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PRESIDENT'S MALARIA INITIATIVE

BENIN

Malaria Operational Plan (MOP) – Year Two

FY 2009

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ABBREVIATIONS

ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal care
BASICS	Basic Support for Institutionalizing Child Survival
CAME	<i>Centrale d'Achat des Medicaments Essentiels</i> (Central Medical Stores)
CCM	Country Coordinating Mechanism
CDC	Centers for Disease Control and Prevention
FCFA	<i>Franc de la Communauté financière d'Afrique</i> (Franc from the Financial Community of Africa)
CHW	Community health worker
CREC	<i>Centre de Recherche Entomologique de Cotonou</i> (Center for Entomology Research – Cotonou)
CSA	<i>Centre de Santé d'Arrondissement</i> (small health center)
CSC	<i>Centre de Santé de Commune</i> (large health center)
DHS	Demographic and Health Survey
EPI	Expanded Program on Immunization
FBO	Faith-based organization
FY	Fiscal Year
Global Fund	The Global Fund to Fight AIDS, Tuberculosis, and Malaria
GOB	Government of Benin
HMIS	<i>Système National d'Information et de Gestion Sanitaires</i> (Health Management Information System)
IEC / BCC	Information, education, communication/ Behavior change communication
IMCI	Integrated Management of Childhood Illnesses
IPTp	Intermittent preventive treatment of malaria in pregnancy
IRD	<i>Institut de Recherche pour le Développement</i> (Institute for Research and Development)
IRS	Indoor residual spraying
IRSP	<i>Institut Régional de Santé Publique</i> (Regional Institute of Public Health)
ITN	Insecticide-treated net
LLIN	Long-lasting insecticide-treated net
LQAS	Lot quality assurance sampling
MCDI	Medical Care Development International
M&E	Monitoring and evaluation
MCH	Maternal and child health
MICS	Malaria Indicator Cluster Survey
MIP	Malaria in pregnancy
MOH	Ministry of Health
NGO	Non-governmental organization
NMCP	<i>Programme National de Lutte contre le Paludisme</i> (National Malaria Control Program)
PISAF	<i>Projet Intégré de Santé Familiale</i> (Integrated Family Health Project)
PMI	President's Malaria Initiative

PSI	Population Services International
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RTI	Research Triangle Institute
SNIGS	<i>Système National d'Information et de Gestion Sanitaires</i> (Health Management Information System, HMIS)
SP	Sulfadoxine-pyrimethamine
SPS	Strengthening Pharmaceutical Systems Program
UNICEF	United Nations Children's Fund
URC	University Research Corporation
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization
WHOPES	World Health Organization Pesticide Evaluation Scheme

EXECUTIVE SUMMARY

In December 2006, Benin was selected as one of eight countries to receive funding during the third year of the President's Malaria Initiative (PMI). The objective of this Initiative is to assist African countries, in collaboration with other partners, to rapidly scale up coverage of vulnerable groups with four highly effective interventions: artemisinin-based combination therapy (ACT), intermittent preventive treatment for malaria in pregnancy (IPTp), insecticide-treated mosquito nets (ITNs), and indoor residual spraying with insecticides (IRS).

Malaria is endemic nationwide and is a major cause of morbidity and mortality in Benin. It is reported to account for 40% of outpatient consultations, 25% of all hospital admissions, and about 32% of deaths of children under five. With 30% of the population living below the poverty line and a per capita income of only \$530 annually, malaria places an enormous economic strain on Benin's development. According to the World Bank, households in Benin spend approximately one quarter of their annual income on the treatment and prevention of malaria.

The Government of Benin (GOB) views malaria control as a top priority for the development of the country and the National Malaria Control Program (NMCP) has developed a five-year strategic plan (2006-2010) that builds on recent changes in the national malaria policy to include long-lasting insecticide treated nets (LLINs), rapid diagnostic tests (RDTs), artemisinin-based combination therapy (ACT), and sulfadoxine-pyrimethamine (SP) for intermittent preventive treatment of malaria in pregnancy (IPTp). The overall goal of the GOB is to reduce malaria morbidity and mortality by 50% by the year 2010.

In 2007, the GOB received a four year, \$31 million World Bank Booster Program grant, which includes significant support for commodities, particularly ACTs and LLINs. Benin has also been awarded a five year, \$22.6 million Round 7 malaria grant from the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) that includes community-level distribution of ACTs in 40% of health zones nationwide. With these financial sources and support from the World Health Organization (WHO), the United Nations Children's Emergency Fund (UNICEF), and other national and international partners, scaling-up of malaria prevention and control interventions is in progress and considerable advances have been made.

The following table shows the proposed Year 1 targets and the early implementation activities supported by PMI and partners during this initial year.

Proposed Year 1 Targets (PMI and implementing partners)	Expected Results after 12 months of Implementation By March 2009
2.3 million LLINs purchased and distributed, of which PMI will contribute 810,000	In October 2007, more than 1.7 million LLINs were distributed through a national campaign (with 150,000 coming from PMI). As of August 2008, 830,000 additional nets have been procured by PMI with delivery expected in November 2008 and February 2009, exceeding Year 1 targets. An additional 60,000 subsidized nets are being distributed through commercial markets.

85% of houses sprayed in the areas targeted for IRS (approximately 70,000 households with a population of 350,000 people)	Spray operations were completed in August 2008 in the four targeted communes with a significantly higher population than projected. In all, an estimated 141,154 households with a population of 521,738 were protected by IRS, covering 94% of eligible households.
Procure 800,000 SP treatments to implement IPTp in all 12 departments of the country	With FY07 funds, PMI procured and distributed 800,000 SP treatments in 2008. Together with 200,000 tablets provided by the World Bank in August 2008, this covers the entire need for pregnant women attending antenatal clinic visits for more than 12 months. A PMI-supported, nationwide training of health workers on IPTp is to be completed by March 2009.
1 million ACT treatments purchased and distributed and ACTs in use nationwide	With FY07 funds, 1,073,490 ACT treatments have been procured and distributed to health facilities. In FY08, PMI is procuring 131,000 ACT treatments for distribution at public health facilities nationwide. Together with an additional 890,000 treatments to be provided by the World Bank, all departments will be using ACTs by March 2009. With PMI support, a comprehensive quality assurance and quality control system for delivery of malaria treatment in all health facilities will be rolled out and will have reached 50% of health facilities by March 2009.
Community-based distribution of ACTs implemented in two departments	By March 2009, ACT distribution will have begun at the community level in two of Benin's 12 departments through non-governmental organizations with PMI FY08 support. Including contributions from the World Bank and Global Fund Round 7, community-based ACT roll out will be extended to at least half of the 34 health zones nationwide.

* Year 1 Implementation ends March 31st 2009

This PMI Year 2 operational plan is based on progress and results to date with Year 1 activities as well as input received from the NMCP and partners during a planning visit that was carried out in June 2008. The PMI operational plan was developed with the participation of the NMCP and nearly all national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing to support complement the contributions of other partners and directly support the NMCP's strategic plan.

The following paragraphs describe the progress to date and Year 2 plans for each of the major interventions.

Insecticide-treated nets (ITNs): When PMI began in Benin, 24% of households owned at least one ITN and use of ITNs was about 20% for pregnant women and children under five years (DHS 2006). In October 2007, with the support of the World Bank and other partners, a nationwide integrated campaign took place that distributed a total of 1.7 million long-lasting ITNs (LLINs) for free to children under five years of age. PMI contributed 150,000 LLINs to this campaign. A follow-up survey to assess ITN ownership and use is currently being conducted. Over the next six months, 830,000 LLINs will be procured with PMI Year 1 funds and 475,000 LLINs procured by the World Bank Booster Program will arrive in-country for distribution at health facilities through routine antenatal care and vaccination services. PMI is also supporting the distribution of approximately 60,000 subsidized LLINs through social marketing approaches in rural areas with Year 1 funding. In Year 2, PMI plans to procure

568,000 LLINs to meet the need for routine services and 66,000 for distribution through social marketing. This should bring household ownership of at least one ITN to approximately 75% nationwide.

Indoor residual spraying (IRS): Although Benin has limited experience with IRS, the NMCP recognizes its value, particularly in areas where ITN coverage is low. With Year 1 funds, PMI supported spray operations in four communes with high malaria transmission located in the Ouémé Department. A total of 141,154 households were sprayed, protecting 521,738 residents. Ninety-four percent of the eligible targeted households were sprayed. PMI is also supporting training to strengthen the Ministry of Health's (MOH) entomological capacity. During Year 2, PMI will continue to support IRS operations in the same geographic areas as Year 1 and will shift the target area in Year 3 to another part of the country where LLIN coverage is low and where malaria is highly endemic with seasonal transmission. PMI will procure and distribute approximately 100,000 LLINs in Year 2 to provide protection to sprayed households as part of the long-term IRS strategy currently being discussed with the NMCP. PMI will also continue to support the national insecticide resistance surveillance program being implemented at 12 different sentinel sites.

Intermittent preventive treatment of malaria in pregnancy (IPTp): Antenatal clinic attendance is high in Benin with 88% of women making at least one antenatal care (ANC) visit. In late 2004, Benin adopted IPTp as a national policy, but roll out has only occurred in about one-third of all health zones. Even in those health zones, implementation in health facilities has been irregular and stock-outs of SP are common. During Year 1, using FY07 funds, PMI procured and distributed 800,000 SP treatments to support nationwide availability of drugs for IPTp. PMI will continue to support training and supervision of health workers, to reach all health facilities in Year 2. PMI also supports information, education, communication/behavior change communication (IEC/BCC) to increase early and frequent ANC visits and acceptance and proper administration of IPTp among pregnant women and health workers. During Year 2, PMI will continue to strengthen pharmaceutical management to ensure that SP is available in all health facilities that offer antenatal care.

Case management: Benin adopted artemether-lumefantrine (AL, or Coartem®) as the first-line treatment for uncomplicated malaria in 2005. Under the NMCP's policy, any child under five years of age with a febrile illness should receive presumptive antimalarial treatment. However, scale-up has been slow, and the new ACT policy has only been implemented in select areas through a Global Fund-supported pilot project and *Projet Intégré de Santé Familiale* (PISAF), a Mission-funded Integrated Family Health Project. With assistance from the World Bank Booster Program and PMI Year 1 funding, however, the NMCP plans to scale up the AL policy in 2008 to all public health facilities. During Year 1, PMI is supporting a comprehensive effort to improve malaria case management that involves strengthening diagnostic capabilities, including the introduction of rapid diagnostic tests (RDTs) to the most peripheral health facilities (*Centre de Santé d' Arrondissement*) and promoting case management based on diagnostic tests. In coordination with the World Bank Booster Program, PMI is also supporting quality assurance for diagnostics at all levels of the national health system. In Year 1, PMI procured over 1.2 million AL treatments. This procurement complemented the ones planned by the World Bank Booster Program and thus there is no

expected gap of AL treatments through 2009. In addition to implementation at the facility level, the NMCP also plans to extend AL implementation to the roughly 25% of communities with the lowest access to facilities, and perhaps also to licensed private health facilities in 2009. In Year 2, PMI will support community-based distribution of ACTs through non-governmental organizations (NGOs) in two of the country's 12 departments. PMI is also supporting IEC interventions focused on the recognition of severe illness, and prompt treatment of children under five, together with efforts to improve forecasting, storage and delivery of RDTs and ACTs. During Year 2, PMI will support procurement of artesunate suppositories and other drugs for severe malaria as well as training for their use at peripheral and referral health facilities.

Monitoring and evaluation (M&E): The PMI Year 1 plan addressed key elements for strengthening malaria-related M&E. Good progress has been made on efforts to strengthen facility-based surveillance for malaria morbidity and mortality and availability and use of commodities in three health zones where the NMCP has designated sentinel sites. PMI's Year 2 plans are to continue and expand support to existing facility-based sentinel surveillance sites, collect data on process indicators, provide support to strengthen the health information management system, and build the overall monitoring and evaluation capacity of the NMCP.

Building NMCP capacity: Benin's NMCP staff are overstretched and in need of additional training at the central, departmental, and health zone levels. To reach national targets for coverage with the major interventions, PMI will support training in epidemiology, management, monitoring and evaluation, malariology, and social mobilization for NMCP staff. PMI will also provide direct support for supervision of case management and equipment for the NMCP.

The proposed fiscal year 2009 PMI budget for Benin is \$13.8 million. Of the total, 42% is for the procurement and distribution of LLINs; 19% for IRS; 14% for procurement of ACTs, drugs for severe malaria, and improved laboratory diagnosis of malaria; 2% for IPTp; and 6% for monitoring and evaluation. Overall, 49% will be spent on commodities.

PRESIDENT'S MALARIA INITIATIVE

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

The PMI began in three countries in 2006. Four countries were added in 2007; and eight countries, including Benin, were added in 2008 (for a total of 15 countries). For all of PMI, funding began with \$30 million in fiscal year (FY) 2006 for the initial three countries, \$135 million in FY 2007, and \$300 million in FY 2008. The projected funding levels for FY 2009 and FY 2010 are \$300 million and \$500 million, respectively.

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

This document presents a detailed one-year implementation plan for the second year of the PMI in Benin. It briefly reviews the current status of malaria control and prevention policies and interventions, identifies challenges and unmet needs, and provides a description of planned Year 2 activities under PMI. The plan was developed in close consultation with the National Malaria Control Program (NMCP, *Programme National de Lutte Contre le Paludisme*) and with participation of all national and international partners involved in malaria prevention and control in Benin. The total amount of PMI funding requested for Benin is \$13.8 million for FY 2009 (Benin's PMI budget in FY08 was \$13.8 million).

BACKGROUND

In 2005, Benin's population was estimated at 8.3 million of which approximately 20% and 4% are children under 5 years of age and pregnant women, respectively. In 2002, almost 30% of the population was living below the poverty line. In 2007, Benin ranked 163 out of 177 countries on the Human Development Index and has a per capita income of only \$530 USD. Life expectancy is 52 and 53 years of age for men and women, respectively. Educational levels are low – six in ten women and four in ten men have had no schooling. For the period

from 2001–2006, the infant mortality rate was 67 per 1,000 live births, the under-five mortality rate was 125 per 1,000 live births, and the maternal mortality ratio is 397 per 100,000 live births (with estimates taking into account issues of undercounting running as high as 850). Total fertility rate is 5.7 per woman.

Benin spends 4.6% of its GDP on health. According to the World Bank, households spend approximately 24% of their annual income on the treatment and prevention of malaria. In 2005, an epidemiological model done by Rowe et al. for the Child Health Epidemiology Reference Group estimated that 27% of deaths of children under five for the year 2000 were attributable to malaria. Malaria is the number one reported cause for outpatient care and hospitalization of children under five.

Administratively, Benin is divided into 12 departments (average 650,000 inhabitants per department). In practice, however, the departments function as 6 pairs of “old” departments. Departments are subdivided into communes (1 to 9 communes per department), for a total of 74 communes and 3 autonomous urban areas (Cotonou, Porto Novo, and Parakou). Communes are subdivided into a total of 546 *arrondissements* and 3,747 villages.

After many years of Marxist-Leninist rule and several coups, Benin is now widely considered a model democracy in Africa. Free and fair multiparty elections have been held for over a decade, most recently, in March 2006 when Dr. Boni Yayi was elected President for a 5-year term.

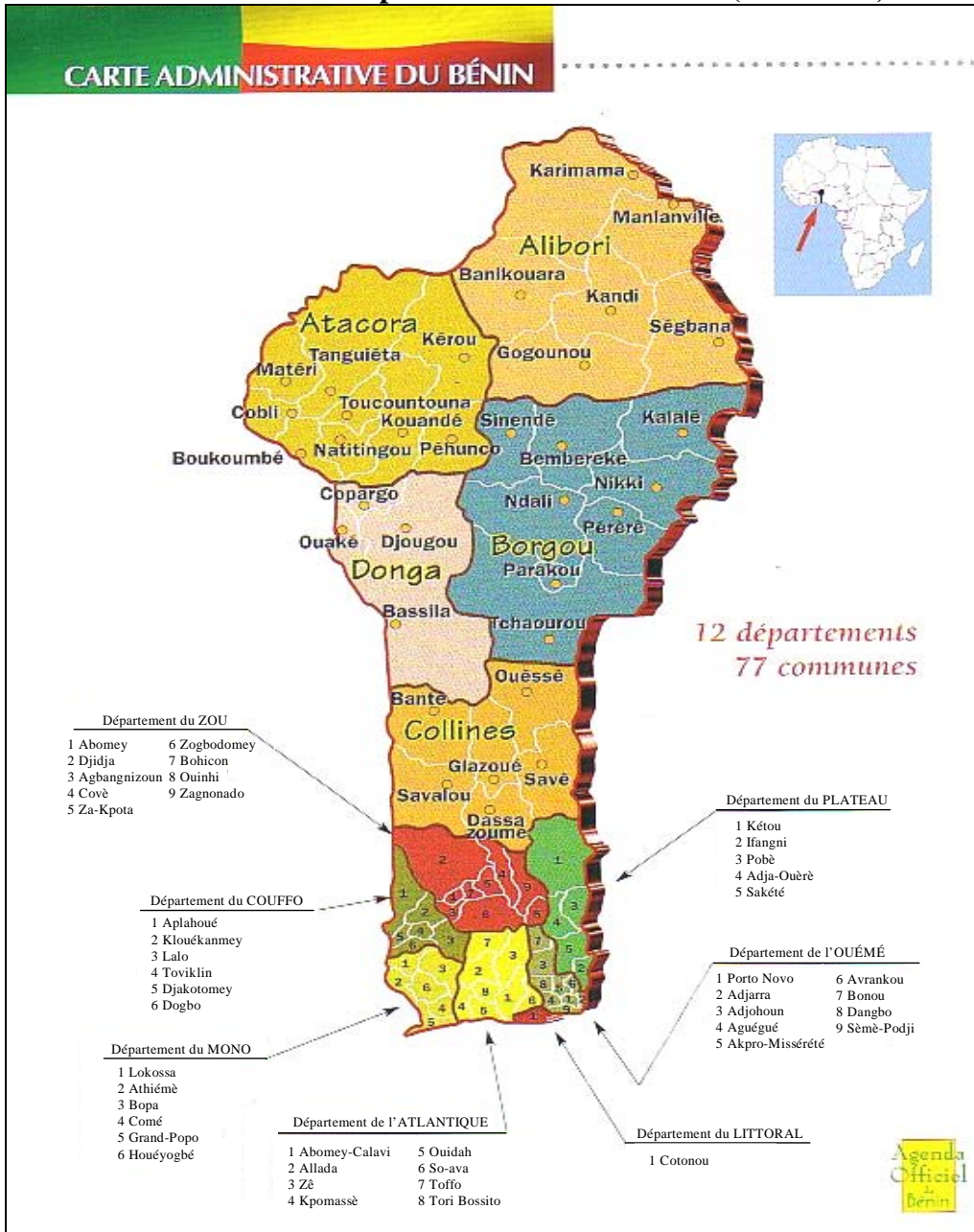
National Health System

Benin’s MOH underwent a reorganization in 2005. This reorganization expanded the number of health directorates, allowing for an additional and special focus on hospitals and health zones. Benin’s public health system is organized as a pyramidal structure consisting of three levels:

- **Central:** Ministry of Health and its central Directorates; National Referral Hospital (*Centre National Hospitalier et Universitaire*; CNHU)
- **Intermediate:** Departmental Directorates for Health, Departmental referral hospitals (*Centre Hospitalier Départemental*; CHD). Functionally, there are only 6 - i.e. one per “old” department.
- **Peripheral:** Health zones which contain the following health facilities: Zonal referral hospital (*Hôpital de Zone*; HZ), Commune Health Centers (*Centre de Santé de Commune*; CSC), Arrondissement Health Centers (*Centre de Santé d’Arrondissement*; CSA), private health facilities, and village health units. In practice, not all health zones have a functioning zonal referral hospital.

The country’s 34 health zones each cover an average population of 230,000 (range from 84,000 to 492,000). Health zones contain from 1 to 4 communes (average of 2 communes per health zone).

Benin's 12 administrative departments and 77 districts (*communes*)



The first level of facility-based health care in the public sector starts with the Arrondissement Health Center (CSA) which typically includes a dispensary (for curative care) and a maternity (for ANC and deliveries) and is usually staffed by a nurse, a midwife, and some auxiliary staff. The next level is the Commune Health Center (CSC), which is usually staffed by a doctor, several nurses, and midwives and offers a wider range of health care services. Community Health Workers (CHWs) (*Relais Communautaires*) are present at the village level and are formally linked to either a CSA or CSC. These CHWs are volunteers. It was not possible for the team to determine how many CHWs are currently working in Benin. The zonal hospital is the first referral level of specialized care and is usually staffed with a

pediatrician, a surgeon, and an obstetrician-gynecologist. Within a health zone, there are private clinics and doctor's offices, pharmacies, etc. These can be for profit or not for profit. The health zone is responsible for overseeing the whole range of providers (public and private) operating in the zone and the planning for the best use of resources within the zone to achieve the government's health objectives.

In 2006, there were an estimated 592 physicians, 2,952 nurses, 968 midwives, and 512 laboratory technicians working in Benin's public health system. For the country as a whole, there are an estimated 442 CSAs, 75 CSCs, and 305 licensed private health facilities (SNIGS, 2006).

Private health providers

The private health sector in Benin is varied and includes traditional practitioners, private hospitals run by faith-based organizations, private facilities run by licensed health practitioners, unregulated providers, and drug vendors. The NMCP has acknowledged the important role of the private sector and it is generally agreed that a significant proportion of the population seeks care from the private health sector. A descriptive study about the availability of private health care services in Benin published in the 2006 SNIGS reports that the private health sector sees more patients per year than the public health sector. From the NMCP's point of view, the private sector falls into two categories: authorized (licensed private pharmacies and health facilities, including faith-based facilities) and unauthorized (drug vendors and unlicensed health facilities). The NMCP is able by law to work with the former, but not the latter. This is a potential obstacle, as the unauthorized private sector is likely to be an important source of care for the poor.

Health system financing

Benin is a low-income country, according to the World Bank. Its workforce is employed mostly in the informal sector, adult illiteracy is low, and an estimated 1.5 million people are extremely poor (roughly 20% of the population). These factors suggest that the national revenue collection is likely to be severely constrained. The government invests about 8% of total public spending in the health sector (average for Sub-Saharan Africa is 9%). The MOH has a mechanism in place to identify the poorest in the country and to subsidize their user fees through the recently established Indigent Fund. Although the system is in place, it appears that many people do not know that they are eligible.

Public health facilities usually charge direct fees at the time of service for consultations, procedures, and medicines, except for, in recent years, certain essential health services and commodities like LLINs. The fees collected are kept at the facility level. A *carnet de santé* (health book that acts as a patient chart) must also be purchased to access care at public health facilities. The facility staff members work together with community committees to allocate user fees according to policies that are set by the MOH. Community financing represents a substantial share (average of 43%) of local operating costs for the MOH facilities.

Malaria Situation in Benin

Epidemiology

Malaria is a leading cause of morbidity and mortality among children under five in Benin. Based on the national health and management information system (HMIS or *Système National d'Information et de Gestion Sanitaires* [SNIGS]), in 2006, about 1.1 million malaria cases and 1,432 malaria deaths, all ages, were reported. These data, however, seriously underestimate true malaria cases and deaths. RBM estimated that in 2004 there were about 3 million cases of malarial illness (all ages), and the WHO-convened Child Health Epidemiology Reference Group (CHERG) estimated that in the year 2000 about 10,000–13,000 malaria deaths occurred in children under five years of age. The Benin HMIS data also suggest a high burden of morbidity from anemia, much of which is likely caused by malaria. The Benin 2006 Demographic and Health Survey (DHS) found that among children 6–59 months old, 78% had anemia (25% mild, 46% moderate, and 8% severe). Furthermore, the 2006 SNIGS reported that clinical malaria is the primary cause of outpatient visits at health facilities and hospitalizations (all ages), accounting for 40% of all outpatient visits and 25% of all hospitalizations, respectively. Among children under five years, the 2006 SNIGS reported that clinical malaria accounts for 44% of outpatient visits and for 40% of hospitalizations.

Entomology/transmission (populations at risk of malaria)

The malaria situation reflects the presence of vector breeding sites throughout the country and a seasonal rainfall pattern that increases the number of sites during the rainy season. Ubiquitous vector production in the presence of a large reservoir of gametocytes explains why malaria is endemic and transmission is stable everywhere. Transmission usually starts peaking in May during and after the “long” rainy season (April–July) and in October during the “short” rainy season (October–November). There are no epidemic-prone areas. The Mapping Malaria Risk in Africa (MARA) project estimates that 100% of the population lives in areas with high intensity transmission. Entomological inoculation rates for *Anopheles gambiae s.l.* in the south of the country range from 11 to 58 infective bites per person per year. Most of these bites (75%) occur during the long rainy season.

The country can be divided into three climatic zones with somewhat different rainfall patterns:

- a southern (or coastal) region with higher annual rainfall (e.g., 1500 mm in Cotonou) and 4 seasons: long rainy (April–July), short dry (August–September), short rainy (October–November), and long dry (December–March);
- a central region with lower annual rainfall (1000–1200 mm) and 4 seasons similar to the southern region; and,
- a northern region with a more temperate climate due to higher elevation and with only two seasons: rainy season from May to October and a dry season from November to April. Annual rainfall in the region can reach 1300 mm (e.g., Natitingou).

Because of poor infrastructure throughout the country, many roads are impassable during the rains. Thus, community-level vector control activities, such as IRS, should occur toward the end of the long dry season (February–April).

Twenty-two *Anopheles* species have been collected in Benin. Of these, the major malaria vectors are: *An. gambiae sensu stricto* (*s.s.*) (M and S cytotypes), *An. arabiensis*, *An. funestus* and *An. melas* (coastal marsh areas). Minor vectors may become important in certain

circumstances or at certain times of the year. Depending on the species composition in a given area, NMCP recommendations for vector control might vary. For example, presence of high numbers of *An. melas* might require some form of larval control since it is an outdoor biter that may not respond to long-lasting insecticide-treated nets (LLINs) and IRS. Such examples point out why the NMCP in collaboration with the *Centre de Recherche Entomologique de Cotonou* (Center for Entomology Research – Cotonou, or CREC) has established a national vector surveillance program to determine vector density, species composition, and vector resistance in the country.

Vector pyrethroid insecticide resistance is well documented in Benin. Frequencies for the *kdr* pyrethroid resistance mechanism in vector populations range from 0% in the north to more than 75% in the southern and central parts of the country. Currently, it is not known how resistance affects the insecticidal efficacy of LLINs and IRS and hence, the LLINs and IRS impact on preventing and controlling malaria. An operational research activity is ongoing to answer this question.

Rationale for current allocation of control interventions

For malaria prevention, the strategies adopted by the NMCP include:

- Scale up LLIN coverage through: a) national campaigns to distribute free LLINs to children under age five years (the first national campaign was held in October 2007; an estimated 1.7 million nets were distributed, covering 98% of children < 5); b) selling highly-subsidized LLINs to pregnant women at antenatal care (ANC) clinics, and distributing free LLINs at vaccination clinics to children who complete their vaccination series (upon receiving measles vaccination, at about 9 months); c) community-based distribution of highly-subsidized LLINs; and d) commercial sales of LLINs.

The rationale for this 4-pronged approach is that while campaigns can rapidly increase LLIN ownership and use (the catch up phase), to maintain high coverage among newborns and pregnant women requires on-going distribution (the keep up phase). LLIN distribution at ANC and vaccination clinics could help increase clinic attendance and create synergy.

- Adoption of IPTp in pregnant women because of concerns that the previous policy of chemoprophylaxis with weekly chloroquine is less likely to be effective due to chloroquine resistance and doubts about compliance.
- Use of IRS: The NMCP's 2006-2010 Strategic Plan recommends IRS and with the support of FY08 PMI funds, IRS is currently being piloted in four communes in south Benin covering about 521,738 people in 141,154 households (IRS operations started on July 4, 2008 and ended on August 23, 2008).
- For malaria treatment, the NMCP plans to scale up ACTs via public health facilities, licensed private health facilities, and community-based treatment with CHWs. The rationale is that: a) despite relatively low use of public health facilities (37%), there are still over one million cases of clinical malaria treated at public health facilities annually; b) licensed private health facilities are a significant source for malaria treatment; and c) community-based malaria treatment could reach those who do not visit health facilities.

Key partners in malaria control

To date, two grants have been awarded by the Global Fund for malaria control and prevention in Benin. The first grant (US\$2.14 million) was awarded through Round 3 to Africare as the Principal Recipient and is currently in Phase 2 of implementation. This grant is being implemented in the Departments of Mono and Couffo, an area of high malaria transmission. The goal of this community-based project is to reduce malaria-related morbidity and mortality among pregnant women and children under five. The specific objectives of the grant are to: (1) improve use of ITNs among pregnant women and children under five; (2) improve case management of uncomplicated malaria in health facilities and home-based management of fever in under-fives with the use of ACTs; and (3) improve access to IPTp with SP for pregnant women. The grant supports community mobilization and participation, information, education, communication/behavior change communication (IEC/BCC) approaches at the community level, and involvement of local stakeholders in malaria control. The second grant (US\$22.6 million) was awarded through Round 7 to Catholic Relief Services (CRS) as the Principal Recipient. The goal of this project is to extend the project started by Africare through Round 3 to a total of 14 of Benin's 34 health zones, which would cover about 40 communes or 1,402 villages (i.e., 41% of the general population). CRS will be implementing this project in collaboration with Africare, Plan Benin, and Medical Care Development International. The project was launched in July 2008.

World Bank's main contribution to malaria control and prevention in Benin is through its Malaria Booster Program, a \$31 million 4-year grant to the GOB. This includes significant support for commodities including the purchase of ACTs, rapid diagnostic tests (RDTs), SP, and LLINs. A majority of the LLINs distributed in the 2007 national campaign were purchased with funding from the Booster Program (the total World Bank contribution was 1.4 million LLINs). The Booster Program also provides significant support for training of health workers and for monitoring and evaluation (M&E) activities.

In 2007/2008, WHO provided technical assistance to the NMCP to overcome difficulties in implementing the new national malaria control policy, build capacity in management and research, improve the M&E system and mobilize resources. It worked with the NMCP to review its strategic plan to include ITNs and IRS interventions and the development of a supervision card for the integration of case management.

Population Services International (PSI) and the University Research Corporation (URC) have been two key local implementing partners. PSI has been working in Benin since 1993 and has supported a number of malaria activities since 1998, particularly around the area of ITN use and distribution. URC has been working in Benin since 1999 and is the principal recipient of the Mission-funded Integrated Family Health Project (PISAF).

UNICEF's main project is the Accelerated Child Survival and Development (ACSD) project, which primarily supports the implementation of Integrated Management of Childhood Illness (IMCI), ANC, and vaccinations, focused in three Health Zones. Since 2002, UNICEF has trained over 600 community health workers in these three Health Zones on IMCI including

malaria case management. In 2008, UNICEF is planning to extend the training to another four Health Zones. UNICEF has also partnered with PSI for the distribution of over 70,000 LLINs through routine services and their utilization through IEC/BCC campaign in Zou.

Under a USAID-funded Child Survival and Health Grants Program (2003-2007), Medical Care Development International (MCDI) implemented a successful ITN distribution model using social marketing approaches, partnering with PSI and local NGOs.

Finally, UNIDEA, an Italian Foundation working in the field of international development, solidarity and cooperation, is supporting the implementation of IMCI and distributing LLINs and ACTs in the Tanguiéta Health Zone in the department of Atakora through its “Tata Somba” project. The goal of the project, started in 2005, is to improve access at all levels to the health services network in the Tanguiéta Health Zone, with particular attention to women of child-bearing age and young children at risk.

NATIONAL MALARIA CONTROL PLAN AND STRATEGY

Malaria is regarded as a high priority in Benin and the government is a signatory to RBM and the Abuja targets. The GOB is committed to allocating at least 6% of its national budget for the health sector. In 2006 and 2007, Benin spent approximately 5.8% of its health budget on malaria control. The GOB recently changed its national malaria policy to include LLINs, ACTs, and SP for IPTp. The new national policy was issued in November 2005 together with a five-year strategic plan for 2006-2010. The overall goal of the GOB is to reduce malaria morbidity and mortality by 50% by the year 2010 and to eliminate malaria as a public health problem by the year 2030. The specific objectives of the NMCP’s new malaria policy are to:

- By 2010, ensure that 80% of malaria cases have been correctly managed at the household or community level within 24 hours of the onset of symptoms;
- By 2010, ensure that 80% of severe malaria cases have been correctly managed according to the national policy;
- By 2010, ensure that 80% of vulnerable groups (children under five and pregnant women) sleep under an insecticide-impregnated mosquito net;
- By 2010, ensure that 80% of pregnant women benefit from IPTp; and
- By 2010, ensure that 80% of communities have been informed regarding larval and environmental control measures.

CURRENT STATUS OF MALARIA INDICATORS

The table below presents the most recent estimates of malaria indicators. They are from the 2006 DHS, a nationally representative household survey conducted from August 3 to November 18, 2006, which corresponds to a mix of high malaria transmission periods and somewhat lower transmission periods. These estimates have been accepted as the baseline indicators for PMI-Benin, as no other survey of acceptable quality has been conducted since then. Note that the ITN and IRS indicators in the table below almost certainly underestimate

the true values in 2008 because of recent large-scale ITN distribution activities (e.g., a national campaign to distribute 1.7 million free ITNs to children under 5 in October 2007) and an IRS campaign in July–August 2008.

Most Recent Estimates of Malaria Indicators: 2006 Benin DHS	
Proportion of households with at least one ITN	24.5%
Proportion of children under five years old who slept under an ITN the previous night	20.1%
Proportion of pregnant women who slept under an ITN the previous night	19.6%
Proportion of targeted houses adequately sprayed with a residual insecticide in the last 12 months (assume no IRS at baseline)	94%*
Proportion of women who received >2 doses of IPTp during their last pregnancy in the last 2 years	3.0%
Proportion of children under five years old with fever in the last two weeks who received treatment with ACTs within 24 hours of onset of fever	<1%

* source: Research Triangle Institute

GOAL AND TARGETS OF THE PRESIDENT’S MALARIA INITIATIVE

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

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

EXPECTED RESULTS – YEAR TWO

Prevention:

- Approximately 568,000 LLINs will have been purchased and distributed by PMI through routine services to pregnant women and children and an additional 66,000 LLINs through the commercial sector (this should bring household ownership of at least one ITN to approximately 75%);
- Implementation of IPTp will continue to be expanded nationwide and PMI will procure and distribute 800,000 SP treatment doses which is sufficient to cover all needs for pregnant women in 2009 nationwide during routine ANC visits (providing IPTp coverage of at least 2 doses to 50% of pregnant women in Benin);
- At least 85% of houses (approximately 141,154 households with a population of 521,738 people) in geographic areas targeted for spraying during Year 2 will have been sprayed and approximately 141,000 LLINs procured and distributed in these areas as part of the long-term post-IRS strategy.

Treatment:

- As a result of the combined efforts of PMI, the World Bank Malaria Booster Program, and the NMCP, all laboratory technicians at the commune, health zone, and reference hospital level will have been trained in malaria diagnostics, and all public hospitals will have functional microscopes and reagents to conduct microscopy;
- As a result of the combined efforts of PMI, the World Bank Malaria Booster Program, and the NMCP, all departments will be using ACTs, supervision will promote correct case management for malaria in health facilities and hospitals;
- Approximately 440,000 pediatric ACT treatments will have been purchased for distribution via community-based workers in two departments; and
- Approximately 180,000 artesunate suppositories and 25,000 quinine drug kits for treatment of severe malaria will have been purchased and distributed to health facilities.

INTERVENTIONS - PREVENTION

Insecticide-treated nets (ITNs)

Current Status

The NMCP's National Five-year Strategic Plan 2006 – 2010 emphasizes the use of ITNs for the prevention of malaria among children under five and pregnant women. The 2006 DHS found that more than half of all households (56%) owned at least one mosquito net of any type (50% rural, 66% urban). However, only 24.5% of households reported owning at least one ITN and only 20% of children under five and pregnant women said that they had slept under an ITN the previous night. Therefore, the NMCP is supporting a four-pronged approach to net distribution in Benin, which includes free distribution via campaigns, free distribution at vaccination clinics, sale of highly-subsidized LLINs, and sale of LLINs on the commercial market.

1. Distribution through health centers during antenatal care and immunization clinic visits. Benin has focused on ANC services as the channel to distribute highly-subsidized ITNs to

pregnant women. LLINs are included as part of an ANC kit containing one LLIN, one dose of mebendazole, folic acid, iron, and SP at a cost of slightly more than \$1 per kit. Although the cost may be a determining factor for some pregnant women who can not afford to pay, health facilities have established indigent funds for poorest of the poor households, including those with pregnant women, to assist with paying for services. To reach children under five, the NMCP strategy is to distribute free ITNs through vaccination clinics. The current NMCP position is that only LLINs will be distributed through the public sector. Between 2003 and 2005, approximately 700,000 mosquito nets were distributed through ANC and Expanded Program on Immunization (EPI) clinics, of which 160,000 were LLINs. The need for ANC and EPI services is estimated 568,000 LLINs for the period of 2008-2010 (see Table).

LLIN need and gap from September 2008 to August 2010

	September to December 2008	January to December 2009	January to August 2010
ANC need	131,667	408,000	280,000
EPI need	113,333	351,000	240,000
EPI + ANC need	245,000	759,000	520,000
Total Need*	1,751,000		
Total Contributions**	1,183,000		
Total Gap	568,000		

* This includes an estimated 227,000 children for the period October 2007-August 2008 who were missed by the October 2007 campaign because they were born after the campaign. The projected number of infants was the number of live births minus the estimated number of deaths in the first year of live (based on UNICEF mortality estimates for Benin). The projected number of pregnancies in 2009 was calculated by taking the estimated number of pregnancies in 2005 (which was the number of live births counted by Benin's Health Management and Information System [HMIS] plus 15%) and adding an annual population growth factor of 3.25% (which was from the HMIS and based on national censuses).

**Contributions include 108,000 from UNICEF, 600,000 from PMI (FY08 Year 1 funds), 475,000 from the World Bank Booster Program.

2. Distribution through community-based channels.

Africare has distributed 76,498 ITNs to rural populations in two departments (Mono and Couffo) through a Global Fund Round 3 grant. This approach supports the sale of highly-subsidized ITNs (500 FCFA; ~ \$1) at the community level through CHWs and women's groups. The community-based approach has been successful in increasing ITN usage among under-fives and pregnant women in part because it includes a health education component with the sale of each subsidized net and additional follow up activities such as household visits by CHWs to check on net use. The success has resulted in the Global Fund awarding a Round 7 grant (US\$22.6 million) to Catholic Relief Services (CRS) as its Principal Recipient to extend the Africare project to an additional 11 health zones (for a total of 14), which would cover about 40 communes or 1,402 villages (i.e., 41% of the general population). The NMCP continues to support community-based delivery channels and has encouraged support for these activities through CHWs. The NMCP and PMI agree that these community-based strategies should be supported to ensure that ITN ownership and use rates increase, particularly in areas where health facility attendance is low.

3. Distribution through mass campaigns.

In October 2007, Benin held its first national ITN distribution campaign. The campaign was integrated and included the free distribution of vitamin A and albendazole as well as LLINs to all children under the age of five. The World Bank Booster Program procured the majority of the 1.7 million LLINs that were distributed. Using FY07 funds, PMI contributed 150,000 LLINs to this campaign in addition to other partners such as UNICEF, WHO, and *Soroptimistes Internationales*. The NMCP reported that the campaign reached 98% of children under five. A follow-up survey in December 2008 will assess ITN ownership and use. No other campaigns are currently planned, and the NMCP strategy for maintaining high coverage with LLINs is the distribution of LLINs through routine ANC and vaccination services at health facilities as well as through community-based strategies.

4. Distribution through the commercial sector.

Mosquito nets are also available for sale on the commercial market. For an ITN or one packaged with insecticide for treatment, the price ranges from 3,000-4,000 FCFA (\$7-9). Unfortunately, untreated nets can also be purchased through the commercial sector. With support from USAID, PSI has been implementing social marketing of ITNs and retreatment kits in Benin since 2003. Two types of nets have been commercially marketed at full cost through PSI: (1) an LLIN for urban populations (sold at 5,300 CFA, ~ \$12); and (2) an ITN with a treatment kit (sold at 4,900 CFA, ~ \$11), which is being phased out. At present there are no ITNs for sale that populations in rural areas can easily afford, and the NMCP and PMI agree that there is a need to extend the reach of reasonably-priced (e.g. \$2-4) socially-marketed LLINs to these population groups. Profits generated from the sale of socially marketed nets are used to purchase more nets for this approach. Under a USAID-funded Child Survival and Health Grants Program (2003-2007), MCDI implemented a successful ITN distribution model using social marketing approaches in two rural health zones (Tchaourou and N'Dali) within the department of Borgou. The project partnered with PSI and a local NGO to sell nets via CHWs, mothers, and kiosks at markets. In the project area, ITN use among children under two more than doubled in one year, increasing from 21% to 47% (MCDI Child Survival Project Report).

Progress to Date

During Year 1, PMI procured 150,000 LLINs (using FY07 funds), which were distributed via the national campaign free to children under five. PMI is currently procuring 600,000 LLINs which will arrive in two shipments, one in November 2008 and another in February 2009, to avoid overloading the MOH logistics management system, which is currently being strengthened with PMI support through the Strengthening Pharmaceutical Systems (SPS) project. These LLINs will be distributed through routine services for free to under fives at vaccination clinics and as part of a subsidized ANC kit for pregnant women. Together with a World Bank procurement of 475,000 LLINs scheduled for delivery in December 2008, routine needs for 2008 and most of 2009 have largely been met. PSI has developed a workplan and final approval for the amendment to their bilateral agreement to implement activities in the Year 1 MOP was given in July 2008. Their activities include the transport of LLINs from health zones to facilities to assure the availability of nets at the community level

(which was identified as a barrier by the NMCP), IEC/BCC activities, and the sale of 60,000 socially-marketed subsidized LLINs. For the improvement of LLINs storage capacity, DELIVER is currently drafting a workplan. An assessment of the supply chain system has been carried out by SPS and it has also submitted a workplan. SPS is in the process of setting up an office and hiring staff. The operations research studies described in the Year 1 MOP to assess whether pyrethroid resistance in Southern Benin reduces the clinical impact of ITN and IRS interventions are underway with the initial tranche of funding received by *Centre de Recherche Entomologique de Cotonou* (Center for Entomology Research – Cotonou, or CREC) A subcontract is currently being established to ensure the transfer of the remaining funds to CREC for the completion of the activities.

Proposed Year 2 activities (\$5,738,000)

1. *Procure LLINs for routine services*: Procure approximately 568,000 LLINs for distribution to pregnant women at ANC visits at a highly-subsidized price (~\$1) and free to children at vaccination clinics. Pregnant women will receive LLINs as part of a kit including one LLIN, one dose of mebendazole, folic acid, iron, and SP at a cost of slightly more than 1\$ per kit. These nets, together with contributions from other partners, will cover 100% of the estimated need at both ANC and vaccination clinics in 2009 through August 2010. Costs in this line item include procurement of the LLINs as well as their transport all the way to the health zone depots. (\$3,976,000)

2. *Distribute LLINs for routine services*: Transport the 568,000 LLINs intended for routine distribution from health zone depots to health facilities. Because health zones often lack the means (e.g. vehicles, staff, fuel) to transport LLINs from health zone depots to health facilities, it is vital that PMI program some funds to ensure that LLINs are distributed to the level of health facilities. PMI will also engage the NMCP to determine the best long-term solution to this barrier as this responsibility will need to be transferred to the MOH. (\$200,000)

3. *Procure LLINs to support the post-IRS strategy*: Procure approximately 100,000 LLINs for free distribution to houses that will be sprayed with a second round of IRS in 2009. The LLINs will be distributed to houses (enough to cover a portion of all sleeping spaces, which is estimated to be about 2 per household) after the round has occurred to ensure that residents will continue to be protected since IRS is likely to be shifted and conducted elsewhere in Benin in 2010. Working closely with the IRS program, PMI will assess the total number of nets needed to cover all sleeping spaces, and will procure the balance needed in Year 3. (\$700,000)

4. *Strengthen logistics management for LLINs*: Continue to provide technical assistance to the *Centrale d'Achat des Medicaments Essentiels* (CAME, Central Medical Stores) to improve supply management, forecasting/quantifying, tracking, and storing LLINs and other malaria commodities at the central, regional, and zonal levels. Training of CAME staff at all levels will be conducted. This activity will be coordinated and integrated with logistics management of SP, ACTs, and other malaria drugs. (*Costs covered under Pharmaceutical Management section*)

5. *IEC/BCC for LLINs, IPTp, and ACTs*: Support IEC/BCC strategies including mass media and community-level approaches (e.g. local radio stations, women's groups) to increase demand and promote correct and consistent utilization of LLINs by target groups. Messages will focus on creating demand for ITNs, explaining correct care and use of nets, and emphasizing the importance of ITN use among under-fives and pregnant women. This will be part of a larger integrated BCC/IEC activity to satisfy needs for LLINs, IPT and case management. This will include building the IEC/BCC capacity of the NMCP through continuous technical assistance so that there is good coordination of IEC/BCC efforts at the national level. These IEC/BCC activities will be coordinated with IEC/BCC approaches supported through NGOs (*see Community-Based Interventions section*). (\$400,000)

6. *Procure and distribute LLINs through the private sector*: Procure and distribute approximately 66,000 highly-subsidized LLINs through the private sector, using a social marketing approach in rural areas with high malaria transmission. This activity will involve NGOs/FBOs with community-level experience in Benin and will build on the existing model that was piloted in the Borgou Department. A high subsidy will be applied to these nets so that they are sold at a more affordable price of around US \$1-2. Social marketing of highly-subsidized ITNs through volunteer community agents and commercial outlets will be an integral strategy to establish market demand and to expand rural reach. (\$462,000)

Indoor residual spraying (IRS)

Current Status

The principal vector control strategy relies on high coverage of vulnerable populations with LLINs. However, the NMCP also recognizes the value of time-limited IRS applications, where ITN coverage is low, and where IRS (with a non-pyrethroid insecticide) may reduce the frequency of pyrethroid-resistant vectors, thereby promoting LLIN efficacy.

Focusing on areas with high malaria prevalence in target groups, high entomological inoculation rates, high vector densities, and high infant mortality rates has led the NMCP to target IRS in the south of the country (the four communes of Sèmè-Podji, Akpro Misséré, Adjohoun and Dangbo in Ouémé District).

Vector abundance surges during the 4-month 'long rainy season', and drops to lower levels, especially in the North, during the remainder of the year. Malaria transmission tends to track vector abundance. Therefore, one well-timed round of IRS, with a residual effect of 4-6 months, would have a significant impact on malaria transmission. Accurate timing of the spray round (immediately before the start of the rains) is required. With FY08 PMI support, CREC carried out an evaluation of candidate insecticides for IRS in Benin and the findings of this evaluation supported the MOH recommendation of bendiocarb for IRS (CREC PMI report, 2008). According to the WHO Pesticide Evaluation Scheme (WHOPES) specifications, the duration of the effect of bendiocarb, a carbamate insecticide, ranges from 2 to 6 months, depending on surface and climatic conditions.

The current IRS target area, Ouémé Department, includes a major river basin. To assure protection of the environment in this wetlands ecosystem, it has been determined that approximately 30% of the dwellings, those located on, near, or above the waterways, cannot be sprayed (Supplementary Environmental Assessment Report, 2007). Instead of IRS, these households are to receive LLINs in order to cover all sleeping spaces (estimated 2 LLINs are needed per household). This strategy has been endorsed by the NMCP. PMI's IRS partner is being supported with FY08 funds to not only distribute these LLINs to individual households but also to help homeowners hang these LLINs within their homes.

Since IRS is a new malaria intervention for Benin, the country does not have a long-term IRS strategy. PMI has encouraged and is actively engaged with the NMCP to develop such a plan. PMI has continued to emphasize time-limited use of IRS in the South, followed by universal coverage with LLINs. PMI will then shift its focus to areas in the North, where LLIN coverage is relatively low and where malaria is highly endemic with seasonal transmission. Meetings were held in mid-October 2008 to review the 2008 IRS activity, to discuss IRS sustainability issues and expansion, and to further develop an integrated plan for malaria vector control.

Progress to date

IRS related activities have been underway since January 2008. Selection of an insecticide has taken into consideration the existence of vector resistance to pyrethroids in Benin. A non-pyrethroid insecticide, bendiocarb, shown to be the best option for IRS (CREC report, April 2008), has been approved by the GOB. This carbamate class insecticide should work well against pyrethroid-resistant vector populations, since there is no cross resistance between these insecticide 'families'. Bendiocarb has been approved by WHOPES for IRS. One drawback is its potential short residual activity, 2 to 6 months. Therefore, IRS follow-up decay rate testing (as described in the IRS monitoring and evaluation plan, 2007) is being used to determine the actual residual effect in Benin. Baseline and post IRS evaluation of vector resistance to synthetic pyrethroids and to carbamate insecticides as prescribed in the IRS entomological monitoring and evaluation plan is also ongoing.

Entomological (baseline) and sociological evaluations to determine the population's knowledge, attitudes, and practices in the IRS target areas were carried out and published. Based on these studies, informed recommendations about choice of insecticide for IRS, targeting of IRS to non-sensitive areas (locations within target zones that are not part of the riverine / wetlands system); and a strategy for use of LLINs in ecologically sensitive areas, were made and accepted by the NMCP.

Starting in April 2008, environmental mitigation and logistical assessments were conducted, spray operators and IEC mobilizers were recruited and trained, insecticide and spray equipments were ordered and delivered, and an IRS operations and an environmental mitigation center in Porto Novo were established culminating with spray operations beginning on July 4, 2008. To cover the four targeted communes, spray operations lasted approximately 7 weeks (spray operations ended on August 23, 2008). An estimated 141,154 targeted

households were sprayed, protecting an estimated 521,738 residents. Among the households determined eligible to be sprayed, the coverage was 94% (see Table below).

District	Total Number of Structures	Total Number of Structures Sprayed	Total Number of Structures Not Sprayed	Total Number of Households Covered
Adjohoun	109,630	101,793	7,767	41,929
Akpro-Misséréte	113,084	105,898	7,284	34,437
Dangbo	47,238	44,541	2,963	13,761
Sèmè-Podji	142,898	136,223	4,912	51,027
Total	412,850	388,455	22,926	141,154

Source: RTI IRS Program Update - 08/29/2008

The PMI response to ecological concerns seems to be a viable strategy. Feedback to the IRS contractor indicates that the population supports the approach accepted by the NMCP (hanging LLINs in houses where IRS is deemed unsuitable due to environmental concerns). A second lesson learned from this experience is that ecological suitability needs to be considered in the selection of new IRS target locations.

Two operations research studies related to IRS and vector control are underway:

(1) Implementation of a vector control strategy, based on LLINs + non-pyrethroid-based IRS, to assess protective efficacy against malaria in a location where the vector has a high (>70% kdr) level of pyrethroid resistance by CREC. The Protocol has been written and cleared; phase II trials (scheduled ahead of the phase III trial), are completed, baseline data (mapping, sensitization of local population, census, vector monitoring, parasitology, randomization of villages according to study design, at the study site, Tori Bossito) have occurred. Of a total of 600 villages and neighborhoods, 28 were selected; seven of these were selected for IRS. Spray operations occurred in July 2008 and LLINs are to be hanged within the next month. The time frame of the study is from August/September 2007 to September 2009.

(2) Evaluation of new technology to determine when LLINs need to be replaced by CDC. The Protocol has been written and cleared; an evaluation of a colorimetric test, to determine if there is sufficient insecticide on an LLIN to kill vectors, was completed in September 2008. Preliminary results show a good correlation between the colorimetric test and the standard WHO cone test, which is currently used. Publication of the data will occur in 2009.

As soon as FY08 funding is available, and vectors are abundant, collection and testing of mosquitoes will commence at 12 surveillance sites (1 site/department). Data will be mapped and surveillance, based on annual assessment, will be initiated.

Training of NMCP staff in entomology and vector control is still desirable. The challenge for the NMCP has been to 'cover' the 'day-to-day work load' of the candidates given the shortage of staff.

Proposed Year 2 activities (\$2,627,100)

1. *IRS Implementation*: Support a second round of targeted IRS in the four communes (Sèmè-Kpodji, Akpro-Misséré, Adjohoun and Dangbo) of the Department of Ouémé. Engage the NMCP in a dialogue about the development of a long-term strategy for IRS and its expansion, starting with IRS meeting in October 2008. (\$2,500,000)

2. *Entomological evaluation of IRS*: Support entomological monitoring and evaluation of vector taxonomy, density, insecticide resistance and IRS decay rates, baseline and post spraying evaluations, in the IRS target areas. Details of the activities are described in the Benin IRS entomology monitoring and evaluation plan drawn up in 2007 and endorsed by the NMCP. (\$35,000)

3. *Support national vector resistance surveillance program*: Continue supporting the national vector resistance mapping and surveillance activity, which include routine vector collection and testing at 12 sentinel sites to monitor insecticide resistance status of local vector populations. The results of this activity will be used to guide the NMCP's LLIN and IRS policy going forward. A protocol for this activity is also included in the entomology monitoring and evaluation document. (\$80,000)

4. *CDC technical assistance for vector control activities*: Provide technical assistance to NMCP and CREC including CDC vector resistance testing, supervision and support of Operations Research (OR) activity approved in Year 1, and entomological surveillance at sentinel sites. (\$12,100)

Intermittent preventive treatment of malaria in pregnancy (IPTp)

Current Status

Intermittent preventive treatment for pregnant women was adopted as a national policy in November 2004 and officially introduced in all 12 departments during 2005. The protocol consists of two treatment doses with SP during pregnancy: the first after 16 weeks or quickening and the second at least one month later. Although the WHO policy recommends a third dose of SP in areas with an HIV seroprevalence > 10%, the NMCP recommends that HIV positive women receive a third dose. IPTp is not recommended for HIV positive women taking cotrimoxazole prophylaxis. PMI will work with the MOH to clarify this policy. Training and roll out at the facility level has been slow and the policy has been fully implemented in only about one-third of the health zones. In addition, even in those zones, implementation has been uneven and stock-outs of SP have occurred.

ANC clinic attendance is high in Benin. The 2006 DHS found that 88% of women make at least one ANC clinic visit and rates of attendance are higher in urban (93%) than rural (85%) areas. During their last pregnancy, 84% of women reported that they made at least two and 61% made four or more ANC clinic visits. As expected with the high level of multiple ANC visits, pregnant women attend their first ANC clinic visit relatively early, on average at 4.2 months.

The 2006 DHS found that 82% of women reported taking antimalarials for malaria prevention during their last pregnancy, but only 5% reported receiving SP and only 3% received two doses of SP. The GOB adopted an IPTp policy at the end of 2004. The low uptake of SP a year and a half later is undoubtedly related to a slow roll out and implementation of that policy. Data on ANC attendance indicate that high IPTp coverage is possible in Benin. Appropriate training and post-training support for midwives and nurses, who together provide 80% of ANC consultations, and a steady supply of SP are needed. The SNIGS (2006) puts the number of midwives in the public sector at 968. This differs from figures recently provided by several senior MOH personnel of 1,400 midwives in the public sector and an additional 600 in the private sector. The SNIGS (2006) also reports that there are 489 peripheral public health facilities and 305 private health facilities reporting through the public health system. Although the number of midwives is greater than the number of peripheral facilities, they are unevenly dispersed and in a number of facilities nurses facilitate ANC clinics and deliveries.

Two treatments of SP (6 tablets) for IPTp are included in the ANC kit. This kit, provided at a cost of 500 CFA, also includes iron supplements, folic acid, mebendazole, and a LLIN. The first SP treatment is delivered at the time that the kit is provided to the client and is administered as a direct observed treatment. The second treatment is held at the health facility and given as a direct observed treatment during a follow up ANC visit, at least one month later.

Progress to date:

Although rolling out of IPTp nationally was identified as a PMI “jump start” activity for Year 1, it was later decided to support the October 2007 LLIN campaign and that was used that as the official PMI “jump start” activity. An adequate stock of SP was secured in early 2008 and will be delivered to health facilities in the second half of 2008 following training on IPTp. PMI procured 800,000 and the World Bank Booster Program an additional 200,000 treatment doses of SP. This covers the need for about one and a half years based on annual use of 700,000 treatment doses for an estimated 350,000 pregnant women, with another 35,000 to be given as a third dose to HIV seropositive women.

Through the focused ANC initiative, a standardized training curriculum for ANC, including IPTp, was adopted by the MOH and partners in 2008. The rollout of training with this curriculum is set to begin in mid-2008 with the goal of reaching all public sector midwives and nurses who administer ANC clinics. Because the number of individuals targeted is higher than originally projected in the PMI Year 1 planning (as a result of updated numbers provided by several senior MOH personnel), some FY08 funds were reprogrammed to achieve rapid scale-up and national coverage within the public sector.

Proposed Year 2 activities (\$280,000)

PMI will continue to support nationwide ANC training for midwives and nurses in the context of the MOH focused ANC initiative and, on completion of training for health workers in the public sector, the focus will shift to supervision and to extending training to private providers.

PMI will continue to support the cross-cutting approaches of IEC/BCC and supply chain management. PMI will also fill the gap in SP projected for Year 2.

The proposed PMI activities to increase IPTp coverage in 2009 are:

1. *Procure SP*: PMI will fill the entire gap for SP for Year 2. This is projected to be approximately 800,000 treatment doses to cover 350,000 pregnant women and includes additional doses needed for HIV seropositive women. (\$80,000)
2. *Train health workers in IPTp*: These funds will support training for any public health facility midwives or nurses who were not covered in Year 1 and an expansion of the training to include midwives in the private sector. (\$200,000)
3. *Supervise health workers in IPT*: Supervision of nurses and midwives to correctly deliver SP in the context of the MOH focused ANC initiative. This supervision is part of an integrated approach for supervision at health facilities. (Costs covered in Case Management section.)
4. *IEC/BCC for IPTp*: Support IEC/BCC to promote ANC attendance and educate pregnant women and communities on the benefits of IPTp. This will include support for mass media (including local radio stations) as well as community-level approaches such as training of community-based workers. Immunization outreach sessions will be used as opportunities for educating women. This will be part of a larger integrated IEC/BCC activity to satisfy needs for case management, LLINs, and IPTp. (Costs covered in ITN section)
5. *Strengthen logistics management for SP*: Provide technical assistance to the CAME to improve supply management, forecasting/quantifying, tracking, and storage of SP. Training of CAME staff at all levels (central, regional, and health zone) will be conducted. These activities will be combined with the other support that PMI will provide to improve logistics management (see the LLIN and case management sections of this document). (Costs covered Pharmaceutical Management section)

INTERVENTIONS – CASE MANAGEMENT (DIAGNOSIS AND TREATMENT)

Current status

Uncomplicated malaria

The new first-line antimalarial for uncomplicated malaria is the ACT artemether-lumefantrine (AL, or Coartem®). Artesunate-amodiaquine (Arsucam®) is recommended for patients under six months of age, for patients who cannot tolerate AL, and when AL is not available. Under the NMCP's new treatment policy, any child under five years of age (under-five) with a febrile illness should receive presumptive antimalarial treatment, regardless of whether the child is treated in a health facility or community setting. No diagnostic test is needed. Additionally, Integrated Management of Childhood Illness (IMCI) guidelines state that under-

fives with anemia should be treated with an antimalarial. Notably, existing training materials have an algorithm indicating that under-fives with a febrile illness should be tested with microscopy or an RDT and such children should be treated regardless of whether the test is positive or negative. This contradiction has been pointed out to NMCP staff, and efforts have been made to start a process to revise the algorithm and the related training materials. Anecdotally, during training courses on malaria case management, trainers tell their students to ignore or correct this problematic algorithm. For children older than five and adults, the new policy recommends reserving antimalarials for those with a positive diagnostic test (microscopy or RDT).

The new ACT policy is being slowly implemented in health facilities. About one-third of the country is covered (i.e., ACTs delivered to facilities and staff trained), including the Departments of Mono, Couffo, Zou, and Collines. In 2008, the World Bank Booster Program funds will be used to train 5,888 health workers (including physicians, nurses, midwives, and nursing aides) on the new malaria guidelines—enough to cover all public health facilities. ACTs are available in some private pharmacies, although they are expensive. A comprehensive scale-up strategy in the private sector is still being formulated by the NMCP. The governmental policy that guarantees free treatment for under-fives, which was announced in 2008, will not be implemented because of cost. AL is sold to patients at a price below market price (blister packs of 6, 12, 18, and 24 tablets are sold for 150CFA [~ \$0.36], 300CFA [~ \$0.71], 450CFA [~ \$1.07], and 600CFA [~ \$1.43], respectively), relative to the cost of ACTs when PMI began work in Benin. As ACT prices have decreased the subsidy is not so large but is still substantially less than ACTs available in private pharmacies in Benin (where ACTs cost 3-4,000 CFA or \$6.50-\$8.70). Furthermore, an important issue that partners have raised several times is whether ACTs should be sold at all. The NMCP maintains that ACT prices are the same as the prices charged for chloroquine (the drug that ACTs are replacing), and that funds from drug fees in general are needed to support the health system (e.g., paying for the transportation of drugs, covering the general costs of running health facilities). Funds from ACT fees, however, are reportedly to be kept in a special account for purchasing additional ACTs (to contribute to the sustainability of ACTs in Benin). Partners will continue to work with the GoB to understand more clearly the current justification for selling drugs, clarify how the drug fees are to be used and managed, and work to ensure that cost does not become a barrier to utilization of ACTs.

In general, diagnostic testing is introduced with ACTs. The new policy includes use of RDTs throughout the health system and these will be the only diagnostic test performed at the (peripheral) CSA level. Although microscopy is supposed to be available in hospitals and larger health facilities, such facilities often lack a functional microscope, and laboratory workers' ability to perform microscopy is likely to be sub-optimal. In 2008, the World Bank Booster Program purchased 10 microscopes, and PMI is in the process of buying 30 additional microscopes with FY08 funds. Additionally, with funding from World Bank Booster Program and USAID, the NMCP is working with the MOH Division of Diagnostics and other partners (e.g., URC, via the PISAF project) to train facility-based health workers at all levels on appropriate use of the tests and use of results to manage fever cases. Proper use of negative results is essential both for correct management of fever and to maximize cost-

effectiveness of the treatment algorithm. Supervision activities will promote correct use of malaria diagnostics.

Estimated oral ACT needs in health facilities for 2009 and 2010

Weight category	Estimated ACT treatment courses needed for 2009*		Estimated ACT treatment courses needed for 2010*	
	Artemether-lumefantrine	Artesunate-amodiaquine	Artemether-lumefantrine	Artesunate-amodiaquine
<5 kg	0	73,428	0	75,815
5–14 kg	347,617	18,296	358,914	18,890
15–24 kg	234,725	12,354	242,354	12,755
25–34 kg	26,623	1,401	27,488	1,447
35+ kg	282,858	14,887	292,051	15,371
Total (by ACT type)	891,823	123,366	920,807	124,278
Total (for each year)	1,012,189		1,045,085	

* Estimates based on population projections and HMIS data on the number of malaria/febrile illness episodes managed in public and licensed private health facilities. It is assumed that under-fives with uncomplicated illnesses will be treated with an ACT presumptively, older children and adults will be tested, and 50% of older children and adults will be treated with an ACT.

In 2009, about one million AL treatments will be needed for health facilities (about 60% for under-fives and about 40% for older children and adults). USAID has already purchased about one million AL treatments and the World Bank Booster Program plans to purchase about one million more, although the actual amount is difficult to calculate because the price of AL has changed since the World Bank's budget was developed. Most of these treatments will be distributed to health facilities, although some will be distributed by CHWs (see section on Community-Based Interventions). Thus, there is no expected gap for ACTs in health facilities in FY09. Regarding RDTs, the estimated need for 2009 is about 609,000 tests, and the World Bank Booster Program plans to purchase 1.1 million RDTs (and thus, there is no expected gap in FY09 either).

Severe malaria

The NMCP's policy recommends treating severe malaria with quinine. Injectable artesunate or artesunate suppositories are recommended for pre-referral treatment of severe malaria. For pregnant women, all malaria cases are considered severe, and the recommended treatment is quinine. Severely ill cases identified in peripheral outpatient health facilities should be referred to a larger health facility with an inpatient ward. For under-fives, the estimated need for 2009 is 180,000 artesunate suppositories and 54,000 inpatient treatments. The World Bank plans to purchase 17,000 inpatient treatments. For patients 5 years of age and older, the estimated need is 31,000 inpatient treatments.

One issue transcending patient age, illness severity, and health care setting (i.e., inpatient, outpatient, or community level) is the quality of case management. Studies in Benin under the old chloroquine policy found inadequate quality of care and supervision. Of note, an

operations research project in Benin conducted pre-PMI found that IMCI training plus health worker supports (strengthened supervision, job aids, and non-financial incentives) significantly improved quality—although further improvements were possible. The World Bank Booster Program plans to support some supervision, although the plan is still being formulated.

The CAME also have training needs around forecasting, management and tracking of commodities for case management that need to be addressed to ensure the success of PMI-supported activities. Personnel at health facilities often lack the capacity to adequately quantify their requirements and manage their inventory according to pharmaceutical norms. The absence of a formal distribution system and plan is also a serious constraint that can cause periodic shortages in essential drugs and commodities.

The GOB has developed a draft plan for pharmacovigilance with technical support from WHO (*Plan National pour la Mise en Oeuvre de la Pharmacovigilance*). The plan, though not yet officially finalized, includes forms to report adverse events as well as a curriculum for pharmacovigilance training which lists antimalarials. Under the World Bank Booster Program, funds have been allocated to support this system, and an evaluation of pharmacovigilance for ACTs is planned in 2008 (World Bank Booster Program Budget, November 2006).

Progress to date

The PMI Year 1 plan addressed key elements for promoting correct diagnosis and treatment of malaria. One important activity that was completed was the procurement of 1,073,490 ACT treatments using FY07 funds. Most Year 1 activities are expected to begin in the next several months. Of note, two Year 1 activities were removed from the plan: the procurement of 64,000 RDTs was not considered necessary because of the large number of RDTs being purchased by the World Bank Booster Program and the slow scale-up of training on malaria case management and diagnostics, and the health facility survey was re-scheduled until Year 2 (see below) because health worker training will probably not be completed until early- or mid-2009.

Proposed Year 2 activities (\$177,100 for diagnostics and \$1,410,700 for treatment)

Diagnosis

1. *Procure microscopes and laboratory consumables:* Procure 15 new microscopes (and if appropriate, replacement parts to repair existing microscopes), reagents for microscopy (e.g. slides, Giemsa stain, etc.) for public hospitals. This contribution, along with 30 microscopes purchased with FY08 PMI funds and 10 microscopes from the World Bank Booster Program, fills all of the NMCP's need (55 microscopes). (\$55,000)

2. *Train and supervise laboratory technicians, and support quality assurance/quality control for diagnostics:* To improve and maintain microscopy and RDT use for malaria, support a quality assurance/quality control system that includes refresher training and supervision for

laboratory technicians, and a quality control system (e.g., assessing microscopist skills against gold standard slides, and comparing a small sample of RDT results against microscopy to assess RDT accuracy). This activity will be coordinated with the World Bank-supported training to ensure malaria diagnostics are used correctly. (\$75,000)

3. *Print and distribute laboratory registers:* To improve record-keeping in laboratories, which has been noted by the NMCP and other partners as a significant weakness, PMI will provide funds to print and distribute laboratory registers. Scope of this activity is national. (\$35,000)

4. *CDC technical assistance on diagnostics:* CDC staff will conduct one technical assistance visit to help assess the diagnostics quality assurance/quality control system. This activity is justified given the limited in-country experience with quality control systems for RDTs. (\$12,100)

Treatment

1. *Procure ACTs:* Procure 440,000 Coartem® treatments for distribution to under-fives by CHWs in two departments. Together with contributions from the World Bank Booster Program, these procurements meet all Benin's needs in 2009 for all ages. (\$220,600)

2. *Procure artesunate suppositories:* Procure 180,000 suppositories for pre-referral treatment of severe malaria cases in remote clinics where definitive inpatient malaria therapy cannot be provided. This procurement will fill the gaps for 2009. (\$68,000)

3. *Procure drug kits for inpatient treatment of severe malaria:* Procure 25,000 injectable quinine drug kits (including glucose solution, perfusion equipment, etc) for inpatient treatment of severe malaria to meet needs for 2009 (21,000 kits for children under age five and 4,000 kits for patients 5 years and older). (\$200,000)

4. *Supervise and support health workers to follow case management and prevention guidelines:* Strengthen and help implement a supervisory strategy, as part of a comprehensive quality assurance approach, to ensure high quality malaria case management with ACTs, focused ANC (which includes IPTp and ITN distribution), and the distribution of ITNs during routine immunization clinics. The quality assurance and quality improvement component will include improvement at the health facility level, as well as community involvement in health and oversight in health center management. The system, which will be coordinated with the MOH and supervision activities supported by the World Bank Booster Program, will incorporate training of supervisors (including those responsible for supervising the CHWs who distribute ACTs), developing practical tools, supporting travel, conducting on-the-job observation and training, monitoring, and promoting use of diagnostic results to ensure appropriate treatment, providing feedback, collecting, analyzing and using data to improve planning and training, motivating supervisors and supervisees, and according authority to implement changes identified during supervision. The focus of supervision for this activity will be at the health facility level (with less attention on CHWs for now, as the rollout of CHW programs will be initially done by international NGOs, including BASICS under PMI, who are receiving funding to support the implementation and supervision of these

community-level programs). This supervision/health worker support activity will be designed with technical input from MOH and CDC experts. The key goals are to: 1) provide supervision (as described above) to at least 90% of health workers with malaria-related responsibilities at least once every three months, 2) ensure that at least 90% of patients (all ages) needing an antimalarial receive an effective antimalarial, and 3) ensure that at least 90% of patients (all ages) not needing an antimalarial do not receive an antimalarial. Part of the funding (at least \$100,000) will directly support some NMCP supervision expenses. (\$600,000)

5. *Support IMCI training*: Support IMCI training for 250 health workers to contribute to national scale-up of IMCI. According to RBM and Benin's MOH, IMCI is the vehicle through which under-fives with suspected malaria should be treated. The IMCI guidelines ensure treatment of key non-malaria causes of child deaths that often operate in concert with malaria. PMI will support this training since only about half of the approximately 2,000 health workers targeted for IMCI have been trained so far in Benin. (\$255,000)

6. *Management of severe malaria*: Support refresher training and supervision on appropriate management and referral practices for severe malaria in 55 hospitals. Although training for health workers on malaria case management will have already occurred, past studies and experience suggest that treatment of severe illness tends to be a weakness of case management programs. (\$55,000)

7. *IEC/BCC for treatment*: Support a broad communication strategy on the risks of malaria, the need for prompt referral to health facilities for treatment (uncomplicated and severe malaria), and the importance of compliance with ACTs. IEC/BCC messages will especially emphasize treatment for under-fives and pregnant women. This will include support for mass media (including local radio stations) as well as community-level approaches such as training of community-based workers. This will be part of a larger integrated IEC/BCC activity to satisfy needs for case management, LLINs, and IPTp. Activities will be coordinated with IEC/BCC approaches implemented by NGOs that will be funded another PMI mechanism (see Community-Based Interventions section below). (*Costs covered in ITN section*)

8. *Strengthen logistics management for ACTs and severe malaria drugs*. These activities to improve logistics management are detailed in other sections of the document (see the LLIN, IPTp, and Pharmaceutical Management sections). They are to ensure the availability of key antimalarial commodities needed for proper case management at the facility level. (*Costs covered in Pharmaceutical Management and other above mentioned sections*)

9. *CDC technical assistance for supervisory systems*: Technical assistance visit from CDC to assist in the implementation of a supervisory system for health worker performance. (\$12,100)

PHARMACEUTICAL MANAGEMENT

Current Status

Observations during the PMI assessment in 2007 identified some issues around ITN stock-outs and a need to assess and upgrade warehouses for malaria commodities at all levels, central, regional and health zone. A review conducted in March 2008 focused on the central and regional levels of the CAME or Central Medical Store which stocks all the pharmaceutical products for the public sector, its own orders as well as those of donors and partners of the government, as well as the health zone depots and health centers. The review verified earlier findings that space is insufficient, means of transport is limited, storage conditions and arrangements are often inappropriate, qualified human resources are limited, supply does not take into account consumption data at the health center level, there is a lack of standard or systematic information for management, and supervision is irregular and inadequate. These problems coupled with damaged or expiring stocks and late delivery by suppliers has led to stock-outs in the supply system and the emergence of parallel supply circuits by other public institutions, private organizations, government partners, and NGOs that circumvent the control system of the *Direction des Pharmacies et du Médicament* (DPM).

In addition to problems with the drug management, some outstanding legal and policy issues are also undermining the efficient operations of the system. Since its creation, CAME has had a statute of autonomy through a memorandum of understanding with the MOH. This MOU expired in April 2007 and has not yet been reviewed and renewed, which is having an impact on CAME's operations as the customs services is putting pressure on CAME to pay its fiscal taxes before it will clear its products. The National Pharmaceutical Plan (PPN) 2000–2004 was to be evaluated in 2007 to determine the components that have worked well and those that have not in order to reorient the PPN. The evaluation is still pending and should occur in 2008.

Progress to date

To address the needs for a standard system, skills in forecasting, management, and tracking of commodities, and improved storage conditions, PMI is financing several interventions with the technical assistance of SPS. In March 2008, PMI financed Strengthening Pharmaceutical Systems (SPS) to conduct a review of the in-country management system for malaria products to verify earlier observations on the condition of the system and develop a plan of action to address the deficiencies (see the above section for details on the results of the review). During 2008, SPS will work with the NMCP, DPM and CAME to strengthen the pharmaceutical management information system for data collection, analysis and use including the development of key indicators for monthly reporting, a pharmaceutical management supervision guide, and feedback loops to and from both central and peripheral levels. SPS will also assist in the revision of inventory management training materials to create a harmonized, comprehensive and practical inventory management training module and assist with the training of targeted trainers as well as support training of health facility and health zone staff. In addition, SPS will work with NMCP, CAME, DPM, and RBM to support a supervision system and establish and disseminate standard operating procedures. The United States Pharmacopeia Drug Quality and Information Project (USP-DQI) is developing a work plan to

work with the National Laboratory for Quality Control to improve inspection, test ACTs at ports and in the field, reinforce operations, and replace or repair equipment.

Proposed Year 2 Activities (\$525,000)

Activities planned for 2009 include the continuation of activities started in 2008, notably:

1. Drug quality control: Continue support for the National Laboratory for Quality Control to improve inspection, test ACTs at ports and in the field, reinforce operations, and replace or repair equipment. (\$50,000)

2. Strengthen logistics management for LLINs, SP, ACTs, and severe malaria drugs: Technical assistance to CAME, NMCP and DPM to improve supply management, supervision, data collection and utilization, and communication will continue. Activities will continue to focus on standardizing the system, complying with international norms, and emphasizing linking actual commodity consumption to commodity purchases to avoid stock-outs and commodity expiration. Pharmaceutical 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 sample of health facilities and regional warehouses to detect problems and trigger further action on the following critical areas: ACT (or other drug) stockouts; expiration dates of ACTs at health facilities; leakage; anomalies in ACT use; and verifying quantification/consumption assumptions. In addition, an assessment of the management structure and governance within CAME will be conducted with FY 08 funding and activities will be planned to address the issues affecting overall performance of CAME, including decision-making, transparency, accountability, and staff motivation. (\$475,000)

COMMUNITY-BASED INTERVENTIONS

Current Status

Community Health Workers (CHWs) (*Relais Communautaires*) are present at the village level and are formally linked to either a CSA or CSC. CHWs are volunteers selected with village input and have in general been most active in regions where NGOs or FBOs have played a role in implementing community based interventions. In recent years, Africare, supported through a Global Fund Round 3 grant, and Medical Care Development International (MCDI), supported by USAID, have piloted community-based maternal and child health interventions. The malaria components of these interventions have included community-based sale of ITNs and ITN retreatment kits, and treatment of febrile children under five, first with antimalarial drugs. The MCDI intervention included IEC/BCC to address pneumonia and diarrheal disease in children. These activities have been limited to a few health zones in the Departments of Mono/Couffo and Borgou. With the shift to ACTs as first-line treatment of uncomplicated malaria, both a policy document and strategic plan developed by the NMCP

call for community or home-based management of malaria with ACTs (*La Nouvelle Politique Nationale de Lutte Contre le Paludisme au Benin*; November 2005 and *Plan Stratégique Quinquennal de Lutte Contre le Paludisme au Benin* (2006-2010); Aug. 2006).

The Global Fund Round 7 grant, which began in July 2008 and will be implemented by CRS (Principal Recipient) in collaboration with Africare, Plan Benin, and Medical Care Development International, will extend community and home-based management of uncomplicated malaria care from three to 14 of the country's 34 health zones and introduce community-based treatment with ACTs. With Year 1 funds, PMI plans to implement community-based management of uncomplicated malaria with ACTs in several additional health zones. These will be identified in close collaboration with the NMCP and take into consideration where other partners are not working in order to avoid duplication.

Progress to date:

Several small-scale, community-based interventions funded by the Global Fund and UNICEF have included the distribution or sale of ITNs or LLINs along with treatment of malaria in children under five. A large scale distribution of about 1.7 million LLINs in October 2007 depended on strong community mobilization and coordination. Reports of the distribution by area indicate a high coverage of children under 5 was achieved (~98%). An evaluation to determine ITN ownership and use is planned for December 2008, and results will be used to guide future programming.

In 2008, led by the NMCP and the Directorate of Family Health, a working group will finalize training manuals for community-based child health interventions. These will include integrated approaches for treatment of malaria, with ACTs, pneumonia and diarrheal diseases. These will be in place in time for the beginning of PMI supported community-based activities.

Proposed Year 2 activities (\$750,000)

PMI will continue to support an integrated, community-based child health intervention in health zones designated by the NMCP. The activity will be co-financed by USAID/Benin Maternal and Child Health funds and will include community-based delivery of ACT, cotrimoxazole, and oral rehydration salts and zinc. This activity also includes distribution of LLINs free of charge to pregnant women in rural areas with low ANC attendance. In addition to low ANC attendance, criteria for selection will be that these are low income areas with generally poor service delivery and where other partners are not working in order to avoid duplication. Implementing mechanisms will be international and/or local NGOs with adequate capacity to work in the selected areas. Support for IEC/BCC and supply chain management will be provided through partners working nationwide.

The proposed PMI activities to support community-based interventions in 2009 are:

1. Support implementation of community-based child health interventions by NGOs/FBOs: Support implementation of ACT distribution for children under five by community-based workers in health zones with low access to health services and high child mortality, to be

selected in consultation with the NMCP. Develop guidelines, train and supervise workers, develop innovative methods to motivate CHWs, support distribution system, assess progress for further scale-up. This activity is linked with the community-based distribution of LLINs. It will be implemented by NGOs/FBOs under sub-agreements with a lead agency. Results of the activities in these health zones will be closely monitored and documented to inform possible scale-up of this approach in Year 3. (\$750,000)

2. *IEC/BCC for caregivers and CHWs:* Support communication strategy on the risks of malaria, the need for prompt treatment of simple malaria at community level, recognition of signs of severe illness and referral severe cases to health facility, and the importance of compliance with ACTs. This will include support for mass media (including local radio stations) and community-level approaches. This will be part of a larger integrated IEC/BCC activity to satisfy needs for case management, LLINs, and IPTp. Activities will be coordinated with IEC/BCC approaches. *(Costs covered in ITN section)*

3. *Strengthen supply chain logistics to ensure supplies of ACTs and LLINs at CHW level:* Provide technical assistance to CAME to improve supply management, forecasting/quantifying, tracking, and storage of ACTs and LLINs to the health zone. Strengthen system for reporting data on use of ACTs and LLINs down to the CHW level, so that demand will drive timely stocking of these commodities. *(Costs covered in Pharmaceutical Management section)*

HIV/AIDS and MALARIA

Current Status

The HIV/AIDS epidemic in Benin is characterized by a low prevalence in the general population with relatively high levels of infection among populations with high-risk behaviors, such as commercial sex workers (national seroprevalence of 25.5% in 2005), truck drivers (5%) and military personnel (8%). The results of the 2006 DHS confirm the low prevalence rate with a general population prevalence estimated at 1.2%. In 2007, the National Monitoring and Evaluation Unit of the National AIDS Program estimated the overall number of people living with HIV/AIDS in Benin at approximately 72,406. The projected number of people living with HIV for 2010 is 72,933. The estimated number of HIV positive pregnant women was 7,160 in 2004 and is estimated to be 6,294 by 2010. A national HIV prevalence survey in towns across Benin gave a prevalence rate among pregnant women of 1.9% (2002). Benin has the largest experience with prevention of mother-to-child transmission (PMTCT) and voluntary counseling and testing (VCT) interventions in West Africa thanks to the leadership of the MOH/PMTCT program and support from the World Bank, USAID, the Global Fund and other partners in the HIV/AIDS sector. In 2007, 156,392 women were received for ante-natal care visits at PMTCT sites. The number of orphans due to HIV is estimated at 49,329 in 2007 and is projected to reach 56,676 by 2010. Since voluntary counseling and testing was introduced in 2002, the numbers arriving for testing have continued to increase with the number rising to 115,194 in 2007.

In 2001, Benin officially opted for an antiretroviral access strategy that includes young children. Currently there are 43 medical distribution sites; and as of 2007, 5,661 patients are receiving treatment with antiretrovirals, approximately 3% of whom are children under the age of fifteen, of an estimated 24,350 people needing treatment. While not a PEPFAR focus country, USAID supports HIV/AIDS activities in Benin through its bilateral health projects.

Proposed Year 2 Activities (no proposed funding for specific HIV/AIDS linked activities during Year 2 of the PMI)

Clear evidence indicates an interaction between HIV-1 and malaria in pregnancy, causing more peripheral and placental parasitemia, higher parasite densities, more clinical malaria, more anemia, and increased risks of adverse birth outcomes. HIV infected women remain susceptible to the effects of malaria whether or not they are pregnant. While not specifically designed to support HIV/AIDS services, several activities in Year 2 of PMI should contribute to the success of PMTCT activities in Benin. PMI activities to reinforce the logistics and distribution infrastructure, to strengthen both the laboratory system and routine data collection through HMIS, and to support to supervision as part of a comprehensive quality assurance approach will benefit the entire health system including the PMTCT program. Infected pregnant women and children under five will receive LLINs through PMI-supported routine ANC and vaccination services at health facilities as well as through community-based distribution of LLINs in two departments with low ANC attendance. PMTCT activities in Benin will benefit directly from the IEC/BCC activities promoting early ANC attendance planned in Year 2 of PMI.

CAPACITY BUILDING WITHIN NATIONAL MALARIA CONTROL PROGRAM

Current Status

The NMCP still faces critical staffing shortages at the central and peripheral levels, impeding its ability to manage existing and new malaria program activities effectively. In collaboration with other donors, including WHO, the World Bank and UNICEF, USAID is initiating policy dialogue with the MOH to engage in reforms that will contribute to strengthening the program. Options will be explored to fill the staffing gap identified in 2007 and reinforce the program's human resources. The additional staff required to meet the NMCP obligations, include a monitoring and evaluation expert, health planner (will be supported by the World Bank Booster Program), logistician, midwife, pharmacist, statistician, parasitologist, epidemiologist or malariologist, and a communication specialist at the central level.

Progress to date

In June 2008, the NMCP disseminated a plan for staff training in 2008, focusing on the areas of epidemiology, public health, results-based management, monitoring and evaluation, health communications, entomology, statistics, malariology, pharmacovigilance, health information systems, molecular biology, and capacity building in administrative functions. The plan

requested a total of nearly CFA 70 million from the World Bank Booster Program, CFA 68 million from PMI, and CFA 10.3 million from the national budget. URC will oversee the organization of courses that PMI elects to support, once funding is made available. However, the plan lacks a vision for a multi-year capacity building strategy that incorporates informal and formal learning approaches based on core competencies of the NMCP. In FY08, PMI set aside \$100,000 to support the NMCP to conduct supervision activities. USAID/Benin mission is in the process of transferring the funds through an implementation letter already signed by the Minister of Health and the Mission Director.

Proposed Year 2 activities (\$310,000)

With malaria program resources expanding rapidly, especially from PMI, the World Bank Booster Program, and the Global Fund, the NMCP must acquire adequate managerial and technical capacity to provide effective leadership and coordination within the MOH, with other Government ministries and with partners. In Year 2, PMI will contribute to this capacity building as follows:

1. *Capacity building of the NMCP:* Capacity building will focus on educational and training activities that will improve and strengthen the NMCP technical capabilities (knowledge, skills, and competencies) in all areas required for the NMCP to be able to manage and coordinate a comprehensive malaria prevention and control program. In addition to capacity building activities planned for FY08, PMI will support training in epidemiology, capacity strengthening of NMCP and the Center for Entomologic Research in Cotonou (CREC) staff in management, monitoring and evaluation, computerized epidemiology, malariology and communication (social mobilization). The NMCP has requested additional resources for training from the World Bank and MOH and has submitted a detailed list of requested courses, trainings, and workshops. The PMI team is reviewing the request in collaboration with the World Bank and is also working with the NMCP to develop a long-term strategy and plan for sustainable capacity building that PMI can help support (e.g., distance-learning activities and purchasing CD-ROM based training courses that can be used by many people over many years, rather than a one-off training course that generally benefits one staff person). (\$160,000)

2. *Direct support for the NMCP for case management activities:* As in FY08, the NMCP will receive some funds to conduct supervision of health workers on case management. PMI plans to use the same approach in FY09 to support supervision activities. (*Costs covered in Case Management section*)

3. *Equipment for the NMCP:* In order to provide a suitable working place for the NMCP, the World Bank Booster Program is providing funding to renovate and expand the NMCP office. Activities planned under PMI in FY09 will complement and reinforce those planned to be supported by the World Bank. PMI will not fund any portion of the construction costs, but will instead procure the furniture, office and computer equipment needed to enable the NMCP to function with the anticipated additional staff (both newly recruited government staff and PMI supported technical advisors). (\$150,000)

4. *Advocacy*: The weak management capacity of the NMCP has prompted the USAID/Benin mission to initiate a malaria-specific donors' coordination group that includes the World Bank, WHO and UNICEF. The malaria donors' group is committed to increase policy dialogue and advocacy. Through coordination meetings, PMI will actively promote Government commitment to increase NMCP staffing to the minimum levels required to function effectively. This will involve engagement of the Ministries of Health, Finance and others that can influence NMCP capacity. *(No additional funding)*

COMMUNICATION AND COORDINATION

Current Status

The NMCP's national strategic plan includes the need for a multi-sectoral committee for coordinating activities related to the prevention and control of malaria in Benin. The NMCP has agreed to re-energize the RBM Partners group. The following communication and coordination mechanisms exist in Benin:

Country Coordinating Mechanism (CCM)

The CCM meets on general assembly twice a year. However, extraordinary sessions can be initiated when needed. There is also a technical unit that meets once a month to assess progress made. The CCM has been meeting regularly with health sector stakeholders to review options and plan for submission to Round 9 of the Global Fund. Benin is currently the recipient of a Round 3 Global Fund grant, currently in Phase 2, which was launched in July 2008. USAID is a voting member of the CCM.

Malaria Partners/RBM

The Malaria Partner/RBM group has been re-invigorated and is meeting monthly. Participation at these meetings consists of NMCP staff, USAID, PSI, UNICEF, WHO, the World Bank, the private sector, and NGOs/FBOs. There remains a specific need to revitalize the technical working groups to ensure that work-plans and activities of various malaria partners are well coordinated with the NMCP. USAID/Benin will continue to be an active participant in this group, particularly as the two new PMI positions are filled (USAID and CDC Resident Advisors).

Proposed USG Activities

Although there are no specific planned activities for "Coordination and Communication" the PMI Resident Advisors (one CDC and one USAID) will provide both technical and logistical support to the MOH for planning and implementation of PMI activities. There will also be one to two additional local staff hired to support PMI activities. This team will closely coordinate PMI activities with the NMCP and the World Bank Booster Program, and serve as active members of the Malaria Partners/RBM group. Costs for these positions are covered under the Staffing and Administration section.

PRIVATE SECTOR PARTNERSHIPS

At this time, there are no public-private partnerships working for malaria control in Benin.

MONITORING AND EVALUATION PLAN

Current status

The NMCP's draft national M&E plan (*Plan de Suivi et d'Evaluation de la Lutte Contre le Paludisme au Benin 2007-2010*, December 2006) describes a multi-institutional M&E Technical Working Group, monitoring of programmatic process indicators with routine data collection systems, periodic evaluations of outcome indicators, and epidemiologic surveillance. Five specific components are highlighted: 1) information from the HMIS system, Integrated Disease Surveillance and Response (IDSR), and sentinel surveillance sites; 2) data collection on commodity stocks and management via a logistic management information system; 3) community-based malaria surveillance via women's groups and CHWs; 4) measurement of impact indicators via household surveys such as the DHS; and 5) regular monitoring of quality of health services via LQAS methodology. The status of key indicators, using the 2006 DHS results, is shown in the table above (see 'Current Status of Malaria Indicators' section).

A DHS was done in 2006, which included all-cause child mortality, anemia, and the standard malaria module. The next DHS is planned for 2011 and UNICEF is considering conducting a Multiple Indicator Cluster Survey (MICS) in 2009. The World Bank Booster Program is also planning household and health facility LQAS surveys related to malaria control. The questionnaire for the first LQAS household survey is being finalized will take place in December 2008.

NMCP/RBM household surveys and health facility surveys were conducted in 2001, 2004, and 2005, but with non-probability samples. In addition, the NMCP and WHO conducted a household/health facility survey on malaria in pregnancy from September–December 2007 (reportedly, this was done because of concerns that problems with the DHS method underestimated IPTp use). However, the sampling seemed biased towards health workers who had been trained and women who had access to health facilities. Thus, the indicator values were quite high and were probably not representative of the country as a whole.

No demographic surveillance sites exist in the country. Aside from a few referral hospitals, there is no source of reliable data on cause-specific mortality, although plans are underway to strengthen hospitals in the sentinel sites (see below) to produce such data. NMCP staff has been able to collect monitoring data on number of ITNs distributed per year by the NMCP and donors, although collecting data on more commodities from multiple partners will be challenging. Data on rainfall are available from a local meteorological institute.

Malaria is included in Benin's HMIS system of notifiable diseases. Each month, public health facilities are expected to report on the number of malaria cases, deaths, and case-fatality rates.

Although data are stratified by age group and facility type (inpatient vs. outpatient), no effort is made to distinguish clinically diagnosed cases from those that are confirmed by laboratory testing. The system has limited capacity and there are concerns about the accuracy, timeliness, and coverage of the data, as well as how the data are used for decision-making. Seven health zones are sentinel sites, where health facilities routinely collect data (e.g., no. of malaria cases, with or without laboratory confirmation) for the HMIS system plus malaria cases among pregnant women. Facilities that can perform microscopy are expected to test suspected malaria cases and report slide-positive rates. The World Bank Booster Program plans to strengthen these sites. The NMCP also periodically conducts surveys in the sentinel sites to assess trends in RBM indicators of malaria intervention coverage. Special studies are also conducted periodically to monitor insecticide resistance and antimalarial resistance.

There are also several sub-national M&E activities. PISAF and Africare conduct household surveys in their project areas. UNICEF is conducting surveys to evaluate its Accelerated Child Survival and Development program.

The World Bank Booster Program is supporting several M&E activities, including: monitoring related to the ITN distribution campaign, finalizing a national M&E plan; collecting routine data on process indicators relevant to malaria control (including a baseline survey, data collection tools, and setting up a database); LQAS surveys; M&E activities related to the logistic management information system; strengthening epidemiological monitoring at sentinel sites; monitoring LLIN efficacy and resistance to insecticides; monitoring antimalarial drug efficacy; and supporting a pharmacovigilance system.

The NMCP noted a serious lack of trained staff to oversee M&E activities, especially statistical capacity and data analysis for program decision-making. Regarding coordination among partners on M&E, a mechanism exists (Benin's RBM partnership, chaired by the NMCP); however this mechanism needs strengthening.

Progress to date

The PMI Year 1 plan addressed key elements for strengthening malaria-related M&E. Good progress has been made on plans to strengthen health-facility-based surveillance in health zones that the NMCP has designated sentinel sites. To date, the NMCP with assistance from CDC has developed a protocol, the Regional Institute of Public Health in Ouidah has been identified as the implementing partner, a full plan has been drafted, and an initial pilot test of the data collection forms was conducted in late July. Most of the other Year 1 activities are expected to begin in the next several months.

Proposed Year 2 Activities (\$787,100)

1. *Conduct health facility and hospital survey:* Conduct health facility and hospital survey focused on malaria case management and quality of ANC care. Many PMI activities will occur in health facilities, so data on performance is critical. The World Bank Booster Program plans to fund lot quality assurance sampling (LQAS) survey to collect quantitative data from outpatient facilities. In addition, the Global Fund will support yearly "light" surveys in health

facilities in conjunction with UNICEF, although we have not yet received details on what these surveys will measure. To complement the surveys already planned by the World Bank, PMI will support a national health facility survey to collect qualitative data on the causes of problems in outpatient and ANC care (especially on use of ACTs and RDTs) and ways to resolve them. As almost no data exist on the quality of inpatient care for malaria cases, the hospital survey will be quantitative. We will continue to work with the World Bank, NMCP, and other partners to understand what currently planned surveys will measure. If these surveys fill our data needs then we will reprogram these funds. (\$200,000)

2. *Strengthen Benin's HMIS system and the NMCP's M&E capacity:* To improve the validity and timeliness of data collection and to promote the use of new HMIS data collection forms that ask for more malaria-related information, PMI will support the NMCP in conducting an evaluation of the HMIS and implementing the recommendations of the evaluation. Additionally, PMI will contribute funds to those provided by other partners to support training of health workers on the new HMIS forms and the production and dissemination of quarterly bulletins of HMIS results. (\$75,000)

3. *Technical assistance on measuring process indicators:* Collect, analyze, and report data on process indicators quarterly as well as “confounders” data such as rainfall, in addition to building NMCP capacity. Data will be collected by contacting partners each month, and data on rainfall will be collected from a governmental department that measures rainfall in several sites in Benin. Key process indicators include: the number of ITNs distributed by all partners, the number of health workers trained (e.g., in case management, diagnosis with RDTs, prevention of malaria in pregnancy, and home-based management of fever), and the frequency of supervision. The NMCP specifically mentioned that it was challenging to keep up with the activities of multiple partners. This activity includes a provision for field visits. (\$50,000)

4. *Health facility-based surveillance:* Up to seven zonal hospitals in the NMCP's existing sentinel sites will be selected and strengthened for the implementation of health facility-based surveillance in support of the PMI M&E framework. This activity, in collaboration with World Bank Booster activities, will include technical assistance to improve the capacity of these sites to collect reliable data on inpatient malaria cases and deaths. (\$300,000)

5. *Support national household survey to measure intervention coverage and child mortality:* Provide technical and financial support to UNICEF in order to conduct MICS in 2009. The MICS is a nationally representative household survey to measure intervention coverage and all-cause child mortality. UNICEF will organize the survey and cover the remaining survey costs. (\$150,000)

6. *CDC technical assistance for M&E:* CDC staff will conduct one technical assistance visit to assist the NMCP with M&E planning and implementation. (\$12,100)

STAFFING AND ADMINISTRATION

Two new health professionals are currently being recruited to oversee the PMI in Benin, one representing CDC and one representing USAID. In addition, one FSN will be hired to support the PMI team specifically on logistics and procurement of malaria commodities. All PMI staff members will be part of a single inter-agency team led by the USAID Mission Director or his/her designee in country. The PMI team will share responsibility for development and implementation of PMI strategies and work-plans, coordination with national authorities, managing collaborating agencies and supervising day-to-day activities. Candidates for these positions will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

It is envisioned that these two PMI professional staff will work together to oversee all technical and administrative aspects of the PMI, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, and reporting of results. Both staff members will report to the USAID Mission Director or his/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 WHO, UNICEF, the Global Fund, the 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.

Table 1
President's Malaria Initiative – Benin
Year 2 (FY09) Timeline of Activities

Activity funded by FY09 Funds

ACTIVITY	2008			2009												2010							
	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	
Phased procurements of commodities including ACTs, severe malaria drug kits, artesunate suppositories, SP, LLINs, and lab equipment																							
Transport of LLINs from health zone depots to health facilities																							
Strengthen logistics management for LLINs, SPs, ACTs, and severe malaria drugs																							
Implement IEC/BCC strategies to increase demand and utilization of LLINs, ACTs, and IPTp at all levels of the health system																							
Implement community-based distribution of ACTs and LLINs with focused IEC/BCC support in 2 selected departments																							
Distribute highly-subsidized LLINs with social marketing through the private sector in rural areas																							
Conduct entomological evaluation of IRS in targeted areas																							
Support the establishment and expansion of the national malaria vector resistance surveillance program																							
Implementation of IRS campaign and development of a long-term IRS strategy																							
Conduct supervision of health workers on IPTp, ANC-focused services, malaria case management, and distribution of LLINs during vaccination visits																							
Train health workers on IPTp according to the ANC-focused																							

Table 2
President's Malaria Initiative – Benin
Planned Obligations for FY 2009 (USD \$13,800,000)

Proposed Activity	Mechanism	Budget (commodities)	Geographic area	Description of activity
PREVENTION				
Insecticide-Treated Bednets				
1. Procure and distribute LLINs for routine services	DELIVER Malaria Task Order 3	3,976,000 <i>(3,976,000)</i>	Nationwide	Procure 568,000 LLINs for free routine distribution. Includes costs to transport nets to health zone depots.
	PSI	200,000 <i>(200,000)</i>	Nationwide	Transport 568,000 LLINs from health zone depots to health facilities.
2. Procure LLINs in support to the long-term IRS strategy	DELIVER Malaria Task Order 3	700,000 <i>(700,000)</i>	4 communes in Ouémé Department	Procure 100,000 LLINs for distribution to households in the IRS target areas
3. Strengthen logistics management for LLINs	SPS	<i>Costs covered in Pharmaceutical Management section</i>	Nationwide	Training and technical assistance to the Central Medical Stores staff on forecasting, supply management, tracking, and storage of LLINs.
4. IEC/BCC for LLINs, IPTp, and ACTs	PSI	400,000	Nationwide	Support strategies to increase demand and utilization of LLINs, ACTs, and IPTp at all levels of the health system and technical assistance for NMCP in IEC/BCC
5. Procure and distribute LLINs through the private sector	PSI	462,000 <i>(396,000)</i>	TBD	Procure and distribute approximately 66,000 highly-subsidized LLINs through the private sector, using a social marketing approach in rural areas with high malaria transmission.
SUBTOTAL: Insecticide-treated bednets		\$ 5,738,000 <i>(\$5,272,000)</i>		

Proposed Activity	Mechanism	Budget (commodities)	Geographic area	Description of activity
Indoor Residual Spraying				
1. IRS implementation and development of a long-term IRS strategy	RTI IRS IQC	2,500,000 (833,000)	4 communes in Ouémé Department	One round of IRS in South Benin in the same areas that were sprayed in 2008 (Seme Kpodji, Akpro-Misserete, Adjohoun and Dangbo) with an estimated total of 141,154 households and a population of 521,738. Households located in ecologically-sensitive areas will only receive LLINs. This activity includes training for personnel, equipment/insecticide procurement, sensitizing the community, and carrying out IRS activities. RTI will also be responsible for the distribution and hang up of LLINs to achieve coverage of 2 LLINs/household.
2. Conduct entomological evaluation in IRS target areas	RTI IRS IQC (with sub to CREC)	35,000	4 communes in Ouémé Department	Entomological surveys before, during, and at one-month intervals after IRS.
3. Support national vector resistance surveillance program	RTI IRS IQC (with sub to CREC)	80,000	Nationwide	Support ongoing national malaria vector resistance surveillance program.
4. CDC technical assistance for vector control activities.	CDC	12,100	N/A	Technical assistance visit to monitor planning and implementation of vector control activities.
SUBTOTAL: IRS		\$ 2,627,100 (\$833,000)		
Malaria in Pregnancy (IPTp)				
1. Procure SP	DELIVER Malaria Task Order 3	80,000 (80,000)	Nationwide	Procure 800,000 treatments of IPTp to cover 100% of the need for 2009 (400,000 pregnant women)

Proposed Activity	Mechanism	Budget (commodities)	Geographic area	Description of activity
2. Train health workers in IPTp in the context of F-ANC	URC	200,000	Nationwide	Training for midwives and nurses in health facilities (public health facilities and private faith-based facilities) to deliver SP in the context of F-ANC.
3. Supervise health workers in IPTp	URC	<i>Costs covered in Treatment section</i>	Nationwide	Supervision of midwives and nurses in health facilities (public health facilities and private faith-based facilities) to deliver SP in the context of F-ANC.
4. IEC/BCC for IPTp	PSI	<i>Costs covered in ITN section</i>	Nationwide	Continue to support IEC/BCC approaches to promote ANC attendance and uptake of IPTp.
5. Strengthen logistics management for SP	SPS	<i>Costs covered in Pharmaceutical Management section</i>	Nationwide	Training and technical assistance to the Central Medical Stores staff on forecasting, supply management, tracking, and storage of SP.
SUBTOTAL: Malaria in Pregnancy		\$ 280,000 (\$ 80,000)		
CASE MANAGEMENT				
Diagnostics				
1. Procure microscopes and laboratory consumables	DELIVER Malaria Task Order 3	55,000 (55,000)	Nationwide	Procure 15 microscopes and reagents for microscopy.
2. Train and supervise laboratory technicians, and support quality assurance/quality control for diagnostics	IMaD	75,000	Nationwide	To improve and maintain microscopy and RDT use for malaria, continue to provide refresher training and supervision for laboratory technicians, including a quality control system.
3. Support for laboratory registers	IMaD	35,000	Nationwide	Provide support to print and distribute updated laboratory registers.
4. CDC technical assistance on diagnostics	CDC	12,100	N/A	Technical assistance visit to help assess the diagnostics quality assurance/quality control system.
SUBTOTAL: Diagnostics		\$177,100 (\$55,000)		

Proposed Activity	Mechanism	Budget (<i>commodities</i>)	Geographic area	Description of activity
Treatment				
1. Procure ACTs	DELIVER Malaria Task Order 3	220,600 (220,600)	2 departments TBD (same as in FY08)	Procure 440,000 ACT treatments for distribution to under fives by CHWs.
2. Procure artesunate suppositories	DELIVER Malaria Task Order 3	68,000 (68,000)	Nationwide	Procure 180,000 artesunate suppositories for pre-referral treatment of severe malaria cases in remote clinics where definitive in patient treatment cannot be provided.
3. Procure drug kits for inpatient treatment of severe malaria	DELIVER Malaria Task Order 3	200,000 (200,000)	Nationwide	Procure 25,000 quinine drug kits for inpatient treatment of severe malaria cases.
4. Supervise and support health workers to follow case management and prevention guidelines	URC (\$500K) NMCP (\$100K) (via Implementation Letter)	600,000	Nationwide	Strengthen and help implement a supervisory strategy, as part of a comprehensive quality assurance approach, to ensure high quality malaria case management with ACTs, focused ANC (including LLINs and IPTp), and ITN distribution during routine immunization visits.
5. Support IMCI training	URC	255,000	Nationwide	Support IMCI training for 250 health workers to contribute to national scale-up of IMCI. This includes an 11-day training as well as a supervisory follow-up visit.
6. Management of severe malaria	URC	55,000	Nationwide	Support refresher training and supervision on appropriate management and referral practices for severe malaria in 55 hospitals.

Proposed Activity	Mechanism	Budget (commodities)	Geographic area	Description of activity
8. IEC/BCC for treatment	PSI	<i>Costs covered in ITN section</i>	Nationwide	Support broad communication strategy on the risks of malaria, the need for prompt referral to health facilities for treatment, and the importance of compliance with ACTs.
9. Strengthen logistics management for ACTs, and severe malaria drugs	SPS	<i>Costs covered in Pharmaceutical Management section</i>	Nationwide	Training and technical assistance to the Central Medical Stores staff on forecasting, supply management, tracking, and storage of LLINs.
10. CDC technical assistance visit for supervisory systems	CDC	12,100	NA	1 technical assistance visit from CDC to assist in the development of a scope of work for health worker performance.
SUBTOTAL: Treatment		\$ 1,410,700 (\$488,600)		
PHARMACEUTICAL MANAGEMENT				
1. Drug quality control	USP-DQI	50,000	Nationwide	Support the National Laboratory for Quality Control to improve malaria drug quality control
2. Strengthen logistics management for LLINs, SP, ACTs, and severe malaria drugs	SPS	475,000	Nationwide	Training and technical assistance to the Central Medical Stores staff on forecasting, supply management, tracking, and improving malaria commodity storage.
SUBTOTAL: Pharmaceutical Management		\$525,000		
COMMUNITY-BASED INTERVENTIONS				
1. Community-based distribution of ACTs and LLINs with focused IEC/BCC support at the community	New Task Order under	750,000	2 departments TBD (same as in FY08)	NGO/FBO implementation of community-based distribution of ACTs and LLINs with community-based IEC/BCC strategies in 2 departments with

Proposed Activity	Mechanism	Budget (commodities)	Geographic area	Description of activity
level	BASICS III with sub-grants to NGOs/FBOs			low access to health services and high child mortality. Includes technical assistance for NGO partners.
SUBTOTAL: Community-Based Activities		\$750,000		
CAPACITY BUILDING WITHIN NATIONAL MALARIA CONTROL PROGRAM				
1. Capacity building of the NMCP and CREC	URC	160,000	N/A	Support training NMCP and CREC staff
2. Equipment for the NMCP	URC	150,000	N/A	Computers, internet access, photocopiers, printers, office renovation, etc. (central and departmental level)
SUBTOTAL: Capacity building		\$310,000		
MONITORING AND EVALUATION				
1. Conduct health facility and hospital survey	TBD	200,000	Nationwide	Conduct health facility and hospital survey focused on malaria case management and quality of ANC care.
2. Strengthen Benin's HMIS system and NMCP's M&E capacity	URC	75,000	Nationwide	Support the NMCP to evaluate the HMIS and implement recommendations, including training of health workers on new HMIS forms.
2. Technical assistance on measuring process indicators	URC	50,000	N/A	Quarterly collection, analysis, and reporting of process indicators and "confounders".

Proposed Activity	Mechanism	Budget (commodities)	Geographic area	Description of activity
3. Conduct health facility-based surveillance in support of the PMI M&E framework	IRSP (via Implementation Letter)	300,000	Up to 7 health zones	Technical assistance to sites for collection of reliable data on inpatient malaria cases and deaths.
4. Support national household survey to measure intervention coverage and child mortality	UNICEF	150,000	Nationwide	Technical and financial support for a MICS in 2009
5. CDC technical assistance for M&E	CDC	12,100	N/A	Technical assistance visit to assist NMCP with M&E planning and implementation.
SUBTOTAL: Monitoring and Evaluation		\$ 787,100		
IN-COUNTRY MANAGEMENT AND ADMINISTRATION				
1. USAID technical staff	USAID	406,700	N/A	Support for USAID/ PMI Resident Advisor,
2. CDC technical staff	CDC	506,700	N/A	Support for CDC/PMI Resident Advisor
3. FSN staff and other in-country administrative expenses	USAID	281,600	N/A	Support for USAID FSNs to work full time with PMI and to cover other administrative expenses related to PMI.
SUBTOTAL: Management and Administration		\$1,195,000		
GRAND TOTAL		\$13,800,000 (\$6,728,600)	<i>Commodities represent 49% of total budget</i>	

Table 3
President's Malaria Initiative – Benin
Year 2 (FY 2009) Budget Breakdown by Intervention (\$13,800,000)

AREA	Commodities (% of Subtotal)	Other (% of Subtotal)	Total (% of Budget)
Insecticide-treated Nets	\$5,272,000 92%	\$466,000 8%	\$5,738,000 42%
Indoor Residual Spraying	\$833,000 32%	\$1,794,100 68%	\$2,627,100 19%
Intermittent Preventive Treatment	\$80,000 29%	\$200,000 71%	\$280,000 2%
Case Management - Diagnostics	\$55,000 31%	\$122,100 69%	\$177,100 1%
Case Management - Treatment	\$488,600 35%	\$922,100 65%	\$1,410,700 10%
Pharmaceutical Management	\$0	\$525,000 100%	\$525,000 4%
Community-based Interventions	\$0	\$750,000 100%	\$750,000 5%
Capacity Building	\$0	\$310,000 100%	\$310,000 2%
Monitoring and Evaluation	\$0	\$787,100 100%	\$787,100 6%
Administration	\$0	\$1,195,000 100%	\$1,195,000 9%
Total	\$6,728,600 49%	\$7,071,400 51%	\$13,800,000

Table 4
President's Malaria Initiative – Benin
Year 2 (FY 2009) Budget Breakdown by Partner (\$13,886,600)*

Partner Organization	Geographic Area	Activity	Budget
DELIVER Malaria Task Order 3	Nationwide	Procure and deliver microscopes/kits, LLINs, SP, ACTs, artesunate suppositories, and severe malaria drug kits.	\$ 5,299,600
Strengthening Pharmaceutical Systems (SPS)	Nationwide	Training and technical assistance to the Central Medical Stores on supply management, forecasting, tracking, and improving storage of malaria commodities.	\$ 475,000
Population Services International (PSI)	Nationwide	IEC/BCC for LLINs, IPTp, and treatment. Private sector LLIN distribution. Capacity building of NMCP in IEC/BCC.	\$ 1,062,000
Research Triangle Institute (RTI)	IRS: South Benin (4 communes)	IRS in several communes of South Benin, including procurement of insecticides and spray equipment, training of spray operators, and community sensitization. Includes post-IRS LLIN distribution.	\$ 2,500,000
CREC (<i>Centre de Recherche Entomologique de Cotonou</i>)	Surveillance: Nationwide Surveys: IRS target area	Support for CREC to conduct entomological surveys in IRS area; expand and strengthen the national vector resistance surveillance system	\$ 115,000
New Task Order through BASICS III (NGOs/FBOs –TBD)	2 departments TBD (same as in FY08)	Community-based distribution of LLINs and ACTs paired with focused IEC/BCC activities at the community level	\$ 750,000
IMaD	Nationwide	Train and supervise laboratory technicians. Support quality assurance/quality control system for malaria diagnostics. Improve lab registers.	\$ 110,000
University Research Corporation (URC)	Nationwide	Support training and supervision of health workers in IPTp and case management including severe malaria. Train health workers in IMCI. Capacity building for NMCP/CREC and equipment for NMCP. Support for improved transfusion services. Support for HMIS, NMCP M&E capacity, and process indicator collection.	\$ 1,445,000
NMCP (National Malaria Control Program)	Nationwide	Support training and supervision of health workers in case management	\$ 100,000
United States Pharmacopeia (USP) DQI	Nationwide	Support drug quality control	\$ 50,000
IRSP (<i>Institut de Recherche pour la Sante Publique</i>)	Nationwide	Conduct health facility-based surveillance in support of the PMI M&E framework at up to 7 sites	\$ 300,000
UNICEF	Nationwide	Support national household survey to measure intervention coverage and child mortality	\$150,000
TBD	Nationwide	Conduct health facility and hospital survey	\$200,000

* Table does not include technical assistance visits nor administrative/management costs for USAID/CDC.