and Monitoring of Progress: The PMI will support the NMCP malaria sentinel site surveillance system to strengthen collection of information on malaria morbidity and mortality at selected health facilities. The PMI is developing a plan for sentinel site surveillance and this plan will be adapted for use in Angola to provide the common set of sentinel site indicators for use in PMI. In addition, CDC staff will conduct one technical assistance visit to assist the NMCP with the sentinel site surveillance system and the integration of the system into the M&E for malaria control within Angola (\$262,500); and
6. Malaria survey in Luanda: According to the national surveillance system, Luanda Province reports the highest number of malaria cases in country; however, entomologic surveillance suggests that transmission, at least in the more heavily urbanized areas of the city, is extremely low. To assess the incidence of malaria in Luanda, PMI will carry out an evaluation in up to 20 randomly selected health facilities to validate the proportion of parasitemic cases among fever cases, and collect additional information on place of residence and travel history to determine the probable place of infection. The field work associated with this activity is to be covered with Year 1 and Year 2 PMI funds. The PMI is setting aside money in Year 3 to cover technical assistance visits by CDC staff (\$25,000).

STAFFING AND ADMINISTRATION

Planned Year 3 PMI Activities: (\$1,600,000)

Both the USAID and CDC in-country Malaria Advisors assumed their posts in late 2006. They have been provided with space within the NMCP offices and spend most of each work day there. This has greatly improved communication and coordination between PMI and NMCP, however their working space is small and inadequate, and needs to be upgraded. In the afternoons both advisors work out of the USAID Mission. In addition, one or more Foreign Service Nationals are expected to be hired to support the PMI team.

All PMI staff members are part of a single inter-agency team led by the USAID Mission Director or her designee in country. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, management of collaborating agencies, and supervision of day-to-day activities. Both staff members will report to the USAID Mission Director or her designee. The CDC staff person will be supervised by CDC, both technically and administratively. All technical activities will be

undertaken in close coordination with the MoH/NMCP and other national and international partners, including the WHO, UNICEF, Global Fund, World Bank, and the private sector.

Locally-hired staff to support PMI activities either in Ministries or in USAID will be 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.

ANNEXES

Table 2

**President's Malaria Initiative — Angola
Planned Obligations for FY08 (\$)**

Planned Activity	Mechanism	Budget (<i>commodities</i>)	Geographic Area	Description of Activity	Relation to Interventions
PREVENTIVE ACTIVITIES					
Entomologic evaluation of malaria risk areas	CDC/RTI–Integrated Vector Management Project	25,000 (CDC TDY) 30,000 (RTI)	Cunene, Huila Namibe, Huambo, Luanda City	Continue and start evaluation of malaria risk in Cunene, Namibe, Huila, and Huambo Provinces and Luanda City until 12 months of data is collected	IRS and ITNs
Entomologic monitoring/insecticide resistance testing	CDC/RTI–Integrated Vector Management Project	30,000 (CDC) 50,000 (RTI)	To be determined	Increase capacity for entomologic monitoring/resistance testing in NMCP	IRS and ITNs
Procurement and distribution of LLINs	Grant to UNICEF	4,415,000 (4,415,000)	Nationwide	Purchase/distribution of 440,000 LLINs to pregnant women/children <5 through clinics, outreach programs and child health days	ITNs
Social marketing of LLINs	Population Services International	500,000 (200,000)	Luanda and major urban areas	Purchase and distribution of subsidized/full-cost LLINs in Luanda, IEC	ITNs
Indoor residual spraying	RTI–IRS IQC	2,150,000 (400,000)	Huila and Huambo Provinces	Procurement of insecticide, spray equipment/supplies; spraying of 110,000 households; pre- and post-campaign surveys	IRS
Roll out of IPTp by NGOs/FBOs in underserved areas	Grants to NGOs/FBOs through USAID–World Learning grant	500,000	Nationwide	Health worker training/development; printing and dissemination of IEC materials and ANC registers related to IPTp	IPTp
SUBTOTAL: Preventive Activities		7,700,000 (5,015,000)			

Planned Activity	Mechanism	Budget (<i>commodities</i>)	Geographic Area	Description of Activity	Relation to Interventions
CASE MANAGEMENT ACTIVITIES					
Assessment of malaria laboratory capacity	New Diagnostics RFA	100,000	Nationwide	Assessment of current status of malaria laboratory diagnosis	Case management
Procurement of microscopes/laboratory supplies	New Diagnostics RFA	200,000 (200,000)	Nationwide	Procurement of laboratory diagnostic equipment and supplies based on results of assessment	Case management
Procurement of RDTs	DELIVER	450,000 (450,000)	Nationwide	Procurement of 600,00 Paracheck [®] RDTs	Case management
Laboratory training in malaria diagnosis/quality control	CDC Interagency Agreement/New Diagnostics RFA	12,500 (CDC TDY) 250,000 (New Diagnostics RFA)	Nationwide	Training of public and private sector malaria microscopists/lab. workers in RDT use	Case management
Procurement of artemether-lumefantrine for the public and private sectors	DELIVER	4,000,000 (4,000,000)	Nationwide	Purchase of artemether-lumefantrine	ACTs
Pilot implementation of ACTs in the private sector	Competed cooperative agreement	500,000	Selected provinces	Purchase and implementation of artemether-lumefantrine	Case management
Strengthen MoH antimalarial drug management system	Strengthening Pharmaceutical Systems	500,000	Nationwide	Strengthen pharmaceutical mgmt. related to antimalarial drugs including regular supervision	ACTs
Support to IEC related to ACTs, IPTp, and ITNs	Population Services International	200,000	Nationwide	Develop and implement unified, comprehensive IEC plan for ACTs, IPTp, and ITNs	ACTs, IPTp, and ITNs

Planned Activity	Mechanism	Budget (<i>commodities</i>)	Geographic Area	Description of Activity	Relation to Interventions
CASE MANAGEMENT ACTIVITIES (cont)					
Roll out of AL treatment by NGOs/FBOs in underserved areas	Grants to NGOs/FBOs through World Learning	2,075,000	3–4 additional provinces	Implement ACT treatment of malaria in areas not currently served by the MoH and include IEC/BCC related to ACTs, ITNS, IPTp in the same areas	ACTs
SUBTOTAL: Case Management		8,287,500 (4,650,000)			
OTHER ACTIVITIES					
Epidemic response stock pile	RTI–Integrated Vector Management Project	50,000 (50,000)	Four southern provinces	Stockpile of insecticides, ACTs, and RDTs to respond to epidemics	Epidemic response
NMCP capacity building in financial, program management and M&E	Chemonics	250,000	Luanda	Training of NMCP staff in financial and program management and M&E	General
SUBTOTAL: Other Activities		300,000 (50,000)			
MONITORING AND EVALUATION					
Monitoring and Evaluation Strengthening System Tool (MESST)	Chemonics	60,000	Nationwide	Support to national malaria M&E plan	M&E
2006–2007 MIS	ORC Macro Follow-on	265,000	Nationwide	Remaining costs for data analysis from 2005–2006 baseline MIS	M&E
Standardized coding of verbal autopsies of 2006–2007 MIS	Measure/Evaluation Request for Task Order Proposal	100,000	Nationwide	Standardize coding of verbal autopsies	M&E

Planned Activity	Mechanism	Budget (<i>commodities</i>)	Geographic Area	Description of Activity	Relation to Interventions
MONITORING AND EVALUATION (cont)					
2008 MICS	UNICEF grant	400,000	Nationwide	Support for MICS to collect midpoint coverage estimates for PMI	M&E
Strengthening sentinel site surveillance; monitoring of program implementation	Chemonics	250,000 12,500 (CDC TDY)	Nationwide	Support to national malaria M&E plan	M&E
Malaria survey in Luanda	CDC	25,000 (CDC TDY)	City of Luanda	Estimate malaria burden in Luanda City	M&E
SUBTOTAL: Monitoring and Evaluation		1,112,500 (0)			
IN-COUNTRY MANAGEMENT AND ADMINISTRATION					
In-country staff; Administrative expenses	CDC/USAID	1,600,000	Nationwide	Salaries/support of in-country PMI staff	All interventions
SUBTOTAL: Management/Admin.		1,600,000			
GRAND TOTAL		19,000,000 (9,715,000)	<i>Commodities represent 51% of total budget</i>		

Table 3

**Angola — Year 3 Targets
Assumptions and Estimated Year 3 Coverage Levels**

Year 3 PMI Targets:

- *A total of 2,300,000 additional free LLINs will have been distributed by different NMCP partners (with 440,000 contributed by PMI) to children under five and pregnant women. An additional 200,000 highly-subsidized LLINs will have been distributed in Luanda and other urban areas with PMI support. This is expected to bring household ownership of one or more ITNs to 70% nationwide;*
- *At least 85% of houses targeted for IRS in Huila Province will be covered in a third annual round of spraying and IRS will be initiated in Huambo Province, one of the most malarious provinces in the country (a total of approximately 100,000 households will be sprayed, benefiting more than 500,000 residents);*
- *Epidemic response capacity will be established in Namibe and Cunene provinces, as part of a transition from IRS to increased LLIN coverage and improved case management;*
- *Intermittent preventive treatment of pregnant women with SP will have been implemented in all government health facility in all 18 provinces. In Huambo Province and up to nine other provinces (to be selected), IPTp will have been implemented in all health facilities. This is expected to increase IPTp coverage to 35% of all pregnant women nationwide.*
- *Malaria case management with ACTs will have been implemented in all health facilities with microscopy in all 18 provinces. In Huambo Province and up to nine other provinces (to be selected), ACTs will have been implemented in all health facilities. This is expected to increase ACT coverage to 35% of all children under five nationwide.*

Assumptions:

Population of Angola (estimated): 16,000,000

Pregnant women: 4% of total population = 640,000 pregnant women

Infants (children <1): 3% of population = 480,000 infants

Children <5: 20% of population = 3,200,000 children under five

Average number of malaria-like illnesses per year and cost per AL treatment: (number of episodes per age group varies according to endemicity level)

Children 6 months to 3 years old: 0.25 to 2.5 illnesses/year at \$0.45 each treatment

Children 4 years to 8 years old: 0.25 to 1.5 illnesses/year at \$0.90 each treatment

Children 9 years to 13 years old: 0.25 to 1.0 illnesses/year at \$1.35 each treatment

Children above 14 years old and adults: 0.25 to 0.5 illnesses/year at \$1.80 each treatment

Average of 2.5 nets/household needed to cover all pregnant women and children under five in a household.

Inter-vention	Needs for 100% Nationwide Coverage over 5 Years*	Needs for 85% Nationwide Coverage over 5 Years*	Annual Needs to Achieve 100% Coverage	Needs to Achieve Year 2 PMI Targets	Year 2 Contributions
IPTp	600,000 pregnant women x 2 treatments/woman = 1.2 million treatments/year x 5 years = 6 million treatments	5.1 million SP treatments	1.2 million SP treatments	Target: 35% of pregnant women receive 2 doses of IPTp = 420,000 treatments	MoH — 3 million SP treatments to arrive early 2006; Sufficient SP available to achieve 100% coverage, if fully implemented
LLINs	2.3 million households x 2.5 nets/household = 5.75 million nets	4.9 million LLINs	980,000 LLINs	Target: 60% of households with one or more ITNs 2.3 million x 60% = 1,380,000 LLINs	GLOBAL FUND — 791,000 USG (PMI) — 400,000 JICA (Benguela) — 180,000 World Food Program — 170,000 TOTAL = 1,541,000 LLINs Thus, more than 100% of Year 2 LLINs needs are met
ACTs — children < 5	3 million children under 5 x 3.5 episodes/year = 10.5 million treatments/year x 5 years = 52.5 million	10.5 million x 85% = 8.9 million treatments x 5 yrs = 44.5 million	10.5 million treatments	Target: 25% of children under 5 receive ACTs nationwide 10.5 million x 25% = 2.6 million treatments	GLOBAL FUND — \$5.5 million USG (PMI) — \$4.0 million JICA (Benguela Province) — \$400,000 TOTAL available for ACTs = \$9.9 million.
ACTs — older children	6 million older children x 2.0 episodes/year = 12 million treatments/year x 5 years = 60 million	12 million x 85% = 10.2 million x 5 yrs. = 51 million	12 million treatments	12 million x 25% = 3 million treatments	If all 2.6 million child treatments are covered at \$0.45/treatment = \$1.2 million + all 3 million older child treatments are covered at \$1.00/treatment = \$3 million + all 750,000 adult treatments are covered at \$1.80/treatment = \$1.4 million = total of \$5.6 million needed Thus, more than 100% of Year 2 ACT needs are covered.
ACTs — adults	6 million adults x 0.5 episodes/year = 3 million x 5 years = 15 million treatments	3 million x 85% = 2.55 million x 5 years = 12.8 million	3 million treatments	3 million x 25% = 750,000 treatments	

IRS	107,000 houses sprayed by PMI in 2006 in Cunene and Huila Provinces + 25,000 houses sprayed with GLOBAL FUND funding in 2006 in Namibe Province + one additional township = 140,000 houses	140,000 x 85% = 119,000 houses annually	140,000 households	Target: <i>85% of targeted houses to be sprayed</i> 119,000 households to be sprayed	USG (PMI) — 140,000 houses scheduled for spraying in provinces of Cunene, Huila, and Namibe Thus, 100% of Year 2 needs are met.
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*These calculations are based on the assumption that the total population of Angola is at risk of malaria. Since malaria transmission probably does not occur in large areas of the capital, Luanda, which represents 25% of the country's population, it is likely that only 80–85% of the population is at risk of a malaria infection and needs preventive and curative malaria services.

Table 4

**President's Malaria Initiative — Angola
Year 3 (FY08) Estimated Budget Breakdown by Intervention**

Area	Commodities		Other		Total	
	\$	%	\$	%	\$	% of Grand Total
Insecticide-treated nets	4,615,000	94%	300,000	6%	4,915,000	25%
Indoor residual spraying	400,000	19%	1,750,000	81%	2,150,000	11%
Case management	4,650,000	57%	3,637,500	43%	8,287,500	43%
Intermittent preventive treatment of pregnant women	0	0%	500,000	100%	500,000	3%
Monitoring and evaluation	0	0%	1,112,500	100%	1,112,500	6%
Epidemic detection and response	50,000	100%	0	0%	50,000	<1%
Other activities	0	0%	385,000	100%	385,000	4%
Staffing and administration	0	0%	1,600,000	100%	1,600,000	8%
Total	9,715,000	51%	9,285,000	49%	19,000,000	100%

Table 5**Year 3 (FY08) Budget Breakdown by Partner***

Partner Organization	Geographic Area	Activity	Budget
UNICEF	Nationwide	Procurement of LLINs; MICS	4,415,000
DELIVER	Nationwide	Procurement of diagnostic equipment and supplies, RDTs, AL	4,450,000
RTI IRS-IQC	Huila and Huambo Provinces	IRS, entomologic surveillance and insecticide monitoring	2,200,000
World Learning — competed sub-grants to NGOs/FBOs	3–4 provinces	ACT and IPTp implementation in underserved areas	2,575,000
Strengthening Pharmaceutical Systems	Nationwide	Strengthening MoH drug management system	500,000
New Diagnostics RFA	Nationwide	Procurement of microscopes/laboratory supplies; training/quality control of malaria diagnosis	550,000
Newly competed cooperative agreement	Selected provinces	Pilot ACTs in private sector	500,000
Population Services International	Nationwide	Procurement and social marketing of LLINs; develop and implement unified comprehensive IEC plan; support IEC (ACTs, ITNs, IPTp)	700,000
RTI IVM	Epidemic-prone provinces	Malaria risk evaluation; entomologic monitoring; purchase commodities for epidemic response	130,000
ORC Macro follow on	Nationwide	MICS survey	265,000
Measure/Evaluation	Nationwide	Verbal autopsies analysis for the 2006–2007 MIS	100,000
UNICEF	Nationwide	MICS	400,000
Chemonics	Nationwide	Sentinel site surveillance	250,000
Chemonics	Nationwide	Capacity building in financial/program management	310,000
CDC	Nationwide	Technical assistance related to entomological evaluation of malaria risk, entomological capacity building, laboratory strengthening, M&E	105,000

*Does not include staffing/administration of \$1,600,000