

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 Five – Fiscal Year 2011**

**SENEGAL**

## TABLE OF CONTENTS

|  |    |
|--|----|
| Abbreviations  | 4  |
| Executive Summary  | 6  |
| Introduction   | 10 |
| Global Health Initiative                                 | 10 |
| President’s Malaria Initiative Background                | 10 |
| Malaria Situation in Senegal                             | 11 |
| Current Status of Malaria Indicators                     | 13 |
| National Malaria Control Plan                            | 15 |
| Multilateral and Bilateral Donors in Malaria Control     | 17 |
| Goal and Targets of the President’s Malaria Initiative   | 19 |
| Expected Results – Year Five                             | 19 |
| Interventions - Prevention Activities                    | 20 |
| Insecticide-treated nets                                 | 20 |
| Indoor residual spraying                                 | 24 |
| Malaria in Pregnancy                                     | 27 |
| Interventions - Case Management Activities               | 29 |
| Malaria diagnosis  | 29 |
| Malaria treatment  | 31 |
| Pharmaceutical Management and Drug Quality               | 34 |
| Epidemic Surveillance and Response                       | 37 |
| Capacity Building and Health Systems Strengthening       | 38 |
| Capacity Building  | 38 |
| Strengthening Public-Private Partnerships                | 39 |
| Integration with other Global Health Initiative Programs | 40 |

|   |    |
|---|----|
| Maternal and Child Health, Reproductive Health and Malaria    | 41 |
| Community-level integration of GHI programs including Malaria | 41 |
| HIV/AIDS and Malaria  | 46 |
| Communication and Coordination with other Partners            | 47 |
| Monitoring and Evaluation                                     | 48 |
| Staffing and Administration                                   | 52 |
| Annex 1   | 53 |
| Table 1   | 54 |
| Table 2   | 61 |

## ABBREVIATIONS and ACRONYMS

|             |   |
|-------------|---|
| ABCD        | <i>Atteindre les Bénéficiaires Communautaires à travers les Districts</i> (Reaching community beneficiaries via the health districts) |
| ACT         | artemisinin-based combination therapy   |
| AIDS        | Acquired Immunodeficiency Syndrome  |
| ANC         | antenatal care  |
| AL          | artemether-lumefantrine combination therapy   |
| ART         | anti-retroviral therapy   |
| AS–AQ       | artesunate-amodiaquine combination therapy  |
| BCC         | behavior change communication   |
| CBO         | community-based organization  |
| CCM         | community case management (of childhood illness)  |
| CDC         | Centers for Disease Control and Prevention  |
| CFA         | West African Financial Community Franc (USD \$1 = Fr CFA 420)   |
| 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  |
| GIS         | Geographic Information Systems  |
| 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  |
| JICA        | Japan International Cooperation Agency  |
| LLIN        | long-lasting insecticide-treated bednet   |
| 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)  |
| PLWHA       | people living with HIV/AIDS   |
| PMI         | President’s Malaria Initiative  |
| PMTCT       | prevention of mother to child transmission (of HIV)   |
| 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 invest \$63 billion over six years to help partner countries 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 FY 2007 and has progressed rapidly with significant progress demonstrated to date. The FY 2011 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. While universal access to malaria prevention and treatment measures is the goal of the NMCP, pregnant women and children under five remain the primary focus of PMI efforts, since they are the most vulnerable to malaria. The activities that PMI is proposing to support with FY 2011 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. The proposed FY 2011 PMI budget for Senegal is \$24 million.

Senegal has a population estimated at 12.9 million, with approximately 2.4 million children under five and 502,000 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 in the last two years. While the decline in the first year can be partially ascribed to a change in the malaria case definition that 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.

A PMI-funded Malaria Indicator Survey (MIS) in Senegal in 2008 showed that parasite prevalence was less than 6% nationwide and that under-five mortality had fallen 30%, from 121 per 1000 live births in 2005 to 85 in 2008. Compared to the 2006 MIS, a post-campaign survey

showed that the proportion of households owning at least one ITN increased from 45% to 82% in 2009, and that the proportion of children under five sleeping under an ITN the previous night had increased from 21% to 45% in 2009, with similar trends for pregnant women. The proportion of pregnant women receiving one dose of intermittent preventive treatment with sulfadoxine-pyrimethamine (SP) also increased from 69% in 2006 to 76% in 2008/9, and 52% of pregnant women now receive two or more doses of SP. The PMI will build on these achievements, as well as reinforce its commitments to GHI principles through increased integrated programming and efforts to strengthen the overall health system in FY 2011.

The following paragraphs discuss progress made during the last 12 months of the PMI and proposed FY 2011 activities.

**Insecticide-treated nets (ITNs):** In 2009-2010, PMI supported a comprehensive, three-pronged strategy to increase household ownership and use of LLINs: 1) **free distribution** of 2.3 million LLINs to young children participating in the MOH's local supplementation days, and over 620,000 LLINs using a universal coverage approach in four regions; 2) **subsidized distribution** of more than 105,000 LLINs to pregnant women and children under five through a voucher program; and 3) **social marketing**, resulting in retail and institutional sales of more than 65,000 nets. To promote ITN demand and use, PMI has also invested in behavior change communication (BCC) activities around ITNs.

With FY 2011 funding, PMI and the NMCP will focus on completing activities designed to achieve universal coverage of LLINs nationwide and instituting a strong routine distribution system. The universal coverage strategy adopted by the NMCP involves a household census to determine the number of sleeping spaces not already covered by an LLIN followed by the distribution of the needed number of nets to each family to ensure each sleeping space is covered. In 2011, an estimated 3.2 million additional LLINs are needed to cover all sleeping spaces in Senegal. The 1.4 million LLINs expected to be distributed by PMI in 2011-2012, along with those expected to be purchased by the NMCP via their Global Fund grants, will fill the estimated gap and ensure continued high rates of household possession and use.

**Indoor Residual Spraying (IRS):** Starting with the May 2010 spray season the NMCP and PMI expanded IRS activities from three to six districts. Guinguiné, Malem Hoddar and Koumpentoum health districts were chosen from among the districts prioritized for IRS expansion by the NMCP. Overall, 98% of the 259,967 houses targeted by spray teams were successfully sprayed. With FY 2011 funding, PMI will again support spraying in all six districts with the aim of protecting over 900,000 residents.

**Intermittent preventive treatment in pregnant women (IPTp):** Intermittent preventive treatment in pregnant women is implemented in all MOH antenatal care service delivery sites nationwide. With FY 2010 funding, PMI worked with the MOH and other partners to strengthen malaria in pregnancy (MIP) interventions through training, monitoring, and supportive supervision of health care workers. Nearly 300 health workers were trained in MIP interventions by PMI and a program of outreach visits to provide ANC services at health huts was also started with nearly 2,000 visits made to 873 health huts in 52 districts outside Dakar. With FY 2011 funding, PMI will continue to support training, monitoring, and supportive supervision of health

care workers in MIP service delivery, as well as expand the ongoing outreach program nationwide to 2,000 visits.

**Case management:**

*Diagnosis:* Since late 2007, rapid diagnostic tests (RDTs) have been available in all health facilities nationwide and MOH directives have mandated testing of all suspected cases of malaria. In FY 2010, PMI supported training courses for supervisors and implementation of a quality assurance/quality control protocol for microscopic diagnosis of malaria, as well as continued courses in laboratory diagnosis of malaria. With FY 2011 funds, PMI will continue support for training in parasitological diagnosis of malaria for additional staff, refresher training, quality assurance, and supervision of diagnostics including performance of RDTs.

*Treatment:* During the last four years, PMI supported refresher training in case management for more than 3,000 clinical-level providers and management staff, and supportive supervision at health center and health post levels in all regions. With FY 2010 funding, PMI supported introduction of on-site refresher training in case management and the procurement of 444,420 ACT treatments in response to a national shortfall. With FY 2011 funding, PMI will support the procurement of artemether-lumefantrine to cover the gap in artemisinin-based combination therapy (ACT) needs for Senegal. The PMI will continue to strengthen case management of malaria with ACTs through supportive supervision and monitoring, and training of new health care workers. The PMI will also expand support to include training and supervision for hospital level staff, as well as support an assessment of the quality of care provided by the private sector.

**Global Health Initiative and enhanced integration:**

In line with GHI principles, PMI has reinforced its efforts to build capacity and integrate across programs. At the national level, PMI will support training on supply chain management as part of an integrated activity covering principles that apply to all essential drugs. Similarly, drug quality monitoring will include medicines for the treatment of malaria, tuberculosis, and HIV/AIDS, as well as oral contraceptives. The PMI will increase support aimed at strengthening services provided at the facility level and through outreach clinics operated by health facility staff at the community level. To extend care to those areas far from health posts, Senegal has also developed a network of “health huts” offering a package of health services to rural populations. In the majority of the 1,427 functional health huts, PMI and the USG/Maternal and Child Health program will support 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 30% of health huts, and community surveillance for tuberculosis is offered in about half of health huts.

With FY 2011 funding, PMI will increase support for community mobilization and communication activities to prevent and control malaria as part of integrated communication and behavior change activities at the community level. PMI will also continue to support and promote the effective collaboration between Peace Corps Volunteers and community-based malaria activities in the communities where the volunteers work.

Consistent with GHI principles, PMI will reinforce integration of malaria and HIV/AIDS activities, which aim to strengthen the delivery of malaria prevention and treatment services at HIV/AIDS service delivery points. Key components include: promotion of malaria prevention and care-seeking behavior, integration of malaria prevention and early treatment within HIV ambulatory treatment settings and care services at community level. With FY 2011 funds, PMI will support training of HIV care workers in ambulatory care settings in prevention and effective case management of malaria.

**Capacity Building and Health Systems Strengthening:** To build country ownership and sustainability, PMI supported the participation of ten regional and national MOH staff to attend a three-week course on data management and monitoring with FY 2010 funding, and two MOH staff attended a regional applied epidemiology course in Benin. The PMI has also joined several development partners to support the evaluation of the current 2006-2010 NMCP Strategic Plan and the development of the 2011-2015 Strategic Plan, together with the Global Fund Round 10 proposal. With FY 2011 funding, PMI will increase support for activities aimed at developing capacity at all levels in supportive supervision and monitoring and evaluation, and training in malariology to sustain Senegal's accomplishments in controlling malaria.

**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 NMCP M&E plan. Activities supported by PMI include MIS surveys in 2006 and 2008, a survey after the 2009 LLIN distribution campaign, support for a malaria epidemic detection system, and interim monitoring of the four main intervention areas. With FY 2010 funding, PMI also supported a Demographic and Health Survey (DHS) with a full malaria module, including parasitemia and anemia testing of children under five.

Support with FY 2011 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 providing initial funding for a nationwide MIS in September 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 invest \$63 billion over six years to 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 IPTp began in Senegal in mid-2007 and has progressed

rapidly with support from PMI and other partners. This FY 2011 PMI Malaria Operational Plan presents a detailed implementation plan for the fifth 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, including the Global Fund Round 7 grant. 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 description of planned FY 2011 activities. The total amount of PMI funding requested for FY 2011 is \$24 million.

## **MALARIA SITUATION IN SENEGAL**

Senegal has a population of approximately 12.9 million<sup>1</sup> with 47% living in urban areas. The proportion of the population living below the poverty line is 62% in rural areas and 32% in Dakar<sup>2</sup>. Although substantial improvements have been achieved since the 1960s, Senegal's indicators of human development remain unacceptably low with the country ranked 144 out of 169 countries worldwide on the Human Development Index<sup>3</sup>. The infant mortality rate is 54 and the under-five mortality rate is 85 per 1,000 live births<sup>4</sup>. Maternal mortality is estimated to be 401 per 100,000 live births and the mean life expectancy is 56 years<sup>5</sup>. The adult HIV prevalence rate is estimated at 1% for adults 15-49 years of age, with 64,000 adults and 3,100 children estimated to be living with HIV/AIDS<sup>6</sup>.

---

<sup>1</sup> Agence National de la Statistique et de la Démographie. Situation Economique et Sociale du Sénégal 2007. Available on web at [http://www.ansd.sn/publications/annuelles/SES\\_2007.pdf](http://www.ansd.sn/publications/annuelles/SES_2007.pdf) accessed 18 May 2010.

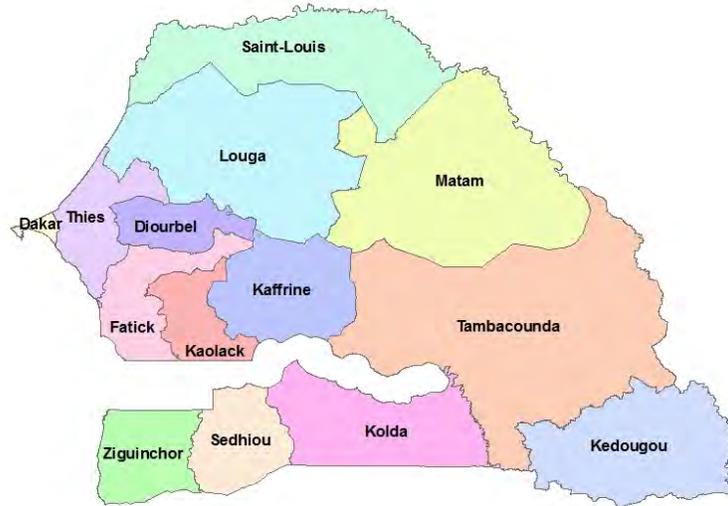
<sup>2</sup> Based on comparing the cost of a standard basket of food and non-food items to the per-capita annual consumption. République du Sénégal. Evaluation quantitative du DSRP-I (2003-2005), July 2007

<sup>3</sup> Human Development Report 2010: Senegal. Available on web at <http://hdr.undp.org/en/statistics/> accessed 12 November 2010.

<sup>4</sup> Ndiaye, S, et al. 2009. 2008/9 Senegal Malaria Indicator Survey. Calverton, Maryland USA: Centre de recherche pour le développement humain (Sénégal) and Macro International

<sup>5</sup> 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

<sup>6</sup> UNAIDS/WHO Epidemiological Fact Sheet on HIV and AIDS for Senegal, September 2008. Available on web at [http://apps.who.int/globalatlas/predefinedReports/EFS2008/full/EFS2008\\_SN.pdf](http://apps.who.int/globalatlas/predefinedReports/EFS2008/full/EFS2008_SN.pdf) accessed 18 May 2010.



**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 both care and treatment at the District Health Center at peripheral facilities throughout the district, as well as overseeing prevention activities. There are currently 69 health districts in Senegal.

Although not a formal part of the health system, Senegal’s health care pyramid rests on a foundation of almost 1400 “functional”<sup>7</sup> 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 complicated medical care. Additional 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 artemisinin-based combination therapies (ACTs) through the home-based management of fever program (*Prise en Charge à Domicile*, PECADOM).

Malaria is endemic throughout Senegal. The three ecological zones, based on annual rainfall, are the northern Sahelian zone with < 300 mm of rainfall occurring between July and September, a central Sahelian zone and 400 – 1000 mm of rainfall occurring between July and October, and a southern tropical zone with 1000 – 1250 mm of rainfall and a rainy season from June to October. The two epidemiological zones are the Sahelian, with high transmission toward the end of and immediately after the rainy season and little transmission during the rest of the year, and the tropical, with year-round transmission peaking during the rainy season. Transmission occurs throughout the year, often as small outbreaks, in peri-urban areas and in areas close to rivers or

<sup>7</sup> 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 1,387 functional health huts currently supported by the PMI program.

other water sources that persist through the dry 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 2.4 million children under five and 502,000 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 this point on, clinicians were directed to test all suspected cases of malaria, to treat with antimalarials and to report only 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 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 decrease has continued, with malaria representing only 3% of all outpatient visits and 4% of all deaths in 2009.

## CURRENT STATUS OF MALARIA INDICATORS

The PMI funded a Malaria Indicator Survey (MIS) in Senegal in 2008 and a post-campaign survey in 2009 after the long-lasting insecticide-treated bednet (LLIN) distribution campaigns that year. These surveys showed improvements for most malaria indicators since the baseline MIS, which was carried out between November and December 2006<sup>8</sup>. Household ownership of at least one insecticide-treated net (ITN) rose from 36% in 2006 to 82% in 2009, and utilization of ITNs by children under five rose from 16% in 2006 to 45% in 2009. Similar trends in utilization were observed with pregnant women and in the general population.

The proportion of pregnant women receiving one dose of intermittent preventive treatment (IPTp) with sulfadoxine-pyrimethamine (SP) also increased from 69% in 2006 to 76% in 2008, with 52% of women having received two or more doses of SP in 2008. 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 artemisinin-containing therapies 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 in 2008, 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; 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.

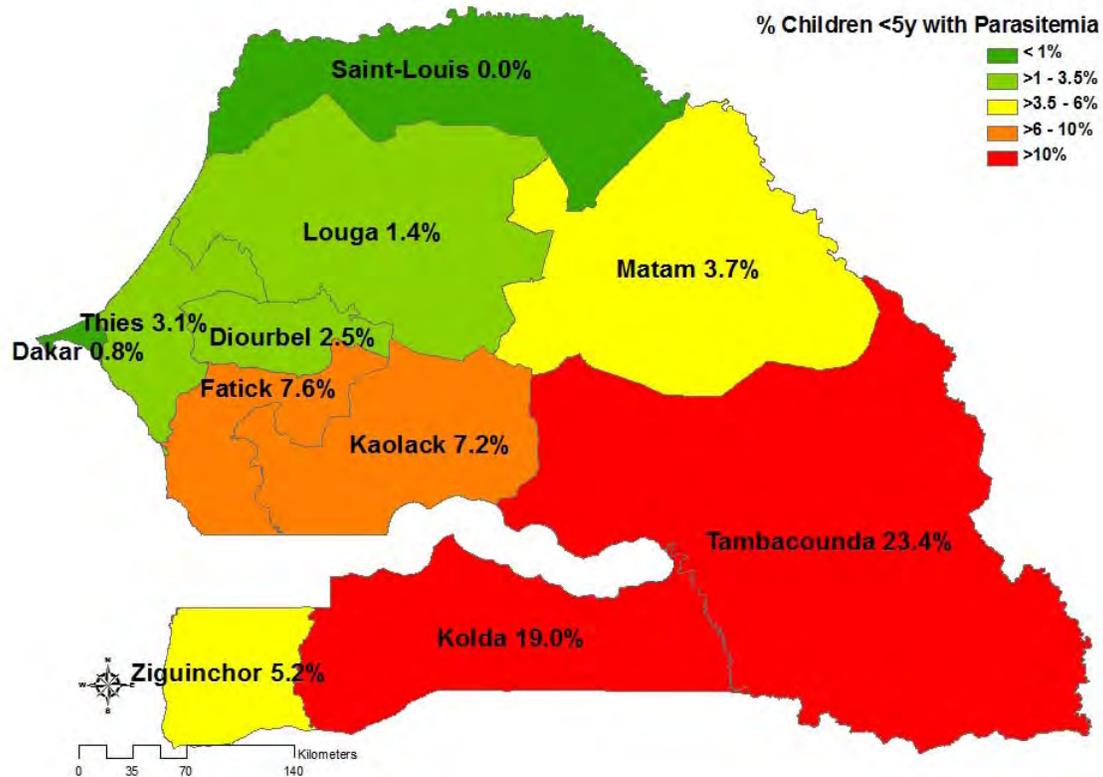
---

<sup>8</sup> 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

| Indicator  | 2005<br>DHS | 2006<br>MIS | 2008<br>MIS | 2009<br>PCS | Regional Range of Latest<br>Survey (MIS or PCS) |
|--|-------------|-------------|-------------|-------------|---|
| % Households with an ITN*  | 20          | 36          | 60          | 82          | 64 (Dakar) - 97 (Fatick)                        |
| % General population who slept under an ITN* the previous night  | 6           | 12          | 23          | 34          | 17 (Dakar) – 61 (Kolda)                         |
| % Children under five who slept under an ITN* the previous night   | 7           | 16          | 29          | 45          | 23 (Dakar) - 71 (Fatick)                        |
| % Pregnant women who slept under an ITN* the previous night  | 9           | 17          | 29          | 49          | 6 (Dakar) - 66 (Fatick)                         |
| % Women who received 2 or more doses of IPTp during their last pregnancy in the last 2 years                                     | 12          | 49          | 52          |             | 43 (Tambacounda) – 71 (Diourbel)                |
| % 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           |             | 0.2 (Matam) - 7 (Kolda)                         |
| % Women of childbearing age with anemia (< 11 g/dL)  | 59          | --          | 64          |             | 57 (Diourbel) – 86 (Tambacounda)                |
| % Children under five with anemia (< 11 g/dL)  | 83          | --          | 79          |             | 72 (Ziguinchor) – 87 (Fatick)                   |
| % Children under five with parasitemia ( <i>P. falciparum</i> )  | --          | --          | 6           |             | 0.8 (Dakar) – 23 (Tambacounda)                  |
| Under 5 mortality rate per 1000 live births  | 121         | --          | 85          |             | 59 (Dakar) - 160 (Kolda)                        |

The 2008 MIS included several measures of the impact of malaria control efforts in Senegal. Both this survey and the Demographic and Health Survey (DHS) conducted in 2005 assessed under-five mortality, and a comparison of results showed a drop of 30%. Since the 2005 DHS, the proportion of children with anemia has declined modestly while the proportion of women of childbearing age with anemia increased slightly. 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 overall was 6% in children 6-59 months of age, with regional prevalence increasing from 0% in Saint Louis in northern Senegal to 23% in Tambacounda in the southeast (see map). These results correspond to the ranking of regions by malaria morbidity according to routine NMCP data.

**Percent of children 6-59 months of age with parasitemia due to *P. falciparum* by region, Senegal, 2008**



Except for malaria treatment, the comparison of these surveys shows a considerable increase in coverage and utilization of major malaria prevention and control activities and evidence of impact on overall child mortality; however, it also shows that continued support is needed to scale up interventions to reach targets established by the NMCP and PMI.

**NATIONAL STRATEGIC PLAN FOR MALARIA**

Proposed PMI activities are aligned with the 2011-2015 National Strategic Plan for Malaria Control, which has the overall objective of reducing malaria morbidity to the threshold for pre-elimination and of reducing mortality due to malaria by 75% by 2015. In addition, the following specific objectives are identified:

- Increase to 80% the rate of utilization of ITNs by 2015;
- Cover 90% of the population living in targeted zones with IRS by 2015;
- Treat at least 95% of larval sites identified in target areas by 2015;
- Increase to 80% coverage of IPTp in accordance with national directives;
- Treat according to national directives all cases of malaria in pregnant women seen in health facilities by 2015;
- Confirm 95% of suspected cases of malaria;

- Treat 100% of malaria cases at all levels of the health pyramid in accordance with national directives;
- Early detection of 80% of epidemics and emergency situations by 2015;
- Ensure a constant availability of anti-malarial treatments and products in 95% of public and community health facilities;
- 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 for the M&E of the 2011-2015 National Strategic Plan.

In order to accomplish these objectives, the NMCP focuses on strengthening prevention measures and ensuring correct and timely treatment not only at all levels of the healthcare system but also through community health workers. The 2011-2015 National Strategic Plan for Malaria Control outlines an integrated package of activities with the following components:

- **Vector control:** reach universal coverage with LLINs throughout the country, enhance community participation in IRS and larval control, promote larval control in targeted areas, and improve entomological monitoring and M&E;
- **Malaria in pregnancy:** intermittent preventive treatment with at least two doses of sulfadoxine-pyrimethamine, free distribution of LLINs during antenatal care, and revise treatment guidelines to allow use of ACTs in pregnant women;
- **Malaria case management:** revise care and treatment policies according to latest international guidelines and recommendations for areas with falling endemicity, explore intermittent preventive treatment in infancy, provide chemoprophylaxis for migrants and travelers, make treatment of severe malaria free of charge, develop a partnership with private sector health providers to improve adherence to care and treatment directives, improve planning and management at district level, increase rates of RDT use (notably in the private sector and hospitals), conduct drug quality monitoring, and expand PECADOM throughout highly endemic zones;
- **Epidemic prevention and control:** extension of the system of epidemic surveillance sites in high-risk districts, epidemic response planning, and capacity building;
- **Pharmaceutical supply chain management:** improve coordination with the Central Medical Stores (CMS), supply chain capacity building at all levels, improve collaboration with private sector health providers, and enhance the quality assurance of antimalarial drugs and products;
- **Health promotion:** improve IEC / BCC through a new communications plan, improve feedback using print and web-based channels, expand advocacy, consolidate community-based interventions, increase social mobilization, improve community-level capacities in health communication;
- **Program management:** revise national malaria control policies, increase central, regional and local government budgets for malaria control, improve coordination within the MOH and with other sectors, and strengthen partnerships with the private sector, international partners, and civil society;

- **Monitoring and evaluation:** enhance epidemiologic surveillance, strengthen supervision and routine data collection, support training in research methods, and evaluate implementation of the national plan at its mid-point and at the end of the five years.

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 two **Global Fund** malaria grants, Round 4, a \$33.3 million grant for the period from 2005 to 2010 and Round 7, a \$67 million grant for the period from 2007 to 2012. A Round 9 submission was unsuccessful and recently a proposal was submitted for Round 10. The **World Bank** continues to provide support to Senegal through the Senegal River Basin Development Organization and the Nutrition Enhancement Project. In 2010, the Senegal River Basin Development Organization distributed over 775,000 LLINs in its 19 districts (St. Louis, Matam, Tambacounda, Kedougou and Louga regions) through various approaches. After mass distribution campaigns for children under five in 2008 and on a smaller scale in 2009, the Nutrition Enhancement Project will continue 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 to the health sector in Senegal primarily through support of district-level health plans in the regions of Kolda, Sédhiou, Kédougou, Tambacounda and Matam. 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, 600,000 of which were used to carry out the first phase of universal coverage activities in four regions in 2010.

### Other Bilateral Donors

The **French Cooperation** contributes significantly to research activities through the *Institut Pasteur de Dakar* and the *Institut pour le Recherche et Développement (IRD)* and places a technical advisor at the MOH. The **Japan International Cooperation Agency (JICA)** supports about 10 volunteers in the health sector, with one dedicated to malaria. The **Chinese Cooperation** donated 358,880 ACT treatments (duo-cotexin) in 2007-2008 and has sponsored training in malariology. The Embassy of **Thailand** has also 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. While not specifically malaria focused, their activities improve the quality of clinical care and data collection at all levels through training and standardization of health post referral forms and inpatient records.

**The United States Peace Corps** and USAID have been working collaboratively on various programs in Senegal over the past few years, and under PMI, this relationship has been

strengthened. PMI staff and implementing partners regularly participate in pre-service and in-service training sessions to discuss ideas for collaboration. Peace Corps' innovative experiences in carrying out universal coverage campaigns in two districts in 2009-2010 have served as the basis for expanding this approach throughout Senegal.

### **Non-governmental and Faith Based Organizations**

**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, Counterpart 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, RTI International, Johns Hopkins University Center for Communications Programs and Management Sciences for Health.**

In 2009, the **Senegalese Red Cross Society** received funds from PMI via the **International Federation of Red Cross and Red Crescent Societies** to support nearly 2,000 volunteers and nearly 100 supervisors/coaches during the mass distribution campaign and to implement follow-up activities encouraging net hanging and use. The two will also receive FY10 funds to carry out similar activities related to universal coverage. 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, has supported the development of the 2011-2015 National Strategic Plan and continues to support the NMCP in monitoring, evaluation and surveillance.

### **Academic and Research Institutions**

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)**, **Institut de Recherche pour le Développement (IRD)** and **Institut Pasteur de Dakar**. These groups have strong collaborative relationships and together have published much of the recent literature on malaria in Senegal.

### **Private Sector**

In the private sector, the **Pfizer** pharmaceutical company continues to implement a malaria control program focused in three health districts in the Tambacounda Region, with funding estimated at \$300,000 per year for five years (2007 – 2011). The program 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. This activity is managed by one of PMI's implementing partners and significant efforts have been made to ensure that the programs are complementary by using BCC and training materials developed under PMI.

Other private sector actors include **Malaria No More** which supports dissemination of a variety of messages promoting malaria prevention and treatment through the “Senegal Surround Sound” campaign in collaboration with the Youssou Ndour Foundation. They also have contracted a local market research firm to conduct a series of surveys looking at the results of their media campaigns. In addition, **Total**, a French petroleum company, has worked with the NMCP to carry out 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 in populations at risk for malaria:

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

## **EXPECTED RESULTS – YEAR FIVE (FY 2011)**

### Prevention:

1. A total of 1.4 million LLINs will have been procured and distributed with PMI funding;
2. The proportion of the general population sleeping under an ITN the previous night will have increased to 50%; and
3. At least 85% of eligible houses visited in the six target spray districts will be sprayed protecting over 900,000 residents.

### Treatment:

1. Procure at least 450,000 first-line ACT treatments covering all ACT needs in Senegal during Year 5; and
2. >90% of presumed malaria cases will be confirmed with diagnostic testing (as per data collected by the NMCP).

## INTERVENTIONS – PREVENTION

### **Insecticide-treated nets (ITNs)**

Please refer to the “Community-level integration of GHI programs” and “HIV/AIDS and Malaria” sections that appear under the “Integration with other Global Health Initiative Programs” for additional ITN activity descriptions.

#### **Background:**

Key strategies for malaria prevention in the NMCP 2011-2015 Strategic Plan are the distribution of LLINs<sup>9</sup> to achieve and maintain universal coverage and reinforcement of communication on the use of ITNs, with a goal that 80% of the population will sleep under an ITN by 2010. In a strategy meeting held in February 2010, the NMCP and partners agreed to focus efforts on achieving universal coverage by the end of the year and then revitalize the routine distribution system.

The NMCP remains committed to diversifying sources of LLINs and in the past has promoted four 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**

The NMCP follows the “catch-up” and “keep-up” strategies endorsed by the RBM partnership to rapidly increase and maintain high coverage with LLINs. The NMCP in 2007 began to work with partners on large-scale mass distributions of LLINs to “catch-up” net ownership among children under five, culminating in a national campaign in 2009. These campaigns were integrated with the semi-annual national supplementation days that target children 6-59 months of age for administration of vitamin A and mebendazole.

Other partners distributing significant quantities of LLINs have included the Nutritional Enhancement Program of the World Bank (>500,000 LLINs in 2008) and the Senegal River Basin Development Organization (775,000 LLINs in 2010). The “catch up” strategy has been complemented by routine distribution and BCC to maintain coverage gains and ensure LLINs are properly used.

#### **Targeted subsidies for vulnerable groups**

From 2004 to 2009, PMI supported the NMCP by subsidizing the sale of ITNs and later LLINs to pregnant women and children under five. Under this system, health committees at participating facilities negotiated agreements with private sector distributors to stock and sell nets through the health facility’s pharmacy. These agreements specified the co-payment required from the client for each type of LLIN (generally 1,000 FCFA [about \$2.17] for rectangular nets and 1,500 FCFA [about \$3.26] for circular) and the amount of

---

<sup>9</sup> Since 2007, the NMCP only procures long-lasting insecticide treated nets, however it continues to measure coverage and utilization based on ITNs.

the co-payment retained by the health committee. The distributors were in turn responsible for ensuring a consistent supply of LLINs to the points of sale.

Senegal is a Bamako Initiative country and has a long tradition of co-payments for health services and products, a practice generally well-accepted by the public. While the NMCP and partners feel strongly that the co-payment is not a barrier to most people, it is recognized that free mass distributions help to reach many families that cannot afford an LLIN through routine services.

### **Untargeted sales of subsidized bednets**

The NMCP has supported untargeted bednet sales at health facility pharmacies and through CBOs at a subsidized price of 1,000 CFA (about \$2.17), a portion of which is retained by the health districts and CBOs. Nets for this program came from donations by UNICEF and the World Bank, as well as procurements made under the Global Fund Round 4.

The NMCP and PMI had planned to revitalize the subsidized, untargeted routine distribution system in early 2010 but the recent decision to focus on universal coverage strategies has put this LLIN distribution approach on hold until later in the year.

### **Commercial bednets sold at market prices to the general public**

The elimination of national taxes and tariffs on ITNs in 2004, along with increased availability of competing brands on the commercial market, brought down retail prices of ITNs and increased access for the general population. Three major manufacturers supply LLINs in Senegal, along with two manufactures of ITNs. Commercial suppliers reach 13 of 14 regions, though they do not reach some rural areas (specifically Kédougou). These bednets are sold at 3000 – 7500 CFA (\$7.15 – \$17.90) each.

Social marketing efforts have also resulted in a steady supply of nets being available in-country. Expanding the market has encouraged net manufacturers to invest in Senegal, to develop their own marketing plans, and to promote their products.

### Progress During Last 12 Months:

The PMI supports the NMCP's comprehensive strategy to increase household ownership of LLINs to achieve universal coverage and protect vulnerable populations. Equally important are the efforts to boost LLIN use that are included in social marketing activities and in the community interventions supported by PMI.

- 1) The NMCP completed the second phase of a **nationwide free LLIN distribution** in Dakar in October 2009, delivering in both phases a total of 2,304,886 LLINs to children under five. The PMI contributed 380,000 LLINs and funding for operational costs. The post-campaign survey showed that this distribution resulted in 83% of the children in the target age group receiving an LLIN. The PMI also supported the free distribution of 9,000 LLINs to people living with HIV/AIDS (PLWHA) through regional PLWHA networks.

The Senegal River Basin Development Organization also distributed 387,000 LLINs in January 2010 to children under five in five regions.

Universal coverage has been defined by the NMCP as one LLIN per sleeping space. A strategy to reach universal coverage of LLINs was developed and piloted in two districts - Saraya and Vélingara - by the Peace Corps in partnership with several organizations including NetLife, the Against Malaria Foundation, Malaria No More, Tostan, and World Vision. This strategy includes a door-to-door census of sleeping spaces and available bednets, with each family given a coupon showing their net needs. The coupons are then redeemed during distribution ceremonies in the local community. In the pilot phase, a total of 120,000 LLINs were distributed, including 19,000 contributed by PMI.

The NMCP is applying these strategies on a wider scale in 2010. During the first phase of distribution, between May and September 2010 in Sédhiou, Kolda, Tambacounda and Kédougou Regions, an estimated 620,000 LLINs were distributed. Additional phases will follow in late 2010 and early 2011 to cover the rest of the country. LLINs are being provided by the Islamic Development Bank, PMI, the Global Fund and the Senegal River Basin Development Organization. Numerous partners are supporting post-distribution communications activities to ensure that LLINs are hung correctly and properly used.

- 2) The PMI supported **subsidized distribution** of LLINs to pregnant women and children under five through the voucher program functioning in 539 facilities in seven of the country's 14 regions. During FY09, the last year that the program operated, 105,661 pregnant women and young children received LLINs from this program.

The PMI has begun working with the NMCP on a strategy to expand the routine, subsidized LLIN distribution system to reach the general population on national scale. This strategy will seek to integrate the PMI-supported, targeted, facility-based system and the NMCP-supported, untargeted, community based system, beginning in the areas where universal coverage has already been achieved. To increase access for pregnant women and encourage proper pre-natal care, the NMCP has agreed that LLINs will be given out free of charge during ANC visits. The new routine LLIN project also includes technical support to the NMCP to assist with the development of routine net monitoring and replacement strategies.

- 3) The PMI-funded **social marketing** activities such as billboards, TV and radio spots, newspaper insertions, and technical assistance for planning and marketing contributed to the sale of over 65,000 unsubsidized ITNs by local commercial distributors during FY09. Social marketing messages identify the advantages of LLINs over other types of bednets, encourage correct and consistent use, and strengthen the brand identity of suppliers in Senegal.

#### Gap analysis:

Achieving and maintaining universal coverage with LLINs in Senegal will require completing the rolling distributions started in 2010 and implementing a system for routine delivery of LLINs

in each district as it completes the catch-up distribution. LLIN needs in 2011 are estimated to be 7.4 million LLINs, based on the average number of people and sleeping spaces per region coming from the post-campaign survey and official population figures. Based on actual distribution results from 2008 and 2009 and projected results for 2010, and assuming that LLINs are lost at a rate of 8% in the first year, 20% in the second year, and 50% in the third year, 4.8 million LLINs will be in Senegalese homes at the start of 2011, leaving an unadjusted gap of 2.6 million. Based on the results of the pilot project in Vélingara, these needs estimates must be increased by 20% to account for inaccuracies in estimates of existing nets and the total population, giving a total expected gap for 2011 of 3.2 million LLINs.

Up to 500,000 LLINs are planned to be distributed to pregnant women via antenatal care clinics in 2011, and the remainder (2.7 million) will be distributed through universal coverage catch-up activities. The PMI will provide 1.4 million of the needed LLINs, while the NMCP will purchase approximately 400,000 LLINs under phase two of their Global Fund Round 7 grant and will also include the purchase of LLINs in their Round 10 application. These combined resources should allow Senegal to reach universal coverage and implement a routine system to sustain this coverage nationwide by early 2012, assuming the Round 10 application is successful. This analysis is summarized in the table below.

|                       |   |                      |
|-----------------------|---|----------------------|
| Defining the gap      | Number LLINs needed to cover every sleeping space in 2011 | 7.4 million          |
|                       | Number LLINs existing in country at start 2011            | <u>- 4.8 million</u> |
|                       | Unadjusted gap  | 2.6 million          |
|                       | Adjusted gap (including 20% buffer)                       | 3.2 million          |
| Partner contributions | PMI   | 1.4 million          |
|                       | Global Fund Round 7                                       | 0.4 million          |
|                       | Global Fund Round 10 (if awarded)                         | 1.6 million          |
|                       | Total   | 3.4 million          |

Proposed Year 5 (FY 2011) Activities: (\$9,727,000)

In FY 2011, PMI and the NMCP will focus efforts on completing universal coverage activities and instituting a strong routine distribution system.

*1. Procurement (\$7,000,000) and operational support (\$2,327,000) for distribution of LLINs:*

As requested by the NMCP, PMI support for LLIN distribution in Year 5 will focus on completing universal coverage activities in the country and scaling up the new national routine distribution system. The PMI plans to distribute at least 1.4 million LLINs by the end of 2011 (400,000 through routine distribution and one million via catch-up universal coverage activities). The funding will cover both procurement and operational costs, including transportation to regions/districts, training, supervision, and reporting. The remaining gap of 1.8 million LLINs should come from the NMCP's Global Fund Round 7 and, if awarded, Round 10 grants.

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

The PMI will continue to use all possible communication strategies to increase awareness of the benefits of LLINs and, more importantly at this stage, their correct and consistent use. Mass media and promotional efforts, as well as local social mobilization activities will be utilized. With a new nationwide focus on universal coverage, 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*”).

Information on PMI support for BCC activities to be undertaken with PLWHA can be found in the “Integration with other Global Health Initiative Programs” section later in this document. Additional malaria prevention activities implemented by Peace Corps Volunteers can be found in the “Community-level integration of GHI programs.”

3. Evaluation of universal coverage activities: (\$100,000)

Senegal is one of the first countries in Africa to attempt a large-scale distribution of LLINs to achieve universal coverage, and the NMCP has chosen a method that is different from that used by other countries. It is therefore important to assess the effectiveness and efficiency in achieving universal coverage of an approach based on a household census of sleeping spaces and available nets. This study, to be conducted between May and June 2011, will also evaluate how well this innovative strategy was implemented and how well the new communication strategies are resulting in increased utilization of LLINs. The timing of the DHS and the complexity of its questionnaire make its data unsuitable to adequately assess these strategies. This study will be subnational, involving only the first six regions of the distribution, and use a questionnaire significantly different from the DHS. The findings of the study will guide the planning and implementation of the rest of the universal coverage campaign in Senegal, guide revisions of communications strategies to increase utilization, and document the results of this approach for other PMI countries to learn from. The protocol and questionnaire will be developed in consultation with the PMI M&E team, the NMCP, the PMI country team, the implementing partner, and other stakeholders.

**Indoor residual spraying (IRS)**

Background:

The 2011-2015 Strategic Plan for Malaria Control includes IRS as a key strategy for malaria prevention in Senegal. Based on the 2006-2010 Plan, 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. Spray operations were organized by PMI implementing partners under the direction of the NMCP, the Hygiene Service (the environmental public health division of the Ministry of Health), UCAD, and district health leadership. PMI support for IRS implementation included training and equipping locally-recruited spraying agents with help from the NMCP and its vector-control partners with supervision by the Hygiene Service. In 2008 and 2009, one spray round was carried out annually in Vélingara and Nioro and two rounds were carried out in Richard Toll. Each spray round has been 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 (around 95%).

Most of Senegal has a single malaria transmission season with vectors such as *Anopheles gambiae*, *An. arabiensis* and *An. funestus* that feed and rest indoors, so a single round of spraying just before the rains begin each year is believed to be adequate. The irrigated areas upriver from the Diama Dam on the Senegal River experience a small second peak of transmission in April and May, but with the use of residual insecticides of long duration, one round of spraying is adequate. In coastal mangrove areas, where the predominate vectors (*An. melas*) prefer 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.

Senegal is a beneficiary of a WHO/AFRO-Gates Foundation grant to improve insecticide resistance monitoring capacity. Entomologists from UCAD, the *Institut Pasteur de Dakar*, the *Institut de Recherche pour Développement* and the Parasite Control Service in Thiès (SLAP), together with members of National Hygiene Service, have 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.

The Australian company **Mineral Deposits Limited** has carried out three spray operations in two mining camps and 2,000-3,000 houses in eight villages near its gold mine in Saraya District in southeastern Senegal. In 2008, Mineral Deposits Limited contacted PMI with the desire to collaborate more closely with the NMCP and the National Hygiene Service on future spray rounds. As a result, PMI facilitated contact between the parties, resulting in the mining company inviting the National Hygiene Service leadership to monitor activities in the mining camp in 2008-2010.

#### Progress During the last 12 months:

During the 11 months following the end of the 2009 spray round in July 2009, entomologists from UCAD, SLAP, the NMCP, the *Institut Pasteur de Dakar*, and the *Institut de Recherche pour Développement* conducted entomologic monitoring in five villages in each of the three IRS districts. The monitoring included cone bioassays on walls to test for insecticidal activity, knockdown spray catches and human landing catches. In Vélingara and Nioro Districts, the insecticide application in 2009 was found to have not been evenly carried out with some walls and sections of walls showing reduced insecticidal activity, with an increase in the proportion of rooms with *An. gambiae* mosquitoes found with knockdown spray catches. These problems were not noted in Richard Toll District. Nevertheless, where properly applied, ICON 10-CS still had effective insecticidal activity 6-8 months after application. Levels of insecticide resistance continue to be monitored closely.

In July 2009, the NMCP and PMI agreed to expand IRS activities to cover a total of six districts in 2010. Guinguinéo, Malem Hoddar and Koumpentoum health districts were chosen by the NMCP, PMI and other IRS stakeholders from among the districts prioritized for IRS expansion

by the NMCP. In October 2009, PMI supported the baseline entomological monitoring in the three new districts.

Spray operations were conducted in all six districts between May and July 2010. Deltamethrin water-dispersible granules (K-othrine® WG 250) was the insecticide used, with 254,559 structures sprayed (98% of those visited and eligible for spraying) and 959,727 people protected (98% of the population reported living in all structures visited). A new data collection system was introduced with electronic entry of spray data at the district level to allow real-time tracking of the progress of spray operations.

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

With each subsequent 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 Year 5 (FY 2011) Activities: (\$5,312,000)

In FY 2011, PMI will support IRS and entomological monitoring in six districts. Five of the original six districts will be sprayed plus one new one. Given the low numbers of reported cases, the low parasite prevalence, and evidence of little local transmission, the NMCP and partners decided to discontinue IRS in Richard Toll and replace it with a new district chosen from among the priority districts identified by the NMCP. With the discontinuation of spray operations, the district will participate in the universal coverage campaign described above and will be closely monitored through the epidemic surveillance system. To improve the monitoring of campaign operations and coverage, PMI will provide support for piloting in at least one district the use of personal digital assistants (PDAs) using GIS technology to geo-code structures to be sprayed and collect spray operation data.

PMI will continue to support post-campaign entomological monitoring in all IRS districts. A baseline entomological survey will be conducted in the new sixth district in September or October 2010. Entomological monitoring will also be continued in Richard Toll, in its first year without IRS. An initial entomological survey will also be conducted in the suburbs of Dakar experiencing flooding during and after recent rainy seasons with an apparent increase in malaria morbidity. Insecticide susceptibility assays will be performed not only in the six IRS districts, but also in five additional sites throughout the country to monitor resistance to the pyrethroid insecticides used in LLINs.

1. IRS Operations: (\$4,750,000)

In Year 5, PMI will support one round of spray operations between May and July 2011 in each of the current districts of Vélingara, Nioro, Guinguinéo, Maleme Hoddar, and Koumpentoum and in one new district.

2. Technical assistance for training in PDAs using GIS technology: (\$12,000)

Through a technical assistant visit from a CDC epidemiologist, support will be provided for training in the use of PDAs using GIS technology and to develop data collection methods for spray operations.

3. 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.

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

The PMI will continue to support entomologists from UCAD and *Institut Pasteur de Dakar* 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 and Richard Toll. 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. In peri-urban Dakar, entomologists will conduct an initial entomological survey. To monitor insecticide resistance, entomologists will conduct insecticide susceptibility assays in the six spray districts as well as in five additional sites throughout the country. An entomologist from CDC will provide technical assistance for the planning and implementation of all monitoring activities, as well as ensuring the completion of centrally-funded operations research projects.

## **Malaria in Pregnancy (MIP)**

This section describes facility-based MIP interventions. Please refer to the “Community-level integration with other Global Health Initiative programs” 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 also receive a third dose. The MOH has issued a directive requiring that SP be stocked and given 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. 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 2008 MIS found that 76% of pregnant women had taken at least one dose of SP at an ANC visit; however, only 52% had taken two or more doses. This proportion is similar to the 49% found in the 2006 MIS and shows a need for improvements in the implementation of IPTp during antenatal visits.

The NMCP 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, 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; 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.

#### Progress During the Last 12 Months:

During FY 2010, an additional 276 personnel 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 873 health huts in 52 districts with almost 2,000 outreach visits made. A mass media campaign has been developed and diffused through national and regional media outlets. Efforts to increase IPTp coverage in 2010 have been offset by a national level stock-out of SP caused by inefficient procurement and management at the Central Medical Stores. The PMI and partners are working with the CMS to ameliorate this situation.

#### Proposed Year 5 (FY 2011) Activities: (\$900,000)

In FY 2011, PMI will continue to support efforts to strengthen MIP interventions nationwide.

1. *Reinforce provision of effective MIP services in health facilities and in outreach strategies: (\$700,000)*

The PMI will continue to support activities to reinforce 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, the 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 in health facilities, and will also support the implementation of the new routine LLIN distribution system that includes offering free LLINs to women attending ANC. Support for ANC outreach activities at health huts will be increased to allow for a total of 2,000 outreach visits annually.

2. Support for mass media activities to increase ANC attendance and promote IPTp: (\$200,000)

Infrequent and late ANC attendance is a limiting factor in reaching IPTp coverage goals. In Years 3 and 4, PMI funded communications programs aimed at promoting ANC attendance early in pregnancy and increasing compliance with the recommended frequency of visits. These included television and radio spots, brochures and posters. Support for these forms of mass media to improve early ANC attendance and to promote IPTp will be continued in FY 2011, with an emphasis on increasing public awareness of the benefit of free LLINs provided at ANC visits.

3. Assessment of and technical assistance to the CMS: (funding included in pharmaceutical management section)

An assessment of supply chain logistics and technical assistance to improve procurement and supply chain management at the CMS will be conducted by PMI in order to assure a sufficient stock of SP at peripheral levels, as well as to improve management of other malaria prevention and treatment commodities.

## INTERVENTIONS – CASE MANAGEMENT

This section describes facility-based case management interventions. Please refer to the “Community-level integration of GHI programs” section under “Integration with other Global Health Initiative Programs” for a discussion of community case management and home-based management of malaria activities.

### Malaria diagnosis

#### Background:

In Senegal, malaria microscopy is available in about 10% of all health facilities, almost exclusively hospitals and district-level health centers.<sup>10</sup> To expand the availability of malaria diagnostic testing, the NMCP purchased RDTs through its Round 4 Global Fund grant, developed an algorithm for the treatment of uncomplicated malaria using RDTs and ACTs, trained health care workers in all districts, and worked to ensure that RDTs are available and used in all health facilities. In 2007, with PMI support, the NMCP distributed microscopes and

---

<sup>10</sup> Most health posts do not have laboratories.

consumables to all public health facility laboratories and set up a teaching center at the SLAP in Thies. Technicians from all sites receiving microscopes received refresher training on malaria diagnosis at SLAP and supervisory technicians were trained in quality assurance and quality control.

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).<sup>11</sup> All presumed cases are to be tested with an RDT for malaria 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 RDT testing. The NMCP reports that 86% of suspected outpatient malaria cases were confirmed 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. According to data collected by the NMCP, 71% of hospitalized cases were tested and confirmed 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; the two lots tested in 2009 gave results matching microscopic diagnosis for all samples tested (positive and negative). This system of quality control is continued at regular intervals. In addition, samples of RDTs are regularly collected from the field and tested against microscopic diagnosis to assure stability in field conditions, and during supervisory visits the proper use of RDTs by health care providers is reviewed and reinforced.

#### Progress During Last 12 Months:

In FY 2010, PMI supported workshops for the development of a quality assurance/quality control protocol for parasitological diagnosis of malaria and supported implementation of the system, as well as courses in laboratory diagnosis of malaria. Staff from regional reference laboratories in all of the 14 regions have received training in quality control of microscopic diagnosis of malaria and are conducting supervisory visits; to date, 68 laboratory technicians have received this training. Forty-one districts in 12 regions sent slides to the NMCP for reference microscopy, with 35 districts having reached a minimum of 60% concordance. In addition, 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. PMI has also supported the development, validation, and printing of new outpatient registers that have a specific column for noting RDT results.

---

<sup>11</sup> The home-based PECADOM program, which is currently malaria-specific, utilizes another algorithm by which all fevers are tested immediately with an RDT.

## Proposed Year 5 (FY 2011) Activities: (\$300,000)

In FY 2011, PMI will focus support for malaria diagnosis on strengthening the supervision and quality assurance of microscopy and RDTs. 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.

### 1. Supportive supervision, quality assurance, and quality control for microscopy and RDTs: (\$250,000)

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 in 2010 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.

### 2. Training of hospital laboratory technicians and refresher training for technicians previously trained: (\$50,000)

While district and military health center laboratory technicians have received training in microscopic diagnosis of malaria with PMI funds, laboratory technicians in reference hospitals at regional and national levels have thus far not been included. The poor quality of hospital laboratory diagnosis has recently been highlighted as a key priority for the NMCP. The PMI will provide training in microscopic diagnosis of malaria for hospital microscopists, as well as for additional district-level staff to accommodate new staff and additional technicians from district laboratories. Refresher training will also be offered to those who were trained in 2008.

## **Treatment**

### Background:

In 2003, the NMCP held a national consensus-building conference where the first line therapy for uncomplicated malaria was changed from chloroquine to combination therapies, initially with amodiaquine-SP, then in 2006 with artesunate-amodiaquine (AS-AQ). With the change to AS-AQ, health workers were trained and drugs were made available to all public health facilities (and functioning health huts) using the Global Fund Round 4 grant. In addition to AS-AQ, private pharmacies also sell numerous other antimalarial drugs, including chloroquine and SP, artemether and artesunate monotherapies, ACTs in various formulations, including syrup for children, and other combinations. Quinine is recommended by the NMCP for the treatment of severe malaria and the treatment of 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:

Last year Senegal changed its first line treatment from artesunate-amodiaquine to artemether-lumefantrine (AL). Due to procurement difficulties, at the onset of the 2009 malaria transmission season only limited amounts of AS-AQ, originally intended for patients who could not tolerate AL, were available. To ensure adequate ACTs the NMCP also began using Duo-cotecxin (dihydroartemisinin-piperaquine) donated by the Government of China and in November 2009 asked PMI to purchase AL. PMI procured 444,420 AL treatments that were delivered to the NMCP in January 2010. At World Malaria Day in 2010, the Minister of Health declared that all medications for the treatment of uncomplicated malaria would be free as of May 1, 2010. Also in May 2010, the MOH issued a directive banning the use of artemisinin monotherapies in Senegal.

In the last year, PMI has supported training of 276 providers in malaria case management and interpersonal communication and integrated supportive supervision visits at 337 locations. In addition, PMI supported the development and distribution of 2,000 job aids for RDT performance and 1,000 laboratory registers. The PMI also supported the on-going therapeutic efficacy monitoring of AS-AQ and AL by UCAD researchers, showing that 96% of patients receiving AS-AQ and 98% receiving AL had an adequate clinical and parasitological response. In Year 3, PMI had planned to subsidize treatment of severe malaria by providing medication and equipment free of charge to the districts (quinine, intravenous tubing, syringes, needles, and glucose-containing intravenous fluid). However, the logistics of preparing different kits for each age/weight group, distribution, training, and supervision was felt to be unnecessarily complicated. Furthermore, given the declining incidence of severe cases and the need to ensure adequate ACT supplies, the PMI/Senegal team re-directed this funding to the purchase of ACTs.

#### Proposed Year 5 (FY 2011) Activities: (\$1,050,000)

In FY 2011, 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. The PMI will expand support to include training and supervision for hospital level staff, as well as an assessment of quality of care provided by the private sector. A qualitative study of care-seeking behavior for febrile illness will be conducted to determine the factors responsible for the low accessing of care within 24 hours, and to inform the development of strategies to increase prompt care seeking.

1. Improve case management: (\$400,000)

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 for the management of malaria with ACTs at all levels of the health care system. To provide the same training that has been given to the staff of public health centers and health posts on appropriate case management of severe and uncomplicated malaria, PMI will support refresher training and supervision in correct case management of malaria for hospital-based staff.

2. Procurement of AL: (\$500,000)

The PMI will continue to procure 450,000 AL treatments to help meet ACT needs nationwide for FY 2011.

3. Private sector case management assessment: (funding included in public-private partnerships section)

The quality of case management for febrile illness in the private sector is unknown. Previous NMCP efforts to engage the private sector and provide training have attracted a limited number of participants. The PMI will support an assessment of management of febrile illness in the private sector and the best manner to engage private providers for future efforts to improve the quality of care.

4. Community-based study on care and treatment seeking: (\$150,000)

The 2008 MIS showed that 2% of children under five with fever in the previous two weeks received an ACT within 24 hours of symptom onset. While not all children with fever would be treated with an ACT according to the diagnostic algorithm, the need for testing before treatment does not entirely explain the low results. Other factors, including failure to seek care, delay in care-seeking, seeking care in facilities including health huts that did not provide ACTs, and ACT stock outages at health facilities, may be responsible. The PMI/Senegal team proposes a qualitative study to investigate the factors that influence care-seeking behavior and care provided. This study will include health facility-based assessment of ACT and RDT stocks and provider attitudes and behavior, as well as interviews with focus groups and key informants in the community and illness narratives. These data will be analyzed to identify economic, logistic, and cultural factors impeding early treatment seeking for children with fever. The results will be used to guide supervision and training of healthcare providers, to directly improve BCC for care seeking and care provided, and to contribute to developing tools to better measure our progress in the face of increasing diagnostics use and falling transmission.

## **Pharmaceutical management and drug quality**

### **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 purchasing from the district. At the health facility, patients pay user fees for consultations, drugs and other supplies, and laboratory tests other than RDTs. Since May 1, 2010 a new MOH policy makes treatment for uncomplicated malaria with ACTs also free of charge in public facilities.

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 the side effects of drugs that focused on reporting 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; however the number of adverse drug reactions reported is still quite low. Technical responsibilities for pharmacovigilance were transferred in 2008 to the National Poison Control Center, with administrative authority at the DPL.

### **Progress during 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 FY 2010, 264 health post and health center staff members in three regions were trained on the management of antimalarial medicines, with 125 health facilities benefitting from post-training supervision. The PMI implementing partner for this activity also receives funding through the NMCP under its Round 7 Global Fund grant to conduct training on pharmaceutical management. Staff members from four districts in two regions have been trained and supervised using the resource materials developed under PMI. Results showed that significant efforts are being made to make available and utilize malaria commodities by health workers, although appropriate utilization of RDTs still needs to be more consistent.

Good ACT prescribing and dispensing practices are also discussed at the NMCP quarterly review meetings, where districts present monthly reports on the overall proportion of suspected cases that are tested and the ratio of confirmed cases to the number of ACT treatments dispensed. Cases of under- or over-utilization of ACTs relative to RDT test results are discussed. Monitoring of quinine stocks at the Regional Medical Stores has suggested that this drug is over-utilized, with quantities ordered by districts being greater than the number of severe malaria cases reported. The NMCP plans to integrate reporting on quinine use by each district into its quarterly format in an effort to identify and discourage over-utilization, particularly for uncomplicated cases. This monitoring will be particularly important now that ACTs are free to patients, while quinine is not.

Recent procurements of antimalarials and LLINs have experienced long delays related to CMS internal procedures, difficulties in obtaining the necessary letters of credit for large purchases, and difficulty adapting to the new government procurement code. The NMCP has in some cases negotiated with the Global Fund for direct payment to suppliers. The delay in procuring AL led to numerous short-term, local stock-outs of ACTs and to the use of several substitute ACT formulations as the first-line treatment, while delays in procuring SP have led to repeated national stock-outs since early 2010, adversely affecting IPTp coverage. 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.

The PMI also continues to support the monitoring of antimalarial drug quality by the DPL and UCAD. In 2010, 22 staff members were trained in Minilab basic tests for antimalarials, ARVs and anti-tuberculosis medicines and supported in collecting and testing samples. A seventh surveillance site was identified (Matam) and staff were trained and provided with a Minilab, reagents and supplies to carry out monitoring activities. Results of drug quality monitoring at six sites around the country in June 2009 showed that 23% of the ACTs and 20% of SP sampled did not conform to one or more quality standards, such as visual inspection and proper concentration of the active ingredient. Communication activities to inform people about the dangers of buying drugs in the informal sector continue. These activities, combined with advocacy efforts with regulatory authorities, seem to be having an effect, as the sampling teams noted a decrease in the availability of antimalarials in the informal sector. The DPL has defined actions to address the quality issues identified, including establishing a new strategy for marketing authorization, improving storage conditions at health facilities, and taking measures to withdraw non-conforming lots from the market and possibly suspend the medicine marketing authorization.

The PMI has contributed significantly to the advancement of pharmacovigilance activities by providing technical assistance and supporting participation in training courses at the WHO Collaborating Centre for International Drug Monitoring in Sweden and the pharmacovigilance center in Morocco. The DPL has developed a pharmacovigilance action plan for 2010-2011 that seeks to continue integrating the various programs into one system and to increase reporting. In July 2010, PMI supported a pharmacovigilance workshop that focused on integrating different health programs, revising a training manual and guide, and addressing obstacles to adverse drug event reporting. A total of 35 adverse reactions were reported for antimalarials in 2009: 25 for ACTs (all for AS-AQ), 4 for quinine, and 6 for SP. Five of the cases were determined to be

attributable with certainty to the indicated drug. Approximately half<sup>12</sup> of patients received “corrective” treatment and 64% recovered without any negative effects (no further information was available for 21% of patients).

Proposed Year 5 (FY 2011) Activities: (\$850,000)

PMI’s work in 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. Complicated national procurement regulations, capacity issues at the CMS, and the extension of antimalarial therapy through the home-based treatment approach make ensuring an adequate supply of malaria commodities a continued challenge in Senegal.

1. Drug management capacity building and training: (\$400,000)

The PMI will continue to work to build capacity at the district level and below, to manage ACTs and RDTs through improved drug quantification and forecasting, quality control, storage and inventory management, and supervision. USAID-funded support for tuberculosis drug management, Global Fund support to the NMCP for training on malaria case management, and PMI supported training of public health facilities outlined in the “Treatment” section above all complement this activity. An increased level of funding in FY 2010 allowed training and supervision activities to reach national scale and this will continue with FY 2011 resources.

2. Strengthen central level supply chain management: (\$200,000)

With FY 2011 funding, PMI will also explore possibilities for providing technical assistance to the national level CMS to address capacity and coordination problems. Such technical assistance will start with an assessment of the pharmaceutical management system to identify problems that need to be corrected and strengths that can be reinforced. Because FY 2011 funds will not be available before late in 2011, the PMI team will seek ways to begin this critical activity under existing partner work plans.

3. Drug quality monitoring, advocacy and pharmacovigilance: (\$250,000)

In collaboration with the NMCP, UCAD, the DPL and the National Laboratory for Drug Quality Control, PMI will continue to support drug quality surveillance at the seven existing sites. In addition, more focus will be given to communication activities to inform the public about the dangers of counterfeit and poor quality drugs. The PMI will continue to advocate for regulatory actions to be taken when poor quality drugs are found. Finally, PMI will continue to support the integrated national pharmacovigilance program and strengthening of the reporting system.

---

<sup>12</sup> The NMCP received a total of 65 notifications, of which 30 were for drugs other than antimalarials. Analysis was done for all of the cases and the figures cited from this point on refer to the total 65 cases, not only the antimalarials.

## **EPIDEMIC SURVEILLANCE AND RESPONSE**

### Background:

The NMCP and WHO identified the Senegal River Valley in 2007 as an area where malaria transmission is unstable and thus at risk of epidemics. As traditionally malaria was considered to be endemic in Senegal, the disease was not included in the national MOH weekly epidemic disease reporting system. As a result, in 2008 the NMCP developed a malaria epidemic surveillance system using several existing health posts in the River Valley. These health posts continue to report the same routine malaria case data (number of patients seen for any reason, number of suspected malaria cases, number tested, and number confirmed) but now on a weekly basis to the district, region and NMCP. Eight health posts were selected in the first phase, two in each of four districts along the Senegal River Valley. To improve the collection and transmission of data, new electronic forms were developed and the sites were provided with computers. At semi-annual meetings, these 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.

A conclusion of the review meetings was that the system improves overall data quality by engaging the health post and district staff to review and analyze their data. The analysis and interpretation of these data 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:

As malaria cases and parasitemia rates decline in Senegal, the importance of monitoring for malaria epidemics throughout the country has grown. In 2010 the NMCP developed plans to add nine additional health posts to the surveillance network to cover additional areas where transmission has fallen dramatically. The PMI agreed to provide laptops and training to staff at new posts in newly epidemic-prone areas in Saint-Louis and Louga Regions, to provide internet connections to health posts participating in this system and to support supervisory visits. PMI country staff also provided assistance in the analysis and presentation of the data from these sites during the semi-annual meetings. The NMCP continued to support the 16 existing sites and stockpiled materials necessary for epidemic response using money from the Global Fund Round 7 grant.

### Proposed Year 5 (FY 2011) Activities: (\$50,000)

FY 2011 PMI monitoring and evaluation activities will be performed jointly with the NMCP and other partners, as the PMI continues to support implementation of the NMCP Strategic Plan. The PMI will support 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 (\$50,000)

In FY 2011, the PMI will support refresher training of 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**

### **Capacity building**

#### Background:

The Senegal NMCP resides in the MOH's Division of Disease Control and has a well-developed strategy for malaria control, a clear organizational structure, and an effective management team. The staff includes four public health physicians, two pharmacists, two public health nurses, an economist, an entomologist, and several other experienced personnel who together manage all aspects of the NMCP's activities including training, supervision, M&E, and research. Three entomologists work for SLAP, and several entomologists and parasitologists teach at UCAD. In addition, two French institutions (IRD and *Institut Pasteur de Dakar*) have many experienced epidemiologists, parasitologists and entomologists who collaborate with the NMCP. While there are no full-time malaria staff at the regional or district levels of the public health system, health workers and depot managers at all facilities are engaged in case management and prevention of malaria in pregnancy, as well as ITN activities. Employees of the National Hygiene Service are involved in some limited spraying and bednet re-treatment campaigns. To build district and regional capacity for malaria control, the NMCP and WHO have organized a two-week Malariology Course at the *Institut de santé et développement* (Institute for Health and Development) training center in Mbour, with support from the Global Fund. In 2008 and 2009, 70 physicians and 24 advanced technicians attended completed this course. The NMCP has called on this group to support supervision missions and improve program management. Though Senegal has a wealth of expertise working on malaria prevention and control at all levels, PMI recognizes a continuing need for increased and strengthened supportive supervision both at peripheral and national levels. Capacity building is still needed to strengthen skills for effective monitoring and evaluation, for applied epidemiology for malaria control, and for planning and implementing IRS activities.

#### Progress during the Last 12 Months:

In 2010, PMI supported the participation of ten regional and national MOH staff to attend a three-week course in data management and monitoring and evaluation at *Centre Africain des Etudes Supérieures en Gestion* (African Center for Advanced Management Studies) in Dakar. Two District Medical Officers attended the SURVEA Course (*Surveillance Epidémiologique en Afrique*) given by the Agency for Preventive Medicine at the Regional Institute for Public Health in Benin in September 2010. The PMI also joined the RBM HWG, MACEPA and Malaria No

More to support the evaluation of the 2006-2010 Strategic Plan and the development of the 2011-2015 Strategic Plan together with the Global Fund Round 10 proposal.

Proposed Year 5 (FY 2011) Activities: (\$360,000)

As the country continues to make significant progress toward reducing malaria transmission and curbing under five mortality, the NMCP will need increased capacity in applied epidemiology and monitoring and evaluation to be able to detect and respond to changes in malaria epidemiology. In FY 2011, PMI will support activities to develop critically-needed capacity at sub-national and central levels to sustain the NMCP's accomplishments in controlling malaria:

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

In FY 2011, the PMI will contribute to supporting the costs associated with the NMCP's supportive supervision to peripheral levels.<sup>13</sup>

2. M&E Capacity Building for National Program Staff and District Personnel: (\$30,000)

In FY 2011, the PMI will support the training of up to ten people to participate in the annual three-week francophone data management and monitoring and evaluation course at the African Center for Advanced Management Studies in Dakar. The participants will be selected in collaboration with the NMCP and will mostly come from the peripheral levels of the health system.

3. Capacity Building in Applied Epidemiology: (\$30,000)

The PMI will support the attendance of up to two MOH staff involved in malaria control at a course in applied epidemiology, ideally in Senegal or elsewhere in the African region. The curricula should include interactive exercises, lectures, a field survey, and discussions of the epidemiologic aspects of current major programs in international health.

4. Support for NMCP Malariology course: (\$150,000)

The PMI will support the NMCP in its organization of malariology training courses for staff at the regional and district levels. This training provides a cost-effective means to improve the malaria knowledge and experience of health personnel from all levels of the health system.

## **Strengthening Public-Private Partnerships**

### **Background:**

---

<sup>13</sup> As referenced in other sections, other PMI implementing partners also contribute significantly to supervision activities.

According to a study conducted in 2009 by the Private Sector Partnership for Better Health project, 85% of Senegal's private service providers are located in Dakar.<sup>14</sup> This includes 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, as well 133 pharmaceutical depots around the country. 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. The NMCP believes that malaria is one of the chief reasons for seeking care amongst those attending private clinics. However, whether malaria case management algorithms are respected is yet to be assessed. The NMCP's invitations to private sector providers to attend training sessions they offer have rarely been accepted. In addition, the NMCP does not conduct supervision activities in their clinics.

The 2009 study recommended instituting re-licensure requirements for private facilities linked to Continuing Medical Education credits, in order to create incentives for private clinics to implement policies, standards, and protocols issued by the government. The PMI will support the NMCP and other MOH divisions to establish a strong public-private partnership that will improve the quality of malaria case management in the country overall.

Proposed Year 5 (FY 2011) Activity: (\$50,000)

*1. Private sector case management strengthening: (\$50,000)*

The PMI will support a study to assess the services offered at private clinics and hospitals to patients seeking treatment for fever, including attitudes of health care providers. The findings of this study will inform the quality of case management in the private sector and facilitate compliance of private providers with NMCP malaria case management policy and guidelines. Also, the recommendations of the study will serve as a basis to engage the public sector and the private sectors in an open dialogue, leading to partnerships for increased access of the population to quality malaria diagnosis and treatments.

## **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, working within 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, its components were added to existing integrated community health, service delivery and health system support programs. Program implementation continues to be horizontal, focusing on health intervention levels (policy, clinical, community) rather than sectors (Maternal Child Health, Tuberculosis, etc). The overall

---

<sup>14</sup> Private Sector Partnerships For Better Health (PSP-One): *Senegal Private Health Sector Rapid Assessment*; March 2009, sponsored by USAID.

goal of this strategy is to provide a quality package of services at each service delivery point. This approach helps to ensure that programming is mutually reinforcing, cohesive and coordinated.

In FY 2011, the PMI will further strengthen efforts to ensure strategic integration with other USG health programs in Senegal, particularly maternal and child health programs, HIV/AIDS programs, family planning and reproductive health programs, and the health and nutrition aspects of the Global Food Security Initiative.

### **Maternal and Child Health, Reproductive Health Services and Malaria**

Under PMI, malaria prevention and control activities have been implemented as part of integrated maternal and child health services and make a significant contribution to strengthening capacity to deliver these services. Insecticide-treated nets and IPTp are distributed through ANC clinics, and nets are distributed through integrated campaigns targeting children under five that include vitamin A supplementation and deworming. Achieving universal coverage with LLINs should provide additional protection to pregnant women and children by reducing malaria transmission overall.

### **Community-level Integration of GHI Programs including Malaria**

#### **Background:**

Since malaria typically 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 brought for care somewhere other than a public or private hospital, health center or health post. 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 extend 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. The table below describes the levels of the health system at which malaria services are provided, all of which PMI supports.

### 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                               |

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

Under the PECADOM program, DSDOMs are nominated by their villages and then 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 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, the DSDOMs receive a stipend during training that serves as a form of motivation. The NMCP began this program in 2008 with 20 village malaria workers in three districts. During 2009, the program was expanded with assistance from PMI to 423 villages and is planned to expand to 1,000 villages by the end of 2010 in the regions with the highest malaria morbidity and mortality.

Currently, 1,387<sup>15</sup> 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 540 "sites," generally in more urban areas or places far from health huts, where *relais* implement malaria IEC/BCC activities.

The community-case management program in Senegal provides an integrated package of services, which varies slightly depending on the inclusion of pilot interventions. In the majority of health huts (1,285), 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 cotrimoxizole requires the presence of a literate CHW, and is currently available in 1,206 health huts. Neonatal and perinatal services are offered in 977 health huts, and community surveillance

<sup>15</sup> 1349 through PMI / Senegal and 38 through a Malaria Communities Program grant to CARITAS.

for tuberculosis is offered in approximately 1,217 health huts nationwide.

With support from the Global Fund, the NMCP also promotes community-based malaria activities through its *Atteindre les bénéficiaires communautaires à travers les districts program* (Reach Community Beneficiaries via the Health Districts). Under this program, which is now operational in 41 districts, health districts spend at least 60% of their Global Fund money from the NMCP on contractual arrangements with CBOs. In turn, CBOs provide a package of malaria-control activities, including organizing community meetings and home visits to discuss malaria and hygiene and clean environment education.

#### Progress During the Last 12 Months:

Since PMI was launched in Senegal in 2007, more than 8,500 community members have been trained in malaria prevention and control interventions in accordance with Senegalese policies through support to a consortium of NGOs. This figure includes community health workers, *matrones*, *relais*, and village health committee members who oversee the functioning of health huts. Community interventions reached national scale in 2008, covering every district in Senegal, and include two broad categories of activities: 1) integrated community case management/malaria-specific home-based care services, and 2) community mobilization.

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

In FY 2010, 6,680 community health workers, *matrones*, and *relais* were trained in malaria case management and prevention with PMI support, of which 2,543 CHWs and *matrones* were trained specifically in malaria case management with ACTs. Case management training includes 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. Overall, CHWs at health huts in Senegal have demonstrated excellent adherence to the treatment protocol. During this same period, 9,238 RDT-confirmed cases of malaria were treated with an ACT at the health hut level.

In 2009, 387 DSDOMs were trained as part of the expansion of the PECADOM program, which now covers 408 villages in seven regions. During the year, 6,707 RDTs were performed with 2,300 being positive and 2,226 people treated. The remaining 74 cases were considered severe and referred to the nearest health facility for treatment. No malaria deaths were reported from any of these sites. PMI directly supported the training and supervision of 186 DSDOM in four regions.

##### *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 communications activities in Senegal have included community meetings on a specific topic, home visits, theater, community radio (radio spots as well as

interviews and programming), and social mobilization (setting aside a day to focus on a specific theme or topic and bringing the whole community together around that topic – for speeches, music, skits, with banners and t-shirts with messages, etc.). Topics of ongoing BCC at community level include the importance of owning and using ITNs every night and year round, prompt treatment-seeking at the health hut or health post in the case of fever, recognition of danger signs, the importance of attending ANC visits and receiving the recommended IPTp.

#### *LLIN promotion and utilization activities*

In 2010, several partners are helping to ensure high rates of LLIN utilization including the NMCP, through Global Fund supported programs; the Senegalese Red Cross Society, through their post-campaign household visits; and Malaria No More/Youssou Ndour Foundation, through their “Senegal Surround Sound” campaign containing specific messages to encourage people to sleep under LLINs. The community-based activities supported by PMI have focused on LLIN utilization since the beginning of the program and have been adapted over time to address issues pertaining to year-round use and utilization by all household members.

#### *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, community education and LLIN distribution through private Catholic health posts and their associated 38 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 2010, Caritas trained 604 community mobilizers and 86 community health workers. During FY 2010, 255 patients presenting with fever were given a rapid diagnostic test and 107 were found to be positive for malaria. The project also distributed 285 LLINs to pregnant women during pre-natal consultations.

#### *PMI-Peace Corps Community-based activities*

Peace Corps Volunteers are active in malaria education and prevention throughout the country. As part of their universal coverage campaign activities in Saraya and Vélingara, Peace Corps Volunteers participated in the training of *relais* in the community census methodology used to identify LLIN needs, the completion of community censuses before LLIN distribution, the transport of bed-nets to the village level, LLIN distribution to heads of households, village-level education and messaging on the day of distribution, and follow-up household visits.

On a routine basis, Peace Corps Volunteers also assist in community mobilizing for IRS and BCC activities promoting net use, ANC and IPTp for pregnant women, and treatment-seeking for fever. In addition to providing interpersonal communication in their villages, volunteers also host programs on local radio stations and work with community theatre groups.

#### Proposed Year 5 (FY 2011) Activities: (\$3,160,000)

In FY 2011, PMI will continue to support community case management of malaria and

communication efforts as part of an integrated package of services for mothers and children nationwide. The PMI will also continue to support the NMCP with the expansion and supervision of its PECADOM program.

1. Sustaining community mobilization activities: (\$850,000)

Working through NGOs, CBOs and all types of CHWs, PMI will implement a variety of BCC activities at all community intervention points (approximately 1,349<sup>16</sup> health huts and 540 community sites) aimed at:

- Informing and mobilizing the population around LLIN mass distribution campaigns and ongoing routine distribution of LLINs.
- 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 in children
- 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 (CCM) of malaria with ACTs and diagnosis with RDTs as part of an integrated CCM package of services: (\$1,250,000)

With FY 2011 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 NMCP's reporting system. As part of an integrated package of services, PMI funding complements USAID/MCH funding to train, supervise, and monitor community-based staff. Support from the PMI also assists non-functional health huts in becoming functional, which facilitates greater access to basic health services in underserved areas.

3. Support roll-out of the NMCP's PECADOM program: (\$1,000,000)

Implementing partners for PMI have played key roles in the pilot phase and early expansion of PECADOM and the NMCP has requested ongoing support from PMI as the program continues to scale-up. In FY 2011, support from PMI will fund the training of village malaria workers in malaria diagnosis with RDTs and case management with ACTs, as well as support health post nurses in their supervision and provide additional oversight by the project's community development agents.

4. Support for one position at the NMCP to manage PECADOM activities: (\$35,000)

In FY 2011, the PMI will support the NMCP's capacity to manage the expanding PECADOM program by providing support over two years for a position at the NMCP that

---

<sup>16</sup> Funding for the 38 health huts supported by Caritas is not included here, as that is covered separately under their Malaria Communities Program grant.

will be 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, as volunteers and their communities benefit from the technical resources that partners provide and partners benefit from the long-term community presence of volunteers. The PMI will also continue to make available a small amount of funding through Small Project Assistance that Peace Corps Volunteers can access for local malaria-related projects.

**HIV/AIDS and Malaria:**

Background:

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

The HIV/AIDS epidemic in Senegal is characterized by a low prevalence in the general population (1% of adults 15 to 49 years of age), with higher prevalence of infection among some risk groups: 19% among commercial sex workers, 22% of men having sex with men, and 3% among women in the Ziguinchor region. No significant differences exist between urban and rural areas, though the rates are higher (2%) in the Casamance (Kolda, Sédhiou and Ziguinchor). According to the Joint United Nations Program on HIV/AIDS, an estimated 67,000 people infected with HIV were living in Senegal in 2007<sup>17</sup>.

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

Progress During the last 12 months:

In FY 2010, working closely with the Government of Senegal, the National AIDS Committee, and civil society groups, PMI supported the free distribution of approximately 9,000 LLINs through regional PLWHA networks, the AIDS ambulatory treatment center in Dakar, and outside Dakar in six ambulatory treatment units and PLWHA associations in five regions. Two hundred health care providers, counselors, and leaders of PLWHA associations have been trained in malaria prevention messages, including emphasis on correct and regular use of LLINs and early

---

<sup>17</sup> UNAIDS/WHO Epidemiological Fact Sheet on HIV and AIDS for Senegal, September 2008. Available on web at [http://apps.who.int/globalatlas/predefinedReports/EFS2008/full/EFS2008\\_SN.pdf](http://apps.who.int/globalatlas/predefinedReports/EFS2008/full/EFS2008_SN.pdf) accessed 15 July 2009  
18 May 2010.2009.

care-seeking for fever.

Proposed Year 5 (FY 2011) Activities: (\$25,000)

In FY 2011, activities are aimed at continuing integration of malaria prevention and treatment within HIV/AIDS prevention, care and treatment efforts. Key components will include: promotion of positive behavior change for malaria prevention and care-seeking behavior, integration of malaria prevention and early treatment within HIV ambulatory treatment settings and care services at community level, and capacity development of existing partners to be able to effectively integrate scientific and programmatic knowledge for malaria prevention and treatment within their program portfolios.

As the ambulatory units and care and support sites serve as the starting point for the provision of a package of services for PLWHA, PMI will support an intensified focus on ensuring a well-trained cadre of HIV care providers capable of providing effective malaria case management services to the clients they care for.

*1. Support training of HIV care providers in ambulatory care settings in prevention strategies and effective case management of malaria: (\$25,000)*

In FY 2011, the PMI will continue to promote malaria prevention messages through interpersonal communication activities carried out by trained counsellors, peer educators and leaders of PLWHA associations. Malaria prevention messages will include emphasis on correct and regular use of LLINs and early care-seeking behaviour for fever. The PMI will also support training of health care providers working within HIV ambulatory care and treatment settings to adequately diagnosis and treat malaria in this vulnerable group. This training will be integrated, where possible, with malaria case management training, monitoring and supervision activities. People living with HIV/AIDS will receive nets from the nationwide ITN universal coverage activities, which target the entire population.

## **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, the Poverty Reduction Strategy is 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 give clarifications on issues related to an ongoing program. 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 Country Coordinating Mechanism (CCM) in Senegal has a yearly agenda and holds regular meetings to monitor the implementation of Senegal's current malaria, tuberculosis and HIV Global Fund grants, with extra meetings as necessary. The CCM has a 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. In the past, an active National Malaria Steering Committee, made up of various stakeholders, met on a regular basis. It was responsible for overseeing the activities of four NMCP commissions: (1) planning, monitoring, and evaluation; (2) clinical and therapeutic training; (3) communication and social mobilization; and (4) research. In the past three years, this Steering Committee has been inactive. Working groups on drug quality, IPTp, ACTs, and ITNs continue to meet, but are uncoordinated.

#### Progress During the Last 12 Months:

In February 2010, PMI held a mid-year MOP review meeting with all major malaria stakeholders that coincided with a visit by the Deputy PMI Coordinator. Two themes were discussed in the meeting, achieving universal coverage with LLINs in Senegal and scaling-up the home-based management of fever strategy, with the goal that the meeting would further engender collaboration between partners, and garner additional resources to support these activities.

A major outcome of the meeting was the establishment of a Malaria Partners' Coordination Group (*Cadre de Concertation des Partenaires de la Lutte contre le Paludisme, CCP-LP*). This Coordination Group had its first meeting in May to finalize the group's purpose and terms of reference, and present and discuss the plans for the review of the 2006-2010 National Strategic Plan and the development of the new 2011-2015 Plan and Global Fund Round 10 proposal. A Technical Secretariat of the Coordination Group was created including partners from academia, civil society, the NMCP and NGOs. The group nominated a member of the PMI Team as the Chair of the Coordination Group for the first year.

#### Proposed Year 5 (FY 2011) Activities: (No additional cost to PMI)

##### 1. Convene bi-annual meetings of the Malaria Partners' Coordination Group

PMI staff will chair and participate in the Technical Secretariat of the Malaria Partners' Coordination Group, working closely with the NMCP and partners to organize and convene the semi-annual Coordination Group meetings. These meetings should allow partners to share experiences, identify gaps in programming and help the NMCP plan future activities, as well as provide a more complete review of all malaria activities being carried out in Senegal.

##### 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 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 rapid scale-up of malaria prevention and control interventions and achieving high coverage rates with ACTs, ITNs, IPTp, and IRS are priorities not only of PMI, but also the NMCP, the Global Fund, and other national and international partners working on malaria.

### Background:

The NMCP developed its first Monitoring and Evaluation Strategic Plan in 2005. This plan focused on collecting routine data on cases and program implementation to monitor the progress of the Global Fund-financed activities, to provide essential data for the development of new control strategies, and to develop capacities at all levels of the program.

In order to collect complete and timely data on malaria cases and program implementation and to provide feedback to health providers, the NMCP conducts quarterly review meetings where each district presents malaria surveillance and program data as well as the indicators reported to the Global Fund. Results of key performance indicators (the proportion of outpatient cases tested, the RDT positivity rate, the ratio of ACT doses given to number of outpatient cases confirmed, and IPTp coverage) are compared between districts at the end of the review. These meetings allow for a self-critique by the districts and allow the NMCP to present results of surveys and annual reports, clarify existing guidelines, and disseminate new ones. The PMI Resident Advisors participate in the quarterly reviews and on the commission charged with improving the quality of these reviews. Similar reviews are conducted with heads of hospitals, military health facilities, and NGOs. The data from these reviews are synthesized into a quarterly national report that is submitted to the national HMIS, the WHO and the Global Fund. Clinical drug efficacy and entomological and IRS-related data are also being collected in collaboration with UCAD with support from PMI.

During the past two years the Global Malaria Program of WHO supported several missions to improve the collection, analysis and “real time” use of data collected during the quarterly reviews. The database used at district level to collect case data is being expanded to allow collection of all data presented during the quarterly review. District-level data will be synthesized into a national database and used to prepare a standard feedback report for the NMCP quarterly bulletin showing regional/district progress regarding performance indicators as well as routine LLIN coverage and Global Fund indicators. Necessary equipment for data processing and storage and support for installation and training on the new database at district and national levels is being provided through PMI; however, the system has yet to be fully implemented.

To supplement the quarterly reviews, the NMCP also conducts regular supervisory visits at the health facility level. After trying several models, it now uses a “supervision by peers” strategy, where 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, the proper performance of RDTs, and an on-site verification of malaria morbidity data through a review of patient registers.

To provide additional data for in-country program managers to assess progress and redirect resources as needed, interim monitoring of the four main intervention areas is tracked through periodic reports from groups providing commodities and conducting IRS activities, visits to health facilities, and reports from international and local partners. Types of activities that are monitored include procurement and distribution of LLINs for distribution during campaigns and routine, the progress of IRS campaigns, training of health care staff to build capacity to improve service delivery, and behavior change communication efforts in areas such as improving treatment seeking for children with fever, the use of LLINs, and compliance with IRS efforts.

#### Progress During the Last 12 Months:

After the nationwide LLIN campaign in 2009, the NMCP requested PMI to support a post-campaign survey. This survey was done between December 2009 and January 2010 and assessed the various communications activities used to increase LLIN utilization rates, the success of targeted under-five campaigns in attaining universal coverage goals, and the success of door-to-door voucher campaign strategies in achieving high coverage and utilization rates. CDC/Atlanta staff provided extensive technical support for data collection and analysis.

In addition to the results presented above under “Current Status of Malaria Indicators,” the survey found that one or more ITN was present in 82% of all households, 89% of households with a child under five and 57% of households without a child under five. Just over half (53%) of ITNs had been received during the campaign. Considering possible indicators of universal coverage, 40% of households had at least one ITN per two people, 22% had at least one ITN per sleeping space and 34% of the general population slept under an ITN the night before the survey. Most (92%) of guardians of eligible children had heard about the campaign, 34% from a health agent, 26% from a neighbor and 22% by radio. Campaign coverage was 88% for mebendazole, 86% for vitamin A, and 83% for LLINs. Almost all (91%) LLINs received during the campaign remained in the household and none were reported sold. The survey found that the proportion of households reporting a visit after the campaign to explain the importance of sleeping under a bednet or to help hang the net was low (16%). However, houses that did receive a visit reported modest though not statistically significant increases in LLIN utilization in the general population by 7-8 percentage points. This survey showed that the nationwide integrated LLIN distribution campaign successfully reached its target population, increased household ITN ownership above the RBM target of 80% set for 2010 and contributed substantially to universal coverage.

The results of this survey are being used to estimate LLIN needs for universal coverage activities, to prioritize communications strategies to use, to decide where to start routine distributions and to develop the 2011-2015 National Strategic Plan and the Global Fund Round 10 submission.

To measure coverage and impact of malaria prevention and control interventions PMI is also contributing to a nationwide DHS to be conducted from October 2010 – January 2011. This survey will include a full malaria module, testing for parasitemia and anemia, and over-sampling of the six IRS districts to provide district-level IRS coverage results. The survey will be

conducted by the *Agence Nationale de la Statistique et la Démographie* (National Statistics and Demography Agency) with support from Macro International and the *Centre de recherche pour le développement humaine* (Research Center for Human Development). Support from the PMI will ensure that the survey is done at the appropriate time of the year and will include necessary malaria indicators and biomarkers.

From March to June 2010, the NMCP completed the evaluation of its 2006-2010 National Strategic Plan and from May to August 2010, prepared the 2011-2015 National Strategic Plan and a proposal to Round 10 of the Global Fund. The PMI provided technical and financial assistance to support meetings and workshops. Major components of the evaluation included a review of relevant documents; an internal review by the NMCP, PMI, and key partners; and an external review with field visits by NMCP, partners, experts from outside Senegal, and staff from other programs in the MOH.

#### Proposed Year 5 (FY 2011) Activities:

In FY 2011, PMI M&E activities will be done jointly with the NMCP and other partners, and PMI will support implementation of the NMCP M&E plan. The PMI will help build national capacity in monitoring program implementation of ACTs, ITNs, IPTp and IRS, in evaluating the coverage of these interventions through the 2012 Senegal MIS and in improving health facility and community-level performance through supportive supervision, routine record reviews, and service statistics. The PMI will continue to support improvements in the collection of routine data proposed by the WHO Global Malaria Program and their implementation nationwide, and the expansion of the number of health posts reporting this data on a weekly basis for the detection and response to malaria epidemics.

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.

The PMI M&E Team (CDC/USAID) will lead and coordinate an impact evaluation in Senegal in collaboration with the PMI country teams in Atlanta, Washington, and Senegal. 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.

FY 2011 funding will focus on the following interventions: (\$524,000)

1. *Coverage of interventions and impact on malaria mortality: (\$400,000 for initial funding of a nationwide MIS to be conducted in September – December 2012; additional funding will be provided in the FY12 Malaria Operational Plan)*

To measure coverage for malaria interventions, PMI will contribute support to a nationwide MIS in September-October 2012. This survey will be similar to the 2008/2009 MIS with anemia and parasitemia testing and oversampling of IRS districts. As with the 2008 MIS, the NMCP will organize a MOH committee to supervise the survey.

2. PMI Impact Evaluation: (\$100,000)

This funding will support initial planning and organizational activities for the PMI Impact Evaluation.

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

Two CDC visits for technical assistance in M&E will be funded; one for implementation support of the WHO-proposed routine system and one for NMCP-requested technical assistance with analysis and dissemination of routine NMCP data.

### **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 (FSN) 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 Program 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 5 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 FSN staff, office equipment and supplies, and routine administration and coordination expenses.

## **Annex 1**

### **Tables**

**Table 1**  
**(\$24,000,000)**

| <b>Activity</b>  | <b>Mechanism</b>                 | <b>Budget</b>                                     | <b>Geographic Area</b>  | <b>Description of Activity</b>  |
|--|----------------------------------|---|-------------------------|---|
| <b>PREVENTION</b>  |                                  |   |                         |   |
| <b>Long-lasting insecticide treated bednets (LLINs)</b>                              |                                  |   |                         |   |
| Procurement and distribution of LLINs for distribution through campaigns and routine | Networks/<br>DELIVER             | NetWorks<br>2,000,000<br><br>DELIVER<br>5,000,000 | Nationwide              | Procurement of approximately 1.4 million LLINs for distribution through universal coverage (1 million) and routine (400,000) distribution mechanisms                          |
| Operational costs of setting up and maintaining routine distribution system          | Networks                         | 2,327,000   | Nationwide              | Support for LLIN distribution activities to achieve universal coverage and support for implementation of an ongoing comprehensive nationwide routine LLIN distribution system |
| IEC/BCC activities   | Networks                         | 300,000   | Nationwide              | Support for BCC activities including mass media and community activities to promote ownership and correct and consistent use of LLINs   |
| Universal coverage evaluation  | Networks                         | 100,000   | UC regions              | Support for post distribution evaluation to determine LLIN coverage, LLIN retention, and effectiveness of distribution strategy   |
| <b>LLIN Total</b>  |                                  | <b>9,727,000</b>                                  |                         |   |
| <b>Indoor Residual Spraying (IRS)</b>  |                                  |   |                         |   |
| Indoor residual spraying   | IRS2 IQC<br>Global Task<br>Order | 4,750,000   | 6 priority<br>districts | Support for all aspects of planning and implementation for one round of IRS in 6 districts in Senegal protecting approximately 900,000 people                                 |
| Data management - GIS/PDA training for IRS monitoring                                | CDC IAA                          | 12,000  | N/A                     | Technical assistance by a CDC epidemiologist to support use of GIS/PDA within the context of the IRS program implementation   |

| <b>Activity</b>   | <b>Mechanism</b>                            | <b>Budget</b>     | <b>Geographic Area</b>   | <b>Description of Activity</b>   |
|---|---|-------------------|--|--|
| Community Mobilization for IRS  | ChildFund Senegal Consortium of FBOs / NGOs | 150,000           | 6 districts: Vélingara, Nioro, Malem Hodar, Guinguinéo, Koumpentoum, 6 <sup>th</sup> TBD | Support for community mobilization and communication activities at the community level to increase cooperation with IRS activities   |
| Strengthen entomologic capabilities and entomologic monitoring  | UCAD via WHO                                | 400,000           | 6 districts: Richard Toll, Vélingara, Nioro, Malem Hodar, Guinguinéo, Koumpentoum        | Entomologic monitoring post IRS implementation in 6 spray districts, plus continued entomologic monitoring in Richard Toll   |
|   | CDC IAA                                     | 12,000            | N/A  | 1 technical assistance visit by a CDC entomologist   |
| <b>IRS Total</b>  |   | <b>5,324,000</b>  |  |  |
| <b>Malaria in Pregnancy (MIP)</b>   |   |                   |  |  |
| Supervision and monitoring of ANC, support to ANC outreach strategy, and reinforcement of MIP services in health facilities | IntraHealth follow on                       | 700,000           | Nationwide   | Bring ANC services, IPTp, and LLINs for pregnant women to the community level through health post outreach activities; monitoring and supervision of MIP delivery; training of new health care providers in ANC, IPTp, LLINs, MIP, and interpersonal communication; replacement of water filters and cups for IPTp; and support coordination between NMCP and DRH. |
| IEC/mass media for early ANC attendance and IPTp uptake   | TBD   | 200,000           | Nationwide   | Support IEC/mass media activities to mobilize women for early ANC and IPTp uptake  |
| <b>MIP Total</b>  |   | <b>900,000</b>    |  |  |
| <b>PREVENTION TOTAL</b>   |   | <b>15,951,000</b> |  |  |
| <b>CASE MANAGEMENT</b>  |   |                   |  |  |
| <b>Malaria Diagnosis</b>  |   |                   |  |  |

| <b>Activity</b>  | <b>Mechanism</b>      | <b>Budget</b>    | <b>Geographic Area</b> | <b>Description of Activity</b>   |
|--|-----------------------|------------------|------------------------|--|
| Supportive supervision of malaria diagnosis with both microscopy and RDTs                                    | IntraHealth follow on | 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. Includes support for maintenance of distributed microscopes      |
| Strengthen microscopy for hospital microscopists and provide refresher training for those previously trained | IntraHealth follow on | 50,000           | Nationwide             | Training for hospital microscopists; refresher training in microscopic diagnosis for others previously trained   |
| <b>Diagnosis Total</b>   |                       | <b>300,000</b>   |                        |  |
| <b>Malaria Treatment</b>   |                       |                  |                        |  |
| Improve and strengthen case management of malaria  | IntraHealth follow on | 400,000          | Nationwide             | Training and supportive supervision of case management of malaria at all levels of the health care system including hospitals; support for supervision by health post personnel of case management of malaria at the level of the health hut |
| Procure AL   | DELIVER               | 500,000          | Nationwide             | Procure at least 450,000 AL treatments   |
| Qualitative study on care and treatment seeking  | IntraHealth follow on | 150,000          | Nationwide             | Qualitative study to look at care seeking, costs, attitudes regarding care seeking for febrile illness and malaria treatment, as well as health facility stocks and provider behavior  |
| <b>Treatment Total</b>   |                       | <b>1,050,000</b> |                        |  |
| <b>Pharmaceutical Management and Drug Quality</b>  |                       |                  |                        |  |

| <b>Activity</b>  | <b>Mechanism</b> | <b>Budget</b>    | <b>Geographic Area</b> | <b>Description of Activity</b>   |
|--|------------------|------------------|------------------------|--|
| Drug management capacity building including support for implementation of end user verification tool | SPS              | 400,000          | Nationwide             | Support to strengthen the logistics and pharmaceutical management systems in the public and private sectors including improving drug stock management for dispensers at health centers and health posts, and private pharmacies.   |
| Support to central level supply chain management strengthening                                       | TBD              | 200,000          | N/A                    | Provide technical assistance to the central medical stores to address capacity and coordination weaknesses including support for an assessment of the system.  |
| Pharmacovigilance and drug quality monitoring and advocacy   | USP PQM          | 250,000          | Nationwide             | Support for maintaining system of drug quality monitoring in 9 sites. Also includes IEC activities to inform the public about counterfeit and poor quality drugs, and advocacy for policy enforcement of drug quality standards. Possible long-term TA to shepherd institutional changes indicated by drug quality monitoring. |
| <b>Pharmaceutical Management and Drug Quality Total</b>  |                  | <b>850,000</b>   |                        |  |
| <b>CASE MANAGEMENT TOTAL</b>   |                  | <b>2,200,000</b> |                        |  |
| <b>EPIDEMIC SURVEILLANCE AND RESPONSE</b>  |                  |                  |                        |  |
| Strengthening malaria epidemic surveillance  | TBD              | 50,000           | Sub-National           | Provide support to the malaria epidemic detection system including training and computing equipment to allow routine reporting sites to report malaria case data weekly rather than monthly.   |
| <b>Epidemic Surveillance and Response Total</b>  | <b>50,000</b>    |                  |                        |  |

| Activity   | Mechanism             | Budget         | Geographic Area | Description of Activity  |
|--|-----------------------|----------------|-----------------|--|
| <b>CAPACITY BUILDING and HEALTH SYSTEMS STRENGTHENING</b>                |                       |                |                 |  |
| <b>Capacity Building</b>   |                       |                |                 |  |
| Support to NMCP to enable program supervision                            | NMCP (through WHO)    | 150,000        | Nationwide      | Provide support for supervision visits by national staff to regional and district levels   |
| Support for attendance at regional applied epidemiology course           | TBD                   | 30,000         | N/A             | Support for NMCP attendance at a regional course on applied epidemiology   |
| M&E capacity building for NMCP staff and regional and district personnel | IntraHealth follow on | 30,000         | Nationwide      | Support for 10 people to participate in the annual 3-week health focused francophone M&E course at CESAG in Dakar (participants chosen in collaboration with NMCP) |
| Support for NMCP malariology course                                      | IntraHealth follow on | 150,000        | N/A             | Support for NMCP Malariology course for staff at regional and district levels  |
| <b>Capacity building total</b>   |                       | <b>360,000</b> |                 |  |
| <b>Strengthening Public-Private Partnerships</b>                         |                       |                |                 |  |
| Private sector case management strengthening                             | IntraHealth follow-on | 50,000         | Nationwide      | Support study to assess the services offered at private clinics and hospitals to patients seeking treatment for fever, and attitudes of health care providers      |
| <b>CAPACITY BUILDING and HEALTH SYSTEMS STRENGTHENING</b>                |                       | <b>410,000</b> |                 |  |
| <b>INTEGRATION WITH OTHER GLOBAL HEALTH INITIATIVE PROGRAMS</b>          |                       |                |                 |  |
| <b>Community-level integration of GHI programs</b>                       |                       |                |                 |  |

| <b>Activity</b>   | <b>Mechanism</b>                                    | <b>Budget</b>    | <b>Geographic Area</b>                | <b>Description of Activity</b>  |
|---|---|------------------|---------------------------------------|---|
| Community mobilization  | ChildFund Senegal Consortium of FBOs/NGOs follow-on | 850,000          | Nationwide                            | Support continuation of comprehensive malaria community mobilization activities including BCC, support for MIP, appropriate health seeking, and LLIN promotion  |
| Community-level case management with ACTs/RDTs                        | ChildFund Senegal Consortium of FBOs/NGOs follow-on | 1,250,000        | Nationwide                            | Community based case management of fever in 1427 functional health huts. Includes training, supervision, and monitoring of staff. Facilitate the integration of MCH activities into the PMI platform. |
| PECADOM   | Child Fund follow-on                                | 1,000,000        | ChildFund and Intra divided by region | Supervision of village malaria worker volunteers trained to perform RDTs and administer ACTs at the community level where there is no health hut, as well as provision of medicine kits.              |
| Support for PECADOM program manager at PNL                            | IntraHealth follow on                               | 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                     | TBD   | 25,000           | Peace Corps Volunteer Communities     | Support linkages between community implementing partners and Peace Corps Volunteers   |
| <b>Community-level integration Total</b>                              |   | <b>3,160,000</b> |                                       |   |
| <b>HIV and Malaria</b>  |   |                  |                                       |   |
| Training in malaria case management for HIV care providers            | FHI follow-on                                       | 25,000           | TBD                                   | Support for training of HIV care providers in prevention strategies and effective case management of malaria  |
| <b>HIV and Malaria Total</b>  |   | <b>25,000</b>    |                                       |   |
| <b>INTEGRATION WITH OTHER GLOBAL HEALTH INITIATIVE PROGRAMS Total</b> |   | <b>3,185,000</b> |                                       |   |

**MONITORING AND EVALUATION**

| <b>Activity</b>                                      | <b>Mechanism</b> | <b>Budget</b>       | <b>Geographic Area</b> | <b>Description of Activity</b>   |
|--|------------------|---------------------|------------------------|--|
| Preparation for 2012 Malaria Indicator Survey        | Measure DHS      | 400,000             | Nationwide             | Initial funding of a nationwide Malaria Indicator Survey to be conducted in Sep-Dec 2012; additional funding will be provided in the FY12 MOP  |
| Impact evaluation                                    | TBD              | 100,000             | Nationwide             | Funding for the PMI impact evaluation  |
| Technical Assistance for M&E                         | CDC IAA          | 24,000              | N/A                    | Funding for two CDC TDYs: to provide M&E technical assistance for analysis and reporting of routine NMCP data and to provide assistance with implementation of WHO-proposed routine information system |
| <b>Monitoring and Evaluation total</b>               |                  | <b>524,000</b>      |                        |  |
| <b>IN-COUNTRY MANAGEMENT AND ADMINISTRATION</b>      |                  |                     |                        |  |
| In-country staff and program administrative expenses | CDC/USAID        | 1,680,000           | N/A                    | Support for salaries, benefits and administrative expenses for PMI in-country staff and support for coordination of all in-country PMI activities  |
| <b>Administration total</b>                          |                  | <b>1,680,000</b>    |                        |  |
| <b>GRAND TOTAL</b>                                   |                  | <b>\$24,000,000</b> |                        |  |

**Table 2****Year 5 (FY11) Budget Breakdown by Partner (\$000)**

| <b>Partner Organization</b>                  | <b>Geographic Area</b> | <b>Activity</b>  | <b>Budget*</b> |
|--|------------------------|--|----------------|
| CDC IAA                                      | Nationwide             | TA for entomology, M&E, and GPS/PDA use  | 48             |
| Child Fund Consortium of FBOs/NGOs follow-on | Nationwide             | Implementation of community case management with ACTs, PECADOM, training and supervision of community health workers, and community mobilization       | 3,250          |
| DELIVER                                      | Nationwide             | Procurement of ACTs  | 500            |
| FHI Follow-on                                | Nationwide             | Ensure malaria training by HIV care providers  | 25             |
| Intrahealth Follow-on                        | Nationwide             | Supervision and monitoring of ANC, diagnosis and treatment; capacity building of NMCP; strengthening of microscopy, and support for a PECADOM position | 1,815          |
| IRS2 IQC Global Task Order                   | Nationwide             | Indoor residual spraying in six priority districts   | 4,750          |
| Measure/DHS                                  | Nationwide             | MIS preparation  | 400            |
| Networks                                     | Nationwide             | Distribution of LLINs through mass distributions and routine systems, BCC efforts to increase net use, and universal coverage evaluation               | 2,727          |
| Networks/DELIVER                             | Nationwide             | Procurement of approximately 1.4 million LLINs for distribution through universal coverage and routine distribution mechanisms                         | 7,000          |
| NMCP (through WHO)                           | Nationwide             | Support to enable supervision  | 150            |
| SPS  | Nationwide             | Drug management training and end use verification  | 400            |

| <b>Partner Organization</b> | <b>Geographic Area</b> | <b>Activity</b>   | <b>Budget*</b> |
|-----------------------------|------------------------|---|----------------|
| TBD                         | Nationwide             | BCC/mass media for early ANC attendance, supply chain management strengthening, support to Peace Corps activities, PMI impact evaluation, and support for attendance at applied epidemiology course | 605            |
| UCAD (through WHO)          | Nationwide             | Entomological monitoring  | 400            |
| USP DQI                     | Nationwide             | Pharmacovigilance, drug quality monitoring, and advocacy efforts  | 250            |

\* Does not include staffing and administration