

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

PRESIDENT'S MALARIA INITIATIVE

BENIN

Malaria Operational Plan (MOP)

FY 2008

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ABBREVIATIONS

ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal care
BASICS	Basic Support for Institutionalizing Child Survival
BCC	Behavior change communication
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)
DDT	Dichlorodiphenyltrichloroethane
DHS	Demographic and Health Survey
EPI	Expanded Program on Immunization
FBO	Faith-based organization
FY	Fiscal Year
GFATM	The Global Fund to Fight AIDS, Tuberculosis, and Malaria
GOB	Government of Benin <i>Système National d'Information et de Gestion Sanitaires</i> (Health Management Information System)
HMIS	
IEC	Information, education, communication
IMCI	Integrated Management of Childhood Illnesses
IPTp	Intermittent preventive treatment of pregnant women
IRD	<i>Institut de Recherche pour le Développement</i> (Institute for Research and Development)
IRS	Indoor residual spraying
ITN	Insecticide-treated bed net
LLIN	Long-lasting insecticide-treated bed net
LQAS	Lot quality assurance sampling
M&E	Monitoring and evaluation
MCH	Maternal and child health
MIP	Malaria in pregnancy
MIS	Malaria Indicator Survey
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)
PLWHA	People living with HIV/AIDS
PMI	President's Malaria Initiative
PMTCT	Prevention of mother-to-child transmission
PSI	Population Services International

RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RTI	Research Triangle Institute
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
WB	World Bank
WHO	World Health Organization

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 (ITN), 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 41% of outpatient consultations, 29% of hospital admissions, and about 28% of deaths of children under five. With about 30% of the population living below the poverty line and a per capita income of only \$530, malaria places an enormous economic strain on Benin's development. Households in Benin spend approximately 24% 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 has a strong National Malaria Control Program (NMCP). The NMCP has developed a five-year strategic plan (2006-2010) that builds on recent changes in the national malaria policy to include long-lasting ITNs (LLINs), rapid diagnostic tests (RDTs), ACTs, and sulfadoxine-pyrimethamine (SP) for IPTp. The overall goal of the GOB is to reduce malaria morbidity and mortality by 50% by the year 2010.

Benin is currently in Phase II of a \$2.15 million grant from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), which ends in September 2008. In 2007, the GOB received a 4-year, \$31 million World Bank (WB) Booster Program grant, which, together with the GFATM grant, covers many of Benin's commodity needs, particularly for ACTs and LLINs. With these sources of financing and support from the World Health Organization (WHO), the United Nations Children's Emergency Fund (UNICEF), and other national and international partners, a scaling-up of malaria prevention and control interventions has already started and considerable progress has been made. The activities and commodities to be funded in PMI's Year 1 Operational Plan for Benin are complementary to the existing malaria control activities and directly support the NMCP's strategic plan. To achieve the targets of PMI in Benin, the following major activities are proposed for the \$14 million funding for Year 1.

Insecticide-treated nets: Coverage with ITNs in Benin is low among high risk populations with only 24% of households owning at least one ITN. Use of ITNs is at about 20% nationally for pregnant women and children under five years. The NMCP's Five-Year Strategic Plan 2006 – 2010 supports a segmented market approach with the distribution of LLINs through the public sector via national campaigns, routine ANC (antenatal care) visits, and to infants completing routine vaccination. A national campaign is planned for September 2007 that will distribute over 1,500,000 free LLINs to families with children under five. PMI will procure 600,000 LLINs for distribution at health facilities to pregnant women attending ANC visits and to children on completion of their routine vaccinations. These nets will be distributed at a subsidized price to pregnant women as part of an ANC kit and for free to children attending vaccination clinics. Together with LLINs purchased with WB Malaria Booster Program

funds, PMI procurements should fill all needs for routine delivery of LLINs in 2008. PMI will also support strengthening of systems to deliver LLINs and health education activities to raise awareness about the importance of sleeping under an ITN, the value of an ITN, and correct and consistent use of ITNs among pregnant women and under-fives. PMI will support social marketing and community-based distribution of highly-subsidized LLINs through non-governmental organizations (NGOs) and/or faith-based organizations (FBOs) and community health workers to increase ITN coverage among vulnerable populations missed by other strategies (and older children as well as non-pregnant adults).

Indoor residual spraying: Although Benin has limited experience with IRS, the NMCP recognizes its value, particularly where ITN coverage is low. PMI will support IRS covering a population of about 350,000 in three communes in the first year, with the potential to expand the program based on positive outcomes. PMI will also support training to strengthen the Ministry of Health's (MOH) entomological capacity including strengthening the national insecticide resistance surveillance program.

Intermittent preventive treatment of pregnant women: Antenatal clinic attendance is high in Benin with 88% of women making at least one ANC visit. Benin adopted IPTp as a national policy in late 2004 but roll out has occurred in only approximately 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. In Year 1, PMI will work with the MOH to achieve national coverage with an integrated package of antenatal interventions. This will include procurement of SP tablets (with FY 07 USAID/Benin funds), roll out of training and supervision of health workers in all health facilities, 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. PMI will 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 at a health facility or in the community. Due to a lack of funds, the new ACT policy has only been implemented in a small area through a GFATM-supported pilot project in health facilities and at the community level via community health workers. With assistance from the WB Booster Program and USAID, the NMCP plans to scale up the AL policy in 2007 to all public health facilities. In 2008, the NMCP 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. During Year 1, PMI will support a comprehensive effort to improve malaria case management that will include strengthening diagnostic capabilities, including the introduction of RDTs to the most peripheral health facilities (*Centre de Santé Arrondissement*). In coordination with the WB Booster Program, PMI will support quality assurance for diagnostics at all levels and to promote case management based on diagnostic tests. PMI purchases of RDTs and ACTs in Year 1 will complement those of the WB Booster Program to fill all anticipated needs for these commodities. Community-based distribution of ACTs through NGOs/FBOs will be supported in one-sixth of the country (2 departments).

PMI will also support IEC interventions focused on the need for recognition of severe illness, prompt treatment of children under five together with efforts to improve forecasting, storage and delivery of RDTs and ACTs. PMI will support procurement of artesunate suppositories and other drugs for severe malaria and training in their use at peripheral and referral health facilities.

Monitoring and evaluation: The PMI includes a strong monitoring and evaluation component to measure progress against the project goal and targets and identify and correct problems in program implementation. The PMI monitoring and evaluation plan will be coordinated with the NMCP, the World Bank, and other partners to ensure that critical gaps are being filled and data collection and reporting are standardized. In the first year, PMI will provide support to strengthen the health information management system, support existing sentinel surveillance sites, collect data on process indicators, 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 central, departmental, and health zone level. To reach NMCP targets for coverage with the major interventions, the PMI and other partners will support efforts to strengthen the capacity of the NMCP at all levels to plan, conduct, supervise, monitor and evaluate malaria prevention and control activities.

The proposed fiscal year (FY) 2008 PMI budget for Benin is \$14 million. 50% of the budget is for procurement and distribution of LLINs, 26% for procurement of ACTs, drugs for severe malaria, and improved laboratory diagnosis of malaria, and 9% for IRS. Overall, 40% will be spent on commodities.

Jump Start: The PMI, in collaboration with NMCP and partners, will support the launch of IPTp to cover all health facilities nationwide in Year 1.

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, pregnant women, and people living with HIV/AIDS (PLWHA) - 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: Angola, Tanzania, and Uganda. In 2007, four countries were added: Malawi, Mozambique, Senegal, and Rwanda. In 2008, eight additional countries were named to reach a total of 15 countries covered under the PMI. Benin was one of the eight countries added in 2008. Funding began with \$30 million in fiscal year (FY) 2006 for the initial three countries, \$160 million in FY 2007, \$300 million in FY 2008, and will reach \$500 million in FY 2010.

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 (GFATM), Roll Back Malaria (RBM), the World Bank (WB) 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 the PMI, as well as subsequent evaluations, will be highly consultative and held in collaboration with the National Malaria Control Program (NMCP) and other partners.

This document presents a detailed one-year implementation plan for the first 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 One activities under the PMI. The plan was developed in close consultation with the *Programme National de Lutte Contre le Paludisme* (PNLP, National Malaria Control Program) 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 \$14 million for FY 2008.

BACKGROUND

In 2005, Benin's population was estimated at 8.3 million of which about 20% is under 5 years old and 4% consists of pregnant women. In 2002, almost 30% of the population was living below the poverty line. In 2005, Benin ranked 161 out of 177 countries on the Human Development Index and has a per capita income of only \$530 USD. Life expectancy is 52 and

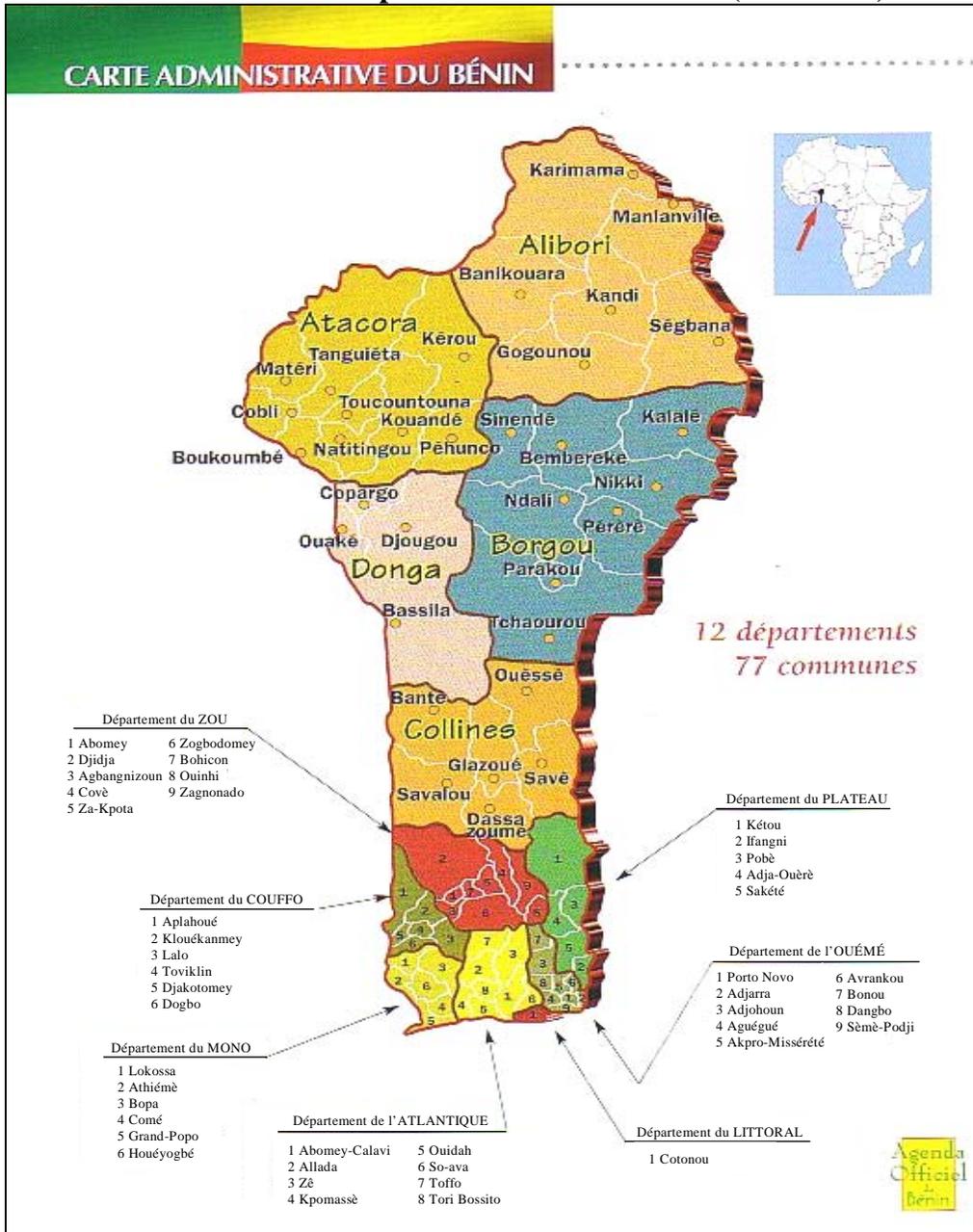
53 years of age for men and women, respectively. Educational levels are low – six in ten women and four in ten men have had no schooling. In 2004, the infant mortality rate was 90 per 1,000 live births, the under-five mortality rate was 152 per 1,000 live births, and the maternal mortality ratio was 850 per 100,000 live births. Total fertility rate is 5.7 per woman.

Benin spends 4.6% of its GDP on health. Households spend approximately 24% of their annual income on the treatment and prevention of malaria. In 2000, an epidemiological model estimated that 27% of deaths of children under five 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 600,000 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, Parakou) in the country. 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 and, most recently, in March 2006 when Boni Yayi was elected President.

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



National Health System

Benin's Ministry of Health underwent reorganization in 2005. This reorganization expanded the number of directorates, allowing for an additional and special focus on hospitals and health zones. Benin's public health system is organized as a pyramid which consists 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 has been divided into 34 health zones, each covering an average population of 210,000 (range from 110,000 to 410,000). Health zone borders do not necessarily correspond to the administrative divisions of the country (the commune), because many of those were too small to justify construction of a referral hospital. Health zones contain from 1 to 4 communes (average of 2 communes per health zone).

The health zone concept is designed to—

1. ensure access to care and guarantee quality of basic and first referral level care
2. ensure rational and efficient management of available resources
3. contribute to the process of decentralization
4. reinforce community participation
5. develop a partnership between the public and private sectors

The first level of facility-based health care in the public sector starts with the Arrondissement Health Center which typically includes a dispensary (for curative care) and a maternity (for ANC and deliveries) and which is usually staffed by a nurse, a midwife, and some auxiliary staff. The Commune Health Center is usually staffed by a doctor, several nurses, and midwives and offers a wider range of health care services. Community Health Workers (*Relais Communautaires*) are present at the village level and are formally linked to health centers (either AHC or CHC). 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 specialist care. The ZH is usually staffed by 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 planning for the best use of resources within the zone to achieve health objectives. Above the health zones are two additional layers of referral care—the Departmental Hospital Center and the Central Hospital. The implementation of health zones is still incomplete and quite a few are not yet functional.

In 2005 (SNIGS, 2005), there were an estimated 323 physicians, 1,972 nurses, 827 midwives, and 303 laboratory technicians working in Benin’s public health system. For the country as a whole, there are an estimated 425 Arrondissement Health Centers, 75 Commune Health Centers, and 305 private health facilities (SNIGS, 2005).

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. From the NMCP's point of view, the private sector falls into 2 categories: authorized (licensed private pharmacies and health facilities, including faith-based facilities) and unauthorized (drug vendors and unlicensed health facilities). The NMCP can 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's income level is low, its work force 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). Those factors suggest that 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 Ministry of Health 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. Households are by far the largest source and agent of health spending in Benin. Private out-of-pocket spending makes up 51.2% of total spending. Households are followed as a source of health funds by the government (at 31%) and donors (at 16.5%).

Public health facilities charge direct fees at the time of service for consultations, procedures, and medicines. These fees 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 rules that are set by the MOH. Community financing represents a substantial share (average 43%) of local operating costs for the MOH facilities.

In December 2006, Benin's President announced that all health care costs at public health facilities would be abolished for children under five and pregnant women, including the costs for the *carnet de santé*, consultation fee, procedures (e.g. lab tests), and medicines. At the time of the team's visit, discussions with the MOH confirmed that the abolition of user fees would occur and that a decision on how this policy will be implemented is expected soon. Because utilization of public health facilities is relatively low, the removal of user fees could dramatically increase access for those who were unable to afford them in the past. However, it is still unclear how health facilities will be able to function if these revenues are not replaced from another source. It is also unclear whether increased demand for services might negatively impact the quality of care.

MALARIA SITUATION

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 2005, about 900,000 malaria cases and 1,581 malaria deaths (all ages) were reported (personal communication, M. Okê, NMCP). 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. HMIS data also suggest a high burden of morbidity from anemia, much of which is likely caused by malaria. The 2006 Demographic and Health Survey (DHS) found that among children 6–59 months old, 78% had anemia (25% mild, 46% moderate, and 8% severe).

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 peaks in May during and after the rainy season. There are no epidemic-prone areas. The Mapping Malaria Risk in Africa (MARA) project estimates that 100% of population lives in areas with high intensity transmission. Entomological inoculation rates for *Anopheles gambiae s.l.* range from 11 to 58 infective bites/person/year, in the south. Most of these (75%) occur during the long rainy season.

The country can be divided into three climatic zones with somewhat different rainfall patterns: a southern region with higher annual rainfall (e.g., 1500 mm in Cotonou) and 4 seasons: long rainy (May – July), short dry (August – September), short rainy (October – November), and long dry (December – April); and two northern (east and west) regions with lower annual rainfall (1000–1200 mm) and no short rainy season. Many roads are impassable during the rains. Thus, community-level vector control activities, such as IRS, would need to occur toward the end of the long dry season (February – April).

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 areas in the south (Ouémé /Plateau, Mono/Couffo, Zou/Collines) and northeast (Natitingou) for IRS.

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 include: *An. nili*, *An. brochieri*, *An. flavicosta*, *An. paludis*, *An. pharoensis*, and *An. hargreavis*. These 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 does vector surveillance for density, species composition, and resistance in areas targeted for IRS.

Vector pyrethroid insecticide resistance is well documented in Benin. Frequencies for the *ldr* 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. It is not known how resistance affects the efficacy of LLINs and IRS (insecticidal effect) and their impact (malaria illness). It is also not known whether additional use of LLINs and IRS will result in higher levels of resistance.

Rationale for current allocation of control interventions

For malaria prevention, the NMCP plans to scale up LLINs via: a) a national campaign to distribute free LLINs in late 2007 to children under age five years, b) selling highly-subsidized LLINs to pregnant women at antenatal care (ANC) clinics, and c) distributing highly-subsidized or free (policy is pending) LLINs at vaccination clinics to children who complete their vaccination series (upon receiving measles vaccination, at about 9 months). The rationale for this 3-pronged approach is that: a) campaigns can rapidly increase LLIN ownership and use; b) a high proportion of pregnant women (88%) attend at least one ANC clinic; and c) a moderate proportion of children (47%) receive all vaccinations. LLIN distribution at ANC and vaccination clinics could provide an incentive to increase clinic attendance. IPTp has been adopted (although not yet widely implemented) because of concerns that the previous policy of chemoprophylaxis with weekly chloroquine is less likely to be effective because of chloroquine resistance and doubts about compliance. While the NMCP's 2006-2010 Strategic Plan recommends IRS, no spraying has been done in Benin for many years due to a lack of trained personnel and financial resources. For malaria treatment, the NMCP plans to scale up ACTs via public health facilities, licensed private health facilities, and community-based treatment with community health workers (CHWs). The rationale is that: a) despite relatively low use of public health facilities (37%), there are still about 900,000 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

Benin is the recipient of a \$2.15 million Round 3 grant from the GFATM, which is currently in Phase 2 and ends in September 2008. Africare is the Principal Recipient and is implementing this grant in three health zones of Mono-Couffo Department, an area of high malaria transmission. At present, Mono-Couffo is the only department in the country where artemether-lumefantrine (AL; Coartem®) is available in public health facilities. The goal of the 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; 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 WB's main contribution to malaria control in Benin is through its Booster Program, a \$31 million 4-year malaria control grant to the Government of Benin (GOB) which includes significant support for the purchase of ACTs, rapid diagnostic tests (RDTs), SP, and LLINs (including a free LLIN distribution campaign targeting under-fives in late 2007), as well as funding for training of health workers, and support for monitoring and evaluation activities at the national level.

USAID/Benin supports a variety of malaria control activities, including the purchase of malaria commodities and technical assistance through the Mission's two integrated family health bilateral projects: Population Services International's (PSI) IMPACT project and University Research Corporation's (URC) PISAF project. These two projects support policy development and implementation, strengthening human resources through training and supervision, quality assurance and management.

Currently the WHO supports the NMCP to overcome difficulties in implementing the new national malaria control policy, build capacity in management and research, improve the monitoring and evaluation system and mobilize resources. 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 on 2 communes (in the departments of Plateau and Zou).

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 recent estimates of malaria indicators from the preliminary report of the 2006 DHS. The 2006 DHS is a nationally representative household survey that was conducted from August 3 to November 18, 2006, which corresponds to a mix of high malaria transmission periods and somewhat lower transmission periods.

Recent Estimates of Malaria Indicators: 2006 Benin DHS (preliminary report)	
Indicator	Estimates
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	20.5%
Proportion of pregnant women who slept under an ITN the previous night	19.7%
Proportion of targeted houses adequately sprayed with a residual insecticide in the last 12 months (assume no IRS at baseline)	Not applicable (no IRS in many years)
Proportion of women who received ≥ 2 doses of IPTp during their last pregnancy in the last 2 years	Not yet available (final results pending, although 2.5% for pregnancies in past 5 years)
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	Not yet available

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 ONE

Prevention:

- Approximately 660,000 LLINs will have been purchased and distributed through health facilities, community groups, and the commercial sector to children under five and pregnant women, bringing nationwide ownership of ITNs to about 50%;
- At least 85% of houses (approximately 59,500 houses with a population of 297,500) in geographic areas targeted for IRS during Year 1 will have been sprayed;
- Intermittent preventive treatment with SP in pregnant women will have been implemented in all 12 departments of the country.

Treatment:

- All laboratory technicians at the commune and health zone level will have been trained in malaria diagnostics;
- The National Laboratory for Quality Control will have been strengthened to implement an improved quality control system for malaria diagnostics, (including microscopy and use of RDTs), and improved inspection and testing of drugs (including ACTs);
- All departments will be using ACTs and approximately 1 million pediatric ACT treatments will have been purchased and distributed via government health facilities (nationwide) and through community-based workers (2 departments);
- Approximately 180,000 artesunate suppositories and 50,000 quinine drug kits for treatment of severe malaria will have been distributed to health facilities;

INTERVENTIONS - PREVENTION

Insecticide-treated nets (ITNs)

Current Status

Ministry of Health policy on ITNs: 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 owned at least one ITN. Twenty percent of children under five and pregnant women had slept under an ITN the previous night. Even though ownership of ITNs is low, these data indicate that, among those who own an ITN, use by pregnant women and children under five is high.

Distribution of ITNs: There is a three-pronged approach to net distribution in Benin, which supports both free distribution, 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 1 LLIN, 2 treatment courses of SP (6 tablets), iron supplement (90 x 5mg tablets) and folic acid (90 tablets). The ANC kits are sold for 1,000 FCFA (~\$2). Individual LLINs are sold for 500 FCFA (~\$1). To reach children under five, the NMCP strategy is to distribute ITNs for free through vaccination clinics. The majority of mosquito nets in Benin are conventional nets which require re-treatment every 6 months to remain effective, however, the current NMCP position is that only LLINs will be distributed through the public sector. Between 2003 and 2005, approximately 700,000 ITNs 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 at 735,000 ITNs for 2008.

2. Distribution through community-based channels.

Africare has distributed ITNs to rural populations in two departments (Mono and Couffo) through a GFATM Round 3 grant, which will end in September 2008. This approach supports the sale of highly-subsidized ITNs (500 FCFA; ~ \$1) at the community level through CHWs (known as *relais* in Benin, or health facility extension workers) and women's groups. Through a USAID Child Survival grant, the non governmental organization Medical Care Development International (MCDI) also has successfully distributed ITNs using community-based workers in Borgou Department (see 4 below). These approaches have been successful in increasing ITN usage among under-fives and pregnant women. For example, in the 3 health zones targeted by Africare, the proportion of under-fives sleeping under an ITN increased from 4% to 16% in one year; similarly the percentage of pregnant women sleeping under an ITN increased from 5% to 31% in the same period. 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 September 2007, the NMCP and other partners, with financial support from the WB Booster Program, will distribute over 1,500,000 free LLINs nationwide to all families with children under five. This is the first such campaign in Benin. This will be an integrated campaign which will include the distribution of vitamin A and albendazole. 1,400,000 LLINs will be procured by the WB Booster Program, 39,000 by USAID, and 19,250 by UNICEF. To fill the remaining gap of 141,750 LLINs (June 2007, WB Booster Program assessment) USAID is procuring 150,000 LLINs (with FY07 funds). Maintaining high coverage of LLINs following this nationwide campaign through routine services was identified by the NMCP and PMI as critical.

4. Distribution through the commercial sector.

Mosquito nets are also available for sale on the commercial market. For an insecticide-treated net or one packaged with insecticide for treatment, the price range is 3,000-4,000 FCFA (\$6-8). Untreated nets can also be purchased through the commercial sector. With USAID support, 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, ~ \$10.60); and (2) an ITN with a

retreatment kit (sold at 4,900 CFA, ~ \$9.80), 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. Under a USAID-funded Child Survival and Health Grants Program (2003-2007), MCDI has implemented a successful ITN distribution model using social marketing approaches. This project was implemented in 2 rural health zones (Tchaorou and N'Dali) within the department of Borgou. The project included partnerships with PSI and a local NGO (Sia N'Son) and nets were sold via community health workers, through mothers, and via kiosks during market days. In the project area, ITN use among children under 2 more than doubled in one year, increasing from 21% to 47%.

Supply chain management: Observations during the PMI assessment indicate that ITN stock-outs are common in health facilities. In addition to the procurement of more LLINs, there is a pressing need to assess and upgrade warehouses for malaria commodities at all levels: (1) Central Medical Stores central warehouse in Cotonou (which serves the 8 neighboring departments), (2) Regional depot in Natitingou (which supplies the departments of Atacora and Donga), (3) Regional depot in Parakou (which supplies the departments of Borgou and Alibori), and (4) Health zone depots (known as *dépôts répartiteurs*). The GOB is in the process of creating these health zone depots and the plan is to have 1 depot for each of the 34 health zones. A World Bank assessment (June 2006) reviewed existing health zone depots, determined their capacity to stock malaria commodities (estimated numbers of ITN bales and numbers of ACT/RDT boxes). The report also provided recommendations for improvements/repairs. The NMCP has developed a plan to supply and manage malaria commodities which recognizes the need to renovate these depots to improve storage conditions or rent storage space, particularly for the LLINs that will be distributed for the mass campaign (*Plan d'Approvisionnement et de Gestion des Médicaments et Produits de Lutte Contre le Paludisme 2007-2010, August 2006*). Under the World Bank Booster Program, some renovations of the central depot in Cotonou are planned. However, there is still a need to renovate some of the depots at the rural level. The existing distribution system is also weak. Health facilities are responsible for purchasing their orders from the depots and transporting the nets themselves. Most health facilities do not own vehicles and therefore must rely on public transportation. Central Medical Stores staff at all levels of the system need training around forecasting, management, and tracking of commodities.

IEC/BCC: To create demand for LLINs and to ensure that those nets delivered through ANC and EPI clinics and through community-level activities are used correctly and consistently, it will be important to invest in IEC/BCC strategies that are culturally-appropriate for Benin. The NMCP has begun to address communication issues by developing an “Integrated Communication Plan to Support Malaria Control 2006-2010”, which includes malaria prevention and control messages and a prominent role for CHWs, women’s groups, schools, local radio stations, and local NGOs. With support from the GFATM, the NMCP has partnered with several local NGOs and radio stations to conduct malaria IEC/BCC activities. In addition, several international NGOs (such as PSI, MCDI, and Africare) have experience with IEC/BCC activities using mass media as well as community-level approaches. There is a need to ensure that IEC/BCC messages are consistent throughout the country and that efforts

of different partners are better coordinated. The NMCP has also stressed that there is only one staff person dedicated to IEC/BCC at the national level which is insufficient.

Pyrethroid resistance and LLINs/IRS: Recent findings published by a consortium of research groups working in Benin, including the Center for Entomology Research – Cotonou (CREC); the Institute for Research and Development (IRD), University of Montpellier, France; and the London School of Hygiene and Tropical Medicine (LSH&TM) suggest that vector resistance to pyrethroid insecticides may compromise the impact of ITN and IRS interventions in Benin. Evidence supporting this belief comes from experimental hut studies in Benin and experimental hut studies and clinical trials in Ivory Coast. The Benin study demonstrated that, in an area where vectors are pyrethroid-resistant, ITNs and IRS together did not prevent vectors from blood feeding (i.e. transmission) behavior. However, based on this entomological study alone, it remains unclear whether the pyrethroid resistance situation in Benin will compromise the clinical impact of ITNs and IRS. In the Ivory Coast, clinical trials concluded that pyrethroid resistance did not compromise the impact of ITNs. However, the Ivorian experimental hut studies that accompanied this work, unlike those in Benin, did not link resistance to a failure of ITNs and IRS. The discrepancy between the Benin and Ivory Coast experimental hut studies can only be resolved with a clinical trial at the Benin site. An IRD clinical trial, already funded by the French government, can add an arm to assess whether pyrethroid resistance in Southern Benin reduces the clinical impact of ITN and IRS interventions.

Monitoring and evaluation of ITN efficacy will benefit from an existing quality assurance testing program at CREC. The program evaluates ITNs for insecticidal effect, durability and flammability. The WB Booster Program has budgeted support for this activity.

Proposed USG Activities (\$7,045,000):

The proposed PMI activities to increase coverage and utilization of LLINs in 2008 are:

1. *Procure LLINs for routine services:* Procure approximately 600,000 LLINs for distribution to pregnant women at ANC visits (at a highly-subsidized price) and to children at vaccination clinics (for free). Pregnant women will receive LLINs as part of a kit including one LLIN, one dose of mebendazole, folic iron and SP at a cost of 2\$ per kit). These nets, together with 135,000 LLINs provided by the WB Booster Program, will cover 100% of the estimated need at both ANC and EPI clinics in 2008. (\$4,200,000)

2. *Strengthen storage capacity and distribute LLINs for routine services:* An updated assessment of the current storage capacity for LLINs at the central, departmental, and health zone levels will be carried out. Based on this assessment of storage capacity and needs, PMI will invest in upgrading and renovating some of the rural-level depots so that there is sufficient capacity to secure, store, and supply LLINs for routine distribution via health facilities. To prevent stock-outs of LLINs, vehicles will be rented to ensure that LLINs are transported in a timely manner from the central warehouse in Cotonou through to health facilities. (\$261,000)

3. *Strengthen logistics management for LLINs, SP, ACTs, and severe malaria drugs:* Provide technical assistance to the CMS to improve supply management, forecasting/quantifying, tracking, and storing LLINs and other malaria commodities. Training of CMS staff at all levels (central, regional, health zone) will be conducted. These activities will be combined with the other support that PMI will provide to improve logistics management (see the IPTp and case management sections of this document). (\$800,000)

4. *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. Activities will be coordinated with IEC/BCC approaches supported under the newly-competed NGO RFA (see (7) below). (\$950,000)

5. *Assess effect of insecticide resistance on impact and efficacy of ITNs and IRS:* This operations research study will be conducted in an area of high pyrethroid resistance and will include: (1) a clinical trial to assess the impact of LLINs alone and LLINs combined with IRS (with a non-pyrethroid insecticide) on measures of clinical malaria (anemia and malaria infection among children under five), and (2) experimental hut trials to determine whether LLINs combined with IRS (with a non-pyrethroid insecticide) can be used to manage pyrethroid resistance in the vector population (e.g. by killing off pyrethroid-resistant mosquitoes and thus 'restoring' the effectiveness of LLINs). (\$300,000)

6. *Evaluation of new technology to determine when LLINs need to be replaced.* On average, long-lasting insecticide-treated nets remain effective for an average of 4 years. However, factors such as the manner and frequency of washing as well as exposure to sunlight can cause significant deviation from this mean. Therefore, a technique to determine when to replace suboptimal ITNs is needed. The only method currently available to assess the 'insecticidal' status of an ITN is the WHO cone test, a bioassay that requires live mosquitoes from a standard 'susceptible' colony. The interpretation of this test is subjective, the results are variable, and it is difficult to do in the field. As a result, the cone test is not used systematically. In this operations research study, new tests - with fewer constraints - will be evaluated to determine if they can reliably predict the bioactivity (cone test result) of various ITNs. (Activity is funded with Core Funds: \$37,000)

7. *Community-based distribution of ACTs and LLINs with focused IEC/BCC support at the community level:* The PMI will support the training and supervision of CHWs and women's groups to distribute approximately 25,000 highly-subsidized LLINs in two departments with low ANC attendance and high child mortality. This activity will be linked with community-based distribution of ACTs and will include IEC/BCC strategies at the community level. This will be a comprehensive activity that will cover all communes and all health facilities in both departments. It will be implemented by NGOs/FBOs under a new RFA. Results of this first

phase in 2 departments will be closely monitored and documented to inform possible scale-up of this approach to other departments in Years 2 and 3. (*Cost covered in Treatment section*)

8. *Private sector LLIN distribution*: Procure and distribute approximately 60,000 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 has been piloted in Borgou Department by MCDI/PSI. A high subsidy will be applied to these nets so that they are sold at a more affordable price of around \$2-4. Social marketing of highly-subsidized ITNs through volunteer community agents and commercial outlets is a complementary strategy to establish market demand and expand rural reach. (\$534,000)

Indoor residual spraying (IRS)

Current Status:

Benin has holoendemic, perennial transmission of malaria, characterized by high attack rates in children under five years of age and pregnant women. The primary malaria control strategy of the NMCP and the PMI is based on high coverage of vulnerable populations with LLINs. However, the NMCP also recognizes the value of time-limited IRS applications, particularly where ITN coverage is low. While the NMCP's 2006-2010 Strategic Plan mentions IRS, it does not yet include a defined plan and strategy for how IRS will be implemented in the country. The Strategic Plan supports the integrated vector control strategy of WHO, which covers several insect-borne diseases and is not malaria-specific. The strategy includes: (1) transitioning to LLINs, (2) distributing ITN re-impregnation kits, (3) use of insecticide-based larval control and IRS (in a complementary manner), and (4) environmental management (e.g. drainage) to reduce larval habitats. While IRS was implemented in Benin (using DDT, malathion, and carbamate insecticides), during the malaria eradication era (1960-1970), no spraying has been done in Benin for many years due to a lack of trained personnel and financial resources. The NMCP has requested support from PMI to implement IRS in Benin and increase technical capacity at the NMCP in vector control/entomology. Benin's current GFATM grant and the WB Booster Program do not fund IRS activities.

The NMCP has an Integrated Vector Control Unit (*cellule*) to which 3 NMCP employees are assigned: a physician/manager responsible for monitoring and efficacy studies, a geographer responsible for environmental impact issues (in collaboration with the Ministry of Environment), and a technical specialist in IRS and ITNs. None of these individuals has received training in entomology. At the sub-national level, the NMCP has assigned a technical person to each Health Office (*Direction Départementale de la Santé, DDS*) in each of the 12 departments. At the *commune* and *arrondissement* levels, there are no vector control staff, however, Community Health Workers (*relais communautaires*) are involved in delivering IEC messages about vector control based on Roll Back Malaria guidelines.

The NMCP has requested that PMI support IRS in rural areas of Ouémé Department in South Benin, where malaria transmission is stable and endemic. It is expected that spray operations will cover a population of approximately 350,000 (about 70,000 houses) and will include several communes, which remain to be selected. Baseline entomological surveys, resistance

studies, and KAP surveys are currently being conducted in several communes in South Benin. These data will be reviewed by the NMCP in order to make a determination of which communes will be selected for IRS. These areas are part of a shortlist of possible locations for IRS, which include areas in Alibori, Atacora, and Borgou Departments.

Given the high levels of vector resistance to pyrethroids (and thus cross-resistance to DDT) at selected sites in South Benin, selection of insecticides for IRS will present challenges. Since the basic strategy of the NMCP is to cover all children under five years of age and pregnant women with LLINs treated with pyrethroid insecticides, a non-pyrethroid insecticide may be the best option for IRS. This could improve efficacy and at the same time help manage the spread of pyrethroid resistance. Organophosphate or carbamate insecticides should work well against pyrethroid-resistant vector populations, since there is no cross resistance between these insecticide ‘families’. Organophosphates and carbamates have been approved by WHO even though short residual activity and, in some cases, unpleasant odor have been associated with them. Benin is a signatory to the Stockholm Convention on Persistent Organic Pollutants. While DDT is not authorized for in Benin for agricultural purposes, its use is permitted for malaria control. The specific formulations used for IRS in Benin will also be evaluated using CDC technology developed for this purpose. There are no taxes or tariffs on insecticides and spraying equipment brought into Benin by the Ministry of Health (MOH).

Benin has a strong national insecticide resistance surveillance program, which is implemented by the Center for Entomology Research – Cotonou (CREC). CREC is part of the MOH and provides entomological support to the NMCP. It conducts quality assurance testing of ITNs (insecticidal effect, durability, flammability) and has excellent insectary facilities. In collaboration with several research institutions (including IRD and LSH&TM), CREC is conducting important studies on the impact of vector resistance on IRS and ITN malaria interventions. The GFATM provides support to CREC for pyrethroid vector resistance studies. The NMCP itself lacks trained staff in epidemiology and vector control, and has asked PMI to support such training.

Since pyrethroid resistance is a concern both to Benin and the West African sub-region, the existing national malaria vector surveillance program should be supported. Data from this program will inform the implementation of IRS and LLIN activities in Benin as well as generate important information for other PMI countries. Managing pyrethroid resistance is a critical issue facing malaria control interventions worldwide because: (1) IRS programs commonly use pyrethroids, (2) ITN technology, at the present time, relies solely on pyrethroids, and (3) pyrethroids are used on a large scale in agriculture. Selection for pyrethroid resistance in such an environment is not surprising. Conducting surveillance and using the results to manage resistance (i.e. by choosing an alternative insecticide for IRS) are priority activities that that need ongoing support.

Proposed USG Activities (\$1,220,000):

1. *Train NMCP staff in entomology and vector control:* Provide short-term certificate training for 1 NMCP staff person at University of Abomey-Calavi and entomological training (short course) for 2 NMCP laboratory technicians. (\$50,000)

2. *Entomological evaluation in IRS target areas:* The PMI plans to conduct an initial entomological survey to establish the presence or absence of vectors, their density and their insecticide resistance profile prior to making a final determination of where IRS will be done. CREC will be supported to conduct these surveys, which will include a baseline survey before spraying and a follow-up survey after spraying. (\$27,500)

3. *Support national vector resistance surveillance program:* Support CREC national malaria vector resistance surveillance program including training, equipment, logistics, and supervision. PMI support will allow ongoing surveillance activities to continue and will also expand the system to include resistance monitoring for DDT, organophosphates, and carbamates, since compounds from these classes may be used for IRS (instead of pyrethroids). With PMI's support, CREC will expand the number of surveillance sites from 3 to 11. The data from this surveillance program will be used to inform the scale-up of IRS and ITN coverage in years 2 and 3 of the PMI, together with the results of the ITN/IRS operations research studies (detailed in ITN section above, under (5)). (\$80,000)

4. *IRS implementation:* Conduct one round of IRS in several communes selected by the NMCP (Ouémé Department, population 350,000, approximately 70,000 houses, 4 communes). In Benin, a single round of IRS with a long-lasting (6 months) insecticide is expected to reduce vector density and transmission significantly. Given the context of Benin, PMI and the NMCP will carefully evaluate the choice of insecticide and the formulation to use to avoid pyrethroid resistance-related problems. Given that IRS has not been conducted for many years in Benin, it will be particularly important to conduct community sensitization and education activities to ensure that the population knows what to expect and what to do when their house is to be sprayed. (\$1,050,000)

The IRS timeline, below, shows that spray operations will occur just before the beginning of the long rains, which is the major transmission season and is the period when houses in the target area are accessible. For spraying to occur in early 2008 (April/May), several preparatory activities will need to be implemented in late 2007 (baseline surveys, environmental assessments). If not, IRS operations would need to be delayed until April/May 2009.

Fiscal Year	FY2007												FY2008											
Calendar Year	2006			2007									2008											
	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
FY08 PMI funds available																	X	X	X	X	X	X	X	X
Long rainy season								X	X	X	X	X							X	X	X	X	X	X
Long dry season	X	X	X	X	X	X	X						X	X	X	X	X	X	X					
Organize IRS						X	X	X	X	X	X	X	X	X	X	X	X							
Entomological evaluation in IRS target areas (baseline survey)								X	X	X	X	X												
IRS/ITN impact evaluation						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			
IRS operation																	X	X	X					

5. *CDC technical assistance for vector control activities:* CDC staff will conduct one technical assistance visit to Benin to monitor planning and implementation of vector control activities. (\$12,500)

Intermittent preventive treatment (IPTp)

Current Status

IPT 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 during pregnancy: the first after 16 weeks or quickening and the second at least one month later. Based on the current WHO policy, the NMCP recommends that HIV positive women receive a third dose. 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 attend at least one ANC, similar to the 87% reported in the 2001 DHS. Results for 2006 are not yet available on the total number of ANC visits per woman, but the 2001 DHS showed that 84% of pregnant women attended ANC clinics at least twice. As expected, rates of attendance are higher in urban (93%) than rural (85%) areas. In 2001, the median month for the first visit was 4.6 and 76% of women gave birth in a health facility (DHS 2001). Three rural departments stand out from the rest with lower attendance rates, ranging from 61% to 76% (DHS 2006). Antenatal care attendance is lower in the departments of Atacora, Borgou, and Alibori because of the long distances women have to travel to reach health facilities. Although these departments are large in geographical terms (covering about 45% of Benin), the total population is only approximately 1 million.

The 2006 DHS also found that use of antimalarials for malaria prevention during the previous pregnancy was high (82%), but only 2.5% of pregnant women had taken 2 doses of SP. This low coverage with SP is due to the fact that the IPTp policy has not been completely rolled-

out (e.g. not all health workers trained, not enough SP in stock at health facilities). The WB Booster Program will provide 200,000 SP tablets for ANC clinics in 2008. With an estimated 400,000 new pregnancies in 2008, there is a gap of 2,300,000 tablets needed for two treatments each of three tablets (which includes the additional tablets needed for the estimated 10% of pregnant women who are HIV+).

Several challenges to scaling up IPTp have been identified by NMCP and PMI. These include rapid roll out of training for health workers to appropriately administer IPTp, educating women and communities on the benefits of early and repeated ANC visits, particularly focusing on women in departments with low ANC attendance, and ensuring good management of SP distribution to prevent stock-outs.

Proposed USG Activities: (\$230,000)

ANC clinic attendance is high and a high proportion of pregnant women (82%) took an antimalarial during their last pregnancy (DHS 2006). Taken together, these data suggest that Benin can reach the RBM and PMI targets for IPTp. A key challenge will be to increase the proportion of women who come for their first visit early in their pregnancy. Provision of ANC kits, which include an LLIN, two treatment doses of SP, iron, and folic acid, may serve as an incentive for early attendance. This, combined with a strong BCC/IEC component, is needed to increase early and frequent ANC attendance.

The NMCP and PMI have identified taking IPTp to national scale as the PMI “jump start” activity, which will be implemented at the end of 2007. In addition to FY 2008 PMI funds (\$230,000), the USAID Mission will use FY 2007 funds to purchase 2,300,000 SP tablets, which should fill the entire SP gap for all pregnant women in 2008, including women with HIV/AIDS. The Mission will also provide support for limited training and BCC/IEC support (e.g. inter-personal communication, job aids).

The proposed PMI activities to increase IPTp coverage in 2008 are:

1. *IEC/BCC for IPTp*: Support IEC/BCC to increase the number of pregnant women coming early and repeatedly to ANC clinics and to educate them 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*)

2. *Train and supervise health workers in IPTp*: Health workers in all health facilities nationwide will be trained on correct delivery of SP, including the need for DOT and for women to return for a second ANC visit and SP treatment. The training will be part of a more comprehensive ANC refresher training. (*\$230,000*)

3. *Strengthen logistics management for SP*: Provide technical assistance to the CMS to improve supply management, forecasting/quantifying, tracking, and storage of SP. Training of

CMS 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 in ITN 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 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.

Due to a lack of funds, the new ACT policy has only been implemented in part of Mono and Couffo Departments (less than 1/6 of the country). Since May 2006, the GFATM has supported the NGO Africare to implement ACTs (in 3 health zones) in public health facilities and at the community level via CHWs and leaders of women's groups. The NMCP has also implemented ACTs in public health facilities (in 1 health zone) and at the community level (in 1 commune, Houéyogbé) via 60 community health workers. In both the NMCP-supported pilot and the Africare pilot, ACTs were sold to caretakers in the community for the same price as at health facilities. Community Health Workers were volunteers who did not receive financial compensation. CHWs in Benin act as an extension of the health facilities and typically work out of their homes. Acceptability and feasibility of this model has been evaluated with a small WHO-supported study (of the NMCP ACT pilot). Although the final study report is not yet ready, the general impression is that community-based distribution works reasonably well. ACTs were well-accepted by communities (e.g. purchased and used correctly) and community-based distribution was deemed feasible. One problem was that sometimes parents of an ill child would inappropriately purchase the AL blister pack with the lowest dosage (i.e. a dose too low for the ill child) because it was the least expensive.

With assistance from the WB Booster Program and USAID's PISAF project, in 2007, the NMCP plans to scale up the AL policy in all public health facilities. In 2008, the NMCP 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. Currently, ACTs are available in some private pharmacies, although they are expensive. Beginning in 2008, efforts will begin to expand coverage in the private sector (licensed health facilities and pharmacies); although a comprehensive scale-up strategy in the private sector is still being formulated by the NMCP.

In 2008, the need for under-fives will be about 800,000 AL treatments^a for health facilities and about 1.1 million treatments for community-based distribution. The true need might be greater because of a new policy (not yet implemented) that guarantees free treatment for under-fives. For 2008, the WB plans to purchase about 1 million treatments, although the actual amount is difficult to calculate because the price of AL has changed since the WB's budget was developed.

For children older than five and adults, the new policy recommends reserving antimalarials for those with a positive diagnostic test (microscopy or rapid diagnostic test [RDT]). The new policy includes use of RDTs throughout the health system and these will be the only diagnostic test at the CSA level. Due to a lack of funds, this had not yet been widely implemented. Although microscopy is supposed to be available in hospitals and larger health facilities, such facilities often lack a functional microscope and the quality of microscopy is likely to be sub-optimal. The NMCP expressed a need for 55 new microscopes. The WB Booster Program plans to purchase 10 microscopes and train technicians in microscopic diagnosis for malaria over the period 2008-2010.

Regarding RDTs, the estimated need for 2008 is about 614,000 tests (enough for all patients 5 years of age and older seen at public health facilities), and the WB Booster Program plans to purchase 550,000. Since the NMCP's plan for community-based treatment is only for children under five years of age, diagnostics will not be needed at the community level. Biological diagnostics will only be needed for individuals 5 years of age and older seen in health facilities.

The NMCP is working with the Division of Diagnostics 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. This will be a major challenge, as indicated by results from other African countries in which many are treated for malaria despite negative tests. In 2008, the need for AL for patients 5 years of age and older will be about 307,000 treatments at health facilities^b. For 2008, the WB plans to purchase about 400,000 treatments.

Severe malaria: The NMCP's new 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,

^a Assume population of under-fives is ~ 1.5 million, and 3 febrile episodes per child per year; of these 4.5 million cases, roughly 800,000 are seen in health facilities (485,136 cases of malaria [fever] and anemia in health facilities in 2005 [according to the HMIS], then scaled up to 2008 [using HMIS 3.25% population growth factor], then increased by 50% [to account for increased use of facilities]).

^b Assume population aged five years and older is ~ 6.8 million, and 1 febrile episode per person per year; of these 6.8 million cases, roughly 614,000 are seen in health facilities (558,166 cases of malaria [fever] and anemia in health facilities in 2005 [according to the HMIS], then scaled up to 2008 [using HMIS 3.25% population growth factor]). Also, assume that all patients are tested, and that 50% are test-positive. Assume that only test-positive patients are treated with an ACT at a health facility (~ 307,000 treatments needed).

the estimated need for 2008 is 180,000 artesunate suppositories and 54,000 inpatient treatments. The WB 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 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 Central Medical Stores 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 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 result in periodic shortages in essential drugs and commodities.

The WB Booster Program budget has planned to train about 5,000 health workers (including physicians, nurses, laboratory technicians, midwives, and other health facility personnel), 7,500 community health workers, and 5,000 schoolteachers on the new malaria diagnosis and treatment guidelines in 2008. The NMCP and PMI agreed that, while there was no gap in terms of training, follow-up supervision of trained health workers would be important to ensure that the new malaria guidelines were being correctly implemented by health workers and with the appropriate support (e.g. job aids).

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 validated, includes forms to report adverse events as well as a curriculum for pharmacovigilance training which lists antimalarials. Under the WB Booster Program, funds have been allocated to support putting in place this system and an evaluation of pharmacovigilance for ACTs is planned in 2008 (WB Booster Program Budget, November 2006).

Proposed USG Activities: (\$285,000 for diagnostics and \$3,317,500 for treatment)

Diagnosis

1. *Procure microscopes and laboratory consumables:* Procure 30 new microscopes and repair/replacement parts for existing microscopes, reagents for microscopy (e.g. slides, giemsa stain, etc) in district and commune-level public facilities. This contribution, along with 10 microscopes from the WB Booster Program, fills most (40/55, or 73%) of the NMCP's need. (\$110,000)

2. *Procure RDTs:* Procure 64,000 RDTs. This procurement completely fills the 2008 gap. (\$50,000)

3. *Train laboratory technicians:* Train laboratory technicians in microscopy and RDT use at the commune and health zone levels for the diagnosis of malaria in patients above 5 years of age. This activity will be coordinated with the WB-supported training to ensure diagnostics are used correctly. The combined funding provided by the PMI and the WB Booster Program will ensure that all laboratory technicians are trained in 2008 (\$62,500).

4. *Support quality assurance/quality control system for diagnostics:* Support the National Laboratory for Quality Control to strengthen and implement quality control system for malaria microscopy and RDTs in both public and private facilities. This activity is particularly important, as RDT quality might vary because of batch-to-batch variation, storage conditions, and how they are used by health workers. (\$50,000)

5. *CDC technical assistance on diagnostics:* CDC staff will conduct one technical assistance visit to help design the diagnostics quality control system. This activity is justified given the limited experience with developing quality control systems for RDTs. (\$12,500)

Treatment

1. *Procure ACTs:* In addition to 1,092,000 Coartem® treatments procured by the USAID/Benin Mission using FY 2007 funds, PMI will procure 39,000 Coartem® treatments with FY 2008 funds. These ACTs will be distributed in 2008 at public health facilities nationwide and (for under-fives) by community-based workers in 2 departments. The large majority of ACTs are for under-fives (1,079,000 treatments for under-fives and 52,000 treatments for patients aged 5 years and older). Together with contributions from the WB Booster Program, these procurements meet all the needs in 2008 for all ages. Additionally, the USAID/Benin FY 2007 and the PMI FY 2008 contributions cover all needs for the first 2 months of 2009 (a safeguard against ACT stock-outs). (\$82,000)

2. *Procure artesunate suppositories:* Procure 180,000 suppositories for pre-referral treatment of severe malaria cases in remote clinics where parenteral malaria therapy cannot be provided. This procurement will fill the gap for 2008. (\$68,000)

3. *Procure drug kits for inpatient treatment of severe malaria:* Procure 50,000 quinine drug kits (including glucose solution, perfusion equipment, etc) for inpatient treatment of severe malaria to meet needs for 2008 and early 2009 (42,000 kits for children under age five and 8,000 kits for patients 5 years and older). (\$400,000)

4. *Supervise and support health workers on case management:* Strengthen and help implement a supervisory strategy, as part of a comprehensive quality assurance approach, to ensure high quality malaria case management with ACTs. The system 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 on supervision for this activity will be at the health facility level. This activity would also support some NMCP supervision expenses. A proportion of these funds will be directly transferred to the NMCP to conduct supervision of health workers on case management. There is currently no agreement to transfer funds from the USAID/Benin Mission to the MOH/NMCP. A pre-award assessment will be conducted and, following approval, transfer of funds will be possible to carry out this activity. The possibility of expanding funding and scope of work for the NMCP will be determined based on Year 1 results. (\$600,000)

5. *Private sector case management*: Develop guidelines, train and promote activities targeting private clinics, drug outlets, traditional healers, and pharmacies to ensure consistent practices with national policies. (\$200,000)

6. *Management of severe malaria*: Support training and supervision on appropriate management and referral practices for severe malaria. Although training for health workers on malaria case management will have already occurred by 2008, past studies and experience suggest that treatment of severe illness tends to be a weakness of case management programs. (\$175,000)

7. *Support IMCI training*: Support IMCI training for 200 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. (\$170,000)

8. *Strengthen logistics management for ACTs and severe malaria drugs*: Provide technical assistance to the CMS to improve supply management, forecasting/quantifying, tracking, and storage of SP. Training of CMS staff at all levels (central, regional, health zone) will be conducted. These activities will be combined with the other support that PMI will provide to improve logistics management. (Costs covered in ITN section)

9. *Community-based distribution of ACTs and LLINs with focused IEC/BCC support at the community level*: Support implementation of ACT distribution for children under five by community-based workers in 2 departments with low access to health services and high child mortality: develop guidelines, train and supervise workers, develop innovative methods to motivate workers, support distribution system, assess progress for further scale-up. This activity will be linked with the community-based distribution of LLINs and will include IEC/BCC strategies at the community level. This will be a comprehensive activity that will cover all communes and all health facilities in both departments. It will be implemented by NGOs/FBOs under a new RFA with technical assistance. Results of this first phase in 2 departments will be closely monitored and documented to inform possible scale-up of this approach to other departments in Years 2 and 3. (\$150,000 for technical assistance, \$950,000 for the RFA)

10. *Drug quality control*: Support the National Laboratory for Quality Control to improve inspection, test ACTs at ports and in the field, reinforce operations, and replace or repair equipment. (\$150,000)

11. *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 WB Booster Program plans to fund LQAs surveys twice a year to collect quantitative data from outpatient facilities (see Monitoring and Evaluation section). To complement the surveys already planned by the WB, PMI will support a 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. (\$350,000)

12. *IEC/BCC for treatment*: Support 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 supported under the newly-competed NGO RFA (see (9) above). (Costs covered in ITN section)

13. *USAID/HQ technical assistance on community-based distribution of ACTs*: USAID headquarters staff will conduct one technical assistance visit to assist with the design of community-based ACT distribution activities. (\$10,000)

14. *CDC technical assistance for supervisory systems*: Technical assistance visit from CDC to assist in the development of a scope of work to strengthen and implement a supervisory system for health worker performance. (\$12,500)

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 28% in 2004), truck drivers (5%) and military personnel (8%). The preliminary results of the recent DHS in 2006 confirm the low prevalence rate with a general population prevalence estimated at 1.2%. In 2004, the National Monitoring and Evaluation Unit of the National AIDS Program estimated the overall number of PLWHA in Benin at approximately 79,240. The estimated number of HIV positive pregnant women was 7,160 in 2004 and is forecast at 6,294 for 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 WB, USAID, GFATM and other partners in the HIV/AIDS sector. Since voluntary counseling and testing was introduced in 2002, the numbers arriving for testing have continued to increase with the number rising to 82,848 in 2005.

In 2001, Benin officially opted for an antiretroviral access strategy that includes young children. Currently there are 43 medical distribution sites and, as of 2005, 4,298 patients are receiving treatment with antiretrovirals, approximately 4% of whom are children, of an estimated 13,190 people needing treatment. While not a PEPFAR focus country, USAID supports HIV/AIDS activities in Benin through its bilateral health projects.

Proposed USG Activities (no proposed funding for specific HIV/AIDS linked activities during Year 1 of the PMI)

While not specifically designed to support HIV/AIDS services, several activities in Year 1 of PMI should contribute to the success of PMTCT activities in Benin. PMI activities to reinforce the logistics and distribution infrastructure, strengthen both the laboratory system and routine data collection through HMIS, and 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 2 departments with low ANC attendance. PMTCT activities in Benin will benefit directly from the IEC/BCC activities promoting early ANC attendance planned in Year 1 of PMI.

CAPACITY BUILDING WITHIN NATIONAL MALARIA CONTROL PROGRAM

Current Status

The NMCP faces critical staffing shortages at the central and peripheral levels, impeding its ability to manage existing and new malaria program activities effectively. Recently, the NMCP identified minimum staffing required to meet its obligations, including a monitoring and evaluation expert, health planner, logistician, midwife, pharmacist, statistician, parasitologist, epidemiologist or malariologist, and a communications specialist at the central level. In total, the NMCP has 22 positions that are not filled. Many existing staff members need additional training, to develop skills in epidemiology, entomology, evaluation, management and information technology. In addition, the NMCP lacks resources to perform regular supervision at all levels.

Proposed USG Activities: (\$310,000)

With malaria program resources expanding rapidly, especially from PMI and the WB Booster Program, 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 its first year, PMI will contribute to this capacity building as follows:

1. *Capacity building of the NMCP:* Training in epidemiology, malariology, program management and data analysis. PMI will support in-country training for 32 central NMCP staff, 12 physicians at the health zone level and 8 staff at the department level. (\$160,000)

2. *Train NMCP staff in entomology and vector control:* To provide critical technical expertise to support planned LLIN and IRS interventions, PMI will provide short-term certificate training in entomology for one NMCP staff member at the University of Abomey-Calavi. In addition, two NMCP laboratory technicians will receive entomological training (short course) in the West African sub-region. (Costs covered in IRS section)

3. *Strengthen Benin's HMIS system, NMCP's M&E capacity, and provide technical assistance on measuring process indicators:* The CDC PMI Resident Advisor will spend 80% of his time at the NMCP, supporting all areas of planning, implementation and evaluation of target PMI interventions. In addition, PMI will provide technical and operational assistance and on-the-job training to NMCP staff to assist with the design and implementation of strategies to measure key program indicators, both at the central and departmental level. This will include working with the NMCP to analyze and report on process indicators quarterly (including the frequency of supervision), as well as confounders data such as rainfall. This activity will include training and supervising health workers who are responsible for data collection and reporting as part of the HMIS. (Costs covered in Monitoring and Evaluation section)

4. *Direct support for the NMCP for case management activities:* The NMCP will receive some funds to conduct supervision of health workers on case management. There is currently no agreement to transfer funds from the USAID/Benin Mission to the MOH/NMCP. A pre-award assessment will be conducted and, following approval, transfer of funds will be possible to carry out this activity. The possibility of expanding funding and scope of work for the NMCP will be determined based on Year 1 results. (Costs covered in Case Management section)

5. *Equipment for the NMCP:* PMI will fund basic office infrastructure for the NMCP, such as computers, internet access, photocopiers and office renovation (for the central level and 12 departments). (\$150,000)

6. *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 7 of the GFATM. Benin has been unsuccessful in the last three rounds of submission. Benin is currently the recipient of a Round 3 GFATM grant, which is in Phase 2 and will end in September 2008. Benin has submitted a malaria proposal for consideration under Round 7. USAID is a voting member of the CCM.

Malaria Partners/RBM

The Malaria Partner/RBM group is supposed to meet monthly, however the last meeting was held in November 2006. Participation at these meetings consists of NMCP staff, USAID, PSI, UNICEF, WHO, WB, the private sector, and NGOs/FBOs. The NMCP has agreed that it is important to re-invigorate this group for purposes of coordination. There is 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” in Year 1, USAID/Benin, under PMI, will hire two staff members (one for CDC and one for USAID) to handle both technical and logistical planning for PMI activities. As well, there will be one to two additional local staff hired to assist with the implementation of PMI activities. These people will closely coordinate PMI activities with the NMCP and the WB Booster Program, and be 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. PMI plans to support the NMCP’s strategy to engage the private health sector by (1) procuring 600,000 LLINs for distribution through both public and private (licensed) health facilities, (2) supporting the sale of 60,000 highly-subsidized LLINs through the commercial sector using a social marketing approach, and (3) improving case management of malaria in the private sector (private clinics, drug outlets, traditional healers, pharmacies) through training/education on national malaria policies.

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 Bénin 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 the lot quality assurance sampling (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. No Multiple Indicator Cluster Survey or Malaria Indicator Survey is currently planned. The WB Booster Program is planning household and health facility LQAS surveys twice a year related to malaria control. NMCP/RBM household surveys and health facility surveys have been conducted in 2001, 2004, and 2005, but with non-probability samples. 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 hospitals in the sentinel sites (see below) could be strengthened 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. Six 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 WB 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 surveys 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 WB 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 (e.g., planned monthly meetings often do not occur). That said, partners genuinely do wish to work together.

Proposed USG Activities: (\$362,500)

1. Strengthen Benin's HMIS system and the NMCP's M&E capacity: Train and supervise health workers to ensure prompt and complete reporting to all levels, and put in place a comprehensive feedback system to encourage data for decision-making; provide computers and supplies. This activity would include advising and supporting the NMCP/HMIS (central and departmental level) and would include field trips. Scope of activity is national. (\$150,000)

2. Strengthen sentinel sites: Six sentinel sites will be strengthened. This activity, in collaboration with WB Booster activities, will include technical assistance to improve the capacity of these sites to collect reliable data on inpatient malaria cases and deaths. Scope of activity is 6 health zones. (\$150,000)

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. 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. CDC technical assistance for M&E: CDC staff will conduct one technical assistance visit to assist the NMCP with M&E planning and implementation (\$12,500).

STAFFING AND ADMINISTRATION

Two new health professionals will be hired to oversee the PMI in Benin, one representing CDC and one representing USAID. In addition, one or more FSNs will be hired to support the

PMI team. 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 the WHO, UNICEF, the GFATM, WB, 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 2

**President's Malaria Initiative – Benin
Planned Obligations for FY 2008 (USD \$14,000,000)**

Proposed Activity	Mechanism	Budget (<i>commodities</i>)	Geographic area	Description of activity	Page number reference
PREVENTIVE ACTIVITIES					
Insecticide-Treated Bednets					
Procure LLINs for routine services	DELIVER	4,200,000 (4,200,000)	Nationwide	Procure 600,000 LLINs for distribution via public and private ANC clinics and immunization clinics	P. 21
Strengthen storage capacity and distribute LLINs for routine services	DELIVER	261,000	Nationwide	Assess and upgrade storage capacity and ensure distribution	P. 21
Strengthen logistics management for LLINs, SP, ACTs, and severe malaria drugs	SPS Program	800,000	Nationwide	Training and technical assistance to the Central Medical Stores staff on forecasting, supply management, tracking, and improving commodity storage	P. 21
IEC/BCC for LLINs, IPTp, and ACTs	PSI	950,000	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	P. 22
Assess effect of insecticide resistance on impact and efficacy of ITNs and IRS	WHO (CREC)	300,000	South Benin TBD	Operations research to determine the effect of pyrethroid resistance on the impact and efficacy of ITN/IRS	P. 22

Proposed Activity	Mechanism	Budget (<i>commodities</i>)	Geographic area	Description of activity	Page number reference
Evaluation of new technology to determine when LLINs need to be replaced	CDC/WHO (CREC)	Core Funded	N/A	Operations research to evaluate a new technique to determine when LLINs need to be replaced.	P. 22
Community-based distribution of ACTs and LLINs with focused IEC/BCC support at the community level	Newly competed RFA	<i>Costs covered in Treatment section</i>	2 departments	NGO/FBO implementation of community-based distribution of ACTs and LLINs with community-based IEC/BCC strategies in all communes and all health facilities of 2 departments with low access to health services and high child mortality	P. 22
Private sector LLIN distribution	PSI	534,000 (400,000)	TBD	Procure and distribute approximately 60,000 highly-subsidized LLINs with social marketing to the general population in rural areas.	P. 22
SUBTOTAL: Insecticide-treated bednets		\$ 7,045,000 (\$ 4,600,000)			
Indoor Residual Spraying					
Train NMCP staff in entomology & vector control	URC	50,000	N/A	Short-term entomology/vector control training for MOH personnel.	P. 24
Entomological evaluation in IRS target areas	WHO (CREC)	27,500	IRS target areas	Entomological surveys before and after IRS.	P. 24
Support national vector resistance surveillance program	WHO (CREC)	80,000	Nationwide	Support for national malaria vector resistance surveillance program	P. 24

Proposed Activity	Mechanism	Budget (commodities)	Geographic area	Description of activity	Page number reference
IRS implementation	RTI	1,050,000 (350,000)	Several communes in South Benin	1 round of IRS in South Benin (houses: 70,000, population: 350,000), includes assessment, training personnel, equipment/insecticide procurement, sensitizing the community, etc.	P. 24
CDC technical assistance for vector control activities.	CDC	12,500	N/A	Technical assistance visit to monitor planning and implementation of vector control activities.	P. 25
SUBTOTAL: IRS		\$1,220,000 (\$350,000)			
Malaria in Pregnancy (IPTp)					
IEC/BCC for IPTp	PSI	<i>Costs covered in ITN section</i>	Nationwide	BCC strategies for targeting pregnant women to promote ANC attendance and IPTp. Includes training of community-based workers.	P. 26
Train and supervise health workers in IPTp	URC	230,000	Nationwide	Train, supervise health workers, including midwives, to deliver SP in ANC.	P. 27
Strengthen logistics management for SP	SPS Program	<i>Costs covered in ITN section</i>	Nationwide	Training and technical assistance to the Central Medical Stores staff on forecasting, supply management, tracking, and improving commodity storage.	P. 27
SUBTOTAL: Malaria in Pregnancy		\$230,000			
CASE MANAGEMENT ACTIVITIES					

Proposed Activity	Mechanism	Budget (<i>commodities</i>)	Geographic area	Description of activity	Page number reference
Diagnostics					
Procure microscopes and laboratory consumables	Diagnostics RFA	110,000 (110,000)	Nationwide	Procure 30 microscopes and repair/replacement parts for existing microscopes, reagents for microscopy in district and commune-level public facilities.	P. 29
Procure RDTs	DELIVER	50,000 (50,000)	Nationwide	Procure 64,000 RDTs.	P. 29
Train laboratory technicians	Diagnostics RFA	62,500	Nationwide	Train laboratory technicians in microscopy and RDT use at the commune and health zones levels in malaria diagnostics.	P. 29
Support quality assurance/quality control system for diagnostics	Diagnostics RFA	50,000	Nationwide	Support National Laboratory for Quality Control for quality control system for microscopy and RDTs in all facilities.	P. 29
CDC technical assistance on diagnostics	CDC	12,500	N/A	Technical assistance visit to help design the diagnostics quality control system.	P. 29
SUBTOTAL: Diagnostics		\$285,000 (\$160,000)			
Treatment					
Procure ACTs	DELIVER	82,000 (82,000)	Nationwide	Procure 39,000 ACT treatments (in addition to 1,092,000 treatments procured with FY 2007 funds) for distribution at facilities and CHWs.	P. 30
Procure artesunate suppositories	DELIVER	68,000 (68,000)	Nationwide	Procure 180,000 suppositories for pre-referral treatment of severe malaria cases.	P. 30

Proposed Activity	Mechanism	Budget (<i>commodities</i>)	Geographic area	Description of activity	Page number reference
Procure drug kits for inpatient treatment of severe malaria	DELIVER	400,000 (400,000)	Nationwide	Procure 50,000 quinine drug kits for inpatient treatment of severe malaria cases.	P. 30
Supervise and support health workers on case management	URC NMCP	500,000 100,000	Nationwide	Strengthen and implement a supervisory strategy, as part of a comprehensive quality assurance approach, to ensure high quality malaria case management with ACTs.	P. 30
Private sector case management	URC	200,000	Nationwide	Develop guidelines, train and promote activities targeting private health sector.	P. 30
Management of severe malaria	URC	175,000	Nationwide	Support training and supervision of health workers on appropriate management and referral practices for severe malaria.	P. 30
Support IMCI training	URC	170,000	Nationwide	Provide IMCI training for health workers	P. 30
Strengthen logistics management for ACTs and severe malaria drugs	SPS Program	<i>Costs covered in ITN section</i>	Nationwide	Training and technical assistance to the Central Medical Stores staff on forecasting, supply management, tracking, and improving commodity storage.	P. 31
Community-based distribution of ACTs and LLINs with focused IEC/BCC support at the community level	Newly competed RFA	950,000	2 departments	NGO/FBO implementation of community-based distribution of ACTs and LLINs with community-based IEC/BCC strategies in all communes and all health facilities of 2 departments with low access to health services and high child mortality	P. 31

Proposed Activity	Mechanism	Budget (<i>commodities</i>)	Geographic area	Description of activity	Page number reference
	BASICS	150,000	N/A	Technical assistance to NGO grantees of the newly competed request for applications, on community-based distribution of ACTS and LLINs.	P.31
Drug quality control	USP-DQI	150,000	Nationwide	Support the National Laboratory for Quality Control to improve malaria drug quality control	P. 31
Conduct health facility and hospital survey	TASC3	350,000	Nationwide	Conduct health facility and hospital survey focused on malaria case management and quality of ANC care.	P. 31
IEC/BCC for treatment	PSI	<i>Costs covered in ITN section</i>	Nationwide	Support broad communication strategy on dangers of malaria, and the need for prompt referral to health facilities for treatment.	P. 31
USAID/HQ technical assistance on community-based distribution of ACTs	USAID	10,000	N/A	Technical assistance visit in design of community-based distribution of ACTs.	P. 31
CDC technical assistance for supervisory systems	CDC	12,500	N/A	Technical assistance visit to develop scope of work for health worker performance supervisory system.	P. 31
SUBTOTAL: Treatment		\$ 3,317,500 (\$550,000)			
CAPACITY BUILDING WITHIN NATIONAL MALARIA CONTROL PROGRAM					
Capacity building of the NMCP	URC	160,000	N/A	Support training for 20 people (12 physicians at health zone level and 8 staff at department level) and 32 NMCP staff	P. 33

Proposed Activity	Mechanism	Budget (<i>commodities</i>)	Geographic area	Description of activity	Page number reference
Equipment for the NMCP	URC	150,000	N/A	Computers, internet access, photocopiers, printers, office renovation, etc. (central and departmental level)	P. 34
SUBTOTAL: Capacity building		\$ 310,000			
MONITORING AND EVALUATION					
Strengthen Benin's HMIS system and NMCP's M&E capacity	TASC3	150,000	Nationwide	Train and supervise health workers to ensure prompt and complete reporting to all levels, including comprehensive feedback system to encourage data for decision-making; provide computers and supplies. Support for NMCP/HMIS (central and departmental level).	P. 36
Strengthen sentinel sites	TASC3	150,000	Nationwide	Technical assistance to sites for collection of reliable data on inpatient malaria cases and deaths.	P. 36
Technical assistance on measuring process indicators	URC	50,000	N/A	Quarterly collection, analysis, and reporting of process indicators and "confounders".	P. 36
CDC technical assistance for M&E	CDC	12,500	N/A	Technical assistance visit to assist NMCP with M&E planning and implementation.	P. 37
SUBTOTAL: Monitoring and Evaluation		\$362,500			
IN-COUNTRY MANAGEMENT AND ADMINISTRATION					

Proposed Activity	Mechanism	Budget (<i>commodities</i>)	Geographic area	Description of activity	Page number reference
USAID and CDC staff and administrative expenses	USAID/CDC	950,000	N/A	Support for USAID PSC resident advisor, CDC direct hire resident advisor, includes travel for PMI retreat.	P. 32
FSN staff and other in-country administrative expenses	USAID	280,000	N/A	Support for USAID FSNs to work full time with PMI and to cover other administrative expenses related to PMI.	P. 32
SUBTOTAL: Management and Administration		\$1,230,000			
GRAND TOTAL		\$14,000,000 (\$5,660,000)	<i>Commodities represent 40% of total budget</i>		

Table 3

**Benin – Year 1 Targets
Assumptions and Estimated Year 1 Coverage Levels**

Year 1 PMI Expected Results:

Prevention:

- Approximately 660,000 LLINs will have been purchased and distributed through health facilities, community groups, and the commercial sector to children under five and pregnant women, bringing nationwide ownership of ITNs to about 50%;
- At least 85% of houses (approximately 59,500 houses with a population of 297,500) in geographic areas targeted for IRS during Year 1 will have been sprayed;
- Intermittent preventive treatment with SP in pregnant women (IPTp) will have been implemented in all 12 departments of the country.

Treatment:

- All laboratory technicians at the commune and health zone level will have been trained in malaria diagnostics;
- The National Laboratory for Quality Control will have been strengthened to implement an improved quality control system for malaria diagnostics, (including microscopy and use of RDTs), and improved inspection and testing of drugs (including ACTs);
- All departments will be using ACTs and approximately 1 million pediatric ACT treatments will have been purchased and distributed via government health facilities (nationwide) and through community-based workers (2 departments);
- Approximately 180,000 artesunate suppositories and 50,000 quinine drug kits for treatment of severe malaria will have been distributed to health facilities.

Assumptions:

Population of country (estimated): 8.3 million

Pregnant women:	4% of total population = 332,000 pregnant women
Infants (children <1):	3% of population = 249,000 infants
Children <5 years:	20% of population = 1,660,000 children under five
Older children (5–14 years):	28% of population = 2,324,000
Adults (≥15 years):	52% of population = 4,316,000

Average number of malaria-like illnesses per year and cost per treatment (costs given are for artemether-lumefantrine):

Children <5:	3.0 illnesses/year at \$0.50 each
Older children	1.0 illnesses/year at \$1.00 each
Adults	0.5 illnesses/year at \$1.50 each (assume that the PMI will cover only one-third of adult episodes)

Cost of a LLIN = \$7.00; average of 2.5 nets/household needed to cover all pregnant women and children under five in family

Cost of spraying a house with an average of 5-6 inhabitants = \$15.00

Intervention	Needs for 100% Nationwide Coverage over 3 Years	Needs for 85% Nationwide Coverage over 3 Years	Annual Needs to Achieve 100% Coverage	Needs to Achieve Year 1 PMI Targets	Year 1 Contributions
IPTp	332,000 pregnant women x 2 treatments/woman = 0.6 million treatments/year x 3 years = 1.8 million treatments	1.53 million SP treatments	0.6 million SP treatments	Target: 20 % of pregnant women receive 2 doses of IPTp = 132,800 doses (1 dose = 3 SP tablets)	<ul style="list-style-type: none"> • WB Booster will purchase 200,000 SP tablets • USAID will purchase 2.3 million SP tablets (using FY 2007 funds) • No gap
LLINs	1.66 million households x 2.5 nets/household = 4.15 million nets	3.5 million LLINs (or 1.2 million nets per year for 3 yrs)	1.4 million LLINs	Target: 40% of children under five and pregnant women sleep under an LLIN = 560,000 LLINs	<ul style="list-style-type: none"> • WB Booster will purchase 135,000 LLINs • USAID will purchase 150,000 LLINs (using FY 2007 funds) • USAID will purchase 660,000 LLINs • No gap (for LLINs distributed via routine ANC and vaccination clinics)

Intervention	Needs for 100% Nationwide Coverage over 3 Years	Needs for 85% Nationwide Coverage over 3 Years	Annual Needs to Achieve 100% Coverage	Needs to Achieve Year 1 PMI Targets	Year 1 Contributions
ACTs – children < 5	1.66 million children under five x 3.0 episodes/year = 5.0 million treatments/year x 3 years = 15 million	5 million x 85% = 4.25 million treatments x 3 yrs = 12.75 million	5 million treatments	Target: 20% of children under five receive ACTs = 1 million treatments	<ul style="list-style-type: none"> WB Booster will purchase about 1 million treatments for children <5 years and about 400,000 treatments for patients ≥5 years old USAID will purchase 1,079,000 treatments for children <5 years and 13,000 treatments for patients ≥5 years old (using FY 2007 funds). USAID will purchase 39,000 treatments for patients ≥5 years old No gap (for treatment in public health facilities for patients of all ages, and for treatment in 25% of communities for <5s)
ACTs – older children	2.32 million older children x 1.0 episode/year = 2,32 million treatments/year x 3 years = 6.96 million	2.32 million x 85% = 1.97 million tx x 3 years = 5.91 million	2.32 million treatments		
ACTs – adults	4.32 million adults x 0.5 episodes/year x 33% = 0.71 million treatments/year x 3 years = 2.13 million	0.71 million x 85% = 0.60 million tx x 3 yrs. = 1.8 million	0.71 million treatments		
TOTAL	24.1 million treatments	20.5 million treatments			
Drugs for severe malaria children <5	1.66 million children under five x 0.3 (i.e., 10%) severe episodes/year = 0.5 million treatments/year x 3 years = 1.5 million	1.5 million x 85% = 1.3 million	0.5 million treatments		<ul style="list-style-type: none"> WB Booster will purchase 17,000 inpatient treatment kits USAID will purchase 50,000 inpatient treatment kits (for 2008 and early 2009) and 180,000 artesunate suppositories for pre-referral treatment No gap for children < 5; a gap of 27,000 exists for older children and adults
Drugs for severe malaria older children	2.32 million older children x 0.1 (i.e., 10%) episodes/yr = 0.23 million treatments/year x 3 years = 0.69 million	0.69 million x 85% = 0.6 million	0.23 million treatments		

Inter- vention	Needs for 100% Nationwide Coverage over 3 Years	Needs for 85% Nationwide Coverage over 3 Years	Annual Needs to Achieve 100% Coverage	Needs to Achieve Year 1 PMI Targets	Year 1 Contributions
IRS	N/A	N/A	N/A	<p>Target: 85% of targeted houses to be sprayed =</p> <p>70,000 households x 85%, or 59,500 households to be sprayed</p>	<ul style="list-style-type: none"> • USAID will support all IRS • No gap (for the geographic area targeted)

Table 4

President's Malaria Initiative – Benin Year 1 (FY 2008) Budget Breakdown by Intervention (\$14,000,000)

Area	Commodities \$ (%)	Other \$ (%)	Total \$
Insecticide-treated Nets	\$4,600,000 (65%)	\$2,445,000 (35%)	\$7,045,000 (100%)
Indoor Residual Spraying	\$350,000 (29%)	\$870,000 (71%)	\$1,220,000 (100%)
Intermittent Preventive Treatment	\$0 (0%)	\$230,000 (100%)	\$230,000 (100%)
Case Management - Diagnostics	\$160,000 (56%)	125,000 (44%)	\$285,000 (100%)
Case Management - Treatment	\$550,000 (17%)	\$2,767,500 (83%)	\$3,317,500 (100%)
Capacity Building	\$0 (0%)	\$310,000 (100%)	\$310,000 (100%)
Monitoring and Evaluation	\$0 (0%)	\$362,500 (100%)	\$362,500 (100%)
Administration	\$0 (0%)	\$1,230,000 (100%)	\$1,230,000 (100%)
Total	\$5,660,000 (40%)	\$8,340,000 (60%)	\$14,000,000 (100%)

Table 5**Year 1 (FY 2008) Budget Breakdown by Partner (\$14,000,000)***

Partner Organization	Geographic Area	Activity	Budget
DELIVER	Nationwide	Procure and deliver LLINs, ACTs, RDTs, artesunate suppositories, and severe malaria drug kits. Improve storage capacity for malaria commodities.	\$ 5,061,000
Strengthening Pharmaceutical Systems (SPS) Program	Nationwide	Training and technical assistance to the Central Medical Stores on supply management, forecasting, tracking, and improving storage of malaria commodities.	\$ 800,000
Population Services International (PSI)	Nationwide	IEC/BCC for LLINs, IPTp, and treatment. Private sector LLIN distribution. Capacity building of NMCP in IEC/BCC.	\$ 1,484,000
Research Triangle Institute (RTI)	IRS: South Benin (several communes)	IRS in several communes of South Benin, including procurement of insecticides and spray equipment, training of spray operators, and community sensitization	\$ 1,050,00
World Health Organization (WHO)	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; conduct operational research on resistance and efficacy of LLINs/IRS	\$ 407,500
Newly competed Request For Applications (NGOs/FBOs -TBD)	2 departments with low access to health services and high child mortality	Community-based distribution of LLINs and ACTs paired with focused IEC/BCC activities at the community level	\$ 950,000
BASICS	N/A	Technical assistance to NGO grantees of the newly competed request for applications, on community-based distribution of ACTs and LLINs	\$150,000
Diagnostics RFA	Nationwide	Train laboratory technicians. Support quality assurance/quality control system for malaria diagnostics. Procure microscopes/laboratory consumables.	\$ 222,500
University Research Corporation (URC)	Nationwide	Train health workers in IMCI. Support training and supervision of health workers in IPTp and case management including severe malaria. Training of private sector providers in national malaria policies. Training of NMCP and department level staff. Equipment for NMCP. Process indicator collection.	\$ 1,685,000
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	\$ 150,000
TASC3	Nationwide	Strengthen HMIS system and sentinel sites. Build NMCP's Monitoring and Evaluation capacity. Conduct health facility and hospital survey.	\$ 650,000

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

ANNEX 2

Multi-Year Strategy and Plan: Benin

GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

The goal of the PMI is to reduce malaria-related mortality in Benin by 50% when compared with pre-Initiative levels. After three years of full implementation, the PMI will have provided resources to assist Benin to attain the following targets in populations at risk for malaria:

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

PREVENTION ACTIVITIES

Control of malaria in pregnant women

PMI's goal is the delivery of a high quality, integrated package of ANC interventions, which includes an LLIN and 2 doses of SP. Although coverage with two doses of SP is currently only 2.5% (DHS 2006), the high attendance rate at ANC clinics (88% of pregnant women attend at least one ANC, DHS 2006) and the commitment of several international donors such as the WB Booster Program and the PMI, are a sign that IPTp and LLIN coverage rates among pregnant women can be significantly increased in Benin over the next three years.

In Year 1, PMI will support the NMCP's new strategic plan for malaria control by launching IPTp nationwide through the procurement of enough SP (using USAID/Benin FY07 funds) to cover 100% of the gap and the training of all health workers to properly administer IPTp. To ensure that more pregnant women attend ANCs, the PMI will also invest in community-based IEC/BCC activities to encourage early and repeated ANC visits as well as educating women and girls about the risks of malaria during pregnancy and the benefits of IPTp to increase demand. The availability of LLINs through ANC (at a highly-subsidized price) and vaccination clinics (for free or at a highly-subsidized price) is expected to serve as an incentive for pregnant women to attend ANCs and thus boost IPTp/LLIN coverage. In 2

departments with low ANC coverage, PMI will support community-based distribution of subsidized LLINs to cover hard-to-reach women. Because of the need to guard against stock-outs of SP and ensure good supply chain management and storage, PMI will invest in improving warehousing facilities and training for health facility workers on logistics management for commodities related to the prevention of malaria in pregnancy.

In Years 2 and 3, PMI plans to continue to procure SP tablets to address some of the projected gaps for 2009 and 2010 (see Table 1 below). Together with other partners, PMI will provide refresher training for health workers as needed (currently envisioned for Year 3) as well as supervision to improve performance and motivate health workers. M&E will continue to be strengthened to provide timely information on program progress and pharmaceutical management will be supported to ensure an appropriate supply of SP in all health facilities. PMI will work with partners through meetings of the GFATM CCM and the Malaria Partner/RBM group to identify commodity needs and purchases and coordinate training, supervision and monitoring activities.

Table 1. Estimated SP needs and gaps for Benin from 2008–2010

	2008	2009	2010
No. of new pregnancies	395,369	408,219	421,486
Total number of SP tablets needed	2,490,825	2,571,780	2,655,363
SP tablets purchased by WB Booster Program	200,000	200,000	0
Gap	2,290,825 (Gap covered with USAID/Benin FY07 funds)	2,371,780	2,655,363

Insecticide-Treated Nets (ITNs)

In Year 1, PMI will support the distribution of LLINs to pregnant women as part of the integrated package of ANC interventions and to children under five through vaccination clinics. PMI will also provide funding to invigorate sales of highly-subsidized nets through the private, commercial sector for those who are able to pay. In addition, community-based distribution of highly-subsidized LLINs to children under five and pregnant women will be strategically supported in 2 departments with low ANC attendance. These approaches, combined with the WB-supported free ITN distribution campaign to all families with a child under five (in late 2007), will result in high ownership of ITNs in Benin.

In Years 2 and 3, PMI support will focus on ensuring that LLIN ownership translates into high utilization of LLINs by target groups. This will include BCC/IEC, strengthening of a monitoring system that will provide accurate information on delivery of LLINs through routine services, and strengthening of the forecasting and supply system to prevent stock-outs of LLINs in health facilities. Working directly with NMCP, the PMI will coordinate activities with other partner organizations to avoid duplication and gaps in delivery and promotion of LLINs. In Years 2 and 3, PMI plans to continue to procure LLINs to address some of the projected gaps in health facilities for 2009 and 2010 (see Table 2 below). In addition, PMI will expand social marketing of LLINs and community-based distribution of LLINs. PMI

plans to scale-up to all other departments based on results from implementation in the initial 2 departments in Year 1 and as feasible.

Table 2. Estimated ITN needs and gaps for Benin from 2008–2010

ITN distribution routes	2008	2009	2010
ITNs needed for ANC clinics	395,000	408,000	421,000
ITNs needed for EPI clinics	340,000	350,000	360,000
Total ITNs needed	735,000	758,000	781,000
ITNs purchased by the WB Booster Program	135,000	135,000	0
Gap	600,000 (Gap covered with PMI FY08 funds)	623,000	781,000

Indoor residual spraying (IRS)

Over the next three years, the focus will be on building the capacity of Benin’s MOH to plan, implement, and monitor IRS activities. PMI’s support for IRS in Benin will allow the GOB to progressively scale-up the approach and expand it to other areas that have been prioritized by the NMCP based on epidemiological data, LLIN coverage, and other criteria. In Year 1, PMI will support spray activities in 70,000 households. IRS activities in Year 1 will be closely monitored (efficacy, acceptability, cost, insecticide resistance, etc) to determine how best to proceed with expanding IRS in subsequent years. Decisions on future IRS will be based on Year 1 experiences and discussions with the NMCP. It is anticipated that the scale of IRS in Benin will expand in Years 2 and 3 of the PMI. PMI staff (USAID and CDC) will work closely with the NMCP to build capacity to take over increasing responsibility for managing IRS activities and develop a national IRS plan for Benin based on outcomes of the initial round of spraying in 2008. This, coupled with a decrease in equipment procurement costs for subsequent years, should allow for a modest increase in the number of households sprayed each year, even if the budget is to remain the same. It will also be critical to continue entomologic and epidemiologic monitoring of areas being sprayed in order to determine where additional rounds of IRS should be implemented. This should be considered along with data regarding LLIN ownership and usage, such that areas with continued low coverage with LLINs can be considered for IRS. PMI will work with the NMCP and coordinate with other in-country malaria partners including the World Bank and the GFATM to plan and potentially co-fund subsequent IRS activities to achieve broader national coverage.

CASE MANAGEMENT

In accordance with the NMCP’s strategy, PMI will assist with implementing the artemether-lumefantrine policy in public health facilities first (in 2007–2008), then expanding coverage (for under-fives only) in communities with particularly low access to health facilities (in 2008–2009). Careful evaluation of early experiences with community distribution of ACTs will be conducted, particularly with regard to appropriate use, patient adherence, and timely referral of severely ill children in order to guide any future expansion of the program. Beginning in 2008, efforts will begin to expand coverage in the private sector (licensed health facilities and pharmacies); although a comprehensive scale-up strategy in the private sector is

still being formulated by the NMCP. Children under five years old with febrile illness will be treated presumptively with an ACT (no diagnostic needed). Older children and adults will be tested with microscopy or an RDT and only test-positive patients will be treated with an ACT, unless laboratory diagnosis is unavailable. PMI will continue supporting case management via: 1) procurement of equipment (e.g., microscopes) and consumables (e.g., ACTs, RDTs, microscopy reagents); 2) support for health workers (e.g., training, supervision, and other support); 3) strengthening logistics and commodity management (with an emphasis on linking actual commodity consumption to commodity purchases to avoid stock-outs and commodity expiration); 4) quality control for drugs and diagnostics; 5) IEC/BCC to promote prompt care-seeking for suspected malaria; and 6) promoting use of data from the M&E system to identify and solve implementation problems. These are all major challenges that will require the joint efforts of the NMCP and its partners. Thus, PMI will also support Benin's RBM partnership, which is the primary coordination mechanism.

In Years 2 and 3, PMI plans to procure a substantial number of ACT treatments as well as RDTs to fill the gap, which will complement contributions from the WB Booster Program (see Table 3 below). In addition, in support of the NMCP policy, PMI will extend community-level and private facility roll out of ACTs to achieve broader coverage.

Table 3. Estimated treatment and diagnostic needs and gaps for Benin 2009–2010

	2009	2010
Estimated total no. of ACT treatments needed for all age groups ¹	7.5 million	7.8 million
Estimated number of ACTs to be contributed by the WB Booster Program ²	1.8 million	0.9 million
Gap (ACTs)	5.7 million ACTs	6.9 million ACTs
Estimated no. of diagnostic tests needed (1 test per febrile illness episode for people ≥ 5)	4.7 million	4.8 million
Estimated no. of microscopes needed	15	15
Estimated number of RDTs to be contributed by the WB Booster Program ³	0.3 million	0.3 million
Gap (RDTs and microscopes)	4.4 million RDTs 15 microscopes	4.5 million RDTs 15 microscopes

¹ Estimates are based on a total projected population of 8.6 million in 2009 and 8.9 million in 2010, 20% of whom are estimated to be under-fives. Estimated incidence of febrile illness: (1) 3 episodes per child <5 per year, (2) 1 episode per child 5-14 per year, and (3) 0.5 episodes per person ≥ 15 per year. Assume 1 ACT treatment needed for each episode among under-fives. Assume all >5 year olds with febrile illness are tested, 50% are test-positive, and are treated with an ACT.

² ACT numbers in the above table are based on the WB Booster Program's budget. The assumption is that the average treatment costs \$1.

³ RDT numbers in the above table are based on the WB Booster Program's budget. The assumption is that the average RDT costs \$1.

Note: Above estimates are simplistic and will depend on a number of factors such as (1) health facility utilization, (2) implementation of the announced free health care policy for under-fives, (3) true incidence of malaria (including potential drop in transmission if high community coverage with LLINs is achieved and gametocidal effect of ACTs), and (4) implementation and utilization of community-based treatment of fever. Potential PMI purchases in Years 2 and 3 will depend on actual utilization of RDTs in Year 1.

MONITORING AND EVALUATION PLAN

To monitor key process, outcome, and impact indicators, PMI will: 1) provide technical support to help gather and analyze process indicators; 2) use data from DHSs in 2006 and 2011 to measure outcome and impact indicators; 3) fund an MIS in 2009 to measure outcome indicators at the project's mid-point; 4) fund health facility surveys that focus on ACT implementation (including use of diagnostics) and management of severe malaria; 5) strengthen 6 existing sentinel sites to provide data on malaria cases and deaths; 6) support entomological monitoring; and 7) promote use of data from M&E activities supported by other partners (e.g., LQAS surveys at the household and health facility level funded by the WB Booster Program). PMI will also strengthen M&E capacity within the NMCP and help improve the HMIS. An "early warning" system will consist of regular monitoring of process indicators and following results from the LQAS surveys that are planned to be done twice a year.

SUSTAINABILITY PLAN

In Benin, the long-term sustainability of malaria control interventions implemented with the support of all malaria partners, including PMI will depend on a number of factors. PMI's plan for sustainability addresses five major components: (1) human resources development, (2) mobilization and management of financial resources, (3) support for decentralization, (4) provision of quality services, and (5) integration and collaboration.

(1) *Human resources development*: Implementation of the PMI will result in the transfer of technical knowledge, management and implementation skills to local partners including the NMCP, NGOs/FBOs, health workers, and private sector partners. Given the lack of experience in IRS in Benin, the PMI has specifically invested in training NMCP staff in entomology to ensure that there are staff with the technical knowledge to continue implementation of IRS after PMI. PMI will also work with the NMCP to assist it to fill critical positions so that the NMCP has enough technical staff to continue to implement malaria activities into the future.

(2) *Financial resources*: PMI will work with the NMCP and the GOB to assist with the mobilization and management of financial resources so that other partners (such as the GFATM and others) are encouraged to finance malaria control activities in Benin. PMI will provide some direct financial assistance to the MOH/NMCP in Year 1 and, for Years 2 and 3, will continue to strengthen the NMCP's financial management capacity.

(3) *Support for decentralization*: In the decentralizing environment of Benin, PMI will support building capacity at the departmental and health zone levels so that decision-making is decentralized. This is particularly important for the supervision of health workers.

(4) *Provision of quality services*: If the population perceives that malaria services at the community and health facility level (including the private sector) are of high quality, then use

of those services will increase over time and this demand will put pressure on all levels of the government to ensure that those services are maintained.

(5) *Integration and collaboration:* During the planning process for Benin's Year 1 MOP, PMI consulted extensively with other malaria partners in-country, including the World Bank, GFATM, UNICEF, WHO, NGOs/FBOs, and others, in addition to other health-related divisions of the GOB as well as the NMCP. Every effort will be made to identify areas of synergy, avoid duplication, and promote an integrated and complementary effort at all levels. Although PMI's support is specifically for malaria control activities, every effort will be made to integrate activities within the overall context of maternal and child health services and use PMI as an opportunity to strengthen the overall health system in Benin.

STAFFING AND ADMINISTRATION

In Years 2 and 3, PMI will continue to support the two health professionals hired in Year 1 to oversee the PMI in Benin, one representing CDC and one representing USAID. In addition, one or more FSNs will be hired to support the PMI team. 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 continue to 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 the WHO, UNICEF, the GFATM, WB, 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**Proposed Multi-Year Timeline of Coverage of Interventions**

Indicator	2006 Benin DHS preliminary report	Year 1	Year 2	Year 3
Proportion of households with at least one ITN	24.5%	50%	75%	>90%
Proportion of pregnant women who slept under an ITN the previous night	19.7%	40%	60%	85%
Proportion of children under five years old who slept under an ITN the previous night	20.5%	40%	60%	85%
Proportion of children under five years old with fever in the last 2 weeks who received treatment with ACTs within 24 hours of onset of fever	Not yet available	20%	45%	85%
Proportion of government health facilities that have ACTs available for treatment of uncomplicated malaria	Not available	20%	45%	85%
Proportion of women who have completed a pregnancy in the last two years and have received two or more doses of IPTp during that pregnancy;	Not yet available (final results pending, although 2.5% for pregnancies in past 5 years)	20%	45%	85%
Proportion of households in geographical areas targeted for IRS that have been sprayed	Not applicable (no IRS in many years)	85%	85%	85%
Proportion of pregnant women and children under five who have slept under an ITN the previous night or in a house that has been sprayed with IRS in the last 6 months (assume no IRS at baseline)	20.5 % for under-fives 19.7% for pregnant women	40%	60%	85%

Table 2

Illustrative 3-Year Budget and Expected Coverage Levels for Benin

PMI Targets: After three years of full implementation, the PMI will achieve the following targets in Benin:

- i. 85% of children under five will have slept under an ITN the previous night;
- ii. 85% of pregnant women will have slept under an ITN the previous night;
- iii. 85% of pregnant women will have received two or more doses of SP for IPTp during their pregnancy;
- iv. 85% of houses targeted for indoor residual spraying will have been sprayed;
- v. 85% of children under five with suspected malaria will have received treatment with ACTs within 24 hours of the onset of their symptoms.

Assumptions:

Population of country (estimated): 8.3 million

Pregnant women:	4% of total population = 332,000 pregnant women
Infants (children <1):	3% of population = 249,000 infants
Children <5 years:	20% of population = 1,660,000 children under five
Older children (5–14 years):	28% of population = 2,324,000
Adults (≥15 years):	52% of population = 4,316,000

Average number of malaria-like illnesses per year and cost per treatment (costs given are for artemether-lumefantrine):

Children <5:	3.0 illnesses/year at \$0.50 each
Older children	1.0 illness/year at \$1.00 each
Adults	0.5 illnesses/year at \$1.50 each

100% of total population of Benin is at risk of malaria = 8.3 million

Cost of a LLIN = \$7.00; average of 2.5 nets/household needed to cover all pregnant women and children under five in family

Cost of spraying a house with an average of 5-6 inhabitants = \$15.00

Cost of IPTp with SP = \$0.20 (\$0.10 for each of the two treatments a woman will receive during her pregnancy)

Costs per person for implementation support are based on a detailed cost analysis prepared for Uganda.

Item/Activity	Annual Cost per Person	Annual Cost	3-Year Total	Assumptions/Comments
Prevention – insecticide-treated nets		\$8,715,000	\$26,145,000	8.3 million people at risk of malaria = 1,660,000 households x 2.5 nets/household x 90% coverage x \$7/net
Prevention – indoor residual spraying		\$2,082,500	\$6,247,500	Assumes IRS (one round per year) will target 70,000 households in Year 1, 140,000 households in Year 2, and 280,000 households in Year 3 (doubling the scale of IRS each year). Total 490,000 households x 85% coverage x \$15/household. Actual scale-up of IRS will be based on lessons learned and NMCP IRS plan developed in Year 1 of PMI.
Treatment – malarial illnesses		\$6,499,950	\$19,499,850	Assumes treatment of 85% of all malaria-like illnesses in under-fives, older children, and adults (see assumptions listed above).
Treatment – IPT for pregnant women		\$56,440	\$169,320	332,000 pregnant women x 3 years x 85% coverage x \$0.20 per year
Implementation Support	\$0.92	\$7,636,000	\$22,908,000	Commodity management, human resources, supervision, training, social mobilization, etc. (8.3 million population at risk of malaria x \$0.92 x 3 years)
Monitoring and Evaluation		\$2,000,000	\$6,000,000	There is currently no costed national M+E plan for Benin. Assume that the cost to implement the national M&E plan is an estimated \$2 million per year.
Cost of Program			\$80,969,670	

ISG Implementation Support Costs		\$1,230,000	\$3,690,000	Long-term expatriate advisors' salaries, benefits, travel; local staff; office supplies and equipment for PMI in-country office; TDY from CDC and USAID
Total funding needed (including USG program costs)			\$84,659,670	
Government of Benin malaria budget		\$1,250,000	\$3,750,000	Assumes that the GOB's annual malaria budget is constant over the period 2008-2010 and funding is at the same level as it was in 2005 and 2006 (625m FCFA).
WB Booster Program		\$10,333,333	\$31,000,000	GOB is the recipient of an International Development Assistance grant from the WB Booster Program which is \$31 million for 3 years (2008-2010).
Global Fund Round 3		\$0	\$0	The funds from Round 3 will have ended by September 2008; Note: Benin has submitted a Round 7 proposal.
Available funding from other sources			\$34,750,000	
PMI funds available (estimated):				Assumes PMI funding is divided between countries based roughly on their populations
Year 1		\$14,000,000		Assumes 15 PMI countries for all 3 years and an increase in PMI funding for Benin in Years 2 and 3
Year 2		\$16,000,000		
Year 3		\$17,000,000		
Years 1 through 3			\$47,000,000	
Total available funding			\$81,750,000	
Remaining Gap			\$2,909,670	3-year shortfall to meet total need