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 (MOP)

MALI

FY 2011

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ACRONYMS AND ABBREVIATIONS

ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal care
ASACO	*Association de Santé Communautaire* (Community Health Association)
AS-AQ	Artesunate-amodiaquine
ASC	*Agent de Santé Communautaire* (Community Health Worker)
BCC/IEC	Behavior change communication/information education communication
CCM	Community case management
CDC	Centers for Disease Control and Prevention
CNIECS	National Center for Information and Communication in Health
CSCOM	*Centre de Santé Communautaire* (Community Health Center)
CSHGP	Child Survival and Health Grants Program
CSREF	*Centre de Santé de Référence* (Reference/District Health Center)
DHS	Demographic and Health Survey
DHPS	*Division d'Hygiène Publique et Salubrité* (Division of Public Hygiene and Safety)
DNS	Direction Nationale de la Santé (National Health Directorate)
DPLM	*Division Prévention et Lutte Contre la Maladie* (Division of Prevention and Disease Control)
DPM	Directorate of Drugs and Pharmacies
DSR	*Division Santé Reproductive* (Reproductive Health Division)
EPI	Expanded Program for Immunization
FBO	Faith-based organization
FENASCOM	*Fédération Nationale des Associations de Santé Communautaire* (National Federation of Community Health Associations)
FSN	Foreign service national
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GOM	Government of Mali
HIPC	Highly-Indebted Poor Countries
IDA	International Development Association
IMCI	Integrated Management of Childhood Illness
INRSP	*Institut National de Recherche en Santé Publique* (National Institute of Public Health Research)
IPTp	Intermittent preventive treatment of pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated bed net
LNS	*Laboratoire National de Santé* (National Health Laboratory)
LLIN	Long-lasting insecticide-treated bed net
MCH	Maternal and child health
MOH	Ministry of Health
MICS	Multiple Indicator Cluster Survey

MIP	Malaria in pregnancy
MIS	Malaria Indicator Survey
MRTC	Malaria Research and Training Center
MSF	*Médecins sans Frontières* (Doctors without Borders)
NAMCOL	Network of African Medicine Control Laboratories
NGO	Non-governmental organization
NIH	National Institutes of Health
NMCP	National Malaria Control Program
PCR	Polymerase chain reaction
PKC	Project Keneya Ciwara (bilateral implemented by CARE)
PLWHA	People living with HIV/AIDS
PMI	President's Malaria Initiative
PPM	*Pharmacie Populaire du Mali* (People's Pharmacy of Mali)
PRODESS	National Health and Social Development Program
PSI	Population Services International
PTF	Technical and Financial Partners' Forum
PVO	Private voluntary organization
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RTI	Research Triangle Institute
SIAN	Semaine d'intensification des activité*s* de nutrition (National Nutrition Weeks)
SIMR	*Surveillance Intégrée de la Maladie et la Riposte* (Integrated Disease Surveillance and Response – IDSR)
SLIS	*Système Local d'Information Sanitaire* (Health Management Information System)
SP	Sulfadoxine-pyrimethamine
SPS	Strengthening Pharmaceutical Systems
TASC-3	Technical Assistance and Support Contract, Three
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 are major foreign assistance objectives 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 the next 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 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 FY2014. 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.

Malaria is one of the major causes of morbidity and mortality in Mali. In 2009, according to the Ministry of Health (MOH) malaria accounted for 45% of outpatient visits in children less than five years of age and 62% of all reported deaths. Planning for support to Mali from the President's Malaria Initiative (PMI) began in 2007 in close collaboration with the National Malaria Control Program (NMCP) and international and national partners.

The 2006 Demographic and Health Survey (DHS) provides the most recent data on the status of malaria prevention and treatment measures. Fifty percent of households owned at least one insecticide-treated net (ITN), and 27% of children less than five years old and 29% of pregnant women had slept under an ITN the previous night. Only 15% of children less than five with fever were managed promptly with antimalarials (artemisinin-based combination therapies; ACTs adopted in 2007), and only 4% of pregnant women had received the recommended two doses of sulfadoxine-pyrimethamine (SP) for intermittent preventive treatment (IPTp) of malaria during pregnancy. Over the last three years, however, Mali has made significant progress in scaling up malaria control interventions. PMI and other partners supported a mass integrated long-lasting insecticide-treated net (LLIN) campaign in December 2007. According to a post-campaign survey, 83% of households owned at least one ITN, and 74% of pregnant women and 78% of children less than five years of age had slept under an ITN the previous night.

Key partners of the NMCP include the Global Fund for HIV/AIDS, Tuberculosis and Malaria (Global Fund), the World Health Organization (WHO), UNICEF, the World Bank, the Dutch Cooperation, USAID and non-governmental organizations (NGOs). Mali received a $26 million Global Fund Round 6 malaria grant to support procurement of LLINs and ACTs and has been approved for Phase 2 funding. With support from malaria control partners, the

NMCP has submitted a proposal for Round 10 that includes scaling up of community case management (CCM) as one of the major components.

In 2007, the Government of Mali (GOM) raised the profile of the NMCP within the MOH by elevating it to the Directorate level. The GOM has also increased its investment in malaria control and the NMCP from about $1 million in FY 2007 to $6.7 million in FY 2008, and to more than $9 million in FY 2009, although this fell in FY 2010 to approximately $4 million. These allocations do not include NMCP administrative costs that the GOM funds separately.

The FY 2011 Malaria Operational Plan was based on progress achieved during the last three years and a planning exercise carried out in June 2010. The MOP was developed in close collaboration with the NMCP and national and international partners involved with malaria control in Mali. The proposed activities support the priorities outlined in the recently updated NMCP National Strategic Plan for 2010 – 2014 and complement funding from other donors. The proposed FY 2011 PMI budget for Mali is $27 million to support the following major activities:

Insecticide-treated nets (ITNs): The National Malaria Strategic Plan promotes universal LLIN coverage for all age groups, with one LLIN for every two people by 2010. The main delivery channels have been mass distribution during integrated health and vaccination campaigns and routine distribution through antenatal care (ANC) and Expanded Program for Immunization (EPI) clinics in all health centers. A significant gap (over five million nets) exists to achieve universal coverage despite PMI and other donor contributions planned in 2010 and 2011. PMI has procured 570,000 free LLINs with FY 2009 funding for free distribution in 2010 to children less than five years of age and pregnant women attending EPI and ANC clinics. With FY 2010 funding, PMI will procure 1.54 million LLINs to support a nationwide universal coverage campaign that is planned to begin in late 2010. PMI will continue strengthening the capacity of the MOH and partners to coordinate donor inputs, track LLINs, and manage logistics and distribution systems. PMI will also support campaign coordination activities, as well as targeted communications for the mass campaign promoting correct and consistent LLIN use.

With FY 2011 funds, PMI will procure 1.55 million nets to reduce the projected 2011 gap of nearly five million nets needed to achieve universal coverage. The PMI is also strengthening LLIN distribution systems to district and community levels to prevent stock-outs, and is continuing support to information, education, communication / behavior change communication (IEC/BCC) activities at national and community levels. These activities and contributions from other donors are expected to bring household ownership of one or more LLINs to more than 85% nationwide.

Indoor residual spraying (IRS): The PMI supports the NMCP's strategy to reduce malaria transmission through targeted IRS in selected high-risk areas. Since 2008, PMI has supported two IRS campaigns in the districts of Bla and Koulikoro, including initial and refresher training of more than 445 spray trainers, supervisors and operators, the purchase of all commodities and personal protective equipment, and communication, supervision, monitoring and environmental compliance activities. During the 2010 IRS campaign, a total of 127,000

houses were sprayed, protecting about 440,000 residents, with an acceptance rate of 97%. PMI supports entomological monitoring through the Medical Research and Training Center (MRTC) and results have shown no evidence of insecticide resistance. With FY 2011 funding, PMI will continue to support IRS in Bla and Koulikoro Districts and will expand to a third district with an estimated population over 190,000. The PMI will continue to support the insectary, insecticide resistance testing, and implementation of the entomological monitoring plan. PMI will also work to strengthen the MOH's capacity to plan and supervise IRS activities.

Intermittent preventive treatment in pregnant women (IPTp): Utilization of antenatal care by pregnant women and IPTp coverage are low in Mali. The 2006 DHS showed that only 4% of pregnant women received the recommended two doses of sulfadoxine-pyrimethamine (SP) for IPTp. Improved coverage rates are expected from the 2010 Multiple Indicator Cluster Survey (MICS), which will be available in November. In 2009, PMI procured 1 million IPTp treatments and trained 1,571 health care workers malaria in pregnancy in focused antenatal care (FANC) which highlights the GHI principle of improving women's health. With FY 2011 funding, PMI will continue to help fill gaps in SP and supplies, including providing cups and drinking water for directly observed IPTp administration at health facilities, help update supervision and training materials, and assist in the roll out of new malaria in pregnancy treatment guidelines. In order to respond to cultural barriers, PMI will also continue to target communication activities to engage religious and traditional leaders to advocate for changing the traditional cultural practice of hiding pregnancies, which delays visits to antenatal care clinics and increases the risk of adverse outcomes.

Case management: Malaria diagnosis in most public-sector health facilities is based on clinical criteria, with fewer than 10% of suspected cases of malaria confirmed by laboratory testing. According to national treatment policy, every malaria case requires laboratory confirmation before administering ACTs; where microscopy is not available, rapid diagnostic tests (RDTs) are used for confirmation. The *Institut National de Recherche en Santé Publique* (INRSP) is responsible for quality control of all diagnostic services, including malaria diagnostics, and PMI has supported the INRSP in diagnostic trainings, procurement of microscopes/RDTs, and support in the development and implementation of a comprehensive strategy for diagnostic quality control and assurance.

PMI has also been a major advocate for integrated community case management of fever (CCM) which supports the GHI principles of integration with maternal child health and improving the health of women and girls. In 2008 and 2009, PMI supported a CCM pilot with community health agents (*Agents de Santé Communautaire* [ASCs]) and more recently, PMI supported the program's expansion to three districts in Sikasso Region. PMI also procured drugs for the management of severe malaria, and supported in-service training and supervision of health workers and ASCs. PMI is funding a study on the impact of user fees on health services in the Bamako Initiative cost recovery system. In 2009, PMI and other partners supported an MOH-organized national forum to build consensus around essential care services offered at the community level.

In 2010, due to advocacy efforts of PMI and other partners, the MOH adopted new national policies related to community case management of fever, treatment of malaria in pregnancy with ACTs, and severe malaria treatment and pre-referral treatment. The national integrated CCM package is expected to improve access to care by allowing ASCs to provide health services at the community level, including treatment for uncomplicated malaria with ACTs after confirmation by rapid diagnostic test (RDT), acute respiratory infections, diarrhea, and micronutrient supplementation.

With FY 2011 funding, PMI will continue to support and strengthen efforts to ensure prompt and effective case management of malaria at health facilities and the community level. At the health facility level, PMI will concentrate on strengthening capacity in laboratory diagnostics, supply chain management, and BCC related to malaria case management. The PMI will strengthen quality assurance/quality control systems at national and district levels for accurate malaria diagnostics, and will support the NMCP's supervisory role to monitor and reinforce the correct use of ACT at health facilities and in communities.

Health system strengthening and integration: Consistent with GHI principles, PMI has strengthened the health system by supporting the development, adoption, and costing of a National Malaria M&E plan in 2008. The plan included collection and analysis of routine data through the health information system known as *Systeme local d'information sanitaire* (SLIS), implementation of sentinel sites for malaria surveillance, and periodic national surveys to evaluate malaria prevention and treatment activities. To improve the quality of routine data collection, analysis and reporting through the SLIS, PMI in collaboration with Global Fund has supported the assessment of the SLIS, development of a data collection tool, and standardized malaria reports to be used at local, regional and national levels. These tools have been field tested and results and recommendations have been disseminated. With FY 2011 funding, PMI will support the NMCP to implement recommendations from the SLIS assessment and reinforce data quality, reporting, analyses and evidence-based decision making at the district level through quarterly M&E meetings.

In line with the principles of the GHI, advocacy efforts of PMI and partners have resulted in the adoption of integrated CCM as national policy. PMI in cooperation with MCH will continue to support scale up of CCM including training on diagnosis and case management as well as the procurement of commodities for CCM. PMI will also continue to integrate with HIV/AIDS programs by providing LLINs for distribution to people living with HIV/AIDS in antiretroviral therapy sites and IPTp treatments with SP for pregnant women. Another promising area for integration is with Neglected Tropical Diseases (NTDs), given that Mali is endemic for all five targeted NTDs (lymphatic filariasis, onchocerciasis, schistosomiasis, trachoma and soil-transmitted helminthes). PMI will continue to explore joint coordination of LLIN distribution and community case management with NTD mass drug administration, and integrated health education activities provided by community health workers.

PMI has also been coordinating with the MRTC, which provides state of the art entomological capacity. PMI has supported two operational research studies with MRTC evaluating the impact on malaria transmission of IRS spraying along the Niger River and larviciding during the dry season; both studies are ongoing and results are pending.

Epidemic surveillance and response (ESR): Mali's ESR system features weekly disease reporting procedures from 13 districts in the epidemic-prone Northern region. While gradually improving in recent years, data analysis capacity and epidemic response plans need reinforcement, and laboratory confirmation of suspected malaria cases is necessary. With FY 2011 funding, PMI will support strengthening of the Integrated Disease Surveillance and Reporting (IDSR) system by contributing to health worker training, laboratory confirmation, and supervision.

Monitoring and Evaluation (M&E): The NMCP, with support from PMI and other partners, has developed a comprehensive National Malaria M&E Plan, which addresses capacity building, improvement of data collection, and provision of equipment to collect and analyze data. PMI helped assess the quality and timeliness of routine reporting for malaria through the national health information system. PMI is collaborating with UNICEF by supporting a 2010 Multiple Indicator Cluster Survey, which will provide an up date on progress in coverage of malaria prevention and control current measures; results of this survey will be available in November. PMI is also supporting an anemia and parasitemia prevalence survey at the peak of malaria transmission season in September/October 2010.

With FY 2011 funding, PMI will provide financial support for the preparation and implementation of the 2011 DHS and continue to support improvements to routine reporting on malaria through the national health information system. PMI will assist the NMCP build data management capacity and strengthen the coordination of malaria M&E activities. Finally, PMI will support NMCP M&E activities, including implementation of the National M&E Plan, with particular emphasis on strengthening district capacity in the collection and use of data for decision-making.

INTRODUCTION

Global Health Initiative

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 core principles which include: 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

Malaria prevention and control is a major foreign assistance objective of the U.S. Government (USG). 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 FY2014 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 (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

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 and complementary and that RBM and Millennium Development goals are achieved.

Mali was selected for PMI during the third phase and launched in 2008. Large-scale implementation of ACTs and IPTp began in mid-2007 and has progressed rapidly with support

from PMI and other partners, in spite of the country's weak health infrastructure. Artemisinin-based combination therapies and IPTp are now available and being used in all public health facilities nationwide. Community case management (CCM) has been adopted as national policy and will be scaled up with support from different health partners. By end of 2010, USAID /PMI will support the expansion of iCCM to 10 districts. A large-scale free ITN distribution campaign in 2007 and routine net distributions through ANC and EPI clinics have resulted in high levels of household ownership of nets. A phased universal coverage campaign is planned between December 2010 and June 2011 which will target regions progressively, in accordance with phased arrival of LLINs in country. PMI has also supported IRS in two districts protecting approximately 450,000 individuals annually and is expanding to a third district in 2011.

This document presents a detailed one-year implementation plan for (FY)2011 funding from the PMI in Mali. It briefly reviews the evolution of malaria control and prevention policies and interventions in Mali, reports the status of implementation of the FY2010 PMI activities, identifies challenges and unmet needs if National Malaria Control Program (NMCP) and PMI goals are to be achieved, and provides a description of activities planned in FY2011 under the PMI. It was prepared in close collaboration with the NMCP and key malaria stakeholders. The total amount of PMI funding requested for Mali is $27 million for FY2011.

BACKGROUND

In 2011, the population of Mali will be approximately 15.6 million (General census 2009), with more than 47% less than 15 years of age. Approximately 64% of Malians live in poverty; i.e. on less than US$1 a day. In 2005, the estimated annual gross national income per capita was just $500 (World Bank 2007), making Mali one of the world's poorest countries. The total expenditure on health in Mali represented nearly 8% of the GDP in 2009 (MOH/ PRODESS).

Administrative and health infrastructure in Mali

Mali is divided into eight administrative regions (Kayes, Koulikoro, Sikasso, Ségou, Mopti, Gao, Tombouctou and Kidal) plus the capital Bamako. The regions are subdivided into 49 administrative "*cercles*" comprised of 53 health districts while Bamako is divided into 6 administrative communes that correspond to 6 health districts, making up a total of 59 health districts in the country. Governance is decentralized into 703 communes, each one administered by an elected local council headed by a mayor. The organization of the health system is based upon the principles of decentralization of health services and community participation to: a) extend health service coverage, and b) ensure access to essential and effective medicines.

The health system is composed of three levels:

- The central-level with five national reference hospitals plus the maternal and child hospital that serve as the highest reference level;
- The intermediate level with six regional hospitals for patients requiring a higher level of care;
- The local level with:

- Fifty-nine referral health centers (CSREF) constituting the district reference level;
- A total of 993 community health centers (CSCOM) in 2009 as well as parastatal, faith-based, military and other private health centers, constituting the community health services level. The CSCOMs are established and managed by community health associations (ASACOs).

The MOH has a critical staff shortage at all levels of the public health system, especially for service provision below the national-level. In addition, health workers are not distributed throughout the country. In 2009, the ratio of doctors to the population varied from 1/3,637 in sparsely populated Kidal to 1/22,045 in Mopti Region, compared with the WHO standard of 1/10,000. Regional directors oversee health teams that implement integrated health interventions; currently all regional teams have malaria focal persons. The district health center (CSREF) is the first referral structure for CSCOMs; the district health team is headed by a medical chief responsible for technical supervision of CSCOMs. Community health associations manage CSCOM staff and operations; collect proceeds from drug sales, consultation and user fees, and pay salaries and other expenses. As is the case at the central-level, distribution of staff is uneven. In 2009, the percentage of CSCOMs headed by a certified head nurse was close to WHO norms ranging from 100% in five regions to 95% in Kayes. The number of staff employed may depend on the level of community resources to pay them.

In 2009, PMI and other partners supported an MOH-organized national forum to build consensus around essential care services that may be offered at the community level. In 2010, Mali approved an integrated Community Case Management (iCCM) package offered by *agents de santé communitaire* [ASCs] (community health workers) to provide health services to the community level. The ASCs will provide free treatment for uncomplicated malaria with artemisinin-based combination therapies (ACTs) after confirmation by rapid diagnostic test (RDTs), acute respiratory infections with antibiotics, diarrhea with oral rehydration solution and micronutrient supplementation, including targeted Vitamin A distribution. The ASC will also provide primary care to the newborn and family planning for eligible families. Based on the national CCM directive, the CCM package and ASC model will be introduced in villages located 5 km or more from a health facility and will cover 2-3 villages in a radius of 3 km with a catchment area of approximately 1,500 people. This iCCM approach and ASC efforts will be supported by an additional cadre of community health volunteer, the *relais*, whose role is to carry out BCC/IEC and health education to promote key health messages to complement iCCM activities. The details of nationwide implementation of the iCCM package including supervision, commodities management, RDT confirmation and quality control and assurance are being discussed and will be the focus of a Global Fund Round 10 proposal.

Health financing through cost recovery

Mali has a strong cost recovery system in place that is based on the "Bamako Initiative". At the district-level, communities can establish CSCOMs based on the following criteria: the establishment of a community health association (ASACO); raising a minimum of 10% contribution to the construction or renovation of the health facility; and the hiring and support of health personnel. All CSCOMs are required to deliver the national minimum package of

services: antenatal care, immunizations, and curative services. Once authorized by the District Medical Officer, the MOH provides an initial stock of medicines, consumables and equipment. In principle, communes are expected to allocate 15% of their budget allocations for social services including water, education, and health.

Three forms of revenue generation exist at CSCOMs and are managed by the ASACO: membership fees, the sale of essential drugs, and fees for services. Service fees vary by health area and are set by the ASACO after consultation with the population. Membership fees allow for reduced service charges at some CSCOMs. Funds derived from the sale of medications are kept in a separate account to prevent providers from overprescribing to generate revenue and to prevent de-capitalization of pharmacy stock. The ASACO management committee purchases replacement drugs for the CSCOM through the national pharmacy system or from the private sector based on availability. Selected drugs (e.g. antimalarials for children less than five and pregnant women, vitamin A, oral rehydration solution) are provided free by the government or donors. The CSCOMs must finance the transportation of their drugs from CSREFs. However, due to small profit margins and the loss of or use of revenues for non-pharmaceutical purposes, CSCOM drug stores often become de-capitalized.

National financial planning for malaria and health/social development

The NMCP receives annual budget support from National Health Sector Wide Approach or PRODESS. The PRODESS Evaluation Committee (*Comité de Suivi)* manages and approves the annual operating budget plan. Several partners (including the governments of the Netherlands, Sweden and Canada) provide direct budget support on an annual basis. Other donors including the USG, target their funding to sub-sectors and specific programs. The Government of Mali (GOM) contributes mostly to salaries, office space and other operating costs in the PRODESS annual budget. The GOM also uses Highly Indebted Poor Countries (HIPC) program funds to pay some MOH salaries, especially in CSCOMs.

The GOM-approved FY2010 Operating Plan for the PRODESS includes budget line items totaling about $1 million for activities to be conducted by the NMCP. GOM funding for NMCP activities has increased substantially in FY2008 to $6.7 million and in FY2009 to over $9 million, following the government's procurement of malaria commodities and equipment. However, in FY2010 GOM funding for malaria decreased to just $4 million. This budget includes resources from countries providing direct budget support, with the remainder of needs covered by funds from other donors including Global Fund, PMI, UNICEF and others. This does not include funds for NMCP administrative costs, which are funded separately by the GOM.

MALARIA SITUATION IN MALI

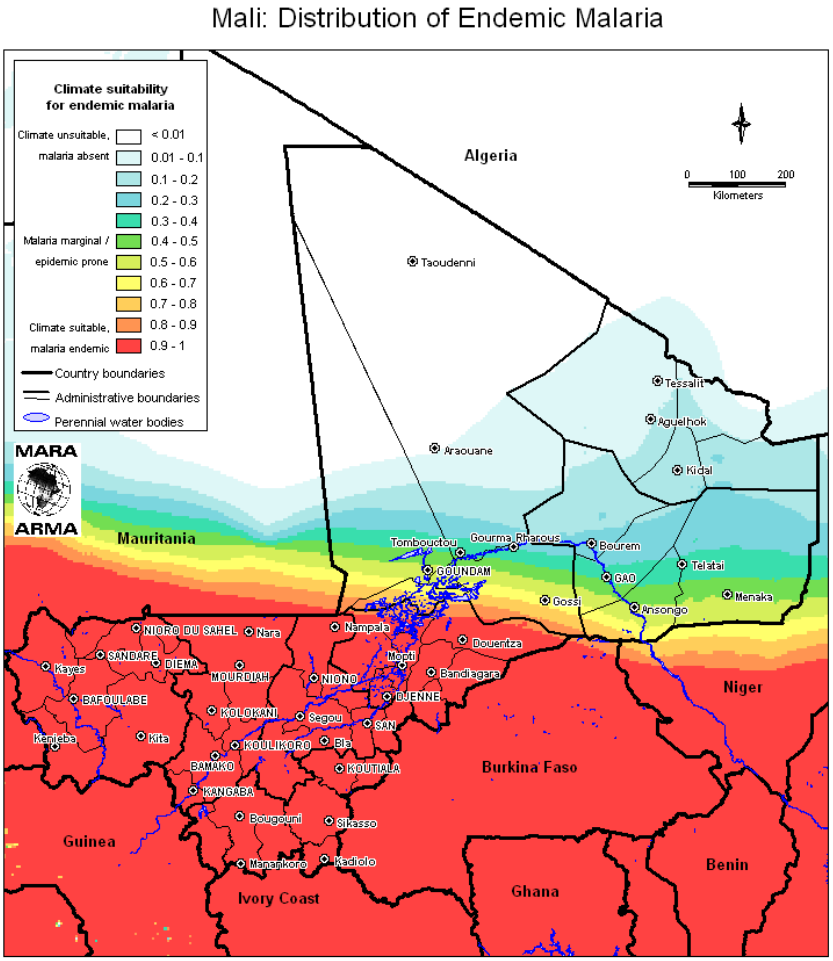
Malaria is the primary cause of morbidity and mortality in Mali, particularly for children less than five years old. In 2009, the national health information system (*Système Local d'Information Sanitaire* or SLIS), reported more than 1.6 million clinical cases of malaria in health facilities, accounting for 38% of all outpatient visits (all ages), however only 10% of these cases were confirmed by either microscopy or RDTs. Malaria also accounts for 45% of all outpatient visits for children less than five years of age. Sixty-two percent of all reported

deaths and 68% of deaths in children less than five are attributed to malaria. However, with the lack of laboratory confirmation, the SLIS data should be viewed with caution.

Plasmodium falciparum accounts for 85-90% of malaria infections while *P. malariae* (10-14%) and *P. ovale* (1%) make up the remaining infections. A 2004 study conducted by the Medical Research and Training Center (MRTC) in Menaka, an epidemic-prone region in the north indicated a prevalence of *P vivax* of 8% which was confirmed by polymerase chain reaction (PCR).

Malaria is endemic to the central and southern regions (where about 90% of Mali's population lives), and considered epidemic in the north based upon viability of *Anopheles* species in the desert climate. Malaria transmission varies in the five geo-climatic zones. It occurs year-round in the Sudano-Guinean zone in the south, with a seasonal peak between June and November. The transmission season is shorter in the northern Sahelian Zone, lasting approximately three to four months (July/August to October). Malaria transmission is endemic in the Niger River Delta and areas around dams with rice cultivation, and is endemic with low transmission in urban areas including Bamako and Mopti. Epidemics occur in the north (Tombouctou, Gao, and Kidal Regions) and in northern districts of Kayes, Koulikoro, Segou and Mopti Regions, however, the last identified epidemic was in September 2003 in Tombouctou.

Distribution of endemic malaria and climate suitability for endemic malaria (Source: MARA/ARMA, July 2002)



This map is a product of the MARA/ARMA collaboration (http://www.mara.org.za). July 2002, Medical Research Council, PO Box 70380, Overport, 4067, Durban, South Africa
CORE FUNDERS of MARA/ARMA: International Development Research Centre, Canada (IDRC); The Wellcome Trust UK; South African Medical Research Council (MRC); Swiss Tropical Institute, Multilateral Initiative on Malaria (MIM) / Special Programme for Research & Training in Tropical Diseases (TDR), Roll Back Malaria (RBM).
Malaria distribution model: Craig, M.H. et al. 1999. Parasitology Today 15: 105-111.
Topographical data: African Data Sampler, WRI, http://www.igc.org/wri/sdis/maps/ads/ads_idx.htm

Key partners of the NMCP include the Global Fund, the WHO, UNICEF, the World Bank, the Dutch Cooperation and USG. Non-governmental organizations (NGOs) and private voluntary organizations (PVOs) partners include *Groupe Pivot Santé*, *Fédération Nationale des Associations de Santé Communautaire* (FENASCOM), *Médecins Sans Frontières* (MSF), Plan International and Mali Voices /John Hopkins University Center for Communications Program (JHUCCP). The National Institutes of Health (NIH) supports the Malaria Research and Training Center (MRTC) within the Faculty of Medicine, Pharmacy and Odontostomatology of the University of Bamako**.**

NATIONAL MALARIA CONTROL PLAN AND STRATEGY

The MOH guides and coordinates all malaria control activities. The NMCP was established in 1993 under the oversight of the Disease Control Division of the National Health Directorate (DNS). In July 2007, the GOM elevated the NMCP to a Directorate level in the MOH organizational structure. The NMCP Director supervises four technical divisions and one administrative and finance division, and reports directly to the Secretary General of Health. Due to its new higher profile in the MOH, the NMCP can now participate in and influence decision making about malaria control more effectively, including development of MOH work plans and budgets.

The NMCP establishes strategies for all malaria interventions, coordinates research, proposes policies, norms and guidelines, and coordinates partner work plans. The NMCP also supports decentralized regional and district health teams through training and supervision. In 2009, the NMCP Strategic Plan was revised for the period 2010 – 2014 and aims to achieve the following ambitious goals:

- Reduce malaria mortality by at least 50% in 2010 and by 75% in 2015 as compared to year 2000 levels
- Reduce malaria case-fatality rates reported in health facilities by at least 50% in 2010 and by 80% in 2014, as compared to year 2005 levels
- Reduce malaria morbidity by at least 50% in 2010 and by 75% in 2015 as compared to year 2000 levels

To achieve these objectives, the NMCP has defined four major malaria control and prevention strategies: 1) improved case management, 2) intermittent preventive treatment in pregnancy, 3) vector control through the distribution and use of LLINs, elimination of mosquito breeding sites using larvicides, and targeted indoor residual spraying, and 4) malaria epidemic preparedness and response. Three cross-cutting approaches support these major strategies: community mobilization and behavior change communication (BCC), operational research, and monitoring and evaluation.

CURRENT STATUS OF MALARIA INDICATORS

The Demographic and Health Surveys (DHS) conducted in 1996, 2001 and 2006 are the only nationally-representative health surveys conducted in Mali in recent years. The 2006 DHS was conducted from May to December, which includes the peak period for malaria

transmission (August-November). The results show relatively high household ownership of any type of net, but low coverage with an ITN and even lower use of ITNs by high-risk groups (pregnant women and children). Prompt case management in children less than five years of age with fever is also very low, as is use of sulfadoxine-pyrimethamine (SP) for IPTp.

A UNICEF multiple indicator cluster survey (MICS) was conducted from December 2009 – July 2010. The survey includes a module on selected malaria indicators (such as net ownership and use and treatment seeking behaviors) and measures anemia prevalence in children 6-59 months of age. Results will be available in August 2010.

A national parasitemia and anemia survey is planned during September/October 2010, the usual peak period of malaria transmission. Data from the survey will provide the country with its first national estimate of malaria parasitemia prevalence that will be used as a baseline. These data along with DHS data and other studies recently conducted in the country will be used to guide NMCP program implementation and provide data for the impact evaluation exercise planned by the M&E Team in all PMI countries.

Malaria Indicator	DHS 2006
Proportion of children less than five years old with fever in the last two weeks who received treatment with ACTs within 24 hours of onset of fever	N/A*
Proportion of households with at least one ITN	50%
Proportion of children less than five years old who slept under an ITN the previous night	27%
Proportion of pregnant women who slept under an ITN the previous night	29%
Proportion of women who received two or more doses of IPTp during their last pregnancy in the last 2 years	4%

*Preliminary data will be available in last quarter of 2010.

GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

The goal of PMI is to reduce malaria-associated mortality by 70% in the original 15 PMI countries compared to pre-Initiative levels. By the end of 2012, PMI will assist Mali to achieve the following targets in populations at risk for malaria:

- Over 90% of households with a pregnant woman and/or child less than five years old will own at least one ITN;
- 85% of children less than 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 less than 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 less than five with suspected malaria will have received treatment with an ACT in accordance with national malaria treatment policies within 24 hours of onset of their symptoms.

EXPECTED RESULTS FY2011

Prevention:

- PMI will procure approximately 1.55 million LLINs to contribute to either a universal coverage campaign or a nationwide under five <5 targeted campaign nationwide tied to the National Nutrition Weeks and contributions to LLIN delivery in the routine net distribution. This together with other donors' contributions is expected to result in more than 80% of households owning one or more LLINs;
- 180,000 houses with approximately 580,000 residents will be sprayed
- Approximately 230,000 treatments of sulfaxdoxine-pyrimethamine (SP) for IPTp will be procured in conjunction with the Global Fund and UNICEF to cover 100% of SP needs for 2012. This represents approximately one-half of SP needs for 2012. PMI will also provide funds for procurement of cups and water containers to make sure that women take the SP under direct observation by health care providers.

Treatment:

- PMI will procure approximately 1 million RDTs towards the estimated annual need of 1.8 million RDTs of which about 500,000 are covered by the Global Fund. A one-year supply of lab consumables will be purchased to reinforce the diagnostics capacity at all 59 district referral centers, including referral hospitals.
- Approximately 461,000 ACT treatments will be purchased to prevent stockouts in health facilities and to support the implementation of integrated community case management (CCM). Together with the Global Fund contribution, this is expected to raise the proportion of children under 5 with fever receiving treatment with ACTs to 85%.
- Approximately 170,400 artesunate suppositories and injectable (intramuscular) artemether treatments will be procured for pre-referral treatment of severe malaria for use in government health facilities.

INTERVENTIONS – LONG LASTING INSECTICIDE-TREATED NETS (LLINs)

Background:

According to the revised Malaria Strategic Plan for 2010-2014, the NMCP aims to achieve universal LLIN coverage for all age groups (defined as one LLIN for every 1.8 persons) by 2014. To achieve this goal, multiple approaches will be used, including mass distribution

campaigns in 2010-11 and continuing routine distribution through antenatal care (ANC) and Expanded Program for Immunizations (EPI) clinics. Since 2006, the MOH has provided LLINs for free to children less than five years of age through mass campaigns, to pregnant women at their first ANC visit, and to children less than one year of age with completed vaccination cards at EPI services.

In 2007, the Malian Government and its health partners conducted an integrated EPI/LLIN campaign, distributing 2.8 millions nets over the course of the year. In a follow-up study conducted in August 2008, 78% of children less than five and 74% of pregnant women had slept under a treated net the night before the survey (HealthBridge, August 2008). The NMCP strategy calls for replacement of old nets every three to four years so nets distributed in 2007 will need replacing by the end of 2010. In addition to replacement nets, the NMCP is currently seeking additional quantities of LLINs for mass household campaigns to help reach its universal coverage target by December 2010.

The following LLIN contributions are planned or available in 2010-2011:

Sources of LLINs	Quantity	Time frame for Distribution	Target
Global Fund Round 6	500,000	2010	For routine EPI/ANC clinics
PMI FY 2009	570,000	2010	For routine EPI/ANC clinics
World Bank (OVMS)	375,000	2010	For phased mass campaign
UNICEF	100,000	2010	For phased mass campaign
Government of Mali	500,000	2011	For phased mass campaign
PMI FY 2010	1,540,000	2011	For phased mass campaign
Total LLINs available	**3,585,000**		

Thus, there are a total of 3,585,000 new LLINs planned or available in 2010 and 2011 to contribute to the NMCP's universal coverage goal. The following LLIN needs and gaps are projected through 2012:

- Total population in 2010 = 15.4 million
- LLINs needed in 2010 for universal coverage based on 1.8 persons per net = 8.556 million
- Total LLINs available (2010 + 2011) = 3.585 million
- LLIN gap in 2011 (8.556 m – 3.585 m) = 4.971 million
- LLIN needs for 2011 increase in population (assuming 3% growth rate) = 256,667
- LLIN needs for 2012 increase in population (assuming 3% growth rate) = 264,367

In FY 2011, PMI will contribute 1.55 million LLINs to reduce the projected 2011 gap of 4.97 million LLINs as well as an additional gap of approximately 521,000 LLINs needed to maintain universal coverage in 2011 and 2012. At this time, the NMCP has not elaborated a plan for achieving universal LLIN coverage nor defined a distribution strategy targeting the available LLINs, except for prioritizing continued support to routine facility services reaching the most vulnerable populations. The NMCP is still determined to achieve its universal coverage target by December 2010 through a mass distribution campaign, and has embarked on advocacy efforts with malaria partners to seek additional LLINs from other donors. Several up-coming nationwide health campaigns could provide opportunities to distribute LLINs to target groups, including a nationwide measles vaccination campaign in November 2010 and a semi-annual Vitamin A campaign in June 2011. Another option being considered is a rolling stand-alone campaign targeting either vulnerable groups or universal coverage, beginning with the most highly-endemic regions.

The NMCP has expressed concern about the lack of access to LLINs by children ages one to four years. Because attendance at pre-schools is low (ranging from 2.2% in Mopti to 35% in Bamako) mass distribution may remain the most effective way to reach this age group.

Progress during the last 12 months:

With FY 2009 funding, the PMI procured 570,000 LLINs for distribution by September 2010 to pregnant women and children less than one year of age attending ANC and EPI clinics. The NMCP and partners have conducted BCC/IEC activities to reinforce correct behaviors and practices around net use. PMI supported radio and TV broadcasts focused on malaria transmission and increasing year-round net use. Mali has generally high demand for LLINs, but consistent year-round use among target groups remain below NMCP and PMI objectives, especially during the dry season when people are less likely to sleep under a net due to the heat. The 2010 MICS will provide current coverage information on LLINs and help to inform targeted BCC/IEC strategies for existing delivery channels and future campaigns.

PMI supports the NMCP to strengthen supervision, forecasting, planning and coordination of net distribution. The NMCP M&E Planning Division is responsible for forecasting net needs in collaboration with other MOH offices including the Directorate of Drugs and Pharmacies (DPM), the Division of Reproductive Health (DSR), and the EPI Section with input from the regions and districts. While sufficient LLINs are available to support routine service needs, a lack of coordination on LLIN between the MOH/NMCP and donor partners resulted in some confusion about the quantities, timing, and delivery of nets for routine distribution, with some stock outs reported at health facilities. Additional challenges stem from GOM and donor LLINs that are distributed to the regional or district levels without the necessary resources to ensure delivery to the health facilities. Nets procured by PMI are distributed from Bamako directly to the peripheral health facilities. In addition, Global Fund Round 6 funds support procurement, warehousing, and distribution of nets to the district CSREF-level and further to the CSCOM-level. Malaria partners carry out nationwide LLIN inventories twice per year to ensure adequate stocks exist at the district depot and CSCOM levels, particularly before the peak of the malaria transmission season. Prior to this inventory control, many CSCOMs did not have the minimum stock required for six months and had limited means of transporting

nets to their facilities and recovering these costs. PSI with support from PMI and the Global Fund developed a tracking table of all nets procured and distributed since 2008 was developed to assist in identifying CSCOM needs and potential stock outs and has facilitated better coordination and planning of net distribution among the relevant partners.

Proposed FY2011 activities: ($12,060,000)

PMI will continue to contribute to improving coverage and use of free LLINs among the principal target groups (children less than five years of age and pregnant women) by supporting free distribution through public sector routine delivery channels and mass distribution campaigns. The level of PMI's support to the NMCP's universal coverage target will largely depend on a clearly defined national strategy, additional LLIN contributions and other partner support. PMI will also continue to strengthen the capacity of the MOH and partners to coordinate donor inputs, track LLINs, and manage logistics and distribution systems from central to peripheral health facility levels. The following PMI Year 4 activities are planned for Mali:

LLIN procurement: ($9,300,000) PMI will procure approximately 1,550,000 LLINs for free distribution through EPI and ANC clinics and mass campaigns. These LLINs will help reduce the estimated annual LLIN gap for 2010-2011 and/or contribute to achieving the NMCP's universal coverage goal as part of mass distribution campaigns in 2011. Support includes distribution costs and any post-campaign "hang-up, keep up" activities that use household visits by community members to encourage proper year-round use of nets. PMI will also continue to strengthen capacity of the NMCP in supervision, forecasting, planning and coordination of net distribution. PMI will work closely with NMCP and other partners to leverage additional support and funding for LLINs to meet the remaining gaps.

Distribution of LLINs: ($1,818,000) PMI will support distribution of free LLINs to pregnant women and infants in the public sector by ensuring nets are delivered to the CSCOM level for routine distribution during ANC and EPI services. PMI will continue to help CSCOMs improve their distribution and reporting systems and ensure proper labeling of public sector LLINs. PMI will also support the NMCP in planning and coordination for mass distribution campaigns in 2011 and monitoring of routine distribution to EPI and ANC.

Technical assistance for LLIN campaign: ($12,000) A CDC advisor will provide technical assistance on LLIN mass campaign planning, implementation, and monitoring.

LLIN logistics strengthening: ($280,000) PMI will continue to strengthen the capacity of the NMCP and other key implementing partners involved with LLIN logistics from central- to district-levels. PMI will fund technical assistance to strengthen commodity management to adequately forecast, plan and track distribution of LLINs and carry out semi-annual inventory controls of LLIN stocks. This includes advising on transportation and other inputs needed to ensure adequate stocks are available for routine distribution. Funding will support improved monthly stock distribution and reporting as well as inventory and supervisory checklists. A portion of the funds will also be used to support an annual end-use verification exercise for LLINs at health facilities.

Post-campaign follow-up and reinforcement: ($100,000) PMI will support the NMCP and key implementation partners to carry out specific post-campaign activities that include promoting correct and consistent use of LLINs, implementing "hang-up, keep-up" activities with trained community volunteers, and contributing to post-campaign evaluation efforts (both quantitative and qualitative).

BCC/IEC: ($500,000) Support for BCC/IEC activities will reinforce the correct use of bed nets throughout the year. While reported net usage is high during the high transmission season, efforts are needed to maintain it high during the low transmission season. Identifying the remaining barriers to correct hanging, use and maintenance of nets and promoting year-round use is extremely important to help meet NMCP and PMI goals. PMI will support innovative ways to combine tracking of LLINs with targeted BCC messages, emphasizing the necessity to continue sleeping under LLINs during the dry seasons, associated with low transmission season. PMI will identify multi-channel strategies to design, develop and communicate this information, including door to door message dissemination by *relais* in their communities. BCC/IEC coordination among PMI and NMCP partners at the national and community levels is even more critical in Year 4 to ensure correct and consistent use of nets, uniformity of messages from various interventions, regular monitoring, and subsequent reorientation as needed.

NGO Capacity Building: ($50,000) PMI will contribute to efforts led by the NMCP and implementing partners to coordinate and build capacity of local non-governmental, faith-based and community-based organizations (NGOs, FBOS, and CBOs) in LLIN distribution and follow-up activities. During the campaigns, the GOM will rely heavily on a wide range of CBOs to assist with the household distribution of LLINs. Following the campaigns, NGO partners will participate in post-campaign IEC/BCC to promote correct and consistent use of nets.

INTERVENTIONS: INDOOR RESIDUAL SPRAYING (IRS)

Background:

The NMCP's Strategic Plan envisions an integrated vector control program that includes LLINs, indoor residual spraying, destruction of larval habitats, larviciding, and environmental management in urban zones.

Regional climatic zones in Mali range from desert in the north with less than one month of rainfall, to the Sudano-Guinean Zone in the far south with six to seven months of rainfall. IRS is likely to be most effective in the areas of the country where malaria transmission is perennial and occurs in seasonal peaks that vary in duration from three to six months. This would exclude the three northernmost regions and the northernmost districts within the Kayes, Koulikoro, Segou and Mopti Regions that are considered zones of sporadic or epidemic risk for malaria transmission. IRS is also not conducted in rice-growing areas and zones of

irrigation around the Niger River Delta where transmission is holoendemic, or in the urban areas of Bamako and Mopti, where much lower level transmission occurs.

Private companies conduct IRS regularly in the gold mining areas of Sadioloa, Yatela, Loulou, Morila and Kalana, but it is limited to the mines and surrounding villages rather than to the entire district. No Global Fund-supported or other private sector IRS activities are currently underway. In support of the NMCP's strategic plan to scale up IRS, PMI has supported spraying in two districts, and in 2011 will extend coverage and protection to a third contiguous district between the original two in order to provide continuous area coverage and act as the nucleus for future IRS districts.

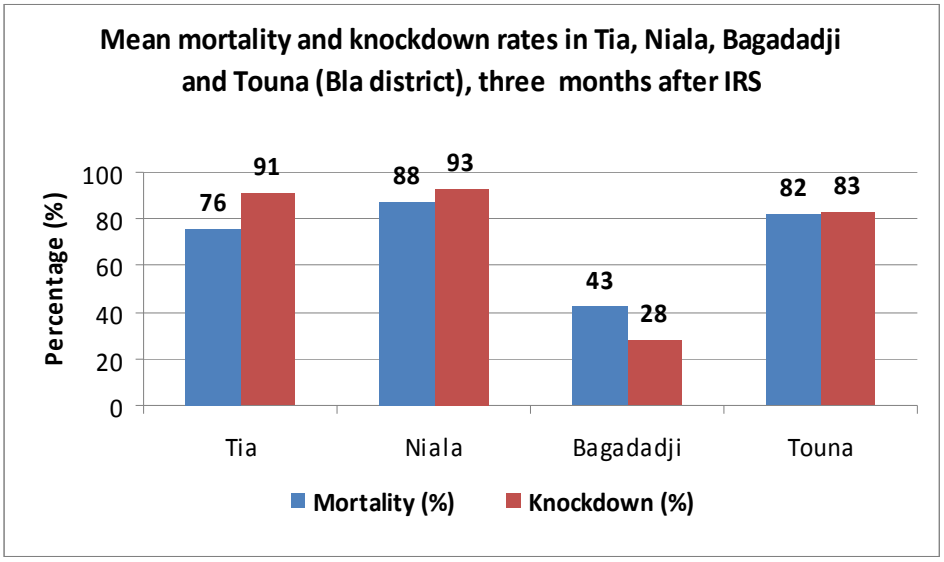
A list of WHO-approved insecticides for IRS includes several insecticides in four classes that offer good options for pesticide rotation strategies designed to limit the development of resistance in mosquito populations. Based upon MRTC's insecticide resistance tests conducted using *Anopheles gambiae* collected in Bla and Koulikoro during 2007, the NMCP and its in-country implementing partners chose the pyrethroid insecticide, lambda-cyhalothrin (30 mg/m2), as the insecticide of choice for 2008 and 2009. Deltamethrin, another pyrethroid insecticide, was chosen for the 2010 spray round based upon previous susceptibility data and additional tests conducted in 2009. Resistance assays are conducted in the three IRS districts to inform selection of insecticide for future use.

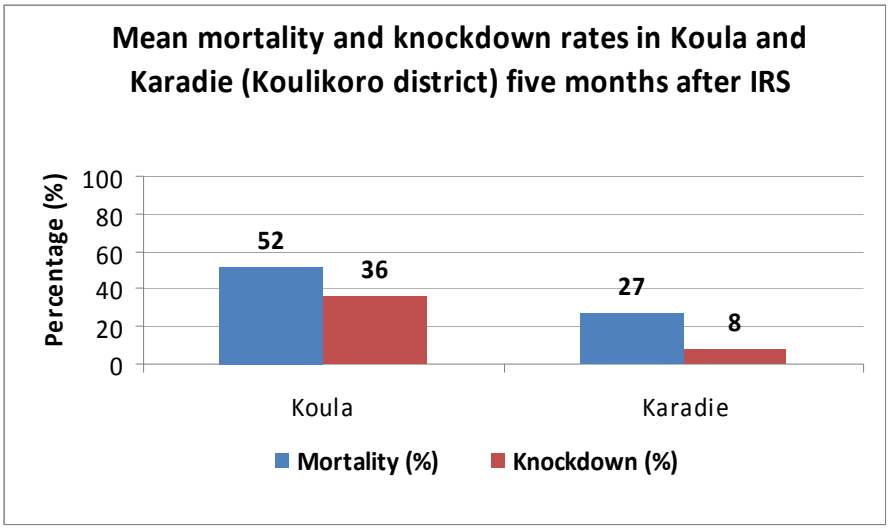
Progress during last 12 months:

In 2008, PMI funds supported Mali's first large-scale IRS campaign in the districts (*cercles)* of Bla and Koulikoro, with continuing support of both districts in 2009 and 2010. PMI has proposed to support an additional district (Baraoueli) in 2011. Entomological baseline data are being collected in Baraoueli prior to 2011 IRS operations. PMI supported the training of spray trainers, supervisors and operators, the purchase of commodities and protective equipment, and communication, supervision, monitoring, and environmental compliance activities. Activities to promote IRS and mobilize the population around IRS have been carried out each year. About 445 supervisors and spray operators were trained for IRS operations and 1,848 community *relais* (1,221 in Bla and 627 in Koulikoro) received BCC/IEC training and materials to conduct informational group meetings and carry out door-to-door mobilization for IRS. In 2009, spray activities were conducted May and June in Bla and Koulikoro, where 126,922 houses were sprayed and over 497,122 residents protected. The IRS campaign for 2010 was conducted from mid-May to beginning of July and covered a total of 127,273 houses with 440,815 residents protected and coverage of 97% of targeted houses sprayed.

Entomologic monitoring of the IRS program determined the quality and duration of insecticidal activity remaining on walls during the malaria transmission season. Monitoring in Bla and Koulikoro districts began three weeks after the spray round was completed in July 2009 and included WHO cone bioassays, pyrethroid spray catches inside houses and indoor and outdoor human landing catches. Results of cone assays three weeks after IRS operations showed low vector mortality and knockdown rates in the range of 48-77% mortality and 53-71% knockdown. Only one village (Koula) showed adequate mortality and knockdown rates (99% and 95% respectively).

These results indicate sub-optimal insecticide activity on walls early on, and decreased activity levels 4-5 months later due to insecticide decay (see figures below). Such results highlight the importance of early testing of IRS-sprayed houses to inform IRS implementing partners when spray operations need corrective action to ensure adequate levels of coverage lasting the entire malaria transmission season.





The GOM wants an integrated vector control program. Two PMI-supported operational research projects have been implemented to inform vector control interventions. At the NMCP's request, PMI supported a larviciding project in a small subset of houses in Koulikoro District to determine if there is an added benefit to larviciding water sources surrounding sprayed houses. Field activities began in June 2009 and included three treated villages and three untreated villages within Koulikoro district. Most breeding sites identified and monitored were borrow pits (51%), and natural depressions such as ponds (30%) and tire

tracks (19%). The results indicated highly significant reductions in larval breeding activity in the three test villages after treatment compared to the three untreated villages. However, entomological parameters of adult *Anopheles* mosquitoes collected via pyrethroid spray catches and human landing catches varied widely by location, and unfortunately did not show clear reductions in adult mosquito densities, biting rates, infection rates, or EIRs in the treated compared to untreated villages. These results are being verified through additional field studies conducted in 2010, and when final results of both seasons are analyzed and reported, PMI and NMCP will be better informed as to the value of larviciding.

A second PMI-supported operational research project targets *An. gambiae s.l.* breeding in water-filled depressions along the Niger River during the dry season. Although *An. gambiae* is found year-round in the hamlets along the Niger River, it disappears during the dry season in larger villages a few kilometers inland. The "river" anophelines may be the primary source for the mosquito population that increases and migrates inland after the rains begin. By controlling mosquitoes during the dry season with IRS in hamlets along the river's edge, malaria transmission may be reduced in villages farther upland and away from the river. This project is studying the effects of dry season IRS in three treated hamlets and three untreated villages along the Niger River, with entomological monitoring throughout the rainy season from June to December 2010. Results to date have shown some reductions in *Anopheles* densities per house in two of the three IRS river hamlets (Dangassa-somonosso and Bozokin) but little difference in a third (Fourda). Similarly, *Anopheles* biting rates were reduced in Dangassa-somonosso but not in the other two IRS river hamlets. No reduction in *Anopheles* densities or biting rates was seen in inland villages, indicating that overall, IRS had limited success in river hamlets but no observable effect in larger inland villages as was originally hypothesized. The final results of both operational research projects will help the NMCP and PMI choose the best combination of strategies for the control of malaria vectors.

Proposed FY2011 activities: ($5,342,000)

IRS: ($4,860,000) PMI will continue to support IRS covering 180,000 households in Bla, Koulikoro and Baraoueli districts in 2011 by procuring insecticide and equipment and covering expenses for trainers, spray teams and storage facilities. Other support to be provided will include training at the regional, district, and community levels, and joint supervision with the NMCP and the Division of Public Hygiene and Health (*Division d'Hygiène Publique et Salubrité, or* DHPS). Communications materials will be provided to inform beneficiaries, raise public awareness, promote behavior change (including environmental management and sanitation) and promote cooperation with the DHPS spray teams.

Technical assistance for entomology: ($12,000) A CDC entomologist will provide technical assistance on entomological monitoring activities to ensure quality control and the completion of operational research projects.

IRS capacity building for the NMCP: ($80,000) PMI will strengthen national and local capacity for IRS by training the new NMCP entomologist in conducting entomological monitoring related to IRS and insecticide resistance management activities. In addition, PMI will assist with the NMCP's IRS oversight committee to develop an IRS sustainability plan for

the MOH. The support will cover periodic IRS committee meetings to ensure partner coordination and effective monitoring and evaluation. PMI will support IRS quarterly coordination meetings and assist with the design and production of IRS planning, implementation and monitoring tools.

Entomological monitoring: ($190,000) To measure the impact of IRS on mosquito populations, PMI will continue to support ongoing insecticide efficacy and longevity studies in selected villages within the three IRS districts immediately after spraying in 2012. PMI FY2010 funding already covers monitoring activities through November 2011.

IEC/BCC messaging to community: ($20,000) PMI will support development of communication approaches and messaging to provide accurate understanding and behaviors related to IRS. Currently, there are several misconceptions around sprayed houses and presence of any mosquito populations. PMI will support the development of specific information around IRS by CNIECS, linking IRS to malaria prevention best practices, in line with the NMCP communication strategy. These efforts are not intended to replace house to house mobilization which allows rapid and efficient movement of household effects before, during, and after spraying each house.

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Integrated vector management (IVM) strategy implementation: ($150,000) After developing a strategic IVM national plan for IRS, ITNs and insecticide resistance management in 2011, PMI will support the plan's implementation and coordination at the national level, plus a focus on the three IRS districts.

Environmental Compliance Monitoring: ($30,000) PMI will continue to support environmental compliance monitoring for all IRS operation centers and locations where IRS insecticides and equipment are used and stored.

INTERVENTIONS: MALARIA IN PREGNANCY

Background:

Mali's malaria in pregnancy (MIP) strategy applies WHO's three-pronged approach: providing two doses of intermittent preventive therapy for pregnancy (IPTp) with sulfaxdoxine-pyrimethamine (SP), promoting the use of LLINs distributed free at the first ANC visit, and effective case management of suspected malarial illnesses. Utilization of ANC services by pregnant women is relatively high; according to the 2006 DHS, 72% of pregnant women made at least one ANC visit and 63% made two visits or more. However, ANC attendance usually occurs late with only 30% of pregnant women coming before the end of their first trimester of pregnancy. IPTp use is low as the 2006 DHS showed that only 4% received the recommended two doses of SP at ANC visits. The CNIECS (*Centre National d'Information Education et Communication pour la Santé*), which is tasked with creating IEC/BCC materials and strategies, is addressing barriers to increasing uptake of IPTp by improving providers' interpersonal communication skills and encouraging early ANC visits by pregnant women.

Another barrier to IPTp in Mali arises from pregnant women having to pay for SP for IPTp. In 2006, the MOH announced that IPTp would be provided free; but, some pregnant women continue to pay for SP as the policy has not been widely disseminated and has not been adopted within the Bamako Initiative cost recovery system. Women also report that they are still required to pay for all other medicines prescribed by clinicians and consultation fees remain prohibitively high. Advocacy for removal of consultation fees and adherence to the free SP policy has been ongoing at the central level.

Quantification of SP needs and available supplies, which include a PMI procurement of 1 million SP treatments in 2009, are enough to cover all pregnant women until 2012. However, a surplus of free SP at CSCOMs may encourage inappropriate use of SP as a first-line treatment of malaria when stock outs of ACTs occur, potentially resulting in SP shortages for IPTp. A health fee assessment survey to verify SP costs and an end-use quantification tool to identify if SP is available but not being used are currently underway to identify ways to respond to this problem.

Integration and coordination between the NMCP and the MOH's Reproductive Health Unit (RH) is critical in ensuring effective MIP programs and high IPTp coverage. Since 2006, the RH and the NMCP have developed a revised in-service training module for focused antenatal care (FANC) that included MIP and IPTp. The PMI has supported the RH, NMCP, and Midwives Association to expand use of this FANC in-service training module, which includes the diagnosis and treatment of malaria, IPTp and malaria in pregnancy and use of LLINs, as well as increase supportive supervision of IPTp implementation through facility and community outreach activities.

PMI implementing partners have helped produce technical guides for providers, IEC outreach materials for *relais*, and radio and TV campaigns on IPTp. Other PMI-supported partners have promoted the provision of free LLINs to pregnant women at their first ANC visit; in practice, LLINs are often not given until the third or fourth ANC visit. The partners have trained *relais* to promote key MIP messages, including IPTp and the availability of free SP and LLINs at ANC consultations.

Health facilities collect and report information quarterly through the national SLIS on the number of ANC visits (including early ANC visits), postnatal consultations, SP doses administered, and assisted deliveries by a skilled birth attendant. In 2007, the MOH released revised ANC visit cards that included IPTp and LLIN information.

Progress during last 12 months:

In 2009, PMI supported national-level policy dialogue and consensus building that included targeting religious and traditional leaders as well as elected officials to help advocate for the importance of malaria prevention during pregnancy. In response to late or missed ANC visits, PMI works with influential religious leaders to include messages from the Koran and Bible in their public addresses that emphasize the importance of ANC, risk of malaria in pregnancy, and overcoming cultural barriers to taking IPTp. These teachings also educate and promote

dialogue among couples about malaria in pregnancy and encourage husbands to accompany their wives on these visits, a common practice in other Muslim countries.

In April 2010, the MOH signed directives ensuring the free provision for SP for ITPp; updated treatment guidance to include oral quinine for the treatment of malaria in pregnant women in the first trimester, and approved ACTs for treatment in the second and third trimesters. PMI has supported in-service training and supervision to facilitate the implementation of these new guidelines.

PMI also supported a multi-channel IEC/BCC strategy targeting pregnant women, women of child bearing age, and men, focusing on knowledge and perceptions related to malaria in pregnancy, women's awareness of risks of malaria during pregnancy, early and frequent ANC attendance at the CSCOMs, early use of IPTp in the second trimester, completion of the recommended two treatments courses of IPTp, provision of a free LLIN at first ANC, and demand for proper treatment of malaria in pregnancy. PMI supported training health providers on interpersonal communication, an area cited by the MOH's CNIECS as a challenge. PMI also continued to support refresher training for *relais*, with a focus on men and key decision-makers in households. Malaria BCC/IEC activities were linked with HIV/AIDS messaging where appropriate.

PMI procured one million SP treatments, which together with UNICEF and Global Fund, will ensure sufficient SP to cover all pregnant women in Mali until 2012. However, some stockouts continue to be reported. An end-use quantification exercise is currently being conducted to assess the extent of SP stockouts and possible misuse of SP as first-line treatment for malaria in health facilities with ACT stockouts.

In 2009, PMI supported training of 142 health providers in the FANC in-service training module and expanded this training along with supportive supervision among facility staff at the CSREF and CSCOM levels. In addition, PMI supported refresher trainings and supervision of health workers to complete the IPTp portion of the new MOH health facility reporting form, and to use this information locally to improve IPTp quality and coverage. PMI also supported capacity building and improvement of supply chain management of SP within the *Pharmacie Populaire du Mali* [PPM] (People's Pharmacy of Mali).

Proposed FY2011 activities: ($965,000)

The projected annual need for SP in 2012 to maintain the NMCP objective of 80% coverage is about 1.56 million treatments, based on 5% of the population being pregnant women (780,000) and each woman receiving two doses. Global Fund Round 6 Phase 2 includes 2.4 million SP treatments for IPTp over the next three years (approximately 800,000 treatments per year). Therefore, in 2012, there will be a gap of approximately 760,000 treatments. PMI and UNICEF will procure SP to fill this gap. PMI will also support early and frequent attendance at ANCs, and work with the MOH and other donors to ensure SP is used correctly and provided free to pregnant women for IPTp. Through training of health providers and strengthening of the commodity system, PMI will continue to improve MIP and increase IPTp rates. PMI will also support engagement and mobilization of pregnant women and the

promotion of MIP/IPTp in the community through religious/traditional leaders, midwives, and coordinated and harmonized IEC/BCC activities.

SP Procurement: ($35,000) The current quantity of SP available is enough to cover all pregnant women until 2012 PMI will procure enough SP for half of the annual need of 700,000 pregnant women including handling and distribution costs, with the assumption that UNICEF will fund the remainder. This procurement will also include equipment for direct observed therapy, including cups and water containers.

Facility-level service provider training and supervision: ($430,000) PMI will continue to update supervision and training materials as necessary and assist in implementing the malaria in pregnancy guidelines. PMI will work to ensure that every cadre of health provider is providing appropriate services at ANC visits.

PMI will work with partners, including the MOH Reproductive Health Division and Midwives Association, to expand use of the new in-service FANC training module and increase supportive supervision during IPTp implementation nationally through facility and community outreach activities. The NMCP 2010 – 2014 master training plan targets 1,930 service providers for training. As part of its overall M&E plan, PMI will continue to support training and supervision of health workers to complete the IPTp portion of the new MOH health facility reporting form, and to use this information locally to improve IPTp quality and coverage.

MIP coordinator at the NMCP: ($50,000) PMI will also support the NMCP's efforts to coordinate IPTp strategic planning and supervisory activities with the Reproductive Health Directorate by assigning a MIP focal person to promote and coordinate these efforts.

Policy support for ANC and IPTp: ($150,000) Religious and traditional opinion leaders will continue to be engaged to accelerate the uptake of the IPTp policy and help encourage pregnant women to seek ANC services early in their pregnancies. PMI will help ensure that the national leadership understands the importance of IPTp and encourages adherence to policies such as the provision of free SP to pregnant women. PMI will support the development of advocacy materials, and a national consensus building workshop to help change provider behaviors to provide free SP to pregnant women.

BCC/IEC for ANC and IPTp: ($250,000) PMI will support a multi-channel strategy targeting pregnant women, women of child bearing age, and men, focusing on knowledge and perceptions related to malaria in pregnancy, women's awareness of risks of malaria during pregnancy, early and frequent ANC attendance at the CSCOMs, early use of IPTp in the second trimester, completion of the recommended two treatments courses of IPTp, ensure a LLINs are given free to pregnant women at their first ANC visit, and demand for proper treatment of malaria in pregnancy. PMI will continue to link BCC/IEC activities with HIV/AIDS messaging where appropriate.

Logistics strengthening: ($50,000) PMI will continue to support the *Pharmacie Populaire du Mali* (PPM) to strengthen the logistics system for SP and other malaria in pregnancy

commodities, along with those for ACTs and LLINs. This includes routine monitoring of supplies to avoid stock outs in some areas and overstocks in others.

INTERVENTIONS –CASE MANAGEMENT

Background:

Diagnostics: Malaria diagnosis in most MOH facilities is based on clinical criteria and fewer than 10% of suspected cases of malaria are laboratory confirmed. This is due in part to the lack of laboratory supplies as well as the user fees patients are charged. Microscopic diagnosis is performed in four national, six regional and 59 district hospitals at a cost of 300-600 FCFA ($0.75-1.50) per blood smear. It is worth noting that some privately run CSCOMs staffed with physicians and/or lab technicians also perform malaria microscopy. According to national policy, every malaria case should be laboratory confirmed before administering ACTs; where microscopy is not available, rapid diagnostic tests (RDTs) should be used to confirm the diagnosis. The *Institut National de Recherche en Santé Publique* (INRSP) is responsible for quality control of all diagnostic services, including malaria diagnostics. The INRSP is currently developing a comprehensive strategy for quality control of malaria microscopy and RDTs (Paracheck) with technical assistance from PMI.

Case management: The MOH recently revised the national policy for the treatment of uncomplicated malaria to make artemether-lumefantrine (AL) is the first-line drug. As per national directive, ACTs are free to children under five years. Two regimens are recommended for severe malaria: quinine or injectable artemether. PMI is supporting pilot projects of pre-referral drugs, including injectable artemether and rectal artesunate.

Poor geographic and economic access to care is the overwhelming challenge for malaria treatment in Mali. With approximately 993 CSCOMs in Mali, about 88% of the population has geographic access to public health services according to WHO standards (living within 15 km of a first-line health facility), but according to the 2006 DHS, only 31% of children less than five years of age with fever received any antimalarial, and only 15% were treated within 24 hours.

Quantification of ACT needs: Quantification of ACT needs for 2007-2009 was based upon 2005 health facility usage data that suggested that approximately 29% of patients with fever seek treatment at public-sector health facilities. The Global Fund Round 6 grant covered most national needs for public sector ACTs in 2009. In 2010, Global Fund Round 6 Phase 2 funds are supporting procurement of 1,300,872 AL treatments. PMI is supporting a limited quantity of AL for CCM and for treating severe malaria, and will contribute to a national buffer stock of ACTs.

Assumptions were made that with increasing availability of ACTs, health facility usage would increase annually by 5-10%. In 2009, 1,633,423 cases of suspected malaria were reported from health facilities. This represents 0.1 cases per person per year, which reflects poor utilization of health services due to access or other problems. Global Fund Round 6 has

committed $4.3 million for financing ACTs in Mali from 2007-2009. Global Fund Round 6 Phase 2 has been approved but not signed and will procure 1,762,641 ACTs from 2010 - 2012. The table below presents estimates of ACT needs for 2011-2012.

Age Group	ACT estimated need for 2011 for health facilities	Planned ACTs from Global Fund for 2011	Gap in treatment courses for 2011	ACT estimated need for 2012 for health facilities	Planned ACTs from Global Fund 2012	Gap in treatment courses for 2012
0-5 years	724,312	313,263	411,049	567,489	265,330	302,159
6-13 years	376,857	249,638	127,219	735,778	236,432	499,346
>13 years	719,853	435,480	284,373	930,721	389,550	541,171
Totals	1,827,022	998,381	822,641	2,233,988	819,312	1,342,676

Global Fund financing may provide enough ACTs to cover current needs at MOH facilities, but these projections are based upon the number of cases presenting to health facilities, which is less than 20% of all malaria cases. The effect of the ministerial decree that malaria treatment will be free for all children less than five years is unknown and current projections have not accounted for possible increased ACT needs following implementation of this new policy. In order to attain 85% coverage of febrile children with ACTs, scaling up of community-based treatment will be essential. The ACT distribution system will also need to be supported to meet the increased demands of community-based distribution.

Community treatment of malaria: A few NGOs and UNICEF are operating small-scale projects at the district level to overcome barriers of access by training ASCs to treat children under five with free ACTs. NGO partners have developed their own models for utilizing the ASCs. Save the Children has expanded a community-based treatment program to over 470 villages in three health districts reaching approximately 17,000 children over a two-year period. The NMCP has reviewed the Save the Children pilot project and has agreed to expand that project to all 5 districts in Sikasso Region. CCM is part of an integrated community case management package adopted in February 2010 as a national policy. Through funding from Canadian CIDA, PSI will begin implementation of CCM in two regions in 2010. UNICEF, on the other hand, has supported *relais* to deliver health messages and to encourage parents to bring ill children to health facilities, but not to deliver antimalarial treatment.

Supply chain management: The *Pharmacie Populaire du Mali* (PPM) manages medicines for Mali's primary health care system. The PPM procures drugs through international tender from qualified suppliers and distributes them to the nine administrative regions. The PPM has no capacity to ensure reliable transportation of commodities to the district, health center or community. The district pharmacies purchase drugs from regional depots based upon monthly

orders from health facilities (CSREFs and CSCOMs) and the average number of drugs expected to be distributed within the district's catchment area. If a drug is unavailable in the regional PPM stores, private pharmaceutical warehouses can fill orders. There are significant problems with drug storage at district pharmaceutical depots regarding storage capacity, humidity, security and drug classification in the warehouse. While CSCOMs must collect all required drugs from the district pharmaceutical depots, there is no central funding to support the transportation and logistics.

Regulation and drug quality: Several Ministerial decrees target the management of pharmaceuticals in Mali. These include the formation of a national committee to oversee pharmacy retailers responsible for quality control, inspection, licensure and ensuring a basic package of pharmaceutical products. The National Essential Drug List is reviewed bi-annually. Laws are in place to ensure quality control for imported drugs. The *Direction de la Pharmacie et du Médicament* (DPM) issues visas and import licenses only after the exporter meets certification and other requirements. The *Laboratoire National de la Santé* (LNS) samples drugs and verifies quality, and has regulatory authority to monitor pre- and post-market quality of drugs and other products (including insecticides and bednets).

Pharmacovigilance: Pharmacovigilance is a high priority of the NMCP and the MOH. Following training in Morocco, the Pharmacovigilance Department at the DPM has developed an action plan, adverse events notification form, and timetable. The plan has been implemented and trainings on adverse events notification and reporting have been conducted up to district level in all the regions except for Kidal region. Adverse events reporting forms have been distributed nationally at all public health facilities but pharmacovigilance reporting is not complete and requires strengthening through supervisory visits.

<u>Progress during last 12 months</u>:

Major achievements have occurred in the last 12 months in case management policies, include adoption of :

- AL as first line drug for uncomplicated malaria (instead of two different regimens)
- CCM policy with the treatment of malaria, diarrhea and pneumonia at the community level by trained ASC
- ACTs for treatment of pregnant women with uncomplicated malaria in the second and third trimesters
- Oral quinine for treatment of pregnant women in the first trimester without signs of severe disease
- Rectal artesunate or IM artemether for pre-referral treatment of severe malaria

The following issues remain to be solved for improved case management:

- Clarification of guidelines on when to refer severe malaria cases
- Inclusion of dosing and administration information for IV artesunate in national treatment guidelines (currently listed as acceptable alternative)

To date, some progress has been made on these issues and PMI has supported the introduction of small-scale regional efforts (e.g. CCM and use of drugs for treatment of severe malaria).

Training manuals for malaria case management and laboratory diagnosis have been developed and officially adopted. A master training plan on malaria case management and laboratory diagnosis (microscopy and RDTs) has been developed and training conducted up to the district level. Cascade training in case management at CSCOM level is completed in most of endemic regions with the support from PMI and is continuing in the rest of the country. This training will continue at the community level with the adoption of CCM policy.

An on-going challenge in case management will be to support of high quality clinical and diagnostic services at all levels. PMI will support strengthening of formative supervision at all levels of the health systems. Though the MOH has officially adopted CCM, mobilizing the resources to support implementation at large scale will remain the primary challenge in case management.

Pre-referral treatment for severe malaria (rectal artesunate or IM artemether) was introduced in two districts in 2009 and will be evaluated in 2010 prior to expanding nationwide. PMI trained 64 MOH staff in drug and laboratory quality control at the National Health Laboratory (LNS – *Laboratoire National de Santé*) and in appropriate use of WHO's Model System for Computer-assisted Drug Registration SIAMED software for drug registration and drug import verification. During that training session, a drug quality control plan and a pharmacovigilance plan were developed for nationwide implementation. The Directorate of Pharmacy and Drug with support from PMI, provided training to health providers at all levels on the notification and reporting of adverse drug events with an emphasis on ACTs.

Small scale stock outs of ACTs and SP continue, resulting from inadequate distribution planning. A PMI-supported logistic assessment was conducted in May 2009 and repeated in April 2010 focusing on supply chain, storage capacity, and data quality. The April 2010 assessment found that the PPM has 5-10 months of stock AS-AQ for older children and adults and over 400,000 bottles of AL syrup. An unknown quantity of artesunate + SP was donated by the Chinese, but the NMCP and PPM have not determined how to disperse these medications.

PMI has also supported a health fee assessment to assess financial barriers to health care services. In the Bamako Initiative cost recovery system, the CSCOM must recuperate costs through charging patients fees for services and drugs. However, certain drugs and services are free according to national policy (i.e. SP for IPTp and ACTs for children less than five). Anecdotal reports reveal that drugs and services that should be free according to national policies continue to be sold in some health facilities. Data from the health fee assessment will be used to guide programmatic decisions related to financial barriers that are preventing pregnant women and children from receiving health care services and effective drugs.

<u>Proposed FY2011 activities</u>: ($6,467,500)

PMI will contribute to filling annual needs/gaps in essential malaria commodities including ACTs, RDTs and severe malaria drugs. PMI will continue to support the improvement of malaria diagnosis by microscopy and RDTs through training and supervision as well as the development of a national system of quality control for microscopy and RDTs. PMI will also

support the scale up of the national policy of the integrated CCM approach including the training of a new cadre of community health workers (ASC) and continued support for the community *relais* to carry out BCC/IEC activities. Specific activities to be funded in FY2011 include:

Procurement of RDTs: ($766,500)
PMI will procure one million RDTs to cover the gap from the Global Fund Round 6 Phase II for CSCOMs nationwide to promote laboratory confirmation of all malaria cases diagnosed at health facilities.

Procurement of laboratory equipment and consumables: ($300,000)
PMI will procure laboratory equipment and consumables to support microscopy testing in all 59 district and 6 regional hospitals. This amount translates to $384/hospital /month for 12 months.

Quality assurance/quality control for diagnostics: ($200,000) In addition to in-service training, PMI will support the NMCP and INRSP to implement a plan for quality assurance and control of microscopy and RDT diagnosis, including regular supervisory visits, systematic review of a predetermined percentage of positive and negative blood smears, and simultaneous use of both tests in a percentage of cases to monitor the quality of RDT diagnosis. The plan will also include QA/QC for the nationwide scale-up for RDT diagnosis. Technical assistance from CDC Atlanta will be provided to the INRSP and NMCP to support QA/QC activities.

Technical assistance on diagnostics: ($24,000) CDC laboratorian and medical epidemiologist will provide technical assistance to develop and refine a quality assurance/quality control plan throughout the health system down to the community level, and recommend best practices for the plan's implementation.

Procurement of ACTs and severe malaria drugs: ($800,000) PMI will procure 500,000 AL treatments to fill gaps with Global Fund Round 6 Phase 2 ACT procurements as well as supporting scale up of community-based ACT distribution, and to ensure adequate coverage of children less than five years of age in accordance with the free treatment policy. PMI will also continue to procure pre-referral drugs for managing severe malaria, including injectable artemether, rectal artesunate, and oral quinine.

Supervision for malaria case management and lab diagnostics: ($300,000)
After training health personnel at all levels in case management and laboratory diagnostics, PMI will continue to support the NMCP capacity to conduct quarterly supervisory visits in order to maintain and strengthen the quality of services at multiple levels of the health delivery system. Refresher courses will also be conducted as needed at selected health centers where problems are identified.

Technical assistance on case management: ($12,000) A CDC medical epidemiologist will provide technical assistance in improving case management throughout the health system including the implementation of new CCM guidelines.

CCM implementation and scale up: ($2,500,000) A CCM policy has been adopted and PMI will support implementation of new community case management training and supervision activities in 3 out of 6 regions building upon the success of the Sikasso region pilot. This includes continued support to the malaria/fever component of the CCM package, including original and refresher trainings at district levels, supportive supervision, training in appropriate RDT use, evaluating ASC performance with RDTs, monitoring activities, and provision of ASC materials and supplies. PMI will support ASCs to provide appropriate health communications and BCC messages to encourage understanding and adherence to the most current treatment algorithms. The PMI will continue to support the NMCP to coordinate all community health implementing partners to ensure that community health materials (e.g. training modules, job aids, motivation/incentive packages, per diem rates, supervision protocols, and key messages) are reviewed and standardized across partners.

Procurement of complementary drugs for integrated community case management: ($207,000) In the context of GHI, PMI will procure complementary drugs, such as amoxicillin, for treatment of respiratory infections, vitamin A for micronutrient supplementation, and ORS and zinc to support treatment of diarrheal diseases within integrated community case management.

BCC/IEC for case management: ($470,000) PMI will continue to support the dissemination of IEC/BCC messages related to case management of malaria through mass media and interpersonal communication and to harmonize malaria prevention and treatment messages. The strategy will promote care-seeking for febrile children and compliance with treatment regimens. PMI will also support training on treatment of malaria with ACTs at the facility and community levels, and training in ACT compliance monitoring by ASCs. The ASCs and *relais* will also educate care givers on signs of severe malaria that require referral.

Logistics strengthening: ($358,000**)** PMI will continue to facilitate distribution of PMI-funded ACTs and provide technical assistance for pharmaceutical management, including distribution at central, district, and community levels and improved coordination between the NMCP and PPM. Pharmaceutical and supply chain strengthening activities will also include end-use verification/monitoring of the availability of key antimalarial commodities at the facility and community levels. This will entail regular supervisory/monitoring visits to a random sample of health facilities, community health workers, and regional warehouses to detect and trigger further action on the following critical areas: ACT (or other drug) stockouts; expiration dates of ACTs at health facilities; leakage; anomalies in ACT use; and verifying assumptions on quantification and consumption.

Drug quality control: ($390,000) PMI will continue to support ACTs, RDTs, SP, and other malarial drugs upon arrival in country (including drug donations that do not comply with national treatment policies) and post-market drug quality monitoring by the LNS with equipment and technical assistance. Technical assistance to the LNS will also examine quality of insecticides, LLINs, and RDTs. Regarding drug quality, the challenges in Mali are great. Mali just completed the first extensive study of antimalarials quality. The scope of such monitoring of these medicines should be extended and strengthened. This will require follow-up training of the staff in the field, training of the lab staff to conduct confirmatory testing

appropriately, and equip the laboratories. There is still a great deal of technical assistance needed for strengthening the quality system of the National Reference Laboratory. Also, Mali is part of NAMCOL (Network of African Medicine Control Laboratories). The National Reference Laboratory will participate in two proficiency testing, lab training, and annual meeting.

Pharmacovigilance: ($140,000) PMI will continue to support the implementation of a pharmacovigilance plan through the DPM. The pharmacovigilance plan will specifically address adverse events reporting during the widespread implementation of ACTs. Pharmacovigilance system in Mali is still in its early stages. Mali is currently an associate member of WHO's Drug Monitoring Program. The objective is to bring the pharmacovigilance system to full functionality and the pharmacovigilance center become full member of WHO program. This will require sensitization campaigns, training of health workers on reporting adverse effects, and subscription to Vigiflow to report to WHO monitoring center in Uppsala, Sweden.

EPIDEMIC SURVEILLANCE AND RESPONSE

Background:

An estimated 1.3 million people in the northern areas of Mali are considered at risk for malaria epidemics. This includes the 13 districts of the Tombouctou, Gao and Kidal Regions and the northernmost districts of Mopti, Segou and Koulikoro, and Kayes Regions. The periodicity of epidemics generally ranges from two to seven years with the most recent epidemic having occurred in 2003. The northern Sahelian region is subject to irregular rainfall amounts, and climatic conditions such as increased rainfall and temperatures appear to play a significant role in the occurrence of epidemics. However, there are no recent data in terms of parasitemia or laboratory-confirmed cases to provide insight into the epidemic nature of northern Mali.

Past NMCP strategic plans as well as the 2011-2015 strategic plan include the goal of implementing a system for surveillance, prevention, detection and response to malaria epidemics. The objectives are to detect 80% of the episodes in the two weeks following their appearance and to control 80% of episodes within two weeks of their detection. In the proposed budget for 2007-2011, $1.75 million was suggested for epidemic control, but no budget for such activities was included in the National Plan for Accelerated Malaria Control, or in the Global Fund Round 6 budget.

The SLIS, managed by the DPLM, compiles data on reported malaria cases every three months for the whole country and reports it annually; thus data are not collected frequently enough for timely epidemic detection and response. The WHO-supported Integrated Disease Surveillance and Response system (IDSR), implemented in 2003, collects weekly data on diseases with potential for epidemics. Suspected cases of malaria in this system is limited to the three northern regions and is collected as follows: the CSCOMs report the previous week’s data to the CSREFs where they are combined and reported to the Regional and then the National level

to the DNS, DPLM and WHO. In the IDSR system, an epidemic is declared when the number of cases doubles from one week to the next and remains at that level during the third week.

Progress during the last 12 months:

PMI has procured ACTs and IRS supplies to be stored at the regional and district hospitals in Tombouctou and Gao. PMI also supported the NMCP strategy of effective and efficient stock rotation of commodities, while providing other contingency support in the case of stock-outs with replacement and rotation of current supplies of ACTs and IRS commodities positioned in 2009 for epidemic surveillance and response in the North before they expire. Current supplies will be utilized for IRS activities in Bla and Koulikoro and ACTs will be used in malaria endemic areas to avoid expiration.

Proposed activities (listed under M&E):

In 2011 PMI will rotate supplies of ACTs and IRS commodities pre-positioned in 2010 for epidemic surveillance and response in the North. Current supplies will be utilized for IRS activities in Bla, Koulikoro, and Baroueli and ACTs will be used in malaria endemic areas to avoid expiration. Training needs for IRS will be assessed in collaboration with the NMCP.

During FY2011, PMI plans to support the WHO-supported IDSR system in the northern regions to improve surveillance and ensure that all malaria cases are laboratory confirmed. For this purpose, PMI will provide training to the heath care providers in those regions on microscopy or RDT use, timely reporting, data quality, and analysis, and case management. Periodic supervisory visits will verify that the RDTs are performing adequately, data is being reported in a timely fashion, and case management is appropriate in the 13 IDSR health facilities. This activity is separate from the laboratory diagnostic strengthening and funding will not support epidemic response.

Strengthening epidemic surveillance and response: (Costs included in the M&E section) Current malaria prevalence and transmission dynamics in Mali's three northern regions and other epidemic-prone districts are unclear. PMI will strengthen the NMCP's capacity to conduct ESR in these areas including strengthened surveillance and discussions on appropriate epidemic responses. A rapid assessment post-rainy season in select population centers will inform future decisions on provision of IPTp, RDTs, ACTs and LLINs in these areas. Also, PMI will support the MOH to strengthen the WHO-supported weekly IDSR system, to make sure that only confirmed cases of malaria are reported through this system.

CAPACITY BUILDING AND HEALTH SYSTEMS STRENGTHENING

Background:

The MOH reports a critical staff shortage of staff at all levels of the public health system, especially for service provision below the national-level. In addition, health workers are not distributed evenly nor proportionately throughout the country. Regional directors oversee health teams that implement integrated health interventions; currently all regional teams have

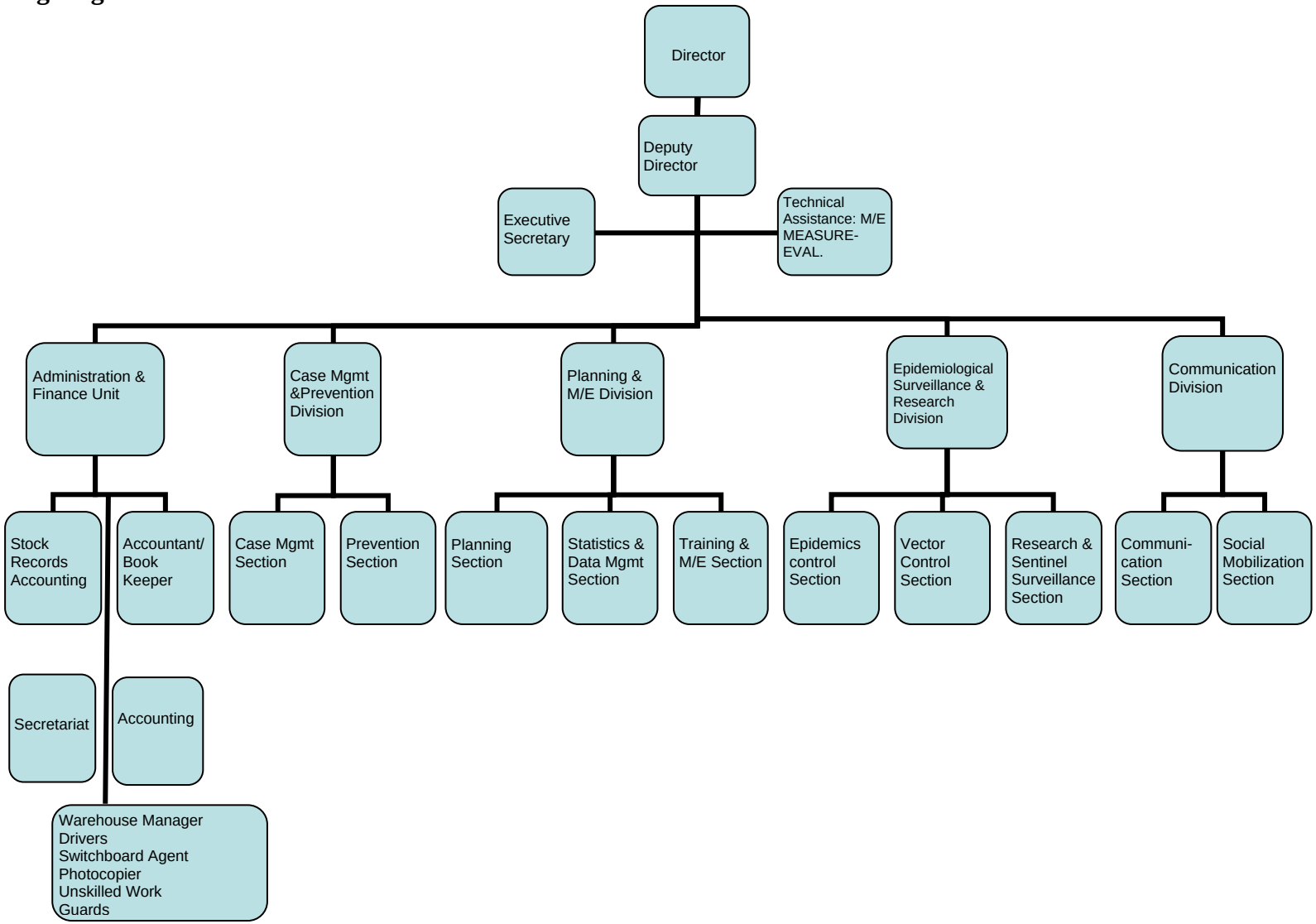
malaria focal persons. The district health center (CSREF) is the first referral structure for CSCOMs; the district health team is headed by a medical chief responsible for technical supervision of CSCOMs. Community health associations manage CSCOM staff and operations; collect proceeds from drug sales, consultation and user fees, and pay salaries and other expenses.

Entomological capacity is fairly strong both within the MOH and at research institutes such as the University of Bamako's Medical School and MRTC. In 2009, the NMCP recruited a full time entomologist. The NIH-supported MRTC has over 50 malaria experts including laboratory scientists, epidemiologists and entomologists. It has ongoing collaborations with the NIH, University of California (at Los Angeles and Davis), Johns Hopkins University, Tulane University, Gates Foundation, and the WHO Africa Regional Office.

The quality, completeness and frequency of malaria-specific supervision are starting to improve thanks to joint efforts of PMI implementing partners and MOH divisions involved in malaria control. In FY2008 and FY2009, PMI funded efforts to strengthen malaria-focused supportive supervision, including direct funding to the NMCP plus technical assistance through PMI's implementing partners. However, there continues to be limited funding for supervision visits below the district level. Support for monitoring comes through the PRODESS using HIPC or donor funding. District-level teams carry out integrated supervision for all health interventions at CSCOMs, using a supervision guide. National and regional teams perform malaria specific supervision irregularly. Following the end of GF Round 6 Phase 1 funding in November 2009 and a prolonged period of negotiation of the second phase, the strengthening of NMCP supervision supported with GF money slowed down.

In March 2008, the Ministry of Health took an important step towards creating a strong, sustainable framework for capacity in malaria control by raising the NMCP to the national directorate level, and creating a new management structure. Challenges for the NMCP include ensuring effective coordination among malaria partners, beginning at the central level, and training new staff who lack skills in malaria control. In addition, The NMCP occupies a small, dilapidated two story house, without enough space for its 50 employees and poor electricity and internet facilities.

Organogram of the NCMP



Progress during the last 12 months:

Since FY2008, PMI has contributed substantially to building capacity of the NMCP and other GOM entities (including MRTC and the Ministry of Social Development) through direct funding of specific activities. PMI provided this direct funding based on demonstrated capacity to manage US Government funds appropriately. Combined annual funding of over $1.2 million was given to specific departments in the MOH for implementing targeted activities, supervision and monitoring of PMI-supported interventions.

Malian Government Entity	Activity Supported
Malaria Control Program (NMCP)	Supervise LLIN distribution, train and supervise health workers on case management, and disseminate the malaria monitoring and evaluation plan; Collaborate with PPM and DPM in forecasting and managing distribution of malaria commodities.
Division of Reproductive Health	Train and supervise health workers on IPTp, and evaluate LLIN distribution and IPTp practices in antenatal clinics, support collaborative MIP approaches with the Mali Midwives Association
National Immunization Program (EPI)	Work with the NMCP to estimate LLIN needs for infants and supervise LLIN distribution during routine vaccination services
Directorate of Pharmacy and Medicines	Train and supervise health agents who prescribe ACTs at all levels to recognize and notify about adverse events
National Pharmacy (PPM)	Assess practices, inform key partners about proper ACT and other malaria commodities procurement and distribution, and conduct supervision in their capacity as Central Medical Store.
Malaria Research and Training Center (MRTC)	Conduct operational research on larviciding during the rainy season and IRS near the Niger River, and support entomological monitoring and surveillance activities in IRS districts
National Health Laboratory (LNS)	Train pharmacists and laboratory technicians on quality control for LLINs and malaria medicines, refurbish equipment and purchase consumables
National Institute of Public Health Research (INRSP)	Train CSREF laboratory technicians and regional pharmacists on malaria

Malian Government Entity	Activity Supported
	diagnostics; Establish and oversee implementation of malaria diagnostics QA/QC
Directorate of Social Development	Train social development agents at the national and regional levels on malaria communications strategies, train school teachers and pupils on malaria prevention.

In 2010 with FY2009 funding, PMI is supporting a study tour of the NMCP staff to Rwanda with the goal of learning about the national malaria control program's coordination approaches around implementation of policies and guidelines, staff roles and responsibilities, and approaches to address different technical and operational challenges. The NMCP selected Rwanda with the objective of observing what it takes to succeed with issues such as universal coverage with LLINs, home-based case management, implementation challenges for IRS, policy changes and implementation, and partner coordination.

In addition, PMI is following up on findings from a study on the feasibility of free case management of malaria in Senegal, and free case management of illnesses for under five children in Mali. This study analyzed costs implications and possible consequences of their removal for case management consultations, diagnosis, and drugs. The recommendations from these studies will provide an important framework for PMI and partners to help solve the critical issue of income shortage and its implications for the lowest service delivery level.

Finally, the NMCP is exploring alternative office space to resolve their poor working environment. PMI will consider support with other partners once the needs are clearly identified.

Proposed FY2011 activities: (costs covered in other sections)

Strengthening NMCP functions: To help the NMCP reach its coverage targets for key malaria interventions, PMI will continue collaboration with other partners to support the new NMCP structure and staff, to increase capacity at all levels to plan, implement, supervise, coordinate with partners, and monitor and evaluate malaria prevention and control activities. Strengthening NMCP managerial capacity will be critical as PMI supports scale-up of all interventions. Therefore, PMI will continue implementing the recommendations of the SLIS assessment in relation to information technology, M&E, supervision, management capacity and coordination, as well as specific training.

Direct support to the NMCP and other government partners: Support will continue in FY2011 for assisting the NMCP and other government partners to design or refine supervision and M&E tools, and conduct supportive supervision in all malaria program interventions supported by PMI. Activities are described in the various subsections of

the MOP. In FY2011, PMI will continue training and mentoring NMCP staff to increase their skills in data analysis, interpretation and reporting of findings both from routine supervision and other data sources such as large household and health facility surveys. Starting with FY2011, PMI will support district-level quarterly meetings for malaria data analysis and compilation for program decision making. Scopes of work for implementing partners will include provision, whenever feasible, for collaborating with NMCP in building staff managerial and technical capacity.

Advocacy for adequate staffing levels: At the community-level, PMI will continue to assist the MOH to explore options to increase the number of adequately staffed and functioning CSCOMs, and identify ways to reallocate responsibilities, giving ASCs certain carefully-selected clinical responsibilities that CSCOMs must currently handle on their own. As one approach, PMI will continue to advocate for HIPC and other funding sources to complement salary support generated by communities. Joining efforts with other partners, PMI will help expand the skills and numbers of community-based health workers to mobilize populations for proper use of LLINs, prompt care seeking, and referral to health facilities for appropriate care. In particular, PMI will continue to advocate for effective scaling up of CCM of febrile childhood illnesses and the expansion of ASC service to all malaria endemic regions. FY2011 PMI resources will support provision of essential care in the community starting with malaria case management in three of the six malaria endemic regions.

INTEGRATION WITH OTHER GLOBAL HEALTH INITIATIVE PROGRAMS

PMI is committed to support integration of activities from the planning to implementation stages at all levels of the health system. The Global Health Initiative (GHI) offers the opportunity to amplify this commitment by providing funding and technical resources to maximize the impact of USG health interventions. Mali was named a GHI-plus country in June 2010. GHI Plus countries will receive additional technical and management resources to quickly implement GHI's approach, including integrated programs and investments across the spectrum of infectious diseases, maternal and child health, family planning, and health systems activities. GHI Plus countries will provide enhanced opportunities to build upon existing public health programs; improve program performance; and work in close collaboration with partner governments, across USG agencies, and with global partners. With Mali selected as a GHI-Plus country, PMI has an even greater opportunity to continue or expand integration to benefit both malaria control and other USG-supported health activities. Examples of integration in on-going and planned initiatives supported by PMI include:

- *Implementing a woman- and girl-centered approach:* Pregnant women are one of the two most vulnerable groups to the effects of malaria infection. PMI will accelerate its support of communications strategies to encourage early and frequent ANC attendance and provision of free SP to pregnant women to increase IPTp coverage. Midwives and female community *relais* will be targeted for training on malaria in pregnancy.

- *Increasing impact and efficiency through strategic coordination and integration:* In HIV/AIDS, PMI will continue to provide LLINs for distribution to people living with HIV/AIDS in antiretroviral therapy sites and to their immediate family members. In addition, pregnant women with HIV who are not receiving daily prophylaxis with cotrimoxazole will receive SP funded by PMI. In FY 2011, PMI will explore more opportunities to incorporate malaria into HIV/AIDS laboratory training. Another promising area for integration is with Neglected Tropical Diseases (NTDs), given that Mali is endemic for all five targeted NTDs (lymphatic filariasis, onchocerciasis, schistosomiasis, trachoma and soil-transmitted helminthes). PMI will continue to explore joint coordination of LLIN distribution and community case management with NTD mass drug administration, and integrated health education activities provided by the *relais*.

- *Strengthening and leveraging key partnerships, multilateral organizations, and private contributions:* PMI will play a key facilitation role with partners such as the World Bank in identifying and resolving funding gaps for a national LLIN mass distribution campaign. With an on-going interest to scale-up to universal coverage, PMI will continue to leverage additional support from partners that will be critical in FY 2011. PMI has also supported development and writing of the Round 10 Global Fund application.

- *Encouraging country ownership and investing in country-led plans:* As a general principle, PMI funds national malaria control strategies and plans. PMI is supporting the sub-national level roll-out of the CNIEC's national communication strategy, which includes an important malaria component. In addition, PMI will support an innovative NMCP initiative to conduct monthly health data review meetings at the district level, to review data on confirmed malaria cases and availability of malaria commodities. This will greatly improve routine reporting and help improve services at the district and CSCOM levels.

COMMUNICATION/COORDINATION

Coordination with Other Partners

Background:

The NMCP was established in 1993 and, until July 2007, remained under the oversight of the Disease Control Division of the National Health Directorate (DNS). In July 2007, the GOM made a decision to elevate the NMCP to a Directorate level in the MOH organizational chart; the NMCP Directorate was officially established in April 2008. The MOH, through the NMCP Directorate, guides and coordinates all malaria control activities. The NMCP director supervises one administrative and four technical divisions, and reports directly to the Secretary General of Health. Due to this higher profile in the MOH, the NMCP can now participate in and influence decision making about malaria control more effectively, including development of MOH work plans and budgets.

The NMCP establishes strategies for all malaria interventions, coordinates research, proposes policies, norms and guidelines, and develops and oversees implementation of partner work plans. The NMCP also supports decentralized regional and district health teams through training and supervision.

The NMCP cites its capacity to coordinate partner and donor efforts as its biggest challenge, given the increased number of partners interested in malaria control. The NMCP seeks better mechanisms for ensuring that partners share information on the timing and nature of key activities.

Malaria control is part of the bigger national sector-wide approach, supported by the Financial and Technical Partner's Forum. A strategic plan for the health sector wide approach known as the Ten Year Plan for Social and Health Development, is operationalized through a five-year health development program (PRODESS). The Financial Partner's Forum meets monthly to share information on ongoing programs, new initiatives, strategies, and policies, to coordinate interventions, and to help leverage resources.

In relation with Global Fund support to Mali, the Country Coordinating Mechanism has 25 members including nine from the public sector, nine from civil society and private sector including people affected by the diseases, and six representatives from the donor community. The CCM holds quarterly meetings and can call extraordinary sessions as needed. The CCM chairperson and deputy chair are elected for a two-year term that can be extended only once. The CCM has oversight on all the three Global Fund target diseases: HIV/AIDS, tuberculosis, and malaria.

Communications among malaria control partners in Mali are coordinated through the NMCP partners meetings, through the Technical and Financial Partners' Forum, and through the Global Fund Country Coordinating Mechanism.

Progress during the last 12 months:

Starting in November 2009, the NMCP and partners began holding a monthly meeting to monitor the progress of the NMCP annual work plan. Given the lack of meeting facilities in the NMCP, this important monthly meeting is housed by Mali Voices, a Bill &Melinda Gates Foundation Regional Initiative, covering five African countries including Mali.

The NMCP maintained its working relations with local and international NGOs, and with private sector players, mainly with the Associations of Employers (*Patronnat du Mali*), the Malian singers, the Chamber of Commerce, the Mining Companies, and LLIN vendors. Partnership with the Patronnat (an association of high-level business owners) and the Chamber of Commerce continued to benefit from active participation of Mali Voices Project, and translated into awareness raising and distribution of LLINs procured by employers, for their employees and their dependants.

Proposed FY2011 activities: (costs covered in other sections)

Support *Groupe Pivot* to build NGO capacity for post LLINs distribution follow up: PMI will provide financial and technical support to Groupe Pivot, the umbrella organization of NGO active in the Health Sector in Msali, to strengthen local NGOs operational capacity to be more effectively involved in post LLINs campaigns. Local NGOs will be enlisted to be active in bednets hang-up and keep-up and promotion of consistent bednet use.

Collaboration with private sector: Given Mali's net culture, USAID, in the past, supported collaboration with LLIN vendors through the former Netmark Project. PMI will maintain communication with LLINs private vendors and encourage their work targeting more affluent members of the general population. PMI will monitor activities from the private sector and support the working relations between GOM and the private sector.

Collaboration with mining companies: There are opportunities for PMI to support collaboration with mining companies in malaria control. Currently, companies in five mining areas (Karana, Morila, Loulo, Sadiola, Yatela) are implementing IRS in employee residences and neighboring villages, and new mining companies are starting business in Mali. Given the ambitious plan of the NMCP to expand IRS to more than 80% of the endemic south in the next five years, PMI will facilitate the dialogue between mining companies and NMCP.

BEHAVIOR CHANGE COMMUNICATION

Background:

PMI and other partners IEC/BCC activities are coordinated and led by the *Centre National d'Information, Education et Communication pour la Santé* (CNIECS). PMI has supported the CNIECS with a review and revision of the national malaria communication strategy. The strategy includes LLIN utilization for year round use, community mobilization for IRS, early uptake of ANC services including appropriate management of malaria in pregnancy, and promotion of prompt care seeking for fever, especially among children less than five. As policies are modified, it will be critical to ensure that target populations understand and seek appropriate services for malaria prevention and control. PMI is supporting the BCC/IEC strategy development at all levels, ensuring consistency of technical messages and appropriate use of all communication channels and target audiences.

Progress during last 12 months:

PMI has targeted BCC efforts to highly influential persons, such as religious leaders. A policy dialogue tool on malaria, pregnancy and Islam, developed with PMI support, has been used with the Islamic Network for Child Survival, the Islamic Network for

Population Development, and the National Union of Muslim Women. The tool is based on passages from the Koran that encourage dialogue among couples about malaria and pregnancy. Over 950 religious leaders have been engaged in policy dialogue sessions. In addition, PMI helped develop a data collection sheet used by religious leaders to gather information on current practices and beliefs.

PMI has also supported health workers as outreach service providers and developed a variety of pre-tested counseling materials and radio spots in local languages, as well as facilitated interpersonal communication through community groups. Through implementing partners, PMI supports work with nine local and faith-based NGOs that reach target populations through 143 community and national radio stations. PMI partners developed subcontracts with different radio stations and teachers' training centers that have trained over 8,800 Youth Ambassadors against Malaria (YAAM) and distributed over 9,000 brochures in schools. Over 60,000 youths in 55 schools were reached with messages (on leaflets, 55 banners) that they shared with peers and parents.

Proposed FY2010 activities: (costs referenced in other sections)

PMI will work at the national level to support the CNIECS to support BCC/IEC at all levels and ensure consistency in technical messages and appropriate targeting of audiences. PMI will work with other partners to explore ways to promote desired behavioral outcomes. PMI and partners will continue to include schools, NGOs, and religious leaders in targeted BCC/IEC activities and messages. Where appropriate, PMI will link BCC/IEC activities with HIV/AIDS.

Among the interventions, some key components include (each technical area is referenced in the appropriate section with related costs):

- **IRS:** *Relais* will go door-to-door to explain the importance of IRS, and improve compliance with instructions on how to prepare houses for spraying, and reduce refusal rates.

- **LLINs:** PMI will support national-level communications efforts, training of *relais* to reinforce correct and consistent LLIN use, including net repair and proper care, and possibly collect data on net use. PMI will support communication activities around the universal coverage campaign scheduled for early 2011 calendar year.

- **MIP:** *Relais* will provide outreach to encourage early and frequent ANC visits, and pregnant women to sleep under a LLIN. PMI will promote a multi-channel approach for MIP, including innovative strategies including packaging of SP with pictorial messages that indicate SP is free for pregnant women and that the packaged SP should be used for IPTp only.

- **Case Management:** *Relais* will sensitize communities and caretakers on changes that affect care seeking and prevention of malaria, such as prompt follow-up with

a referral for a child with severe malaria or a non-malaria related fever. Efforts will also be made to improve interpersonal communication among health providers and their clients.

MONITORING AND EVALUATION

Background:

The MOH's Planning and Statistical Unit oversees all monitoring and evaluation (M&E) activities, in close collaboration with health training and research institutions. As part of the reorganization of the NMCP, the GOM created the Division of Planning and Monitoring and Evaluation, which is tasked with developing operational plans and monitoring and evaluating program implementation. The Division of Epidemiological Surveillance and Research is in charge of promoting research on malaria, establishing an early warning system to detect and respond to malaria epidemics, and supporting operational units in epidemic response.

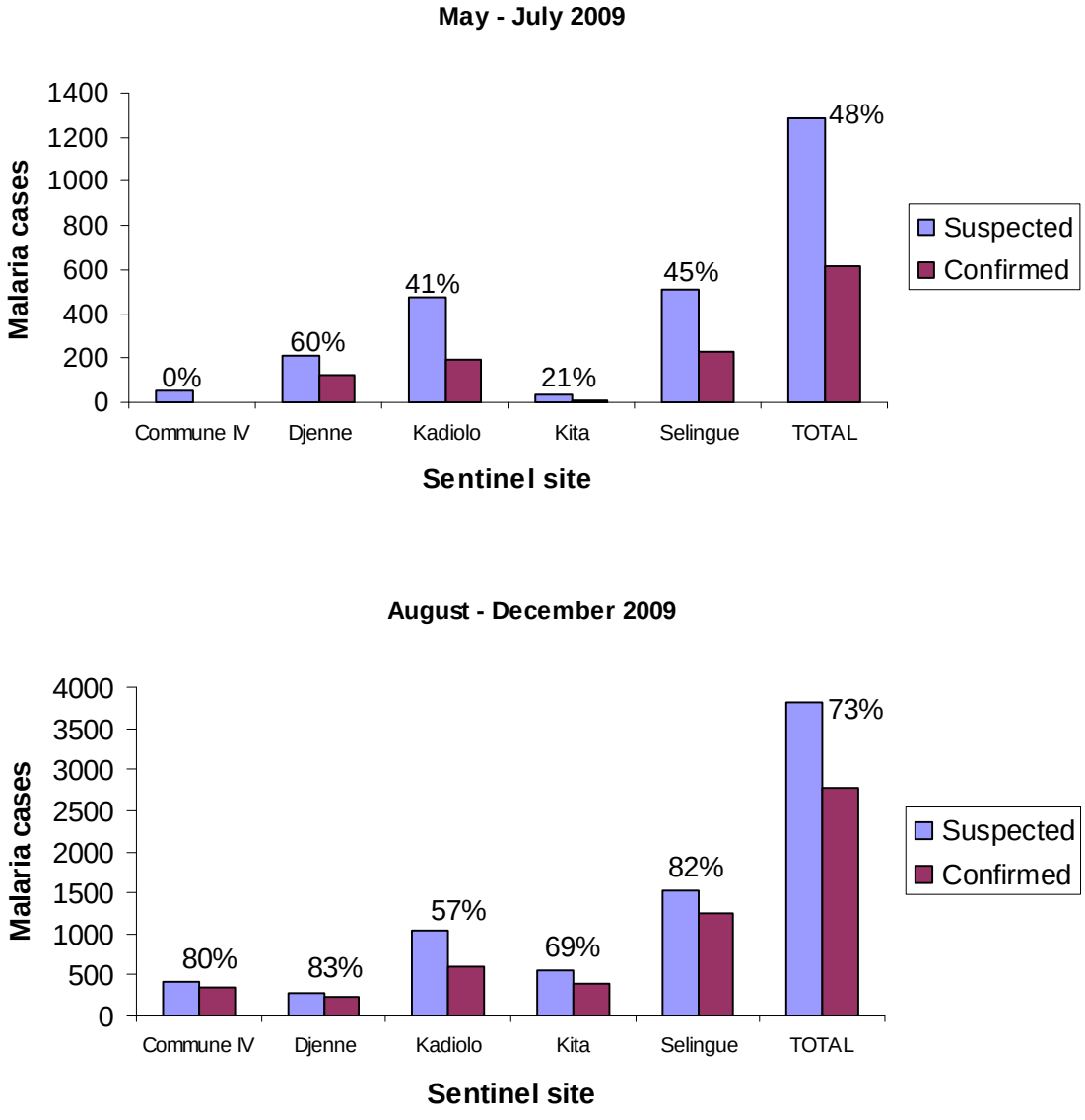
A national malaria M&E plan was developed, adopted and costed in 2008, and subsequently disseminated nationwide. The plan includes collection and analysis of routine data through the health information system known as *Systeme local d'information sanitaire* (SLIS), implementation of sentinel sites for malaria surveillance, and periodic national surveys to evaluate malaria prevention and treatment activities. The quality of routine data collection, analysis and reporting through the SLIS is variable and feedback is not delivered in a timely manner to assist program planning and management. Because so few cases of malaria are laboratory confirmed (10%, SLIS 2009), SLIS data are unreliable as an indicator of malaria prevalence..

To supplement the SLIS, the NMCP proposed establishing sentinel sites for enhanced malaria surveillance to monitor trends in suspected and laboratory-confirmed cases of malaria over time in 5 malaria transmission zones. Supporting five of these sites from 2009-2010, PMI worked with the NMCP and MRTC to develop a training manual and a protocol; provided microscopes, slides, reagents, and RDTs to laboratory confirm all suspected malaria cases. The five sites reported case-based data on suspected and laboratory-confirmed malaria cases directly to the NMCP. Sentinel sites were to be supervised monthly to ensure quality data collection, timely reporting and appropriate analysis and interpretation of data. Some of key activities conducted for sentinel surveillance include:

- Training of 86 health care workers on sentinel surveillance in May 2009
- Data entry screen developed and installed at all 5 sentinel sites
- Four formative supervision visits at each of the sentinel sites
- Two quarterly reports produced
- One national feedback meeting held with personnel from all 5 sentinel sites

In the five sentinel sites supported by PMI approximately 96% (4889/5093) of patients with suspected malaria received a diagnostic test, a substantial improvement over the national average of 10%. In the two reports prepared after implementation in 2009, the percentage of patients testing positive by RDT or microscopy increased from 48% in May-July 2009 to 73% in August-December 2009. As observed at all 5 reporting sites, this finding demonstrated an expected increase in the percentage of positive cases coinciding with the peak transmission season August-October.

Percentage of positive tests from malaria sentinel sites, May-December 2009



Several national population-based surveys with malaria components are planned in next two years. UNICEF completed a Multiple Indicator Cluster Survey (MICS) with a malaria module in 2010, an anemia and parasitemia survey supported by PMI is planned to obtain a nationwide estimates for baseline during peak transmission season

in 2010, and a demographic and health survey (DHS) is planned for 2011, which will provide mortality estimates and incorporate a malaria module.

Progress during last 12 months:

In April 2010, PMI's headquarters-based Monitoring and Evaluation team assessed Mali's progress to date in sentinel surveillance. They found that the despite over 80% completeness of data reporting, the accuracy, consistency and timeliness of reporting were weak. Noting other NMCP competing priorities (in particular, strengthening the SLIS), the team recommended that PMI discontinue its support for the sentinel sites and focus instead on helping develop the routine SLIS and consider other surveillance activities to corroborate SLIS data including rapid impact assessments, health facility surveys, school-based surveys, and end-use commodity tracking.

Highlights of PMI's on-going support for strengthening the routine SLIS include examination of the functioning of Global Fund supported data collection system for timeliness and completeness; development of a data collection form and data entry screen and; a data analysis plan for routine data; production of a draft outline of malaria reports to be used at the CSCOM/CSREF, regional and national levels; field testing of the form, data collection, and reporting at nine selected sites in two regions; and organization of a stakeholder meeting to review results of first pilot phase and obtain consensus regarding tools and processes.

With the last national survey (the DHS) conducted in 2006, and the fact that neither that nor the MICS measured parasitemia, the NMCP with PMI support chose to organize a national anemia and parasitemia survey. This cross-sectional study, to be conducted during the peak transmission period (August-September 2010), will include approximately 1,650 children ages 6 to 59 months from 1,500 households. The anemia and parasitemia rates measured will serve as a baseline for assessing the outcome of malaria control activities supported by PMI and others, with progress to be measured through a repeat survey with biomarkers in approximately 2013. It will also measure coverage of malaria prevention activities, namely LLIN ownership and use.

Proposed FY2011 activities: ($910,500)

MOH NMCP annual review of the malaria M&E plan: ($30,000) PMI will support an annual programming and planning meeting through the MOH and NMCP to help refine and update a comprehensive M&E Plan. Funds will also help cover the cost of disseminating the updated plans.

Support to DHS: (Funds provided in FY 2010.) The PMI country team will provide technical guidance to the preparation and implementation of the 2011 DHS**.**

On-going M&E technical assistance to NMCP: ($130,500) Support for assistance to the NMCP and partners will continue for general M&E capacity building and routine reporting. Noting the importance given in the M&E plan to supervisory reports, PMI

will emphasize efforts to collect, summarize and use report findings and recommendation to refine program plans and strategies. Part of the funds will be used to support an in-country M&E Advisor who will provide necessary technical assistance to implement different activities described in the M&E plan.

Strengthening the SLIS: ($250,000) PMI will continue to support activities to improve routine reporting on malaria through the SLIS, and to develop NMCP capacity to capture data at the community level. Areas of emphasis will continue to be training, quality control/quality assessment, completeness and timeliness of reporting, analysis and feedback. A key new strategy initiated by the NMCP (described below) will be support to monthly meetings at the district level to review and disseminate data to improve program performance. PMI will support continued training for the NMCP and the regional and district levels to increase data management capacity and to optimize the use of data for program management and strategic planning. PMI will support appropriate technology to improve data flow and reporting through the SLIS.

SLIS reporting and dissemination: ($100,000) PMI will provide funding to the NMCP to coordinate training, supervision and assessment for a new system of reporting and disseminating data for program decision making through quarterly district-level meetings to coincide with SLIS meetings. A portion of the funds will also be used to support quarterly meetings at the district level where peripheral health facilities will share data with the district health team on key indicators, including data on confirmed malaria cases and stocks of malaria commodities such as drugs, LLINs, SP, RDTs and other laboratory reagents. District teams will compile monthly data on quarterly basis and send reports to the Regions that in turn will inform the national SLIS database. In addition, district health teams will provide feedback at these meetings to peripheral health centers on the quality of data received at the previous meeting. This mechanism is expected to improve the quality of data collected routinely through the SLIS. Funding will also be used to support district-level formative supervision visits to health centers for data quality assurance and to verify the accuracy of data reported to the district level.

Strengthening epidemic surveillance and response: ($250,000) (See the activity description in the Epidemic Surveillance and Response section.)

Impact evaluation: ($50,000) PMI will work with the NMCP and other malaria partners to conduct a meta-analysis of information on all-cause mortality to provide an indirect assessment of the impact of malaria prevention and control activities on malaria mortality. This evaluation will apply a framework developed by RBM's Monitoring and Evaluation Reference Group (MERG) and adapted by PMI's Monitoring and Evaluation Team.

***In vivo* drug efficacy monitoring**: ($100,000) PMI will work with the NMCP and other partners to continue to monitor the sensitivity and ongoing efficacy of Mali's first line ACT treatment (AL) in one or two sites.

STAFFING AND ADMINISTRATION

USAID and CDC have each hired a Resident Advisor to oversee PMI activities in Mali. In addition, one FSN technical advisor and a Program Management Assistant have been hired to support the PMI team. All PMI staff members are part of a single inter-agency team led by the Mission Health Officer. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, managing collaborating agencies and supervising day-to-day activities.

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

Locally-hired staff to support PMI activities either in Ministries or in USAID will be approved by the USAID Mission Director. Because of the need to adhere to specific country policies and USAID accounting regulations, any transfer of PMI funds directly to Ministries or host governments will need to be approved by the USAID Mission Director and Controller.

President's Malaria Initiative – *Mali*
Planned Obligations for FY2011 ($27,000,000)

Proposed Activity	Mechanism	Budget	Geographic Area	Description of Activity	Page Number Reference
PREVENTIVE ACTIVITIES					
LLIN Procurement	DELIVER	9,300,000	Nationwide	Procurement of 1,550,000 LLINs to contribute to a nationwide mass LLIN distribution campaign (1,400,000 nets) plus 150,000 nets to complement other donor contributions to LLIN delivery through routine services.	20
Distribution of LLINs	TBD CDC IAA	1,818,000 12,000	Nationwide; specific regions	Distribution of LLINs through a mass campaign and routine services to children <1 and pregnant women. Provide a CDC advisor to assist with campaign planning and monitoring.	20
LLIN logistics strengthening	SPS PPM (through NMCP) NMCP	200,000 40,000 40,000	Nationwide	Strengthening NMCP in LLIN logistics management, focusing on net tracking, coordination of donor inputs, and improving delivery systems from the district to CSCOM levels. Include end-use verification activity. Ensuring distribution to private and para-statal health facilities will be included. Strengthening PPM oversight of LLIN tracking and harmonizing distribution systems. Strengthening NMCP capacity for LLIN forecasting, distribution and supervision	20
Post LLIN	TBD	100,000	Nationwide; specific	Support efforts to ensure strong hang-up activities following distribution in both campaigns and	21

distribution support and assessment			regions	routine delivery, and conduct post-campaign process assessment	
IEC/BCC for LLINs	TBD CNIECS (through NMCP)	450,000 50,000	Nationwide	Support IEC/BCC strategy harmonization and message design, including national roll-out of the new CNIECS malaria communication plan, and conduct supervisory visits to monitor its implementation	21
NGO capacity building	Groupe Pivot	50,000		Strengthen local NGO technical and operational capacity related to post-LLIN distribution through campaigns and routine delivery	21
Indoor Residual Spraying	IRS2 IQC Global Task Order CDC IAA	4,860,000 12,000	3 districts	Procure IRS equipment (insecticide, sprayers, etc.), training, implementation, data collection, protocols, guidelines, IEC/BCC, logistic assessment, technical assistance for spraying/entomological assessment (CDC IAA). Technical assistance from CDC entomologist for monitoring IRS implementation.	24
Entomological Monitoring	MRTC NMCP DHPS (through NMCP)	190,000 40,000 40,000	3 districts	Conduct entomological monitoring for one spraying round. Support the new NMCP entomologist in conducting IRS-related entomological monitoring. Strengthen capacity of DHPS to provide coordination with NMCP on district IRS operations.	25
IEC/BCC messaging to community	CNIECS (through NMCP)	20,000	3 districts	Support development of communication approaches and messaging to provide accurate understanding and behaviors related to IRS.	25
IVM strategy	IVM IQC	150,000		Support national IVM strategy implementation,	

implementation			Nationwide	and coordination at the national level, plus a focus on the three IRS districts.	25
Environmental compliance monitoring	EMCAB	30,000	3 districts	Support environmental compliance monitoring associated with IRS.	25
SUBTOTAL: Preventive		**$17,402,000**			

MALARIA IN PREGNANCY					
SP procurement	DELIVER	35,000	Nationwide	Procurement of SP needs for half of 700,000 pregnant women, as well as cups and water containers	28
Facility level service provider training and supervision	ATNPlus DSR/Mid wives (through NMCP)	250,000 80,000		Provide new and refresher training to service providers, and conduct post-training supervision. Support Midwife Association to increase awareness about IPTp and free SP provision.	28
IPTp Policy/Advocacy	TBD	150,000		Work with traditional leaders (Imams) in reinforcing advocacy tool to encourage adherence to policies such as the provision of free SP to pregnant women to improve care and utilization of services at regional and district levels. Include assessment activities to improve and expand initiative.	28
IPTp IEC/BCC	ATNPlus	100,000 150,000		Support efforts to harmonize strategies and design focused messages to promote free SP	28

	TBD			distribution.	
Supervision of facility level service providers	NMCP	100,000		Provide multi-level supervision on MiP practices, with an emphasis on regular supervisory visits by district-level malaria focal persons to the CSCOM.	28
Support NMCP MIP coordination	NMCP	50,000		Support the expanded efforts by the MIP focal person to coordinate technical and supervisory activities with the Reproductive Health Directorate.	28
MIP logistics	SPS	50,000		To facilitate strengthening of MOH capacity in MIP commodity logistics management	29
SUBTOTAL: Malaria in Pregnancy		**$965,000**			
CASE MANAGEMENT (INCLUDING DIAGNOSTICS)					
Procurement of RDTs	DELIVER	766,500	Nationwide	Procure 1 million RDTs to cover gap not covered by Global Fund. Includes 5% processing fee.	33
Procurement of lab consumables	DELIVER	300,000	Nationwide	Procure consumables for microscopy testing for 59 CSREFs.	33
Quality assurance/quality control for diagnostics	INRSP (through NMCP) CDC IAA	200,000 24,000	Nationwide	Support implementation of QA/QC plan for RDT and microscopy diagnostics, including supervision. Provide technical assistance on refinement of QA/QC plan and best practices for implementation.	33
Supervision for malaria case management	ATNPlus NMCP CDC IAA	100,000 200,000 12,000	Nationwide	Support formative supervision visits of trained clinicians at all levels, and refresher training as needed; technical assistance for case management from CDC	33
Implementation of	PKC/Save	2,500,000	3 regions	Implement new community case management	

community case management	the Children			activities in 3 of 6 southern regions	34
Procurement of malaria drugs - ACTs and severe malaria	DELIVER	800,000	Nationwide	Procure AL and severe malaria drugs for health facilities and community case management	33
Procurement of drugs for integrated community case management	DELIVER	207,000	3 regions	In context of GHI, procure complementary drugs and ORT to support diarrheal diseases and respiratory infection within CCM.	34
BCC/IEC for case management	ATNPlus TBD CNIECS (through NMCP)	200,000 250,000 20,000	Nationwide	Support harmonization of messages and communications approaches for case management; implement through *relais*, train on referral systems at the community level. Support CNIECS capacity to develop and implement communications approaches and messaging for case management.	34
Logistics strengthening	SPS	358,000	Nationwide	Facilitate distribution of ACTs and strengthen pharmaceutical management and supply chain strengthening at the national, district and community levels	34
Drug quality control	USP LNS (through NMCP)	350,000 40,000		Support testing of the quality of ACTs, RDTs, SP upon arrival in country and support post-market quality control. Also include testing the quality of insecticides on the LLINs distributed in the countries (with the LNS)	35
Pharmacovigilance	USP LNS (through NMCP)	100,000 40,000		Continue support to the implementation of the pharmacovigilence plan developed with PMI funding.	35

SUBTOTAL: Case Mgmt.		**$6,467,500**			
MONITORING AND EVALUATION AND MALARIA SURVEILLANCE					
MOH NMCP annual review of M&E plan	MEASURE Evaluation	30,000	Nationwide	Support an annual programming and planning meeting through the MOH and NMCP to help refine and update a comprehensive M&E Plan. Funds will also help cover the cost of disseminating the updated plans.	48
Strengthening SLIS	MEASURE Evaluation	250,000	Nationwide	Support training and quality control/timeliness for completion of routine SLIS reporting forms, assist in analysis and feedback on malaria indicators and promote use of findings at all levels to improve program performance.	49
Ongoing TA for M&E activities at the NMCP	Measure Evaluation	130,500	Nationwide	Support NMCP to analyze SLIS data for decision making	48
SLIS reporting, dissemination, and response	NMCP	100,000	Nationwide	Support the reporting and dissemination of data for program decision making through district-level monthly meetings	49
In vivo drug efficacy testing	TBD	100,000	Targeted districts	Conduct *in vivo* drug efficacy monitoring in selected sites to test the sensitivity of AL and the efficacy of ACTs	49
Impact evaluation	MRTC	50,000	Nationwide	Support data collection, analysis, and dissemination of the meta-analyses for the impact assessment.	49
Strengthening of epidemic surveillance and	TBD	250,000	Northern regions	Strengthen capacity for conducting ESR in three northern regions and other epidemic-prone districts, including rapid assessment in select	49

response				population centers.	
SUBTOTAL: M&E		**$910,500**			
IN-COUNTRY MANAGEMENT AND ADMINISTRATION					
In-country staff; Program Administration Expenses	USAID	880,000	Nationwide	Salaries, benefits of in-country USAID PMI staff (1 PSC/2 FSN), contribution to salaries and benefits of Mission support staff, IT support costs, office space, vehicle, attendance at PMI retreat, other Mission program support costs, local costs for CDC PMI advisor.	50
In-country staff; Admin. expenses	CDC	375,000	Nationwide	Salaries, benefits of in-country CDC PMI advisor (1), attendance at PMI retreat.	50
SUBTOTAL: Mgmt. & Admin.		**$1,255,000**			
GRAND TOTAL		**$27,000,000**			

Year 4 (FY2011) Budget Breakdown by Partner* ($27,000,000)

Partner Organization	Geographic Area	Activity	Budget
ATNPlus	Nationwide	Provide new and refresher training to service providers, and conduct post-training supervision. Support NMCP capacity in supervision.	700,000
CDC IAA	Nationwide	TA for IRS, diagnostics, case management, benefits of in-country CDC PMI advisor (1)	435,000
DELIVER	Nationwide	Procurement of LLINs, SP, lab consumables, RDTs and ACTs	11,408,500
Groupe Pivot	Nationwide	Strengthening local NGOs	50,000
IVM IQC	Nationwide	Support national IVM strategy planning, implementation, and coordination at the national level	150,000
EMCAB	Nationwide	Environmental compliance monitoring	30,000
MEASURE Evaluation	Nationwide	Strengthening SLIS, TA for M&E support	410,500
MOH (NMCP, EPI, DPM, CNIECS, INRSP, LNS, DSR, PPM)	Nationwide	Capacity building, training and supervision, M&E (NMCP), EPI strengthening of tracking nets, net forecasting, capacity building (NMCP+ EPI Section), pharmacovigilance (DPM), quality assurance/control for laboratory diagnostics (INRSP), drug quality control (LNS), BCC/IEC (DSR, Midwives Association), logistics,	1,090,000

		oversight and coordination of BCC/IEC for LLINs, IRS, CCM targeting the community strengthening (PPM),	
MRTC	Nationwide	Conduct entomological monitoring for one spraying round.	240,000
PKC II	Nationwide	Implement new community case management activities in 3 of 6 southern regions	2,500,000
IRS2 IQC Global Task Order	Nationwide	IRS commodities and operational costs, NMCP capacity building	4,860,000
SPS	Nationwide	LLIN, MIP, CM logistics management	608,000
USAID Mali Mission	Nationwide	Salaries, benefits of in-country USAID PMI staff (1 PSC/2 FSN), contribution to salaries and benefits of Mission support staff, IT support costs, office space, vehicle, attendance at PMI retreat, other Mission program support costs, local costs for CDC PMI advisor.	880,000
USP	Nationwide	Drug quality control ; pharmacovigilance	450,000
TBD	Nationwide	Distribution of LLINs; Post LLIN distribution support and assessment; IPTp Policy/Advocacy; IEC/BCC for LLINs, IPTp and Case Management; Strengthening epidemic surveillance and response	3,268,000