

This Malaria Operational Plan has been endorsed by the U.S. Global Malaria 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 Six – Fiscal Year 2012

SENEGAL

November 11, 2011

Note: Data on malaria situation in Senegal as well as other health and socio-demographic data will be updated in the MOP once the 2010-2011 DHS final results are released.

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ABBREVIATIONS and ACRONYMS

ACT	artemisinin-based combination therapy
AIDS	Acquired Immunodeficiency Syndrome
ANC	antenatal care
AL	artemether-lumefantrine combination therapy
AS–AQ	artesunate-amodiaquine combination therapy
BCC	behavior change communication
CBO	community-based organization
CCM	Country Coordinating Mechanism
CDC	Centers for Disease Control and Prevention
CFA	West African Financial Community Franc (USD \$1 = Fr CFA 450)
CMS	Central Medical Stores
CHW	community health worker
DHS	Demographic and Health Survey
DSDOM	<i>distributeur de soins à domicile</i> (village malaria worker)
FY	fiscal year
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GHI	Global Health Initiative
HIV	Human Immunodeficiency Virus
HMIS	health management information system
IEC	information, education, communication
IMCI	integrated management of childhood illnesses
IPTp	intermittent preventive treatment in pregnant women
IRD	<i>Institut pour le Recherche et Développement</i>
IRS	indoor residual spraying
ITN	insecticide-treated bednet
LLIN	long-lasting insecticide-treated bednet
MACEPA	Malaria Control and Evaluation Partnership for Africa
M&E	monitoring and evaluation
MIP	malaria in pregnancy
MIS	Malaria Indicator Survey
MOH	Ministry of Health
NGO	non-governmental organization
NMCP	National Malaria Control Program
PECADOM	<i>prise en charge à domicile</i> (home-based management of malaria)
PMI	President’s Malaria Initiative
RBM	Roll Back Malaria
RDT	rapid diagnostic test
SLAP	<i>Service de Lutte Antiparasitaire</i> (Parasite Control Service)
SP	sulfadoxine-pyrimethamine
UCAD	<i>Université Cheikh Anta Diop</i>
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

EXECUTIVE SUMMARY

Malaria prevention and control is a major foreign assistance objective of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a six-year, comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the United States will partner with countries to improve health outcomes, with a particular focus on improving the health of women, newborns, and children.

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, and tuberculosis. The PMI was launched in June 2005 as a five-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through Fiscal Year (FY) 2014. Programming of PMI activities follows the core principles of GHI: encouraging country ownership and investing in country-led plans and health systems; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; implementing a woman- and girl-centered approach; improving monitoring and evaluation; and promoting research and innovation.

In June 2006, Senegal was selected to be included among the second group of countries added to the PMI. Implementation of large-scale malaria control activities began in FY2007 and has progressed rapidly with significant progress demonstrated to date. This FY2012 Malaria Operational Plan for Senegal was developed in close consultation with the National Malaria Control Program (NMCP) and with the participation of all national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing to support with FY2012 funding fit in well with the 2011-2015 National Malaria Control Strategic Plan and build on investments made by PMI and other partners to improve and expand malaria-related services over the last five years. The proposed FY2012 PMI budget for Senegal is \$21.6 million.

Senegal has a population estimated at 13.2 million, with approximately 2.5 million children under five and 516,000 pregnant women. Malaria is a major cause of morbidity and mortality and a high priority for the government; however, the number of reported cases of malaria has dropped significantly since 2007-2008. While the decline in the first year can be partially ascribed to a change in the malaria case definition that now requires parasitologic confirmation of all cases, in the second year the proportion of all outpatient visits due to confirmed malaria continued to fall, from 6% in 2008 to 3% in 2009. Since July 2010, morbidity data are not available because health worker unions began a nationwide data retention strike; although clinical activities have not stopped, health workers no longer report any routine data, including those related to malaria.

The 2010-2011 Demographic and Health Survey showed that under-five mortality continued to fall, from 121 per 1000 live births in 2005 to 85 in 2008 to 72 in 2010, a 40% drop in five years. The proportion of households owning at least one ITN increased from 45% in 2005 to 63%, and

that the proportion of children under five sleeping under an ITN the previous night had increased from 21% to 35%, with similar trends for pregnant women. The proportion of pregnant women receiving two doses of intermittent preventive treatment with sulfadoxine-pyrimethamine (SP) fell from 52% in 2008 to 39% in 2010, due largely to recent problems in maintaining supplies of the drug.

The following paragraphs describe progress made during the last 12 months and proposed FY2012 activities.

Insecticide-treated nets (ITNs): During FY 2011, PMI supported the free distribution of more than two million LLINs using a universal coverage approach in four regions, as well as 494 LLINs to pregnant women attending prenatal care. To promote LLIN demand and correct use, PMI has also invested in behavior change communication (BCC) using primarily community-based networks.

With FY2012 funding, PMI and the NMCP will focus on supporting the routine distribution system that is in the early stages of development. The strategy is expected to include two tracks – 1) free LLINs given to pregnant women as part of the antenatal care package; and 2) subsidized LLINs made available to the general public via health facilities and community-based organizations. LLIN needs in 2012 are estimated to be just over two million. The one million LLINs expected to be distributed by PMI in 2012-2013, along with those expected to be purchased by the NMCP via the Global Fund, will meet the estimated needs and ensure continued high rates of household possession and use.

Indoor Residual Spraying (IRS): During the 2011 spray season, the NMCP and PMI carried out IRS activities in five health districts: Guinguineo, Koumpentoum, Malem Hoddar, Nioro and Velingara. Overall, 98% of the 242,000 houses targeted by spray teams were successfully sprayed protecting 859,309 residents. With FY2012 funding, PMI will support spraying in six districts (the five listed above and Kounghoul) with the aim of protecting over 1,000,000 residents.

Intermittent preventive treatment in pregnant women (IPTp): In 2011, PMI continued to support refresher training in IPTp and case management of malaria in pregnancy, provision of job aids and material support for enhancing delivery of IPTp, as well as outreach visits that deliver ANC services at the community level. However, repeated stock-outs of SP have compromised Senegal's ability to deliver IPTp. With FY2012 funding, PMI will procure sufficient SP to cover estimated IPTp needs nationwide, and continue to support training, materials, and outreach visits.

Case management: During FY2011, PMI procured over 600,000 doses of ACTs to meet the country's needs for the year. The PMI also maintained support for training and supervision in both diagnostics and treatment, and expanded peer supervision for diagnostics and case management. With FY2012 funds, PMI will procure 1.2 million rapid diagnostic tests to cover the full needs for the year, procure 300,000 ACTs for treatment at the health facility and health hut levels, provide continued support for training and supervision in case management, and support therapeutic efficacy studies.

Global Health Initiative and enhanced integration: In line with GHI principles, PMI has reinforced its efforts to build capacity and integrate across programs. In response to stock outs of several commodities, PMI supported an evaluation of the Central Medical Stores aimed at identifying problems and potential solutions. With FY2011 funds PMI supported training for 55 pharmacy managers on supply chain management as part of an integrated activity covering principles that apply to all essential drugs. Similarly, drug quality monitoring integrated not only medicines for the treatment of malaria but also for tuberculosis, HIV/AIDS, and oral contraceptives, with different programs contributing to support the overall budget. The PMI strengthened integrated health services provided at the facility level and through outreach clinics operated by health facility staff at the community level. Senegal boasts a network of community-based “health huts” that offers a package of health services to rural populations far from health posts. In the majority of the 1,627 functional health huts, PMI and the USAID/Maternal and Child Health program supported a basic package of services, including malaria case management with RDTs and ACTs, diarrhea case management, de-worming, growth monitoring and promotion, vitamin A supplementation, management of malnutrition, and a series of health promotional services, including those for family planning and reproductive health. At present, pneumonia case management and basic neonatal/perinatal services are offered in about 60% of health huts, and community surveillance for tuberculosis is offered in about half of health huts.

With FY2012 funding, PMI will continue supporting the provision of an integrated package of prevention and treatment services at the health hut level, maintain support for community mobilization and communication activities to prevent and control malaria, and increase support for the National Malaria Control Program's home-based management of malaria program. PMI will also continue to support and promote the effective collaboration between Peace Corps Volunteers and implementing partners at the community level.

Capacity Building and Health Systems Strengthening: Since its inception, PMI has been committed to strengthening the health system in Senegal and to building the capacity of the national government to control malaria. In the last 12 months, PMI/Senegal funded participation in courses on monitoring and evaluation and applied epidemiology, covered routine costs associated with supervision of health system staff by the NMCP. PMI has also provided health system support through pharmaceutical management activities, as well as antimalarial drug quality monitoring. With FY2012 funds, the PMI plans to continue to support for capacity building efforts in malariology and other health systems strengthening activities in supply chain management, as well as expanded support to the private sector for appropriate malaria case management.

Monitoring and Evaluation (M&E): The PMI's M&E activities are carried out jointly with the NMCP and other partners, and PMI supports implementation of the new NMCP M&E plan. Activities supported by PMI have included Malaria Indicator Surveys (MIS) in 2006 and 2008, a survey after the 2009 LLIN distribution campaign, the 2010 DHS, support for a malaria epidemic detection system, and monitoring of PMI's four main intervention areas.

Support with FY2012 funds will include assisting the NMCP to implement a new data management system for routine data, supporting the Roll Back Malaria/PMI Impact Evaluation, and support for the new continuous DHS that will begin in early 2012.

INTRODUCTION

Global Health Initiative

Malaria prevention and control is a major foreign assistance objective of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a six-year, comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. Through the GHI, the United States will help partner countries improve health outcomes, with a particular focus on improving the health of women, newborns and children. The GHI is a global commitment to invest in healthy and productive lives, building upon and expanding the USG's successes in addressing specific diseases and issues.

The GHI aims to maximize the impact the United States achieves for every health dollar it invests, in a sustainable way. The GHI's business model is based on: implementing a woman- and girl-centered approach; increasing impact and efficiency through strategic coordination and programmatic integration; strengthening and leveraging key partnerships, multilateral organizations, and private contributions; encouraging country ownership and investing in country-led plans and health systems; improving metrics, monitoring and evaluation; and promoting research and innovation. The GHI will build on the USG's accomplishments in global health, accelerating progress in health delivery and investing in a more lasting and shared approach through the strengthening of health systems.

President's Malaria Initiative

The President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDS, and tuberculosis. The PMI was launched in June 2005 as a 5-year, \$1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has now been extended through FY 2014 and, as part of the GHI, the goal of the PMI has been adjusted to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. This will be achieved by reaching 85% coverage of the most vulnerable groups — children under five years of age and pregnant women — with proven preventive and therapeutic interventions, including artemisinin-based combination therapies, insecticide-treated nets, intermittent preventive treatment of pregnant women, and indoor residual spraying.

In implementing this initiative, the USG is committed to working closely with host governments and within existing national malaria control plans. Efforts are coordinated with other national and international partners, including the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund), Roll Back Malaria (RBM), the World Bank Malaria Booster Program, and the non-governmental and private sectors, to ensure that investments are complementary and that RBM and Millennium Development goals are achieved.

Senegal was one of the four countries selected for PMI in the second year of the initiative. Large-scale implementation of ACTs and ITNs began in Senegal in mid-2007 and has progressed rapidly with support from PMI and other partners. This FY2012 PMI Malaria

Operational Plan presents a detailed implementation plan for the sixth year of PMI in Senegal. It was developed in consultation with the NMCP, with participation of national and international partners involved with malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the 2011-2015 National Malaria Control Strategic Plan and build on investments made by PMI and other partners to improve and expand malaria-related services. This document briefly reviews the current status of malaria control policies and interventions in Senegal, describes progress to date, identifies challenges and unmet needs if the targets of the NMCP and PMI are to be achieved, and provides a detailed description of activities planned to be carried out with FY2012 funding. The total amount of PMI funding requested for FY2012 is \$21.6 million.

MALARIA SITUATION IN SENEGAL

This section will be updated when the final 2010 DHS results are released in late 2011

Senegal's estimated population in 2012 will be approximately 13.2 million with 42% living in urban areas.¹ The proportion of the population living below the poverty line is 63% in rural areas and 31% in Dakar². Although substantial improvements have been achieved since the 1960s, Senegal's indicators of human development remain unacceptably low with the country ranked 155 out of 187 countries worldwide on the Human Development Index³. The infant mortality rate is 47 and the under-five mortality rate is 72 per 1,000 live births⁴. Maternal mortality is estimated to be 401 per 100,000 live births and the mean life expectancy is 56 years⁵. The adult HIV prevalence rate is estimated at 0.9% for adults 15-49 years of age, with 54,000 adults and 5,000 children estimated to be living with HIV/AIDS⁶.

¹ Agence Nationale de la Statistique et de la Démographie. Situation Economique et Sociale du Sénégal 2009. Available on web at http://www.ansd.sn/publications/annuelles/SES_2009.pdf, accessed 4 November 2011.

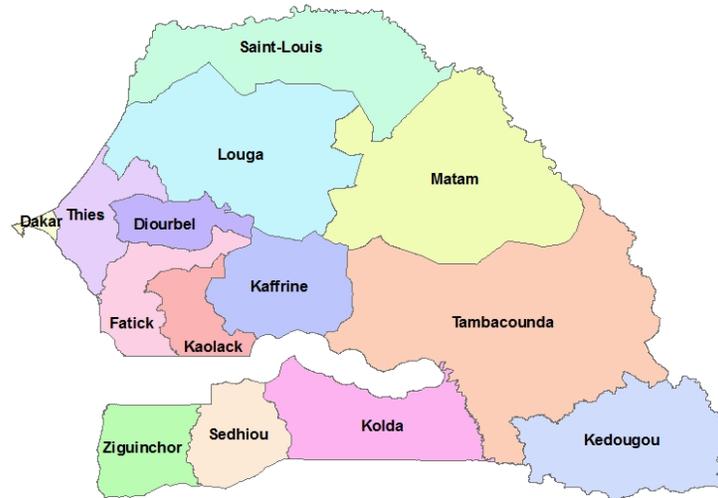
² Republic of Senegal, Ministry of Economy and Finance. Poverty Reduction Strategy Paper-II Progress Report, October 2010.

³ Human Development Report 2011: Senegal. Available on web at <http://hdr.undp.org/en/statistics/>. Accessed 9 November 2011.

⁴ Agence Nationale de la Statistique et de la Démographie. Sénégal Enquête Démographique et de Santé à Indicateurs Multiples 2010-2011, Rapport Préliminaire

⁵ 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

⁶ UNAIDS/WHO Global report: UNAIDS Report on the Global AIDS Epidemic 2010. Available on web at http://www.unaids.org/documents/20101123_GlobalReport_Annexes1_em.pdf. Accessed 9 November 2011.



Map of Senegal showing the current 14 Regions

Administratively, the country is divided into 14 regions and 46 departments. 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 District Health Management Team, oversees care and treatment at the District Health Center and at peripheral facilities throughout the district, as well as overseeing prevention activities. There are currently 75 health districts in Senegal.

Although not a formal part of the health system, Senegal’s health care pyramid rests on a foundation of approximately 1,627 “functional”⁷ health huts that are established and managed by local communities and cover approximately 19% of the country’s population. 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 advanced medical care. Additional community health staff includes *matrones*, who are trained birth attendants; and *relais*, who are health educators and communicators. Since 2008, a new type of health worker, the village malaria worker (*Distributeur de Soins à Domicile*, DSDOM), provides testing with rapid diagnostic tests (RDTs) and treatment with artemisinin-based combination therapies (ACTs) through the home-based management of fever program (*Prise en Charge à Domicile*, PECADOM), now active in 1,000 villages.

Malaria is endemic throughout Senegal and 100% of the population is at risk of the disease. 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 with 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 country can also be divided into two epidemiological zones -- the Sahelian, with high transmission toward the end of and

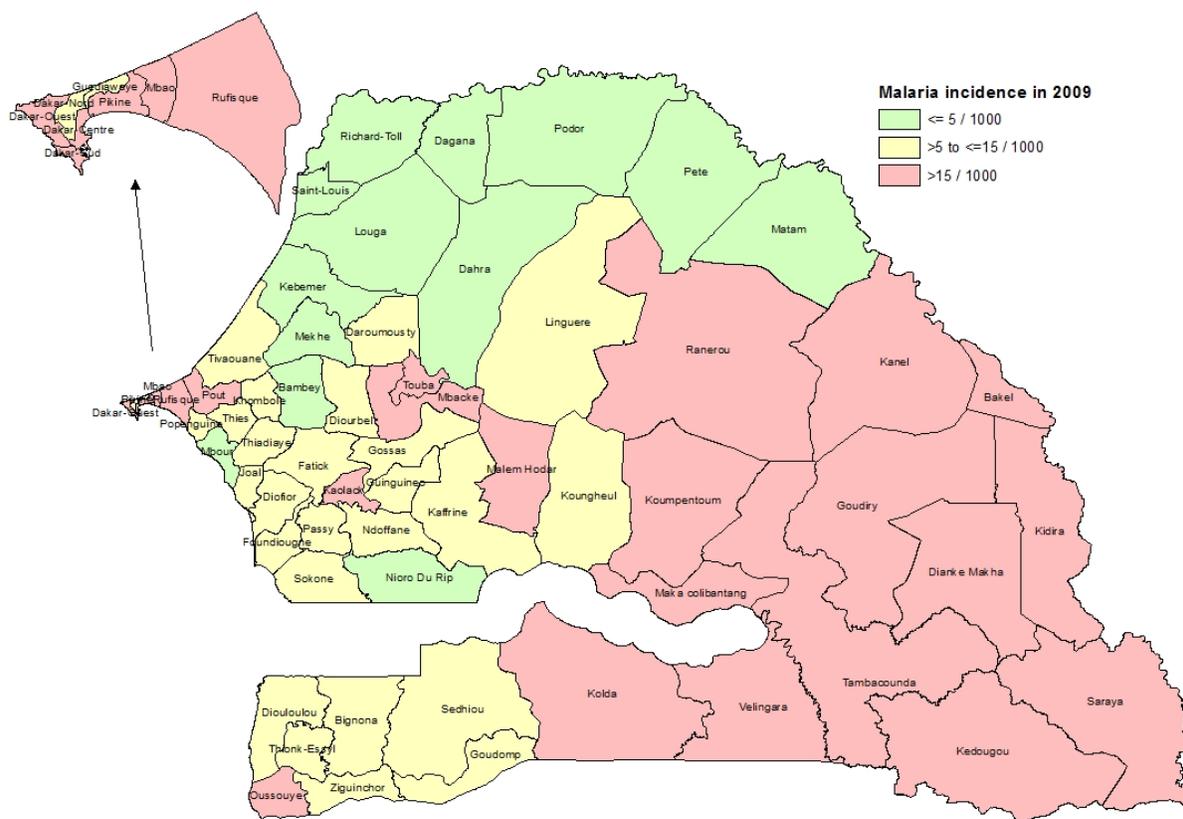
⁷ A functional health hut is defined as one that has a trained community health worker (literacy is preferred but not required), regular supervision by the chief nurse of the health post, and the basic equipment and space needed to provide services. There are 1,627 functional health huts currently supported by the PMI program.

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 occurs throughout the year, often as small outbreaks, in areas close to rivers or other water sources that persist through the dry season. In peri-urban areas the increased rainfall and flooding of the past three years has led to higher peaks in transmission during the rainy season. *Plasmodium falciparum* is the major malaria parasite species, accounting for more than 90% of all infections. The main vector species are *Anopheles gambiae sensu strictu*, *An. arabiensis*, *An. funestus*, and *An. melas*. The species distribution depends on rainfall and the presence of permanent sources of water.

The vulnerable groups in Senegal comprise an estimated 2.5 million children under five and 516,000 pregnant women. According to routine data collected by the NMCP, between 2001 and 2006 malaria was responsible for just over one-third of all outpatient consultations. In October 2007, the definition of a case of malaria changed from a purely clinical definition to one that relies on parasitological confirmation. From that point on, clinicians were directed to test all suspected cases of malaria, and to treat and report only those cases with positive results. The proportion of suspected cases actually tested rose from 15% in January 2008 to 89% in December 2008 and in 2009, 86% of suspected cases were tested. Patients who are not tested are not included in case reporting.

As a result of these changes, the proportion of all outpatient visits due to malaria fell from 25% in 2007 to 6% in 2008. The proportion of all deaths in children under five in health facilities that were attributed to malaria also fell from 40% in 2001 to 21% in 2007 and to 7% in 2008. Although the change in late 2007 from a clinical case definition of malaria to one requiring parasitological confirmation obscures assessment of the impact of other program activities, between 2008 and 2009 this reduction continued, with malaria representing only 3% of all outpatient visits and 4% of all deaths in 2009. The incidence per 1,000 population by district shows that the decline in malaria incidence has been greater in the north and west of the country, with high malaria incidence remaining in the southeast and in larger cities such as Dakar, Touba and Kaolack. Since July 2010, morbidity data are not available because health worker unions began a nationwide data retention strike. Although clinical activities continue, health workers no longer report any routinely collected data, including those related to malaria.

Incidence of confirmed malaria per 1000 population by district, Senegal, 2009



CURRENT STATUS OF MALARIA INDICATORS

This section will be updated when the final 2010 DHS results are released in late 2011

Table 1 below shows that steady progress has been made for most malaria indicators in Senegal, as measured by two Demographic and Health Surveys (DHS, 2005 and 2010), two Malaria Indicator Surveys (MIS, 2006 and 2008) and a post-LLIN campaign survey (PCS, 2009). Household ownership of at least one insecticide-treated net (ITN) rose from 20% in 2005 to 82% in 2009, but fell back to 63% in 2010. This difference may be due to the timing of the surveys in relation to distribution campaigns and the transmission season, or people not disclosing all of their available nets in the belief that they would receive more. Utilization of ITNs by children under five rose from 7% in 2006 to 35% in 2010. Similar trends in utilization were observed with pregnant women and in the general population.

The proportion of pregnant women receiving two doses of intermittent preventive treatment (IPTp) with sulfadoxine-pyrimethamine (SP) increased from 12% in 2005 to 52% in 2008, but fell to 39% in 2010 due primarily to stockouts of SP. Comparing the proportion of children with fever who receive prompt treatment with an ACT between 2006 and 2008 surveys is difficult given the introduction of ACTs in early 2006 and the implementation of a new treatment

algorithm in late 2007 that mandates testing of all suspected cases and treatment only for those testing positive. Overall at the time of the 2008 MIS (November 2008 to January 2009), only 2% of children were reported to have received an ACT within 24 hours for fever. Care or advice was sought for 52% of children with fever;⁸ 65% of these went to a public hospital, health center, or health post and 13% to a public, community-level structure such as a health hut. Only 9% of all children with fever had a malaria test. Of those whose mothers reported that the test was positive, 20% were treated within 24 hours.

The 2010-2011 DHS showed that under five mortality continues to fall, from 121 per 1,000 live births in 2005 to 85 in 2008 to 72 in 2010 (a drop of 40%). Since the 2005 DHS, the proportion of children with severe anemia has fallen slightly, from 7.4% to 4.9% and the proportion of women of childbearing age with any anemia has also declined, from 59% to 54%. As anemia rates vary according to the season and the level of malaria transmission, it is unclear whether these results represent any real change. The parasite prevalence from November 2008 to January 2009 was 6% in children 6-59 months of age, with regional prevalence increasing ranging from 0% in Saint Louis in northern Senegal to 23% in Tambacounda in the southeast, correlating well with the incidence map above. The results from the 2010 DHS for parasite prevalence, LLIN utilization, and malaria treatment need to be interpreted with caution, as most of the data collection was done during the low transmission season. The period of data collection for the 2010 DHS and 2008 MIS only partially overlapped, with less than half of the data collected during the same period of the year.

These two surveys show notable increases in coverage and utilization of major malaria prevention and control measures and evidence of impact on overall child mortality; however, they also show that continued support is needed to scale up interventions to reach targets established by the NMCP and PMI.

⁸ According to the 2010 DHS preliminary results, 23% of children under 5 had a fever within the previous two weeks and 43% of those sought treatment at a health facility.

Table 1: Evolution of Key Malaria Indicators in Senegal from 2005 to 2010

Indicator	2005 DHS ⁹	2006 MIS ¹⁰	2008 MIS ¹¹	2009 PCS ¹²	2010 DHS ¹³	2010 DHS Range by Residence
% Households with an ITN	20	36	60	82	63	52 Urban – 73 Rural
% General population who slept under an ITN the previous night	6	12	23	34	TBD	
% Children under five who slept under an ITN the previous night	7	16	29	45	35	31 Urban – 37 Rural
% Pregnant women who slept under an ITN the previous night	9	17	29	49	37	35 Urban – 39 Rural
% Women who received 2 or more doses of IPTp during their last pregnancy in the last 2 years	12	49	52	--	39	35 Rural – 46 Urban
% Children under 5 years old with fever in the last 2 weeks who received treatment with an ACT within 24 hours of onset of fever	--	3	2	--	TBD	
% Women of childbearing age with anemia (<11 g/dL)	59	--	64	--	54	No difference
% Children 6-59 months with severe anemia (<7 g/dL)	7	--	7	--	5	72 Urban – 79 Rural
% Children under five with parasitemia (<i>P falciparum</i>)	--	--	6	--	TBD	
Under 5 mortality rate per 1,000 live births	121	--	85	--	72	

⁹ 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

¹⁰ Ndiaye, Salif, and Mohamed Ayad. 2007. Senegal Malaria Indicator Survey 2006. Calverton, Maryland, USA : Centre de Recherche pour le Développement Humain [Sénégal] and Macro International Inc.

¹¹ Ndiaye, S. et al. 2009. 2008/9 Senegal Malaria Indicator Survey. Calverton, Maryland USA: Centre de Recherche pour le développement humain (Sénégal) and ORC Macro.

¹² Programme National de Lutte Contre le Paludisme. 2010. Evaluation de la campagne intégrée de distribution de moustiquaires imprégnées à longue durée d'action, de vitamine A, et de mébendazole au Sénégal 2009

¹³ Agence Nationale de la Statistique et de la Démographie. Sénégal Enquête Démographique et de Santé à Indicateurs Multiples 2010-2011, Rapport Préliminaire

NATIONAL STRATEGIC PLAN FOR MALARIA

Proposed PMI activities are aligned with the 2011-2015 National Strategic Plan for Malaria Control. The overall objective of this plan is to reduce malaria morbidity to the threshold for pre-elimination and to reduce malaria mortality by 75% from a 2010 baseline by attaining the following objectives by 2015:

- Increase the proportion of the population sleeping under an ITN to 80%;
- Cover 90% of the population living in zones targeted for IRS;
- Treat at least 95% of identified larval sites;
- Increase IPTp coverage to 80%;
- Treat all cases of malaria in pregnant women according to national guidelines;
- Test at least 95% of suspected cases of malaria;
- Treat all malaria cases seen by health care workers according to national directives;
- Detect rapidly 80% of epidemics and other emergency situations;
- Ensure that at least 95% of public and community health facilities have a steady supply of antimalarials and other products;
- Reinforce health promotion in order to improve the effectiveness of malaria control interventions;
- Improve the management of the program at all levels; and
- Ensure timely availability and utilization of data to monitor and evaluate the implementation of the 2011-2015 National Strategic Plan.

These objectives will be achieved by strengthening prevention measures providing correct and timely treatment through both health facilities and community health workers. The 2011-2015 National Strategic Plan for Malaria Control outlines an integrated package of activities, which includes major efforts in vector management, malaria in pregnancy, case management, epidemic prevention and control, pharmaceutical supply chain management, health promotion, program management, and monitoring and evaluation.

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

MULTILATERAL AND BILATERAL DONORS IN MALARIA CONTROL

Senegal currently has one active **Global Fund** malaria grant, Round 7, a \$67 million grant for the period from 2007 to 2012. Phase 1 ended in April 2010 and though the GF has approved Phase 2, the signing has been delayed, resulting in the cancellation of five quarters of funding totaling roughly \$21 million. Senegal's Round 10 submission was successful for a total budget of \$88 million over 5 years, awarded to two principal recipients, the NMCP and IntraHealth International. The Round 7 and 10 grants are being consolidated but it is unclear when the new grant will be signed.

The **World Bank** continues to provide support for malaria through the Senegal River Basin Development Organization and the Nutrition Enhancement Project. In November 2010, the

Senegal River Basin Development Organization distributed 481,500 LLINs in Matam, Saint Louis, Tambacounda and Louga regions and continues to support information, education and communication (IEC) activities. After distribution campaigns targeting all children under five in the rural communities served by the program in 2008 and on a smaller scale in 2009, the Nutrition Enhancement Project continued malaria communication/education activities in 2011 targeted to pregnant women and mothers of children under five.

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

The United Nations Children’s Fund (UNICEF) provides support for district-level health plans in the regions of Kolda, Sédhiou, Kédougou, Tambacounda and Matam. In addition, UNICEF is providing direct support to 70 USAID/PMI supported health huts through the USAID Community Health program.

The Islamic Development Bank is providing \$8 million in loans for the procurement of LLINs and RDTs, health personnel training, and support for supervision. One million LLINs and RDTs were procured through UNICEF with this funding with 600,000 of these LLINs used to carry out the first phase of universal coverage activities in four regions in 2010.

In addition to multilateral institutions, Senegal benefits from the support of various bilateral donors. **The French Cooperation** contributes significantly to research activities through the Pasteur Institute and the Institute for Research and Development (IRD) and places a technical advisor at the MOH. **The Japan International Cooperation Agency** and USAID are developing a joint partnership in Tambacounda and Kedougou regions where PMI supports health facility and community-based malaria services provision. **The Chinese Cooperation** has donated drugs for the treatment of uncomplicated and severe malaria, and **the Embassy of Thailand** has supported the participation of health personnel at malaria training courses in Thailand. **The Belgian Technical Cooperation** is supporting the overall development of the health sector primarily in Fatick and Kaolack regions.

The United States Peace Corps and PMI embarked on a new partnership in 2011, called “Stomping Out Malaria in Africa.” In Senegal, PMI staff and implementing partners will continue to regularly participate in pre-service and in-service training sessions and beginning this year will support one third-year malaria volunteer to further enhance collaboration on universal coverage activities.

Senegal’s non-governmental and faith-based partners are also numerous. **Medicos del Mundo** and several Spanish NGOs are active in Sédhiou and Kolda regions. They have supported outreach activities by health post staff, rehabilitation of health huts, and LLIN distribution campaign operations. Non-governmental and faith based organizations such as the **ChildFund Consortium** implement PMI’s community level malaria activities. Members of the consortium include World Vision, Plan International, Catholic Relief Services and Africare. **Caritas** implements similar activities in communities surrounding private Catholic health posts through its Malaria Communities Program grant. The PMI’s clinic/facility, IRS, LLIN distribution,

communication and drug management activities are managed by several US-based organizations, including **IntraHealth International, Abt Associates, Johns Hopkins University Center for Communications Programs** and **Management Sciences for Health**.

The **Senegalese Red Cross Society** has received funds from PMI via the International Federation of Red Cross and Red Crescent Societies, and contributed its own funds, to support volunteers and supervisors/coaches during the under-five and universal coverage mass distribution campaigns and to implement follow-up activities encouraging net hanging and use. The **Spanish Red Cross Society** has distributed several thousand LLINs in peri-urban Dakar and the Senegal River valley. The **International Committee of the Red Cross** supports outreach activities and LLIN distribution campaign operations in conflict zones in Ziguinchor and Sédhiou regions. **PATH / MACEPA**, which began work in Senegal in 2009, supported the development of the 2011-2015 National Strategic Plan and continues to support the NMCP in monitoring, evaluation and surveillance, particularly in the north.

Senegal is fortunate to have strong academic and research capacities in epidemiology, parasitology and entomology at the NMCP, **Université Cheikh Anta Diop** (UCAD), the **Parasite Control Service (SLAP)**, **IRD** and the **Pasteur Institute**. These groups have strong collaborative relationships and together have published much of the recent literature on malaria in Senegal.

In the private sector, the **Pfizer** pharmaceutical company implemented a malaria control program focused in three health districts in the Tambacounda Region, which focuses on 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. **Malaria No More** supports the dissemination of a variety of messages promoting malaria prevention and treatment through the “Senegal Surround Sound” campaign in collaboration with the Youssou Ndour Foundation. In addition, **Total**, a French oil and Gas group, has worked with the NMCP to implement outreach and sensitization programs.

GOAL AND TARGETS OF THE PRESIDENT’S MALARIA INITIATIVE

The goal of PMI is to reduce malaria-associated mortality by 70% compared to pre-initiative levels in the 15 original PMI countries. By the end of 2014, PMI will assist Senegal to achieve the following targets:

- >90% of households with a pregnant woman and/or children under five will own at least one ITN;
- 85% of children under five will have slept under an ITN the previous night;
- 85% of pregnant women will have slept under an ITN the previous night;
- 85% of houses in geographic areas targeted for IRS will have been sprayed;
- 85% of pregnant women and children under five will have slept under an ITN the previous night or in a house that has been sprayed with IRS in the last 6 months;
- 85% of women who have completed a pregnancy in the last two years will have received two or more doses of IPTp during that pregnancy;

- 85% of government health facilities have ACTs available for treatment of uncomplicated malaria; and
- 85% of children under five with suspected malaria will have received treatment with ACTs within 24 hours of onset of their symptoms.

EXPECTED RESULTS – YEAR SIX (FY2012 funding)

The following results will be achieved by the end of calendar year 2013:

Prevention:

1. A total of one million LLINs will have been procured and distributed with PMI funding. With this and other partners' contributions, the proportion of the general population sleeping under an ITN the previous night will have increased to 60%; and
2. At least 85% of eligible houses visited in the six target spray districts will have been sprayed, protecting over 900,000 residents.

Case-Management and Treatment:

1. 1.2 million rapid diagnostic tests will have been procured and distributed in formal health facilities and through community-based services nationwide to confirm > 90% of presumed malaria cases (as per data collected by the NMCP)
2. At least 300,000 first-line ACT treatments will have been procured and distributed, meeting national needs in Senegal during Year 6.

INTERVENTIONS – PREVENTION

Insecticide-treated nets (ITNs)

Please refer to the “Community-level integration of GHI programs including malaria” section for additional ITN activities.

Background:

The NMCP 2011-2015 Strategic Plan includes two key strategies for malaria prevention related to LLINs: 1) distribution of LLINs to achieve and maintain universal coverage, defined as one treated net per sleeping space; and 2) reinforcement of behavior change communication (BCC) messages on the use of LLINs. The objective is for 80% of the population to sleep under an LLIN every night by 2015. The NMCP and partners have supported various approaches for LLIN distribution: 1) periodic mass free distribution, 2) targeted subsidies for vulnerable groups, 3) untargeted subsidies through health facilities and community-based organizations (CBOs), and 4) commercial sales.

Periodic mass free distribution of LLINs: In 2007 the NMCP began to work with PMI and other partners on large-scale mass “catch-up” distributions of LLINs to children under five, culminating in a national campaign in 2009. Under the 2011-2015 malaria strategic plan, the NMCP plans on accelerating achievement of universal coverage – distributions began in 2010 and are expected to continue through 2012. Given the quantity of LLINs needed and the operational, logistic and financial challenges involved, the distribution started with high malaria transmission and/or underserved regions and is progressively covering the entire country. “Top up” campaigns are anticipated to be held every three years in order to replace used or lost LLINs not covered through continuous distributions.

Targeted subsidies for vulnerable groups: From 2004 to 2009, PMI supported the subsidized sale of ITNs and later LLINs to pregnant women and children under five. This system involved agreements between facility health committees and private sector net distributors, with beneficiaries contributing a copayment of \$2 to \$3 per net depending on the shape.

Untargeted sales of subsidized bednets: From 2006 to 2007, the NMCP supported bednet sales to the general population at health facility pharmacies and through CBOs at a subsidized price of 1,000 CFA (about \$2.17), a portion of which was retained by the health districts and CBOs. A new system for untargeted sales is in the planning phase.

Commercial bednets sold at market prices to the general public: Three major manufacturers currently supply LLINs for sale in the private sector (Vestergaard Frandsen, Tana Netting and Syngenta), along with one manufacturer of ITNs (Siamdutch). Commercial suppliers are present in all regions, though they often do not reach rural areas. These bednets are sold at 3,000 – 7,500 CFA (\$7.15 – \$17.90) each.

In a strategy meeting held in February 2010, the NMCP and partners agreed to focus efforts on achieving universal coverage via free mass distributions, followed by a comprehensive routine distribution system. This system will provide free LLINs to pregnant women at their first antenatal care visit, and subsidized nets to the general population via the health system and community-based organizations.

Progress During the Last 12 Months:

The PMI has been supporting the NMCP’s strategy to increase household ownership of LLINs to achieve universal coverage. Equally important have been the efforts to boost LLIN use.

- 1) **Free mass distributions** aimed at achieving universal coverage continued, with nearly two million LLINs distributed in four regions in FY2011 (bringing the total to 2.5 million LLINs in eight regions). This strategy, started by Peace Corps in Senegal, includes a door-to-door census of sleeping spaces and available bednets, with each family given a coupon that is later redeemed during distribution ceremonies in the local community. During a validation step, the local coordinating committee uses standardized guidelines to determine the number of nets each household will receive.

LLINs have been provided by PMI and the Global Fund. PMI has provided the majority of funding for operational costs, with the IFRC/Senegalese Red Cross, UNICEF, MACEPA, and local health and government authorities also making significant contributions. Numerous partners are supporting post-distribution BCC activities to ensure that LLINs are correctly hung and properly used.

- 2) The PMI has worked with the NMCP and partners to develop a strategy for **routine, subsidized LLIN distribution** that will reach the general population on national scale. An initial workshop was held in October 2010 to develop the major elements of the strategy, and a draft guide was prepared during a follow-up meeting in April 2011. The strategy includes two tracks: 1) free LLINs given to pregnant women as part of the antenatal care package and 2) subsidized LLINs made available to the general public via health facilities and community-based organizations. The new system will be initially implemented in the southern regions that first completed universal coverage, followed by roll-out across the country. The primary delay in getting the system up and running has been that the same limited staff is planning both the routine and mass distribution programs.
- 3) **Communications activities** have centered on the “Trois Toutes” slogan – emphasizing that LLINs should be used by all members of the family, every night, all year long. Each health district develops a communications plan for its universal coverage strategy, using multiple channels such as community radio, marketplace activities, traditional communicators, household visits, and local press. Pamphlets and counseling cards were developed to help community volunteers communicate the appropriate messages. These strategies are complemented and reinforced by BCC activities at the community level, as described below.

Gap analysis:

The NMCP and PMI expect to achieve universal coverage in early 2012, although this is dependent on the Global Fund Round 10 grant being signed before the end of 2011 (otherwise there will be a gap of approximately 400,000 LLINs). Subsequently maintaining universal coverage with LLINs will require keeping up the routine system across the country. LLIN needs for the routine system in 2013 are estimated to be approximately 2.3 million, to cover new sleeping spaces and nets lost in previous years. These calculations are based on actual distribution results from recent years, and the assumption that 8% of LLINs are lost by the end of the first year, 20% in the second year, and 50% in the third year. Of the estimated 2.3 million LLINs needed, approximately 510,000 are expected to be delivered via antenatal care and 1,800,000 via health facility and community outlets. The PMI will provide approximately one million of the needed LLINs, while the NMCP is expected to purchase approximately 1.3 million LLINs under their Global Fund grants. These combined resources should allow Senegal to sustain universal coverage in 2013. This analysis is summarized in the table below.

Defining the gap	Number LLINs needed to cover every sleeping space in 2013	7.6 million
	Number LLINs existing in country at start 2013	5.3 million
	Gap	2.3 million
Partner contributions	PMI	1.0 million
	Global Fund	1.3 million
	Total	2.3 million

Proposed Activities with FY2012 funding (\$6,600,000)

With FY2012 funds, PMI and the NMCP will focus efforts on maintaining a strong, nationwide routine distribution system for ITNs.

1. Procurement (\$5,000,000) and operational support (\$1,300,000) for distribution of LLINs

As requested by the NMCP, PMI support for LLIN distribution will focus on sustaining the national routine distribution system. The PMI plans to procure approximately one million LLINs and to support operational costs for this system (possibly including operational costs associate with LLINs procured through the Global Fund). Operational costs of \$1.30 per LLIN include transportation to regions/districts, training, supervision, and reporting.

2. Communications to promote LLIN ownership and use (\$300,000)

The PMI will employ a strategic combination of mass, interpersonal and traditional communication channels to promote improved social norms for net use and care. The objective will be to maintain high demand for LLINs, but also to ensure that regular LLIN use is sustained throughout the year, particularly during the months following the rainy season when the chances for contracting malaria remain high and risk perception is low. Consistent with the theme of the universal coverage campaign, messaging will emphasize that all people need to sleep under LLINs, every night, and all year round (“Les Trois Toutes: Toute la Famille, Toute l’Année, Toutes les Nuits”). Messages about the appropriate care of nets will also be reinforced.

Communication channels such as local radio, community and market events, traditional communicators, CBOs and community leaders will be used to disseminate key messages. Appropriate print materials including counseling cards and job aids to facilitate accurate message delivery and discussions will be used. Finally, communication modules will be developed and incorporated into all trainings for health staff involved in routine distribution, to ensure that messages about net care and repair as well as “Les Trois Toutes” are understood and reinforced by all health staff.

A description of PMI support for BCC activities to be undertaken by community health actors and Peace Corps Volunteers can be found in the section on “Community-level integration of GHI programs.”

Indoor residual spraying (IRS)

Background:

Most of Senegal has a single malaria transmission season with vectors such as *Anopheles gambiae*, *An. arabiensis* and *An. funestus*, allowing a single round of spraying just before the rains begin each year to be adequate. The irrigated areas upriver from the Diama Dam on the Senegal River historically experience a small second peak of transmission in April and May. In coastal mangrove areas, where the predominant vector, *An. melas*, prefers to feed outdoors, IRS would be expected to have limited impact. 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 pose special challenges to IRS activities.

The current (2011-2015) and previous (2006-2010) Strategic Plans for Malaria Control both include IRS as a key strategy for malaria prevention in Senegal. The PMI began supporting IRS activities in 2007 in three health districts chosen in collaboration with the NMCP: Vélingara, Nioro, and Richard Toll, each representing one of Senegal's three ecological zones. One spray round was carried out just before the high transmission season in each district, while in Richard Toll, a district along the Senegal River, an additional round was done immediately prior to the second seasonal peak in April. After entomological monitoring demonstrated that the insecticidal activity persisted long enough to cover the second peak, this second round was eliminated in 2010. The funds originally intended for this second round helped to fund the expansion of IRS to three additional districts. These districts, Guinguineo, Malem Hoddar and Koumpentoum, were chosen from among health districts prioritized for IRS by the NMCP.

Spray operations are organized by PMI implementing partners under the direction of the NMCP, the Hygiene Service, UCAD, and district health management teams. PMI support for IRS implementation includes training and equipping locally-recruited spraying agents with help from the NMCP and its vector-control partners with supervision by the Hygiene Service (the environmental public health division of the Ministry of Health Regional Hygiene and Environmental staff supervise spray operations to ensure that standards of safety and quality are met, ensure proper disposal of wastes, and oversee the monitoring of the environmental impact of IRS). In 2010, PMI also supported the development of a new database and data entry system that has since been adapted for use in other PMI countries. Each spray round is followed by post-spray evaluation meetings of stakeholders in order to identify lessons learned and opportunities for improving the next spray round.

Despite the many challenges involved in IRS implementation, high rates of acceptance have been consistently achieved in all spray rounds.

Year (# Districts)	2007 (3)	2008 (3)	2009 (3)	2010 (6)	2011 (5)	2012 (5)
Structures targeted	*	162,439	200,761	259,967	242,098	243,000
Structures sprayed	*	153,942	176,279	254,559	238,198	
Percent acceptance	*	95%	88%	98%	98%	
Population protected	678,971	645,346	661,814	959,727	859,309	860,000

* In 2007 data collected on number of households, not number of structures

Senegal has been a beneficiary of a WHO/AFRO-Gates Foundation grant to improve insecticide resistance monitoring capacity. Entomologists from UCAD, the Pasteur Institute, IRD and the Parasite Control Service in Thiès, together with members of National Hygiene Service, developed a detailed 12-day course on entomologic control and surveillance methods. District and regional Hygiene Service staff participated in this course during annual trainings in 2008 and 2009.

Progress During the Last 12 months:

During the six months following the end of the 2010 spray round, entomologists from UCAD, SLAP, the NMCP, *IP*, and *IRD* conducted entomologic monitoring in five villages in each of the six IRS districts. The monitoring included cone bioassays on walls to test for insecticidal activity, knockdown spray catches and human landing catches. Deltamethrin in the form of water-dispersible granules (K-othrine® WG 250) was the insecticide used during the 2010 spray round. Results of cone bioassays indicate that the insecticide efficacy appears to have declined to between 70-80% by October and November suggesting that the duration of this insecticide in field conditions in Senegal is approximately six months.

Bendiocarb was the insecticide used during the 2011 spray round. The decision to use a carbamate was based on the results of insecticide susceptibility assays conducted by entomologist from the NMCP, UCAP, SLAP, *IP* and *IRD* in 15 sentinel sites, including five of the IRS districts. The percentage of mosquitoes susceptible to pyrethroids and DDT dropped significantly from 2009 to 2010 in most sites. In the IRS districts sampled, the susceptibility levels ranged from 8% to 67% for the pyrethroids deltamethrin, lambda-cyhalothrin (except for Velingara –88%) and permethrin. Because the mosquitoes in most districts still appeared susceptible to the tested organophosphate (fenitrothion) and carbamate (bendiocarb), the IRS steering committee suggested that Senegal switch to bendiocarb in 2011. In addition, because the mosquito susceptibility to bendiocarb was low in Richard Toll and because malaria rates were low in this region, the committee agreed that continued spraying this district would not be cost effective. This district will benefit from universal coverage with ITNs, enhanced surveillance, case detection, and epidemic preparedness.

Spray operations began later in 2011 than in previous three years because of the shorter expected duration of effectiveness of bendiocarb than the pyrethroid formulations used previously. However, in parts of Guinguinéo and Nioro Districts, where susceptibility to pyrethroids was higher, the surplus stock of deltamethrin water-dispersible granules remaining from the previous year was used. A total of 238,198 structures were sprayed (98% of those visited and eligible for spraying) and 859,309 people were protected. In Koumpentoum district, a new data collection system using personal digital assistants (PDAs) was piloted. This system permitted direct entry of spray data from the field into computer databases, eliminating data entry from paper forms and allowing real-time tracking of the progress of spray operations. In the four other districts, data collection on paper forms with data entry at the district level continued as in 2010. PMI also supports communication activities to inform potential beneficiaries about IRS and what they should expect from it, how it is beneficial to them and their family's health, and what precautions they need to take. Before each spray round, the information pamphlets were updated, printed

and distributed. Radio spots, community meetings, and house-to-house visits were also used to disseminate information to potential beneficiaries.

With each spray round, PMI places increasing emphasis on building national and local capacity for IRS. To date, agents of the National Hygiene Service and MOH personnel at many levels of the health system have been engaged in IRS activities. However, to ensure the sustainability of IRS in future rounds, district health management teams need to take a greater role in training, supervision, community mobilization, and micro-planning.

Proposed Activities with FY2012 funding (\$6,302,000)

With FY 2012 funds, PMI will support spray operations and entomological monitoring in six districts: the five districts sprayed in 2011 plus another district to replace Richard Toll. The IRS steering committee, composed of representatives from NMCP, entomologists from UCAD, the National Hygiene Service, the National Directorate of Environment and Agriculture, the IRS implementing partner and PMI, selected Kounghoul district, based on its malaria burden, population estimates, and managerial capacity. This district is in Kaffrine Region between Maleme Hodar and Koumpentoum. Funds from FY 2011 will also be used to support spray operations during the 2012 spray campaign. The insecticide choice for 2012 will be based on the results of resistance assays conducted after the 2011 spray round.

1. IRS Operations (\$5,740,000)

In 2013, PMI will support one round of spray operations in each of the current districts of Vélingara, Niore, Guingénéo, Maleme Hodar, and Koumpentoum and in the newly selected district Kounghoul covering a population of approximately 900,000 people and 250,000 structures. With the increasing problems related to insecticide resistance and rising costs, PMI does not plan to expand its support to IRS beyond these six districts.

2. Community sensitization and mobilization for IRS (\$150,000)

The PMI will continue to support community mobilization and communications activities related to IRS, taking advantage of the lessons learned from previous rounds to develop and implement effective communication and mobilization strategies in all six districts.

3. Strengthen entomologic capabilities and entomologic monitoring (\$412,000)

PMI will continue to support entomologists from UCAD and IPD to conduct entomologic monitoring and evaluation for IRS. Entomologists will conduct cone bioassays immediately after spraying and at monthly intervals in all six spray districts. Entomologic tests, including vector behavior, will also 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. Assessments of mosquito density, behavior and transmission potential will also be conducted in Richard Toll. Entomologists will continue to conduct insecticide susceptibility assays in the six spray districts as well as in

nine additional sites throughout the country where entomologists have been following the evolution of insecticide resistance during the past several years. An entomologist from CDC will provide technical assistance for the planning and implementation of all IRS monitoring activities.

Malaria in Pregnancy (MIP)

This section describes facility-based MIP interventions. Please refer to the “Community-level Integration of GHI Programs including Malaria” section of this MOP for a discussion of community mobilization to improve ANC attendance and use of IPTp.

Background:

In 2003, IPTp with sulfadoxine-pyrimethamine (SP) was adopted as national policy by the NMCP and is implemented in all ANC sites nationwide. 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. Women known to be HIV-positive should receive a third dose. The MOH requires that districts use part of the support they receive from the MOH to fund the purchase of SP then give it free of charge to women receiving ANC.

The MOH’s Division of Reproductive Health policy recommends four ANC visits for normal pregnancies. The 2005 DHS showed 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.¹⁴ However, the first visit is often late: 35% of women make their initial visit after the fourth month of pregnancy and only 40% complete the recommended four visits. The 2010 DHS found that 39% of pregnant women had taken two doses of SP at an ANC visit; down from 52% found in the 2008 MIS.

The NMCP’s strategy for increasing IPTp uptake includes advocacy for health workers and the population at large, training and supportive supervision of health workers, and support for outreach activities by health post staff to provide ANC services at the community level. To date, The PMI has 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; job aids to promote the correct management of malaria in pregnancy and improve the counseling skills of health care providers; water filters/dispensers and re-usable cups for SP administration; and refresher training and supportive supervision. MIP training was part of an integrated ANC training and covered 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 will also support the implementation of the new routine LLIN distribution system that includes offering free LLINs to women attending ANC.

SP is procured through the Central Medical Stores (CMS) and paid for by the government. However, since 2009 there have been several problems in the procurement and distribution

¹⁴ The 2010 DHS showed that the proportion of pregnant women making at least one ANC visit had increased to 93%, but details regarding total number of visits and timing were not available at the time the MOP was finalized.

system that have led to periodic but recurrent stock outs of SP. The PMI has been working with partners to try to resolve the management issues at the CMS (see Pharmaceutical Management section below).

Progress During the Last 12 Months:

SP stock outs have been regular since February 2010, leading to a sharp decline in IPTp coverage, with 39% of women surveyed during the 2010 DHS stating they had taken two or more doses of SP for IPTp.

In the last 12 months, 1,563 workers have been trained in the prevention and treatment of malaria in pregnancy. Supervision to ANC health workers supported by PMI has continued nationwide. In addition, outreach visits to provide ANC services, including IPTp, have served 385 health huts in 11 regions with a total of 1,189 outreach visits made in the preceding 12 months. More than 14,000 pregnant women received antenatal care during these visits.

The NMCP has been working with the Division of Reproductive Health to develop a free package of antenatal care, including free iron and folate, as well as free SP and an LLIN, which is anticipated to be implemented this year.

Proposed Activities with FY2012 funding (\$712,000)

With FY2012 funding, PMI will continue to support efforts to strengthen MIP interventions nationwide. In addition, PMI will continue efforts to address management problems leading to SP stock-outs at the central level, while procuring SP to ensure its availability.

1. *Reinforce provision of effective MIP services in health facilities and in outreach strategies* (\$687,000)

The 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 continue for monitoring and supportive supervision of MIP service delivery, improvement of data collection including IPTp data, and training of new staff on IPTp, the importance of LLIN use in pregnancy, diagnosis and management of malaria in pregnancy, and counseling and interpersonal communication skills. The PMI anticipates that at least 100 staff will receive initial training and 900 will receive refresher training in these areas. The PMI will also continue to provide cups and water filters as needed for directly-observed treatment with SP. Support for ANC outreach activities at health huts will allow for a total of 2,000 visits annually.

2. *Procurement of SP* (\$25,000)

The PMI will procure 725,000 doses of SP, sufficient for a year's supply, to ensure that further bottlenecks will not compromise delivery of IPTp during efforts to improve management at the CMS.

INTERVENTIONS – CASE MANAGEMENT

This section describes facility-based case management interventions. Please refer to the “Community-level Integration of GHI Programs including Malaria” section for a discussion of community case management and home-based management of malaria activities.

Malaria diagnosis

Background:

In Senegal, malaria microscopy is available almost exclusively at hospitals and district-level health centers, with the price fixed at CFA 250 (~ \$0.50) by the Ministry of Health. To expand malaria diagnostic testing, the NMCP developed an algorithm for the diagnosis and treatment of uncomplicated malaria using RDTs and ACTs, trained health care workers in all districts, and worked to ensure that RDTs were available at no charge to the patient and used in all health facilities. The facility-level treatment algorithm defines a case of presumed malaria as a patient of any age with fever at presentation and no symptoms indicating another illness (such as cough, draining ears, or sore throat). All presumed cases are to be tested for malaria with an RDT and only patients with positive tests are to be treated with an ACT. Patients with another cause of fever are to be treated appropriately, and if they remain febrile, may return in two days for follow-up and repeated RDT testing. Implementation of RDTs was begun in 2007 and reached full scale in 2008 in all formal public health facilities. The NMCP reports that 86% of suspected outpatient malaria cases were tested with an RDT in 2009.

For cases of malaria requiring hospitalization, the NMCP requires a blood slide to be prepared before giving antimalarial treatment. RDTs are used to confirm critically ill patients who may also be treated pending laboratory results, patients admitted to centers without laboratories, and patients admitted during hours when the laboratory is normally closed. In recent years, PMI supported the procurement and distribution of microscopes and consumables to all public health facility laboratories and set up a microscopy teaching center at SLAP. Technicians from all sites receiving microscopes received refresher training on malaria diagnosis and supervisory technicians were trained in quality assurance and quality control. According to data collected by the NMCP, 71% of hospitalized cases were tested by microscopy in 2009.

Technical support for quality assurance and quality control of malaria diagnosis comes from the Department of Parasitology of UCAD and the Parasite Control Service. The NMCP has commissioned UCAD to conduct quality control testing of RDTs at the CMS at regular intervals. With PMI support, a quality assurance/quality control protocol for parasitological diagnosis of malaria was developed and implemented. Staff from regional reference laboratories in all of the 14 regions has received training in quality control of microscopic diagnosis of malaria. Senegal uses a peer supervision model in which trained laboratory staff conduct supervision visits to laboratory staff in other regions. In addition, samples of RDTs are regularly collected from the field and tested against microscopic diagnosis to monitor stability in field conditions, and during supervisory visits the proper use of RDTs by health care providers is reviewed and reinforced. PMI has also supported the development, validation, and printing of new outpatient registers that have a specific column for recording RDT results.

Progress During the Last 12 Months:

The data retention strike complicates the assessment of the adequacy of RDT supplies and of adherence to the diagnostic and treatment algorithm. Ordering adequate supplies has been difficult without data on prior usage, resulting in some stock-outs in RDTs at the peripheral level this year. With the end of Islamic Development Bank funding for RDTs in 2011, the NMCP asked PMI to purchase 600,000 additional tests in 2011 to ensure an adequate supply and to continue purchasing the annual RDT needs until the consolidated Global Fund grant is signed.

Peer supervision visits were made to district and regional laboratories in eight regions. At each site the quality of the laboratory was assessed, the data and slides were reviewed, and refresher training was given. Forty-one laboratory technicians received classroom training on the malaria lab diagnosis, and an additional 504 received supplementary onsite training during formative supervision visits. Generally, the concordance between original and supervisory readings was better in regions with higher malaria transmission and poorer where transmission was lower. Many recommendations were made to district and regional authorities to improve the organization of the laboratories. Fifty microscopes were purchased and distributed to all staff trained in 2010. In FY2011, PMI funds were used to expand microscopic diagnostic training to include military health facilities, health centers in newly created districts, and national hospitals. In addition, PMI supported the development and distribution of 1,500 job aids for RDT performance and 1,000 laboratory registers. The PMI initiated an operations research protocol with the NMCP to evaluate the facility-level diagnostic algorithm for case confirmation with RDTs. The PMI anticipates that results from this study will inform the diagnostic and treatment policy in Senegal.

Proposed Activities with FY2012 Funding (\$1,110,000)

Using FY2012 funds, PMI will continue to support strengthening the supervision and quality assurance of microscopy and RDTs. PMI will continue to procure RDTs to ensure a constant supply given the delays in Global Fund disbursements. The PMI will also support the NMCP's initiative to scale-up home-based management of malaria using RDTs and ACTs (PECADOM), as described in the "Community-level integration of GHI programs" section later in this document.

1. *Training, supportive supervision, quality assurance, and quality control for microscopy and RDTs (\$250,000)*

The PMI will provide training in microscopic diagnosis of malaria for new microscopists, as well as refresher training for those needing it. The PMI will provide supportive supervision of malaria diagnosis by microscopy and RDTs for laboratory and health facility staff and assist the NMCP and its partners to implement the quality assurance and control standards for malaria diagnostic tests. Sites showing poor performance will be targeted for additional on-site training and quality control visits. Supportive supervision of RDT use will also be part of supervisory activities listed in the "Treatment" and "Community-level intervention of GHI programs" sections below.

2. Microscopes and consumables for laboratories in newly-created health districts (\$10,000)

Microscopes and laboratory consumables will be provided to new health district laboratories following training in microscopic diagnosis of malaria.

3. Procurement of RDTs (\$850,000)

The NMCP has requested that PMI procure 1.2 million RDTs to cover nationwide needs and ensure that case confirmation for malaria is consistently available at all levels of the health system. This calculation was based on the reported number of suspected malaria cases in 2009 (584,873) and doubled to provide for two years without requiring early money to fulfill the obligation.

Treatment

Background:

In 2003, the NMCP held a national consensus-building conference in which the first line therapy for uncomplicated malaria was changed from chloroquine to combination therapies, initially amodiaquine-SP, and then in 2006 to both artesunate-amodiaquine (AS-AQ) and artemether-lumefantrine (AL). Global Fund grant money was initially used to procure AS-AQ, to make it available to all public health facilities, and to train health workers. In 2009, Senegal changed the drug procured for the public health system to artemether-lumefantrine (AL). Treatment of uncomplicated malaria with ACTs became free in the public sector as of May 1, 2010. In that same month, the MOH issued a directive banning the use of artemisinin monotherapies in Senegal. Starting in 2009, the Government of China began making annual donations of Duo-Cotecxin (dihydroartemisinin-piperaquine), and in early 2010, PMI began procuring AL.

Private pharmacies also sell numerous other antimalarial drugs, including chloroquine and SP, ACTs in various formulations, including syrup for children, and other combinations. Artemisinin monotherapies are becoming rare. Quinine is recommended by the NMCP for the treatment of severe malaria and malaria in pregnant women during all trimesters. Following malaria treatment guidelines of Integrated Management of Childhood Illness, the NMCP does not recommend pre-referral treatment for severe malaria in children under five.

The PMI has supported case management through the training of district health team members and health providers in malaria case management and interpersonal communication skills. The PMI has also supported the development and distribution of job aids for RDTs and treatment of uncomplicated and severe malaria. The PMI funds supportive supervision at all levels of the health system, as well as outreach visits by health post nurses to 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.

Progress During the Last 12 Months:

In the last year, PMI has supported training of 1,563 providers in malaria case management and interpersonal communication, and joint supportive supervision visits were carried out in four health districts. Supervision was severely constrained this year by the health worker data retention strike. PMI also procured over 670,000 AL treatments to meet Senegal's ACT needs for the year and supported a needs quantification workshop at the beginning of the high transmission season to ensure that all districts would have enough RDTs and ACTs in place to meet their needs.

Proposed Activities with FY2012 Funding (\$687,000)

Using FY2012 funds, PMI will continue to strengthen case management of malaria with ACTs through supportive supervision and monitoring, and training of new health care workers. In addition, PMI will continue to procure AL to meet ACT needs. Continuing its support in earlier years, PMI will fund therapeutic efficacy studies with FY2012 funds. The NMCP will also host a workshop to discuss revising the policy and guidelines for treatment of severe malaria, including changing the first-line therapy during the second and third trimesters from quinine to artesunate and making the management of severe malaria free of charge.

1. *Improve case management: (\$325,000)*

As part of the effort to improve the management of uncomplicated malaria with ACTs, PMI will support the training of 100 health care workers in case management, and refresher training of 900 health care workers. Implementing partners will work with the MOH to provide supportive supervision in the management of malaria with ACTs at all levels of the health care system. PMI will support refresher training and supervision in correct case management of malaria for hospital-based staff and a workshop to revise guidelines on treatment of severe malaria.

2. *Procure AL: (\$300,000)*

The PMI will procure 300,000 AL treatments to meet ACT needs nationwide.

3. *Therapeutic efficacy studies: (\$62,000)*

The PMI will support therapeutic efficacy studies to monitor the susceptibility of *P. falciparum* to the first line ACTs (amodiaquine-artesunate and artemether-lumefantrine) in at least two sites in Senegal.

EPIDEMIC SURVEILLANCE AND RESPONSE

Background:

In 2007 the NMCP and WHO identified the Senegal River basin as an area where malaria transmission is unstable and thus at risk of epidemics. Malaria is not included in the national MOH weekly epidemic disease reporting system because it has traditionally been considered to be endemic in Senegal. As a result, in 2008 the NMCP developed its own malaria epidemic surveillance system using several existing health posts in the river basin. These health posts report the same routine malaria case data as other posts (number of patients seen for any reason, number of suspected malaria cases, number tested, and number confirmed) to the district, region and NMCP but on a weekly basis. Eight health posts were selected in the first phase, two in each of four districts along the Senegal River. New electronic forms were developed to improve the collection and transmission of data. At semi-annual meetings, the sites present their data and the districts discuss their plans for epidemic response together with the NMCP, PMI and other partners. The system was expanded in 2009 to include eight additional health posts in flooded peri-urban areas in Dakar. The PMI Resident Advisors participate in the review meetings and site visits, and provide technical advice on the management, analysis, and presentation of data from the system. The approaches for the analysis and interpretation of data from these sites have been applied by the NMCP to their routine morbidity data. For example, the greater focus on the proportion of cases tested and the test positivity rate in evaluating program performance have in part come from analyses of weekly data.

Progress During the Last 12 Months:

Despite the health worker data retention strike, the epidemic surveillance sites have continued to report from all sites except those in the districts of Mbao, Guédiawaye (Dakar Region) and Richard Toll (Saint-Louis Region). Guédiawaye later agreed to resume reporting in 2011 and Richard Toll later agreed to report missing data from 2010 and resume reporting in 2011. At the end of 2010, two additional sites were enrolled in Linguère District of Louga Region, bringing the total number of sites to 14. The new sites in Linguère are also participating in a study of the effects of climate change on health funded by the European Union (Quantifying Weather and Climate Impact on Health in Developing Countries or QWeCI). Of the ten sites with data for all of 2010, seven tested all patients with suspected malaria and the other three tested >92%. The annual malaria incidence, based on the 2010 estimated catchment population, was <5 confirmed cases per 1,000 inhabitants for sites in the Senegal River districts of Richard Toll, Podor and Matam. The highest incidence was over 200 per 1,000 inhabitants at Deggo Health Post in Pikine District in Dakar followed by roughly 100 per 1,000 inhabitants at Gabou Health Post in Bakel District in Tambacounda. Investigations were conducted in both of these posts, in June in Gabou and in October in Deggo.

While reports have not yet been shared, initial discussions suggest that patients come from a much wider area than the formal catchment zone of the Gabou Health Post, where also a village was identified as a transmission hotspot. In response health authorities carried out a communications campaign on malaria prevention and treatment. While the flooding in Dakar and the presence of permanent water sources has led to increased transmission in peri-urban Dakar,

the number of patients coming to Deggo may have increased because of the closure (due to flooding) of a neighboring health post.

This year the Malaria Control and Evaluation Partnership for Africa (MACEPA), a project based at PATH, began supporting surveillance activities in Richard Toll. The PMI will soon begin supporting the training and equipping of five additional health posts in the district to report data weekly for epidemic detection as part of the withdrawal of IRS activities in the region, while MACEPA will support enhanced surveillance activities. Two additional sites are also being selected in the adjacent Dagana Health District.

Proposed Activities with FY2012 funding (\$100,000)

With FY2012 funds PMI will continue to support the supervision of existing surveillance sites, the organization of semiannual review meetings, and the expansion of the number of health posts reporting routine data on a weekly basis for the detection of and response to malaria epidemics.

1. Support for Malaria Epidemic Detection System (\$100,000)

With FY2012 funds, PMI will support refresher training of staff at the existing health posts and the expansion of the epidemic detection system through training and equipment for additional health posts in areas identified as newly epidemic-prone.

CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING

Since beginning work in Senegal, PMI has been committed to strengthening the health system and building the capacity of the national government to operate its malaria control program. Over the past four years, PMI has funded participation in a variety of courses on monitoring and evaluation and applied epidemiology, covered routine costs associated with supervision of health system staff by the NMCP, and supported revision of the National Malaria Control Program's five-year strategic plan.

In addition to strengthening the leadership and governance of the health system, PMI has also provided health system support through pharmaceutical management activities and drug quality monitoring.

PMI works through all six building blocks of the WHO's framework for health systems strengthening to provide a comprehensive set of inputs designed to strengthen the delivery, workforce, information, products, finances, and leadership that govern the Senegalese health system.

Capacity Building

Background:

The Directorate for Health in the Ministry of Health is comprised of several divisions and programs, including a Division of Disease Control that includes the National Malaria Control Program. The NMCP has a well-developed malaria control strategy for 2011-2015, 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, and research.

The NMCP benefits from support from other scientific institutions including entomologists working at SLAP, as well as several entomologists and parasitologists teaching at UCAD. In addition, IRD and the Pasteur Institute house many experienced epidemiologists, parasitologists and entomologists who collaborate on a regular basis with the NMCP. While there are no dedicated malaria staff at the regional or district levels of the public health system, malaria prevention and control are an integral part of the jobs of all manager and facility personnel. In several key programmatic areas, the NMCP mobilizes the expertise of other governmental and partner agencies through technical committees, the most active being those for IRS, LLINs and M&E.

Though Senegal has a wealth of malaria prevention and control expertise at all levels, capacity building is still needed to strengthen skills for effective monitoring and evaluation, for applied epidemiology, and for planning and implementing IRS activities through the government system.

Progress During the Last 12 Months:

In FY2011, PMI supported the NMCP to supervise case management at hospitals, health centers, and health posts. PMI also worked to build national capacity for M&E through funding the attendance of health system staff at the annual data management and monitoring an evaluation course at the African Center for Advanced Management Studies (*Centre Africain des Etudes Supérieures en Gestion*). To build capacity in applied epidemiology, PMI funded two district-level staff chosen by the NMCP to participate in an applied epidemiology course at the Regional Institute of Public Health in Benin.

Proposed Activities with FY2012 funding (\$350,000)

As Senegal continues to make progress toward reducing malaria transmission and decreasing under-five mortality rates, the NMCP will require ongoing skills development to respond to changes in malaria trends. With FY2012 funding, PMI will support activities to develop capacity at sub-national and central levels to sustain and carry forward the NMCP's accomplishments in malaria control.

1. *Support to NMCP to enable program supervision (\$150,000)*

With FY2012 funds, the PMI will contribute to support the costs associated with the NMCP's supportive supervision visits to regional and health district levels.

2. *Support for NMCP Malariology course (\$200,000)*

The NMCP has trained regional and district level doctors and other senior health managers on malariology. These personnel are trained to implement the latest standards for malaria control and treatment in their regions/districts and later form a key resource for supervision of malaria control and treatment activities. This training provides a cost-effective means to improve malaria control and treatment at all levels of the health system. With FY2012 funding, the PMI will continue to support this training to enable the participation of other categories of health system personnel. The FY 2012 investment will support the training of 60 medical doctors and/or health professionals from district health management teams, with another 15 health professionals being trained through support from the Global Fund. The NMCP will look for other donors to support this course after FY 2012.

Health Systems Strengthening

Pharmaceutical management

Background:

The parastatal CMS is responsible for the national procurement of drugs, ITNs, and laboratory products, as well as the distribution of RDT kits. Organizationally, it lies outside the MOH and reports to both the MOH and the Ministry of Finance. Distribution of malaria commodities to the 11 Regional Medical Stores is the responsibility of the CMS. Health districts quantify the commodity needs for all health facilities in the district and purchase them from their Regional Medical Store, with health facilities in turn quantifying their needs and purchasing necessary items from the district. At the health facility, patients pay user fees for consultations, drugs and laboratory tests. RDTs have always been free and a new MoH policy enacted in 2010 also made treatment for uncomplicated malaria with ACTs free of charge in public facilities.

In recent years, the CMS has experienced delays in procuring antimalarials and LLINs as a result of internal procedures, difficulties in obtaining the necessary letters of credit for large purchases, and difficulty adapting to the government procurement code implemented in 2007. To procure LLINs and ACTs, the NMCP has in some cases negotiated with the Global Fund for direct payment to suppliers. The delays in procurement have caused numerous short-term, local stock-outs of ACTs. These difficulties prompted PMI to make an emergency procurement of ACTs for Senegal in late 2009. The delays in procuring SP have adversely affected IPTp coverage.

The Directorate of Pharmacies and Laboratories (DPL) provides quality assurance of medical products and, in collaboration with the CMS and the National Laboratory for Drug Quality Control, is responsible for establishing regulations and granting the right to market a drug. The Ministry of Health has established an Antimalarial Quality Surveillance Coordination Committee that brings together the CMS, the DPL, the National Laboratory for Drug Quality Control, the NMCP, and other partners. The committee is supposed to meet 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; however, committee meetings occur irregularly. Minilabs have been used for field-based drug quality monitoring in Senegal since 2004, with confirmatory testing done at the National Laboratory for Drug Quality Control.

In 2007, the NMCP initiated an independent pharmacovigilance program for monitoring adverse drug reactions related to ACTs. Since then a number of steps have been taken to re-establish a unified national system that builds on the NMCP's experience. Nevertheless, the number of adverse drug reactions reported remains quite low. Technical responsibilities for pharmacovigilance were transferred in 2008 to the National Poison Control Center, with administrative authority at the DPL.

Progress During the Last 12 Months:

Technical assistance from PMI aims to strengthen the pharmaceutical management system, with an emphasis on ensuring good ACT prescribing and dispensing practices at the facility and community levels. During FY2011, 55 personnel responsible for managing and dispensing medicines in health posts and health centers were trained on pharmaceutical management. As the result of the training, health workers' knowledge in pharmaceutical management has improved as evidenced by the post-training test conducted in each district.

The problems at the CMS are not limited to malaria commodities and several health partners are working together to bring the issue to the attention of the MOH and the Ministry of Finance in an attempt to find and implement solutions. To assist the Ministry of Health with overcoming these problems PMI supported an assessment of the CMS in April 2011. An action plan is being developed and will be discussed with key stakeholders to implement the key recommendations. The ultimate goal of PMI support in this context is to ensure that SP, ACTs and RDTs are procured and made available in sufficient quantities at all service delivery points.

The PMI also continues to support the monitoring of antimalarial drug quality by the DPL. In 2010, two additional surveillance sites were identified, bringing the total number of sites to nine nationwide. Staff from the two new sites will be trained in the near future and provided with a Minilab, reagents, and supplies to carry out monitoring activities.

In addition to monitoring drug quality, the PMI is supporting advocacy and communication activities to inform consumers about the dangers of buying drugs in the informal sector. During FY2011 this included workshops with community outreach workers and street caravans in two districts with thriving informal drug markets. The DPL developed a plan of actions to address problems, including establishing a new strategy for marketing authorization, improving storage conditions at health facilities, taking measures to withdraw non-conforming lots from the market, and possibly suspending the medicine marketing authorization.

The DPL has also developed a pharmacovigilance action plan for 2010-2011 that seeks to integrate the various programs into one system and to increase reporting. In 2011, the NMCP did not receive any notifications for adverse drug reactions related to antimalarials.

Proposed Activities with FY 2012 funding (\$800,000)

PMI's support for pharmaceutical management and pharmacovigilance in Senegal contributes to strengthening the health system as a whole and helps address problems that affect other disease programs and MOH support systems. Difficulties in implementing national procurement regulations, capacity issues at the CMS, uncertainties related to Global Fund disbursements, the end of Islamic Development Bank funding for RDT purchases, the removal of user fees for ACTs, and the extension of antimalarial therapy through the home-based treatment approach all

make it extremely challenging to ensure an adequate supply of malaria commodities at all health facilities.

1. *Supply chain and drug management strengthening: (\$600,000)*

The FY2012 PMI funds will be used to support the implementation of key recommendations from the assessment of the CMS related to assuring a steady supply of malaria commodities at the peripheral level. This major activity will be conducted in close collaboration with the Ministry of Health and pharmaceutical stakeholders, including the private sector and civil society groups (consumers' associations). PMI will also support the NMCP and health districts to improve quantification methods and ensure the delivery of malaria commodities, bypassing the CMS distribution system if necessary.

2. *Pharmacovigilance, drug quality monitoring, and policy advocacy: (\$200,000)*

In collaboration with the NMCP, UCAD, the DPL and the National Laboratory for Drug Quality Control, the PMI will continue its support to drug quality monitoring in nine sites. In addition, the PMI will support advocacy for policy enforcement of drug quality standards. Activities will also include technical assistance to the national level structures (national Directorate of Pharmacy and Laboratory) for drug quality assurance/quality control, using high standard technologies, to ensure that quality control tests are conducted according to national and international norms, as well as possible long-term technical assistance to support necessary institutional changes for drug quality monitoring.

Finally, PMI will continue to support the integrated national pharmacovigilance program and strengthening of the reporting system.

STRENGTHENING PUBLIC-PRIVATE PARTNERSHIPS

Background:

The 2008 MIS found that only 7% of children under five with fever were brought to a private sector provider (14% of all children brought for any care or advice), varying by region from 13% in Dakar to 2.5% in Tambacounda. A study¹⁵ conducted in 2009 by the Private Sector Partnership for Better Health project found that 85% of Senegal's private service providers are located in Dakar, including one private hospital, nearly 2,000 clinics staffed by one or more physicians, and 17 clinics staffed by nurses. The same study indicated that Senegal has 767 private pharmacies and 133 pharmaceutical depots around the country. While malaria is likely a chief reason for seeking care at private clinics, the adherence to malaria case management algorithms has not been assessed. The NMCP's invites private sector providers to training sessions it organizes but they rarely attend. In addition, the NMCP does not conduct supervision activities at their clinics.

¹⁵ Private Sector Partnerships For Better Health (PSP-One): *Senegal Private Health Sector Rapid Assessment*; March 2009, sponsored by USAID.

The analysis of the malaria program performance conducted in 2010 revealed the lack of a national advocacy plan for malaria prevention and control in Senegal, considered a major impediment to broadening partnerships and mobilizing communities. To fill this partnership gap, the NMCP has identified the development of public-private partnerships as one of the strategies to implement in its new malaria strategic plan for 2011-2015. The plan calls for the participation of private service providers, pharmacists and private health clinics in malaria prevention and control.

The NMCP plans on holding a national workshop including private professional associations to discuss their contribution to malaria prevention and control in Senegal, mainly in sub-urban and underserved areas.

Progress During the Last 12 Months:

PMI has discussed with the Ministry of Health and the NMCP the importance of building public-private partnerships in the health sector to benefit malaria control and increase health care coverage. With the large numbers of associations, consumers' groups and private clinics working to increase coverage of quality health services, PMI plans to advocate with other donors supporting the health sector such as the World Bank for more support for the public-private partnerships.

The MOH has taken the first step in formalizing public-private partnerships by creating the Public-Private Partnerships Support Unit, a key step in strengthening the private sector and engaging it in public health initiatives. With FY 2011 funding, PMI will support the conduct of an assessment of the quality of malaria case management in the private sector. The findings of the assessment will serve as a basis to engage the public and private sectors in open dialogue, leading to partnerships for increased access of the population to quality malaria diagnosis and treatment.

Proposed Activities with FY 2012 funding (\$75,000)

1. Strengthening private sector case management (\$75,000)

The PMI in Senegal will work with partners to improve case management in the private sector and allow alignment of private providers on NMCP malaria case management policy and guidelines, utilizing the findings of the assessment cited above. This will be part of a broader effort to strengthen public-private partnerships under USAID/Senegal's new health support strategy, using other funding streams.

INTEGRATION WITH OTHER GLOBAL HEALTH INITIATIVE PROGRAMS

In implementing the malaria component of the Global Health Initiative in Senegal, the USG is committed to working closely with the Government of Senegal, in the context of the NMCP's Strategic Plan and under the program's leadership, and coordinating with other national and international partners to ensure that investments are complementary and that RBM and Millennium Development goals are achieved.

When implementation of PMI began in Senegal, malaria activities were expanded in existing integrated community health, service delivery and health policy programs. Program implementation continues to be horizontal, focusing on health intervention levels (policy, clinical, community) rather than sectors (maternal child health, tuberculosis, etc). However, where needed, PMI supports malaria-specific interventions, such as IRS and mass LLIN distribution, to achieve maximum health impact. The overall goal of this approach is to provide a quality package of services at each service delivery point, while reducing malaria mortality through high-impact prevention strategies. This approach also helps to ensure that programming is mutually reinforcing, cohesive and coordinated.

In FY2012, the PMI will further strengthen efforts to ensure strategic integration with other USG health programs in Senegal, particularly maternal and child health programs, family planning and reproductive health programs, and the health and nutrition aspects of the Global Food Security Initiative.

Facility-level Integration of Maternal and Child Health, Reproductive Health and Malaria

The PMI, together with other USAID health programs, has a strong commitment to integration. Other funding streams, such as MCH funding, have been complemented by PMI funding to support IPTp and ITN distribution for pregnant women during ANC. LLIN distribution campaigns targeting children under five also included vitamin A supplementation and deworming. At the community level, PMI funding to extend malaria testing and treatment nationwide provided the foundation for an integrated set of community case management interventions. This integration significantly contributes to strengthening capacity to deliver these services

Community-level Integration of GHI Programs including Malaria

Background:

Since malaria often occurs in rural communities, support to community-based care is critical to successful malaria control. The 2008 MIS found that 48% of children under five with fever were not brought for any care or treatment at all, and an additional 15% were taken for care somewhere other than a public or private hospital, health center or health post. The table below describes the levels of the health system at which malaria services are provided, with PMI support being provided at all levels. As described in the “Malaria Situation in Senegal” section, community health workers at health huts and village malaria workers are important elements in efforts to expand access to health care. Over the past few years, PMI has provided support to both community case management of malaria as part of an integrated package of CCM services provided through health huts, and malaria-specific home-based management in villages where health huts do not exist.

Levels of the health system in Senegal:

Level	Staff	Location	Services
Health center	Doctors, nurses, midwives, lab technicians	Cities and towns	Inpatient and outpatient clinical services
Health post	Nurses and sometimes midwives	Large villages	Outpatient clinical services
Health hut	Community health workers, trained birth attendants and health communicators	Smaller villages	Integrated package of community services*
PECADOM	Village malaria worker (DSDOM)	Remote villages, no health hut	Malaria only, but an expanded package is being explored

* *Malaria, nutrition, family planning, diarrhea, acute respiratory infection*

Under the PECADOM program, DSDOMs are nominated by their villages and trained in malaria diagnosis with RDTs and treatment with ACTs. After training, DSDOMs receive a kit complete with ACTs, RDTs, a sharps box, data collection forms, and a hat and vest. Supervision of DSDOMs occurs at multiple levels, with the nearest health post nurse acting as a primary supervisor, the District Health Management Teams providing quarterly supervision, and the national level supervising periodically. In accordance with the new national policy, DSDOMs provide ACTs free of charge and are re-supplied by their health post. Although officially unpaid volunteers, many DSDOM receive some form of in-kind “motivation” from their communities. The NMCP began this program in 2008 with 20 village malaria workers in three districts. PMI has provided support to help expand the program to 1,000 villages and will continue to target the areas with highest morbidity/mortality and most difficult access to health services. In 2011-2012, the MOH is investigating providing an expanded package of interventions through DSDOMs that may include treatment of respiratory infections and diarrhea.

Currently, 1,627 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, regular supervision by the chief nurse of the health post, and the equipment and space needed to provide basic services. Health posts are staffed by a nurse or midwife plus one or more *matrones* and *relais*. Posts are in turn supported and supervised by the Health District Management Team. In addition, PMI’s community health partners work with 703 “sites,” generally in more urban areas or places far from health huts, where *relais* implement malaria BCC activities but do not treat patients.

The community case management program in Senegal provides an integrated package of services, which varies slightly depending on the inclusion of pilot interventions. In 96% of health huts, PMI and the USAID/Maternal and Child Health program offer a basic package of services, including malaria case management with ACTs, diarrhea case management with oral rehydration therapy, de-worming, growth monitoring and promotion, vitamin A supplementation, management of malnutrition, and a series of other health promotional services, including those for family planning and reproductive health. Pneumonia case management with cotrimoxazole requires the presence of a literate CHW, and is currently available in 949 health

huts. Contraceptives are delivered at the community level in 417 health huts, and community surveillance for tuberculosis is offered in approximately 787 health huts nationwide.

Progress During the Last 12 Months:

Community interventions cover every district in Senegal¹⁶, and include two broad categories of activities: 1) integrated community case management and 2) community mobilization.

1. Community case management of malaria as part of an integrated package of care

During FY2011, PMI supported the training of more than 1,400 community members 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 health huts. Of these, 537 CHWs and *matrones* were trained specifically in malaria case management, including the diagnosis and treatment of cases of uncomplicated malaria (using RDTs and ACTs), and the recognition of danger signs and referral of serious cases or any malaria in pregnant women or young infants. During the year 7,265 children had positive RDTs and were treated with ACTs.

Record review during supervision visits have shown that CHWs adhere well to diagnostic and treatment guidelines for children under five with fever. However, a recent documentation exercise conducted by the Maternal and Child Health Integrated Project, which included direct observation of CHWs treating cases, found some weaknesses in the systematic use of RDTs and insufficient investigation of signs of dehydration. PMI is using the results of this study to make adjustments in CHW training and reinforce their core skill set.

In 2010-2011, 966 DSDOMs were trained as part of the expansion of the PECADOM program, which now covers 1,000 villages in seven regions. In 2010, 6,707 RDTs were performed with 2,300 being positive and 2,226 people treated (data are not available for 2011 because of the strike). No malaria deaths were reported from any of these sites. PMI directly supported the training and supervision of 186 DSDOM in FY2011.

Malaria Communities Program

Senegal was the recipient of an FY08 Malaria Communities Program grant, awarded to Caritas Senegal, for a three-year project to support malaria case management and prevention through specific private Catholic health posts and their associated 43 health huts in five regions. The project follows the model of the USAID/Senegal community health project and has worked closely with their staff to ensure harmonization. During FY 2011, Caritas trained 89 community health workers on the integrated management of childhood illness, including malaria diagnosis and treatment, and provided equipment necessary to implement the protocol. During this same time period, 24,716 patients were seen at Caritas-supported health huts, of which 6,848 cases of suspected malaria. Only 2,858 cases were tested with an RDT (42%) and 1,662 were found to be

¹⁶ With the exception of central Dakar

positive (58%). Many of the Catholic health posts/huts have experienced difficulties in assuring a consistent supply of RDTs. This program will end in March 2012.

2. Community mobilization, interpersonal communication, and BCC for malaria prevention and control

Implementing partners for PMI continue to support community mobilization and BCC activities in health huts and communities. Activities include both ongoing malaria communication (mass media and interpersonal) and communication promoting specific events, such as IRS or LLIN distribution campaigns. Typical communication activities in Senegal have included community meetings on a specific topic, home visits, theater, community radio (public service announcements 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, and skits, with banners and t-shirts with messages, etc.). Under USAID/Senegal’s 2011-2016 Health Strategy, a new program component will be implemented for the promotion of services, products and healthy behaviors. This directly responds to concerns raised by partners and stakeholders regarding the weaknesses in effective BCC programming.

Peace Corps Community-based activities

Peace Corps Volunteers are active in malaria prevention and control activities throughout the country. Peace Corps took the lead in piloting LLIN distribution activities aimed at achieving universal coverage in two health districts and have continued to play an important role in the nationwide roll-out of this strategy. In particular, they assist with supervision in their communities and support innovative communication activities.

Peace Corps Volunteers also assist in routine community mobilization for IRS, promotion of net use, attending ANC and receiving IPTp for pregnant women, and treatment-seeking for fever. Several volunteers also host programs on local radio stations and work with community theatre groups.

Proposed Activities with FY 2012 funding (\$2,760,000)

With FY2012 funds, PMI will continue to support community case management of malaria and communication efforts as part of an integrated package of services nationwide. The PMI will also continue to support the NMCP to expand and supervise the PECADOM program, particularly as it moves towards providing an integrated package of services.

1. Sustaining community mobilization activities (\$700,000)

Working through NGOs, CBOs and all types of CHWs, PMI will implement a variety of BCC activities aimed at:

- Informing and mobilizing the population around LLIN mass distribution campaigns and routine distribution.
- Promoting correct hanging, year-round use, and maintenance of LLINs.
- Informing and mobilizing the population around IRS campaigns.

- Increasing knowledge of the causes of malaria, its prevention, correct treatment and the signs of severe illness
 - Encouraging early care-seeking and treatment
 - Promoting ANC attendance, IPTp, LLIN use, and early care seeking for malaria in pregnancy
2. Sustaining community case management of malaria with RDTs and ACTs as part of an integrated package of services (\$1,000,000)

With FY2012 funding, the PMI will continue to provide technical support on correct diagnosis, treatment, stock management and referral practices for CHWs, and on timely data collection and integration of community case management data into the MOH reporting system. PMI funding will complement other USAID/MCH funding to support the training, supervision, and monitoring of community-based staff. Support from PMI will also focus on revitalizing non-functional health huts and thus increasing access to basic health services in underserved areas.

3. Support expansion and integration of the PECADOM program (\$1,000,000)

PMI staff and implementing partners have played key roles in the pilot phase and early expansion of PECADOM and the NMCP has requested PMI to support its continued scale-up. FY2012 support from PMI will fund the training of village malaria workers in malaria diagnosis with RDTs and treatment with ACTs, as well as contribute to the expansion of the PECADOM package, which will likely include case management of acute respiratory infections and diarrhea. PMI will also support health post nurses in their supervision of DSDOM and provide additional oversight by the project's community development agents.

4. Support for a PECADOM Program Manager at the NMCP (\$35,000)

PMI will support the NMCP's capacity to manage the expanding PECADOM program by funding for two years a new staff member responsible for overall PECADOM program management and coordination. The NMCP has indicated an intention to support such a position in future years.

5. Support to Peace Corps malaria activities: (\$25,000)

The PMI in-country team will continue to encourage linkages between community implementing partners and Peace Corps Volunteers, with volunteers and their communities benefiting from the technical resources that partners provide and partners benefiting from the long-term community presence of volunteers. Peace Corps/Senegal and PMI/Senegal will also increase collaboration through the placement of one or more third-year volunteers in positions to assist with the management of malaria control efforts.

BEHAVIOR CHANGE COMMUNICATION

Background

Senegal developed a national strategy for malaria communication in 2008, which outlined a series of challenges, objectives, and targets for the communication activities underpinning the National Strategic Plan. This communications strategy includes the following objectives:

- Increase the proportion of people sleeping under ITNs from 42% to 80%
- Increase the proportion of pregnant women who take the 2 doses of SP under directly observed treatment at ANC from 47% to 80%
- Increase the proportion of people who seek care at health facilities within 24 hours of the onset of fever from 45% to 80%
- Increase compliance in the treatment of uncomplicated malaria
- Increase acceptance of indoor residual spraying
- Strengthen partnerships with the private sector, media, local government, Parliament and other government departments.
- Monitor and evaluate the NMCP communication plan

The plan also outlined key messages, target groups, and channels through which communication activities would be carried out. These activities fall into the categories of prevention, case management, and communication through partnerships. Monitoring and evaluation of the communication plan was integrated in the NMCP's quarterly review meetings; however since the beginning of the data retention strike in 2010, these meetings have not occurred. External evaluations of the communication plan were also to be conducted annually with support from the Global Fund grant. However, with no Global Fund disbursements these evaluations have not been held.

In the new 2011-2015 National Strategic Plan, the national communication strategy was cited as a strength that underpinned the overall program. The new strategic plan outlines a need to improve the monitoring activities of community-based organizations, strengthen the participation of local communities and the private sector in the fight against malaria, and ensure sufficient funding for communication and social mobilization as part of the broader malaria control effort. The Round 10 Global Fund proposal includes plans to update the communication plan for 2011-2015.

Progress During the Last 12 months:

As referenced in the ITN section, communication activities and net promotion for the universal coverage campaign have centered on the "*Trois Toutes*" slogan – emphasizing that LLINs should be used by all members of the family, every night, all year long. Under this overarching motto, individual health districts have developed their own communications plans, which utilize multiple channels such as community radio, marketplace activities, traditional communicators, household visits, and local press to educate and promote net use.

For its IRS activities, PMI also supports communication to inform potential beneficiaries about IRS and what they should expect from it, how it is beneficial to them and their family's health, and what precautions they need to take. Before the 2011 spray round, the information pamphlets

for these household visits were updated, printed and distributed. Radio spots, community meetings, and house-to-house visits were also used to disseminate information to potential beneficiaries.

In addition to specific activities surrounding ITN use and IRS, PMI has also supported a wide variety of malaria communication and education activities on case management, MIP and other preventive behaviors, which reached nearly 2,000,000 individuals in 2011.¹⁷

Proposed Activities with FY 2012 funding (\$1,150,000 costs covered in relevant sections):

1. *Household visits and other community-based activities to promote consistent use of LLINs* (\$300,000, costs covered in ITNs section)
2. *Community mobilization for IRS*: (\$150,000, costs covered in IRS section)
3. *Community mobilization for comprehensive malaria prevention and control*: (\$700,000, costs covered in Community section)

The PMI Senegal team will monitor all planned BCC activities in order to improve their outcomes and impact. In line with updated PMI guidance on behavior change communications, the Senegal team will pursue a more strategic and focused approach to its mix of communication channels.

COMMUNICATION AND COORDINATION WITH OTHER PARTNERS

Background:

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 and meets every six months to share information and discuss current issues. In addition, a new Poverty Reduction Strategy is under development, with significant input from donors. The strategy will be reviewed annually, including a specific review of health issues. Multilateral and bilateral donors in the health sector have their own coordination mechanism chaired by the WHO Representative to Senegal. This group meets monthly to share information and strategies and discuss current issues. The MOH is represented at these meetings by the Secretary General plus any additional experts from the MOH needed to provide clarification on issues related to ongoing programs. USAID also convenes a specific Steering Committee Meeting on a tri-annual basis, chaired by the Secretary General of the MOH and attended by all National Directors in the MOH, with representation from the Ministry of Finance.

The Global Fund Country Coordinating Mechanism (CCM) holds regular meetings to monitor the implementation of Senegal's current malaria, tuberculosis and HIV grants. The CCM has a

¹⁷ NB: Each person is counted once in a year (partners prepare a systematized group for BCC activities and set up subgroups of men, teens, and grandmothers)

Technical Secretariat, created with assistance from USAID, to facilitate implementation of the existing grants and work closely with the three disease control programs. The CCM manages preparations for developing new Global Fund proposals, provides input, reviews drafts, and validates the final submission. The Malaria Partners Coordination Group meets quarterly to coordinate malaria activities.

Progress During the Last 12 Months:

The Malaria Partners Coordination Group met twice over the last 12 months to discuss various topics of interest and coordinate activities. This group served as a useful forum for feedback on the development and validation of the 2011-2015 National Strategic Plan, for the sharing of information on partner activities and as an opportunity for academia to share malaria specific research activities. A member of the PMI Team continues to serve as the Chair of the Coordination Group. At the last meeting, it was decided to expand the membership of the group to include more private sector partners, to increase the frequency of meetings from bi-annual to quarterly and to create technical sub-committees to accelerate results achievement in specific sectors.

Proposed Activities with FY 2012 funding: (No additional cost to PMI)

1. Convene quarterly meetings of the Malaria Partners Coordination Group

PMI staff will continue to chair and participate in the Malaria Partners' Coordination Group, working closely with the NMCP and partners to organize and convene the Coordination Group meetings.

2. Convene periodic PMI/NMCP coordination meetings

In-country PMI staff will also facilitate periodic coordination meetings with the NMCP and PMI implementing partners to further enhance collaboration and synergies in programming.

MONITORING AND EVALUATION

Monitoring and evaluation (M&E) is critical for measuring progress against PMI goals and targets, identifying problems in program implementation, suggesting what modifications should be made, and confirming that the modifications are having their desired effect. In Senegal, monitoring and evaluating the implementation 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.

Background:

The NMCP developed its first Monitoring and Evaluation Strategic Plan in 2005. In order to collect complete and timely data on malaria cases and program implementation and to provide feedback to healthcare providers, this plan included the start of quarterly review meetings where each district presents malaria surveillance and program data. These meetings include a presentation of key performance indicators, a self-critique by the districts and the presentation by the NMCP of results of surveys and annual reports, clarifications of existing guidelines, and dissemination of new ones. The PMI Resident Advisors participate in the quarterly reviews and on a commission charged with improving the quality of these reviews. Similar reviews are conducted with heads of hospitals, military health facilities, and NGOs.

To supplement the quarterly reviews, the NMCP also conducts regular supervisory visits at the health facility level using a “supervision by peers” strategy. Under this strategy medical officers from several districts join regional and central staff to supervise all health facilities in a district, using a standard methodology and form. The form includes elements on the adherence to diagnostic and treatment guidelines, performance of RDTs, and an on-site verification of reported malaria morbidity data.

Additional data to monitor the implementation of the four main intervention areas, and to redirect resources as necessary, come from monitoring visits, and partner reports. Types of activities monitored include procurement and distribution of LLINs and ACTs, implementation of IRS campaigns, training of health care staff to improve service delivery, and behavior change communication activities to improve treatment seeking for children with fever, the use of LLINs, and compliance with IRS.

During 2010 the NMCP developed a new Monitoring and Evaluation Plan for 2011-2015. This plan responds in part to weaknesses identified during the Malaria Program Review: lack of a clear M&E plan, and thus no clearly defined indicators nor links between indicators and expected results; absence of a mid-term evaluation; inadequate supervision from region to district and district to health facilities; and insufficient exchange of information with regions and districts. In response, the new plan aims to improve the performance of the M&E system through the following strategies:

- **Building the M&E and analytic capacity** of staff at region and district levels

- **Enhancing epidemic surveillance sites** through training on data analysis, collection of entomological and parasite prevalence data, and microscopic diagnosis and through piloting active surveillance at sites with an annual malaria incidence of <1 per 1,000 inhabitants.
- **Improving the quality of routine malaria program data** by adding on-site data verification to district-level supervisory checklists, re-starting the quarterly reviews, including in the quarterly feedback bulletin graphs, tables, and maps showing results of standard indicators, and organizing scientific meetings for researchers to share results.
- **Improving data management** through centralizing programmatic data to allow easy generation of a quarterly feedback bulletin, updating the routine database at all levels to include new data elements, and improving the backup and archiving of NMCP data.
- **Strengthening operations research** focusing on socio-anthropological studies and developing research capacity at district level to identify research questions and design and carry out appropriate studies to answer them.
- **Reinforcing supervision** of health facilities, including training regional staff to better manage their districts.

PMI is supporting the NMCP to conduct an evaluation of the impact of malaria control activities. It is anticipated that the RBM MERG will coordinate the impact evaluation for all of Africa; as a member of the RBM partnership, the PMI will assist the MERG in this overall evaluation while focusing and providing leadership for the impact evaluation in the 15 PMI-supported countries. In Senegal, as in much of sub-Saharan Africa, it is difficult or impossible to directly measure malaria-specific mortality. Many deaths still occur in the home without a reliable diagnosis and methods such as verbal autopsies do not provide sufficiently accurate information. Therefore, malaria-specific mortality measurements need to rely on indirect methods and the use of models.

Progress During the Last 12 Months:

A data retention strike (refusal by health workers to report routine data until various demands are met) since mid-2010 has suspended both the quarterly review meetings and most supervision visits. The retention of data has also delayed the production of the 2010 annual reports by the Ministry of Health and the NMCP. Epidemic surveillance data for malaria and other diseases continues to be reported, as described in the section “Epidemic Surveillance and Response.” Entomological and IRS-related data continue to be collected in collaboration with UCAD with support from PMI.

During the year, in collaboration with the Global Malaria Program of WHO and PMI staff, the new routine database structure was completed for district and national levels and the new feedback bulletin template was finalized. The PMI also began the process of procuring equipment for data processing and storage.

The PMI has supported several nationwide surveys to evaluate the levels of coverage for key malaria interventions. After the Malaria Indicator Surveys in 2006 and 2008 and the Post-LLIN Campaign Survey in 2009, the PMI contributed to the 2010-2011 nationwide DHS, which included a full malaria module, testing for parasitemia and anemia, and over-sampling of the six IRS districts to provide district-level IRS coverage results. It was conducted by the National

Statistics and Demography Agency with support from Macro International and the Research Center for Human Development. The results for parasite prevalence, LLIN utilization, and malaria treatment need to be interpreted carefully, as the majority of data collection was done during the low transmission season.

The malaria impact evaluation began in Senegal with a mission from the PMI M&E team in January 2011. The team joined the NMCP M&E unit to develop the timeline for the evaluation and the terms of reference for a national consultant. The team, together with the NMCP M&E Director, visited groups involved in malaria control as well as those involved in meteorology, environment, and other disease control programs to explain the evaluation and ask them to join the steering committee for the evaluation. The NMCP has asked for the draft evaluation protocol so that it can be presented at the first meeting of the steering committee. The steering committee will then validate the protocol and then use it to select the national consultant who will then work with partners to collect the necessary malaria and non-malaria data necessary for the analysis, and work with experts in Senegal, at Macro, and with PMI to conduct the analysis.

Proposed Activities with FY 2012 funding (\$424,000)

PMI M&E activities will be coordinated with the NMCP and other partners, and PMI will support implementation of the NMCP M&E plan and annual review of its implementation. The PMI will help build national capacity in monitoring program implementation of ACTs, ITNs, IPTp and IRS. The evaluation of the coverage of these interventions has traditionally relied on periodic national surveys. In order to ensure the timely availability of quality data and decrease technical assistance over time by institutionalizing the data collection and analysis processes and strengthening local capacity, Senegal will pilot a continuous survey for demographic and health indicators. Based on a pilot survey in Peru, a unit will be set up at the National Statistics Agency (ANSD) that will support two or three data collection teams that will work throughout the year. The data collected from the clusters visited each year should provide national-level and urban/rural estimates for that year, and every two to three years regional estimates. In order to provide useful data on malaria indicators, data collection would need to continue during the months of the year when malaria transmission is highest. Given the highly seasonal nature of malaria and the likely rapid and significant changes in indicators related to LLIN possession and use and parasitemia, the methods should allow a large enough sample to calculate with adequate precision malaria indicators annually for each transmission period (high and low).

The PMI will continue to support improvements in the collection of routine data proposed by the WHO Global Malaria Program and their implementation nationwide.

The evaluation in Senegal of the impact of malaria control activities will continue this year, using money from FY2011. FY2012 funding will focus on the following interventions: (\$424,000)

1. Malaria module in continuous DHS (\$400,000)

To measure coverage for malaria interventions, PMI will contribute to the first continuous Demographic and Health Survey to be conducted in sub-Saharan Africa. Discussions are ongoing with the PMI M&E team and national partners regarding methodology, including time frames, sampling strategy, and precision of estimates. Data collection is expected to start in mid-2012, beginning with FY2011 funds originally programmed for an MIS in 2012. Other partners are also expected to contribute funding for the survey.

2. Quarterly meetings to present and review routine malaria data (included in program supervision support in Capacity Building section)

PMI funds provided to the NMCP for program supervision will be used to support this critical monitoring activity, in situations when funds from other sources are not available.

3. Technical Assistance for monitoring and evaluation (\$24,000)

Two CDC visits for technical assistance in M&E will be funded, one to give technical support to the implementation of the continuous DHS and one to assist with the ongoing efforts to support the NMCP to improve collection, analysis, and communication of results of routine data.

In addition to the direct expenditures on monitoring and evaluation funded by PMI, the in-country PMI advisors provide ongoing technical assistance and capacity building in M&E to the NMCP, implementing partners, and local institutions.

STAFFING AND ADMINISTRATION

PMI staff includes two PMI resident advisors, one representing CDC and one representing USAID, and a team of USAID Foreign Service National technical specialists that support the two advisors. The PMI staff work collaboratively to oversee and manage all aspects of day-to-day PMI implementation in Senegal.

All PMI team members in Senegal 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 PMI team works together to oversee all technical and administrative aspects of PMI in Senegal, including project design, implementing malaria prevention and treatment activities, M&E of outcomes and impact, and reporting results. The PMI resident advisors report to the USAID Mission Director or his/her designee, who is on a day to day basis the USAID Health Team Leader. 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 Global Fund, World Bank, and the private sector.

Locally hired staff to support PMI activities either in Ministries or in USAID are 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 must be approved by the USAID Mission Director and Controller.

Proposed Year Six (FY2012) Activities: (\$1,680,000)

These funds will be used for coordination and management of all in-country PMI activities including support for salaries and benefits for two resident advisors and Foreign Service national staff, office equipment and supplies, and routine administration and coordination expenses.

Annex 1

Tables

Table 1
President's Malaria Initiative - Senegal
Planned Malaria Obligations for FY 2012

Activity	Mechanism	Budget	Geographic Area	Description of Activity
PREVENTION				
Long-lasting insecticide treated bed nets (LLINs)				
Procurement of LLINs for distribution through campaigns and routine	DELIVER	5,000,000	Nationwide	1,000,000 nets for distribution through routine system
Operational costs of implementing and maintaining routine distribution system	NetWorks	1,300,000	Nationwide	Operational costs associated with implementing and maintaining a routine distribution system for LLINs through ANC and at the community level
Communications to promote LLIN ownership and use	NetWorks	300,000	Nationwide	Strategic combination of mass, interpersonal and traditional communication channels to promote improved social norms for net use and care
LLIN Total		6,600,000		
Indoor Residual Spraying (IRS)				
Indoor residual spraying operations	IRS Task Order # 4	5,740,000	6 districts: Vélingara, Nioro, Malem Hodar, Guinguineo, Koumpentoum, and Kougheul	Indoor Residual Spraying in six priority districts
Community sensitization and mobilization for IRS	Community Health Program Component	150,000	6 priority districts	Communications at community level to increase cooperation with IRS activities
Strengthen entomologic capabilities and entomologic monitoring	UCAD	370,000	7 priority districts	Entomologic monitoring post IRS implementation (current 6 districts), plus continued entomologic monitoring in Richard Toll
	Institut Pasteur	30,000	7 priority districts	
	CDC IAA	12,000	N/A	1 visit for CDC entomologist

Activity	Mechanism	Budget	Geographic Area	Description of Activity
Environmental Compliance Capacity Building	EMCAB	<i>Covered with FY11 funds</i>		1 visit to conduct a capacity building workshop for environment compliance associated with IRS
IRS Total		6,302,000		
Malaria in Pregnancy (MIP)				
Reinforce provision of effective MIP services in health facilities and in outreach strategies	Health Services Improvement Program Component	687,000	Nationwide	Monitoring and supportive supervision of MIP service delivery, improvement of data collection, and training of new staff on IPTp and counseling and interpersonal communication skills. Cups and water filters as needed for directly-observed treatment with SP in health facilities.
Procurement of SP	DELIVER	25,000	Nationwide	Procurement of 725,000 SP doses
MIP Total		712,000		
PREVENTION TOTAL		13,614,000		
CASE MANAGEMENT				
Malaria Diagnosis				
Training, supportive supervision, quality assurance, and quality control for microscopy and RDTs	Health Services Improvement Program Component	250,000	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. Maintenance of distributed microscopes.
Microscopes and consumables for laboratories in newly-created health districts	DELIVER	10,000	Nationwide	Procurement of 5 microscopes for new health centers
Procurement of RDTs	DELIVER	850,000	Nationwide	Procurement of 1.2 million RDTs
Diagnosis Total		1,110,000		
Malaria Treatment				
Improve case management of malaria	Health Services	325,000	Nationwide	Support for supervision of case management of malaria at all

Activity	Mechanism	Budget	Geographic Area	Description of Activity
	Improvement Program Component			levels of the health system, including the private sector
Procure ACTs	DELIVER	300,000	Nationwide	Provision of ACTs for a year (~300,000 treatments)
Therapeutic drug efficacy testing	UCAD	62,000	At least two sites	Therapeutic efficacy studies to monitor the susceptibility of P. falciparum to the first line ACTs in at least two sites
Treatment Total		687,000		
Case Management Total		1,797,000		
Epidemic Surveillance and Response				
Strengthening malaria epidemic surveillance	NMCP	100,000	Nationwide	Ongoing support to sites in pre-elimination and epidemic prone zones, including peri-urban Dakar; support to new sites and active surveillance activities in Richard Toll.
Epidemic Surveillance Total		100,000		
CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING				
Capacity Building				
Support to NMCP to enable program supervision	NMCP	150,000	Nationwide	Support visits by national staff to regional and district levels
Support for malariology course of the NMCP	NMCP	200,000	N/A	Malariology course for district and regional staff
Capacity building total		350,000		
Health Systems Strengthening				
Supply chain management and drug management strengthening	Health Systems Strengthening Program Component	600,000	Nationwide	Follow-up on PNA assessment recommendations
Pharmacovigilance and drug quality monitoring and advocacy	USP PQM	200,000	Nationwide	Support for maintaining system of drug quality monitoring in 9 sites. Also includes advocacy for policy enforcement of drug quality standards. Possible long-term TA to shepherd institutional

Activity	Mechanism	Budget	Geographic Area	Description of Activity
				changes indicated by drug quality monitoring.
Health Systems Strengthening		800,000		
STRENGTHENING PUBLIC-PRIVATE PARTNERSHIPS				
Private sector case management strengthening	Health Services Improvement Program Component	75,000	Nationwide	Implementation of the recommendations from private sector case management assessment
Private Sector Total		75,000		
INTEGRATION WITH OTHER GHI PROGRAMS COMMUNITY-LEVEL INTEGRATION				
Sustaining community mobilization activities	Community Health Program Component	700,000	Nationwide	Comprehensive malaria community mobilization activities including IEC/BCC, support for MIP, case management, ITNs
Community case management (CCM) of malaria with ACTs and diagnosis with RDTs as part of an integrated package of services	Community Health Program Component	1,000,000	Nationwide	Community based case management of fever in 1620 functional health huts. Includes training, supervision, and monitoring of staff. Facilitate the integration of MCH activities into the PMI platform.
Support expansion and integration of the NMCP's PECADOM program	Community Health Program Component	1,000,000	ChildFund and Intra divided by region	Training and supervision of DSDOM as well as provision of PECADOM kits.
PECADOM point person at NMCP	Community Health Program Component	35,000	N/A	Support for one position at the National Malaria Control Program to manage PECADOM activities
Support to Peace Corps malaria related activities	SPA	25,000	Peace Corps Volunteer Communities	Support linkages between community implementing partners and Peace Corps Volunteers
Integration with other GHI programs Total		2,760,000		
BEHAVIOR CHANGE COMMUNICATION				
<i>See ITNs, IRS, MIP, and community sections</i>				

Activity	Mechanism	Budget	Geographic Area	Description of Activity
MONITORING AND EVALUATION				
Support to malaria module in continuous demographic and health survey	Measure DHS and local partners	400,000	Nationwide	Support to a full malaria module as part of continuous DHS, including biomarkers
TA for M&E	CDC IAA	24,000	N/A	Funding for one CDC person to provide M&E technical assistance
M&E total		424,000		
IN-COUNTRY MANAGEMENT AND ADMINISTRATION				
In-country staff Administrative expenses	CDC/USAID	1,680,000	Nationwide	Coordination of all in-country PMI activities
Admin total		1,680,000		
GRAND TOTAL		21,600,000		

Table 2
President's Malaria Initiative - Senegal
FY 2012 Budget Breakdown by Partner \$(000)

#	Partner Organization	Geographic Area	Activity	Budget*
1.	CDC IAA	Nationwide	TA for entomologic monitoring and M&E	36
2.	Community Health Program Component	6 priority districts	Community sensitization and mobilization for IRS	150
		Nationwide	Comprehensive malaria community mobilization activities including IEC/BCC, support for MIP, case management, ITNs	700
		Nationwide	Community-based case management of fever in 1620 functional health huts. Includes training, supervision, and monitoring of staff. Facilitate the integration of MCH activities into the PMI platform	1,000
		Nationwide	Training and supervision of DSDOM as well as provision of PECADOM boxes	1,000
		N/A	Support PECADOM point person at NMCP	35
TOTAL				2,885
3.	DELIVER	Nationwide	Procurement of LLINs, ACTs, RDTs, SPs, and microscopes,	6,185
4.	Health Services Improvement Program Component	Nationwide	Reinforce provision of effective MIP services in health facilities and in outreach strategies	700
		Nationwide	Training, supportive supervision, quality assurance, and quality control for microscopy and RDTs	250
		Nationwide	Support for supervision of case management of malaria at all levels of the health system, including the private sector	325
		Nationwide	Private sector case management strengthening; implementation of the recommendations from the private sector case management assessment	75
TOTAL				1,337

#	Partner Organization	Geographic Area	Activity	Budget*
5.	Health Systems Strengthening Program Component	Nationwide	Supply chain management and drug management strengthening: follow-up on PNA assessment recommendations	600
6.	Institut Pasteur	7 priority districts	Entomologic monitoring post IRS implementation (current 5 districts) plus continued entomologic monitoring in Richard Toll	30
7.	IRS Task Order #4	6 districts: Velingara, Nioro, Malen Hodar, Guinguineo, Koumpentoum, and Kougheul	Indoor Residual Spraying of insecticide	5,740
8.	Measure/DHS and local partners	Nationwide	Support to malaria module in continuous DHS	400
9.	NetWorks	Nationwide	Operational cost associated with implementing a routine distribution system for LLINs through ANC and at the community level; strategic combination of mass, interpersonal and traditional communication channels to drive home messages and promote improved social norms for net use and care	1,600
10.	NMCP	Nationwide	Strengthen malaria epidemic surveillance	100
		Nationwide	Support to enable supervision	150
		N/A	Malariology Course for district and regional staff	200
TOTAL				450
11.	Peace Corps SPA	Peace Corps Volunteer Communities	Support to Peace Corps malaria related activities	25
12.	UCAD	At least two sites	Therapeutic drug efficacy testing	62
		7 priority districts	Strengthen entomologic capabilities and entomologic monitoring post IRS implementation (current districts) plus continued entomologic monitoring in Richard Toll	370
TOTAL				432
13.	USP PQM	Nationwide	Pharmacovigilance, drug quality monitoring, and advocacy efforts	200

#	Partner Organization	Geographic Area	Activity	Budget*
TOTAL				19,920

* Does not include staffing and administration