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

PRESIDENT'S MALARIA INITIATIVE

Malaria Operational Plan

Year Three – Fiscal Year 2009

SENEGAL

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ABBREVIATIONS and ACRONYMS

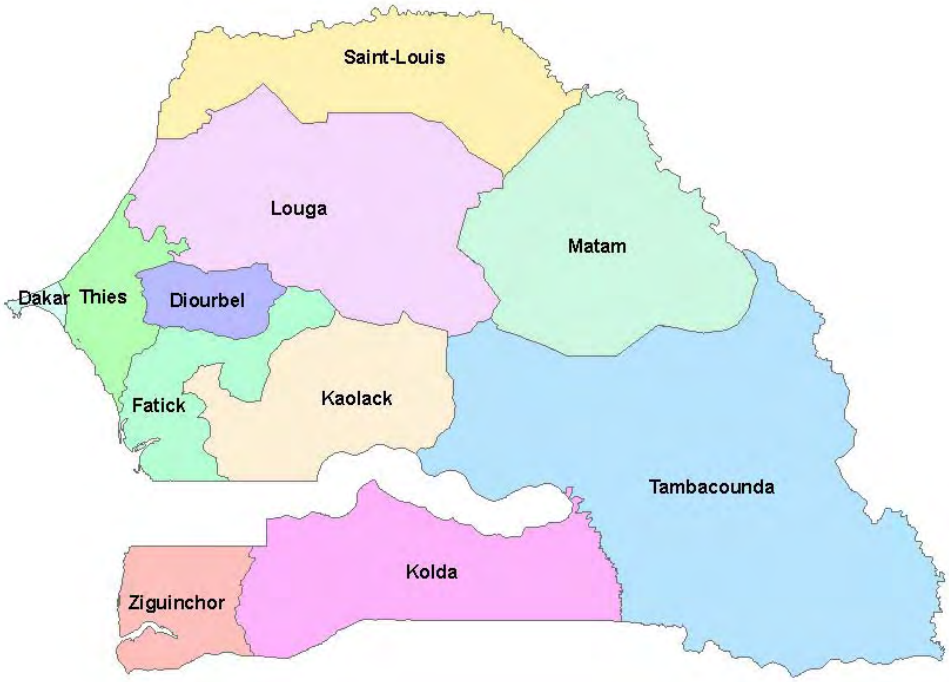
ABCD	*Atteindre les Bénéficiaires Communautaires à travers les Districts* (Reaching community beneficiaries via the health districts)
ACT	artemisinin-based combination therapy
AIDS	Acquired Immunodeficiency Syndrome
ANC	antenatal care
AL	artemether-lumefantrine
ART	anti-retroviral therapy
AS–AQ	artesunate-amodiaquine combination therapy
BCC	behavior change communication
CBO	community-based organization
CCF	Christian Children's Fund
CCM	Country Coordinating Mechanism
CDC	Centers for Disease Control and Prevention
CESAG	*Centre Africain des Etudes Supérieures en Gestion* (African Center for Advanced Management Studies)
CTO	Cognizant Technical Officer
CMS	Central Medical Stores
DHS	Demographic and Health Survey
DPL	Directorate of Pharmacies and Laboratories
DRH	Division of Reproductive Health
Fr CFA	West African Financial Community Franc (USD $1 = Fr CFA 420)
FY	fiscal year
GIS	geographic information systems
GOS	Government of Senegal
HIV	human immunodeficiency virus
HMIS	health management information system
IDB	Islamic Development Bank
IEC	information, education, communication
IMCI	integrated management of childhood illnesses
IP	*Institut Pasteur du Sénégal*
IPTp	intermittent preventive treatment in pregnant women
IRD	*Institute pour le Recherche et Développement*
IRS	indoor residual spraying
ITN	insecticide-treated bednet
LLIN	long-lasting insecticide-treated bednet
M&E	monitoring and evaluation
MIP	Malaria in pregnancy
MIS	Malaria Indicator Survey
MOH	Ministry of Health
MOP	Malaria Operational Plan
MSH	Management Sciences for Health
NGO	non-governmental organization
NMCP	National Malaria Control Program
PGIRE	Integrated Water Resources Management Program (World Bank/OMVS funded)
PLWHA	people living with HIV/AIDS

PMI	President's Malaria Initiative
PMTCT	prevention of mother to child transmission (of HIV)
PRN	Nutrition Enhancement Project (World Bank funded)
QAMSA	Quality of Antimalarials in Sub-Saharan Africa study
RBM	Roll Back Malaria
RDT	rapid diagnostic test
RTI	Research Triangle Institute
SLAP	*Service de Lutte Antiparasitaire* (Parasite Control Service)
SP	sulfadoxine-pyrimethamine
SPS	Strengthening Pharmaceutical Systems Project
SRCS	Senegalese Red Cross Society
UCAD	University Cheikh Anta Diop
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

EXECUTIVE SUMMARY

In June 2006, the United States Government announced that Senegal was selected to be included in a five-year, $1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions in high-burden countries in sub-Saharan Africa.

Senegal has a population estimated at 11.6 million, with approximately 2.2 million children under five, 417,600 pregnant women and 61,000 children and adults living with HIV/AIDS. Malaria is a major cause of morbidity and mortality in Senegal and a high priority for the government. Between 1-1.5 million cases of malaria are reported each year, over one-quarter of which are in children less than five years of age. Malaria is responsible for about one-third of all outpatient consultations and 27% of deaths reported in health facilities.



Map of Senegal showing the current 11 Regions

The most recent information on nationwide coverage of key malaria prevention and control measures in Senegal comes from a Malaria Indicator Survey (MIS) conducted from November to December 2006. Since artemisinin-based combination therapies (ACTs) had only been introduced into the health system in Senegal earlier that year, only 3% of children under five with fever were reported to have taken an ACT within 24 hours of the onset of their symptoms. Approximately 49% of pregnant women reported receiving two doses of intermittent preventive treatment for malaria in pregnancy (IPTp). Approximately 36% of households possessed at least one insecticide-treated mosquito net (ITN), with greater ownership in rural compared to urban areas and in the poorer as opposed to the richer quintiles. Seventeen percent of pregnant women and 16% of children under five had slept under an ITN the night before the survey.

In Round 4, the Global Fund to Fight AIDS, TB, and Malaria (Global Fund) awarded a $33.3 million grant to Senegal covering activities through 2010, the principal recipient of which was the National Malaria Control Program (NMCP). Senegal was also awarded a $67 million grant under the Global Fund's Round 7 competition, with $29.8 million approved for phase one in March 2008. With additional support from the President's Malaria Initiative (PMI), World Health Organization (WHO), the United Nations Children's Fund (UNICEF), the World Bank, the United States Peace Corps, and other national and international partners, the Government of Senegal has made significant progress in the scale-up of malaria prevention and control interventions.

The following table shows the proposed Year 2 targets and the activities supported by PMI and partners during year 2:

Proposed Year 2 Targets (PMI and partners)	**Expected Results after 2 Years of Implementation** (March 2009*)
1 million ITNs distributed	As of September 2008, 1,010,522 ITNs had been distributed or marketed through the private sector with direct PMI support
680,000 residents living in 76,000 houses protected by IRS in three districts	In Year 2 a second round of spraying was carried out in Richard Toll District because of the second peak of transmission in April. In Year 2, another round of spraying in three districts covered 153,942 houses and protected 645,346 people. **
ACTs will be implemented in all MOH health facilities in 100% of MOH districts nationwide	To date, PMI has directly supported training and supervision of over 920 health workers at health centers and posts and 236 management staff, representing 100% of health districts.
Community-based treatment of malaria with ACTs implemented in 100% of functional health huts nationwide	To date, 3,299 community health workers have been trained by PMI to diagnose and treat cases of uncomplicated malaria using ACTs at health huts, representing 100% of functional health huts nationwide. From October 2006-September 2008, 67,028 cases of suspected malaria/in children under 5 were treated with ACTs at these community sites.
IPTp will be fully implemented in all MOH districts	In Year 2, PMI supported refresher training and supportive supervision of 1,156 health care workers including regional and district health care teams in MIP interventions (100% of staff in all districts).

*Year 2 implementation ends March 31st, 2009

** A review of data collection procedures found that in Year 1 **households** were counted, not **houses**. The Year 2 target was set based on Year 1 results and thus refers to the number of households, not houses. In Year 2 the NMCP and partners requested that only houses be counted by spray teams.

This PMI Year 3 Malaria Operational Plan (MOP) is based on progress in Years 1 and 2 and a planning exercise carried out in May-June 2008. The MOP was developed with the participation of the NMCP and nearly all national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing to support fit well with the Ministry of Health (MOH) 2006-2010 Strategic Plan for Malaria Control.

The following paragraphs briefly describe the progress to date and Year 3 plans for each of the major interventions. Further detail can be found in the body of the MOP document technical interventions sections that follow.

Insecticide-treated nets (ITNs): A key NMCP strategy for malaria prevention is the distribution of ITNs, especially LLINs, to pregnant women and children under five years of age. During its first two years of implementation, PMI has supported a comprehensive, three-pronged strategy to increase household ownership and use of ITNs, especially LLINs and especially among vulnerable populations: 1) **free distributions** of approximately 872,000 LLINs to young children participating in the MOH's local supplementation days 4,121 LLINs to people living with HIV/AIDS (PLWHA); and 900 LLINs to cover 100% of pregnant women and children on an island in the Fatick region; 2) **subsidized distribution** of approximately 158,000 LLINs to pregnant women and children under five through a voucher program in 550 facilities in 37 of the country's 63 districts; and 3) **social marketing**, resulting in retail sales of 126,930 ITNs and LLINs. In addition, PMI and partners supported the retreatment of 125,632 nets with insecticide. To ensure high rates of LLIN demand and use, PMI has invested in information, education, and communication (IEC) and behavior change communication (BCC) activities.

In Year 3, the PMI will continue to complement and coordinate with the NMCP to maximize LLIN distribution using the "catch-up" and "keep-up" strategies endorsed by RBM. In June 2009 the NMCP plans to hold a free distribution campaign targeting all children under five nationwide, using its Global Fund Round 7 grant to purchase 1.3 million of the 2.5 million LLINs needed. PMI will contribute 200,000 LLINs, $500,000 in logistics and operational support, and assistance to the NMCP to secure additional donors and partners to fill the remaining LLIN and budget gaps. At the NMCP's request, PMI will complement the campaign by focusing its support for LLIN distribution during Year 3 on expanding the "keep-up" strategy: a routine system of subsidized LLIN vouchers for pregnant women and children under five to all districts nationwide. PMI will also continue to support social marketing activities to stimulate the commercial market for LLINs and increase LLIN use.

An estimated 5.1 million LLINs are needed to cover all sleeping spaces in Senegal, based on an average of 8 people per household and 3 LLINs needed per household. Through the NMCP, PMI, and partners, approximately 1,777,000 LLINs have been distributed in Senegal since 2005, with 1,600,000 estimated to be still effective, leaving a gap of 3.5 million LLINs. The 3.25 million LLINs expected to be distributed in 2009 will fill almost the entire estimated gap (93%) and ensure high rates of household possession by the end of FY09.

Indoor residual spraying (IRS): During Year 1, PMI strengthened vector control capabilities by supporting spraying with a synthetic pyrethroid insecticide in three districts, one in each of the three ecological zones, covering a total population of over 675,000. More than 98% of households found by spray teams were actually sprayed. PMI also collaborated with entomologists at the Université Cheikh Anta Diop (UCAD) and the Institut Pasteur (IP) to develop a detailed IRS entomological monitoring and evaluation plan. Based on results obtained through the entomological monitoring, observations made during program monitoring missions, and a programmatic evaluation, the training, organization and supervision of spray teams was improved for Year 2 activities. PMI supported a second round of spraying in Richard Toll in March 2008 and in summer 2008 completed another spray round in all three original districts, covering a population of 645,346. In Year 3, PMI will support IRS and entomological monitoring in the same districts as in Year 1 and 2, and will continue to support entomological monitoring in a fourth district, as planned with Year 2 funds. A plan for developing capacities in

the MOH to conduct IRS operations is being developed, building on the lead role the NMCP, UCAD, the Parasite Control Service (*Service de lutte anti-parasitaire* or SLAP) and the Hygiene Service have in training and supervision.

Intermittent preventive treatment in pregnant women (IPTp): With the efforts of PMI and other partners, IPTp implementation is underway in all MOH antenatal care service delivery sites nationwide. With Year 1 funds, PMI supported the production and use of new ANC registers and ANC cards that allow for accurate recording of two IPT treatments, as well as job aids to promote the correct management of malaria in pregnancy. In Year 2, PMI supported refresher training and supportive supervision of 1,156 health care workers in MIP interventions including regional and district health care teams from all eleven regions. PMI funds have also been used to support health care workers providing MIP services, including IPTp, during their regular outreach visits to health huts. Finally, PMI supported the purchase and dissemination of water filters and reusable cups to facilitate directly-observed SP treatment for IPTp. In Year 3, PMI will strengthen MIP interventions nationwide through training, monitoring, and supportive supervision of health care workers in MIP service delivery. As infrequent and late ANC attendance is a limiting factor to reaching IPTp coverage goals, PMI will also support mass media and community IEC/BCC activities to increase ANC attendance early in pregnancy and ensure completion of all recommended visits.

Case management: *Diagnosis:* During Year 1, PMI worked closely with the NMCP and other partners to assess existing laboratory capacity, equipment, and needs for the microscopic diagnosis of malaria. Based on this assessment, PMI purchased 84 clinical microscopes, 3 teaching microscopes, laboratory equipment and supplies and developed a plan for training and increased supervision of laboratory workers. During Year 2, PMI supported development of a new curriculum for the microscopic diagnosis of malaria and a revised system of supervision, quality assurance and quality control. To date, 12 regional and national staff and 70 laboratory technicians from the district level have been trained, with 21 district-level staff having received post-training follow-up visits. In Year 3, PMI will support training in parasitological diagnosis of malaria and strengthen the quality assurance and supervision of health facility laboratories in microscopy and extend this system to include RDTs and an operations research project will examine the predictive values of the diagnostic and treatment algorithm. Technical assistance will also be provided to support the extension of the quality assurance/quality control system and the diagnostic and treatment algorithm operations research project

Treatment: Through its Round 4 and 7 Global Fund grants, the NMCP is able to meet all public sector needs for ACTs through 2012. During its first two years, PMI supported refresher training in case management and supportive supervision at health center and health post levels in all regions for 1,156 clinical-level providers and management staff. In Year 3, PMI will continue to strengthen case management of malaria with ACTs through supportive supervision and monitoring, training of new health care workers, and preparation for the transition from AS-AQ to AL in 2010. PMI will also purchase medications and equipment for treatment of severe malaria.

Pharmaceutical Management and Drug Quality: In March 2007, PMI supported refresher training for three MOH program staff in ACT quantification. In 2008, PMI implementers field

tested and finalized a pharmaceutical management procedures manual and supervision guide, and conducted training for health facility pharmacy managers and health system supervisors. PMI has collaborated with UCAD in monitoring antimalarial drug quality and in producing evidence-based data on drug quality. Results of drug quality monitoring at five sites around the country showed that nearly 30% of antimalarial drugs did not conform to one or more quality standards. Most of the non-conforming drugs were in the informal sector and were expired. PMI coordination also resulted in the establishment of a National Pharmacovigilance Committee. In Year 3, PMI will continue to support the strengthening of pharmaceutical management systems for ACTs and the monitoring of drug efficacy for first and second-line antimalarials.

Community Interventions: In Years 1 and 2, PMI has supported malaria interventions at the community level through a consortium of international and local NGOs. With PMI support, a total of 9,568 community members have been trained in malaria prevention and control interventions, including health hut management. Community interventions reached national scale with FY07 funds, covering every district in Senegal, and include two broad categories of activities: 1) community case management of malaria, and 2) community mobilization for malaria prevention and control. In Year 3 PMI will continue the community case management and mobilization efforts begun in Years 1 and 2 and will support the NMCP in its plan to roll out RDTs and a planned new treatment protocol to the community level. The NMCP has requested that PMI and its community health partners train, assist with supervision, and update job aids and training materials for these activities.

Monitoring and Evaluation (M&E): In Year 1, PMI provided support to build national capacity in monitoring and evaluation, including implementation of a national Malaria Indicator Survey (MIS) in November-December 2006 to provide baseline data for PMI, and support to two demographic surveillance sites to obtain facility level malaria-specific mortality data for children under five. During Year 2, the PMI resident advisors actively participated in the quarterly reviews and on a commission charged with following up on recommendations stemming from the reviews, including improvements in the quality of the data collection methods and monitoring. Year 3 PMI monitoring and evaluation activities will be done jointly with the NMCP and other partners, and PMI will support implementation of the NMCP M&E plan. To measure mid-point coverage for PMI-supported interventions, PMI, the NMCP and partners will support a nationwide MIS including anemia and parasitemia testing, with data collection beginning in November 2008. PMI will also provide support to the NMCP to improve systems for storage and archiving of data stored on paper forms and an improved computer network for the management and back up of its computerized data bases.

Budget: The FY2009 PMI budget for Senegal is $15.7 million. Of this amount, 42% will support household ownership and use of LLINs, 20% IRS activities, 7% improved malaria diagnosis and treatment at the health facility level, 3.5% malaria in pregnancy activities, and 14% community-based malaria interventions (including case management and promotion of ITNs, IEC for IRS, and malaria in pregnancy activities). A total of 45.5% will be spent on commodities.

PRESIDENT'S MALARIA INITIATIVE

On June 30, 2005, the United States Government 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 this Initiative is to reduce malaria-related mortality by 50% after three years of full implementation in each country. This will be achieved by reaching 85% coverage of the most vulnerable groups--- especially children under five years of age and pregnant women ---with proven preventive and therapeutic interventions. These include artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment (IPTp) of pregnant women, and indoor residual spraying (IRS).

The President's Malaria Initiative (PMI) began in Fiscal Year 2006 in three countries, Angola, Tanzania, and Uganda. Senegal was added as one of the four additional countries announced on June 8, 2006, beginning implementation in Fiscal Year 2007. Funding for the Initiative began with $30 million in FY06 with three initial countries, increased to $135 million in FY07 with four additional for a total of seven countries, increased further to $300 million in FY08 and FY09 with 15 countries, and is expected to reach $500 million in FY10.

In implementing this Initiative, the United States Government is committed to working closely with host governments and within existing national malaria control strategies and plans. Efforts are being coordinated with other national and international partners, including the Global Fund, Roll Back Malaria (RBM), the World Bank, the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), the US Peace Corps, and the non-governmental and private sectors, to ensure that investments are complementary and that RBM and Millennium Development Goals can be achieved. Country Assessment and Planning sessions for the PMI, as well as subsequent evaluations, are highly consultative and held in collaboration with the National Malaria Control Program (NMCP) and other partners.

This PMI Year 3 Malaria Operational Plan (MOP) for Senegal was developed in close collaboration with the NMCP and nearly all national and international partners involved with malaria prevention and control in the country. The proposed PMI activities fit well with the Ministry of Health (MOH) 2006-2010 Strategic Plan for Malaria Control. Proposed programming also builds on investments made by the PMI in Years 1 and 2 to improve and expand malaria-related services and activities. This plan briefly reviews the current status of malaria control policies and interventions in Senegal, outlines progress achieved to date, identifies persistent challenges and current unmet needs if the targets of the PMI are to be achieved, and provides a detailed description of proposed Year 3 PMI activities.

MALARIA SITUATION IN SENEGAL

Senegal has a population of approximately 11.6 million[1] with 45% living in urban areas. The proportion of the population living below the poverty line is 62% in rural areas, 32% in Dakar and 39% in other urban areas[2]. Although substantial improvements have been achieved since the 1960s, Senegal's indicators of human development remain unacceptably low with Senegal ranked 156 out of 177 countries worldwide on the Human Development Index[3]. The infant mortality rate is 61 and the under five mortality rate is 121 per 1,000 live births. Maternal mortality is estimated to be 401 per 100,000 live births and the mean life expectancy is 56 years[4]. The adult HIV prevalence rate is estimated at 0.7% for adults 15-49 years of age, with 56,000 adults and 5,000 children estimated to be living with HIV/AIDS[5].

Administratively, the country is divided into 11 regions and 35 departments, with three new regions currently being established. The health system functions at the level of the regions (each with a Regional Chief Medical Officer) and is further decentralized into health districts that may be all or part of an administrative department. Health districts are led by the District Chief Medical Officer who, together with the Health District Management Team, oversees both the District Health Center and the staff at peripheral facilities throughout the district. There are currently 63 health districts in Senegal, with two more in the process of being established. Although not a formal part of the health system, Senegal's health care pyramid rests on a foundation of 1297 "health huts" that are established and managed by local communities. The community health workers (CHWs) who staff the huts are supervised by the nurse at the nearest health post and offer preventive and curative services or referral for more complicated medical care. Additional staff includes *matrones*, who are trained birth attendants; and *relais*, who are health educators and communicators.

Malaria is endemic throughout Senegal. The three ecological zones, based on annual rainfall, are the northern Sahelian zone with < 300 mm of rainfall occurring between July and September, a central Sahelian zone and 400 – 1000 mm of rainfall occurring between July and October, and a southern tropical zone with 1000 – 1250 mm of rainfall and a rainy season from June to October. The two epidemiological zones are the Sahelian, with high transmission toward the end of and immediately after the rainy season and little transmission during the rest of the year, and the tropical, with year-round transmission peaking during the rainy season. Transmission is becoming less seasonal in peri-urban areas and in areas close to rivers or other water sources that persist through the dry season. With the construction of a large dam at Diama and the extension of irrigation in the Senegal River Valley a second period of peak transmission now occurs from April to May. *Plasmodium falciparum* is the major malaria parasite species, accounting for more

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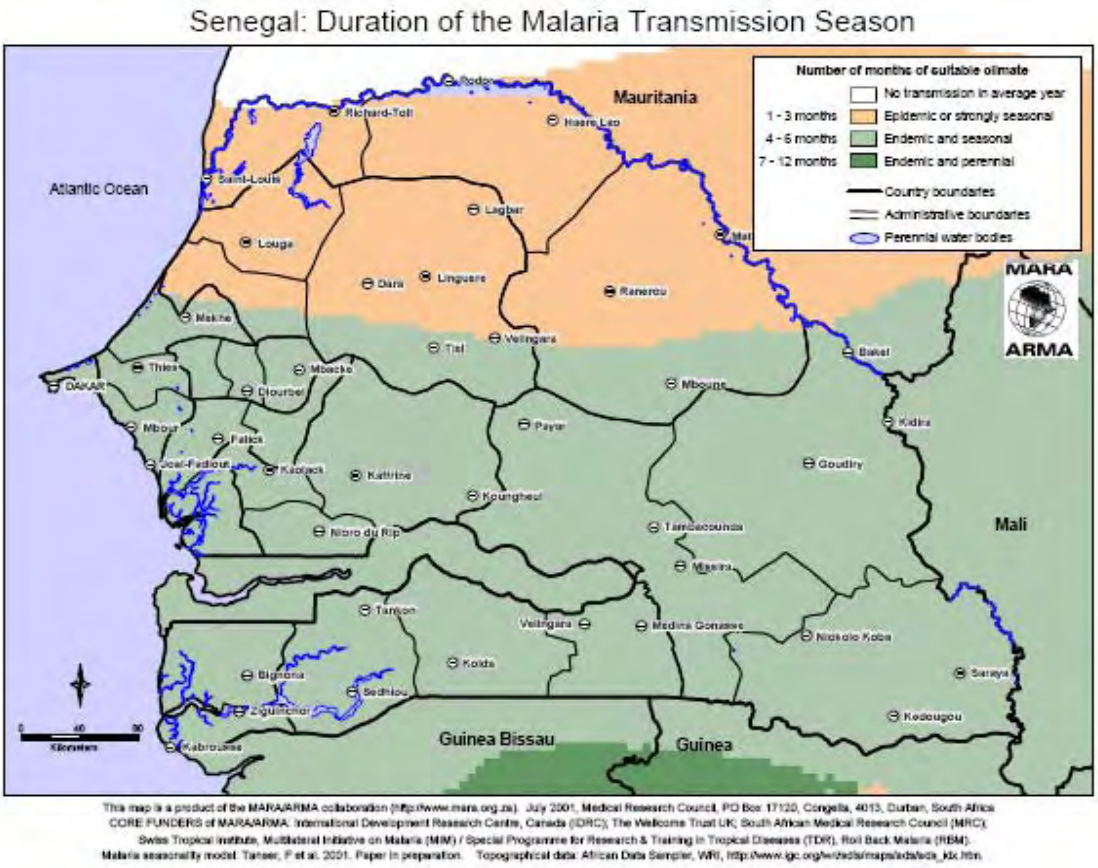
[1] Agence National de la Statistique et de la Démographie. Rapport National de Présentation des Résultats du Troisième Recensement General de la Population et de l'Habitat – (2002), December 2006. Estimate for 2008 based on from the estimate for 2007 on page 124 and an annual growth rate of 2.4%.
[2] Based on comparing the cost of a standard basket of food and non-food items to the per-captia annual consumption. République du Sénégal. Evaluation quantitative du DSRP-I (2003-2005), July 2007
[3] Human Development Report (HDR) Table 1, 2007/2008
[4] Ndiaye, S, Ayad, M. 2006. 2005 Senegal Demographic and Health Survey (DHS). Calverton, Maryland USA: Centre de recherche pour le développement humain (Sénégal) and ORC Macro
[5] UNAIDS and WHO. Epidemiological Fact Sheet on HIV/AIDS and Sexually Transmitted Infections for Senegal, December 2006

than 90% of all infections. The main vector species are *Anopheles gambiae sensu strictu* (both M and S sub-species), *An. arabiensis*, *An. funestus*, and *An. melas*. The species distribution depends on rainfall and the presence of permanent sources of water.



This map is a product of the MARA/ARMA collaboration (http://www.mara.org.za). July 2001, Medical Research Council, PO Box 17120, Congella, 4013, Durban, South Africa
CORE FUNDERS of MARA/ARMA: International Development Research Centre, Canada (IDRC); The Wellcome Trust UK; South African Medical Research Council (MRC);
Swiss Tropical Institute, Multilateral Initiative on Malaria (MIM) / Special Programme for Research & Training in Tropical Diseases (TDR), Roll Back Malaria (RBM).
Malaria seasonality model: Tanser, F et al. 2001. Paper in preparation. Topographical data: African Data Sampler, WRI, http://www.igc.org/wri/eda/maps/eda/eda_idx.htm.

According to routine data collected by the NMCP, from 2001 – 2006 malaria was responsible for 33 – 39% of all outpatient consultations. The proportion of outpatient consultations caused by malaria dropped to 24% in 2007; however this drop is explained at least in part by the shift in October from a purely clinical case definition to one that relies on parasitological confirmation. After pilot testing rapid diagnostic tests (RDTs), the NMCP distributed them to all districts, initiated cascade training, and starting in September 2007 directed clinicians to confirm all suspected cases of malaria before beginning treatment. The proportion of all deaths in children under five in health facilities that were attributed to malaria has steadily declined from 40% in 2001 to 21% in 2007. While it is believed that scale up of malaria prevention and treatment measures is responsible for some of this drop, it is also due, at least in part, to the change in case definition of malaria from clinical to confirmed in late 2007. The 2006 Malaria Indicator Survey (MIS) estimated (with data collected at the end of the rainy season), that 37% of children under five had an episode of fever or convulsions during the two previous weeks. Only 11% of these children received some type of antimalarial drug within the first 24 hours of symptom onset, with only three percent having received an ACT; however, ACTs had only been introduced in Senegal earlier that year.

The vulnerable groups in Senegal comprise an estimated 2,204,000 children under five and 417,600 pregnant women.

NATIONAL MALARIA CONTROL PLAN

Proposed PMI activities align well with the 2006-2010 Strategic Plan for Malaria Control, which has the overall objective of reducing morbidity and mortality due to malaria by 50% by 2010. In addition, the following specific objectives are identified:

- Increase to 80% the rate of coverage and utilization of ITNs by 2010;
- Cover 80% of households in targeted zones with indoor residual spraying;
- Treat 80% of malaria cases at all levels of the health pyramid in accordance with national directives;
- Increase to 80% coverage of IPTp in accordance with national directives; and
- Improve the management of the program at all levels.

In order to accomplish these objectives, the NMCP focuses on strengthening prevention and assuring correct and timely treatment at all levels of the healthcare system. The Strategic Plan for Malaria Control outlines an integrated package of activities with the following components:

- **Malaria case management** (uncomplicated and severe): improved diagnosis using rapid diagnostic tests and microscopic verification, early and correct treatment with ACTs (uncomplicated malaria) or quinine (severe malaria and malaria in pregnancy), and community case management;
- **Prevention of malaria in pregnant women**: intermittent preventive treatment with at least two doses of sulfadoxine-pyrimethamine (SP) using directly observed therapy during antenatal care;
- **Vector control**: indoor residual spraying and use of ITNs, particularly among pregnant women and children under five (although the NMCP has more recently expressed a desire to obtain high LLIN coverage of the general population);
- **Environmental management/hygiene**: identification and destruction of mosquito breeding areas through community-based interventions; and
- **Epidemic prevention and control**: establishment of sentinel surveillance sites in high-risk districts, epidemic response planning, strengthening prevention measures (ITNs, IRS, etc.).

Supporting interventions include human resource management, management and mobilization of financial resources, supply chain management, coordination of partnerships, and community mobilization.

MAJOR PARTNERS IN MALARIA CONTROL

Multilateral and Bilateral Donors

Global Fund to Fight AIDS, Tuberculosis and Malaria
In Round 4, the Global Fund awarded a $33.3 million grant to Senegal covering activities from September 2005 to August 2010, with the agreement for the second phase of funding signed in early 2008 following several months of negotiations. The Principal Recipient of this grant is the NMCP. Thus far, this grant has been used to procure 6,000,000 treatment courses of artesunate-amodiaquine (AS-AQ), 340,000 doses of SP, 746,000 ITNs, 445,000 LLINs, and 300,000 RDTs. All of these commodities have been or are being distributed to public health facilities and the private sector throughout the country, and approximately 100,000 LLINs are expected during 2008. The NMCP also uses the grant to fund community-based organizations (CBOs) working on malaria prevention throughout the country. Most of these interventions involve IEC/BCC and the untargeted subsidized sale of ITNs as available, but to date do not involve case management, IPTp, or vector control measures. PMI is planning to partner with the NMCP's CBO grantees to include promotion and education about the subsidized voucher program and other PMI-supported LLIN activities in the CBOs' activities.

Senegal was also awarded a $67 million grant under the Global Fund's Round 7 competition, with $29.8 million approved for phase one in March 2008. With this grant the NMCP plans to expand the availability of ACTs at the community level, including making more than 500 additional health huts functional and providing ACTs to communities where there is no health hut; purchase RDTs for use in all public health facilities and community health huts; provide 1.3 million LLINs for a nationwide free distribution campaign in 2009; and reinforce the institutional capacities of the NMCP and the Central Medical Stores (CMS).

World Bank
In past years World Bank funds were used to procure ITNs and to support IEC activities focused on malaria prevention messages. The current country assistance strategy (2007 – 2010) for the World Bank in Senegal is based on three pillars, one being human development/shared growth. Part of this pillar is improving health service delivery for women and children, with a goal of reducing malaria mortality by one third in 2010 compared to a 2005 baseline and a target that 50% of targeted households will use an ITN by 2009. The Bank will support the Government of Senegal in reaching these goals and outcomes through Poverty Reduction Support Credits and two separate Bank programs.

The first of these World Bank-funded programs is the Senegal River Basin Project, and specifically the Integrated Water Resources Management Program (*Projet de Gestion Integrée des Ressources en Eau-PGIRE*). This Project plans to distribute 300,000 LLINs to children under five in October/November 2008, with a goal of covering 80% of all households in 19 districts in the Senegal River basin (St. Louis, Matam, Tambacounda, and Louga Regions). Procurement of a second lot of 300,000 LLINs is also being planned. The project will work through local organizations to manage the community-level distribution and communications activities. In order to avoid duplication, PMI took the Project's free net distribution into account when planning the FY08 PMI distribution. PGIRE has expressed interest in collaborating with

PMI on the MIS planned for October in order to collect baseline data on malaria indicators in its project areas.

The second World Bank project is the Nutrition Enhancement Project (*Programme de Renforcement de la Nutrition – PRN*). This community-based project completed Phase 1 in 2005 and started phase 2 in 2006. During Phase 1, a total of 42,500 ITNs and 17,000 net re-treatment kits were distributed to children under three. Phase 2 operates in 115 local communities in 29 districts, serving all children in rural locations and selected children in urban areas. The project recently completed a mass distribution of approximately 450,000 LLINs to children under five in 96 communities in 25 districts (the four excluded districts are those in Dakar that benefited from the mass distribution supported by PMI in May 2007). An additional 50,000 LLINs will be distributed to pregnant women in its intervention areas. Again, in order to avoid duplication, PMI took the PRN's free net distribution into account when planning the FY08 PMI distribution.

World Health Organization (WHO)
WHO provides technical and some financial support for the implementation of treatment and prevention policies; planning, monitoring and evaluation; research; surveillance and management of the NMCP.

UNICEF
UNICEF provides support to the health sector in Senegal primarily through support of district level health plans. Since 2002, UNICEF has spent $2.1 million on malaria specific activities targeted primarily to the Kolda and Tambacounda regions through the multi-country Accelerated Child Survival and Development Project. These activities have included the purchase and distribution (through subsidized sale) of ITNs, KO Tab insecticide re-treatment kits and bottles of deltamethrin insecticide. UNICEF plans to distribute 60,000 free LLINs in the Matam, Kolda and Tambacounda regions (20,000 per region) in late 2008 as part of the Child Survival Days.

Islamic Development Bank (IDB)
The Islamic Development Bank is planning to provide $8 million in loans for the procurement of LLINs and RDTs, health personnel training, and support for supervision. Negotiations between the MOH and the IDB are ongoing and it is unclear when funds will actually be made available.

African Development Bank (ADB)
The African Development Bank is financing a community project in the Fatick and Matam regions (including IEC and net retreatment) and supported development of the NMCP's communication plan.

Other Bilateral Donors
The Belgian Cooperation has been involved with both clinical and community-level malaria prevention and treatment activities, primarily in the Diourbel region. The current project has ended and the future of Belgian cooperation has not yet been determined. The **French Cooperation** is involved with malaria activities through French government support to the Global Fund and staffing of a technical advisor at the MOH. The French also contribute significantly to research activities through the *Institute Pasteur* and IRD. The **Japanese** (JICA) support about 10 volunteers in the health sector, with one dedicated to malaria. JICA has

submitted a request to the NMCP and several other donors for LLINs to distribute in the area where this volunteer works. The **Chinese Cooperation** donates ACTs (200,000 doses in 2007 and approximately $300,000 worth is planned for 2008), sponsors training in malariology, and is constructing a training and research center in cooperation with the MOH.

The United States Peace Corps
USAID and Peace Corps have been working collaboratively on various programs in Senegal over the past few years, and under PMI the relationship has been strengthened. Following the October 2007 communiqué from the US Malaria Coordinator and the Peace Corps Director encouraging PMI to work closely with Peace Corps in all focus countries, the Senegal PMI team and the Peace Corps Country Director met several times and agreed on principles of collaboration and coordination. The Peace Corps Country Director has asked all volunteers, not only those assigned to work in health, to work on malaria, and has assigned a third-year health volunteer in Dakar as the PMI focal person. PMI staff and implementing partners met with all 160 serving volunteers in Senegal, as well as the most recent group of trainees, to discuss ideas for collaboration. The volunteers have designated a PMI/USAID representative for each geographic zone to facilitate communication among all volunteers with PMI staff and implementing partners. In 2008, the PMI staff are working with Peace Corps to put a reporting mechanism in place to track the work that volunteers do toward achieving PMI goals.

Examples of how volunteers will contribute to reaching PMI goals include:

- Retreating bednets that are physically in good condition.
- Participating in planning and implementing the mass LLIN campaign at their sites. The third-year volunteer is participating in planning at the national level.
- Follow-up to ITN distributions (free, voucher, from other donors, or any other kind) to promote hang-up and use.
- Follow-up to women/families who receive a voucher and don't exchange it for a net.
- Mobilizing their communities for IRS.
- IEC/BCC (net use, promoting ANC and IPT for pregnant women, treatment-seeking, sanitation and village cleanup, and IRS).

<u>Non-governmental and Faith-Based Organizations</u>

Christian Children's Fund Consortium
PMI's community-level activities in Senegal are implemented by a consortium of non-governmental and faith-based organizations led by Christian Children's Fund. Members of the consortium include World Vision, Plan, Counterpart International, Catholic Relief Services and Africare. Among them they cover all health districts in the country with the interventions described in the "Community" section below. Occasionally members contract with local organizations to help meet specific needs.

In addition, PMI's clinical and policy-level activities are managed by several US-based organizations, including IntraHealth International, the Academy for Educational Development, and Management Sciences for Health.

The Senegalese Red Cross Society (SRCS)
Though the Senegalese Red Cross Society has not been active in malaria in recent years, they contributed significantly to the 2008 LLIN mass distribution campaign through participation in the national planning committee and mobilization of nearly 1000 local volunteers. With support from the International Federation of Red Cross and Red Crescent Societies, SRCS volunteers will continue to conduct community-based IEC activities to promote correct LLIN use.

Community-based Organizations
The NMCP and health districts routinely contract with community-based organizations for the distribution of ITNs, retreatment campaigns, and other social mobilization activities. These are described in the "Community" section.

Academic Research Partners
Senegal is fortunate to have strong national capacity in epidemiology, parasitology and entomology at the NMCP, UCAD, the Parasite Control Service, and the Institute Pasteur. These groups have a strong collaborative relationship and they have together published much of the recent literature on malaria in Senegal.

Private Sector Donors
The **Pfizer** pharmaceutical company is implementing a malaria intervention program focused in 3 health districts in the Tambacounda Region, with funding estimated at $300,000 per year for five years. The program focuses on IEC/BCC for improved care-seeking behavior, as well as increasing access to care by making additional community health huts functional through staff training and provision of basic equipment. This activity is managed by one of PMI's implementing partners and significant efforts have been made by PMI staff, Pfizer, and the project Chief of Party to ensure that the programs are complementary rather than duplicative.

CURRENT STATUS OF MALARIA INDICATORS

The PMI funded a baseline Malaria Indicator Survey in Senegal in 2006. According to this survey, conducted at the end of the rainy season, 57% of households owned at least one bednet and 36% of households owned at least one ITN. Approximately 16% of children under five had slept under an ITN the previous night, as did 17% of pregnant women. These results are increases over the results of the Demographic and Health Survey done in January 2005, where only 20% of households owned at least one ITN and 7% of children under five and 9% of pregnant women slept under an ITN the night before the survey. The 2006 MIS also showed an increase in pregnant women receiving one dose of IPTp with SP from 21% to 69%, with 51% of women having received two or more doses of SP in 2006. As ACTs had been introduced into the health system in Senegal in early 2006, only 3% of children under five with fever were reported to have taken an ACT within 24 hours of the onset of their symptoms. Except for malaria treatment, the comparison of these surveys shows a considerable increase in coverage and utilization of major malaria prevention and control activities; however, it also shows that continued support is needed to scale up interventions rapidly to reach targets established by the NMCP and PMI.

Recent Estimates of Malaria Indicators: Survey Data		
Indicator	**2005 DHS**	**2006 MIS**
Proportion of children under five years old with fever in the last two weeks who received treatment with an ACT within 24 hours of onset of fever	--	3%
Proportion of households with at least one ITN	20%	36%
Proportion of children under five who slept under an ITN the previous night	7%	16%
Proportion of pregnant women who slept under an ITN the previous night	9%	17%
Proportion of women who received 2 or more doses of IPTp during their last pregnancy in the last 2 years	13%	51%

GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

Goal
The goal of the PMI is to reduce malaria-associated mortality by 50% compared to pre-Initiative levels in all PMI countries.

Target
By the end of 2010, PMI will assist Senegal to achieve the following targets in populations at risk for malaria:

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

EXPECTED RESULTS – YEAR THREE

At the end of Year 3 of the PMI in Senegal (March 31, 2010), the following results will have been achieved:

Prevention:

- More than 3 million LLINs will have been distributed to vulnerable populations by the NMCP and its partners; PMI will have procured at least 700,000 LLINs for routine distribution and at least 200,000 LLINs for a nationwide campaign and provided logistical support for the nationwide campaign to distribute 2.5 million LLINs to children 6-59 months (expected to increase household ownership of one or more ITNs to more than 85% nationwide);
- Approximately 155,000 houses in three districts targeted for IRS will have been sprayed, protecting more than 675,000 residents (with at least 85% of targeted houses sprayed);
- At least 85% of pregnant women will have received two or more doses of IPTp during ANC.

Treatment:

- 80% of all suspected cases of malaria seen in health facilities will receive parasitological confirmation (by microscopy or RDT)
- Rapid diagnostic tests will be implemented at 75% of functional health huts nationwide
- With support from PMI to train new healthcare workers in the case management of malaria, and procurement of drugs for the treatment of severe malaria, 70% of children under five with suspected malaria will have received treatment with an ACT within 24 hours of onset of their symptoms. The Global Fund will procure all needed ACTs for the treatment of uncomplicated malaria.

INTERVENTIONS – PREVENTION

Insecticide-treated nets (ITNs)

Please refer to the "Community" and "HIV/AIDS and Malaria" sections for additional ITN activity descriptions.

Current Status:

Data and Trends

Comparisons between the most recent DHS, conducted in January 2005, at the start of the dry season, and the MIS, conducted in November-December 2006, just at the end of the rainy season, show the status of indicators for ownership and use of mosquito nets. The 2008 MIS will provide up-to-date information on net ownership and use.

Indicator	2005 DHS	2006 MIS (national)	2006 MIS Regional Range
% Households with ≥1 net (treated or untreated)	38.0	56.7	37 (Dakar) – 89 (Ziguinchor)
% Households with an ITN*	20.2	36.3	15 (Matam) – 58 (Kolda)
% Children under five sleeping under a net	13.9	27.9	13 (Louga) – 67 (Ziguinchor)
% Children under five sleeping under an ITN*	7.1	16.4	6 (Louga) – 41 (Kolda)
% Pregnant women sleeping under a net	14.4	31.8	4 (Dakar) – 65 (Kolda)
% Pregnant women sleeping under an ITN*	8.5	17.2	0 (Dakar) – 46 (Kolda)

*An ITN in this survey is defined as a long-lasting treated net, a treated net purchased within the past 12 months, or a net re-treated within the past 12 months

NMCP Policies and ITN distribution mechanisms

Key strategies for malaria prevention in the NMCP 2006-2010 Strategic Plan are the distribution of LLINs[6] to pregnant women and children under five years of age and improving and reinforcing communication on the use of ITNs, with a goal that 80% of each group will sleep under an ITN by 2010. The NMCP also is following the "catch-up" and "keep-up" strategies endorsed by the RBM partnership[7] to rapidly increase and maintain high coverage with LLINs. In its Strategic Plan, the NMCP remains committed to diversifying suppliers of ITNs while providing subsidized nets. The NMCP promotes four approaches for distribution of ITNs: periodic mass free distribution, targeted subsidies through a voucher program, untargeted subsidies through health facilities and CBOs, and commercial sales. The NMCP also conducts mass campaigns to re-impregnate existing nets just before the rainy season.

1. Free distribution of nets to vulnerable groups

As part of the multi-pronged strategy to deliver ITNs to vulnerable groups, the NMCP in 2007 began to work with partners on large-scale mass distributions of LLINs to "catch-up" net ownership among children under five. Because the target population for Senegal's "local supplementation days" campaign is 6-59 months, PMI LLINs are distributed to this group in a streamlined approach. The campaign coordinating committee discussed at length whether children under six months should be included in the LLIN distribution and it was decided that changing the target group for one of the campaign interventions would be too complicated for the door-to-door teams. Children 0-5 months remain a target

[6] Since 2007 the NMCP only procures long-lasting insecticide treated nets, however it continues to measure coverage and utilization based on the "ITN" definition above.
[7] RBM Working Group for Scaling-up Insecticide-treated Netting. Scaling-up Insecticide-treated Netting Programmes in Africa: A Strategic Framework for Coordinated National Action. 2nd Edition. Geneva: Roll Back Malaria, 2005

population for prevention efforts under PMI, and the voucher program and other LLIN distribution mechanisms work to support coverage of this vulnerable group. The "catch up" strategy is complemented by ongoing routine distribution and IEC to ensure LLINs are properly used.

2. Nets sold at subsidized prices through the PMI voucher program (voucher worth $6) targeting pregnant women and children under five

The voucher program, implemented through the NetMark agreement, ensures that PMI's LLIN subsidies are targeted exclusively to pregnant women and children under five. The system began as a pilot activity in six districts in 2004 and because of its high redemption rate it was expanded with PMI funds in 2007. Under this system, health committees at participating facilities negotiate agreements with private sector LLIN distributors to stock and sell nets through the health facility's pharmacy. These agreements specify the co-payment required of the client for each type of LLIN, and the amount of the co-payment the health committee will retain. The distributors are then responsible for ensuring a consistent supply of LLINs to the points of sale. At present, committees can choose from among circular and rectangular styles of three brands of LLINs (Olyset®, PermaNet® and Dawa Plus®), with a fourth (IconLife®, sold in other countries as NetProtect®) joining the program in 2008.

Health personnel at participating facilities are provided with vouchers and are trained to counsel pregnant women attending ANC and caretakers of children under five receiving child health services. Pregnant women or caretakers are told about the use of LLINs to prevent malaria and offered a personalized voucher (documenting the name, contact information, and whether the net is for a pregnant woman or child under five). The client presents the coupon together with the co-payment at the health facility's pharmacy for the LLIN of his or her choice. Currently co-payments range from 800 CFA ($1.90) for the Olyset® rectangular LLIN to 1500 CFA ($3.60) for a conical LLIN; these co-payments are in the range of the MOH policy of 1000 CFA per net.

LLIN distributors collect the redeemed vouchers and restock the nets, and PMI's implementing partner reimburses the distributors for redeemed vouchers. A portion of the co-payment stays with the health committee and the rest goes to the distributor. The program is designed to best utilize the strengths of the public and private sectors. The private sector distributors make a profit by selling their nets and have an interest in ensuring a constant supply of stock at all participating facilities. They assume 100% of the cost of transport and logistics for delivery of the nets to the distribution point, thus transferring this burden from overtaxed MOH systems. The health committee draws a small income from each sale, giving it an incentive to make the system work and to promote redemption of vouchers, but also adding to its available funds to purchase health facility equipment, maintain facilities and support other activities as mandated by Senegal's decentralization code. Historical data show that before the health committees were included in the system, exchange rates were far lower. The NMCP as well as health workers in participating districts report that this is the only routine distribution system that does not experience stock-outs. The NMCP has asked that this program be expanded to ensure the routine distribution of LLINs to children born after the "catch-up" campaigns held in 2008 and 2009.

Senegal has adopted the Bamako Initiative and thus has a long tradition of requiring co-payments for health services and products, a practice generally well-accepted by the public. While the

NMCP and partners feel strongly that the voucher program's co-payment is not a barrier to most people, the various free LLIN distribution campaigns planned in 2008 and 2009, involving nearly two million free LLINs, should reach families that cannot afford the co-payment for an LLIN through routine services.

3. Untargeted sales of subsidized bednets

The NMCP supports untargeted bednet sales at health facility pharmacies and through CBOs at a subsidized price of FrCFA 1000 (about $2.40). In the past few years, nets for this program have included ITNs as well as untreated nets bundled with treatment kits and have come from donations by UNICEF and the World Bank and procurement with the Global Fund Round 4 grant. Details on the distribution of bednets by CBOs are in the "Community Interventions" section. The health districts and the CBOs each receive a portion of the Fr CFA 1000 payment, but maintaining a consistent supply of nets through these channels has been a challenge for the NMCP. Funds for bednets are only periodically available and the bednets are immediately put into distribution, with no consistent supply. In addition, it has been difficult for districts and the NMCP to get regular and reliable reports from some CBOs regarding their distribution activities, posing problems for accountability.

4. Commercial nets sold at market prices to the general public

The elimination of national taxes and tariffs on ITNs in 2004, along with increased availability of competing brands on the commercial market, has brought down retail prices of ITNs over the past few years, increasing access for the general population. Six major manufacturers supply ITNs and LLINs in Senegal, all of whom partner with the NMCP and NetMark. Commercial suppliers reach all 11 regions of Senegal, but do not reach limited rural areas (specifically Kédougou). The commercial partners project their retail and institutional sales for the 2008 calendar year to be approximately 100,000. This is a decrease from past years but is logical given the large availability of free and subsidized ITNs in the country. The number of retailers is estimated to be at least 525, including pharmacies, gas stations, the Pridoux chain of stores, NGOs, CBOs, etc. These bednets are sold at FrCFA 4500 – 7500 ($10.70 – 17.90). Unbranded, untreated nets are still available in some Senegalese markets at prices comparable to the cheaper ITNs, so informed consumers have little rationale to purchase untreated nets. However, consumers and retailers are not always aware of the difference between an LLIN and an ITN.

Social marketing efforts have also resulted in a consistent stock of nets being available in-country at any time. Expanding the market here has served to encourage net manufacturers to invest in Senegal, to develop their own marketing plans, and to promote their products. The in-country stocks have also served other large buyers of nets; NetMark partners have sold over 585,000 nets as institutional sales in the past year, 500,000 of which were distributed by the World Bank Nutritional Enhancement Program as described below.

<u>Progress to Date:</u>
During its first two years of implementation (FY07-FY08), PMI has supported a comprehensive, three-pronged strategy to increase household ownership of LLINs, especially among vulnerable

populations. Equally important are the strategies to boost LLIN use that are included in social marketing activities and in the community interventions supported by PMI.

1) PMI has supported the **free distribution** of nearly 872,407 LLINs to children under five participating in two rounds of the MOH's "local supplementation days" campaign: in Dakar Region in May 2007 and in Diourbel, Fatick, Kaolack, Thiès and Zinguinchor Regions in June 2008. Follow-up activities resulted in the distribution of 69,000 LLINs to other vulnerable populations in these regions. Another 42,000 LLINs were contributed to the NMCP and distributed to children under five and pregnant women in four districts of Dakar region that experienced heavy flooding in September 2008. PMI also supported the free distribution of 4,121 LLINs to people living with HIV/AIDS (PLWHA) through regional PLWHA networks. Approximately 950 LLINs were also distributed through projects managed by Peace Corps Volunteers, one of which helped ensure universal coverage of an entire rural community. Finally, PMI contributed 900 nets to another partner for distribution to the pregnant women and children on an island in the Fatick region – bringing coverage to 100% for the vulnerable groups on the island.

2) PMI supported the **subsidized distribution** of LLINs to pregnant women and children under five through expansion of the voucher program from 20 health facilities in 6 districts before the start of PMI activites to the current 550 facilities in 37 districts, covering seven of the country's 11 regions. Fatick and Dakar regions were added late during Year 2 of PMI. Nearly 1,000 health workers, members of local health committees, and local NGO representatives have been trained in the voucher system. During Year 1, more than 95,000 pregnant women or parents of young children exchanged vouchers for LLINs (including the pre-PMI program), and as of September in Year 2 the program has distributed 158,000 LLINs to these vulnerable groups, resulting in LLINs being provided to 14% of the target populations in the seven regions. The voucher redemption rate for Year 2 was 94%.

3) Partly as a result of PMI **social marketing** support, which funds such activities as billboards and TV and radio spots, 69,225 unsubsidized ITNs were sold in retail outlets during FY07 and 57,705 were sold in FY08. Social marketing messages strive to identify the advantages of LLINs over other types of bednets and strengthen the brand identity of suppliers in Senegal. Expanding the market here has served to encourage LLIN manufacturers to invest in Senegal, to develop their own marketing plans, and to promote their products. Although increasing sources of free and subsidized ITNs mean retail sales are lower than in previous years, there is still a market for the convenience and choice of a full-cost net, and PMI's small investment helps to promote and ensure that this demand is met. Furthermore, because rural and poor populations have higher net ownership than urban or richer quintile populations, a small investment to encourage LLIN demand is warranted.

Distributor	Product	Retail Sales Oct 07 – June 08	Institutional Sales* Oct 07 – June 08	Retail Price (estimate, FCFA)
DNS	PermaNet (LLIN)	1,525	1,700	5,890 – 8,000
PaluNet	Sentinelle (ITN)	17,614	10,458	4,000 – 6,000
SONI	Olyset	307	14,500	3,800 – 4,000
PaluNet	DawaPlus	-	2,580	-
CAD	KO Net (ITN)	1,388	-	3500
	TOTAL	**20,834**	**29,238**	

*Institutional sales are defined as bulk or quantity sales to groups or institutions (i.e. not individual retail sales).

In Year 1 PMI also funded the retreatment of more than 97,200 conventional mosquito nets, and an additional 28,432 were retreated with matching funds as part of the campaign. PMI did not support any retreatment activities in Year 2.

In total, PMI *directly* supported distribution/re-treatment of 486,156 LLINs during Year 1 and 1,010,522 during Year 2 (as of September).

The NMCP is working with several partners to distribute approximately 1.1 million additional LLINs besides those of PMI:

- the World Bank Nutritional Enhancement Program - 450,000 LLINs for children under five and 50,000 nets for pregnant women in 25 districts in nine regions
- the World Bank Senegal River Basin Project – 600,000 LLINs for children under five in 19 districts in four regions
- UNICEF- 60,000 LLINs for children under five in three regions

In addition, since September 2006 the NMCP distributed 791,000 Global Fund-supported ITNs through health facility and CBO channels and retreated nearly 94,000 nets. Combined with PMI-supported distribution efforts, over 3.4 million ITNs were distributed during Years 1 and 2 of PMI in Senegal.

Proposed Year 3 Activities: ($6,675,000)

In Year 3 the PMI will complement and coordinate with the NMCP to maximize LLIN distribution. In FY09, the NMCP will focus on rapidly increasing LLIN coverage through a nationwide mass distribution campaign in mid-2009 targeting all children under five, integrated with other child health interventions. The NMCP is allocating its entire 2009 LLIN budget for the purchase of 1.3 million of the estimated 2.5 million LLINs needed for the national campaign. PMI will complement the NMCP's efforts with the following interventions for Year 3 that will result in the distribution of more than 975,000 LLINs:

1. *Subsidized distribution of LLINs to pregnant women and children under five via the voucher system: ($4,900,000)*

   As requested by the NMCP, PMI support for LLIN distribution in Year 3 will focus on expanding the routine system of subsidized vouchers for pregnant women and children under five to national scale, thus providing a "keep-up" strategy. During FY09 an estimated 425,000 women will become pregnant and an estimated 275,000 children will be born after the cutoff date (and hence be too young) for inclusion in the May / June campaign. The entry of new ITN brands into the market should continue to give consumers more choice, and the increased competition is likely to further reduce co-payments. The value of the voucher will be maintained at $6, and vouchers will continue to be valid only for LLINs. This restriction is to promote use of the more effective but more expensive long-lasting nets, while maintaining consumer choice. PMI will continue to advocate for more competition and lower co-payments when orienting new health committees and when committees are renewing their contracts with distributors. An average of 58,000 LLINs will be distributed per month during the high demand season as a result of this activity.

2. *Distribution of free LLINs during a national campaign: ($1,500,000)*

   To reach PMI and NMCP targets, a successful campaign in June 2009 is essential to rapidly increase coverage. PMI will support the MOH and NMCP mass distribution of LLINs by purchasing 200,000 LLINs for the campaign, assisting the NMCP in securing other donations to meet its goal, and supporting part of the operational costs for net distribution. Several other organizations have contacted the PMI team to express interest in contributing to the campaign and have requested proposals from the NMCP. PMI will also support IEC/BCC promoting LLIN ownership and utilization as part of ongoing mobilization activities described in the Community section. *($500,000 of the total $1,500,000 is allocated for operational costs, and the remaining $1,000,000 is for procurement of nets*)

3. *Social Marketing of retail LLINs: ($200,000)*

   The PMI will continue to support efforts of private LLIN distributors to expand their markets and sales and promote their products to those consumers who prefer the choice and convenience of buying a full-priced retail net. These funds will be used for mass communication (billboards, TV and radio spots, newspaper ads, "road shows", and other promotional items and activities) to increase consumer awareness of the benefits of LLINs and their proper use, as well as for technical assistance in planning and marketing for local distributors. It is expected that sales of ITNs by private sector distributors will reach least 75,000 consumers in 2009.

Gap analysis:
Since 2005 approximately 1,777,000 LLINs have been distributed in Senegal, with 1,600,000 estimated to be still effective LLINs. The total LLIN needs for the country can be estimated as either 5.1 million (assuming 8 people per household and 3 LLINs needed per household) or 5.95 million (assuming 2 people on average sleep under an LLIN), giving a gap of 3.5 – 4.35 million

LLINs. The 3.25 million LLINs expected to be distributed in 2009 will fill almost the entire estimated gap (75% - 93%) and ensure high rates of household possession by the end of FY09.

Indoor residual spraying (IRS)

This section describes IRS operations and entomological and insecticide monitoring. All IRS-related IEC/BCC activities are described in the "Community" section.

Current Status:

The 2006-2010 Strategic Plan for Malaria Control includes IRS as a key strategy for malaria prevention in Senegal. As the NMCP had little experience with IRS, PMI proposed training and equipping locally-recruited spraying agents with help from and supervision by the Hygiene Service (the environmental public health division of the Ministry of Health). The MOH and its partners selected synthetic pyrethroids for use in this activity.

Anopheles gambiae and *An. arabiensis* are the principal vectors over much of the country and *An. funestus* is found around permanent bodies of water in the south. All three species feed and rest indoors to some extent and thus are susceptible to IRS. Other vectors, such as *An. melas*, which predominate in the mangrove swamps of coastal river deltas, prefer to feed outdoors. Consequently, in areas where they are the major vectors, IRS would probably have limited impact. Because malaria transmission is seasonal in much of the country, a single round of spraying just before the rains begin each year should be adequate in those areas. An exception is the irrigated areas upriver from the Diama dam on the Senegal River, where a second round is necessary before the second peak of transmission in April and May. In Dakar, where approximately 25% of Senegal's population resides, malaria transmission is limited to a few peri-urban districts and these densely populated neighborhoods would pose special challenges to IRS activities. Therefore, vector control activities such as IRS would probably not be cost effective in this setting.

The Australian company Mineral Deposits Limited (MDL) has carried out two spray operations in two mining camps and 2,000-3,000 houses in eight villages near its gold mine in Saraya District in southeastern Senegal. The company used alpha cypermethrin (Fendona) during the first round and an organophosphate during the second round. Company representatives stated that the pyrethroid was greatly appreciated by the local population but that the organophosphate's noxious fumes made it less acceptable. MDL contacted PMI with the desire to collaborate more closely with the NMCP and the Hygiene Service on future spray rounds; PMI facilitated their introduction and following this MDL has brought Hygiene Service leadership to the mining camp to asses the situation.

Progress to Date:

In 2007, PMI Year 1 funds supported Senegal's first large-scale IRS campaign in the health districts of Vélingara, Nioro and Richard Toll – with each district representing one of the country's three ecological zones. After completing logistics and environmental assessments and receiving clearances from both the USG and the GOS, PMI funds supported the training of more than 275 spray trainers, supervisors, and operators, the purchase of all commodities and

protective equipment, and all communication, supervision, monitoring, and environmental compliance activities. The campaign achieved high coverage rates in all three districts, covering 76,279 households (98% of those found by the spray teams) and protecting a population of 678,971. Earlier reports gave the results in terms of "houses", but a review of the data and in discussions with staff from RTI the data were actually collected in 2007 on "households. The insecticide, chosen by the NMCP and its in-country partners, was lambda-cyhalothrin wettable powder (ICON 10-WP).

Entomologists from UCAD, the NMCP, the *Institut Pasteur* (IP), the Anti-Parasite Service in Thiès (SLAP), and the *Institut de Recherche pour Développement* (IRD) conducted monitoring from July to September 2007 in five villages of each of the three districts. The monitoring included cone bioassays on walls to test for insecticidal activity, knockdown spray catches and human landing catches. In the first month after spraying in Vélingara and Nioro, the insecticidal activity was very high on all wall surfaces, but decreased significantly the second month and by the third month less than 50% of mosquitoes died in the cone bioassays. In Richard Toll the killing effect of the walls was always below 70% and decreased to 20% in the third month. The low insecticidal activity of the walls was corroborated by the high parity rates in collected anopheline females, suggesting no decrease in longevity of females, and similar indoor and outdoor biting rates of mosquitoes. The short duration of residual activity could have either been due to poor quality of insecticide application or to poor quality of the insecticide itself. Data from Richard Toll show that spray quality was poor, with the killing effect at one month after treatment varying considerably between walls of the same room.

The second spray round was carried out in Richard Toll during March and April 2008, in order to prevent the second peak of malaria transmission during April and May. The training curriculum of spray operators was revised by staff from the NMCP, SLAP, the Hygiene Service, UCAD and RTI International. Supervision was reinforced by the active participation of regional and district Hygiene Service staff. This round protected over 22,070 households and 135,661 people. The decrease in number of households sprayed and population protected compared to the first round were felt by staff involved in the campaign to be the result of the following factors: the inclusion of mosques and schools in the 2007 figures and their exclusion in 2008 (these structures were counted as households in 2007), the repatriation of Mauritanian refugees, the seasonal migrations of Fulani herdsman out of the region during the dry season (November to July), and the absence of seasonal workers typically in the district only in June and July before the rainy season. The number of rooms sprayed in March – April 2008 (61,395) was 78% of those sprayed in 2007 (78,575), but was 94% of the rooms the teams visited in 2008.

A new full round of spraying in all three districts was held between June and August 2008, resulting in the spraying of 153,942 houses (95% of those found by spray teams), protecting 645,346 people (96% of the estimated total population in the three districts). For this round Senegal changed the insecticide formulation from ICON 10-WP (wettable powder) to ICON 10-CS (capsular suspension) given the longer duration of activity of the CS form. Comparing the coverage rates between 2007 and 2008 is difficult because the type of data collected changed from treated and untreated households to treated and untreated houses.

Year 2 PMI funds also will support the expansion of entomological monitoring into a fourth district where spraying could potentially be undertaken by PMI or other partners in the future (expected to begin in approximately June 2009). This activity will continue with FY09 funds.

Although Hygiene Service agents and MOH personnel at many levels of the health system were implicated in IRS activities, in future rounds, PMI will ensure that district health teams will be more involved with the training, supervision, IEC, and microplanning for IRS, and that increased emphasis is placed on capacity-building and development of a sustainability plan.

Proposed Year 3 Activities: ($3,175,000)

In Year 3, PMI will support IRS and entomological monitoring in the same three districts as in Year 1 and 2. In addition, PMI will continue to support entomological monitoring in a fourth district that was initiated with Year 2 funds. Although there are indications that transmission in Richard Toll may not be as high as previously indicated, Nioro and Velingara have moderate to high seasonal transmission. PMI will continue to monitor data from these districts and hold discussions with the NMCP if it appears that a transition to districts with higher transmission may be warranted.

1. *IRS Operations: ($2,875,000)*

   In Year 3 spray operations will be repeated between May and July 2009 in the current districts of Vélingara, Nioro and Richard Toll. A second round of spraying will be done in Richard Toll as the duration of effective mosquito killing by ICON-CS will not be known until after the first round. The Community section of this MOP describes PMI support for IEC activities to encourage the population's cooperation with spraying their homes.

   In the coming months of 2008 and 2009, PMI partners will place considerable emphasis on strengthening national and local capacity for IRS in order to hand over IRS activities to the MOH by 2010. PMI hopes to establish, within the overall malaria coordination mechanism, an IRS oversight committee composed of members of MOH including the Hygiene Service, NMCP, RTI, and PMI team members, will develop a sustainability microplan for the MOH to lead. If Senegal possesses a sustainable, capable system for implementing IRS safely and expertly, then Senegal will be able to expand its IRS program and seek financial support and/or forecast from the national budget to take charge of the current operational cost of IRS activities. Other partners would then join PMI in providing support for equipment and commodities.

2. *Entomologic and insecticide resistance monitoring: ($290,000)*

   PMI will continue to support entomologists from UCAD and IP to conduct entomologic monitoring and evaluation related to IRS. Again cone bioassays will be conducted immediately after spraying and at monthly intervals. Monitoring will continue after the June 2008 round to determine if only one round in March would be sufficient to cover both malaria transmission seasons in Richard Toll. Particular interest will be paid to insecticide susceptibility as resistance may be developing after repeated rounds of IRS and must be

monitored closely. Insecticide susceptibility assays will be performed, as will molecular assays for the presence of genes associated with resistance to synthetic pyrethroids, such as ICON. Vector behavior will be assessed by monitoring indoor and outdoor biting rates and indoor resting densities. Parity rates will aid in determining female longevity and transmission potential. Finally, mosquito strains will be identified and checked for malaria sporozoites.

3. *Technical assistance for entomology:* *($10,000)*

   A CDC entomologist will provide technical assistance for the implementation of entomological monitoring activities and ensure the completion of OR projects.

Malaria in Pregnancy (MIP)

This section describes facility-based MIP interventions. Please refer to the "Community" section of this MOP for a discussion of community-based status, progress to date, and proposed FY09 activities related to MIP.

Current Status:

In 2003, intermittent preventive therapy for pregnant women (IPTp) with sulfadoxine-pyrimethamine (SP) was adopted by the NMCP as one of the key malaria control strategies in Senegal. The national IPTp policy is for all pregnant women to receive at least two directly observed doses of SP, during the second and third trimesters, with a minimum of one month between doses.

The MOH has issued a directive to all health districts stating that they should keep SP stocked and provide it to pregnant women free of charge. Under Senegal's decentralization laws, the Ministry of Economy and Finance sends part of the health budget to mayors and locally-elected councils to manage together with the health districts, rather than giving it all to the MOH. With these funds the peripheral levels have been asked to ensure that SP is stocked and given free of charge to women attending antenatal care (ANC). In some districts, however, local planning has been inadequate, resulting in SP being sold to pregnant women, or occasional stock-outs of SP.

The MOH's Division of Reproductive Health (DRH) policy recommends four ANC visits for normal pregnancies. The 2005 Demographic and Health Survey found that 87% of pregnant women make at least one visit to a medical professional for ANC during pregnancy, with 88% of those coming for ANC making two or more visits. However, the first visit is often late: 35% of women make their first visit after the fourth month of pregnancy and only 40% complete the recommended four visits.[8] The survey found that 83% of women took an antimalarial during pregnancy and that 57% of women taking an antimalarial had taken 2 or more doses of SP, or 48% of all pregnancies. Other sources give similar results, with the percentage of women receiving two doses of SP remaining well below the percentage attending two or more ANC

[8] Ndiaye, S, Ayad, M. 2006. 2005 Senegal Demographic and Health Survey (DHS). Calverton, Maryland USA: Centre de recherche pour le développement humain (Sénégal) and ORC Macro

visits (49% in the Malaria Indicator Survey (MIS), 44% in 2005 and 61% in 2006 according to NMCP data). The greatest challenges therefore are both convincing women to attend the recommended number of ANC visits, beginning early in their pregnancies, and improvement of health worker implementation of IPTp.

The NMCP intends to increase IPTp uptake through a number of strategies including advocacy to health workers and the population at large and training and supportive supervision of health workers. These strategies are also being supported by PMI. The NMCP also intends to support retraining and supportive supervision of health workers to improve the diagnosis and treatment of cases of malaria among pregnant women.

Progress to Date:

With Year 1 funds, PMI supported the production, dissemination and use by health care workers of new ANC registers and ANC cards that allow for accurate recording of IPTp treatments, and job aids to promote the correct management of malaria in pregnancy and to improve the counseling skills of health care providers.

To date, PMI has supported refresher training and supportive supervision for 1,156 health care workers, including regional and district health care teams from all 11 regions, on MIP interventions as an integral part of the package of ANC services. This training included data collection and record-keeping, the prevention of malaria in pregnancy including IPTp with SP and use of LLINs, and diagnosis and case management of malaria in pregnancy with quinine. PMI has supported the purchase and dissemination of 1,243 water filters and 24,860 reusable cups to facilitate directly-observed SP treatment for IPTp. With the efforts of NMCP, PMI and other partners, IPTp implementation is underway in all MOH ANC service delivery sites nationwide.

In Years 1 and 2, PMI funds have also been used to support health care workers to provide MIP services, including IPTp, during their regular outreach visits to health huts. As noted in the LLIN section, PMI funds have also supported the program subsidizing the purchase of LLINs by pregnant women.

Proposed Year 3 Activities ($550,000)

In Year 3, PMI will continue to support efforts to strengthen MIP interventions nationwide.

1. *Reinforce provision of effective MIP services in health facilities: ($450,000)*

   PMI will continue to support activities aimed at reinforcing the provision of effective MIP services in health facilities in all regions in Senegal. Support will include training of new staff on IPTp, importance of LLIN use in pregnancy, diagnosis and management of malaria in pregnancy, and counseling and interpersonal communication skills. PMI will continue to support monitoring and supportive supervision of MIP service delivery including outreach services to community level. These activities will be integrated as one component of PMI

support for overall monitoring and supportive supervision of comprehensive malaria service delivery.

PMI is providing on-going support for the improvement of data collection which includes IPTp data. PMI will continue in Year 3 to provide additional and replacement cups and water filters as needed for directly-observed treatment in health facilities. PMI will also advocate for implementation by all districts of the MOH's directive to provide SP free of charge for IPTp.

2. *Support for mass media activities to increase ANC attendance and promote IPTp: ($100,000)*

   Infrequent and late ANC attendance is a limiting factor to reaching IPTp coverage goals. Efforts in the past two years have been aimed at improving the availability and quality of the service at health facilities. In Year 3 PMI will fund communications programs aimed at increasing ANC attendance early in pregnancy and increasing adherence to the recommended frequency of visits, in order to improve IPTp uptake as part of overall focused ANC. The PMI team will review the recent studies completed in Senegal on this issue and devise specific mass media approaches in collaboration with the NMCP and the MOH's health education service. The behavior change messages will be coordinated with the community based IEC/BCC activities described further in the Community section.

INTERVENTIONS – CASE MANAGEMENT

This section describes facility-based case management interventions. Please refer to the "Community" section of this MOP for a discussion of community-based status, progress to date, and proposed FY09 activities.

Malaria diagnosis

Current Status:

In Senegal, health facilities with laboratories having the capacity to conduct microscopy for malaria diagnosis are almost exclusively limited to hospitals and district-level health centers, which represent only about 10% of all health facilities (most health posts do not have laboratories). In health facilities with laboratories, diagnostic quality is often compromised by inadequate or non-functioning microscopes, limited training of microscopists, and lack of supplies. Efforts at quality control are made during supervisory visits, but these visits have been infrequent and previously read slides were frequently washed for re-use. These factors contributed to the low confidence of clinicians in the results of laboratory tests.

To expand the availability of malaria diagnostic testing, the NMCP purchased RDTs through its Round 4 Global Fund grant and commissioned UCAD to conduct a year-long study of their sensitivity, specificity, feasibility, and likely provider use and acceptability. Based on favorable results from this study, the NMCP decided to require RDT testing of all suspected cases of malaria in outpatient settings in all health facilities where microscopy is not available. An

algorithm for the treatment of uncomplicated malaria using RDTs and ACTs was developed, health care workers in all districts were trained, and RDTs have been placed in all health facilities, though occasional RDT stock-outs have limited effective use. The new treatment algorithm defines a case of clinical presumed malaria as a patient of any age with fever and no other symptoms indicating a different illness (such as cough, draining ears, or sore throat). All presumed cases are tested with an RDT for malaria and only patients with positive tests should be treated with an ACT. Patients with a different source of fever are to be treated appropriately, and if they remain febrile, may return in two days for follow-up and RDT testing.

For cases of malaria requiring hospitalization, the NMCP requires a blood slide be prepared and read before giving antimalarial treatment. Exceptions, in which case testing may be done by RDT, include critically ill patients where treatment may be started pending laboratory results, patients admitted to centers without laboratories, and patients admitted to centers with laboratories during hours when the laboratory is normally closed.

The NMCP continues to receive technical support from the Department of Parasitology of UCAD and SLAP for improving malaria diagnosis and in training health worker and laboratory staff on the use of RDTs. In 2008 the NMCP commissioned UCAD to conduct a quality control of RDTs at the central medical stores; the 11 lots tested gave results matching microscopic diagnosis for all samples tested (positive and negative). UCAD recommended continuing these tests at regular intervals, as well as extending testing to RDTs found at peripheral stores and at points of service and reinforcing supervisory visits to ensure their proper use.

Progress to Date:

PMI in Year 1 conducted a district-level laboratory assessment with the NMCP to assess training and equipment needs. Based on this assessment, PMI purchased and is distributing 84 clinical microscopes, lab consumables, and lamps that do not require electricity for reference laboratories, hospitals, all regional and district medical laboratories and a limited number of capable health posts. PMI also purchased and provided to SLAP three teaching microscopes. Two of these have multiple-viewing heads and the third is equipped with a digital camera, a desktop computer and projector for storing and displaying images. In Year 2, PMI supported the purchase of additional consumables for microscopic diagnostics, including slides and reagents, to facilitate high quality microscopic diagnosis.

In collaboration with the Department of Parasitology at UCAD, the Network of Laboratories, SLAP and PMI, the NMCP developed a curriculum for the microscopic diagnosis of malaria and a revised system of supervision, quality assurance and quality control. Beginning in March 2008, laboratory technicians from the 82 sites selected to receive a microscope are being trained using the new curriculum. Staff from regional and national levels are also being trained on supportive supervision, quality control and quality assurance in addition to microscopic diagnosis of malaria. To date, 12 regional and national staff and 70 laboratory technicians from the district level have been trained, with 21 district-level staff having received post-training follow-up visits.

Year 2 activities included training technicians from the remaining laboratories, supporting the development of a system of quality assurance for microscopic and rapid diagnosis, and supportive supervision of RDT use.

Proposed Year 3 Activities: ($170,000)

PMI will focus efforts related to malaria diagnosis in Year 3 on ongoing training in parasitological diagnosis of malaria, and strengthening the supervision of laboratories in microscopy and of health facilities in RDTs. PMI will also support the NMCP's initiative to pilot test the introduction of RDTs at community-level health huts. If results are favorable, PMI will facilitate subsequent scale-up of the approach (this is further described in the Community Interventions section). Technical assistance will be provided to support and extend the quality assurance and quality control system and to conduct operations research examining the predictive value of the new diagnostic and treatment algorithm.

1. *Supportive supervision, quality assurance, and quality control for microscopy and RDTs ($100,000)*

   PMI through various partners will provide supportive supervision of malaria diagnosis by microscopy and by RDTs for laboratory and health worker staff. PMI will also assist the NMCP and its partners to implement quality assurance and control standards for laboratories and other health facilities performing diagnostic tests. Supportive supervision of RDT use will also be part of supervisory activities listed in the Treatment and Community sections.

2. *Technical Assistance for diagnostics: ($10,000)*

   A CDC diagnostic expert will travel and work with staff from UCAD, SLAP, and NMCP to assist in extending the system of quality control and quality assurance of microscopy to include RDTs, and to follow up on earlier assistance in development of a curriculum for training laboratory technicians.

3. *Operational research to evaluate the new NMCP treatment algorithm ($75,000)*

   Current WHO guidelines for IMCI recommend that all children under five with fever receive antimalarial treatment in addition to treatment for any alternative initial diagnoses. In addition, WHO guidelines recommend restricting RDT testing to people five years of age and older. Contrary to these guidelines, the Senegal NMCP testing and treatment algorithm restricts RDT use to patients of any age with fever and other signs of malaria who do not have signs suggesting other diseases, with only those who test positive being treated with ACTs. The rate of positive tests is used as an indicator of proper application of this algorithm, with the objective being 60% or more of cases testing positive. It is unknown what proportion of patients with fever and another apparent source may also have malaria and therefore merit treatment.

   The objective of this study is to determine the positive and negative predictive values of the current malaria diagnostic and treatment algorithm used in Senegal, for children under five

and for older children and adults. The initial RDT study by UCAD looked specifically at the sensitivity and specificity of RDTs and did not examine all parameters of the new treatment algorithm in children or adults. To provide these data, year-long assessment of the algorithm will be conducted at the health post and health center levels to cover both low and high malaria transmission periods. For any patient presenting with fever, information will be collected on history of illness and presenting signs and symptoms so as to determine how the treatment algorithm should have be applied and then all patients will be tested using an RDT. The results should help to inform supervision of RDT usage and help reconcile IMCI and NMCP guidance on the management of malaria in children under five.

4. *Technical assistance for diagnostics/case management* *($10,000)*

A CDC medical epidemiologist will support the development and implementation of the protocol to evaluate the use of the RDT diagnostic algorithm, and the implementation of PMI-supported case management and diagnostics activities.

Treatment

Current Status:

Since early 2006, AS-AQ has been available for treatment of uncomplicated malaria in Senegal, and case management with ACTs is currently implemented in all public health facilities nationwide (as well as in all functional health huts). The medication comes pre-packaged in blister packs in three different dosages: children less than seven years old, adolescents 8-14 years old, and adults (children under 1 year receive ½ of a child's tablet). On World Malaria Day 2008, the Minister of Health announced that the user co-payments for these drugs would be cut in half effective immediately; as a result the child and adolescent dosage packs are now sold for 150 CFA (approximately $0.36) and the adult dosage pack is sold for 300 CFA (approximately $0.72). These prices are still higher than the cost of the previous first-line monotherapy, but are in the range of co-payments for other medications. PMI is not purchasing AS-AQ because the NMCP has planned to meet all of its ACTs needs through 2012 using its Global Fund Round 4 and 7 grants. The NMCP is planning to transition from AS-AQ to artemether-lumefantrine (AL) in 2010, given the large number of AS and AQ tablets adults must take, the difficulties many patients report in tolerating amodiaquine, and concerns that many patients may as a result be taking only the artesunate tablets from the co-blistered dosage packs. This transition will be supported with Global Fund monies, but since instructions for treatment with AL were included in ACT training for AS-AQ the NMCP is optimistic that minimal re-training will be required.

Quinine is recommended by the NMCP for treatment of severe malaria. As malaria in pregnancy is considered by definition to be severe, injectable quinine is also the recommended treatment of malaria in pregnant women. District medical funds purchase injectable quinine and other supplies necessary for treating severe malaria, requiring in turn that these supplies be purchased by patients. Drugs and supplies can be relatively expensive, with costs varying across health facilities, and time taken to seek funds often delays treatment. Senegal's malaria treatment and

referral guidelines for children under five, following those of IMCI, do not include a recommendation for pre-referral treatment for severe malaria.

In addition to supplying ACTs to the public sector and community health huts, the NMCP allows private sector wholesalers to purchase Global Fund-subsidized ACTs from the Central Medical Stores and distribute them to retail pharmacies, where they are sold at the same prices as in the public sector. In order to keep these prices equal to the end-user, the CMS sells the drugs to the wholesalers at a lower price than it sells to the districts, therefore allowing for a private sector profit margin. In addition to AS-AQ, private pharmacies also sell numerous other antimalarial drugs, including chloroquine and SP, artemether and artesunate monotherapies, and ACTs including AS-AQ syrup for children, Coartem ®, and other combinations.

Progress to Date:

Funds to purchase ACTs through 2012 are included in the Global Fund Round 4 and 7 grants. In Years 1 and 2, PMI supported refresher training of 236 district health team members and 920 providers (as of July 31) in malaria case management and interpersonal communication. PMI also supported the development and distribution of job aids related to malaria prevention, diagnosis and treatment (including durable posters of the RDT/ACT algorithm and summary guidelines for the treatment of uncomplicated and severe cases). PMI also funds supportive supervision at all levels of the health system, as well as outreach visits from the health post nurses to provide services at community health huts. Supervision visits are carried out jointly by technical staff from PMI implementing partners with MOH personnel from the central, regional, or district level to lower levels.

PMI is also supporting on-going *in vivo* monitoring in five health districts of AS-AQ efficacy through UCAD researchers. This activity is critical to monitor the appearance of resistance to the first-line drugs.

Proposed Year 3 Activities: ($615,000)

In Year 3, the PMI will continue to provide support to strengthen case management of malaria with ACTs through supportive supervision and monitoring, training of new health care workers, and preparation for the transition from AS-AQ to AL in 2010. Since the Global Fund is covering all ACT needs, the PMI Year 3 plan does not include the purchase of ACTs, but does include drugs and supplies for treatment of severe malaria. Additional support for implementation and supervision of treatment with ACTs in health posts is included in the Community Interventions section.

1. *Improve case management with ACTs: ($365,000)*

   As part of the effort to support management of uncomplicated malaria with ACTs, PMI will support training of new health care workers in case management, as most of the health care workers currently serving will have been trained. PMI implementing partners will also work with the MOH to provide supportive supervision in management of malaria with ACTs at all levels of the health care system and outreach activities. The NMCP does not foresee a need

for massive retraining of healthcare workers to accommodate the transition from AS-AQ to AL, since AL was also covered in the original transition to ACTs and its use is included in the current treatment guidelines. In preliminary discussions with the NMCP, support for the publication of communications materials for both providers and the public related to the transition was identified as a possible area of support that PMI could provide.

2. Treatment of severe malaria ($240,000)

Initiation of treatment for severe malaria is often delayed when families first have to seek funds for the medication and intravenous administration kits, potentially increasing mortality. PMI will support the preparation and distribution of kits for one day of treatment of severe malaria, including quinine, intravenous tubing, a syringe, needle, glucose-containing intravenous fluid, and an antipyretic. The cost of this package will be subsidized to be equal to the cost of treatment of uncomplicated malaria for the same age-group. Kits for different dosing levels (such as children under 5, children ages 5-15, and adults) will be provided and distributed to all levels of the health system. PMI will work with the NMCP and other partners to ensure that the kits are being sold at the correct price. To ensure their correct use, PMI inputs include the training of healthcare workers in diagnosis and treatment of malaria, including uncomplicated and severe.

Pharmaceutical management and drug quality

Current Status:

The Central Medical Store (CMS) is responsible for national procurement of drugs, health commodities and equipment, including antimalarial drugs, ITNs, laboratory products, and treatment kits. The NMCP is responsible for quantification of the needs of malaria commodities. Forecasting of needs and budgeting are usually based on cases registered at health facilities including community level health huts. Because of the low utilization of health facilities in the country, this method of forecasting can underestimate needs. In the case of ACTs purchased through the Global Fund grant, the original quantification estimates were based on all expected cases of fever rather than cases expected to be treated in a facility.

Distribution of malaria commodities to the eleven Regional Medical Stores is the responsibility of the CMS. Health districts are responsible for identifying and quantifying the commodity needs for all health facilities in the district and for purchasing these commodities from their Regional Medical Store. Health facilities in turn identify and quantify their commodity needs and then purchase them from the district. Senegal has implemented the Bamako Initiative, a cost-recovery system in which each level pays the higher levels for commodities. At the health facility, the cost-recovery system requires patients to pay user fees for consultations, drugs and other supplies.

In January 2006, the PNLP received its first ACTs - 3 million AS-AQ doses (with expiry dates ranging from October to December 2007) from the Global Fund. The second lot of three million doses of ACTs was received by the NMCP in November 2007 and quickly put into the distribution system. Nevertheless, stock outs of ACTs were noted in some health districts during

November and December 2007 due to either the delay in arrival of drugs after previous stocks were exhausted, or a hesitancy to purchase from the original lot of medicines as they neared expiration (despite the NMCP's guarantee to reimburse health districts for expired medicines).

CMS has set up a pharmaceutical management information system with forms and guidelines. This system is separate from the health management information system (HMIS), since the HMIS does not collect the data needed to manage medicines and other health commodities. A plan is in place for supervision and follow-up of distribution activities countrywide, but CMS only supervises the distribution system to the regional level. At the district and health facility levels, information is not flowing as it should and so the NMCP collects data on LLIN, RDT and ACT stocks during the quarterly review meetings (described in the Monitoring and Evaluation section). Commodity tracking and management are computerized at the central and regional levels, with a paper system at the lower levels. Computerization of the pharmaceutical management system down to the district level is planned but has not yet been implemented due to a lack of funds to purchase the necessary software.

The Directorate of Pharmacies and Laboratories (DPL) provides quality assurance and, in collaboration with CMS and the National Laboratory for Drug Quality Control, is responsible for establishing regulations and granting the right to market a drug. The national drug approval and pharmacovigilance committees are based within the DPL. In 2007 the NMCP initiated a separate pharmacovigilance program focused on reporting adverse drug reactions related to ACTs. An adverse drug reporting form was developed, a system for routine reporting up the levels of the system has been established, and over 1,600 health personnel have been trained. Sixty-four adverse reactions (none of them serious) were reported for ACTs in 2007. Overall, the pharmacovigilance system is seen as incomplete since there is neither agreement on the overall strategy nor a coherent, integrated nationwide system to which all relevant actors (including those from other MOH services such as HIV or Tuberculosis) adhere.

The Ministry of Health has established an Antimalarial Quality Surveillance Coordination Committee that brings together the CMS, DPL, National Laboratory for Drug Quality Control, NMCP, and other partners. It meets quarterly to review the status of ACT stocks at the national and regional pharmacies, applications for drug licensing, and the results of drug quality monitoring.

Progress to Date:

In March 2007, PMI provided technical assistance to the NMCP to quantify ACT needs and refresher training to three NMCP staff in drug need quantification. Technical assistance is on-going to strengthen the pharmaceutical management system in order to improve ACT implementation with emphasis on ensuring good ACT prescribing and dispensing practices at the facility and community levels. In 2008, PMI implementing partners field tested and finalized a pharmaceutical management procedures manual and supervision guide. In July, representatives from each of the 11 regional depots and the national medical stores underwent a training of trainers using these materials, and 111 health post and health center staff in the St. Louis region were subsequently trained on management of antimalarial medicines.

In addition, PMI collaborated with UCAD in monitoring antimalarial drug quality. Results of drug quality monitoring at five sites around the country showed that nearly 30% of antimalarial drugs did not conform to one or more quality standards (such as visual inspection and dosage of active ingredient). Most of the non-conforming drugs were in the informal sector and were expired. Monitoring results were shared with stakeholders in various fora in 2008 but to date there has been no clear national commitment to take action to address the problem of poor quality drugs.

PMI is also supporting the participation of Senegal in the multinational Quality of Antimalarials in Sub-Saharan Africa (QAMSA) study, jointly sponsored by USP and WHO. During Year 2, UCAD and NMCP staff was trained in the study methodology and samples of ACTs and SP were collected from around the country.

As a result of coordination efforts by PMI, a National Pharmacovigilance Committee was established and its first meeting held in January 2008. Participants agreed on the need to create a national pharmacovigilance center and to reinforce reporting of adverse drug reactions.

Proposed Year 3 Activities: ($375,000)

Achieving high rates of treatment with ACTs within 24 hours of the onset of fever will require a reliable supply of high-quality drugs out to the most peripheral levels. Ensuring an adequate supply of ACTs will continue to be a major challenge for the NMCP and the PMI, in part due to the relatively short shelf life of AS-AQ (about 24 months), and the proposed extension of antimalarial therapy to villages lacking any even a community health hut. Achieving high rates of treatment with ACTs will require not only continuously improving the pharmaceutical management system but also strengthening the drug quality system to ensure that only high-quality drugs are being distributed.

1. *Drug management capacity building and training: ($230,000)*

   PMI will build on the past several years of activities to continue strengthening the national logistics and pharmaceutical management systems for ACTs through improved drug quantification and forecasting, quality control, storage and inventory management, and supervision. These activities are complemented by similar USAID-funded work to improve the management of tuberculosis drugs. In addition, the Treatment section above describes the technical assistance that PMI, together with the MOH and other partners, will provide to public health facilities to ensure appropriate ACT prescribing and dispensing practices and appropriate use. This support will be critical during the planned transition from AS-AQ to AL.

2. *Drug efficacy testing: ($30,000)*

   In collaboration with the NMCP and UCAD, the PMI will continue to support drug efficacy monitoring of first and second-line antimalarial drugs at three sites. This monitoring will include *in vivo* drug monitoring of patients.

3. *Drug quality monitoring: ($100,000)*

PMI in collaboration with the NMCP, UCAD, and the National Drug Quality Control Laboratory will continue to strengthen national capacity for drug quality surveillance. The current monitoring program will be expanded from six to nine sites, to cover more geographic zones and particularly border areas. In addition, more emphasis will be placed on IEC activities to inform the public about counterfeit/poor quality drugs. These activities could include engaging the media as well as targeting development or modification of policy. PMI will continue to advocate for regulatory action to be taken when poor quality drugs are found. Results of the Quality of Antimalarials in Sub-Saharan Africa study are expected to reinforce these activities.

4. *Pharmacovigilance: ($15,000)*

PMI will continue to support the institutionalization of an integrated national pharmacovigilance committee and strengthening of the reporting system.

COMMUNITY- BASED INTERVENTIONS

Current Status:
Senegal's health care pyramid rests on a foundation of "health huts" that serve rural populations and are operated by three types of workers: community health workers (CHW), who offer preventive and curative services or referral for more complicated medical care; *matrones*, who are trained birth attendants (but not professional midwives) ; and *relais*, who are health educators and communicators. Though not officially part of the MOH system, functional health huts are supervised by the nurse who runs the nearest health post. The health posts are staffed by one nurse or midwife, and one or more *matrones* and *relais*. Posts are in turn supported and supervised by the Health District Management Team. Since many people do not seek care for malaria at higher level health facilities, or go only when it is too late for the treatment to be effective, community-level prevention and treatment interventions are critical for reaching the coverage and mortality reduction goals of the NMCP and of PMI. Working through community channels is essential for ensuring that caregivers know how to recognize and treat malaria, that LLINs in the household are being properly used, that participation in IRS campaigns is high and that safety precautions are taken, and that pregnant women understand the necessity of attending prenatal care and receiving at least two doses of IPT.

Currently, all 1,297 functional health huts nationwide are enrolled in the PMI-supported community health program. A functional health hut is defined as one that has a trained community health worker (literacy is preferred but not required), regular supervision by the chief nurse of the health post, and the basic equipment and space needed to provide services. CHW in each of these health huts have been trained to administer ACTs for uncomplicated malaria. In addition to the health huts enrolled in the program, PMI's community health partners work with 528 "sites", generally in more urban areas or places far from health huts, where *relais* implement malaria IEC/BCC activities. In the five regions where USAID implements community-level maternal and child health, tuberculosis, and family planning activities, the malaria activities are

integrated and part of a comprehensive community health program. In other regions where PMI is the sole funding source for community interventions, the community activities only address malaria.

The NMCP also supports community-based malaria activities through its ABCD program (*Atteindre les Bénéficiaires Communautaires à travers les Districts* or Reach the community beneficiaries via the health districts). Under this program, now operational in 41 districts, health districts spend at least 60% of their Global Fund money from the NMCP on contracts with CBOs. Under these contracts, the CBOs agree to provide a package of malaria-control activities such as organizing community meetings and home visits to discuss malaria, distributing bednets and treatment kits, and hygiene and "clean environment" education. An evaluation in December 2006 was generally positive, but recommended that districts and CBOs urgently strengthen the introduction of ACTs at the community level to ensure prompt and proper case management by community health workers.

In 2008, the NMCP plans to introduce "home-based" management of malaria. Under this program, villages currently not served by a health post or a health hut would nominate someone who would be trained to manage a stock of ACTs and RDTs. Anyone in the village with fever could go to this village health worker for RDT testing, and if results are positive, ACT treatment. Village health workers would be supplied and supervised by community health workers at the nearest health hut and/or the nurse in charge of the nearest health post.

Progress to Date:
Through PMI support to a consortium of NGOs, more than 9,500 community members have been trained in malaria prevention and control interventions in accordance with Senegalese policies. This figure includes community health workers, *matrones, relais* and village health committee members who oversee the functioning of the health hut and help carry out health promotion activities. Community interventions reached national scale with FY07 funds, covering every district in Senegal, and include two broad categories of activities: 1) community case management of malaria, and 2) community mobilization for malaria prevention and control.

1. Community case management of malaria
PMI partners and other stakeholders have updated, validated, and disseminated training materials, job aids, and data collection tools for use by CHWs offering case management services at health huts. Following this exercise, CHW training began. During fiscal years 2007 and 2008, 3,469 CHWs were trained by PMI to diagnose and treat cases of uncomplicated, clinically-diagnosed malaria using ACTs at health huts. They are also trained to recognize danger signs and refer serious cases or any malaria in pregnant women or young infants to the nearest health post or center where they can receive more advanced care. From the beginning of FY07 through the third quarter of FY08, 67,028 cases of malaria/fever were treated with ACTs at these community sites. The program only reached national scale in the second quarter of FY08, and the NMCP experienced delays providing drugs in some areas so the numbers of cases treated at community level is expected to continue to grow in coming years. Community health workers have demonstrated excellent adherence to the treatment protocol.

2. Community mobilization and IEC/BCC for malaria prevention and control

PMI partners and other stakeholders have also updated, validated, and disseminated training materials, job aids, and data collection tools for use by community health workers undertaking community mobilization and IEC/BCC activities in health huts and sites. Activities include both ongoing malaria communication (mass and interpersonal) and communication promoting specific events, such as IRS or LLIN distribution campaigns.

Ongoing communications activities
Typical activities in Senegal include community meetings on a specific topic, home visits, theater, community radio (radio spots as well as interviews and programming), and social mobilization (setting aside a day to focus on a specific theme or topic and bringing the whole community together around that topic – for speeches, music, skits, with banners and t-shirts with messages, etc.). Topics of ongoing IEC/BCC at community level include the importance of owning and using ITNs, prompt treatment-seeking at the health hut or health post in case of fever, recognition of danger signs, the importance of attending ANC visits and of receiving the recommended IPTp, environmental hygiene and cleanup of standing water. From October 2007 through September 2008, CHWs working with the PMI program carried out a total of 160,269 malaria-specific IEC/BCC activities.

Mobilization for IRS
In the three districts where IRS is implemented, focus groups were held to learn about the public's perceptions of IRS and any concerns they might have regarding the spraying. Public information campaigns were then organized to promote IRS and encourage the population's acceptance of spraying homes. A training manual and a handbook were developed for the *relais*, as well as information materials for the public – including a poster and pamphlets in three languages. Radio spots, community meetings, and house-to-house visits were also organized. Partly as a result of these efforts, the refusal rate during the first round of IRS activities in May-August 2007 was only 2%. These activities were carried out again during the April 2008 round of spraying in Richard Toll and for the June-August 2008 round for all three districts.

Mobilization for LLIN distribution campaigns
PMI community health partners worked through local CBOs, health post nurses and community *relais* to organize and promote the distribution of free LLINs in four districts of peri-urban Dakar during the Local Supplementation Days in May 2007 and in five regions during the June 2008 campaign. The *relais* on the door-to-door teams gave information about the importance of malaria prevention and those at the distribution points also provided education about how to properly hang and use the nets. More than 99% of the coupons distributed were redeemed during the campaigns. Leading up to the campaign, the community health implementing partner also carried out localized IEC and community mobilization activities to raise awareness of the supplementation combined with LLIN distribution, and the importance of obtaining and using LLINs. The activity is further described in the LLIN section of this MOP.

Other community-based LLIN activities
With FY07 funding, PMI's community health implementing partners trained more than 60 community *relais* and representatives of women's groups in five districts on bednet retreatment, and 97,200 nets were retreated with insecticide (K-O Tab and K-O Tab 1-2-3). An additional

28,432 were re-treated with non-PMI sources of funding. In FY08, PMI focused ITN resources on procurement of new LLINs rather than re-treatment of older nets.

In addition, the LLIN voucher program (described in the LLIN section) has been decentralized to the community level. Community health implementing partners have trained CHW and health committee members to manage and promote this system at community level. To keep the voucher as part of a complete ANC package which only health post or center staff are authorized to administer, vouchers are only distributed at the facility level or during outreach activities in the community, but can now be exchanged at health huts.

Proposed Year 3 Activities: ($2,200,000)

Community-level activities are integral to the success of all prevention and case management activities. In Year 3 PMI will continue with the community case management and mobilization efforts begun in Years 1 and 2 and will, in addition, support the NMCP in its plan to roll out RDTs to the community level. The NMCP has requested that PMI and its community health partners train, assist with supervision, and update job aids and training materials for this activity.

1. *Sustaining community mobilization activities: ($1,000,000)*

   Working through NGOs, CBOs and all types of community health workers, PMI will implement a variety of information, education and communication activities at all 1,825 community intervention points (health huts and sites) nationwide, aimed at:

   - Informing and mobilizing the population around interventions such as IRS and ITN distribution campaigns and ongoing ITN distribution through the voucher system, health facilities, other donor distributions, and other CBOs
   - Educating the population and following-up on correct hanging, use, and maintenance of ITNs and LLINs
   - Increasing knowledge of the causes of malaria and its prevention and correct treatment and recognition of the signs of severe illness in children
   - Encouraging early care-seeking and treatment
   - Promoting ANC attendance for pregnant women, including IPTp and prevention and management of malaria in pregnancy

2. *Sustaining community-based case management with ACTs and introduction of RDTs in health huts: ($1,200,000)*

   Technical support and supervision on correct diagnosing, prescribing, stocking, and dispensing and referral practices will continue for community health workers. The project will also ensure timely data collection and integration of case management data with the NMCP's reporting system. Data collection tools, job aids, and IEC materials will be replenished as necessary at all 1,297 health huts. Systems for monitoring and supervision of these workers will also be strengthened (see Capacity Building section below).

Furthermore, at the NMCP's request, CHW job aids will be updated to include use of RDTs at health huts and the transition from AS-AQ to AL, and all CHWs will be trained and supported to implement these new NMCP policies as they take effect.

HIV/AIDS AND MALARIA

Current Status:

The HIV/AIDS epidemic in Senegal is characterized by a low prevalence in the general population (0.7% of adults 15 to 49 years of age), with higher prevalence of infection among some risk groups: 19.4% among commercial sex workers, 21.5% for men having sex with men, and 3.4% among women in the Ziguinchor region. No significant differences exist between urban and rural areas, though the regions in the Casamance have higher rates: 2.0% in Kolda and 2.2% in Ziguinchor. According to UNAIDS, there are an estimated 61,000 people infected with HIV in Senegal[9].

USAID supports Senegal's strategic objectives to maintain the HIV prevalence below 2%; to improve the quality of life of PLWHA and reduce the socio-economic impact of HIV/AIDS. The approach is based on a strong partnership with civil society and communities enlisted to participate in key interventions.

In 2000, the Government of Senegal began a pilot program to introduce anti-retroviral therapy (ART) use in the public health sector. By the end of 2007, more than 5,000 Senegalese were estimated to be on ART out of the approximately 11,000 PLWHA thought to be eligible. The Government continues to expand the pilot program for prevention of mother to child transmission of HIV (PMTCT) established in 2005.

To complement the Government's ART program, since 2002 USAID has supported a comprehensive package of care and support services. The USAID program began with a focus on psycho-social support and was expanded to include nutritional education and food distribution in three ambulatory treatment sites. Within the current program, focus is also placed on building capacity of PLWHA associations to reinforce their involvement in prevention and care and support, on integrated tuberculosis screening and management; and income generation. The program targets over 7000 PLWHA through these efforts. One ambulatory integrated care and treatment unit and 15-20 sites for psycho-social care will be established in each region over the life of the program.

USAID and the US Department of Defense also support HIV prevention activities including behavior change interventions targeting high-risk groups, including the military; promotion of voluntary counseling and testing services, and prevention and treatment for sexually-transmitted infections.

[9] UNAIDS and WHO. Epidemiological Fact Sheet on HIV/AIDS and Sexually Transmitted Infections for Senegal, December 2006

HIV increases the risk of malaria infection and clinical malaria in adults, especially in those with advanced immunosuppression. HIV-infected persons are at increased risk of severe malaria and death. Providing integrated health services for malaria and HIV is crucial for reducing the burden of the two diseases.

PMI Progress to Date:

In Year 1, working closely with the GOS, the National AIDS Committee, and civil society groups, PMI supported the free distribution of 2,121 LLINs to PLWHA through regional PLWHA networks and the AIDS ambulatory treatment center in Dakar. This activity was launched by First Lady Laura Bush on her visit to Senegal. In Year 2, PMI donated another 2,000 LLINs to PLWHA.

Proposed Year 2 Activities: ($25,000)

In FY09, activities are aimed at integration of malaria prevention and treatment within HIV/AIDS prevention, care and treatment efforts. Key components will include (i) promotion of positive behavior change for malaria prevention and care-seeking behavior; (ii) integration of malaria prevention and early treatment within HIV ambulatory treatment settings; and (iii) capacity development of existing partners to be able to effectively integrate scientific and programmatic knowledge for malaria prevention and treatment within their existing program portfolios.

As the ambulatory unit and care and support sites serve as the starting point for the provision of a package of services for PLWHA, they, in addition to PLWHA networks, will serve as a point of contact to increase the access and use of ITNs and to strengthen diagnosis and treatment of malaria for this vulnerable group.

1. *Distribution of LLINs to PLWHA & Integration of malaria messages into HIV/AIDS BCC activities targeting high risk groups:* ($25,000) [*cost of 2000 nets covered with FY08 PMI funding]*

   In collaboration with the GOS and the USG-funded HIV program partners, PMI will support free distribution of 2,000 LLINs to PLWHA. Channels for net distribution will include PLWHA networks and HIV/AIDS peer educators trained to deliver malaria prevention messages including during home visits. The nets will come from nets leftover from the 2008 PMI free distribution and thus no FY2009 resources for net procurement are required. PMI will also support the training of peer educators, counsellors, and leaders of PLWHA associations to facilitate the integration of malaria prevention messages into interpersonal communication activities with PLWHA. Malaria prevention messages will include emphasis on correct and regular use of LLINs and early care-seeking behaviour for fever.

COMMUNICATION/COORDINATION

Current Status:
In the framework of the Paris Declaration, the MOH put in place an internal monitoring committee that includes multilateral and bilateral donors in the health sector that meets every six months to share information and strategies and discuss current issues in the sector. Multilateral and bilateral donors in the health sector have their own coordination mechanism chaired by the WHO Representative. This coordination mechanism meets monthly to share information and strategies and discuss current issues in the sector. The MOH is represented by the Secretary General at these meetings where also, if needed, experts from the MOH are invited to give clarifications on issues related to their ongoing program.

The Country Coordinating Mechanism (CCM) for the Global Fund grants, after some initial difficulties, now functions well in accordance with Global Fund guidelines. It has a yearly agenda and holds regular meetings to monitor implementation of Senegal's Round 4 and 7 malaria grants, Round 7 Tuberculosis grant and Round 6 HIV grant, with extraordinary meetings convened as necessary. USAID helped to form and is a member of the Technical Secretariat, which facilitates implementation of the existing grants and works closely with the three disease control programs.

In the past, an active National Malaria Steering Committee, made up of various stakeholders, met on a regular basis. It was responsible for overseeing the activities of four NMCP commissions: (1) planning, monitoring, and evaluation; (2) clinical and therapeutic training; (3) communication and social mobilization; and (4) research. In the past three years, this group has become inactive, although its working groups on drug quality, IPT, ACTs, and ITNs remain active but uncoordinated as a larger group.

Progress to Date:
The Steering Committee has not recently been active. In May 2008 the Minister created (and will chair) an internal committee to follow HIV/AIDS, tuberculosis and malaria activities in Senegal. PMI staff continues to advocate for creation of a sub-committee specific to malaria, which is open to all technical and financial partners active in malaria, and which the NMCP Coordinator is given the authority to convene.

Proposed Year 3 Activities: (*No additional cost to the PMI*)

1. *Revive National Malaria Steering Committee*:

   In-country PMI staff will provide support to the NMCP to revive and coordinate regular meetings of the National Malaria Steering Committee, whose membership will include representatives of key stakeholders from public, donor, NGO, and private interests, and support and participate in the working groups within this Committee, and will work with the NMCP and partners to develop an annual work plan and establish clearly defined roles and responsibilities for Steering Committee representatives and their organizations.

CAPACITY BUILDING

Current Status:
The Senegal NMCP resides in the MOH's Division of Disease Control and has a well developed strategy for malaria control, a clear organizational structure, and an effective management team. The staff includes four public health physicians, two pharmacists, two public health nurses, an economist, an entomologist, and several other experienced personnel who together manage all aspects of the NMCP's activities (including training, supervision, M&E, research, etc.). In addition, the NMCP has recently hired 24 recent medical or pharmaceutical graduates who will supervise diagnosis and treatment in the public and private sectors. Three entomologists work for the SLAP, and several entomologists and parasitologists serve on the faculty of the UCAD, School of Medicine. In addition, two French institutions (IRD and IP) have many experienced parasitologists and entomologists who collaborate with the NMCP. While there are no full-time malaria staff at the regional or district levels of the public health system, health workers and depot managers at all facilities are engaged in case management and prevention of malaria in pregnancy, and ITN activities. Employees of the Hygiene Service are involved in some limited non-PMI spraying and bednet re-treatment campaigns.

Senegal is one of the beneficiaries of a WHO/Gates Foundation grant to improve insecticide resistance monitoring capacity. Entomologists from UCAD, the IP and SLAP, together with members of Hygiene Service, have developed a detailed 12-day course to train Hygiene Service staff on entomologic control and surveillance methods. Two sessions of the course from June to July 2008 trained 42 staff of the Hygiene Service from 11 of Senegal's 63 districts. At present, it is unclear whether Hygiene Service staff will carry out these methods independently or will assist trained entomologists in the studies.

Thus, Senegal has a wealth of expertise and staff working on malaria prevention and control at all levels and this has facilitated the success of PMI assistance to date. However, PMI also recognizes that there is still a need for capacity-building both at peripheral and national levels in order to achieve the goals set out by NMCP and PMI.

Progress to Date:

PMI's activities in capacity building address the improvement of preventive and curative services at all levels. In addition to funding training and supervision of health workers in all areas of malaria prevention and control as described in previous sections, PMI has also funded the training of six regional and national MOH staff to attend a three-week course in data management, monitoring and evaluation at CESAG (*Centre africain des études supérieures en gestion*), and will continue to support up to ten health professionals to participate in this program in FY08. With Year 3 funds, PMI will also continue to fund supervision visits by the NMCP to all levels of the health system active in malaria prevention and control.

Proposed Year 3 Activities:

1. *Support to NMCP to enable program supervision ($50,000)*

   PMI will contribute to supporting the costs associated with the NMCP's supportive supervision to peripheral levels. (Other PMI implementing partners also contribute significantly to supervision activities.)

2. *Financing construction of additional NMCP office space ($100,000)*

This activity is contingent upon review by a Regional Engineering Officer to determine: (1) the need for additional space at the NMCP; (2) that the existing construction can be modified as required; and (3) the estimated cost of the construction. The review will lay out the process to be followed in order for an addition to the NMCP to be built and will describe any potential pitfalls to completing that construction. Once this information is available, PMI headquarters and the Senegal Country Team will jointly review the proposed activity and make a final decision about PMI support for the construction.

The central NMCP team in Dakar is strong and has a sufficient number of technically-sound staff to manage its programs. The main constraint on its ability to function at maximum capacity is a lack of adequate office space to house its staff and visiting technical collaborators. When the current NMCP office space was planned, the staff was one fourth its current size. Three or more staff now share a small office designed for one and people often need to work in the conference room, which itself is too small to hold the number of staff and partners who are routinely convened for meetings. Furthermore, there is no storage space, and files, documents and project materials are piled around desks and in hallways. The NMCP has already had plans and estimates drawn up for this activity and has sought other donors' support, but without success. Specifically, the Global Fund rejected its request in part because a previous grant funded the construction of a building that the NMCP later lost in a property dispute. An addition to NMCP building would improve management and organizational capacity and would also facilitate ongoing collaboration with PMI.

3. *Training in monitoring and evaluation at CESAG: ($30,000)*

   In FY09, the PMI will support the training of up to 10 additional staff at CESAG in data management and monitoring and evaluation. These staff may come from any level of the health care system and will be chosen in collaboration with the NMCP.

MONITORING AND EVALUATION

Monitoring and evaluation is critical for measuring progress against PMI goals and targets, for identifying problems in program implementation and suggesting what modifications should be made, and for confirming that those modifications are having their desired effect. In Senegal, monitoring and evaluating the rapid scale up of malaria prevention and control interventions and achieving high coverage rates with ACTs, ITNs, IPTp, and IRS are priorities not only of PMI,

but also the NMCP, the Global Fund, and other national and international partners working on malaria.

Current Status:

The Strategic Plan for Malaria Control 2006-2010 acknowledges the generally weak state of the National Health Management Information System (HMIS) and the monitoring and evaluation activities that rely on this data. One reason for the cancellation of the Global Fund Round 1 malaria grant was the MOH's inability to provide adequate data to measure the required outcome and impact indicators. As part of the NMCP's successful application for a Round 4 Global Fund grant, the NMCP developed a Monitoring and Evaluation Strategic Plan that focused on monitoring the progress of the Global Fund-financed activities and providing essential data for the development of new control strategies, as well as developing the capacities at all levels of the program and improving the collection and analysis of program data.

The NMCP conducts quarterly review meetings by zone (a grouping of two-three contiguous regions) where each district presents key malaria surveillance and program data, such as the number of reported clinical and confirmed cases and deaths from malaria, stocks of drugs and LLINs, and the number of pregnant women taking IPTp. These meetings allow for a self-critique by the districts and allow the NMCP to provide feedback, clarify existing guidelines, and disseminate new ones. In preparation for this meeting, health posts send morbidity, RDT use, and ACT use data to the district where it is combined with data from the health center. Health facility surveillance data are entered into an RBM Epi Info v6 database and compiled; program data are compiled using a variety of formats and transferred to Excel spreadsheets. The data are synthesized into a quarterly report that is presented and discussed at the review meeting, then summarized at the national level and submitted to WHO and the Global Fund. Entomological and IRS related data are also being collected in collaboration with UCAD. WHO/GMP is developing a database management system in Microsoft Access to unify the various data collection systems and hopes to have the system in use in Senegal in 2009. The quality of data collected from the districts is reviewed during supervision visits, but a standard data quality audit tool is not used.

The NMCP conducted an evaluation of the first year of phase one of the Global Fund Round 4 grant in late 2006, roughly at the same time as the baseline MIS for PMI. This evaluation was done in all 56 districts that existed at the time, both at health facilities and in the community, using a non-random, "targeted" selection of health facilities and communities. An independent consultancy firm assessed adherence to malaria treatment guidelines in the district health center and three health posts, two in rural areas. The consultants also conducted a survey of treatment-seeking, ITN use, and IPTp in communities near the health facilities visited. This evaluation showed that the NMCP was making good progress in the disbursement and use of funds and that malaria was correctly managed in facilities for 66 – 77% of cases. The levels of ACT use and the coverage of IPTp and ITNs from the community survey were roughly double the levels found through the MIS; the Round 4 evaluation results are those that are quoted by the NMCP.

In August 2007, staff from the NMCP participated in a workshop on the Monitoring and Evaluation Systems Strengthening Tool. This tool was designed to assess the data collection, reporting and management systems used to measure indicators of program activities. The plan is

to develop a procedure manual for monitoring and evaluation, strengthen the capacities for using data in decision making, improve the storage and archiving of data, both on paper and electronic, train staff in the use of geographic information systems (GIS), improve the collection of data at the community level, and include the collection of community-level data in the quarterly review meetings.

The PMI monitoring and evaluation framework selects specific activities to be monitored on a regular basis to allow in-country program managers to assess progress and redirect resources as needed. Activities within the four main intervention areas will be tracked through the quarterly NMCP review meetings, periodic reports from groups providing commodities, health facilities, and international and local partners. Types of activities that will be monitored include procurement and distribution of commodities, including ITNs, SP tablets, RDTs, delivery of services such as indoor spraying, ACT and IPT treatment, training of health care staff to build capacity to improve service delivery, behavior change communication efforts to improve health seeking behavior and acceptance of IRS.

Progress to Date:

In November 2006, PMI funded a Malaria Indicator Survey (MIS) to collect baseline data for PMI related interventions. The survey was conducted by ORC Macro in collaboration with local partners including the *Centre de Recherche pour le Développement Humain*. The survey results are discussed in the section "Current Status of Malaria Indicators."

During Year 2 the PMI resident staff actively participated in the quarterly reviews and on a commission charged with following-up on recommendations stemming from the reviews. The most significant accomplishment of this commission was the revision of the data template that the districts complete for the reviews, including clarifying the definition of some indicators and adding a few key analyses. This is expected to contribute significantly to improving data quality.

Proposed Year 3 Activities: ($565,000)

In Year 3, the monitoring and evaluation activities funded by the PMI will be done jointly with the NMCP and other partners, and PMI will support the NMCP's costed M&E plan. PMI will help build national capacity in monitoring and evaluation of coverage and utilization rates for ACTs, ITNs, IPTp and IRS through an MIS, and health facility and community-level performance through supportive supervision, routine record reviews, and service statistics. Rather than establishing parallel sentinel sites as are used in other countries to collect facility-based data, PMI in Senegal will instead support the NMCP M&E plan, and will receive district-level monitoring data regularly from the NMCP. Discussions will also be held with the NMCP on data quality audit tools that could be used to strengthen the quality of routinely collected data.

The PMI will focus on the following interventions for Year 3:

1. *Coverage of interventions and impact on malaria mortality: ($500,000 for a nationwide MIS including anemia and parasitemia biomarkers, in addition to $500,000 budgeted in the FY08 MOP)*

To measure mid-point coverage for PMI-supported interventions, PMI will support a nationwide MIS in October-December 2008. This survey will be similar to the baseline MIS with the exception that it will include anemia and parasitemia testing. The MIS will provide data on the same indicators measured in November 2006, such as the proportions of children under five and pregnant women who slept under an ITN the previous night, the proportion of pregnant women who have received two or more doses of SP for IPTp during their most recent pregnancy, and the proportion of children under five with suspected malaria who have received treatment with an ACT in accordance with national malaria treatment policies within 24 hours of the onset of their symptoms. The NMCP has organized a MOH committee to supervise the MIS, including representatives of PMI, UCAD, WHO, UNICEF, the World Bank, NetMark, RBM and other partners. While the NMCP would prefer estimates for at least some indicators at a district level, the budget required could not be financed and instead the survey will provide estimates at the regional level for 8 regions and at the district level for the regions of Saint-Louis, Kaolack and Kolda.

2. *Support to the NMCP to improve archival and data back up systems ($65,000)*

The NMCP has developed a costed M&E plan; among the most pressing needs are a system for storage and archiving of data stored on paper forms at the district and national levels, and an improved computer network for the management and back up of the computerized data bases. In order to support the NMCP M&E system, the PMI will fund the purchase of these items.

STAFFING AND ADMINISTRATION

Two resident advisors oversee the PMI in Senegal, one representing CDC and one representing USAID. In addition, several health team members, including one FSN dedicates significant time supporting PMI. All PMI staff members are part of a single inter-agency team led by the USAID Mission Director or his/her designee in country. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, management of collaborating agencies and supervision of day-to-day activities.

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

Locally-hired staff to support PMI activities either in Ministries or in USAID will be approved by the USAID Mission Director. Because of the need to adhere to specific country policies and

USAID accounting regulations, any transfer of PMI funds directly to Ministries or host governments will need to be approved by the USAID Mission Director and Controller.

ANNEX 1

Tables

Table 1

President's Malaria Initiative – Senegal
Year 3 (FY09) Timeline of Major Activities

ACTIVITY	2008					2009											
	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
LLIN distribution through Vitamin A campaign																	
Distribution of subsidized and full-cost ITNs through expanded voucher program and social marketing																	
National Malaria Indicator Survey																	
IRS activities in selected districts																	
IEC/mass media for early ANC attendance and IPTp uptake																	
Support NMCP introduction of RDTs at community health huts																	
Construction of additional office space at NMCP building																	

Table 2

President's Malaria Initiative – Senegal
Planned Obligations for FY09 ($000)

Proposed Activity	**Mechanism**	**Budget (*commodities)***	**Geographic Area**	**Description of Activity**	**Relation to Interventions**
PREVENTIVE ACTIVITIES					
ITNS					
Procurement and distribution of LLINs for routine distribution to pregnant women and children under five through subsidized voucher program	TBD	4,900 (4,200)	Nationwide	700,000 nets at $7/net	ITNs
Procurement and distribution of LLINs 2009 free campaign	DELIVER	1,500 (1,500)	Nationwide	200,000 LLINs for the 2009 campaign; including $500,000 for logistics	ITNs
Support to commercial sales of full price ITNs	TBD	200	Nationwide	Support of full cost ITNs in the commercial sector	ITNs
IEC/BCC for LLIN utilization		0	Nationwide	Included in MIP and Community mobilization section	ITNs
LLINs for PLWHA	FHI	25 (25)	Nationwide	Integration of malaria prevention messages into counseling and communications and distribution of LLINs through peer educators	
SUBTOTAL: LLINs		**6,625 *(5,725)***			
IRS					

Proposed Activity	Mechanism	Budget (*commodities)*	Geographic Area	Description of Activity	Relation to Interventions
Indoor residual spraying	RTI (incl. subgrant to Service d'Hygiene)	2,875 *(1,160)*	3 districts: Richard Toll, Vélingara, and Nioro, approximately 650,000 people	One round of spraying in the same 3 districts as the previous year with an additional round of spraying in Richard Toll	IRS
Strengthen entomologic capabilities and entomologic monitoring	WHO (sub-grant to UCAD & Institute Pasteur)	265	3 districts of Richard Toll, Vélingara, and Nioro; possibly a 4th district TBD	Entomologic monitoring pre and post IRS implementation (current 3 districts); entomological monitoring of a 4th district	IRS
Insecticide resistance monitoring	WHO (sub-grant to UCAD)	25	5 sites	Insecticide resistance monitoring in areas where IRS is done or contemplated	IRS
Technical assistance for entomology	CDC IAA	10	N/A	1 visit	IRS
SUBTOTAL: IRS		**3,175 *(1,160)***			
Malaria in Pregnancy					
Supervision and monitoring of ANC, support outreach strategy, reinforce MIP services in health facilities	IntraHealth	450		Bring ANC, IPT, LLIN for pregnant women to community level, Monitoring and supervision of MIP delivery, Training of new health care providers in ANC, IPT, LLINs, MIP, interpersonal communication, replacement of filters and cups	MIP
IEC/mass media to promote early ANC attendance and IPTp uptake	TBD	100	Nationwide	Support IEC/mass media activities to mobilize women for early ANC and IPTp uptake	MIP
SUBTOTAL: MIP		**550 *(0)***			
SUBTOTAL: Prevention		**10,350 *(6,885)***			

Proposed Activity	Mechanism	Budget (*commodities)*	Geographic Area	Description of Activity	Relation to Interventions
CASE MANAGEMENT ACTIVITIES					
DIAGNOSIS					
Supportive supervision of malaria diagnosis with both microscopy and RDTs with quality assurance and control	IntraHealth / UCAD	100	Nationwide	Support for supervision of malaria diagnosis by microscopy and RDTs for laboratory and health worker staff and implement laboratory quality assurance and control measures.	Diagnosis
Technical assistance for diagnostics	CDC IAA	10	N/A	1 trip to continue work with quality control of microscopy and RDTs	Diagnosis
Operational research to assess NMCP diagnostic and treatment algorithm for uncomplicated malaria	Locally competed mechanism	75	Nationwide	Study to determine the positive and negative predictive values of the current malaria diagnostic and treatment algorithm	Diagnosis
TREATMENT					
Improve case management with ACTs	IntraHealth	365	Nationwide	Support transition to AL in 2010 (training,supervision, monitoring, job aids), Training of newly hired HCWs, Supportive supervision, monitoring, outreach strategy	Case management
Technical assistance for OR and diagnostics or case management	CDC IAA	10	N/A	I trip to assist with OR and case management	Case management

Proposed Activity	Mechanism	Budget (*commodities)*	Geographic Area	Description of Activity	Relation to Interventions
Medication kits for severe malaria	DELIVER	240 (240)	Nationwide	Kits for treatment of one day of severe malaria w medicines and supplies, ~2600 cfa per kit	Case management
PHARMACEUTICAL MANAGEMENT AND DRUG QUALITY					
Drug management training	SPS	230	Nationwide	Drug stock management for dispensers at health centers and health posts, including private pharmacies	Case management
Drug efficacy testing	WHO (subgrant to UCAD)	30	N/A	Therapeutic efficacy tests of first- and second-line drugs	Case management
Pharmacovigilance and drug quality monitoring and advocacy	USP DQI	115 (20)	Nationwide	Support for a national system of pharmacovigilance and maintenance system of drug quality assurance in 9 sites. Also includes IEC activities to inform public about counterfeit/poor quality drugs (possible sub-grant for this), and advocacy for policy enforcement of drug quality standards	Case management
SUBTOTAL: Case Management		**1,175 (260)**			
COMMUNITY					
Community mobilization	CCF Consortium of FBOs/NGOs	1,000	Nationwide	Comprehensive malaria community mobilization activities including IEC/BCC, support for MIP, case management, ITNs, IRS	LLINs, IRS, CM, MIP
Community-based implementation of ACTs	CCF Consortium of	1,200	Nationwide	Community based case management of fever in 1297	CM, MIP

Proposed Activity	Mechanism	Budget (*commodities)*	Geographic Area	Description of Activity	Relation to Interventions
	FBOs/NGOs			functional health huts. Includes training, supervision, and monitoring of staff	
SUBTOTAL: Community		**2,200**			
CAPACITY BUILDING					
Support to NMCP to enable program supervision	NMCP (through WHO)	50	Nationwide	Support visits by national staff to regional and district level	Capacity building, CM, Diagnosis, MIP
Support to adding space to existing PNLP building *(pending review by regional engineer)**	TBD	100	PNLP	Adding to PNLP building to accommodate increase in staff	Capacity building, CM, MIP
Support for M&E capacity building for national program staff and regional and district personnel	IntraHealth	30	Nationwide	Support for 10 people to participate at the annual 3-week health focused francophone M&E course based at CESAG in Dakar (participants chosen in collaboration with NMCP)	Capacity Building, M&E
SUBTOTAL: Capacity Building		**180**			
MONITORING AND EVALUATION					
Interim nationwide Malaria Indicator Survey	MEASURE/ DHS follow-on with local partner(s)	500	Nationwide	Midpoint data for indicators to be used within PMI on intervention coverage including biomarkers (Oct-Nov 2008); 500,000 from FY08 MOP for total of $1 million	M&E
Support for improving quality of routine data	Local tender	65	PNLP	Support for archival and data back up system for PNLP	M&E
SUBTOTAL: M&E		**565**			

Proposed Activity	Mechanism	Budget (*commodities)*	Geographic Area	Description of Activity	Relation to Interventions
IN-COUNTRY MANAGEMENT AND ADMINISTRATION					
In-country staff; Admin. Expenses	CDC/USAID [10]	1230	Nationwide	Coordination of all in-country PMI activities	All interventions
SUBTOTAL: Mgmt. & Admin.		**1,230**[9]			
		15,700 (7,145)	***Commodities represent 45.5% of total budget***		

[10] This will cover : two PMI international staff and other in-country administrative expenses

Table 3

Senegal Year 3 (FY09) Estimated Budget Breakdown by Intervention ($000)

Area	Commodities (%)	Other (%)	Total
Insecticide-treated Nets	5,725 (86%)	900 (14%)	6,625 (100%)
Indoor Residual Spraying	1,160 (36%)	2,015 (64%)	3,175 (100%)
Malaria in Pregnancy - IPTp	0 (0%)	550 (100%)	550 (100%)
Case Management	260 (22%)	915 (78%)	1175 (100%)
Community Interventions	0 (0%)	2,200 (100%)	2,200 (100%)
Capacity Building	0 (0%)	180 (100%)	180 (100%
Monitoring and Evaluation	0 (0%)	565 (100%)	565 (100%)
Administration	0 (0%)	1,230 (100%)	1,230 (100%)
Total	7,145 (45.5%)	8,555 (54.5%)	15,700 (100%)

Table 4

Year 3 (FY09) Budget Breakdown by Partner ($000)

Partner Organization	Geographic Area	Activity	Budget*
CCF-led consortium of NGOs/FBOs (World Vision, Africare, Plan International, Counterpart, and CRS/Caritas)	Nationwide	Community case management with ACTs, IEC/BCC for IRS, LLIN, treatment seeking, promotion of ANC and IPTp	2,200
CDC IAA	N/A	Technical assistance visits for entomology, diagnostics and case management	30
DELIVER	Nationwide	Procurement of LLINs and severe malaria medications, TA and logistical support for national LLIN campaign	1,740
FHI	Nationwide	Integrate malaria counseling into materials for care and support of PLWHA, to accompany ITN distribution	25
IntraHealth	Nationwide	Health worker training, promotion of IPTp, ITNs, ACTs, IEC, and support to NMCP for supervision and monitoring; M&E training	945
MEASURE/DHS follow-on with local partners	Nationwide	MIS November 2008, midpoint data for PMI indicators; will complete the $500K budgeted in FY08	500
RTI	Nioro, Richard Toll, and Vélingara districts	IRS commodity procurement and operations	2,875
SPS (MSH)	Nationwide	Drug stock management for dispensers and stock managers, assistance to PNLP and PNA for drug quantification and management	230
USP DQI	Nationwide	National, integrated Pharmacovigilance Center, drug quality assurance sites and drug quality IEC	115
WHO Umbrella Grant local sub-grants			
University Cheikh Anta Diop (UCAD) (through WHO)	Nationwide	Drug efficacy testing, insecticide resistance monitoring, entomological monitoring in 3 IRS districts + 1 new district	290

Partner Organization	Geographic Area	Activity	Budget*
GOS (NMCP) (through WHO)	Nationwide	Support National Level Program Management and Supervision to Regions	50
Institute Pasteur (through WHO)	4 districts	Entomological monitoring in 3 IRS districts + 1 new district	30
(Subtotal via WHO)	To UCAD, NMCP, Institute Pasteur		370
TBD (locally-competed contract)	Dakar with nationwide impact	Expansion of NMCP office to improve functioning of NMCP team	100
TBD (local procurement)	Dakar with nationwide impact	Support for backup of national malaria data archiving system	65
TBD (Locally-competed mechanism)	Nationwide	Operations Research on RDT algorithm	75
TBD	Nationwide	Mass media effort to increase ANC attendance and IPTp uptake; mechanism to be determined early in FY09	100
TBD (new central LLIN project or locally-competed mechanism)	Nationwide	Distribution of LLINs (including reimbursement of vouchers) for the subsidized voucher system targeting pregnant women and children <5 years old and support to private sector social marketing	5,100

* Does not include staffing and administration