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**PRESIDENT'S MALARIA INITIATIVE**  
**Malaria Operational Plan — Year Four (FY09)**

**ANGOLA**

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**ABBREVIATIONS**

ACT — artemisinin-based combination therapy  
AL — artemether-lumefantrine  
ANC — antenatal clinic  
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 — Japan International Cooperation Agency  
LLIN — long-lasting insecticide-treated net  
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  
PMI — President’s Malaria Initiative  
PMTCT — prevention of mother to child transmission  
PSI — Population Services International  
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 nationwide Malaria Indicator Survey conducted between November 2006 and April 2007. According to this survey, 11% of households 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 had not yet been implemented nationwide at the time of the survey. Before the PMI-supported indoor residual spraying (IRS) campaigns in southern Angola in 2006, no large-scale IRS had been carried out in Angola for more than 10 years.

Angola is currently finishing Phase II of a 5-year, \$38 million malaria grant from the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) and is about to sign a five-year, \$78 million Round 7 Global Fund grant. UNICEF and the World Health Organization have been major partners with the National Malaria Control Program (NMCP) in scaling up interventions. An effective partnership with ExxonMobil has resulted in an annual \$1 million donation to USAID over the last three years to further PMI objectives in Angola.

The Year 4 PMI Malaria Operational Plan for Angola was based on progress and experiences from Years 1-3, and was developed during a planning visit carried out in June 2008 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 activities PMI is proposing to support fit in well with the NMCP's National Malaria Control Strategy 2008-2012. Since Angola was successful with its Global Fund Round 7 grant proposal, PMI activities are designed to complement activities supported under that grant.

**Indoor residual spraying (IRS):** 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 139,700 houses, protecting a total population of more than 745,061 in two provinces, Huila and Huambo. More than 85% of the houses targeted for spraying were sprayed. During Year 4, IRS will be continued in the Huambo Province, the

second most malarious province in the country and at a reduced coverage in the province of Huila, which reports the most cases of malaria among the southern provinces. During Year 4, it is expected that a total of 120,000 households will be protected by IRS, benefiting an estimated 700,000 residents.

**Insecticide-treated nets (ITNs):** Insecticide-treated net ownership rates in Angola were estimated to be 11% when PMI began. During Year 3, PMI procured more than 380,000 long-lasting ITNs (LLINs) for distribution nationwide to pregnant women and children. These LLINs are being delivered free of charge through antenatal and immunization clinics. To complement this free distribution, approximately 40,000 subsidized or full-cost LLINs were distributed through commercial markets in major urban areas. Other partners are providing approximately 1.1 million LLINs. In addition, a PMI-supported malaria survey in the capital, Luanda, showed very low rates of malaria infection, except in the outskirts of the city. Since the population of Luanda represents about 25% of the country's population, this finding will allow the NMCP and PMI to target their vector control interventions on higher risk areas in other parts of the country.

With many residents unable to afford the cost of an LLIN, 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 highly- or partially-subsidized prices through the commercial market in urban areas to those who can afford them. During Year 4, approximately 1.8 million LLINs will be procured by all partners, with 400,000 contributed by PMI; approximately half will go toward the planned 2009 nationwide measles-ITN campaign while half will be reserved to sustain routine free distribution through antenatal and immunization clinics. Free nets procured by PMI will not be targeted to the capital, Luanda, where malaria transmission has been shown to be extremely low. Another 70,000 to 80,000 LLINs will be sold at subsidized prices in urban areas, of which PMI will contribute about 30,000. The 2009 integrated measles-ITN campaign is expected to achieve 80% coverage of all children under five years of age.

**Intermittent preventive treatment of malaria in pregnancy (IPTp):** About 80% of women in Angola attend antenatal clinics at least once during their pregnancy. Implementation of IPTp in Angola began in May 2006 together with the roll out of ACTs, at which time, it was estimated that IPTp coverage was no more than 2%. During Year 3, PMI supported the scale up of IPTp, including health worker training and information, education, and communication (IEC) to promote IPTp, together with ACT implementation in five provinces through non-governmental organizations (NGOs). As of June 2008, more than 1,000 health workers had already been trained in IPTp. Together with other partners, IPTp has now been implemented in all 164 municipalities nationwide. The PMI will continue this support during Year 4. 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. Focused IEC/BCC efforts surrounding malaria prevention in pregnancy during ANC visits will encourage women to visit ANCs for their IPTp and we expect IPTp-2 coverage to increase to 45% nationwide among women who use health facility services of prenatal care.

**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, 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 2 and 3, PMI supported the introduction and expansion of AL distribution in five provinces. This has been accompanied by technical assistance to the National Essential Drugs Program and the NMCP to strengthen the pharmaceutical management system at the national, provincial, and health facility levels. Training materials and guides for malaria case management and pharmaceutical management were developed and health workers trained. Also in Year 3 PMI is procuring 4.5 million AL treatments, of which 2.6 million have already been delivered in-country and are being distributed to provinces. In collaboration with other partners, management of malaria with AL therapy has now been implemented in all 18 provinces in the country and more than 1,000 health workers have been trained. Currently, an average of 140,000 AL treatments per month is being administered nationwide. During Year 4, the scale up of AL will be continued through NGOs in two to four additional provinces, with the aim of reaching nine of the 18 provinces in the country. PMI will also procure an additional 4.4 million additional AL treatments

**Monitoring and evaluation:** During the past year, PMI in-country advisors worked with the NMCP and other partners to develop a comprehensive, costed, national plan for monitoring and evaluation to which all donors can contribute. Sentinel sites for surveillance of malaria morbidity and mortality were established in health facilities in four of the five provinces where PMI is supporting NGOs to scale up malaria prevention and treatment measures. During Year 4, this network of sentinel surveillance sites will be expanded to all eight to nine provinces where PMI-supported NGOs will be working.

The proposed FY09 PMI budget for Angola is \$18.7 million. Of this amount, 48% will support malaria diagnosis and procurement and roll out of ACTs, 23% insecticide-treated nets, 14% IRS and 3% IPTp. More than 53% 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 and distribution of 826,000 free long-lasting ITNs (LLINs), of which PMI contributed 420,000 as part of a nationwide measles immunization campaign in July 2006. Large-scale implementation of ACTs and IPTp began in mid-2006 and has progressed rapidly with support from PMI (FY07 and FY08 funding) and other partners, in spite of the weak health infrastructure outside of the capital and major cities.

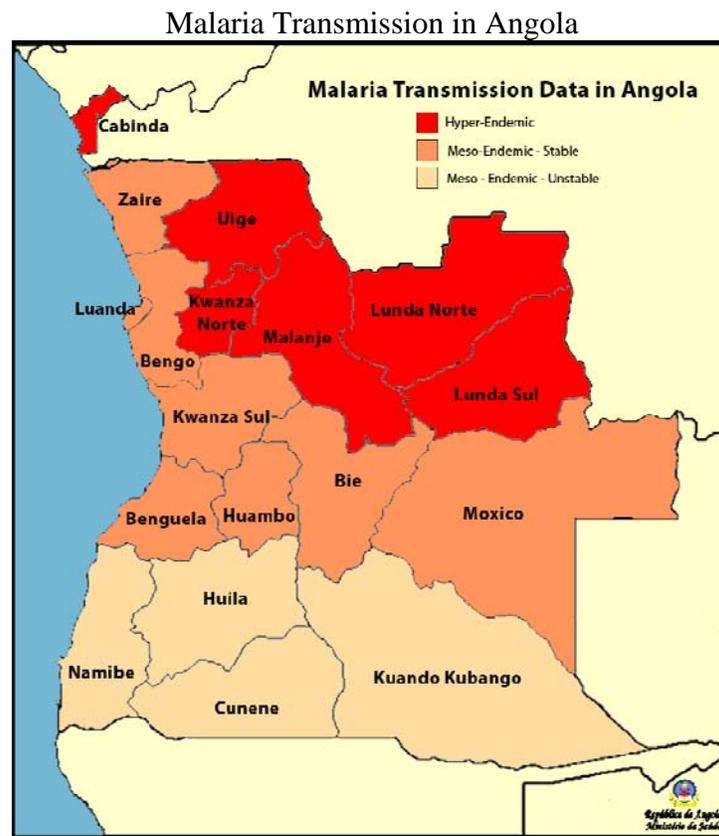
This FY09 Malaria Operational Plan presents a detailed implementation plan for the fourth year of PMI in Angola, based on the PMI 5-Year Strategy and Plan and the NMCP 5-Year Strategy. It was developed in close consultation with the Angolan National Malaria Control Program (NMCP), with participation of national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the 2008-2012 National Malaria Control Strategy and Plan and build on investments made by PMI and other partners to improve and expand malaria-related services, including the recently approved Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) Round 7 malaria proposal. 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 4 activities.

## **MALARIA SITUATION IN ANGOLA**

In 2002, Angola 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 at 250 deaths per 1,000 live births, and maternal mortality is estimated to be 1,280 per 100,000 live births.

Malaria is hyperendemic in northeastern Angola and Cabinda Province. The central and coastal areas are largely mesoendemic 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. Until recently, the extent of malaria transmission in Luanda City has been unclear; 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. However, a recent PMI-supported study has now shown that malaria transmission in Luanda City is very low.



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. As part of its decentralization plan, the MOH has proposed to increase funding to each district and to allow districts to play a greater role in managing disease prevention and control activities within their borders.

## **Funding of malaria control activities**

Angola is currently in Phase II of its \$38 million Round 3 Global Fund grant, which ends in September 2008, and performance has improved significantly during the last two years. The United Nations Development Fund (UNDP) is the Principal Recipient. In 2007, Angola was awarded a \$78 million Round 7 malaria grant. For the first time, the MOH will be the Principal Recipient, with World Health Organization (WHO), United Nations Children's Fund (UNICEF), and Population Services International (PSI) as sub-recipients. A Program Management Unit for the Global Fund grant is being established within the MOH with USAID technical support. This grant includes approximately \$35 million for ITNs, \$17 million for ACTs and case management, \$19 million for general health systems strengthening, and \$6 million for IEC, all over five years. The total funding for Year 1 is \$17.9 million and for Year 2 will be \$14.5 million.

## **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 only just 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:

<b>PMI Baseline Information</b>	
<b>Indicator</b>	<b>2006–2007 MIS</b>
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	1.5%

received treatment with an ACT within 24 hours of onset of fever	
Targeted houses adequately sprayed with a residual insecticide in the last 12 months	85%**

\* The estimated PMI 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 usually considered that 100% of Angola’s population is at risk of malaria, transmission has been shown to be very low in the most heavily urbanized areas of the capital, Luanda, where 20-25% of the country’s population resides. Thus, it is reasonable to assume that only 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 IRS<sup>1</sup>;
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 FOUR

By the end of Year 4 of PMI in Angola (31 March, 2010), the following targets will have been met:

### Prevention:

- A total of 1,800,000 additional free LLINs will have been procured and/or distributed by different NMCP partners (with 400,000 contributed by PMI) to children under five and pregnant women. An additional 50,000 full-cost or highly-subsidized LLINs will

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

- 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 Huambo and Huila Provinces will be covered in a third annual round of spraying. A total of approximately 120,000 households will be sprayed, benefiting more than 600,000 residents;
  - Intermittent preventive treatment of pregnant women with SP will have been implemented in government hospitals and health centers in all 18 provinces. This is expected to increase IPTp coverage with two doses of sulfadoxine-pyrimethamine (SP) to 45% of all pregnant women nationwide.

Treatment:

- Malaria case management with ACTs will have been implemented in government hospitals and health centers in all 18 provinces. This is expected to increase ACT coverage to 45% of all children under five nationwide.

## **PREVENTION ACTIVITIES**

### **General Epidemiology/Entomology – Targeting Use of IRS and ITNs**

Although Luanda Province, which includes the capital Luanda, reports more cases of malaria annually than any other province in the country, strong evidence of malaria transmission in the highly urbanized areas of the capital has been lacking. 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 better 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 organization, together with the NMCP, began monthly 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 was carried out by NMCP entomology personnel.

Luanda: Between January 2007 and January 2008 entomologic surveillance was carried out in five of the nine districts making up the city of Luanda. Only 35 *Anopheles* mosquitoes together with more than 10,342 *Culex* and *Aedes* specimens were collected during surveillance of 350 houses and no suitable breeding sites were found. Twenty-one of the 35 *Anopheles* collected in Luanda came from the peri-urban municipality of Viana. These entomologic data suggest that malaria transmission is very low in the urban center of Luanda but may still a problem in the outskirts of the city.

To complement the entomologic studies in Luanda, CDC, in coordination with the NMCP and provincial authorities, conducted an epidemiological survey in 30 selected health facilities from the urban, peri-urban, and more rural municipalities making up Luanda Province in March 2008. The objective was to determine the proportion of outpatients with fever or a history of fever that had laboratory-confirmed malaria. Thirty patients were enrolled in each facility for a total of 864 patients. Each patient underwent blood testing for malaria (both RDT and microscopy) and answered a questionnaire. Of those enrolled, only 3.7% had laboratory-confirmed malaria and nearly all of them came from the peri-urban municipalities of Viana and Cachuaco. When stratified by distance of health facility from the city center, 1.4% of patients at health facilities located less than 15 km from the city center had malaria compared with 9.2% of patients presenting at health facilities located 15 km or more from the city center. These results confirm the need to improve laboratory diagnosis of malaria in the urban and peri-urban parts of Luanda to better target the use of antimalarial drug therapy and focus vector control measures on the rural areas of the province.

Southern provinces: In Huila, Cunene, and Namibe Provinces, NMCP staff collected 336 *Anopheles* mosquitoes together with more than 4135 *Culex* and *Aedes* specimens from 568 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 to train entomologists in new approaches to vector taxonomy and identification, and insecticide-resistance testing using the bottle test assay 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. A site has been located at the National Institute of Public Health in Luanda, a request for quotations to build the insectary issued, and work is expected to be completed by the end of 2008. In addition, a biologist from the Instituto Nacional de Saude Publica was sent to a training workshop supported by PMI in Maputo, Mozambique from May to June 2008. This biologist and the two current NMCP entomology technicians are part of the plan to improve the NMCP capacity to carry out entomologic surveillance.

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. Species identification will be 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 Huambo and Huila provinces and the three southern provinces. Entomologic monitoring and the epidemiologic survey recently completed in Luanda indicates that malaria transmission is very low throughout the most heavily urbanized areas of the city. It also suggests that IRS and ITN distribution will not be the most cost-effective malaria control measures for Luanda, except in outlying areas. More attention should be paid to prompt and accurate laboratory diagnosis and appropriate treatment of suspected cases than to prevention measures.

*Planned Year 4 PMI Activities: (\$62,100)*

Due to the very low risk of malaria transmission in the urbanized areas of Luanda, entomological surveillance in the capital will be discontinued. The PMI-supported entomologic surveys led by the NMCP and CDC, with logistic and supervisory support from RTI, will continue in the southern province of Huila and will be initiated in the central province of Huambo where IRS began in 2008. This information should make it possible to target, in a more rational and cost-effective fashion, the use of IRS and ITNs in these areas. These data will also be helpful in evaluating the effectiveness of future interventions directed against the mosquito vector and/or parasite.

Planned activities during Year 4 are as follows:

1. Continue monitoring of the risk of malaria transmission in Huila and Huambo Provinces to allow better targeting of IRS and ITN distribution. This will include identifying the anopheline mosquito vectors and their seasonal abundance. 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 (\$50,000); and
2. Continue to strengthen capacity within the NMCP for entomologic monitoring of vector populations and insecticide resistance in areas where LLINs and/or IRS are used. Training for physiological resistance testing of the mosquito vector by bottle bioassay will be provided by CDC and monitoring of the IRS and LLINs will be established after the insectary and laboratory in Luanda have been completed and a susceptible mosquito colony established (\$12,100).

**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, and subsidized and full-cost net sales to residents of 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 not officially approved 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 2.1% in Angola but it is considerably higher along the northern and southern borders with Zaire and Namibia, respectively, where the prevalence reaches 9-10%.

Distribution of ITNs presents a special challenge in rural Angola because of limited infrastructure and the high cost of transportation. The estimated cost of \$11.66 per LLIN used in

this Malaria Operational Plan is based on UNICEF experience in Angola over the last three to four years and is considerably higher than in most other countries. It is made up of \$5.43 for the net procurement, branding and shipping to Luanda, \$1.55 for port clearance, warehousing, and in-country transportation to the district level, \$1.76 for training, IEC/BCC, and net tracking, \$1.11 for monitoring and evaluation, \$1.11 for field administration and implementation, and about \$0.70 for overhead.

*Progress to Date:*

Results of the national Malaria Indicator Survey (MIS) (conducted between November 2006 and April 2007) indicate that, nationwide approximately 28% of households own at least one ITN. This 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. In the seven hyperendemic provinces targeted during the 2006 measles-ITN campaign, 51% of households owned one or more ITNs.

With support from the Round 3 Global Fund grant, UNICEF distributed 957,178 free LLINs in 2007 to all provinces except Benguela through ANCs and outreach programs. Benguela Province benefited from 100,000 nets donated by the World Food Program plus 150,000 nets donated by the Japan International Cooperation Agency (JICA) in that same year.

Approximately 85,000 of the 400,600 LLINs procured by PMI in its FY08 budget have already arrived in country and are awaiting free distribution by UNICEF through ANCs and outreach programs to pregnant women and children under five. The remaining nets will be procured as soon as the rest of the FY08 funds become available. About 10,000 - 15,000 of these PMI nets are intended for free distribution to people living with HIV/AIDS in collaboration with the Angolan National Institute for the Fight Against HIV/AIDS. In addition, in FY08 with PMI and Global Fund Round 7 funding, PSI will continue commercial sales of highly-subsidized LLINs in major towns of some provinces and “full-cost” LLINs in municipalities within the greater Luanda area, such as Cachuaco and Viana, where a recent study shows that malaria transmission still occurs and where the population is better able to afford the cost of a net.

The table below shows the number of LLINs distributed annually between 2005 and 2007 by all partners by province. As can be seen, Luanda, which has little or no malaria transmission, receives a larger proportion of nets than most other provinces and prior to 2007, relatively nets were targeted at the southern provinces of Namibe, Cunene, Cuando Cubango, and Huila.

## LLIN Distribution 2005 – 2007

Province	LLIN Distributed to U5 and PW 2005	LLIN Distributed to U5 and PW 2006	LLIN Distributed to U5 and PW 2007	Total LLIN Delivered to U5 and PW 2005 – 2007	Target Population (U5 and PW) 2007
Bengo	5,440	0	19,558	24,998	60,728
Benguela	0	0	250,000	250,000	754,927
Bie	0	0	157,100	157,100	318,751
Cabinda	0	92,739	22,458	115,197	124,076
Cunene	0	0	17,915	17,915	108,267
Huambo	0	0	99,600	99,600	327,988
Huila	0	0	53,258	53,258	402,388
Kuando Kubango	0	0	15,300	15,300	97,919
Kwanza Norte	0	0	47,853	47,853	95,009
Kwanza Sul	0	0	41,155	41,155	251,423
Luanda	40,449	0	278,273	318,722	1,256,240
Lunda Norte	0	112,968	34,975	147,943	153,004
Lunda Sul	0	70,646	15,300	85,946	71,040
Malanje	0	105,107	30,113	135,220	140,130
Moxico	0	106,316	26,541	132,857	145,985
Namibe	0	0	8,100	8,100	52,761
Uige	0	285,896	56,424	342,320	304,992
Zaire	0	52,984	10,655	63,639	61,838
Other Distribution	0	0	22,600	22,600	
<b>Total</b>	<b>45,889</b>	<b>826,656</b>			<b>4,727,467</b>

According to a gap analysis carried out during development of the Round 7 Global Fund grant proposal, in 2009, Angola will have an estimated population of 5,015,369 children under five years of age and pregnant women. In 2007-2008, a total of 2,807,378 LLINs have either been distributed or are planned for distribution, leaving an existing programmatic gap of 2,207,991 LLINs in 2009 to reach 100% coverage of these two vulnerable groups. Part of this gap will be filled by PMI and Global Fund Round 7. UNICEF is currently engaged in the distribution of about 1.5 million LLINs that are already in country and it is expected that by the end of 2008, UNICEF will have received up to 2 million LLINs in country which will be distributed between 2008 and early 2009 (this quantity includes 200,000 LLINs that were procured with JICA funds last year but transited to 2008).

*Planned Year 4 PMI Activities: (\$4,612,100)*

Because most of the population of Angola, particularly in rural areas, cannot afford the cost of a LLIN, 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 the distribution of highly-subsidized nets through the private sector in urban areas in Huambo, Huila, Cabinda, and Kwanza Sul Provinces while supporting the distribution of full-cost nets in some towns outside central Luanda where malaria transmission still occurs. 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 antenatal clinics 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. To boost this routine distribution, and building on the success of the 2006 “Viva a Vida com Saude” Measles Plus campaign, LLINs will be incorporated into the nationwide integrated measles campaign planned for July 2009. As in the 2006 mass measles campaign, it is expected that free LLINs will be distributed to children under five years old, together with vaccination against polio and measles, de-worming and the administration of Vitamin A. Pregnant women will not be targeted in this campaign. Through the 2009 campaign, UNICEF is planning to focus the distribution of LLINs in the seven hyper- and meso-endemic provinces previously covered during the 2006 *Viva a Vida com Saude* integrated measles vaccination campaign, since the current NMCP guidance defines three years as the average duration of an LLIN. Thus, the LLINs distributed in 2006 will be due for replacement by 2009. The 2009 integrated campaign is expected to achieve 80% coverage of all children under five years of age. For the remaining three years, only pregnant women and new infants will be targeted through ANC and immunization services but it is expected that the introduction of a net with every pregnancy and with every new infant will sustain coverage at 80% in the future.

Since people living with HIV/AIDS are more vulnerable to malaria, PMI will continue to support distribution of LLINs to those patients who are not reached by the targeted distribution of ITNs to pregnant women and children under five. In addition to this distribution of LLINs to people living with HIV/AIDS, PMI will work with other U.S. Government (USG) programs to improve integration of services with the National Institute for the Fight Against HIV/AIDS Program and ensure that IPTp and prompt malaria diagnosis and treatment are also offered to women infected with HIV.

Due to very low net re-treatment rates in Angola, PMI will only procure 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. To this effect, the PMI is interested to understand better, through preliminary durability studies, LLINs efficacy after distribution and with regular use and washing over an extended period of time. Despite the large scale of PMI investment in LLINs, there has been no systematic monitoring of these products in-use. Recently, several studies of nets recovered from the field showed that the extent of physical deterioration and insecticide loss are inconsistent with laboratory simulations. And although

anecdotal evidence may support long-term efficacy (i.e., greater than five years), to date, the literature does not substantiate claims of more than five years' durability of LLINs. In the absence of a shared consensus among experts and a few smaller studies, most programs commonly replace nets after only three years.

The measurement of this is through a protocol CDC developed and will measure durability, duration of insecticidal activity with WHO bioassays and insecticide retention by chemical analysis. This protocol is being used in a few countries. Despite the large body of literature regarding LLINs, a number of practical issues remain unsolved, one of which is the effective life of LLINs under field conditions. Majority of studies of their effectiveness has been based on laboratory, experimental hut and small field test results. Although these studies provide valuable information, they are limited in scope as they cannot capture the effects of local climate, use patterns and many other factors that impact the effective lifetime of LLINs. Conventionally 3-5 years has been assumed but there has been little systematic monitoring under field conditions. There is the need to have a good idea of the durability of LLINs so that programs can estimate when to replace existing ones with free distribution.

Planned activities during Year 4 are as follows:

1. Procure and distribute approximately 380,000 free LLINs. These are to be added to the LLINs provided by other partners in Angola, notably the Phase 1 of the Round 7 Global Fund proposal, which is expected to procure 806,000 LLINs over the first year of implementation (2009). About half of the PMI-supported nets will support routine distribution of free LLINs to pregnant women and children under five, through ANCs, child health clinics, regional or provincial health days, which all partners agree needs to be sustained. The other half will be used to support the Measles Plus campaign planned for 2009. Nets procured by PMI will not be distributed freely or sold at subsidized prices in Luanda Province, due to the very low malaria transmission rates there (\$4,050,000);
2. Continue to support the procurement and distribution of highly-subsidized LLINs through community-based organizations and full-cost nets through commercial sources in urban and peri-urban areas of Angola where residents are better able to afford the cost of an ITN (\$200,000);
3. Continue to 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 about 10,000-15,000 LLINs will be distributed through this approach (No additional cost to PMI, as these ITNs will be purchased as part of #1 above);
4. In July 2006, more than 800,000 LLINs were distributed in 7 highly endemic provinces as part of a nationwide measles immunization campaign. UNICEF is working with support from the WHO Tropical Disease Research group to assess the lifespan of those nets distributed in 2006 and PMI will contribute to this effort (\$50,000 + CDC TDY for \$12,100); and
5. 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 (\$300,000).

### **Indoor Residual Spraying**

Before PMI and the Global Fund (through WHO) began supporting large-scale IRS in the three southern provinces of Huila, Cunene, and Namibe in December 2005/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), an exception could be made along the Angolan-Namibian border, as the Namibian National Malaria Control Program currently relies on DDT for IRS. 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 three years. At the same time, WHO recommendations related to IRS in Africa have changed from focusing on epidemic-prone and urban areas to spraying in more highly endemic areas to take full advantage of this very effective prevention measure. With the accumulating evidence of low levels of transmission from the southern Angola provinces of Cunene and Namibe, the NMCP and PMI agreed to discontinue IRS there in 2008 and focus instead on achieving high LLIN ownership and usage rates, as well as strengthening malaria case detection and malaria case management in both provinces. In addition, an epidemic response plan will be developed to ensure that any potential increase in transmission is rapidly detected and dealt with. Following discussions with the NMCP, in 2008, IRS was introduced in Huambo Province in central Angola, which has a mesoendemic/stable transmission with a less dispersed population and reports the second highest number of malaria cases annually.

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:*

Between December 2007 and April 2008, IRS campaigns were carried out in Huila and Huambo Provinces covering a total of 139,700 houses, protecting approximately 745,061 persons. This was the third round of IRS in urban and peri-urban areas of Huila, the capital of Huila Province; 75,340 houses were sprayed representing 94.2% of all houses targeted in the municipality. The first round of IRS was completed in urban and peri-urban areas of Huambo, the capital of Huambo Province, with 64,360 houses sprayed, representing the targeted houses in the district. A total of 99.8% of the houses targeted for spraying in the two provinces were sprayed, indicating high levels of community acceptance. Lambda-cyhalothrin (ICON<sup>®</sup> wettable powder) was the insecticide used in Huila while a newer, longer-lasting formulation of the same insecticide, ICON CS<sup>®</sup>, was used in Huambo. Due to delays in arrival of insecticide in country,

however, the spraying in Huambo Province began considerably later than originally planned and the rainy season had already begun.

As part of the PMI-supported 2008 spraying campaign, provincial health department staff in both provinces were closely involved in the spraying campaign. A total of 2,104 men and women were hired and trained: 1,826 local men and women as spray operators, 98 local Provincial Health Department staff as supervisors and monitors, and 180 local residents as IEC mobilizers. In addition to the ten people trained in 2007, eight additional people were trained in bioassay methods for monitoring the efficacy of IRS in Huila in 2008. Provincial Health Department Physicians and supervising nurses based in health centers were also instructed on the symptoms and treatment for pesticide exposure and side effects. Spray equipment, insecticide, and protective gear remaining after the April 2008 IRS campaign have been securely stored in warehouses in Lubango, the capital of Huila Province, and in Huambo, capital of Huambo Province, until the next round of spraying. According to RTI in-country staff, sufficient quantities of insecticide remain in country to complete the next round of spraying in Huambo and Huila Provinces.

As part of the transition from IRS to ITN in Cunene and Namibe Provinces, ten laboratory technicians were trained in microscopy and RDTs for improving case detection.

*Planned Year 4 PMI Activities: (\$2,500,000)*

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 Cunene and Namibe, IRS operations have ceased in these provinces. Current activities in these two provinces include the distribution of ITNs as a more cost-effective means of preventing malaria and implementation of AL for the treatment of uncomplicated malaria. PMI will work with the NMCP to continue strengthening malaria case management and detection in these provinces and implement a malaria early warning system with improved malaria surveillance and reporting. Indoor residual spraying will be continued in Huila and Huambo Provinces with an emphasis on improving the quality and timeliness of spraying.

Planned activities during Year 4 are as follows:

1. Assist the NMCP with a fourth year of spraying with lambda-cyhalothrin in Huila Province in southern Angola and a second year of spraying in Huambo Province. With the increased cost of spraying, PMI will cover all previously targeted houses in Huambo Province, which is a high transmission area. The number of houses to be sprayed in Huila Province, a low transmission area, will be reduced but ITN distribution will be targeted to those areas. An estimated 120,000 households will be sprayed. The spraying campaign is expected to take place from August to December 2009 (\$2,500,000); and
2. In the provinces of Cunene and Namibe, where IRS campaigns have been conducted in the past, continue to assist the NMCP in transitioning from an IRS-based prevention approach to high LLIN coverage and use, together with strengthened malaria case detection and epidemic response capabilities. This will include strengthening laboratory diagnosis of malaria, weekly reporting of cases, and development of district-level epidemic response plans. In addition, plans for epidemic response will include

stockpiling of drugs, insecticides, and spraying equipment to deal with potential increases in cases in Huila (costs covered under IRS and LLIN procurement above).

### **Intermittent preventative therapy of pregnant women**

The national malaria control program in Angola adopted the policy to control and prevent malaria in pregnancy in September 2004. This is a three-pronged approach consisting of prompt and effective case management of malaria together with the use of ITNs and IPTp with two doses of SP. The policy has been implemented throughout the country even though Angola has some areas with very low levels of malaria transmission. Guidelines and training materials were prepared and used for the policy implementation. The implementation of the policy commenced in May 2006 with training of ANC staff. Initial implementation was done in antenatal facilities of the major towns but expansion has taken place and now IPTp is being implemented in all antenatal clinics in the country.

According to latest MIS conducted in 2006-07, Angola has a high fertility rate with a crude birth rate of 42 live births per 1,000 population and 80% of women who delivered in the past five years attended an ANC at least once during their pregnancy. The MIS 2006-07 showed an IPTp1 coverage of just 5% and IPTp2 of only 2%. Lower than expected coverage rights, however, are likely due in part to the fact that IPTp implementation had only recently started when the MIS was conducted. Coordination between the Reproductive Health Division of the MOH and the NMCP related to malaria in pregnancy needs to be improved. The renovation of some health facilities has resulted in inadequate space to allow direct observation of SP treatment by pregnant women.

#### *Progress to Date:*

Because of the weak MOH infrastructure in most provinces, PMI, in collaboration with the NMCP, made the decision to work with NGOs/FBOs who have a strong presence at the provincial level to scale up malaria prevention and treatment interventions. The approach was piloted in Huambo Province in 2006 through the British NGO, MENTOR. Due to the success of the approach, in July 2007, a new Request for Applications (RFA) was announced and currently four PMI-supported NGOs now work in a total of five provinces: Huambo, Kwanza Sul, Kwanza Norte, Malange, and Zaire. A national NGO, Consaude, works in Malange Province where it covers three out of 14 municipalities, accounting for 60% of the province's population. AFRICARE is working in five of the 11 municipalities in Kwanza Sul while World Vision and MENTOR have achieved full coverage of all municipalities in the Kwanza Norte, Huambo, and Zaire provinces where they work.

With funding from ExxonMobil, JHPIEGO, a U.S.-based NGO, has been supporting IPTp implementation in six health facilities in Luanda since 2006. IPTp coverage increased from 21% to 45% for IPTp1 and from 11% to 27% for IPTp2 between 2006 and 2008. In collaboration with WHO, PMI funds have supported NGOs to train 348 health workers in malaria in pregnancy (MIP) in Luanda, Huambo, Zaire and Malange Provinces and the Global Fund supported the training of 575 health workers. Between May 2006 and April 2008, more than 260,966 pregnant women received a second dose of IPTp under directly observed treatment in the initial thirteen provinces in which ACT and IPTp implementation began and where a regular reporting system on drug usage was established. New ANC registers and cards have been

designed and printed by the NMCP to allow the collection of data on IPTp and ITN ownership as part of routine ANC visits.

To improve coordination of MIP activities with maternal and child health services of the MOH, WHO had hired a national program officer (NPO) for MIP who was part of the MCH program but she resigned recently; it is hoped that a replacement will be found quickly. The NMCP staff person responsible for IPTp implementation is currently out of the country on training and is expected back in 12 months.

The MOH has sufficient stocks of SP for IPTp, but problems with transportation and irregular supervision at the health facility level occasionally create shortages. Sulfadoxine-pyrimethamine is included in the essential drug kit which is distributed by the “push method” on a quarterly basis to each health facility. However, in provinces where PMI-supported NGOs are working, the NGOs help transport antimalarial drugs from the provincial warehouses to individual health facilities whenever a shortage is detected. These NGOs also carry out regular support visits to facilities in the provinces together with the provincial malaria coordinators of MOH.

*Planned Year 4 PMI Activities: (\$300,000)*

During Year 4, 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.

Planned activities during Year 4 are as follows:

1. Build capacity and ensure standardization of approaches related to the prevention and treatment of malaria in pregnancy across the four PMI-funded NGOs working in Zaire, Huambo, Kwanza Sul, Kwanza Norte, and Malange Provinces (\$300,000);
2. Support NGO/FBOs to continue IPTp and ITN distribution through ANCs and malaria case management in pregnant women in the five provinces and expand to four more provinces bringing the total number of provinces with NGO support to nine. The activities of the NGOs will be linked to malaria control activities in the province (funding for this activity is covered in the case management section); and

3. Continue to work with the NMCP, MCH, and other partners both public and private to explore alternative approaches, such as community health workers, to reach pregnant women and refer them for ANC services (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 now used in most public health facilities with ACTs. In the new NMCP strategic plan (2008-2012), there is a written national policy about the use of RDTs which is now being disseminated through the NMCP and all PMI-funded NGOs in all new training sessions in malaria diagnosis and treatment. This policy is also being disseminated to other provinces through the WHO-coordinated national program officers.

Basically, under the new policy RDTs are being recommended for use where microscopic diagnosis is not available. In areas of stable malaria transmission (hyper- and mesoendemic stable) children under five years of age are to be treated presumptively based on the integrated management of childhood illness algorithm whereas older children and adults are to be tested for confirmation before treatment is given. In areas of low malaria transmission however, namely, Luanda and the four southern provinces, all patients regardless of age are to be tested before treatment is given. It is hoped that this new policy will avoid unnecessary prescription of AL, which is critical in the current context, in which the cost of AL treatment is 15–20 times higher than that of chloroquine.

The Vice Minister of Health has indicated that the MOH may be establishing regional laboratories at several sites in the country that would serve as reference centers for surrounding provinces.

#### *Progress to Date:*

PMI is procuring 600,000 RDTs with FY08 funds. Seven hundred and fifty-thousand RDTs and 25 microscopes and 25 microscopy kits, each one sufficient to test 1,000 patients, were procured with FY07 funds. The microscopes have arrived in country and are being distributed in collaboration with the NMCP with priority given to provinces where PMI-supported NGOs are working. Forty-three microscopes and kits are scheduled for procurement with FY08 funds.

In October 2007, CDC, together with the Instituto Nacional de Saude Publica, organized a microscopy training workshop for ten senior malaria laboratory technicians, selected from the provinces. These trained technicians will in turn train other technicians in their respective provinces. In November 2007, RTI trained 10 laboratory technicians in Cunene Province and in April this year, 15 technicians were trained for the five provinces with PMI-supported NGOs to work in the health facilities selected for sentinel sites. At present, general laboratory training sessions including both microscopy and use of RDTs are taking place in Huambo and Malange provinces with each session training 15 technicians. Laboratory training materials and

laboratory aids from CDC have been translated into Portuguese and the Instituto Nacional de Saude Publica is using it to conduct additional trainings in Angola. From January 2008 to May 2008, 1,035 health workers were trained in the correct use of RDTs (including how to perform the testing), of which 495 were funded by PMI. In addition, PMI funded the training of 90 microscopists from 7 provinces (Kwanza Sul, Kwanza Norte, Malange, Huambo, Zaire, Lunda Sul and Cunene), in malaria microscopy from January to June 2008.

*Planned Year 4 PMI Activities: (\$675,000)*

The PMI views malaria laboratory diagnosis as a key component of good case management and will continue to support the strengthening of malaria diagnosis (both microscopy and RDTs) in both MOH facilities and those currently managed by NGO/FBOs. As prevention measures begin to take effect and malaria cases fall, high quality laboratory diagnosis of malaria will become even more important to target the use of expensive ACTs. As part of the Improving Malaria Diagnosis project's initial laboratory assessment in Angola, team members will look into the issues surrounding establishment of regional laboratories and how PMI malaria laboratory diagnostic activities could support this effort.

Planned activities during Year 4 are as follows:

1. Procurement of approximately 30 compound microscopes and a similar quantity of microscopy kits (slides, alcohol, cotton, staining reagent, immersion oil, etc.) to augment supplies financed through the Global Fund and other partners (\$175,000);
2. Procurement of 450,000 RDTs (\$300,000);
3. Continued technical assistance to laboratory supervision and quality control of malaria laboratory diagnosis (\$100,000); and
4. Facilitation of provincial-level training workshops and regular supervision of provincial- and municipal-level laboratory staff on the correct use of RDTs and microscopy services for malaria diagnosis in collaboration with the Instituto Nacional de Saude Pública. In particular, emphasis will be placed on training of clinical workers to adhere to the results of laboratory tests when administering treatment (\$100,000).

### **Pharmaceutical management**

The MOH pharmaceutical management system remains weak in Angola. At a minimum, the establishment of both a national drug registration and an essential medicines policy are two key regulatory requirements without which pharmaceutical management can not operate at the fullest potential. Accurate forecasting, procurement procedures that follow stringent supply chain management practices, rigorous inventory management and established distribution schemes are integral, complementary components of any pharmaceutical management system. A robust system is required to ensure uninterrupted access to safe, effective and affordable medicines of an assured quality; however, many of these important processes either do not exist or are defunct in Angola. While there are some existing drug regulations, a lack of enforcement likely contributes to further weakening an already fragile system. This has translated into an inability to fully guarantee commodities security, which has manifested in the pilfering of ACTs both at

the central and provincial levels. To date, there have been three deliveries of PMI-supported Coartem to Angola. Each consignment has been subject to theft, twice at the central level and once in Huila province, totaling roughly \$100,000 USD. The frequency and ease of theft suggest significant flaws throughout the supply chain, likely resulting from a combination of poor communication among vested parties, ineffective information management systems, lack of qualified personnel and inaccurate forecasting. And while even the most robust supply chain system is not capable of securing fully every consignment, the degree to which leakage has been documented in Angola implies a systemic problem warranting short- and longer-term corrective actions. Both the NMCP and the MOH have been responsive to address this issue and implement corrective actions thus far but additional measures are needed.

A poorly functioning pharmaceutical management system will result in systemic problems that can not be overcome by addressing only one component. In a system like Angola's, delayed procurements, stock outs, stock piling and drug expiry are all possibilities. Accurate quantification of drug needs is therefore essential. And while quantification of any commodity is inherently complicated, targeted quantification of antimalarials is further complicated by the lack of reliable data on malaria morbidity and drug consumption.

The four National Hospitals in Luanda, provincial hospitals, and provincial governments receive their budgets directly from a general health budget, which is then used for procuring medicines and other health commodities. In the absence of a national essential medicines list, a lack of hospital formularies, formulary committees and standardized treatment guidelines, there is a broad range of drugs for any one therapeutic class that varies from hospital to hospital, province to province. In addition, lower-level health facilities supplement their MOH stocks with locally-available medicines purchased using funds generated from service fees. Medicines purchased from these private sector vendors are often of questionable origin and their quality can not be guaranteed, placing the general population at additional risks. Findings in provincial hospitals in Angola demonstrate not only the diffuse presence of unregulated, locally-procured antimalarials but also artemisinin monotherapies intended for use to treat both complicated and uncomplicated malaria. Continued use of these antimalarials places the people of Angola at risk for increased morbidity and mortality from malaria. Potential longer-term effects include the development of resistance to artemisinins.

While more than 25% of Angola's population resides in Luanda city, a formalized distribution system for the deployment of essential medicines is greatly needed, the lack of which is probably a contributing factor to the periodic shortages currently experienced by peripheral provinces, such as Zaire, which was stocked out of severe malaria treatments for lengthy periods of time. A confounding factor is the lack of proper storage facilities at the provincial and municipal levels, most of which need some rehabilitation. Essential medicines, including some antimalarials (currently amodiaquine, SP, and quinine), are provided in kits. Using a "push" system, 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. This mechanism of quantifying kit needs can lead to drug shortages as well. In 2007, the European Union, through its Programa de Apoio ao Sector de Saúde, signed an agreement with the MOH for 10,500 essential drugs kits, which contain some essential medicines and have been distributed to all 18 provinces.

*Progress to Date:*

During FY08, the Strengthening Pharmaceutical Systems (SPS, formerly the Rational Pharmaceutical Management Plus Project) has continued their close collaboration with the National Essential Drug Program (NEDP) and the NMCP to help strengthen the existing pharmaceutical management system as it relates to malaria, specifically focusing on improving capabilities for malaria drug quantification, distribution, storage, and a monitoring system, on behalf of the PMI. These activities have been especially critical given the leakage issues in Angola. Building on work accomplished during FY07, the DELIVER and the SPS Project assisted in expanding distribution of AL to 13 of the 18 provinces in Angola based on procedures implemented the year prior which established an ACT monitoring system to enable re-supply based on actual consumption reporting. Since the SPS Project does not have permanent staff in Angola, they are working with PMI-funded NGOs in five provinces (Huambo, Kwanza Sul, Kwanza Norte, Malange, and Zaire) to follow up on the training and oversee ongoing implementation of AL. Pilot programs in each province targeted full coverage of health centers and health posts in specific municipalities. Staff at health centers received supervisory training on the management of malaria, proper diagnosis and prevention. Additionally, because monitoring of ACT distribution from the provincial level down to the municipality has been strengthened, stock outs are less frequent and improved ACTs management has occurred. 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.

In addition, SPS provided technical assistance for improved inventory and stock management practices at the central medical stores, Angomedica. By corroborating distribution records from Angomedica with information collected at the municipal levels and following up with corrective actions, the distribution and management of ACTs has been further strengthened. There has also been progress toward harmonizing the integration of ACT management with the kits management system and transfer of the storage and distribution responsibilities of the kit system from the NMCP to the Division of Essential Drugs. As ACTs are the first-line treatment for uncomplicated malaria, through efforts of the SES Project, chloroquine has been removed from kits intended for distribution to health units and health centers.

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 rebuilt. Lack of reliable transportation between national to provincial depots is one of the challenges faced by NEDP, so transport is still typically contracted to private companies even though this is costly to the MOH. In order to address this problem, the NEDP has been using transportation services that are contracted by UNICEF and have them paid for in advance for a certain number of deliveries to the provinces. PMI, through the DELIVER project, is supporting transportation to five provinces, which require air shipments.

### **Malaria treatment**

Although AL and artesunate-amodiaquine were approved as joint first-line drugs for uncomplicated malaria in Angola in October 2004, implementation of the new policy did not

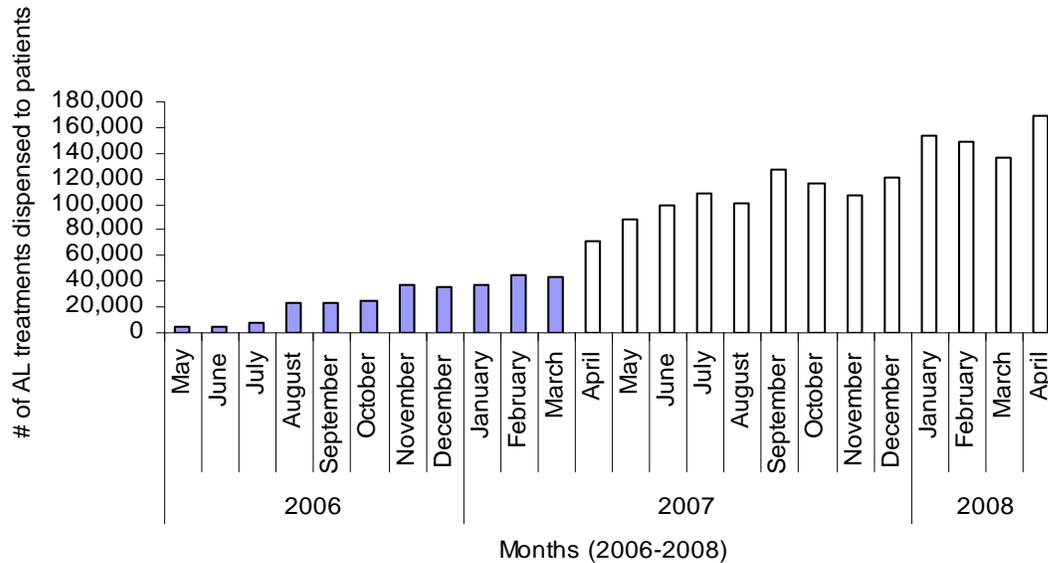
begin until May 2006 in MOH facilities. Implementation of ACTs has proved to be one of the greatest challenges of the NMCP. The initial plan was to roll out ACTs in a selected group of health facilities in the 59 targeted municipalities in nine provinces (Huambo, Luanda, Bengo, Cabinda, Kwanza Sul, Kwanza Norte, Malange, Uige, and Zaire). However, due to limited stocks of AL, the drug was to be prioritized to children under five and overall roll out proceeded slowly. Beginning in Luanda, a team from the NMCP conducted training on the new drug policy (together with instruction in malaria diagnosis and IPTp), moving next from province to province to provide one-week training courses.

Another factor complicating the roll out of ACTs in Angola is that not all provinces have been using the same first-line drug for the treatment of uncomplicated malaria. In Benguela Province, where JICA had planned their project before the Global Fund purchase of AL, artesunate-amodiaquine is still being implemented as first-line therapy. In Bie Province, where Medecins sans Frontieres had been implementing the same combination, the NMCP had decided to continue with artesunate-amodiaquine until AL becomes available. In Zaire Province, artesunate-amodiaquine has been used in three municipalities where MENTOR has been working, but with concurrent roll out of AL in 16 health facilities in that province. In the provinces of Lunda Norte, Lunda Sul, and Moxico, the GRA has been funding artesunate-amodiaquine implementation until additional AL becomes available. During 2007, the NMCP made the decision to move from AL and artesunate-amodiaquine as joint first-line drugs to a single first-line therapy for uncomplicated malaria in Angola. Thus, the NMCP is planning to introduce AL in all the five-remaining provinces by July-August 2008. Training on AL in these five provinces has already been carried out.

Although remaining stocks of chloroquine and amodiaquine monotherapies 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.

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 rollout of AL increased dramatically during the subsequent seven months. As of June 2008, 113 of the 164 districts in the country had implemented ACTs in at least some health facilities. This includes the initial nine provinces plus Huila, Namibe, Cunene, and Cuando Cubango. Since the beginning of 2008, more than 1,000 health-workers have already been trained in case management with AL, including 495 health workers trained with PMI support in the provinces of Kwanza Sul, Kwanza Norte, Malange, Huambo and Zaire and 100 health workers trained with Global Fund support in the provinces of Cunene and Cuando Cubango plus 440 health workers trained also with Global Fund support in the remaining five provinces currently without AL, namely Benguela, Bie, Lunda Norte, Lunda Sul and Moxico. According to the Director of the NMCP, one of the problems encountered during the rollout of AL nationwide has been resistance on the part of some physicians to receive training in the new policy. Many physicians in more rural areas of Angola are foreign and have little first-hand experience with malaria treatment. In Luanda, the Vice Minister has required that all physicians receive training in the new policy but this has not yet been done for the rest of the country. Additionally, the NMCP had organized a training workshop for all district level directors to more effectively implement the new treatment policy.

At the same time, the system for monitoring the roll out of ACTs and IPTp has been greatly strengthened and National Malaria 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 April 2008:



The MOH will continue buying the same amount of generic AL as planned for the current year, 1,000,000 treatments plus 6 million ampoules of intravenous quinine and about 300,000 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 pre-referral treatment with rectal artesunate, but thus far the Essential Drug Program can not procure it because this drug is not part of their essential drug list. Discussions have now begun between the NMCP and Essential Drug Program, toward the inclusion of this drug on the essential drug list.

While PMI only purchases the Coartem<sup>®</sup> brand of artemether-lumefantrine (the only brand approved by a stringent regulatory authority), the GRA is considering purchasing generic formulations for inclusion in the drug kits intended for distribution to the provinces. The GRA is also considering purchase of the new dispersible formulation of Coartem<sup>®</sup>, currently pending approval through the Swiss drug regulatory authority, Swissmedic, and likely available for procurement in early 2009. This dispersible formulation would be used for patients in the three lower weight bands, while the standard oral tablet form would continue to be used for adults. Discussions have also taken place regarding a possible pilot of the new formulation in Angola. Both Novartis and ExxonMobil are interested in this initiative.

A variety of antimalarial drugs, including chloroquine, artemisinin monotherapies, and generic formulations of ACTs, continue to circulate in the private sector in Angola. The Dafra product, Co-Artesiane<sup>®</sup> (a generic formulation of AL) is now commonly found in private pharmacies.

*Progress to Date:*

Because of concerns about the poor access to health care services 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 assistance from locally-established NGOs. In January 2007, MENTOR, a British NGO with considerable experience in Angola, was awarded a grant to help train staff to expedite and expand implementation of AL and IPTp in Huambo Province, the second most populous province in Angola after Luanda.

As of June 2008, MENTOR, is working in all 11 districts and all 151 MOH health facilities in the province. MENTOR coordinates closely with the provincial staff, including the provincial National Malaria Program Officer and Malaria Supervisor. Training has been provided to health workers on malaria diagnosis (including use of RDTs), malaria case management with ACTs, malaria in pregnancy and IPTp, and pharmaceutical management. Working with the SPS Project, MENTOR has also helped local authorities to monitor stocks of antimalarial drugs to distribute drugs within the province. Malaria coordination meetings are now held every other month between MENTOR, the provincial NPO, the Malaria Supervisor, and provincial health staff. As the MOH decentralization process proceeds, we expect the PMI-supported NGOs and other implementing partners to work even more closely with them to plan and carry out activities. A supervisory check list to oversee health worker performance and service delivery in MOH facilities has been developed.

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, and the NMCP Director has asked that PMI work to expand support to additional provinces. He also requested that we attempt to involve and strengthen the capacity of local NGOs as we expand our support in this area. Based on the positive experiences with the PMI-supported implementation of AL and IPTp by MENTOR in Huambo Province, a second RFA was announced for support to ACT and IPTp implementation, and four new awards were made to four NGOs operating in five provinces, namely Africare, World Vision and Consaude, operating in the provinces of Kwanza Sul, Kwanza Norte and Malange respectively and MENTOR operating in Huambo and Zaire Provinces. This was made possible by combining funds from Year 2 of PMI and the ExxonMobil Foundation donation to PMI. Additionally, in the context of the Malaria Communities Program (MCP) launched by the US First Lady in December 2006, an award was made to the NGO "Episcopal Relief and Development," which started operations in October 2007 in the underserved municipality of Mucaba in Uige Province.

Efforts are being made to standardize PMI-supported activities across all these provinces following the model set up by MENTOR in Huambo Province. Although just beginning activities in early 2008 in Zaire Province, MENTOR is working in all six districts and 60 of the 83 health facilities in the province. They are also collaborating with the Angolan Red Cross on IEC. In Malange Province, the Angolan NGO, Consaude, is working in three of the 14 districts in the province but those three districts have 60% of the population of the province. They are also collaborating with other local NGOs involved in health activities in the province. World Vision is working in all ten of the districts in Kwanza Norte Province and Africare has begun activities in five of the 11 municipalities in Kwanza Sul Province but is planning to expand to the entire province.

The recent study of malaria risk in Luanda showed low to non-existent malaria transmission in most parts of the capital. In spite of this, malaria is one of the most common “diagnoses” in Luanda and large quantities of ACTs continue to be used for the treatment of fever cases. It is clear that additional efforts need to be made to promote more rational use of antimalarial drugs in Luanda.

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 and this will considerably increase the nationwide needs and gap in terms of ACTs. The NMCP is also interested in a field trial of AL delivery through the private sector. In response to this, in the FY08 MOP, PMI agreed to fund a pilot phase through an RFA which will be released as soon as the \$500,000 in FY08 funds becomes available. In addition to an increased effort in training of health workers, supervision has been scaled up, particularly in PMI-focused provinces, in which over 260 supervisory visits have already been made over the course of the current year. Despite these developments, there is still a need to improve coordination in drug management, pharmacovigilance, and greater integration with Integrated Management of Childhood Illnesses as well as with the Reproductive Health Department.

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 annual need of 6.3 million ACT treatments for the whole country.

The PMI procured a total of 587,520 and 3.2 million AL treatments with Year 1 and Year 2 funds respectively and will procure an additional 3.2-3.5 million treatments with Year 3 funds depending on whether or not emergency distribution to provinces will be requested by the MOH. PMI also assisted the MOH with planning and distribution of AL to the five most distant provinces. Through Global Fund Round 3, WHO procured 420,000 AL treatments in late 2007. The Global Fund Round 3 Phase 2 grant does not include procurement of additional AL, but has been funding training in malaria diagnosis, ACT treatment, and IPTp. The Round 7 grant has a total of \$17 million programmed over five years for procurement of AL and scaling up ACTs nationwide. As one of the Sub-Recipients of the Round 7 grant, WHO will again take responsibility for distribution of ACTs and they plan to hire a pharmacist at the central level to assist with this activity. They have also requested technical assistance from PMI in logistics and pharmaceutical management and a visit by one of the PMI logistics/pharmaceutical management staff from USAID/Washington is planned for later in 2008 along with an expert from DELIVER or SPS. As evidence of its commitment to malaria control, the GRA has also agreed to begin purchasing 300,000 ACT treatments per year and may purchase rectal artesunate on NMCP’s formal request.

#### **Estimated artemether-lumefantrine needs per year (2008–2009)**

<b>Patient weight</b>	<b>Age group</b>	<b>Blister type (tablets)</b>	<b>No. of blisters needed</b>	<b>Percent</b>

5 to 14 kg	Under 3 years	1 x 6 tablets (6)	1,748,882	28
15 to 24 kg	4 to 8 years	2 x 6 (12)	1,230,546	20
25 to 34 kg	9 to 14 years	3 x 6 (18)	1,940,300	31
Above 34 kg	More than 14 years	4 x 6 (24)	1,302,915	21
<b>Total</b>			<b>6,222,643</b>	<b>100</b>

As part of the Global Fund Round 7 grant, funds are available to re-establish sentinel sites for monitoring the efficacy of antimalarial drugs. A total of eight sites are planned.

With FY08 funding, PMI also agreed with the NMCP to support a district- or subdistrict-level pilot of provision of subsidized ACTs in the private sector. A total of \$500,000 was allotted to this project and an RFA is being prepared.

*Planned Year 4 PMI Activities: (\$8,315,800)*

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, continued poor access to health services by a large number of Angolans and the lack of accurate diagnostic capabilities. 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; and up to \$60/treatment in some private drug sellers), the risk of counterfeits, and the high levels of coverage that need to be attained.

As the Global Fund and PMI remain the two primary sources of ACTs for Angola, a collaborative approach between the two organizations to work with the MOH/NEDP to ensure current ACTs needs are met is critical. Therefore, 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 will also place a high priority on supporting NGOs/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 monitoring and evaluation.

Pharmaceutical management and supply chain strengthening activities will also include end-use verification/monitoring of availability of key antimalarial commodities at the facility level. Specifically, this will entail regular supervisory/monitoring visits to a random sampling of health facilities and regional warehouses to detect and trigger further actions on the following critical areas: ACTs (and other drugs); expiry dates of ACTs at health facilities; evidence of leakage; anomalies in ACT use; and verifying quantifications/consumption assumptions.

Planned activities during Year 4 are as follows:

1. Procure supplies of AL through a central mechanism and distribute through the NEDP system to MOH health facilities (\$4,415,800);
2. Support the final costs of a pilot study 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. A total of \$500,000 was allotted to this pilot in the FY08 PMI budget (\$200,000);
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 (\$600,000);

4. Support focused training of health care workers in Luanda to promote rational drug use and improve adherence to the results of microscopic and RDT diagnoses, in response to the persuasive entomological and epidemiological evidence that malaria transmission in Luanda is very low (\$200,000); and
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 (\$2,900,000); This will include:
  - a. Continued support in up to five provinces (Huambo, Kwanza Sul, Kwanza Norte, Malange and Zaire) plus two provinces that will be added with a Year 4, FY09 PMI RFA; and
  - b. Issuing of a new RFA further expanding this effort to another two new provinces during Year 4 of PMI, totaling nine provinces, equivalent to 50% of country's 18 provinces.

The above activities will be done through continuation of the grant to NGOs/FBOs awarded in PMI Year 3; and

6. Dissemination of IEC/BCC messages related to ACTs, ITNs, and IPTp. This is a comprehensive effort to improve understanding, acceptance, and correct use of major malaria prevention and control interventions (\$300,000).

## 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 have been collaborating on 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 malaria from the four epidemic-prone provinces in the south. Since these cases are clinically-diagnosed and 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, a U.S.-based non-profit organization, 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. Between January 2007 and January 2008, in Huila, Cunene, and Namibe Provinces, NMCP staff collected 336 *Anopheles* mosquitoes together with more than 4,135 *Culex* and *Aedes* specimens from 569 homes at 20 different sites.

The PMI is taking a multi-pronged approach to build capacity within the health departments of the southern provinces to respond to an outbreak of malaria, should one occur. During the second semester of 2008, a consultant supported by PMI will work with provincial health authorities to develop provincial plans for epidemic identification and containment. The PMI is working with UNICEF to increase distribution of LLINs in the south, through both routine channels and large-scale campaigns. In addition, PMI's efforts to strengthen laboratory diagnosis and quality control as well as distribution and rational use of ACTs will help improve the capacity of provincial and district-level health authorities in the south to identify and deal promptly and appropriately with malaria infections. 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 could be used to conduct IRS in response to sudden increases in malaria cases.

*Planned Year 4 PMI Activities:* (\$100,000)

Malaria epidemics in the four provinces bordering Namibia have the potential of causing considerable 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 a reliable malaria surveillance system. This problem should be remedied by the ongoing efforts of the NMCP to improve malaria epidemiologic surveillance at the provincial level.

Planned activities during Year 4 are as follows:

1. Strengthen epidemiologic surveillance and timely reporting on malaria as part of an early warning system in Huila, Cunene, Namibe and Cwando Cubango; 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 (\$100,000);
2. Continue studies of the risk of malaria transmission in Huila 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 11); and
3. Continued PMI support to improving the quality of malaria laboratory diagnosis and strengthening pharmaceutical management systems so as to avoid stocks of ACTs nationwide will help prepare the southern provinces to respond to a malaria epidemic. In addition, PMI will seek to ensure that the southern provinces are targeted in any LLIN distributions that take place during the next 12 months (costs covered under Case Management and ITN sections).

## **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 Global Fund Round 3 and 7 grants, the NMCP has increased its capacity at national level through the recruitment of five National Programme Officers, who are based in Luanda and provide technical support in the areas of monitoring and evaluation, finance, logistics, data management, and IPTp/IMCI. In response to the weak capacity at provincial level, 18 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 monitoring and evaluation of the malaria control activities in their respective provinces. This strategy has been expanded to all 18 provinces using resources from Phase II of Global Fund Round 3 and will continue with the Global Fund Round 7 grant. At the municipal level, an existing staff member have been designated malaria focal point and trained to collect and report routine malaria surveillance data. This has been included

in the planned activities to be undertaken as part of Phase II of the Global Fund Round 3 grant, and Global Fund Round 7, which will extend five more years.

*Progress to Date:*

The hiring of the two PMI Malaria Advisors in November 2006 and the improving in-country malaria partnership has helped to energize malaria control activities in Angola. 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 19 months. In-country PMI staff were able to work with NMCP to accomplish the following key activities:

1. Finalized 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 \$78 million Global Fund Round 7 proposal which was approved. In early 2008 the Angola PMI team worked with NMCP to respond to Global Fund Round 7 requests for the Procurement and Supply Management Plan, the Monitoring and Evaluation Plan, and budget;
2. Carry out regular supervisory visits to the field, which 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;
3. In-country PMI team work with NMCP on developing technical guidelines on monitoring and evaluation, RDTs, ACTs, LLINs and IPTp;
4. The PMI in-country team in collaboration with USAID Washington and CDC Atlanta contributed to the development of the protocol, training, data collection and review of the Luanda malaria survey and Huambo health facilities survey;
5. Organize the first Malaria Partners' Forum in Angola. This Forum meets on a monthly basis to improve coordination among malaria partners in the country (costs covered in Communication section);
6. Review of PMI and Malaria Communities Program applications to support NGOs/FBOs in malaria prevention and control activities in Angola; and
7. Finalize a new costed National Monitoring and Evaluation Plan for 2008–2012 in coordination with the NMCP.

*Planned Year 4 PMI Activities: (no added cost to PMI)*

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 and municipal levels.

1. PMI, together with the SPS Project, is working at national and provincial levels to strengthen pharmaceutical management related to antimalarial and essential drugs by developing tools which have been disseminated national wide. The SPS Project will also scale up the development of the inventory management capacities at provincial and municipal levels, monitor the ACT distribution and support the development of the Pharmaceutical Management Information System (this activity is funded under malaria case management); and
2. PMI will support improved laboratory training at all levels of the health system (this activity is funded under malaria case management).

## 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 continues to improve. 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 offices.

While much still remains to be done, the successful 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. This Forum was designed as a coordinating mechanism for stakeholders involved in malaria prevention and control, with the aim of supporting the NMCP and MINSa to achieve the objectives as defined in the National Strategic Plan. Elections took place during the first forum meeting, establishing a leadership hierarchy including a presidency (currently occupied by the Angolan Red Cross), two vice president positions (occupied by Consaude and PSI), and a secretariat (comprised of six permanent seats occupied by the PMI; WHO; UNICEF; the HIV/AIDS, Malaria, Sexually-Transmitted Diseases, and Tuberculosis (HAMSET) Control Project; and NMCP have been elected as permanent secretaries and three rotating seats, occupied currently by MENTOR, Save the Children and Cessor – a national NGO). While the Forum and its elected leadership continue to meet on a more regular basis, the individual working groups have not been as successful in their organization. PMI was asked by the NMCP Director to

support the establishment of a secretariat for the Partners' Forum that would be located at one of the two Vice Presidents' organizations.

As part of the progress made toward improving communication not only amongst and between malaria partners but also toward improving public awareness regarding malaria, a national IEC strategy has been drafted by Consaude and PSI and will soon be approved by the MOH. With PMI funding, PSI has also helped promote and influence malaria behavior throughout Luanda as well as in some provincial areas through development of two radio spots and two television spots and a national communication campaign that focused on net use and treatment-seeking behavior and included both television (300 placements) and six radio stations (3,200 placements), immediately followed by an impact study.

In spite of the progress made in malaria control and coordination in Angola over the past 3-4 years, the NMCP, PMI and other partners have received little attention either nationally or internationally. For this reason, the Mission and PMI headquarters will develop an advocacy program to draw attention to and promote the successes of the NMCP and partners in Angola.

*Planned Year 4 PMI Activities: (\$35,000)*

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, will 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 4 are as follows:

1. In-country PMI staff will continue to provide administrative support to the NMCP in the monthly meetings of the Malaria Partners' Forum, which should be made up of representatives of the NMCP, WHO, UNICEF, UNDP/Global Fund, private sector, NGOs/FBOs, and PMI. The Forum will continue to develop and strengthen regarding malaria surveillance and monitoring and evaluation, diagnosis and treatment, malaria in pregnancy, issues surrounding vector control as well as BCC (no additional cost to PMI);
2. Support the Partners' Forum to hire a part-time administrative assistant, facilitating improved communication between partners, dissemination of minutes, etc (\$35,000);
3. In collaboration with the Mission, develop an advocacy strategy regarding successes and work of the NMCP, PMI, and other partners in Angola for dissemination nationally and internationally (No additional cost to PMI); and

4. Finalize the national IEC guidelines and begin implementation, together with the NMCP and other partners a unified, a comprehensive IEC plan for ACTs, IPTp, and ITNs. This plan will build on successes from earlier radio and television IEC campaign. A package of messages to be used at the community level should be produced as a result of this activity (no additional cost to PMI).

## **PUBLIC-PRIVATE PARTNERSHIPS**

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.

### *Progress to Date:*

In 2006 and 2007, ExxonMobil 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 were used, together with PMI funds, to support the scale up of ACTs and IPTp through grants to four NGOs/FBOs working in Huambo, Kwanza Sul, Kwanza Norte, Malange, and Zaire Provinces where the government health infrastructure is weak. These grants are supporting the scale up of improved diagnosis and case management and IPTp, and strengthening pharmaceutical management in government health facilities in the five provinces. Thus far, the results of this effort have been very positive. The NGOs are coordinating closely with provincial authorities and provincial NPOs and Malaria Supervisors. The NMCP is very pleased with this initiative and has asked PMI to support expansion to additional provinces using the same approach.

### *Planned Year 4 PMI Activities:* (No additional cost to PMI)

ExxonMobil representatives have informed PMI that they will continue to support the efforts of PMI in Angola in 2008 with a \$1 million donation. If funding is available, it will be used to support NGOs/FBOs to scale up improved diagnosis, ACTs, ITNs, and IPTp in two to three additional provinces as requested by the NMCP Director. 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. Additional technical support in pharmaceutical management, laboratory diagnosis, rational use of ACTs, malaria in pregnancy and IPTp, ITNs, and IEC related to malaria prevention and treatment will be provided by PMI 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, PMI, Global Fund, and other national and international partners working on malaria.

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 monitoring and evaluation 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 25 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 an 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 both of these interventions were only adopted in 2005 and have not yet been implemented nationwide. 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. About 19% of children under five had malaria parasitemia and 3.6% had severe anemia (hemoglobin less than 8 g/dl). 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 supposed to provide malaria-related mortality in children under five for the period five years prior to the survey, but due to small sample size of 2,600, the confidence intervals around the estimate of malaria-specific mortality are very large.

The National Institute of Statistics is conducting a third Multiple Indicator Cluster Survey (MICS) in May 2008, supported by UNICEF and PMI. This survey is being added to a larger World Bank-supported household income and expenditure survey. It is being conducted in four separate sessions over a 12-month period with 3,000 households visited in each session/quarter (a total of 12,000 households), which will allow provincial-level analyses. Because of the very large number of questions, each household will be visited on four successive days for one hour each to obtain cover all questions. The full malaria module of the MICS is included in the survey instrument and this will provide mid-point coverage data for PMI on ITNs, IPTp, and ACTs. The malaria questions are spread out over the four daily visits of each quarterly survey. Most malaria questions are included in the first day's interview; IPTp during the second interview and ITN ownership in the fourth day's interview. The 2008 MICS will also provide an estimation of all-cause mortality rates for the five year period from 2003-2007. The preliminary results from the MICS survey will be available in December 2008 and the final results in September 2009.

PMI has provided funding to four NGOs (World vision, Africare, MENTOR and Consaude) to establish Malaria Sentinel Site Surveillance Sites in health facilities in the five provinces in which they are working to collect data on malaria morbidity and mortality. These sentinel sites will 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.

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 Monitoring and Evaluation officer and data manager hired with Global Fund support. A supervision and reporting system have been put in place by this Monitoring and Evaluation officer to gather data on 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 monitoring and evaluation at the municipal and provincial level, and in implementing regular data collection, is complementing PMI support in this area.

PMI staff participated in Monitoring and Evaluation System Strengthening Tool (MESST) workshop which serves as first step in strengthening an NMCP's monitoring and evaluation strategy and plan by identifying gaps in the existing strategy and plan, data management capacities, and reporting systems. PMI in-country staff also provided technical input on writing the NMCP Monitoring and Evaluation Strategy for 2008-2012.

Planned activities during Year 4 are as follows: (\$300,000)

The nationwide survey at the end of five years of PMI work in Angola will need to take place in late 2010 or 2011. It is not known at this time whether or not the repeatedly delayed DHS survey

will take place about that time, but if this occurs, PMI would support verbal autopsies of under five deaths identified during that survey. Alternatively, PMI will support an MIS with an expanded sample size in 2010 or 2011 to allow estimation of both all-cause under-five mortality and malaria-specific mortality.

1. Continue oversight and standardization to the sentinel sites that have been identified in each province. Reporting will begin in July 2008 (\$100,000; local costs are covered in the budgets of the NGOs working in the PMI-supported provinces); and
2. Angola will start initial planning for a final Malaria Indicator Survey in 2010/2011 with an expanded sample size or a DHS with verbal autopsy, which will provide information on both all-cause mortality and malaria-related mortality for children under-five (\$200,000).

## **STAFFING AND ADMINISTRATION**

*Planned Year 4 PMI Activities: (\$1,800,000)*

The USAID and CDC in-country Malaria Advisors assumed their posts in late 2006. They have been provided space within the NMCP offices and spend most of each work day there. This has greatly improved communication and coordination between PMI and NMCP, and they are now regarded as valued advisors to the NMCP. In the afternoons both advisors work out of the USAID Mission.

Both 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 FY09 (\$)**

<b>Planned Activity</b>	<b>Mechanism</b>	<b>Budget (<i>commodities</i>)</b>	<b>Geographic Area</b>	<b>Description of Activity</b>	<b>Relation to Interventions</b>
<b>PREVENTIVE ACTIVITIES</b>					
Entomologic monitoring/ insecticide resistance testing	CDC/RTI–Integrated Vector Management Project	50,000 (RTI) 12,100 (CDC)	Huambo and Huila	Increase capacity for entomologic monitoring/resistance testing in NMCP	IRS
Procurement and distribution of LLINs	Grant to UNICEF	4,050,000 (4,050,000)	Nationwide	Purchase/distribution of 420,000 LLINs to pregnant women/children <5 through clinics, outreach programs, child health days and contribution measles campaign	ITNs
Procurement and distribution of subsidized and full-cost LLINs	Population Services International (PSI)	200,000 (200,000)	Luanda and major urban areas	Purchase and distribution of subsidized/full-cost LLINs in major urban centers; IEC	ITNs
Evaluate the lifespan of LLINs in Angola	TBD/CDC	\$50,000 (TBD) \$12,100 (CDC)	7 provinces involved in the 2006 measles-ITN campaign)	Estimate the life span of LLINs in Angola	ITNs
Indoor residual spraying	RTI–IRS IQC	2,500,000 (800,000)	Huila and Huambo Provinces	Procurement of insecticide, spray equipment/supplies; spraying of 140,000 households; pre- and post-campaign surveys	IRS
Support NGOs in standardizing and overseeing malaria in pregnancy training	Essential Health Service Project	300,000	5 provinces	Ensure standardized training of trainers and supervision for malaria in pregnancy activities	IPTp

<b>Planned Activity</b>	<b>Mechanism</b>	<b>Budget (<i>commodities</i>)</b>	<b>Geographic Area</b>	<b>Description of Activity</b>	<b>Relation to Interventions</b>
IEC/BCC related to ITNs, ACTs and malaria in pregnancy	PSI	300,000	Nationwide	Integrated IEC/BCC related to ITNs, ACTs, and malaria in pregnancy	Malaria prevention and control
<b>SUBTOTAL: Preventive Activities</b>		<b>7,474,200 (5,050,000)</b>			
<b>CASE MANAGEMENT ACTIVITIES</b>					
Procurement of microscopes/laboratory supplies	DELIVER	175,000 (175,000)	Nationwide	Procurement of laboratory diagnostic equipment and supplies	Case management
Procurement of RDTs	DELIVER	300,000 (300,000)	Nationwide	Procurement of about 450,000 RDTs	Case management
Quality control of malaria laboratory diagnosis	Improved Malaria Diagnosis (IMaD)	100,000	Nationwide	Technical assistance on quality control of laboratory diagnosis (microscopy and RDTs)	Case management
Facilitate provincial-level laboratory training in collaboration with National Institute for Public Health (INSP)	Essential Health Service Project	100,000	Nationwide	Facilitate workshops to expand laboratory training and supervision through INSP	Case management
Procurement of artemether-lumefantrine for public and private sectors	DELIVER	4,415,800 (4,415,800)	Nationwide	Purchase of artemether-lumefantrine and other antimalarial drugs as needed	ACTs

<b>Planned Activity</b>	<b>Mechanism</b>	<b>Budget (<i>commodities</i>)</b>	<b>Geographic Area</b>	<b>Description of Activity</b>	<b>Relation to Interventions</b>
Pilot implementation of ACTs in the private sector	TBD	200,000	1 province	Final costs of pilot trial of artemether-lumefantrine in private sector	Case management
Strengthen MoH antimalarial drug management system	Strengthening Pharmaceutical Systems	600,000	Nationwide	Strengthen pharmaceutical mgmt. related to antimalarial drugs including regular supervision, Provincial training of pharmacist, help with printing of management tools	ACTs
Support to NGOs/FBOs	Sub-grants to NGOs/FBOs through World Learning	2,900,000	Expand to a total of 9 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	Diagnosis and treatment
Improve rational drug use by health workers in Luanda Province	Essential Health Service Project	200,000	Luanda	Promote correct use of laboratory diagnostic test results and rational administration of antimalarial drugs to patients in a low transmission area	Diagnosis and treatment
<b>SUBTOTAL: Case Management</b>		<b>8,990,800 (4,890,800)</b>			
<b>OTHER ACTIVITIES</b>					
Epidemic preparedness and response	WHO	100,000	Huila, Cunene, Namibe, Cwando Cubango	In collaboration with the RTI, establish an early warning system and stockpile of insecticides, ACTs, and RDTs to respond to epidemics	Epidemic response

<b>Planned Activity</b>	<b>Mechanism</b>	<b>Budget (<i>commodities</i>)</b>	<b>Geographic Area</b>	<b>Description of Activity</b>	<b>Relation to Interventions</b>
Support to the Partners' Forum secretariat	PSI	35,000	Nationwide	Administrative support for establishing Partners' Forum secretariat	Coordination of malaria partners
<b>SUBTOTAL: Other Activities</b>		<b>135,000</b>			
<b>MONITORING AND EVALUATION</b>					
Malaria Indicator Survey 2010	ORC Macro	200,000	Nationwide	Initial planning for 2010 MIS with expanded sample size	M&E
Strengthening sentinel site surveillance; monitoring of program implementation	Essential Health Service Project	100,000	Nationwide	Support to national malaria M&E plan	M&E
<b>SUBTOTAL: Monitoring and Evaluation</b>		<b>300,000</b>			
<b>IN-COUNTRY MANAGEMENT AND ADMINISTRATION</b>					
In-country staff; administrative expenses	CDC/USAID	1,800,000	Nationwide	Staffing and general administrative support for PMI	All interventions
<b>SUBTOTAL: Management/Admin.</b>		<b>1,800,000</b>			
<b>GRAND TOTAL</b>		<b>18,700,000 (9,940,800)</b>	<b><i>Commodities represent 53% of total budget</i></b>		

Table 3

**President's Malaria Initiative — Angola**  
**Year 4 (FY09) Estimated Budget Breakdown by Intervention**

Area	Commodities		Other		Total	
	\$	%	\$	%	\$	% of Grand Total
Insecticide-treated nets	4,250,000	92%	62,100	8%	4,312,100	23%
Indoor residual spraying	800,000	31%	1,762,100	69%	2,562,100	14%
Case management	4,890,800	54%	4,100,000	46%	8,990,800	48%
Intermittent preventive treatment of pregnant women	0	0%	600,000	100%	600,000	3%
Monitoring and evaluation	0	0%	300,000	100%	300,000	1.5%
Epidemic detection and response	0	0%	100,000	0%	100,000	0.3%
Other activities	0	0%	35,000	100%	35,000	0.2%
Staffing and administration	0	0%	1,800,000	100%	1,800,000	10%
<b>Total</b>	<b>9,940,800</b>	<b>53%</b>	<b>8,759,200</b>	<b>47%</b>	<b>18,700,000</b>	<b>100%</b>

**Table 4**  
**Year 4 (FY09) Budget Breakdown by Partner\***

<b>Partner Organization</b>	<b>Geographic Area</b>	<b>Activity</b>	<b>Budget</b>
UNICEF	Nationwide	Procurement and distribution of LLINs; MICS	4,050,000
DELIVER	Nationwide	Procurement of diagnostic equipment and supplies, RDTs, AL	4,890,800
RTI IRS-IQC	Huila and Huambo Provinces	IRS, entomologic surveillance and insecticide monitoring	2,500,000
World Learning — sub-grants to NGOs/FBOs	9 provinces	ACT and IPTp implementation in underserved areas	2,900,000
Strengthening Pharmaceutical Systems	Nationwide	Strengthening MOH drug management system	600,000
Improved Malaria Diagnosis (IMaD)	Nationwide	Training/quality control of malaria diagnosis – microscopy and RDTs	100,000
Newly competed cooperative agreement	Selected province (one)	Continued pilot implementation of ACTs in private sector	200,000
Population Services International	Luanda (nets) and nationwide (forum)	Procurement and social marketing of both full-cost and subsidized LLINs; oversight of Malaria Partners' Forum through establishment of secretariat)	535,000
RTI IVM	Huila and Huambo	Improve NMCP capacity for entomologic monitoring and resistance testing	50,000
ORC Macro	Nationwide	MICS survey	200,000
TBD	7 provinces	Estimate life span of LLINs in Angola	50,000
Chemonics/JHPIEGO	Nationwide	a) NGO support through supervisory training of trainers for malaria in pregnancy in 5 provinces b) Provincial level laboratory training in collaboration with INSP; improve provider prescribing through rational drug use trainings (Luanda) c) Strengthen sentinel site surveillance and monitor implementation of program d) Promote correct use of laboratory diagnostic test results, rational administration of antimalarials (Luanda)	700,000
WHO	Huila, Cunene, Namibe, Cwando Cubango	Strengthen epidemic preparedness and response through development of MEWS, stockpile of insecticides, ACTs and RDTs	100,000

\*Does not include budget for staffing/administration of \$1,800,000 or \$24,200 for CDC temporary duty (TDY)