This Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. The final funding available to support the plan outlined here is pending final FY 2013 appropriation. If any further changes are made to this plan it will be reflected in a revised posting.

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PRESIDENT'S MALARIA INITIATIVE

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Mali

Malaria Operational Plan FY 2013

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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
CDC	Centers for Disease Control and Prevention
CNIECS	National Center for Information and Communication in Health
CSCOM	*Centre de Santé Communautaire* (Community Health Center)
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)
ECOWAS	Economic Community of West African States
EPI	Expanded Program for Immunization
ESR	Epidemic surveillance and response
EUV	End-use verification
FANC	Focused antenatal care
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
HIV/AIDS	Human immunodeficiency virus/Acquired immune deficiency syndrome
iCCM	Integrated community case management
IDP	Internally displaced people
IDSR	Integrated Disease Surveillance and Response
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
IVM	Integrated vector management
LNS	*Laboratoire National de Santé* (National Health Laboratory)
LLIN	Long-lasting insecticide-treated bed net

MCH	Maternal and child health
MCHIP	Maternal Child Health Integrated Project
MOH	Ministry of Health
MICS	Multiple Indicator Cluster Survey
MIP	Malaria in pregnancy
MIS	Malaria Indicator Survey
MRTC	Malaria Research and Training Center
NGO	Non-governmental organization
NIH	National Institutes of Health
NMCP	National Malaria Control Program
PCR	Polymerase chain reaction
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
PVO	Private voluntary organization
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
SLIS	*Système Local d'Information Sanitaire* (Health Management Information System)
SP	Sulfadoxine-pyrimethamine
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

EXECUTIVE SUMMARY

Malaria prevention and control is a major foreign assistance objective of the U.S. Government (USG). In May 2009, President Barack Obama announced the Global Health Initiative (GHI), a comprehensive effort to reduce the burden of disease and promote healthy communities and families around the world. The President's Malaria Initiative (PMI) is a core component of the GHI, along with family planning, maternal and child health, nutrition, HIV/AIDS, and tuberculosis. PMI was launched in June 2005 as a five-year, $1.2 billion initiative to rapidly scale up malaria prevention and treatment interventions and reduce malaria-related mortality by 50% in 15 high-burden countries in sub-Saharan Africa. With passage of the 2008 Lantos-Hyde Act, funding for PMI has been extended through FY 2014. The goal of PMI is now to reduce malaria-related mortality by 70% in the original 15 countries by the end of 2015. 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.

PMI began supporting activities in Mali in 2007 in close collaboration with the National Malaria Control Program (NMCP) as well as international and national partners. With the coup d'état of March 22, 2012 in which the democratically-elected president was overthrown by the military, the USG and many other donors suspended foreign aid to the Government of Mali (GOM) until a democratic solution to the political crisis could be achieved. For PMI, this meant suspending all assistance and funding to the NMCP and other MOH entities. The US Department of State authorized some PMI activities on humanitarian grounds, such as procurement and distribution of essential malaria commodities. However, the bulk of PMI projects were temporarily suspended. Following the intervention of the Economic Community of West African States (ECOWAS) and the international community, Malians agreed on a consensual transitional government currently in place and as a result, the USG and international community recognize that Mali is taking the necessary actions to hold democratic elections in the late spring or summer of 2013. USG anticipates that there will be a newly elected government in place by the late summer or fall of 2013. Most of the USAID Mission and PMI projects have been unsuspended and are providing services to 90% of the Malian population living in the southern part of the country. In addition, humanitarian assistance, of which malaria commodities and services are included, has been reaching the North through coordinated UN and NGO efforts. Until these elections, much of PMI's funding and activities have been reauthorized, but mostly to provide assistance at the community level and not to support state-run institutions. Also the authorized departure is lifted at the end of August and all Mali Mission staff along with their families are now allowed to return to Mali. If free and fair elections are held in early 2013, the USG anticipates returning to normal bilateral relations with the newly elected government of Mali. The FY 2013 Malaria Operational Plan (MOP) is written in anticipation that such a resumption of normal business will have occurred before FY 2013 funds are disbursed.

Malaria is the primary cause of morbidity and mortality in Mali, particularly for children less than five years old. The disease is endemic to the central and southern regions (where over 90%

of Mali's population lives), and considered epidemic in the north. In 2011, the national health information system (*Système Local d'Information Sanitaire* [SLIS]), reported 1.9 million clinical cases of malaria in health facilities, accounting for 41% of all outpatient visits for all age groups. However these numbers are suspected cases not confirmed by microscopy or rapid diagnostic tests (RDT). Malaria also accounts for 51% of all outpatient visits for children less than five years of age.

Since the last Demographic and Health Survey (DHS) was conducted in 2006, Mali has demonstrated significant progress in scaling up malaria prevention and control interventions, especially in vector control. Data from the anemia and parasitemia survey conducted in September to October 2010 demonstrated achievement of some of Africa's highest rates of ownership and use of insecticide-treated nets (ITNs). Household ownership of at least one ITN increased from 50% in 2006 to 85% in 2010, and 70% of children under age five had slept under an ITN the night before the survey in 2010 compared with 27% in 2006. However, prompt case management with an ACT remained low at 8%. In addition, parasite prevalence in 2010 appeared high at 38% by microscopy though no national-level baseline data are available for comparison.

Mali is the recipient of a $26 million five-year Global Fund Round 6 malaria grant to support procurement of long-lasting insecticide-treated nets (LLINs) and artemisinin-based combination therapy (ACTs) and has been approved for Phase 2 funding. However, the Round 6 grant was suspended in 2010 because of misappropriation of funds. As a result, PMI has procured emergency stocks of ACTs and RDTs to ensure sufficient quantities are available in-country. Mali's Round 10 Global Fund malaria proposal was recommended for funding; pre-disbursement assessment and negotiations with Population Services International (PSI), the new Principal Recipient, are ongoing and a consolidated version of the two malaria grants is expected to be signed in September 2012 with a total budget of approximately US $123 million. The consolidated grant focuses on nationwide implementation of integrated community case management (iCCM) and a 2014 universal LLIN coverage campaign.

While universal access to malaria prevention and control measures is the goal, pregnant women and children under five remain the focus of PMI efforts since they are the most vulnerable to malaria infection. The activities that PMI is proposing to support with FY 2013 funding align with the 2012 – 2016 National Malaria Control Strategy and Plan (currently being finalized), complement the activities in the country's Global Fund grants, and build on investments made by PMI and other partners to improve and expand malaria-related services.

To achieve PMI's goals and targets in Mali, the following major activities will be supported with FY 2013 funding, a proposed $25 million:

Insecticide-Treated Nets (ITNs): The Malaria Strategic Plan promotes universal LLIN coverage by 2014 for all age groups (defined as one LLIN for every two people). The Ministry of Health (MOH) supports the provision of free LLINs distributed to target populations through two main delivery channels: mass distribution to households as part of universal coverage campaigns and routine distribution through antenatal care (ANC) and Expanded Program for Immunization (EPI) clinics targeting women and infants. The NMCP has made significant

progress recently toward achieving its initial goal of 80% use of LLINs among children less than five years of age and pregnant women. According to the 2010 national malaria survey conducted during the peak transmission season, 85% of households owned an ITN and 93% of households owned at least one mosquito net. With funding provided in FY 2009, 2010 and 2011, PMI procured over 3.6 million LLINs as part of a significant net contribution to a nationwide phased universal coverage campaign conducted from 2011-2012. PMI continued to support capacity building of the MOH and partners to coordinate donor inputs, track LLINs, and manage logistics and distribution systems. PMI supported the mass distribution campaign coordination activities, as well as targeted communications promoting consistent and correct LLIN use.

In FY 2013, PMI will procure 2 million nets to fill the gap for routine LLIN delivery as well as contribute to the 2014 universal coverage campaign in one region. PMI will also continue to strengthen LLIN distribution systems at the national, district and community levels to prevent stockouts, and will increase information, education, communication/behavior change communication (IEC/BCC) activities at national and community levels to promote correct and consistent net use, especially among the most vulnerable groups.

Indoor Residual Spraying (IRS): PMI supports the NMCP's strategy to reduce malaria transmission through targeted IRS and entomological monitoring in select high-risk areas. Since 2008, PMI has supported three IRS campaigns in the districts of Bla and Koulikoro, adding a third district (Baraoueli) in 2011 and 2012. Support in 2012 included initial and refresher training of supervisors and spray operators as well as community health volunteers (*relais)*; the purchase of all commodities and personal protective equipment; and communication, supervision, monitoring, and environmental compliance activities. The 2012 IRS campaign was launched in mid-July, spraying approximately 203,000 houses and protecting about 700,000 residents. With FY 2013 funding, PMI will continue to support IRS in all three districts, covering over 203,000 households. PMI will also continue strengthening the MOH's capacity to plan and supervise IRS activities within the context of its integrated vector management strategy. Other support will go to entomological monitoring related to IRS and insecticide monitoring, insecticide resistance testing, and overall implementation of the entomological monitoring plan.

Intermittent Preventive Treatment in Pregnant Women (IPTp): The 2006 DHS showed that only 4% of pregnant women received the recommended two doses of sulfadoxine-pyrimethamine (SP) at ANC visits during their pregnancy, despite high ANC attendance rates by pregnant women of 72% for at least one visit and 63% for two or more visits. IPTp coverage rates were not measured in subsequent national household surveys. In 2009, PMI procured one million SP treatments for IPTp and in 2010 trained 1,173 health care providers in malaria in pregnancy (MIP) as part of focused antenatal care. Communications strategies on MIP have targeted religious leaders, traditional leaders, grandmothers, women in positions of authority, women of childbearing age, and men. With FY 2013 funding, PMI will procure 1.73 million SP treatments to ensure the projected annual need for over 866,000 pregnant women is covered with at least two doses of IPTp administered as directly-observed therapy at all health facilities. Given potential challenges in achieving IPTp targets, PMI will help expand the use of focused antenatal care training modules and increase supportive supervision of health facility staff who implement IPTp. In addition, PMI will also continue to support engagement and mobilization of

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

Case Management: Poor geographic and economic access to care is a major challenge for malaria diagnosis and treatment in Mali. Malaria diagnosis in most public-sector health facilities is based on clinical criteria, with fewer than 10% of suspected cases of malaria having laboratory confirmation before PMI support began. In 2010, due to advocacy efforts from PMI and other partners, the MOH adopted significant policy changes including a community case management policy, updated severe malaria treatment, and pre-referral guidelines. As a result, recent data from the end-use verification (EUV) surveys suggest a trend towards an increase in testing of children presenting with fever at health facilities; note that these data are not nationally representative.

PMI supported the NMCP to pilot a strategy of integrated community case management of fever (iCCM) with malaria treatment through *relais* in three districts of Sikasso Region. In 2010, PMI supported expansion of iCCM in five districts by training and deploying Community Health Workers *(Agents de Santé Communautaire* [ASCs]*)*, procuring ACTs for community-based ACT distribution and ensuring sufficient supplies of ACTs for children less than five years of age in health facilities. PMI also procured drugs for the management of severe malaria, as well as supported in-service training and supportive supervision of health workers and ASCs. The national iCCM package will improve access to care by allowing ASCs to provide health services to the community level including treatment for uncomplicated malaria with ACTs after confirmation by rapid diagnostic test (RDT), acute respiratory infections with antibiotics, diarrhea with oral rehydration solution, and micronutrient supplementation (Vitamin A). PMI continued its support of iCCM in 2012 in five districts of Sikasso Region and expanded activities to four additional districts (two in Kayes and two in Segou).

With FY 2013 funding, PMI will continue to support and strengthen efforts to ensure prompt and effective case management of malaria at health facilities and support the scale-up of the iCCM policy nationwide. At the health facility level, PMI will concentrate on strengthening capacity in laboratory diagnostics (including quality assurance and quality control), supply chain management, and BCC. 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 ACTs at health facilities and in communities.

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 is still weak and epidemic response plans will need reinforcement especially following the events of March 2012. To ensure accurate malaria case reporting, laboratory confirmation is also required as malaria cases are diagnosed presumptively. In 2008 and 2009, PMI procured ACTs and IRS supplies to be stored in two of the regions as contingency in the event of an epidemic. With FY 2013 funding, PMI will strengthen epidemic surveillance and response capacity in the epidemic-prone areas through a collaborative process with the NMCP and WHO to reach consensus on appropriate epidemic thresholds; strengthen current data sources for malaria epidemic detection; develop revised

reporting mechanisms; train local health officers to analyze and monitor malaria data; and ensure appropriate epidemic response procedures are in place. Assistance will also focus on training to health care providers for diagnostics, case reporting, data analysis and monitoring, and case management. Periodic supervisory visits will verify that health workers use RDTs and microscopy adequately, report in a timely fashion, and perform case management appropriately. Implementation of ESR activities in the north is contingent upon political stability and accessibility in this region.

Monitoring and Evaluation (M&E) and Operational Research (OR): The NMCP, with support from PMI and other partners, has developed a comprehensive national malaria M&E plan, including capacity building, improvement of data collection, and provision of equipment to collect and analyze data. This plan will be reviewed this year as part of the review of the National Strategic Plan for 2012-2016. The quality of routine data collection, analysis and reporting through the health information system, or SLIS, is variable and feedback is not delivered in a timely manner for program management. At present, population-based surveys provide the most accurate data on malaria in Mali, and have recently shown tremendous progress especially for ITN ownership and use. PMI supported a national anemia and parasitemia survey during the peak transmission season in 2010, which found an estimated 38% of children 6-59 months of age were parasitemic and 85% were anemic (hemoglobin<11g/dL).

In FY 2013, PMI will support preparations for a national malaria indicator survey (MIS) in 2014 to provide follow-up data on key malaria indicators along with anemia and parasitemia. Efforts will continue to strengthen the SLIS through training and supervision, and will focus efforts at the community health center level (*Centres de Santé Communautaire* [CSCOM]). Activities will also focus on the community level to strengthen M&E among the multiple partners implementing iCCM interventions so that these data may eventually feed into the SLIS. An operational research project (previously approved but not implemented due to USG activity suspension) will evaluate the impact of LLINs treated with dual insecticides to inform PMI about the potential ability of this new LLIN variety to affect malaria transmission in areas with high pyrethroid resistance.

Capacity Building and Health System Strengthening: The MOH reports a critical shortage of staff at all levels of the public health system, especially for service provision below the national level. The shortage of staff, in terms of their numbers, geographic distribution and level of training, affects the quality of service at all levels. Entomological capacity is fairly strong both within the MOH and at research institutes. 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. However, supervision below the district level at community health centers remains more limited.

Since its first year, PMI has contributed substantially to building capacity of the NMCP and other GOM entities through direct funding of specific activities. This support has allowed GOM partners to improve training, supervision, quality assurance and quality control for diagnostics, to oversee implementation of BCC activities related to malaria, and to improve partner coordination. With the coup in 2012, PMI paused some of these capacity-building efforts, and

focused on strengthening the community health system level. Pending the resumption of USG activities in FY 2013, PMI intends to resume direct funding support to the NMCP to reach coverage targets for key malaria interventions. Collaboration will continue with other partners to support NMCP structure and staff, specifically to increase capacity at all levels to plan, implement, supervise, forecast commodity needs; improve distribution systems; coordinate with partners; and monitor and evaluate malaria prevention and control activities. In addition, 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 from other data sources such as large household and health facility surveys.

The proposed FY 2013 PMI budget for Mali is $25 million.

STRATEGY

INTRODUCTION

In 2013, the population of Mali will be approximately 16 million, with more than 47% less than 15 years of age; children under the age of five represent 17% of the total population.[1] Approximately 64% of Malians live in poverty (i.e., on less than US$1 a day). In 2010, the estimated annual gross national income per capita was just $600 (World Bank, 2010), making Mali one of the world's poorest countries. Since March 2012, Mali has been in political turmoil after the democratically-elected president was overthrown in a military coup, plunging the government into a constitutional crisis. At the same time, various rebel groups in Northern Mali took advantage of the political instability to occupy the three northern regions (representing one-third of the country). The ensuing violence caused some 400,000 people to be displaced either as refugees in the neighboring countries or internally displaced in the southern regions.[2] In response to the coup d'état, the USG and many other donors suspended foreign aid to the Government of Mali (GOM) until a democratic solution to the political crisis could be achieved. For PMI, this meant suspending all assistance and funding to the NMCP and other MOH entities. The US Department of State authorized some PMI activities on humanitarian grounds, such as procurement and distribution of essential malaria commodities. However, the bulk of PMI projects were temporarily suspended. Following the intervention of the Economic Community of West African States (ECOWAS) and the international community, Malian agreed on a transitional government currently in place and as a result, the USG and international community recognize that Mali is taking the necessary actions to hold democratic elections in the late spring or summer of 2013. USG anticipates that there will be a newly elected government in place by the late summer or fall of 2013. Most of the USAID Mission and PMI projects have been unsuspended and are providing services to 90% of the Malian population living in the southern part of the country. In addition, humanitarian assistance, of which malaria commodities and services are included, has been reaching the North through coordinated UN and NGO efforts. Until these new elections, much of the PMI funding and activities have been reauthorized, but mostly to provide assistance at the community level and not to support state-run institutions. Also the authorized departure is lifted and all Mali Mission staff along with their families are now allowed to return to Mali. If free and fair elections are held in early 2013, the USG anticipates returning to normal bilateral relations with the newly elected government of Mali. This MOP is written in anticipation that such a resumption of normal business will have occurred before FY 2013 funds are disbursed and PMI team anticipates to review by June 2013 the current program and funding and assess what revisions will be required if elections will not happen as planned.

MALARIA SITUATION IN MALI

Malaria is the primary cause of morbidity and mortality in Mali, particularly for children less than five years old. In 2011, the national health information system (*Système Local d'Information Sanitaire* or [SLIS]), reported 1.9 million clinical cases of malaria in health

[1] Extrapolated from the 2011 General Census, using a 3% growth per year projection

[2] 255,000 refugees in neighboring countries and 155,000 internally displaced people (IDP) as of 15 July 2012, Office of Humanitarian Affairs

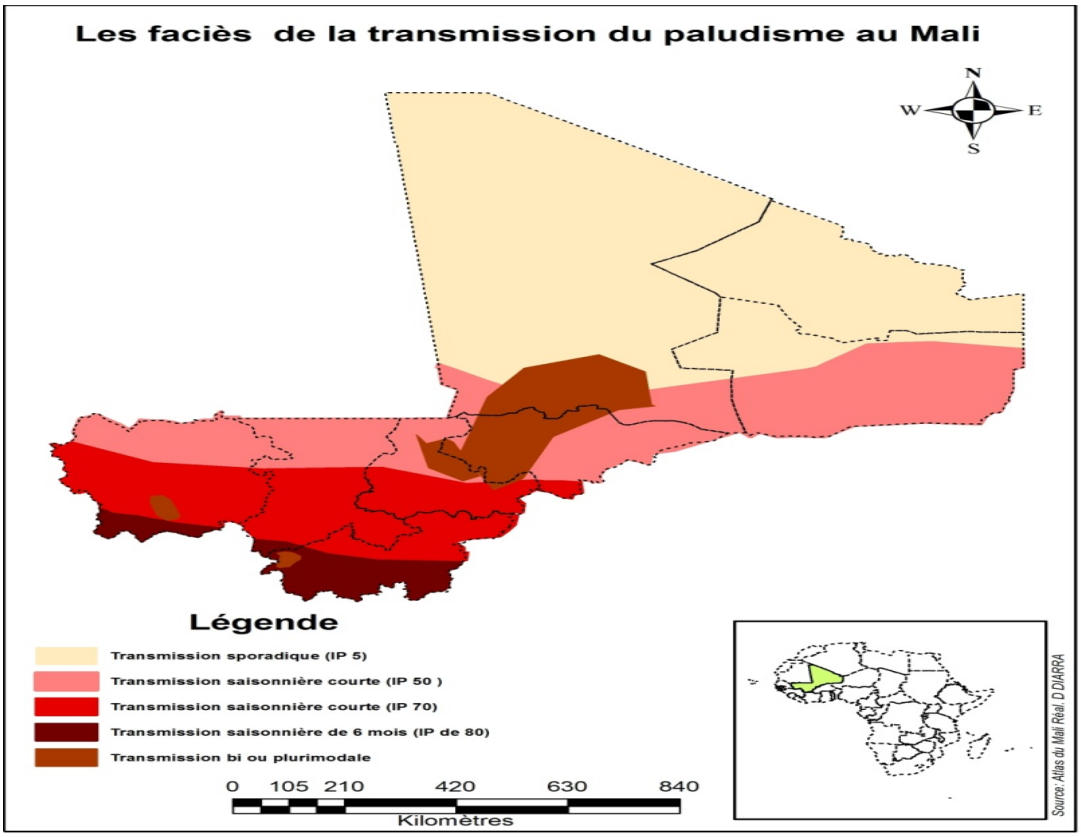
facilities, accounting for 41% of all outpatient visits for all age groups. However these are suspected cases not confirmed by microscopy or RDTs. Malaria also accounts for 51% of all outpatient visits for children under five years of age. A total of 2,128 fatal cases representing 41.7% of all reported deaths were attributed to malaria, and 71.8% of these were children under five. However, with the lack of laboratory confirmation, the SLIS data should be viewed with caution. According to anemia and parasitemia (A&P) Survey conducted in 2010 during the peak transmission period, the prevalence of malaria among children under five years of age was 38% based on microscopy and 42% based on RDTs (results based on 1,617 households and 1,739 children under five years of age surveyed).

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 Malaria 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.

Malaria is endemic to the central and southern regions (where about 90% of Mali's population lives), and is 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; the last identified epidemic was in September 2003 in Tombouctou.

With the recent insecurity in the north, the 155,000 internally displaced people (IDP) who have migrated from the north to the south are at risk of severe disease and death from malaria because of their low immunity.

Stratification of Malaria Transmission in Mali (source: NMCP 2012)



HEALTH SYSTEM DELIVERY STRUCTURE AND MINISTRY OF HEALTH ORGANIZATION

Mali's MOH structure comprises a national level represented by the cabinet of the minister of health and the national directorates reporting directly to the secretary general of the MOH. 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 the MOH. 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.

Mali is divided into eight administrative regions (Kayes, Koulikoro, Sikasso, Ségou, Mopti, Gao, Tombouctou, and Kidal) plus the capital of Bamako, each representing a regional health directorate. The regions are subdivided into 49 administrative "*cercles*" comprised of 54 health districts while Bamako is divided into six administrative communes that correspond to six health districts, making up a total of 60 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 extend health service coverage, and ensure access to essential and effective medicines.

The health delivery 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 seven regional hospitals for patients requiring a higher level of care (Kayes, Kati, Sikasso, Ségou, Mopti, Tombouctou et Gao)
- The local level with 60 referral health centers (*Centre de Santé de Réference* [CSREF]) constituting the district reference level

In 2011, a total of 1,094 community health centers (*Centre de Santé Communautaire* [CSCOM]) as well as parastatal, faith-based, military and other private health centers, make up the community health services level. The CSCOMs are established and managed by community health associations (*Association de Santé Communautaire* [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 proportionally to population throughout the country. In 2011, the national ratio of doctors to the population was 1:8,526, with rural regions having less than one doctor for every 24,000 inhabitants. Regional directors oversee health teams that implement integrated health interventions; currently all regional teams have malaria focal persons. The CSREF (at the district level) is the first referral structure for CSCOMs; the district health team is headed by a medical chief responsible for technical supervision of CSCOMs and has a malaria focal person as well. The ASACO (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 the World Health Organization (WHO) norms ranging from 100% in five regions to 95% in Kayes. The number of staff employed frequently depends on the level of community resources to pay them. In 2011, The MOH started the "medicalization" of CSCOMs meaning the appointment of qualified medical doctors in CSCOMs. According to a draft of the strategic plan for health and social development (2013-2022), in 2011 30% of CSCOMs were headed by a medical doctor and in 2012, 50% of CSCOM will be led by a medical doctor.

In 2010, Mali approved an integrated community case management (iCCM) package offered by Community Health Workers (*Agents de Sante Communautaire* [ASCs]) to provide health services at the community level. The ASCs, who receive a financial incentive from different partners for their services, provide free treatment for uncomplicated malaria, acute respiratory infections with antibiotics, diarrhea with oral rehydration solution (ORS) and micronutrient supplementation. The ASCs will also provide primary care to the newborn and family planning for eligible families. Based on the national iCCM directive, the iCCM 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. Support for the GOM scale-up plan for nationwide implementation of the iCCM package including supervision, commodity management, RDT confirmation, and QA/QC were incorporated into the Global Fund Round 10 grant.

Health Financing Through Cost Recovery

Mali has a strong cost recovery system that is based on the "Bamako Initiative." At the district level, communities can establish CSCOMs based on the following criteria: the establishment of an ASACO; raising a minimum of 10% of the cost of 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 for social services including water, education, and health.

CSCOMs have three forms of revenue generation that 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 under 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 lack available funds to cover these costs.

National Financial Planning for Malaria and Health/Social Development

The NMCP receives annual budget support from the National Health Sector Wide Approach or PRODESS (*Le Programme de Développement Sanitaire et Social*). 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 but also procures malaria commodities such as ACTs, RDTs, severe malaria drugs and LLINs. The GOM, local governments, ASACOs and other donor partners, such as the Global Alliance for Vaccines and Immunizations (GAVI) are supporting the salaries of CSCOM's staff, including qualified medical doctors. While GOM increased its investment in malaria control from about $1 million annually in FY 2007, $6.7 million in FY 2008, and $9 million in FY 2009; this support has decreased in FY 2010 to approximately $4 million and $3 million in FY 2011.

COUNTRY MALARIA CONTROL STRATEGY

In 2011, the MOH revised the National Malaria Policy and guides to include new recommendations from the (WHO) and Roll Back Malaria (RBM) in malaria treatment and control as follows:

- Updated the malaria case definition to include biological confirmation using microscopy or RDTs;
- Adopted artemether–lumefantrine (AL) as the first-line drug for the treatment of uncomplicated malaria;
- Introduced intramuscular artemether and rectal artesunate for pre-referral treatment of severe malaria;
- Updated guidelines concerning malaria in pregnancy to allow treatment of uncomplicated malaria in pregnant women with ACTs in the second and third trimesters of pregnancy or oral quinine in the first trimester of pregnancy;
- Implemented direct observation of SP administration during ANC visits;
- Adopted community case management of malaria by community health workers using RDTs, ACTs, as well as rectal artesunate for pre-referral treatment of suspected severe malaria; and
- Defined a universal coverage target for LLIN distribution as one net for every two persons in a household.

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. The review of the 2007-2011 National Malaria Strategic Plan is completed and a new five-year plan (2012-2016) is in development but delayed due to March 2012 political events. The NMCP is seeking support from partners to develop the Malaria Strategic Plan 2012-2016.

The new plan aims to achieve the following ambitious targets:

- 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 2015, 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 established four major malaria control and prevention strategies: 1) improved case management; 2) IPTp; 3) vector control through the distribution and use of LLINs, elimination of mosquito breeding sites using larvicides, and targeted IRS; 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. Additionally, in 2013, the NMCP plans to pilot the new WHO-approved Intermittent preventive treatment of infants (IPTi) in nine health districts with possible expansion after one year of implementation and evaluation. PMI is closely monitoring this activity and waiting for the results to inform expansion of the approach.

INTEGRATION, COLLABORATION AND COORDINATION

Communications among malaria control partners in Mali are coordinated through the NMCP monthly partners' meetings. Malaria control is part of the national sector-wide approach, based on a strategic Ten-Year Plan for Social and Health Development and operationalized through the five-year health and development program (PRODESS). The Plan is supported by the Financial and Technical Partners' Forum, which meets monthly to share information on ongoing programs, new initiatives, strategies, and policies; to coordinate interventions; and to help leverage resources. The NMCP is responsible for overseeing all malaria control activities conducted in Mali, but cites partner and donor coordination as one of its biggest challenges. The NMCP seeks better mechanisms for ensuring increased partner information sharing around key activities.

Funding

Key funding and technical partners to the NCMP include the Global Fund, WHO, UNICEF, the World Bank, the Dutch Cooperation, and the US Government. The US National Institutes of Health (NIH) also supports the Malaria Research and Training Center (MRTC) within the Faculty of Medicine at the University of Bamako**.** At the implementation level, numerous 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*, World Vision, and Plan International. Partner funding activities include the following:

- UNICEF implements iCCM (including malaria diagnosis and case management) in 30 health districts and provides LLINs, ACTs, and RDTs to the three northern regions (Tombouctou, Gao and Kidal);
- World Vision is assisting with the provision of one million LLINs to implement the universal coverage LLIN campaign in Koulikoro Region;
- Muskoka Initiative, funded by CIDA, is implementing iCCM in four districts in the region of Sikasso that are not already covered by PMI;
- Canadian International Development Agency (CIDA) is procuring ACTs for the implementation of iCCM in the Segou region;
- WHO provides technical assistance in malaria with the development of Global Fund proposals and the development of new NMCP and MOH policy and strategy documents.

Mali's Global Fund Round 6 Phase 2 grant for malaria and its Global Fund tuberculosis grant were suspended in 2010 based on the Global Fund Inspector General's (IG) identification of misuse of approximately US $5.3 million from the tuberculosis and malaria grants. The GOM has been responsive to Global Fund IG concerns and has taken steps to rectify the situation by replacing the Minister of Health and making a commitment to provide a reimbursement plan and timeline. Unfortunately, the destruction of MOH offices during the recent coup d'état has delayed the submission of these documents. Due to the misuse of funds, Global Fund and the MOH selected a new Principal Recipient, Population Services International (PSI) to manage the Global Fund grants. The approved Round 10 malaria grant and the Round 6 Phase 2 grant have been consolidated in one malaria grant which will be signed in September 2012. The

consolidated malaria grant supports scaling up iCCM implementation, procurement of ACTs and RDTs, and support for a universal LLIN coverage campaign in 2014-2015.

GHI and Other USG Programs

Malaria prevention and control is a major foreign assistance objective of the USG. In 2009, President 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. 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 President's Malaria Initiative (PMI) is a core component of the GHI, along with HIV/AIDs and TB.

USAID/Mali provides direct funding to the MOH, including PMI funding to support the NMCP and its priority activities, although no USG funding was given during FY 2012 due to restrictions following the coup d'état. USAID/Mali maintains a team of two accountants and an auditor at the MOH to oversee all USG funding and ensure that all USG requirements are applied. USG funds are disbursed in small increments following a review of the MOH workplans and justifications. These funds are audited annually and the results shared with USAID's Regional Office of Inspector General in Dakar. The audits have revealed no misappropriation of USG funds. USG support to GOM is expected to continue when there are democratic elections and an established democratic government.

PMI with the Peace Corps, launched a donor collaboration in April 2011 in PMI focus countries. The goal of this collaboration is for third-year Peace Corps Volunteers (PCV) to serve as Malaria Volunteers and work closely with PMI, the NMCP, and/or a chosen partner on malaria control and prevention activities. In Mali, PMI supported a Malaria Volunteer during FY 2011 but suspended activities in FY 2012 with the evacuation of all PCVs from Mali. PMI intends to continue this support with a specific scope of work for iCCM in FY 2013 with the return of PCVs.

As a USG Feed the Future country (2011-2016), Mali is implementing a coordinated government strategy to address food security and nutrition issues. Anemia, due to iron deficiency, malaria, and helminth infections, affects over 80% of children under five nationwide and exceeds 90% in some regions (e.g., Sikasso). The GOM is committed to developing multi-sectoral programs that address access to health care to improve overall dietary intake and disease status of Malians. PMI will discuss opportunities for collaboration with FTF and GHI to improve maternal and child health services and coordinate on relevant malaria and nutrition BCC/IEC messages.

Private Sector Partnerships

The NMCP and PMI maintain working relationships with members of the private sector:

- The NMCP has recently partnered with the Association of Employers and Business Owners (*Patronnat du Mali*). Partnership with the *Patronnat* is about three years old and has benefited from advocacy activities with the Mali Voices Project. The members of the *Patronnat* hold malaria prevention awareness events and pledge to provide free nets to their employees and their family dependents.

- The NMCP has a long-established collaboration with bed-net vendors in the country. With the country's well-established net culture, net vendors in Mali enjoy a large market in both urban and rural areas. The NMCP is planning to organize information sessions targeting representatives of net vendors to ensure they import and sell long-lasting ITNs at an affordable price.
- Private clinics, pharmacies and laboratories are becoming more prevalent with a larger presence in urban areas. To date, the NMCP has provided them with diagnosis and malaria case management information based on country guidelines. The NMCP plans to train and supervise their personnel in order to ensure they understand and apply the national directives related to malaria diagnostics and treatment.
- The mining industry is a fast-growing in Mali. Currently, at least five mining companies are supporting IRS activities in their employees' residence sites and neighboring villages. PMI will continue to facilitate a dialogue between the NMCP and the mining companies to ensure that they adhere to national and international IRS standards, and to promote introducing best practices, such as entomological surveillance.

PMI GOALS, TARGETS, AND INDICATORS

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

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

PROGRESS ON COVERAGE AND IMPACT INDICATORS TO DATE

Mali has made significant progress on malaria control in the past decade and has seen subsequent gains in child survival. The under-five child mortality rate for 2010 was 178/1,000 live births, down from 255/1,000 live births in 1990; however, there is still much work to be done in order to reach the intervention coverage targets established by the NMCP and PMI.

Indicator	DHS 2006	Anemia and Parasitemia 2010	Other data sources
Proportion of households with at least one ITN	50%	85%	-
Proportion of children less than five years old who slept under an ITN the previous night	27%	70%	-
Proportion of pregnant women who slept under an ITN the previous night	29%	-	55% (2010 MICS)
Proportion of households in targeted zones reached by IRS	-	-	97% (2011 RTI coverage data)
Proportion of women who received two or more doses of IPTp during their last pregnancy in the last 2 years	4%	-	36% (HMIS 2011)
Proportion of children less than five years old with fever in the last two weeks who received treatment with ACT within 24 hours of onset of fever	-	8%	-
Any anemia (<11g/dL) Severe anemia (<8g/dL)	81% 10%	85% 26%	-
Parasite prevalence (microscopy/RDT)	-	38%/43%	-

RELEVANT EVIDENCE ON PROGRESS

Following its adoption of universal coverage goals, Mali launched a rolling, phased campaign in April 2011 to achieve 100% ownership and 80% use of LLINs in the general population, and to replace old nets distributed in 2006. An estimated 8.67 million nets were originally required based on a population of 15.6 million. As of June 2012, 3,907,451 LLINs had been distributed in five of nine regions, of which PMI funded 3,482,848 nets for distribution in Sikasso, Segou and Mopti Regions.

Over the past year, RDTs were scaled up nationwide, leading to increased levels of confirmed testing. Of the 75 health facility sites surveyed, more than 67% of children under five with suspected malaria had a confirmatory test with RDT according to an end-use verification (EUV) survey conducted in December 2011. Although this figure is not nationally representative, it does suggest an improvement when compared with the less than 10% diagnostic conformation levels reported pre-PMI. In addition, according to a new short message service (SMS)-based reporting system piloted in two districts, the percentage of suspected fever cases tested by microscopy or RDT between July 2011 and November 2012 has reached 96%.

CHALLENGES, OPPORTUNITIES AND THREATS

Recent political events, as well as persistent issues related to NMCP capacity and challenges in coordinating donor funding conspire to threaten Malians' access to malaria prevention and treatment interventions. The situation in Mali is dynamic, however, and with a thorough

understanding of these challenges, PMI can leverage resources, both technical and financial, to address these threats.

Two specific issues pose major challenges to malaria activities in general, and PMI activities specifically:

- Access to the northern regions of Gao, Tombouctou, and Kidal, which are in the hands of various extremist groups, is very limited due to security concerns. This situation limits the ability of the NMCP to respond to malaria epidemics and endangers the population of those regions who have low immunity against malaria and limited access to quality malaria services. In addition, data collection activities, such as the 2012 DHS and routine monitoring and evaluation activities, cannot currently be implemented. The country anticipates that as the region stabilizes, proposed activities, such as epidemic surveillance and response, can be resumed. If security threats continue, the scope of proposed activities will be revisited and redirected to the central and southern regions.
- Mali's southern regions comprise the hyperendemic malaria zone and have received more than 155,000 internally displaced people (IDP) from the northern regions. This presents a logistical problem in many ways: the need to plan and budget commodities for an increased IDP population in Mopti and other southern cities; and the real possibility of epidemics of malaria due to the lower immunity of the IDPs who have not been exposed to endemic malaria previously. PMI's FY 2012 funding is reprogrammed to address some of these concerns (see Epidemic Surveillance and Response section).

The NMCP has several administrative and managerial issues to resolve, including:

- Inadequate office space and inefficient electricity supply and internet connectivity;
- Insufficient qualified staff at all levels;
- Inefficient supply chain management systems where malaria drugs are often available at national and regional levels but not at the health facilities and community level;
- Difficulty coordinating multiple donor partners with different agendas;
- Limited access to primary health care in Mali;
- Despite some progress in routine system strengthening, the quality and use of HMIS data still has major issues including timeliness, completeness, and accuracy, and data are not routinely used to inform decision-making.

The Mali team has taken these challenges into consideration during the FY 2013 MOP planning process. Proposed activities seek to address these issues, including continued M&E support for routine system strengthening, supply chain management, and pilot approaches to iCCM to increase community access to health care.

Finally, suspension of the Global Fund malaria grant activities and disbursement of funding in 2010 have added additional challenges in ensuring that adequate malaria prevention and control measures are in place for the population. The Global Fund intends to finalize and sign Mali's consolidated malaria grant (Round 6 Phase 2 and Round 10) in September 2012, helping boost malaria prevention and control efforts in Mali with procurements of key malaria commodities, including LLINs, ACTs and RDTs. PMI will work closely with the Global Fund and its Principal Recipients to coordinate on these efforts.

PMI SUPPORT STRATEGY AND EXPECTED RESULTS

PMI will support the NMCP and its key objective in malaria control by filling gaps in commodity procurement to ensure the availability of LLINs, RDTs, and ACTs at the local level and bolstering the supply chain to avoid future stockouts. PMI funds will be used to update and develop skills in diagnostics and case management among providers, principally at the community and CSCOM levels, but also throughout the health system. The overall health system will be strengthened through improved approaches to monitoring and evaluation, including enhancements to the routine health information system and training of health care providers and managers on use of data for decision-making. Several operations research activities will be undertaken to fine-tune program implementation for the Malian context. Finally, all the service provision improvements will be supported through a strong program of IEC/BCC to improve knowledge about malaria control in the communities.

Some of the expected results of the PMI program include:

Prevention:

1. PMI will support targeted IRS spraying in three districts, protecting a population of approximately 700,000 people.
2. PMI will procure approximately two million LLINs: 1.4 million LLINs to launch the 2014 mass campaign in Sikasso to maintain universal coverage, and 600,000 LLINs to be distributed during ANC and EPI to cover gaps in target populations through the routine system.
3. PMI will procure 1.73 million SP treatments for the needs of the approximately 900,000 pregnant women in Mali.

Case management:

1. PMI will procure approximately 1.5 million treatment doses of AL, 2 million RDTs and severe malaria drugs to ensure prompt and effective treatment of malaria cases at facility and community levels as well as contribute to epidemic preparedness and response. These figures are based on the assumption that Global Fund and GOM are procuring additional stocks to meet the country's annual commodity needs.
2. PMI will continue to support implementation of iCCM in nine districts together with Global Fund, UNICEF, and CIDA to scale up coverage and increase access to health care for children under five.

OPERATIONAL PLAN

INSECTICIDE-TREATED NETS

NMCP/PMI Objectives

The MOH supports the provision of free LLINs distributed to target populations through two main delivery channels: mass distribution to households as part of universal coverage campaigns and routine distribution through antenatal care (ANC) and child immunization clinics. Mali defines achievement of universal coverage as one LLIN for every two persons. Since 2006, the MOH has provided free LLINs to children less than five years of age in an integrated campaign and through a phased national universal coverage campaign for all susceptible populations (2011-2012). To sustain coverage, the MOH seeks to provide free nets to pregnant women at their first ANC visits and to infants when they complete their immunization series.

Progress during the last 12 months

Traditionally Mali has had a strong culture of net ownership and use. Ownership of at least one net per household is high, as is use in the vulnerable population. According to the A&P survey conducted during the peak transmission season in 2010, 85% of households owned at least one net. Among survey respondents, 70% of children under five slept under a net the previous night. During the dry season that same year, a MICS found that 77% of households owned at least one ITN; 59% of children under five and 55% of pregnant women slept under a net the previous night. These findings suggest that Mali has maintained high net ownership since December 2007, when the Malian Government and its health partners distributed 2.8 million LLINs to children under five during an integrated child health campaign.

Following its adoption of universal coverage goals, Mali launched a rolling, phased campaign in April 2011 to achieve 100% ownership and 80% use of LLINs in the general population, and to replace old nets distributed in 2006. The NMCP and partners opted for a phased approach to the campaign, starting with Sikasso Region and proceeding to other regions until sufficient resources were available to cover the entire country. An estimated 8.67 million nets were originally required based on a population of 15.6 million. As of June 2012, more than 3.9 million LLINs had been distributed in five of nine regions, of which PMI provided more than 3.48 million LLINs for distribution in Sikasso, Segou and Mopti regions. PMI will procure approximately 838,000 LLINs, completing distribution in the remaining four districts of Mopti Region. UNICEF will provide 70,000 nets for the three northern regions. With PMI completing distribution in Kayes, and World Vision providing sufficient LLINs in Koulikoro, only Bamako (1.15m nets) remains to be completed in this campaign cycle. The Global Fund's LLINs are planned for distribution in Bamako. Note that pre-universal campaign ownership of enough ITNs to cover all household occupants—defined as one ITN for every two persons—was low: a secondary analysis of the 2010 A&P survey completed for the WHO 2011 World Malaria Report showed that despite high coverage of one ITN for every household, only 30% of households had enough ITNs to cover all household members; this was an improvement, however, from the 2006 DHS which showed only 13% of households had enough ITNs to cover all household members.

The 2012 DHS results should clarify whether the rolling campaigns helped the country achieve high coverage for all susceptible persons.

PMI continued to complement its campaign support with funding for routine LLIN distribution. In 2011, data collected through the SLIS showed 281,865 LLINs distributed to pregnant women through antenatal clinics (or 36% of the target), and 248,290 nets distributed to children under the age of one year (or 40% of the target). This is a decrease from the 2010 SLIS report which indicated 60% of pregnant women attending ANC and 84% of infants at immunization clinics had received free LLINs. The delay in receiving Global Fund Round 6 nets for routine distribution, coupled with the possible reallocation of some LLINs to the universal campaign, may explain this decrease. The 1.3 million LLINs that PMI procured through FY 2011 funding were used in the universal coverage campaign. In the six southern regions, the NMCP reported in June 2012 that routine stocks were adequate in five regions through September 2012 and in Bamako through December 2012. Global Fund authorized the continued distribution of 757,668 nets originally programmed for 2011 to routine distribution in 2012.

Support has continued for improving coordination of IEC/BCC activities among PMI and NMCP partners to ensure uniform messaging on promoting correct and consistent LLIN use throughout the year. To refine this messaging, PMI is supporting a study of the culture of net use in Mali with FY 2011 funding. Through qualitative research in two regions, the study will identify barriers to net use as well as current practices for net care and repair. The results will inform a new national LLIN communication strategy. Though the study design was completed and cleared in the US and Mali, political events postponed implementation.

The southward migration of over 155,000 persons from the three northern regions since March 2012 raised concerns about the possibility of malaria epidemics occurring in the bordering areas, especially in the Mopti region. As part of its plans for epidemic response, the NMCP seeks 200,000 extra LLINs to distribute to the CSCOMs in the affected regions.

Challenges, Opportunities and Threats

- With Global Fund support in question or delayed, the NMCP must diversify its funding sources for both campaigns and routine services. PMI was working with the NMCP to develop a partner advocacy plan to identify new funding sources when the March 2012 events halted further action. This delay may postpone implementation of the new campaign cycle and further compromise achievement of the country's universal coverage goals.
- The DHS could find that the percentage of households with enough ITNS to cover all occupants remains low despite the rolling universal coverage campaign. If so, PMI could explore new approaches to increasing ownership, such as distribution through schools and other intensified community-based efforts.
- Despite high ownership and use rates in the highest risk populations, the surprisingly high parasitemia and anemia rates found in 2010 raise questions about net effectiveness. Effectiveness may be compromised in terms of the net condition, insecticide retention or resistance to the pyrethroid insecticide used on LLINs. Research being supported by PMI on the effectiveness of a new dual-insecticide treated LLIN on malaria transmission and

parasite prevalence may help inform national policy on the choice of LLINs for Mali to procure.

Commodity Gap Analysis

The NMCP's Road Map document prepared for Roll Back Malaria in February 2012, with updates from PMI in July 2012, notes the following number of nets available or committed by the MOH and partners:

LLIN Gap Analysis

Partner	2011	2012	2013	2014	2015
PMI - 2011 nets used for mass campaign	2,888,171	2,300,000	2,000,000	0	0
UNICEF	360,000	70,000	0	0	0
Global Fund- 2012 and 2013 nets targeted for routine	0	1,339,769	1,005,094	1,059,278	7,722,080
World Vision – 2012 nets are for campaign in Koulikoro	0	1,422,800	0	0	0
GOM - All GOM nets will be used for routine	477,543		500,000	500,000	500,000
Total of LLIN which are available	3,725,714	5,132,569	3,505,094	1,559,278	8,222,080
Total need	7,335,000	6,468,711	4,600,000	1,592,429	9,829,810
Total GAP	3,609,286	1,336,142	1,094,906	33,151	1,607,730

Mass campaign distribution needs: For a population of 17,693,658 in 2014, the country will require 9,829,810 nets to be procured to ensure one net for every two persons, assuming existing nets older than 3 years are not counted. Originally the MOH had planned to conduct its next mass campaign in 2015, but is now considering launching the campaign cycle earlier in 2014 to replace nets distributed in 2011. If the Global Fund is able to provide its 2015 funding earlier and allocates it to the campaign, the contributions from PMI in FY 2013 (1.4 million nets) plus

those from the Fund (6.6 million nets) would still leave a gap of 1.8 million nets. We hope that advocacy efforts supported by PMI will help identify new funding sources to cover this gap.

Routine distribution needs: For the 2014 calendar year, the NMCP and partners estimate the following needs for routine distribution through ANC and immunization clinics:

	Totals	Comments
Total population 2014	17,693,658	
Pregnant women	884,683	5% of total population
Children under one year of age	707,746	4% of total population
Total routine LLIN needs	**1,592,429**	

For a population of 17,693,658 in 2014, the country will require 1,592,429 nets for routine distribution to pregnant women and children under one year of age. With the following planned procurements: 1.1 million Global Fund nets, 600,000 PMI nets and 500,000 GOM nets, all routine net needs will be covered. This depends however on the signing and disbursement of the Global Fund Consolidated Round 6 and 10 funding and the Government's ability to honor its commitments made before the March 2012 events. If the Global Fund and the Government honor their commitment then PMI will divert its routine nets into the 2015 mass distribution campaign.

Plans and Justification

PMI will continue its strong support of Mali's universal coverage strategies through both mass campaigns and routine services. Data from the upcoming 2012 DHS as well as operational research on barriers to nets use and dual-insecticide treated nets will help inform future national LLIN strategies.

Planned activities with FY 2013 funding ($9,958,000)

LLIN procurement: PMI will procure at total of two million LLINs to support the NMCP's universal coverage objectives. Of these, 1,400,000 nets will help launch the 2014 mass campaign cycle in Sikasso Region, and 600,000 nets will be provided to children under one year of age and pregnant women through routine services nationwide. ($8,000,000)

Distribution of LLINs: PMI will support the distribution and follow-up of free LLINs through the mass campaign in Sikasso Region and through routine antenatal and immunization services at the CSCOM level for infants and pregnant women. This support will include efforts to improve LLIN supply management, tracking and forecasting for routine LLIN distribution. ($1,500,000)

Post-campaign assessment in Sikasso Region: PMI plans to support a post-campaign assessment to evaluate universal coverage in Sikasso Region and to inform the remaining cycle of the universal coverage campaign in the rest of the country.This survey will be the first post-campaign evaluation for a mass universal coverage campaign (one net distributed for every two people). Because the MIS, planned for 2014, would not include the process questions and would not be powered to the regional level, a separate survey is needed to ensure campaign methods are

sound and to modify approaches as needed before continuing the campaign in the rest of the country. ($100,000)

Procurement of dual-insecticide treated nets and LLINs for operational research project: To explore alternative vector control options in the face of potential resistance in the pyrethroid insecticide used on nets, PMI will support an operational research project with MRTC to assess the impact of new dual-insecticide treated nets on malaria transmission and parasite prevalence. Described fully in the FY 2012 MOP and approved for funding, this project was postponed due to political events in March 2012. ($143,000)

LLIN logistics strengthening for NMCP: In parallel to other logistics strengthening efforts, PMI will provide resources for the NMCP to improve its own LLIN logistics management capacity, focusing on net tracking, coordination of donor inputs, and improving delivery systems from the district to CSCOM levels. ($40,000)

BCC for LLINs: In collaboration with the CNIECS, PMI will support efforts to harmonize strategies and message designs related to LLIN distribution through mass campaigns and routine services. Focus will be on using the results of the culture of net use study to address barriers to net use and promote net care and repair. ($175,000)

INDOOR RESIDUAL SPRAYING

NMCP/PMI Objectives

The NMCP's Strategic Plan envisions an integrated vector control program that includes LLINs, IRS, and destruction of larval habitats, larviciding, and environmental management in urban zones. The NMCP considers IRS to be most effective in areas of the country where malaria transmission is perennial and occurs in seasonal peaks that vary in duration from three to six months. This excludes 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 ideal for 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 transmission occurs.

In support of the NMCP's strategic plan to scale up IRS, PMI has supported spraying in three contiguous districts to act as the nucleus for future IRS districts. No Global Fund-supported or other private sector IRS activities are currently underway. Private mining 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.

The national strategy recognizes the importance of entomological monitoring to guide the IRS strategy. Routine surveillance of vector insecticide resistance as well as other indicators such as vector taxonomy, density, and biting behavior, inform the NMCP's program decisions about operations and selection of insecticides. Based upon the Malaria Research and Training Center's (MRTC) 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 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.

In addition to the three IRS districts monitored, entomological monitoring at sentinel sites jointly-funded by PMI and the Gates Foundation, have documented varying levels of pyrethroid resistance of *Anopheles* mosquito vectors. Susceptibility bioassay results reported in 2011 indicate full susceptibility to carbamates and organophosphastes, and resistance to pyrethroids and DDT. [3] As a consequence of reviewing these results, the NMCP in collaboration with the Ministry of Agriculture and Sahelian Committee of Pesticides decided to rotate the IRS insecticide class used in 2011 as part of the national IVM strategy for managing insecticide resistance and preserving the effectiveness of pyrethroids used on LLINs. A carbamate insecticide, bendiocarb, was therefore selected for the 2011 IRS spray round because of its proven efficacy in killing wild *Anopheles* mosquitoes.

The residual efficacy of the June 2011 IRS carbamate round was assessed at one, three, and four months post-treatment. At one month post-IRS, walls were fully insecticidal (>80% mortality following exposure) at seven of eight sites. However, at three months post IRS, results indicated that the IRS residual effect had failed (<80% mortality) in all three IRS target districts. Therefore, to maximize the effectiveness of the carbamate during the malaria transmission season, the 2012 spray rounds started one month later, in July, to provide the greatest protection during the most intense malaria transmission period (September - November). Despite the relatively short duration of insecticidal effect observed for carbamate in 2011, IRS monitoring results showed that the intervention had a significant impact on entomological indicators of impact: vector-human biting rates, vector infection rates, entomological inoculation rates and vector density.

Change in Entomological Indicators Associated with 2011 IRS with Carbamate: Assessments from Baroueli IRS target sites before (August 2010) and after (August 2011) IRS[4]

Indicator	August 2010	August 2011
Human biting rate[a]	112	23
Vector infection rate[b]	7	0.7
Entomological inoculation rate[c]	8	0.2
Vector density[d]	28	3.2

[a] number of bites/person/month
[b] vector-*P.falciparum* infection rate (%)
[c] infective bites/person/month
[d] density per room

These results show that the use of a carbamate insecticide for IRS can significantly reduce entomological measures of malaria transmission in this area of Mali.

3 Malaria Research and Training Center (MRTC), Annual Progress Report (2010-2011)
[4] Malaria Research and Training Center (MRTC). Annual Progress Report (2010-2011)

Progress during the last 12 months

Mali's 2011 Roll Back Malaria Road Map calls for a malaria vector control strategy based on universal coverage with LLINs and targeted IRS. [5] Working with the NMCP, PMI has supported one spraying round per year since 2008 as shown below:

PMI-Supported IRS Spray Rounds (2008-2011)[6]

Date	Insecticide (class)	Target districts	Structures Sprayed	Population Protected
July - August/2008	λ-cyhalothrin (pyrethroid)	Bla Koulikoro	108,000	420,580
May - July /2009	λ-cyhalothrin (pyrethroid)	Bla Koulikoro	127,000	497,122
May - June/2010	deltamethrin (pyrethroid)	Bla Koulikoro	127,000	441,000
June - July/2011	bendiocarb (carbamate)	Bla Koulikoro Baroueli	203,000	700,000
July - August/2012*	bendiocarb (carbamate)	Bla Koulikoro Baroueli	205,066	758,021

*****Preliminary results, from 2012 spray round..

Since 2008, PMI funds have supported Mali's first large-scale IRS campaign in the districts of Bla and Koulikoro, with continued support of both districts in 2009 and 2010. At the request of the NMCP, PMI added a third district (Baraoueli) in 2011 to support the national strategy. PMI plans to maintain its support of IRS in all three districts in 2012 including 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 are carried out each year. The 2012 IRS campaign from mid-July through September, is conducted in all three districts, reaching an estimated 700,000 beneficiaries and 215,000 houses targeted although exact coverage estimates are not yet available). About 769 supervisors and spray operators are being trained for IRS operations and 1,172 *relais* (community volunteers) are receiving BCC training and materials to conduct informational group meetings and door-to-door mobilization before spraying.

PMI continues to support entomologic monitoring of the IRS program to determine the quality and duration of insecticidal activity on walls during the malaria transmission season. Monitoring in Bla and Koulikoro districts began shortly after the spray round was completed in July 2011 and included WHO cone bioassays, pyrethroid spray catches and indoor and outdoor human

[5] Feuille de Route pour l'atteinte des Objectifs RBM. 2011

[6] PMI IRS partner end of spray season reports

landing catches. Extensive laboratory analyses have been performed on collected specimens to determine important entomological parameters.

Prior to the start of the 2012 spray round, and in response to the 2011 entomological monitoring results, PMI planned to conduct an evaluation to identify factors associated with the short duration of insecticidal effect as well as remedial steps to prolong it in the future. However, this activity scheduled for March-April 2012 was delayed indefinitely due to the political situation in Mali. The recent lifting of the suspension of IRS activities as of early July 2012 did not allow sufficient time to implement the proposed evaluation.

Challenges, Opportunities and Threats

- In Mali, IRS must be targeted to those areas most at need and its residual effect extended to cover the transmission season. In addition, the appropriate deployment of an IRS strategy requires careful selection of insecticides and rotation strategies to mitigate possible resistance issues.

- In 2010, the MOH expressed interest in costing an IRS strategy. PMI supports assisting the MOH with the development of their strategy, which will be integrated into the National Integrated Vector Management (IVM) Strategy. The IVM and IRS strategy were in the process of being finalized and translated in August of 2012.

- Significant entomological capacity already exists in Mali through the MRTC. The country has the potential to develop a strong IRS program if the NMCP and its partners leverage and build upon existing local technical expertise and identify adequate financial resources. Further capacity would need to be developed to conduct insecticide resistance assessments to inform vector control approaches; develop private sector relationships with the mining companies to extend their spraying activities to other zones; and finalize the NMCP's IVM strategy to align the various approaches and efforts of multiple donors into one concerted push.

Plans and Justification

In FY 2013, PMI will continue to support the NMCP's national strategy for IRS in the three districts targeted to date, including supporting the full package of training, supervision, communications and spray operations. To address such technical challenges as vector insecticide resistance and maximizing the effective life of the insecticide, PMI will strengthen entomological monitoring and vector insecticide susceptibility to inform program management decisions on IRS, LLINs and vector insecticide resistance. PMI will strengthen support for vector collection and resistance testing at the ten entomological surveillance sites established under an earlier project funded by WHO and the Bill and Melinda Gates Foundation. Surveillance will incorporate new resistance testing methods developed by CDC to identify mechanisms of vector insecticide resistance and to monitor the distribution of phenotypic resistance countrywide. Additional entomology IRS monitoring activities will be implemented in IRS and non-IRS areas for comparison before and after IRS to provide data on impact in real time.

Planned activities with FY 2013 funding ($5,484,000)

IRS implementation: PMI will support one round of IRS in three target districts to spray approximately 208,000 households. Insecticide resistance patterns, assessed following the 2013 IRS round, will be used to inform the choice of insecticide. Communications efforts to promote acceptance and compliance with IRS will precede the spray round. PMI will also assist the NMCP to develop a stratification plan for use in targeting the highest malaria risk health zones in the IRS area. ($5,100,000)

Technical assistance for vector control activities: A CDC entomologist will conduct two technical assistance visits: one to assist the PMI entomology monitoring partner to evaluate IRS insecticidal activity and to conduct operations research on dual-insecticide LLINs; and a second trip to design and supervise expanded entomological surveillance to evaluate vector insecticide resistance using CDC testing methods. ($24,000)

Entomological monitoring for resistance mapping and IRS impact evaluation: PMI will support: (1) Annual vector insecticide susceptibility monitoring at ten sites to inform selection of IRS insecticides, and map trends in vector susceptibility; evaluate the impact of resistance management strategies and of combined IRS and LLIN activities; (2) Conducting IRS-related entomological assessments at ten sites: six in IRS districts (two per district) plus four non-IRS (comparison) sites. ($360,000)

MALARIA IN PREGNANCY

NMCP/PMI Objectives

Mali's malaria in pregnancy (MIP) strategy applies WHO's three-pronged approach: providing two doses of intermittent preventive therapy for pregnancy (IPTp) with sulfadoxine-pyrimethamine (SP), promoting the use of LLINs distributed free at the first ANC visit, and effective case management of suspected malarial illnesses. The NMCP has set ambitious goals for MIP through the National Strategic Plan. The program aims to provide 100% of pregnant women living in stable transmission zones with two doses of SP for IPTp at ANC services as per the national guidelines. The NMCP also has a goal of universal coverage with LLINs and, as part of that policy, intends to provide bed nets to all 100% of pregnant women through ANC clinics, as a supplement to the mass campaign distribution. In 2006, the MOH issued directives ensuring free provision of SP for IPTp. In April 2010, this policy was reinforced and treatment guidelines were updated to include oral quinine for the treatment of malaria in pregnant women in the first trimester, and ACTs for treatment in the second and third trimesters. Currently, WHO is reviewing its recommendations for IPTp and may recommend dosing with each ANC visit after quickening. Should WHO recommendations change, PMI will work closely with the NMCP to integrate the new recommendations into the existing protocols, training, and BCC materials.

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 attending

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. IPTp coverage will be assessed in the 2012 DHS. Health facilities also 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. The 2011 SLIS showed 55% of pregnant women attending one ANC visit obtained one dose and 36% received two doses of SP.

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 includes MIP and IPTp.

The CNIECS (*Centre National d'Information Education et Communication pour la Santé*), which is tasked with creating 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.

Progress during the last 12 months

PMI has supported in-service training and supervision of health providers, in collaboration the RH, NMCP, and Midwives Association to facilitate the implementation of the MIP guidelines as well as the training of health providers on interpersonal communication, an area cited by the MOH's CNIECS as a challenge. In 2011, a total of 1,983 health workers were trained on the new training documents. PMI implementing partners have also helped produce a technical guide for providers with key MIP BCC messages, developed IEC outreach materials for *relais* (community volunteers) and radio and TV campaigns on IPTp. PMI also continued to support refresher training for *relais*, with a focus on men and key decision-makers in households.

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. PMI supported a multi-channel 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 health facility, 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 increasing demand for proper treatment of malaria in pregnancy.

Challenges, Opportunities and Threats

- A considerable barrier to IPTp in Mali arises from pregnant women having to pay for antenatal care. In 2006, the MOH announced that IPTp would be provided free; however, some pregnant women continue to be charged for other complementary laboratory tests. 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 has been ongoing at the central level and currently women are only required to pay for ANC cards ($2-4 depending on the fees determined by their community health association management team – ASACO). Future visits and the ANC package of care are provided free of charge for the duration of the pregnancy. However as Mali functions under the Bamako Initiative cost recovery system, it is unlikely that PMI will be able to advocate alone for a change in the cost recovery structure.
- There remain concerns that both providers and community members misunderstand the importance of preventing malaria in pregnancy and the effective mechanisms available to do so. PMI has planned a strong program of training for providers to reinforce the message that MIP activities are integral to the focused antenatal care (FANC) approach that WHO recommends.
- Mali has experienced stockouts of SP due to procurement and supply chain management issues. In April 2011, the end-use verification survey found SP available in all referral centers and health facilities while all district warehouses were stocked out. By the end of the year, 85% of the health facilities reported stockouts of SP. PMI and UNICEF planned to jointly fund the procurement of enough SP to cover the anticipated needs for 2012. To avoid a similar situation in 2013, PMI intends to purchase sufficient SP to cover all national needs.

Gap Analysis

To maintain the NMCP objective of 100% coverage of all pregnant women with IPTp2, the projected annual need for SP in 2014 is approximately 1.73 million treatments (two doses per pregnant woman) for the estimated 866,265 pregnant women nationally. Currently neither the MOH nor other donors have committed to purchasing SP to cover the annual IPTp needs; therefore PMI intends to fill this gap.

Plans and Justification

PMI will support the NMCP and MOH with its multi-pronged approach to MIP, including contributing to annual MIP commodity needs (LLINs and SP), improving facility-level FANC services and health provider practices through training and supervision and promoting coverage of MIP interventions through community mobilization and BCC messages. PMI will support early and frequent attendance of pregnant women at ANCs, and work with the MOH and other donors to ensure SP is available, used correctly and provided free to pregnant women for IPTp. Through training of health providers in FANC and strengthening of the commodity system, PMI will continue to improve malaria in pregnancy services and increase IPTp rates. PMI will also support engagement and mobilization of pregnant women and the promotion of malaria in

pregnancy MIP services at the community level through religious/traditional leaders, midwives, and coordinated and harmonized IEC/BCC activities.

Planned activities with FY 2013 funding ($680,000)

SP procurement: PMI will procure 1.73 million SP treatments to cover the annual need for 866,265 pregnant women in 2014 including handling and distribution costs. To increase uptake of IPTp directly-observed therapy, PMI will provide 250 health centers with sufficient water filters, and cups so that IPTp can be taken with clean water at the facility. ($175,000)

Facility-level service provider training and supervision: PMI will update supervision and training materials and ensure the malaria in pregnancy guidelines are disseminated to all health facilities. PMI will support training of health providers to provide quality services to pregnant women at ANC visits including ensuring the provision of free SP for IPTp. PMI will work with partners, including the MOH Reproductive Health Division and the Midwives Association, to expand use of the in-service FANC training module and increase supportive supervision during IPTp implementation nationally through facility and community outreach activities. ($380,000)

BCC for ANC and IPTp: 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-treatment courses of IPTp, ensuring that LLINs are given free to pregnant women at their first ANC visit, and demand creation for proper treatment of malaria in pregnancy. PMI will continue to link BCC activities with HIV/AIDS messaging where appropriate. ($125,000)

CASE MANAGEMENT

Diagnostics

NMCP/PMI Objectives

Mali updated its case management policy according to WHO guidelines to require that 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. Microscopic diagnosis is performed in four national, six regional and 60 district hospitals at a cost ranging between 300 and 2000 FCFA ($0.75-$5) per blood smear. In addition to hospitals providing microscopy, some privately-operated CSCOMs staffed with physicians and/or laboratory technicians also perform malaria microscopy. RDTs are provided free of charge to children less than five years of age and pregnant women and highly subsidized for other groups. *The Institut National de Recherche en Santé Publique* (INRSP) is responsible for quality control of all diagnostic services. The NMCP has recently updated its choice of malaria RDTs to include SD Bioline Malaria Ag Pf and Paracheck Pf and requested a small quantity of SD Bioline Malaria Ag Pf/Pan for use in the northern regions where up to 8% of malaria cases are *P. vivax* infections according to a study conducted by the MRTC in 2004.

Progress during the last 12 months

With FY 2011 funding, PMI procured more than 1.1 million RDTs and 65 microscopy malaria supply kits for use at district and health facility levels, and supported training on malaria diagnostics and case management for 1,258 health workers, which included 833 health facility workers and 425 ASC. To improve the quality of diagnostics at health and community level, PMI supported the NMCP, INRSP and MRTC to conduct joint supervisory visits in all regions of the country except the north where access was restricted due to the political insecurity. According to the End Use Verification (EUV) assessment conducted in December 2011, more than 67% of children under five presenting at health facilities with suspected malaria had their diagnosis confirmed with an RDT. This signals an overall improvement for Mali compared with the less than 10% of reported cases that were confirmed with a diagnostic test before the policy change. The GOM supported the new policy by procuring 1.5 million RDTs, adapting training manuals for malaria laboratory diagnosis, and developing a master training plan for malaria laboratory diagnosis (microscopy and RDTs) carried out at district level. According to the 2011 end-use verification assessment, more than half of all health workers at 75 sites surveyed are responsible for administering RDTs. Across all health service delivery sites, 61% of health workers had been trained, with the largest percentage trained being hospital workers (92%), followed by CSCOMs facility staff (64%) and the lowest percentage being at referral health centers (57%). Despite this high percentage, the rate of malaria diagnosis using RDTs remains low across health facilities (19% of health delivery sites for uncomplicated malaria and 23% for severe malaria).

Challenges, Opportunities and Threats

- Though access to quality diagnostics is a problem throughout Mali especially in rural areas, it is now particularly difficult in the north due to insecurity. Providing commodities, training and supervision will be a challenge. The program will have to rely on multilateral agencies with access to the north to assist with delivering diagnostic and other services.

- The INRSP has not yet finalized a quality assurance and quality control plan for laboratory services and all diagnostics. Implementing a plan is critical to maintaining NMCP and WHO diagnostic standards.

Gap Analysis

The Global Fund Round 10 proposal, developed in 2009, planned to cover all RDT needs in 2012 and 2013; however it is unclear how the RDT gap analysis was calculated since currently the NMCP does not have reliable RDT consumption data to calculate quantities needed for health facilities and iCCM. In addition, the 2.96 million Global Fund RDTs planned in 2012 have not yet been procured. PMI anticipates that there will be gaps in RDTs needed in 2012, 2013 and 2014 based on the following assumptions: an underestimate of the national RDT need for all age groups at facility level based on the 38% national parasite prevalence reported in 2010; the potential of underestimating quantities of RDTs needed for scaling up iCCM activities

with ASCs; and possible Global Fund procurement delays in 2012 and 2013. Since the consolidation of the Global Fund negotiations are currently underway, the timing of fund disbursements and subsequent procurements are presently unknown (funds may not be available before 2013). In addition, there are 155,000 internally displaced people from the north currently residing in Mali's southern regions who are at greater risk of malaria and will require access to malaria diagnosis and treatment.

RDT Gap Analysis	**2012**	**2013**	**2014**
RDTs Needed			
RDT needs at the health facility level	1,488,957	1,411,834	1,360,274
RDT needs for iCCM	2,358,756	2,437,048	2,607,112
RDT needs to meet gaps	1,000,000	1,000,000	1,000,000
Total RDTs needed*	**4,847,713**	**4,848,882**	**4,967,386**
RDTs Planned			
Estimated Global Fund contribution for health facility needs and ASC's implementing iCCM package**	*2,962,464*	*3,848,882*	3,967,386
PMI RDTs for health facility, iCCM and unmet needs and gaps	1,100,000	2,000,000	1,500,000
Total RDTs planned	**4,062,464**	**5,848,882**	**5,467,386**
RDT gap/surplus	-785,249	1,000,000	500,000

*RDT needs for facility and iCCM are based on estimates provided in the Global Fund Round 10 proposal developed in 2009

** The RDTs planned for 2012 have not been procured as the consolidated Global Fund grant is still under negotiation; PMI anticipates a potential gap of 2.96 million RDTs in 2012 and 3.85 million RDTs in 2013 depending on timing of the Global Fund grant signature, funding disbursement and procurements.

Plans and Justification

To support the NMCP and maintain the increasing trend of malaria confirmation, PMI will procure sufficient RDTs and microscopy kits to contribute to the annual nationwide need. As a result of the gap analysis, PMI plans to procure 1.5 million RDTs in FY 2013 to contribute to health facility and iCCM needs for the period of 2013-2014. A portion of these RDTs will be available for emergency and epidemic preparedness and response. PMI will also work closely with NMCP, Global Fund and supply chain management partners to conduct a more thorough RDT gap analysis and quantification exercise in the next year. Once the consolidated Global Fund grant is signed, funds disbursed and procurements underway, PMI will revisit and adjust its planned RDT quantities for FY 2013 to more accurately reflect the country's needs and gaps. PMI will continue to work with the Global Fund and the GOM to coordinate the quantification and the procurement of key diagnostics commodities. PMI will continue to support supervision and on-site training of health facility workers to improve the quality of services.

PMI will also continue to support formative supervision of laboratory technicians and clinicians. The INRSP works with the MRTC and the NMCP to conduct QA/QC of malaria diagnostics in health facilities with microscopy and RDTs. In Mali, laboratory technicians may not be

comfortable approaching clinicians about inappropriately treating patients who have a negative diagnosis (RDT or microscopy) with an ACT. The NMCP and INRSP staff will continue to assist with improving supervision of service providers and clinicians so that quality laboratory results are followed.

Planned activities with FY 2013 funding ($1,912,000)

Procurement of RDTs: PMI will procure approximately 2 million RDTs to cover the remaining gap left after contributions from the Global Fund Round consolidated grant for CSCOMs nationwide and to supply ASCs as part of the national iCCM strategy. This procurement also allows some room to fill potential gaps due to donor fluctuations. ($1,500,000)

Procurement of laboratory equipment and consumables: PMI will procure laboratory equipment and consumables to support microscopy testing in all 60 district hospitals and six regional hospitals. Laboratory consumables (slides, stain, etc.) will also be procured to support the INRSP's national reference laboratory and pre-service training. ($150,000)

Quality assurance/quality control for diagnostics: In addition to in-service training, PMI will support the NMCP and INRSP to finalize and implement a plan for quality assurance and quality control (QA/QC) for microscopy and RDT diagnostics, including regular supervisory visits. A combination of observation of health worker performing RDTs, comparing test results of RDTs stored under optimal conditions at the reference laboratory with RDTs stored in the field and using well-characterized parasite positive samples at the reference laboratory to check RDT performance. When necessary, RDTs will be sent to the FIND reference laboratories for quality checks. The plan will also include QA/QC for the nationwide scale-up for RDT diagnosis. ($150,000)

Technical assistance on diagnostics: A CDC laboratory technician or epidemiologist will provide technical assistance to refine the QA/QC plan throughout the health system down to the community level, and recommend best practices for the plan's implementation. ($12,000)

Formative supervision of laboratory technicians and clinicians: PMI will continue to support supervision and on-site training of laboratory technicians and clinicians. The focus of this training will be on microscopy, RDTs, quality of laboratory services and adherence to test results at regional, district, and CSCOM levels. ($100,000)

Treatment

NMCP/PMI Objectives

The MOH revised the national policy for the treatment of uncomplicated malaria to make artemether-lumefantrine (AL) the first-line drug in 2010. As per national directive, ACTs are free to children less than five years of age and pregnant women in the second and third trimesters. Two regimens are recommended for severe malaria: intravenous quinine or injectable artemether. PMI is supporting the use of pre-referral drugs, including injectable artemether and rectal artesunate.

The NMCP and MRTC initiated supervision of malaria case management practices in 2010 starting with Bamako and transitioning to other regions. These visits include district referral health centers (CSRefs) where the team provides training of trainers to district health leads to provide supervisory support in their specific district.. The team uses supervisory tools developed in collaboration with NMCP, PMI, MRTC and malaria partners to focus on the proportion of suspected malaria cases tested, adherence to test results when prescribing ACTs, and improving care of patients with severe febrile disease. NMCP and partners expect that these additional supervisory visits will improve case management practices in Mali, especially in Bamako where malaria prevalence is very low.

Poor geographic and economic access to care is a major challenge for malaria treatment in Mali. With approximately 1,050 CSCOMs in the country, 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). However, the 2006 DHS showed that only 31% of children less than five years of age with fever received any antimalarial, and only 15% were treated the same day or the day following symptom onset. Results of the 2010 A&P survey showed improvement in care-seeking for febrile children less than five years of age during the rainy season with 59% seeking care and 23% seeking care the day of or the day following symptom onset, but only 39% of children received an antimalarial and fewere than 8% received an ACT. Results of the 2009-2010 MICS showed similar results with 20% of children receiving an antimalarial the day of or the day following symptom onset. (Note that the type of antimalarial treatment received is not specified in the preliminary MICS report).

To overcome barriers of access to health services, the MOH adopted an integrated community case management (iCCM) package in February 2010 that includes treatment for malaria, diarrhea, pneumonia and malnutrition, essential newborn care, and family planning. Free treatment for children under five is provided by trained ASCs and includes malaria diagnosis with RDTs and treatment with ACTs. Severe cases are referred to CSCOMs.

Progress during the last 12 months

With FY 2011 funding, PMI procured 1.4 million ACT treatments provided to health facilities and to ASCs implementing iCCM. PMI supports implementation of iCCM in five health districts of Sikasso Region and in two districts each in Kayes and Ségou Regions. Through funding from Canadian CIDA, Population Services International (PSI) initiated community-

based malaria treatment by *relais* in two additional regions in 2010. With FY 2011 funding, PMI-supported partners have treated more than 14,000 malaria cases at the community level with trained ASCs in nine districts in Sikasso and Kayes. According to a UNICEF report of April 2012 on iCCM, a total of 1,651 ASCs have been trained in the full iCCM package and deployed in 41 of 49 districts in Mali.

PMI supported malaria case management and diagnostic training for 1,258 workers in health facilities in 2011. In Koulikoro, Sikasso and Ségou Regions, PMI supported the NMCP and MRTC to carry out supervisory visits with on-the-job training in malaria case management, including pre-referral management of severe malaria. According to the 2011 EUV survey , 47% of health workers involved in malaria case management at the 75 facilities surveyed had been trained in this area. Training rates were reported to be highest at the district referral centers (63%) and at the CSCOMs (41%).

Challenges, Opportunities and Threats

- Some of the fragile gains made in improving the quality of case management may be reversed with the current USG restrictions to work with NMCP or other GOM entities.

- Though the MOH has officially adopted iCCM, mobilizing the resources to support large-scale implementation will remain a challenge in case management.

- Due to uncertainty of the Global Fund Round consolidated grant, ensuring adequate stocks of ACTs, RDTs, SP, and LLINs in all health facilities also remains a challenge.

Gap Analysis

The NMCP's ACT quantifications were updated as part of the consolidation of Mali's Global Fund Round 6 Phase 2 grant and the Global Fund Round 10 proposal. The calculations were based upon the following assumptions: the incidence rate determined by 2009 reported cases, 90% of population in areas of endemic malaria transmission and 10% in areas of episodic transmission, health facility coverage (% of population within five kilometers of a health facility), 10% of patients testing negative and not receiving treatment, and a 5% buffer stock to avoid stockouts at health facilities. All Global Fund grants to Mali were suspended in 2010 based on the misuse of funds. PMI has communicated with the Global Fund Malaria Portfolio Manager who anticipates the Global Fund consolidated grant will be signed by September 2012.

The Global Fund consolidated grant requested the following quantities of ACTs as shown in the gap analysis table below; however, until the award is signed and funds are disbursed, PMI may be asked by the NMCP to assist with maintaining sufficient ACT stocks. PMI intends to contribute 1.5 million ACTs to the projected 2013 needs for health facilities, iCCM, buffer stock and a stock for epidemic surveillance and response.

ACT Gap Analysis	2012	2013	2014
ACT Needs*			
ACTs at health facility level			
<3 years (6 tabs)	357,150	338,651	326,283
3 - 5 Years (12 tabs)	239,204	226,814	218,531
6 - 14 years (18 tabs)	351,850	333,625	321,441
> 15 years (24 tabs)	650,733	617,027	594,493
Subtotal needs for health facilities	1,598,937	1,516,117	1,460,748
ACT needs for iCCM			
<3 years (6 tabs)	493,087	446,824	397,956
3 - 5 Years (12 tabs)	394,470	357,459	318,365
ACT Subtotal needs at community level	887,557	804,283	716,321
ACT buffer stock and emergency preparedness response	1,500,000	1,500,000	1,500,000
Total ACT Needs	3,986,494	3,820,400	3,677,069
ACTs Planned			
Global Fund will procure ACTs needed for health facility and iCCM**	*1,670,400*	*2,320,400*	2,177,069
PMI will procure ACTs for health facility, iCCM, buffer stock and emergency preparedness response	1,500,000	1,500,000	1,500,000
Total ACTs Planned	3,170,400	3,820,400	3,677,069
Gap/surplus	-816,094	0	0

* ACT needs for facility and iCCM are based on estimates provided in the Global Fund Round 10 proposal developed in 2009; updated estimates provided for the consolidated Global Fund grant are not yet available.

** The ACTs planned for 2012 have not been procured as the consolidated Global Fund grant is still under negotiation; PMI anticipates a potential gap of 1.67 million ACTs in 2012 and 2.3 million ACTs in 2013 depending on timing of the Global Fund grant signature, funding disbursement and procurements.

The Global Fund Round 10 grant planned to provide enough ACTs to cover needs at MOH facilities, but these projections are based upon the number of cases reported at health facilities. In order to reach the NMCP's goal of 85% coverage of febrile children with ACTs, scale up of community case management will be essential. The Global Fund consolidated grant is currently under negotiation and the ACTs for 2012 have not been procured. PMI anticipates ACT gaps in 2013 and 2014 due to unreliable consumption data. In addition, ACT needs for health facilities and scaling up iCCM implementation may be underestimated for a country with 38% parasitemia prevalence. The ACTs needed to support community-based treatment are difficult to project as

they depend on the ability of implementing partners to recruit, train, equip, and deploy ASCs to villages located more than five kilometers from an existing health facility.

Over the next year, PMI plans to work with the NMCP, Global Fund, and supply chain management partners to conduct a more thorough gap analysis of national ACT needs. Once the consolidated Global Fund grant is signed, funds disbursed and procurements underway, PMI will revisit and adjust its planned ACT quantities for FY 2013 to more accurately reflect the country's needs and gaps.

Plans and Justifications

PMI will contribute to fill annual needs/gaps in essential malaria commodities including ACTs and severe malaria drugs. PMI will also support the scale-up of the national iCCM policy including refresher training and supervision of ASCs and continued support for the community *relais* to carry out BCC/IEC activities. PMI will continue to support the NMCP with conducting formative supervision visits to assess the use of AL and artemether and artesunate for severe malaria.

Planned activities with FY 2013 funding ($2,820,000)

Procurement of ACTs and severe malaria drugs: PMI will procure 1.5 million AL treatments to fill gaps with Global Fund ACT procurements. PMI will also continue to procure pre-referral drugs for severe malaria, including 100,000 treatments of injectable artemether. ($1,700,000)

Supervision for malaria case management : After training health personnel at all levels in case management, PMI will continue to support 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 focused on improving health care provider practices. PMI is supporting several partners to provide diagnosis and case management support to the NMCP at various levels of the health system - national, regional, district and community levels. Both supervision and training on diagnosis and case management are provided as one integrated intervention. PMI holds quarterly partner meetings to ensure that training and supervision are carried out jointly by NMCP and implementing partners and that there is good coordination among all partners at all levels of the health system to avoid and prevent any duplication of activities.
This activity is strictly for supervision of case management, focusing on treatment seeking within 24hrs, confirmation of cases, ACT administration and compliance to treatment or referral.($400,000)

iCCM implementation: PMI will support iCCM implementation in five districts in Sikasso Region as CIDA is covering the four remaining districts of the region. In addition to Sikasso Region, PMI will continue to support iCCM in two districts each in Kayes and Ségou Regions for a total of nine districts. This includes continued support to the malaria/fever component of the iCCM package, with new and refresher trainings at district levels, supportive supervision, training in appropriate RDT use, evaluating ASC performance with RDTs, monitoring and evaluations of 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 current treatment algorithms. 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. ($600,000)

BCC for case management: PMI will continue to support the dissemination of 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 early care-seeking for febrile children and compliance with treatment regimens. The ASCs and *relais* will also educate care givers on signs of severe malaria that require referral. ($120,000)

Pharmaceutical Management

NMCP/PMI Objectives

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 delivers commodities from the central level to the regional level but has no capacity to ensure reliable transportation of commodities to the community health centers or community. The supply chain system is a combination of push and pull as the central pushes down to the regions and the community health center staff pull health commodities from the district pharmacies and community health workers obtain their health commodities from the community health centers. The regions order monthly from the central level whereas hospitals are on an automatic system of quarterly ordering. 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. Ideally, the CSOMs keep one month of buffer stock and the regional drug depot (*dépôt répartiteur des cercles)* keep two months' worth. However, there are significant problems with drug storage at district depots related to storage capacity, humidity, security and drug classification in warehouses. 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 provide guidelines for 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 biannually. Laws are in place to ensure quality control for imported drugs. The *Direction de la Pharmacie et du Médicament* (DPM) issues visas and imports licenses only after the exporter meets certification and other requirements. The *Laboratoire National de la Santé* (LNS) samples drugs, verifies quality, and has regulatory authority to monitor pre- and post-market quality of drugs and other products, including insecticides and bed nets. Expired or poor quality medicines are destroyed at the national level. DPM, LNS and customs meet quarterly to discuss regulations and importation or donation of medicines.

Pharmacovigilance: Pharmacovigilance is a high priority of the NMCP and the MOH. 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 some strengthening..

Progress during the last 12 months

While Mali's pharmaceutical management and policies were updated in the new national health sector strategy in 2012, supply chain management systems still need improvement and minimal progress was made due to the 2012 coup d'état. However, the MOH had sufficient stock available at the central level as of January 2012. The pilot districts implementing iCCM also reported no issues with stockouts of ACTs and RDTs. Monitoring stock closely and continuing to improve stock availability at all distribution levels has been a challenge. In order to support regular distribution of commodities, PMI supported the PPM to improve distribution of malaria commodities at all levels, including to the community level.

The LNS and INRSP are reporting regularly about adverse effects of medicines to the WHO monitoring center in Uppsala, Sweden and monitoring poor quality medicines identified in country. Enforcement of those purchasing and administering poor quality medicines is still a challenge.

Challenge, Opportunities and Threats

- Accurate quantification of malaria commodity needs is still a huge challenge in Mali as is effective distribution of commodities to the peripheral level. Distribution or request for commodities is often not seen as a priority by staff unless a direct motivation is included. The combination of a cost recovery system for adult medicines under the Bamako Initiative and the national policy of providing/delivering free antimalarials and treatment for pregnant woman and children under five creates a rather complicated system in whichthere is still inadequate funding to maintain a pharmaceutical and supply chain system, and patients are sometimes charged for free medicines. An even larger challenge is the constant stockout of malaria medicines at most levels outside central medical stores.

- Improved communication and coordination among the PNILP, the PPM and the DPM regarding supply chain issues, particularly quantification and distribution of malaria medicines is needed to improve the flow of medicines and maintenance of stocks.

- The sustainability of the country's supply chain system will depend on regaining previous functionality of parastatal institutions, such as the PPM and other government systems once the political troubles are over. The opportunity gained in FY 2012 to continue to work more closely at the community level should be maintained in some form.

Plans and Justification

The President's Malaria Initiative will continue to strengthen supply chain and logistics management including forecasting and tracking annual malaria commodity needs/gaps. PMI will work with the MOH to ensure that essential life-saving drugs, including ACTs, are pushed through the system to CSCOMs. Support to the PPM in delivering malaria drugs and commodities to the district depots and health facilities will continue. PMI will join with partners to ensure that medications, diagnostic kits, and other commodities donated to the MOH are distributed to CSCOMs by strengthening the distribution system and encouraging distribution of commodities at all levels of the health system. PMI will also work with the MOH to ensure appropriate coordination between the DPM and the PPM. .

Planned activities with FY 2013 funding ($690,000)

Logistics strengthening: PMI will continue to facilitate distribution of PMI-funded ACTs and provide technical assistance for pharmaceutical management, including forecasting commodities needs, 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. ($300,000**)**

Commodity distribution to CSCOMs: PMI will support the PPM to ensure essential malaria drugs and other life-saving commodities are delivered to the health facility level to avoid stockouts. ($150,000)

Drug quality control: PMI will continue to support testing of 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. ($240,000)

EPIDEMIC SURVEILLANCE AND RESPONSE (ESR)

NMCP/PMI Objectives

An estimated 1.5 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, Koulikoro, and Kayes Regions. The intensification of conflict in the north has created a migration of IDPs as well as refugees to neighboring countries. This movement of non-immune residents from the northern epidemic-prone regions to larger

cities and towns in the central and southern endemic regions increases their vulnerability to malaria.

Past NMCP strategic plans included implementation of an epidemic surveillance and response system (ESR) for the north of Mali. Objectives were to detect 80% of epidemic episodes within two weeks of their appearance, and to control 80% of episodes within two weeks of their detection. The NMCP has created a new epidemic management plan for 2012 to address the current IDP crisis as well as the continued epidemic threat in the north. This plan identifies the target areas based on migration of non-immune populations, areas not yet covered by the rolling universal coverage campaign and experiencing increased rainfall, and traditionally epidemic-prone areas (i.e., the north). The plan includes strengthening routine epidemic surveillance by: supporting all CSCOMs and CSREFs to systematically collect and report weekly malaria data; providing preventive measures (LLINs, IRS, SP) to areas at risk; organizing village health days; increasing BCC; ensuring case management through provision of ACTs, RDTs, and supervision; investigating all indications of malaria outbreaks; and ensuring a coordinated response by the district, regional, and national levels.

Progress during the last 12 months

The NMCP has developed training guides for malaria epidemic management. The existing Integrated Disease Surveillance and Response (IDSR) system is theoretically functional and should be reporting malaria cases on a weekly basis, but the NMCP has little confidence that these data are analyzed at the district level. To date, there has been little progress on strengthening malaria epidemic surveillance and response.

In response to the political conflict and migration of IDPs, PMI is using FY 2012 funds to strengthen epidemic surveillance and response. These efforts will begin in the Mopti Region where the largest number of IDPs from the north is concentrated and will build on existing progress made in strengthening routine malaria data collection in Bamako and Segou. Additional commodities such as LLINs, ACTs, and RDTs will be targeted to this vulnerable population as needed; the non-endemic northern regions were not covered by the rolling universal coverage campaign and the IDPs likely do not have access to effective LLINs. The ESR system will then be expanded to the traditionally epidemic-prone northern region per the NMCP strategy for epidemic management.

Challenges, Opportunities and Threats

Establishing a functional surveillance system is itself a challenging task, but Mali's northern regions impose additional challenges and threats:

- Ongoing security concerns limit the ability of implementing partners to move freely in this region to provide technical assistance for intervention activities.

- Health infrastructure in the north has been weakened due to health workers leaving the conflict zones, loss of supplies and drugs and physical destruction of health facilities. The most recent IDSR report (Report 25, for the week of June 18-24, 2012) indicates zero stock of ACTs, RDTs, and LLINs for epidemic response in the three northern regions. Data from Kidal Region have not been received.

- Even in the absence of conflict, the populations, and thus health facilities, are spread across vast areas posing a challenge for supervision and data transmission.

There are also opportunities to facilitate establishing a functional ESR:

- The collaboration will be led by WHO which has extensive experience in establishing malaria surveillance systems.

- PMI and its partners have made progress on malaria routine system strengthening in recent years and may be another potential collaborative partner in this ongoing effort.

- The NMCP recognizes the need to invest in the ESR to prevent a major health crisis in this non-immune population, and PMI can make commodities available to assist with response measures.

Plans and Justification

The periodicity of epidemics generally ranges from two to seven years with the most recent epidemic having occurred in 2003. During this time of conflict, the north has experienced interruption of health care services due to lack of health workers and destruction of health facilities. Areas that are normally at risk for epidemics due to ecological factors are at even greater risk of a health crisis because of the crippled health infrastructure.

Current data sources for malaria cases are inadequate for rapid detection of epidemic threats. Malaria data collected through the routine health information system or *Système Local d'Information Sanitaire* (SLIS), are compiled only every three months and are thus not timely enough for epidemic surveillance. As mentioned above, the IDSR is a potential weekly data source for malaria cases, but health workers and district health officers are not trained to monitor and analyze the data to initiate an appropriate response as needed. Malaria cases reported through the IDSR are presumptive cases. IDSR reports do not indicate the proportion of these cases that are confirmed and they report data only for the current and previous epidemic weeks. They also do not show longitudinal trends over time and there is currently no consensus on epidemic thresholds for the northern regions.

ESR strengthening will be achieved through collaboration with the NMCP and WHO. A WHO representative will lead the collaborative process to: reach consensus on appropriate epidemic thresholds; assess IDSR's capacity to serve as the data source for malaria epidemic detection; develop revised reporting mechanisms as needed; train local health officers to analyze and monitor malaria data; and ensure appropriate epidemic response procedures are in place. Implementation of this activity in the north is contingent upon political stability and accessibility

of the region. If the conflict persists, the team will assess how best to implement the activity so that it still supports the NMCP's strategy to protect vulnerable groups from malaria.

Planned activities with FY 2013 funding (Costs included in the M&E section)

Strengthening epidemic surveillance and response: PMI will collaborate with WHO and the NMCP to establish a functional ESR system in the north. This activity will follow a similar effort in the Mopti Region which is currently seeing a large influx of non-immune IDPs from the north. The expansion of the ESR system from Mopti to the north will be a coordinated effort reflecting the NMCP's epidemic management strategy and incorporating lessons learned as appropriate. Specific ESR strengthening measures will focus on establishing epidemic thresholds, assessing existing data collection and reporting processes, revising these as needed, training health staff to analyze and monitor malaria data, and ensuring actionable response plans are in place. PMI will coordinate with the NMCP and other donors to ensure needed commodities are positioned for epidemic response. (Costs included in the M&E section)

Training and supervision for ESR: PMI will support the NMCP to coordinate training and supervision for the strengthened ESR system. In consultation and collaboration with WHO, the NMCP will convene appropriate stakeholder meetings and workshops to: develop specific guidelines for epidemic detection and response, including establishing epidemic thresholds; assess current data collection and reporting mechanisms; revise those mechanisms as needed; train health center staff and district health staff in data collection, reporting, and analysis; and disseminate epidemic response plans. (Costs included in the M&E section)

MONITORING, EVALUATION, AND OPERATIONAL RESEARCH

NMCP/PMI Objectives

Monitoring and evaluation is a key component of Mali's national malaria strategy and the NMCP is focused on ensuring there is a coordinated plan for malaria data capture to inform programmatic interventions and measure outcomes and impact. A National Malaria M&E plan covering the years 2007-2011 was developed, costed, and adopted in 2008. An updated M&E plan for 2012-2016 has been developed but not yet disseminated. The current plan includes routine data collection and analysis through the national health information system, or SLIS; epidemic surveillance and response; sentinel surveillance; and periodic national surveys to evaluate malaria prevention and treatment activities. PMI supports the NMCP M&E strategy through its continued support for routine system strengthening, epidemic surveillance and response, cross-sectional surveys, and internal M&E capacity building. While the general strategy itself has not changed, with the recent political events, potential changes include a focus on the IDP population as well as security concerns in the northern regions limiting access for implementing activities.

The MOH's Planning and Statistical Unit oversees all M&E activities, in close collaboration with health training and research institutions. The Division of Planning and Monitoring & Evaluation 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.

Routine System Strengthening: Mali's M&E system relies on malaria data collected routinely through the SLIS, but the quality of these data is variable and feedback is not delivered in a timely manner to assist program planning and management. SLIS data are compiled every three months and reported annually. These data theoretically include both confirmed and unconfirmed cases, but the most recent 2011 SLIS report did not include confirmed cases. The NMCP with support from the MOH has made a concerted effort to collect the number of confirmed malaria cases on a weekly basis, but until these data are reported routinely in the SLIS, they are not reliable as an indicator for malaria prevalence. The NMCP hopes to increase the health system's capacity to collect, analyze, report, and use these data for programmatic decision-making. It would also like to explore the potential role of short message service (SMS) technology to improve overall data quality and use.

Epidemic Surveillance and Response: Health facility-based data collection for ESR is another strategic priority for the NMCP but the current system based on IDSR is not adequate for detecting and averting malaria epidemics (see Epidemic Surveillance and Response section). To supplement the SLIS and IDSR, the NMCP M&E plan proposed establishing sentinel sites for enhanced malaria surveillance to monitor trends in suspected and laboratory-confirmed cases of malaria over time in five malaria transmission zones. PMI initially supported this M&E strategy, but following a comprehensive review of the system, PMI support for sentinel sites was discontinued due to poor data quality and use in favor of focusing on SLIS strengthening.

Household Surveys: Population-based surveys currently provide the most accurate data on malaria intervention coverage and malaria biomarkers (i.e., anemia and parasitemia). A national anemia and parasitemia (A&P) survey conducted with PMI support in 2010 during the peak transmission period (Sep-Oct) provided the first parasitemia measures in Mali (see below for national estimates of anemia and parasitemia). A DHS including parasitemia biomarkers for a subsample of the population will be conducted in 2012. Implementation of a health facility survey is also planned for the high transmission season in 2012. This survey will provide data on the quality of malaria case management and antenatal care.

M&E Capacity Building: PMI supports the NMCP in enhancing its own M&E capacity to realize the objectives laid out in its national strategy. To this end, the NMCP benefits from technical assistance and funding support for routine system reporting and dissemination, as well as ESR strengthening activities.

Progress during the last 12 months

Together with the NMCP and implementing partners, PMI-funded M&E activities have shown progress in the last year. The political conflict resulted in the suspension of partner activities, but the country team anticipates that activities will resume again in the near future.

Routine System Strengthening: PMI, through its implementing partners, has conducted focused malaria routine system strengthening activities in ten districts (in Bamako and Sikasso Regions). In collaboration with the NMCP, PMI supported revisions in data collection and reporting tools at 237 CSCOMs in focus districts. They also developed a malaria database and trained health workers and health officials in data collection and data entry at all levels. As a result, 11 months of malaria data have been collected, entered, and are available to the NMCP for analysis and use. Over a ten-month period for which data were available (July 2011-April 2012), the proportion of suspect cases that were diagnostically tested increased from 53% to 96% in the ten pilot districts where system strengthening activities are currently focused. PMI partners have also supported the NMCP, regional, and district health officers to conduct field supervision in these districts. In two of the ten districts, SMS-based data transfer is being piloted; data quality of the SMS-based system will be assessed to determine its potential value for scale-up.

Epidemic Surveillance and Response: See the ESR section for details.

Household Surveys: The 2010 A&P survey has provided the NMCP and partners with Mali's first parasitemia estimates as well as intervention coverage for LLIN ownership and use and timeliness and access to anti-malarial treatment. Results reflect high transmission season estimates and showed that 38% of children 6-59 months of age were parasitemic by microscopy and 26% had severe anemia (hemoglobin <8g/dL). Data also showed 85% of households own at least one ITN and 70% of children under age five slept under an ITN the previous night. The proportion of children under age five with fever in the last two weeks who received ACT treatment within 24 hours was quite low at 8%.

Preparations for the 2012 DHS were well under way when the political crisis occurred, halting all survey activity. Before activities were suspended, a survey sample of approximately 15,000 households had been drawn, the survey had been pre-tested, and surveyors had been trained. There are strong indications that the DHS will be implemented in the next quarter which will coincide with high transmission season. This survey will likely not include the north given regional security issues, but due to the delayed timeline, the NMCP, PMI, and other partners are considering the inclusion of parasitemia biomarkers in a subset of the population in lieu of implementing a separate MIS in 2013. Funding set aside for the MIS would be reprogrammed for the malaria biomarker testing in the DHS.

Health Facility Survey: A health facility survey is scheduled to be implemented during the peak malaria transmission season in September 2012. The objective of the survey is to measure the quality of malaria case management and antenatal care services in health centers by assessing availability and management of commodities, health worker knowledge of case management guidelines, and health worker practices related to diagnostics and prescriptions of ACTs and SP for pregnant women. A survey protocol and questionnaire has been developed, but the activity is currently on hold due to the political crisis. Though designed to be a nationally representative survey, it will not include the northern regions.

M&E Capacity Building: PMI has supported several activities to increase the capacity of the NMCP to implement its strategic plan. A planning meeting for the MOH and NMCP was held to update the NMCP's M&E strategic plan for 2012-2016 based on a program review of the 2007-

2011 national strategy. Several key capacity building activities have taken place in the ten districts piloting the malaria routine system strengthening activities: an automated data entry and analysis program has been established; eighteen district health staff received training in data entry, data analysis, and data use; 51 CSCOM staff received training on SMS data collection and reporting; and refresher training on supervision of health center staff for routine system reporting was held.

Challenges, Opportunities and Threats

As mentioned in previous sections, particularly for Epidemic Surveillance and Response, the most obvious challenge for M&E activities in Mali is the political instability including the insurrection in the north. In summary, as the temporary suspension of USG activities is lifted, as the Mali team anticipates for the proposed FY 2013 activities, several challenges will remain:

- Start-up for suspended activities will take time to rebuild to pre-coup levels of effort. The suspension necessitated a reorganization of activities, including a new focus to work directly at the community level rather than through government institutions.

- The situation in the north of Mali remains unstable and USG activities are not authorized in the northern regions (Gao, Kidal, Tombouctou). While the northern region is sparsely populated and not malaria endemic, this restriction still leaves three regions without support for potential malaria epidemics.

- The instability in the north has also caused a large number of residents to move out of the region – either to large population centers of southern Mali (Mopti, Segou, Bamako) or to refugee camps in neighboring countries. Because these individuals are from a non-endemic region, they don't have the natural defenses against malaria that populations in southern Mali have acquired. PMI therefore anticipates an increased need for prevention measures (LLIN, IPTp) as well as increased cases in southern Mali for as long as the displaced persons remain there. PMI's reprogrammed FY 2012 funding as well as this FY 2013 MOP reflect these needs in the planning for commodities and activities.

Viewed through another lens, however, the readjustment of USG-funded activities to the community level actually presents an opportunity for PMI/Mali, and other USG programs, to accelerate their reorientation towards improving health at the community level. Before the coup, there were pilot programs in various regions to support community case management integrated with other primary health services. During FY 2012, the focus will be on strengthening and expanding those efforts, so that in FY 2013 there will be a strong community component to the health care services in Mali. This renewed emphasis presents an opportunity to develop and expand M&E activities at the community level.

Plans and Justification

FY 2013 will be a year of rebuilding for the PMI/Mali team. The political events of 2012 forced the USG to reorient its programs to the community level and make substantial changes in its planned programming. PMI anticipates returning to its former level of effort at the national level

in FY 2013, while not losing gains in community health interventions. With progress on SLIS in the pilot districts, there is a need to maintain the momentum by ensuring that health officers are equipped and inclined to use the data collected and that the database is user-friendly. This will ensure that data are disseminated and used to improve services. There is also a need to focus on data collection at the lower levels (CSCOM and even ASCs) to reflect the increased emphasis on programming at that level. Implementing partners focused on case management need to develop robust data collection systems that can eventually be incorporated into the SLIS.

Planned activities with FY 2013 funding ($1,681,000)

2014 Malaria Indicator Survey (MIS): PMI recommends that countries track coverage and impact through national-level population-based surveys every two years. Mali will conduct a DHS in 2012 which will capture coverage of major interventions. Consequently, PMI will contribute to conducting a follow-up MIS survey that will be due in 2014. The information from this series of large surveys will be used for the Mali Impact Evaluation in 2014. ($601,000)

Routine system strengthening at CSCOM level: PMI supports improvements in the M&E system at the CSCOM and CSREF levels in Mali to improve malaria data quality and use. In FY 2013, PMI intends to build on accomplishments in improved routine reporting from health facilities by expanding the revised system to new areas. Expansion will include remaining districts in Segou, additional districts in Bamako, and select districts in Mopti, where the IDP influx has been substantial, as well as Sikasso. Activities in Mopti will leverage concurrent ESR strengthening activities focused on facility-based data collection. The efforts will also focus on continuing to build capacity at the local level to collect quality data and use the information for program improvements. Some of the activities will include conducting an assessment to compare data quality between the paper-based system and the SMS-based system, and depending on assessment results, expanding the mobile data transfer system to key districts to facilitate timely malaria surveillance. ($300,000)

Ongoing TA support for M&E activities at the NMCP: PMI will support the NMCP to improve its ability to monitor and evaluate its programs at the national level. One of the key activities will be to assist the NMCP in developing an M&E Strategic Plan 2012-2016 related to the new National Malaria Strategic Plan and to provide technical assistance to implement that M&E strategy, including support to regional workshops to build local capacity in M&E. The implementing partner will work with the NMCP to develop a national database to compile information across partners and geographic regions in order to better manage the programs. Activities will also focus on building capacity of NMCP to interpret and use data (routine data as well as survey data and other sources). ($150,000)

M&E of iCCM: The donor community in Mali supports multiple sites where iCCM is implemented, including diagnosis and treatment for malaria. Different implementing partners support different sites, and so the reporting requirements and M&E activities vary considerably across partners. In addition, the data collected from community sites is not well-integrated into the national information systems leaving gaps in knowledge about the proportion of case management that happens at the community level. PMI plans to contribute to an effort to improve M&E across the iCCM sites so that quality data on services are collected and fed into

the national health information system. This activity will be jointly funded with contributions from USAID's Reproductive Health and Maternal and Child Health programs. ($60,000)

Dual-insecticide net operational research: Due to the increasing prevalence of pyrethroid resistance in entomological surveillance sites in Mali, an operational research project will deploy a WHOPES-approved class of dual-insecticide treated nets (LLINs with two different classes of insecticide impregnation) in one district and compare the impact of the dual-treated nets on the entomological inoculation rate (EIR), prevalence of insecticide-resistant mosquitoes, and prevalence of parasitemia and anemia in the district with the dual-treated nets to the same indicators in a control district with traditional LLINs and similar malaria transmission. This will inform the Mali NMCP and PMI whether this new variety of LLIN product will affect transmission of malaria in areas with high pyrethroid resistance. A small portion of the funds PMI contributes for nets will be used to procure dual-insecticide treated nets for this study. This study was approved in the FY 2012 MOP but funds were reprogrammed due to the political crisis. ($260,000)

Peace Corps Volunteer (PCV) for iCCM M&E: PMI will support a Peace Corps Volunteer to assist the NMCP and implementing partners to develop a data collection system for iCCM. ($10,000)

Strengthening of ESR: The current data collection systems are inadequate for identifying potential malaria outbreaks in the epidemic-prone northern regions and for launching appropriate response measures to avert epidemics. PMI will collaborate with WHO and the NMCP to establish an ESR system in the north. This activity will follow a similar effort in the Mopti Region which is currently seeing a large influx of non-immune IDPs from the north. The expansion of the ESR system from Mopti to the north will be a coordinated effort reflecting the NMCP's epidemic response strategy and incorporating lessons learned as appropriate. Specific ESR strengthening measures will focus on establishing epidemic thresholds, assessing existing data collection and reporting processes, revising these as needed, training health staff to analyze and monitor malaria data, and ensuring actionable response plans are in place. ($250,000)

Training and supervision for ESR: PMI will support the NMCP to coordinate training and supervision for the strengthened ESR system. In consultation and collaboration with WHO, the NMCP will convene appropriate stakeholder meetings and workshops to: develop specific guidelines for epidemic detection and response, including establishing epidemic thresholds; assess current data collection and reporting mechanisms; revise those mechanisms as needed; train health center staff and district health staff in data collection, reporting, and analysis; and disseminate epidemic response plans. ($50,000)

BEHAVIOR CHANGE COMMUNICATIONS

NMCP/PMI Objectives

PMI coordinates BCC activities with the NMCP, implementing partners and the *Centre National d'Information, Education et Communication pour la Santé* (CNIECS). In 2011, PMI supported the CNIECS's review of the national malaria communication strategy. The strategy includes

year-round LLIN utilization, community mobilization for IRS, early uptake of ANC services as part of the focused antenatal care approach (FANC) including appropriate management of malaria in pregnancy, and promotion of prompt care-seeking and case management for fever, especially among children less than five years of age. As policies are modified and updated, it will be critical to ensure that target populations understand, adopt desired preventive behaviors, and seek appropriate services for malaria control. PMI supports harmonization of the BCC/IEC strategy at all levels, ensuring consistency of messages and appropriate use of all communication channels and target audiences. The national strategy specifically mentions BCC messages targeted to vulnerable groups including pregnant women and children under five as well as families and caretakers of children, community health workers, ASCs and the *relais*. The strategy also mentions key delivery channels for disseminating BCC/IEC messages such as radio, TV, mass media and interpersonal communications.

Progress during the 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 in 2010 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. In addition to the community mobilization and health promotion activities implemented by the *relais* (community health volunteers), PMI has supported the introduction of Community Health Workers or ASC, a new cadre of health workers providing a full package of integrated case management services at the community level as well as supporting BCC and door-to-door health promotion visits. Specific to malaria control, in addition to using RDTs for case confirmation and management, the ASC conducts, checks the status of LLIN use, disseminates malaria prevention among pregnant women, and keeps up awareness about the disease. PMI also is supporting the dissemination of a variety of pre-tested counseling materials and radio spots in local languages, as well as facilitated interpersonal communication through community groups. PMI partners developed subcontracts with different radio stations and teachers' training centers, and have trained over 7,500 Youth Ambassadors against Malaria. (The Young Ambassadors are school pupils trained and equipped to disseminate malaria prevention messages at school, in their families, and community. PMI supported the dissemination of the 2007-2011 national BCC strategy to partners to help with harmonization of messages and identifying key indicators for reporting. PMI also supported the development of a BCC guide to promote accurate and standardized key BCC messages on malaria

Challenges, Opportunities and Threats

- Key challenges include limited data on the most effective messages and channels of communication as well as coordination of partner messages and activities. .

- With the current Malian security and political crisis, PMI plans to continue efforts to support implementing partners conduct BCC activities at the community and facility levels. However, PMI support for a “culture of net use” study to understand barriers to

LLIN use and malaria prevention in Mali as well as efforts to strengthen the CNIECS are on hold until further USG guidance is provided and the Malian presidential elections take place in 2013.

Plans and Justification

PMI will support harmonization of messages and BCC activities at all levels to 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 consider alternative delivery channels for targeted BCC activities and messages including schools, NGOs, and religious leaders.

Planned activities with FY 2013 funding (Costs referenced in other sections)

BCC of ITNs: 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 high usage 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 targeted BCC messages, emphasizing the necessity to continue sleeping under LLINs during the dry seasons. PMI will support partners to carry out multi-channel strategies to communicate this information, including door-to-door message dissemination by ASCs and *relais* in their communities. BCC coordination among PMI and implementing partners at the national and community levels is critical in to ensure correct and consistent use of nets, uniformity of messages, regular monitoring, and subsequent reorientation as needed. PMI will support post-distribution BCC/ campaigns to increase the use of newly distributed nets by all age groups. (Costs are covered in ITN section)

BCC for ANC and IPTp: 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, completion of the recommended minimum of two treatment courses of IPTp, and demand for proper treatment of malaria and anemia in pregnancy. These BCC activities will also include messaging for direct observation of SP administration for both health workers and pregnant women. PMI will continue to link BCC activities with HIV/AIDS messaging where appropriate. (Costs are covered in the MIP section)

BCC for case management: PMI will continue to support the dissemination of 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. The ASCs and *relais* will also educate care givers on signs of severe malaria that require referral. (Costs are covered in case management section)

HEALTH SYSTEM STRENGTHENING / CAPACITY BUILDING

NMCP/PMI Objectives

In 2007 the NMCP was elevated to directorate level and is now responsible for overseeing all malaria control activities conducted in Mali. The NMCP has four technical divisions – Prevention and Case Management, Monitoring and Evaluation, Epidemic Surveillance and Operational Research, and Communication and Social Mobilization, as well as one administrative and financial division. The malaria focal point persons at regional and district levels are responsible for ensuring adherence to the national malaria guides and implementation of the strategic plans. The NMCP organizes semester-long malaria review workshops with all the regions focal points to monitor the implementation of the malaria activities, the adherence to national malaria policies and review regions' malaria data. PMI contributed substantially to building capacity of the NMCP and other GOM entities through direct funding of specific activities and technical assistance from implementing partners.

Progress during last 12 months

In FY 2011, PMI provided ongoing capacity building in all malaria intervention areas through training, supervision, and on-the-job mentoring in technical, operational and management practices by PMI in-country and headquarters staff and implementing partners. 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. Since FY 2008, PMI has funded efforts to strengthen malaria-focused supportive supervision, including direct funding to the NMCP and other government entities plus technical assistance through PMI's implementing partners. There continues to be limited funding for supervision visits below the district level. Support for monitoring comes through the PRODESS using donor funding. District-level teams carry out integrated supervision for all health interventions at CSCOMs, using a supervision guide. National and regional health teams perform integrated supervision more regularly than that focused on malaria. In addition, PMI sponsored the participation of two NMCP staff in international training in monitoring and evaluation of malaria programs.

PMI has strengthened the MOH's Division of Hygiene and Public Sanitation, the Ministry of Agriculture, and the National Directorate of Environment in environmental monitoring in conjunction with IRS programs and has provided a mobile incinerator to manage IRS-related waste. Through direct support and implementing partners, PMI strengthened the technical capacity of the National Health Laboratory (LNS) in Medicine Quality Control Services. LNS participated in the second inter-laboratory testing within the Network of Africa Medicine Control Laboratories (NAMCOL). Also PMI is supporting the LNS in its preparedness towards the standard Laboratory ISO 17025 accreditation.

PMI supports GOM participants to attend a number of trainings and workshops consistent with developing their skills within their assigned roles. PMI has supported the NMCP in the organization of malaria donor partners' coordination meetings and the organization of malaria semester review with regional directorates to discuss malaria situation and challenges in each

region. At the time of MOP writing, the MOH had developed a renovation plan for new office space for the NMCP. PMI will continue to encourage efforts to accelerate the renovation, and will consider supporting the renovation with other partners.

Challenges, Opportunities and Threats

The recent political crisis in Mali followed by the USG suspension policy prohibited PMI from providing funds directly to the government of Mali after the coup d'état in 2012. If democratic elections are held by April 2013 and the USG restrictions on aid to the GOM are lifted, the USAID Mission will re-establish mechanisms to provide direct funding to the GOM.

The MOH reports 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 proportionately throughout the country. The shortage of staff, both in terms of quantity and level of training, affects the quality of service at each of these levels. The overstretched NMCP headquarters staff has very limited resources to conduct training and supervision at the regional and lower levels. In addition, NMCP and other staff frequently mention the need to upgrade epidemiological and management skills of its staff to improve the level of service.

Challenges for the NMCP include ensuring effective coordination among malaria partners, beginning at the central level, and training new staff in malaria control. The NMCP also faces additional challenges to its coordination and management functions with the pending status of the Global funds consolidated Round 6 Phase 2 and Round 10 grants. In addition, the NMCP occupies a small, deteriorated structure with inadequate space for its 50 employees and poor electricity and internet facilities. A new building has been located, but due to changes within the Ministry, planning activities have been put on hold.

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, and has been engaged in the planning, analysis and reporting of all activities supported by PMI, including IRS, entomological monitoring and operations research. 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.

Plans & Justification

PMI will continue its strong focus on building technical and managerial capacity at all levels of the health care system, both through implementing partners and direct support to the NMCP and other government partners. Most inputs in training, supervision and operational support are described elsewhere in the MOP.

Planned activities with FY 2013 funding (Costs referenced 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 NMCP structure and staff, specifically to increase capacity at all levels to plan, implement, supervise, and forecast commodity needs; improve distribution systems; 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. In-country and headquarters PMI staff and implementing partners will continue to provide on-the-job training and support to improve NMCP management and coordination capacity. (costs covered in ITN, IRS, case management, and ESR sections)

Direct support to the NMCP and other government partners: Support will continue in assisting the NMCP and other government partners in FY 2013 to conduct training and supportive supervision in all malaria program interventions supported by PMI. In FY 2013, 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. Scopes of work for implementing partners will include provision, whenever feasible, for collaborating with the NMCP in building staff managerial and technical capacity. In FY 2013 PMI will continue to support INRSP to conduct district-level refresher training and supervision in diagnostics and MRTC for evaluation of dual-insecticide nets, mapping of insecticide resistance and mosquito biting behavior, and strengthening of capacity in epidemic surveillance and response. (costs covered in ITN, IRS, case management BCC and ESR sections).

The table below illustrates the proposed activities through the direct support to the NMCP and other government entities:

Malian Government Entity	Proposed Activity
National Malaria Control Program (NMCP)	-Strengthen LLINs logistics and supervise LLIN distribution, -Support NMCP entomologist in conducting IRS entomological monitoring, -Support formative supervision visits to health workers at all levels and refresher trainings as needed, -Support training, supervision and coordination of Epidemic Surveillance and Response (ESR) in collaboration with WHO in epidemic-prone districts.
Division of Public Hygiene and Safety (DHPS)	Strengthen the capacity of DHPS to provide coordination with the NMCP on district-level IRS operations and entomological monitoring.
Directorate of Reproductive Health /Midwives Association	Increase awareness about MIP and free SP and strengthen pre- and in-service training for MIP for nurses nationwide.
Directorate of Pharmacy and Medicines (DPM)	Support the implementation of the pharmacovigilance plan including coordination between the DPM, PPM and the National Center to fight against Disease (CNAM).

Malian Government Entity	Proposed Activity
National Pharmacy (PPM)	Distribution of PMI-procured ACTs and RDTs down to the CSCOM level nationwide.
National Center to fight against Disease (CNAM)	Support the implementation of the pharmacovigilance plan including coordination between the DPM, PPM and CNAM.
Malaria Research and Training Center (MRTC)	Conduct operational research on the effectiveness of dual-insecticide nets on EIR and parasite prevalence because of increasing pyrethroid resistance.
National Health Laboratory (LNS)	Train pharmacists and laboratory technicians in testing for quality control for malaria medicines and LLINs.
National Institute of Public Health Research (INRSP)	Implement the QA/QC plan for RDTs and microscopy diagnostics including supervisions.
National Center for health IEC/SM (CNIECS)	-Support IEC/BCC messaging for LLINs and case management.

STAFFING AND ADMINISTRATION

Two health professionals serve as Resident Advisors to oversee PMI in Mali, one representing CDC and one representing USAID. In addition, one FSN, and a Program Management Assistant support the PMI team. All PMI staff members are part of a single interagency team led by the USAID Mission Health Director in Mali. 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. Candidates for resident advisor positions (whether initial hires or replacements) will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

The PMI professional staff work together to oversee all technical and administrative aspects of PMI, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, and reporting of results. Both resident advisors and other PMI staff members report to the USAID Mission Director or his/her designee. 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 Global Fund, 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.

Table 1: Mali FY 2013 Budget Breakdown by Partner

Partner Organization	Geographic Area	Activity	Budget
DELIVER Task Order 7	Nationwide	Procurement of LLINs, SP, lab consumables, RDTs and ACTs	$11,668,000
DELIVER Task Order 7 (PSI)	Nationwide	Distribution and follow-up of LLINs	$1,500,000
DELIVER Task Order 7 (PPM)	Nationwide	Storage and distribution of commodities to the CSCOM level	$150,000
Networks	1 Region	Post-campaign assessment in Sikasso region	$100,000
MCHIP	Nationwide	Strengthen FANC and MIP services at the facility level	$300,000
MEASURE Evaluation	Nationwide	Strengthening SLIS, TA for M&E support	$510,000
TBD	Nationwide	Support MIS implementation in 2014	$601,000
MOH (NMCP, DPM, INRSP, LNS, DSR, CNIECS)	Nationwide	LLIN logistic strengthening (NMCP), entomological monitoring (NMCP, DHPS), supervision of case management (NMCP), ESR training and supervision (NMCP), laboratory supervision and quality assurance/control for laboratory diagnostics (NMCP, INRSP), drug quality control (NMCP, LNS), BCC/IEC for LLINs, MIP and case management (NMCP, CNIECS, DSR, Midwives Association)	$790,000
MRTC	Nationwide	Evaluation of effectiveness of dual insecticide on nets	$260,000
TBD	3 Districts	Conduct entomological monitoring for one IRS round	$300,000
Abt Associates IRS IQC 2, Task Order 4	3 Districts	IRS commodities and operational costs, NMCP capacity building	$5,100,000
SIAPS	Nationwide	Logistics strengthening and management of malaria commodities	$300,000
USP PQM	Nationwide	Drug quality control	$200,000
TBD BCC/SM RFA	Nationwide	IEC/BCC for LLINs, MIP and case management	$350,000
TBD Bilateral Project	Nationwide	Implement iCCM in 9 districts, supervision for malaria case management at health facilities	$800,000
Peace Corps	Nationwide	Coordinate M&E activities with the NMCP and MEASURE	$10,000
WHO	Nationwide	Strengthen capacity for conducting ESR in three northern regions and other epidemic-prone districts	$250,000

CDC IAA	Nationwide	TA for IRS, diagnostics, case management, benefits of an in-country CDC PMI advisor (1)	$411,000
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.	$1,400,000
TOTAL			**$25,000,000**

Table 2: Mali FY 2013 Planned Obligations

Proposed Activity	Mechanism	Budget *(commodities)*	Geographic Area	Description of Activity
PREVENTIVE ACTIVITIES				
LONG-LASTING INSECTICIDE-TREATED NETS				
LLIN procurement	DELIVER TO7	$8,000,000 *($8,000,000)*	Nationwide (routine) Campaign (Sikasso Region)	Procurement of two million LLINs, of which 1,400,000 LLINs are for the 2014 campaign for the region of Sikasso to complement other donor contributions, and 600,000 LLINs are for delivery through routine services targeting children under one and pregnant women.
Distribution of LLINs	DELIVER TO7 (PSI)	$1,500,000 *($1,500,000)*	Nationwide; specific regions	Distribution and follow-up of LLINs for mass campaign (in Sikasso Region) and routine services to children under one and pregnant women. This includes LLIN supply management, tracking, and forecasting for routine LLIN services.
Post-campaign assessment in Sikasso region	Networks	$100,000	Sikasso Region	Post-campaign assessment in Sikasso Region to inform methodology and completeness of targeted campaigns.
Procurement of dual-insecticide treated nets and LLINs for operational research project	DELIVER TO7	$143,000 *($143,000)*	20-30 villages	Procurement of dual-insecticide treated nets and traditional LLINs for an operational research project exploring impact of dual-insecticide treated nets on malaria transmission and parasite prevalence.
LLIN logistics strengthening	NMCP	$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.
IEC/BCC for LLINs	TBD (BCC/SM RFA) CNIECS (through NMCP)	$125,000 $50,000	Nationwide	Support IEC/BCC strategy harmonization and message design, including the national CNIECS malaria communication plan, and conduct supervisory visits to monitor its implementation.
INDOOR RESIDUAL SPRAYING				

Indoor residual spraying	Abt Associates IRS IQC 2, Task Order 4	$5,100,000 *($1,500,000)*	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.
	CDC IAA	$24,000		
Entomological monitoring	TBD	$300,000	3 districts/ Nationwide	Conduct entomological monitoring for one spraying round. Support the NMCP entomologist in conducting IRS-related entomological monitoring for ten entomological sites. Strengthen capacity of DHPS to provide coordination with NMCP on district IRS operations. Mapping insecticide resistance and mosquito biting behavior nationwide.
	NMCP	$20,000		
	DHPS (through NMCP)	$40,000		
SUBTOTAL: Preventive		**$15,442,000**		
MALARIA IN PREGNANCY				
SP procurement	DELIVER	$175,000 *($175,000)*	Nationwide	Procurement of SP needs for all pregnant women, as well as cups, water filters and plastic containers for 250 ANC clinics.
Strengthen FANC and MIP and services at the facility level	MCHIP	$300,000	Nationwide (and specific region)	Strengthen uptake of FANC and MIP services through refresher training and supervision at 250 ANC clinics in Sikasso Region. Support Midwives Association to increase awareness about MIP and free SP provision. Strengthen pre- and in-service training for MIP for nurses nationwide.
	DSR/Midwives Assoc. (through NMCP)	$80,000		
IPTp IEC/BCC	BCC/SM RFA	$125,000	Nationwide	Support efforts to harmonize strategies and design focused messages to promote free SP distribution.
SUBTOTAL: Malaria in Pregnancy		**$680,000**		
CASE MANAGEMENT				
Diagnostics				
Procurement of RDTs	DELIVER TO7	$1,500,000 *($1,500,000)*	Nationwide	Procure approximately 2 million RDTs.
Procurement of laboratory consumables	DELIVER T07	$150,000 *($150,000)*	Nationwide	Procure consumables for microscopy testing (MMKs)for 60 CSREFs and 6 regional hospitals.

Quality assurance/quality control for diagnostics	INRSP (through NMCP)	$150,000	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.
	CDC IAA	$12,000		
Formative supervision of laboratory technicians and clinicians	INRSP	$100,000	Nationwide	Provide refresher training supervision on microscopy and RDTs at the district level and selected lower-level health facilities.
Treatment				
Procurement of malaria treatments - ACTs, severe malaria	DELIVER T07	$1,700,000	Nationwide	Procure 1.5 million treatments of AL and severe malaria drugs (100,000 treatments of injectable artesunate) for health facilities, community case management and pregnant women.
		($1,700,000)		
Supervision for malaria case management	TBD (new bilateral)	$200,000	Nationwide	Support formative supervision visits of trained clinicians at all levels, and refresher training as needed.
	NMCP	$200,000		
Implementation of iCCM	TBD (new bilateral)	$600,000	9 Districts (Sikasso, Kayes and Segou)	Implement integrated community case management activities in 9 districts (Sikasso, Kayes and Segou).
BCC/IEC for case management	BCC/SM RFA	$100,000	Nationwide	Support harmonization of messages and communications approaches for case management; implement through *relais*, train on referral systems at the community level with a focus on early care-seeking behaviors. Support CNIECS capacity to develop and implement communications approaches and messaging for case management.
	CNIECS (through NMCP)	$20,000		
Logistics strengthening	SIAPS	$300,000	Nationwide	Strengthen pharmaceutical management and the supply chain system at the national, district and community levels. Include tracking of malaria commodities down to the community level and conduct an end-use verification study with an emphasis on follow-up on EUV findings.
Commodity distribution to CSCOMs	DELIVER T07 (PPM)	$150,000	Nationwide	Ensure essential malaria commodities are delivered to health facility level

Drug quality control	USP PQM	$200,000 *($50,000)*	Nationwide	Support quality testing 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)
	LNS (through NMCP)	$40,000		
SUBTOTAL: Case Management		**$5,422,000**		
MONITORING AND EVALUATION AND MALARIA SURVEILLANCE				
2014 Malaria Indicator Survey (MIS)	TBD	$601,000	Nationwide	Support MIS implementation in 2014
Routine system strengthening at CSCOM level	MEASURE Evaluation	$300,000	Nationwide	Continue and expand routine system strengthening efforts with an emphasis at the CSCOM level. Evaluate data quality of SLIS. 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.
Ongoing TA support for M&E activities at the NMCP	MEASURE Evaluation	$150,000	Nationwide	Support NMCP in database development to analyze SLIS and IDSR data for decision-making
M&E of iCCM	MEASURE Evaluation	$60,000	SEC districts	Technical advice and tools development for iCCM
Dual-insecticide net operational research	MRTC	$260,000	20-30 villages	Evaluate the effectiveness of dual-insecticide nets on EIRs and parasite prevalence because of increasing pyrethroid resistance; net distribution costs ($10,000) are included as commodity. (10,000 commodities)
Peace Corps Volunteer (PCV) for iCCM	Peace Corps	$10,000	Nationwide	Coordinate M&E with the NMCP and Measure.
Strengthening of ESR	WHO	$250,000	Nationwide	Strengthen capacity for conducting ESR in three northern regions and other epidemic-prone districts
Training and supervision for ESR	NMCP	$50,000	Nationwide	Support training, supervision and coordination of ESR in collaboration with WHO in epidemic-prone regions.
SUBTOTAL: M&E		**$1,681,000**		

IN-COUNTRY MANAGEMENT AND ADMINISTRATION				
In-country staff; Program Administration Expenses	USAID	$1,400,000	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
In-country staff; Admin. Expenses	CDC	$375,000	Nationwide	Salaries, benefits of in-country CDC PMI advisor (1), attendance at PMI retreat.
SUBTOTAL: Mgmt. and Admin.		**$1,775,000**		
GRAND TOTAL		**$25,000,000**		