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

PRESIDENT'S MALARIA INITIATIVE

MALARIA OPERATIONAL PLAN (MOP)

MALI

FY 2009

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A. EXECUTIVE SUMMARY

Malaria is one of the major causes of morbidity and mortality nationwide. In the 2006 annual statistical summary of the national health information system health facilities reported more than one million clinical cases of malaria, accounting for 38% of all outpatient visits and 41% of outpatient visits in children less than five years of age. Thirty seven percent of all reported deaths are due to malaria; among children less than five years of age, malaria is the reported cause for more than half of all deaths.

Key partners of the National Malaria Control Program (PNLP) include the Global Fund for HIV/AIDS, Tuberculosis and Malaria (Global Fund), the World Health Organization (WHO), UNICEF, the World Bank, the Dutch Cooperation and USAID. Non-governmental organization (NGO) partners include *Groupe Pivot/ Santé Population, Fédération Nationale des Associations de Santé Communautaire* (FENASCOM), *Médecins Sans Frontières* (MSF), Plan International and Mali Voices /JHUCCP. Mali is the recipient of a $26 million Global Fund Round 6 five year malaria grant to support procurement of insecticide treated nets (ITNs) and artemisinin-based combination therapy (ACT).

According to the most recent Demographic and Health Survey (DHS) conducted from May to December 2006, about 50% of the population owned at least one ITN, but only 29% of pregnant women and 27% of children less than five years of age slept under an ITN the previous night. Prompt case management of children less than five years of age with fever was also very low (15%), as was use of sulfoxadine-pyrimethamine (SP) by pregnant women (4%) for intermittent preventive treatment (IPTp). The table below shows the PMI Year 1 targets for Mali and expected results after one year of implementation:

Proposed Year 1 Targets (PMI and partners)	**Expected Results after 1 Year of Implementation** (ending March 2009*)
Over two million ITNs distributed, (of which USG provided over 850,000)	PMI procured 169,800 LLINs for Mali's December 2007 campaign and procured 600,000 LLINs to arrive in October 2008 for routine services in health facilities. USAID Mali procured 212,000 LLINs for distribution through routine immunization and antenatal care services in February 2008. PNLP distributed an additional 890,000 LLINs through the Global Fund Round 6 grant.
430,000 residents living in 86,000 houses protected by IRS in two districts	PMI supported Mali's first large-scale IRS campaign in the Districts of Bla and Koulikoro. PMI supported the training of over 350 spray trainers, supervisors and operators, procurement of commodities and personal protective equipments, and communication, supervision, monitoring and environmental compliance activities. Spray activities took place from July 14 to August 30th. It is estimated that about 87,198 houses were sprayed, protecting about 405,936 residents, with an acceptance rate of over 95%.
ACTs will be implemented in all MOH health facilities nationwide	Global Fund Round 6 supplies all the ACTs for the facilities; PMI supported malaria treatment through community health workers in one district in the region of Sikasso. PMI also supports training and supportive supervision for case management, procurement of severe malaria drugs, drug quality control and pharmacovigilance.
IPTp will be fully implemented in all health facilities nationwide	PMI procured approximately 609,000 doses of SP in addition to UNICEF and the Global Fund procurements to meet 100% of needs for IPTp. PMI is supporting the implementation of the IPTp policy and facility level service provider training, and the development of behavior change communication (BCC) messages.

*Year 1 implementation ends March 31st, 2009

The PMI Year 2 Malaria Operational Plan (MOP) was based on progress in Year 1 and a planning exercise carried out in June 2008. The MOP was developed in close collaboration with

the PNLP and nearly all national and international partners involved with malaria prevention and control in the country. The proposed activities support the priorities outlined in the PNLP National Strategic Plan for 2007 – 2011. To achieve PMI's goals and targets in Mali, the following major activities will be supported:

Insecticide-treated nets (ITNs): The PNLP made significant progress in the last year toward achieving its goal of 80% use of long-lasting insecticide-treated nets (LLINs) among children less than five years of age and pregnant women by 2011. In June 2007, the USG distributed 220,000 free LLINs to target-age children in Tombouctou and Gao regions as a pilot for the larger national campaign. Based on this experience, the Malian Ministry of Health (MOH) conducted an integrated health campaign in December 2007 and distributed 2.3 million LLINs, with support from PMI, Canadian Red Cross, UN Foundation, Malaria No More, Global Fund, and NGO partners. In Year 2, PMI proposes to fill the gap for LLINs delivered though routine channels by procuring and distributing approximately 570,000 LLINs for children less than five years of age and pregnant women, in addition to targeting people living with HIV/AIDS. PMI will also strengthen the capacity of the MOH and partners to coordinate donor inputs, track LLINs and manage logistics and distribution systems. Given the influx of over two million LLINs over the past year, PMI will also support additional targeted behavioral assessments to define BCC messages regarding consistent and correct LLIN use.

Indoor residual spraying (IRS): In 2008, PMI Year 1 funds supported Mali's first large-scale IRS campaign in the districts of Bla and Koulikoro, including the training of more than 350 spray trainers, supervisors and operators, the purchase of all commodities and personal protective equipment, and support all communication, supervision, monitoring and environmental compliance activities. Spray activities began the week of July 14 and ended on August 30th. It is estimated that approximately 87,198 houses were sprayed, protecting about 405,936 residents, and with an acceptance rate over 95%. In 2009, PMI will continue to support IRS in Bla and Koulikoro districts to cover a population of approximately 445,000. Finally, PMI will strengthen the MOH's capacity to plan and supervise IRS campaigns.

Intermittent preventive treatment in pregnant women (IPTp): Utilization of antenatal care (ANC) by pregnant women and IPTp coverage are still low in Mali. The 2006 DHS indicated that only 16.1% of pregnant women reported receiving any SP during their last pregnancy, and only 4% received the recommended two doses at ANC visits. In Year 1, PMI is procuring SP for IPTp and is facilitating national level policy dialogue to enforce free SP provision. To promote the free IPTp policy, PMI is supporting in-service training on the new comprehensive ANC module, as well as the expansion of supportive supervision. In Year 2, PMI will continue to help fill gaps in SP supplies to cover all pregnant women, update supervision and training materials as necessary, and assist in the roll out of malaria in pregnancy guidelines. PMI will also continue to support the roll out of the new communications strategy related to malaria in pregnancy, and work to ensure routine monitoring of supplies to avoid stock outs.

Case management: Malaria diagnosis in most MOH facilities is based on clinical grounds and fewer than 10% of suspected cases of malaria are laboratory confirmed. In Year 1, PMI is conducting a laboratory needs assessment to identify existing gaps in equipment and training at district health facilities. PMI is also facilitating the review of current laboratory training manuals

for malaria microscopy and performance of rapid diagnostic tests (RDTs). In Year 2, PMI will procure additional microscopy supplies as well as RDTs and other consumables for laboratory confirmation of all cases presenting to sentinel sites. PMI will also support pre-service training for laboratory diagnosis and case management, and refresher training for supervisors of sentinel sites and regional laboratories. Finally, PMI will assist the PNLP to implement a plan for quality control of microscopy and RDT diagnosis.

The MOH adopted ACTs for the treatment of uncomplicated malaria. However, ACTs were not available in most government health facilities until June 2007. The PMI-supported NGO, Save the Children, has provided malaria treatment through community health workers (*relais*). The PNLP has since given permission for Save the Children to expand community case management activities to three districts in the region of Sikasso. The scale up of this project from 109 to 470 points of service for community distribution of ACTs will help inform development of national policy for treatment of uncomplicated malaria by community *relais*. In Year 2, PMI will procure ACTs to support community-based ACT distribution and ensure sufficient supplies of ACTs for children less than five years of age. PMI will also continue to procure drugs for the management of severe malaria, as well as support in-service training and supportive supervision of health workers and community *relais*. Finally, PMI will continue to build political and popular support for new policies in case management, support the dissemination of the multi-channel communication strategy, fund a review of the national cost recovery system in relation to free malaria commodities, and strengthen logistics and supply chain management of ACTs.

Monitoring and Evaluation (M&E): The PNLP 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. In Year 1, PMI is supporting five sentinel sites to collect data on frequency of laboratory-confirmed malaria, malaria-related hospitalizations, and deaths attributed to malaria. PMI has also provided funding to assess the quality and timeliness of reporting for malaria. In Year 2, PMI will help expand the sentinel reporting system to eight sites. PMI will also continue support for general M&E capacity building and strengthening of Mali's Health Management Information System. PMI will either contribute to inclusion of a malaria module in a Multiple Indicator Cluster Survey (MICS) proposed by the MOH and UNICEF, or will contribute to a national survey to evaluate progress in malaria control. PMI will also support a workshop and associated efforts to conduct an annual review of the M&E work plan in response to a recommendation which came from the Roll Back Malaria Monitoring and Evaluation Systems Strengthening Tool (MESST) meeting.

The proposed FY 09 PMI budget for Mali is $15.4 million. Of this amount, 32% will support household ownership and use of LLINs, 21% IRS, 27% improved malaria diagnosis and treatment, 7% malaria in pregnancy activities, 6% monitoring and evaluation, and 7% staffing and administration. A total of 42.4% will be spent on commodities.

B. 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
ATN	*Assistance Technique Nationale* (National Technical Assistance)
ART	Antiretroviral therapy
BCC/IEC	Behavior change communication/information education communication
CCM	Country Coordinating Mechanism
CDC	Centers for Disease Control and Prevention
CHW/*Relais*	Community Health Worker
CSCOM	*Centre de Santé Communautaire* (Community Health Center)
CSHGP	Child Survival and Health Grants Program
CSREF	*Centre de Santé de Référence* (Reference/District Health Center)
DHS	Demographic and Health Survey
DHPS	*Division d'Hygiène Publique et Salubrité* (Division of Public Hygiene and Health)
DPLM	Division Prévention et Lutte Contre la Maladie (Division of Prevention and Disease Control)
DNS	Direction Nationale de la Santé (National Health Directorate)
DSR	Division Santé Reproductive
EPI	Expanded Program for Immunization
FBO	Faith-based organization
FENASCOM	*Fédération Nationale des Associations de Santé Communautaire* (National Federation of Community Health Associations)
FSN	Foreign service national
GFATM	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GOM	Government of Mali
HBM	Home-based management
HBMF	Home-based management of fever
HIPC	Highly-Indebted Poor Countries
IDA	International Development Association
IMCI	Integrated Management of Childhood Illnesses
INRSP	*Institut Nationale 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
LBMA	*Laboratoire de Biologie Moléculaire Appliquée* (Applied Molecular Biology Laboratory)
LLIN	Long-lasting insecticide-treated bed net
MCH	Maternal and child health

MOH	Ministry of Health
MESST	Monitoring and Evaluation Systems Strengthening Tool
MICS	Multiple Indicators Cluster Survey
MIP	Malaria in pregnancy
MIS	Malaria Indicator Survey
MRTC	Malaria Research and Training Center
MSF	*Médecins Sans Frontières* (Doctors Without Borders)
NGO	Non-governmental organization
NIH	National Institutes of Health
OMVS	*Organisation de la mise en valeur du fleuve Sénégal* (Senegal River Basin Project)
PDDSS	Plan for Social and Health Development
PKC	Project Keneya Ciwara (bilateral implemented by CARE)
PLWHA	People living with HIV/AIDS
PMI	President's Malaria Initiative
PMTCT	Prevention of mother-to-child transmission
PNLP	*Programme National de Lutte contre le Paludisme* (National Malaria Control Program)
PPM	*Pharmacie Populaire du Mali* (People's Pharmacy of Mali)
PRODESS	National Health and Social Development Program
PSI	Population Services International
PTF	Technical and Financial Partners' Forum
PVO	Private voluntary organization
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RTI	Research Triangle Institute
SIMR	*Surveillance Intégrée de la Maladie et la Riposte* (Integrated Disease Surveillance and Response – IDSR)
SLIS	*Système Local d'Information Sanitaire* (Health Management Information System)
SP	Sulfadoxine-pyrimethamine
SPS	Strengthening Pharmaceutical Systems
TASC-3	Technical Assistance and Support Contract, Three
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

C. PRESIDENT'S MALARIA INITIATIVE

In late June 2005, the United States Government (USG) announced a new five-year, $1.2 billion initiative to rapidly scale-up malaria prevention and treatment interventions in 15 high-burden countries in sub-Saharan Africa. The goal of this Initiative is to reduce malaria-related mortality by 50% in each of the 15 focus countries. This will be achieved by reaching 85% coverage of the most vulnerable groups---children less than five years of age, pregnant women, and people living with HIV/AIDS---with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated bed nets (ITNs), intermittent preventive treatment of pregnant women (IPTp), and indoor residual spraying (IRS).

The President's Malaria Initiative (PMI) began in three countries in 2006: Angola, Tanzania, and Uganda. In 2007, four countries were added: Malawi, Mozambique, Senegal, and Rwanda. In 2008, eight additional countries, including Mali, were added to reach a total of 15 countries covered under the PMI. Funding began with $30 million in Fiscal Year (FY) 06 for the initial three countries, $160 million in FY07, was increased to $300 million in FY08, while projected FY09 funding remains at FY08 level ($300 million). PMI funding is projected to increase to US$500 million in FY10.

In implementing PMI, the U.S. Government is committed to working closely with host governments and within existing national malaria control plans. Efforts are coordinated with other national and international partners. Mali is the recipient of a $26 million Global Fund Round 6 grant, coordinated with efforts of Roll Back Malaria (RBM), the World Health Organization (WHO), United Nations Children's Fund (UNICEF), the World Bank Malaria Booster Program, and the non-governmental and private sectors, to ensure that investments are complementary and that RBM and Millennium Development goals are achieved. Country planning visits for PMI, as well as subsequent evaluations, are highly consultative and held in collaboration with the National Malaria Control Program (PNLP) and other partners involved in malaria prevention and control in the country.

This document presents a detailed one-year implementation plan for Year 2 of the PMI in Mali. It briefly revisits the evolution of malaria control and prevention policies and interventions from the first assessment visit to the present, analyzes the status of implementation of the 2008 fiscal year (FY08) Malaria Operational Plan (MOP), identifies challenges and unmet needs if the PMI goals are to be achieved, and provides a description of activities planned in FY09 under the PMI. The total amount of PMI funding requested for Mali is $15.4 million for FY09.

D. BACKGROUND

In 2008, the population of Mali is estimated to be 12.7 million (World Population Prospects – 2006 Revision, Population Data Base), with over 47% of the population less than fifteen years of age. The total expenditure on health in Mali represented 4.8% of the GDP (WHO, 2003). Approximately 64% of Malians live in poverty. In 2005, the estimated annual gross national income per capita was just $380 (World Bank), making Mali one of the world's poorest countries.

Administrative and health infrastructure in Mali
Mali is divided into eight administrative regions (Kayes, Koulikoro, Sikasso, Ségou, Mopti, Gao, Tombouctou and Kidal) plus the capital Bamako. The regions are subdivided into 49 administrative "*Cercles*" comprising 53 health districts. Governance is decentralized into 703 communes, each one administered by a local council and mayor. The health system has four levels:

- Central-level: four national reference hospitals
- Regional-level: six regional hospitals
- District-level: 59 district health centers (*Centres de Santé de Référence* or CSREF)
- Community-level: More than 800 community health centers (*Centres de Santé Communautaire* or CSCOM), though not all are functional. The CSCOMs are established by a community health association (ASACO).

Health financing through cost recovery
Mali has a strong cost recovery system in place that is based on the "Bamako Initiative." At the district-level, communities can establish CSCOMs based on the following criteria: a minimum of 10% contribution to the construction or renovation of the health facility; the hiring and support of health personnel; and the establishment of a community health association. 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 provide 15% of their national allocations for social services, a proportion of which should support the CSCOMs.

Three forms of revenue generation exist at CSCOMs: membership fees, the sale of essential drugs, and fees for services, which are managed by the CSCOM's community health association. 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. This should also prevent decapitalization of pharmacy stock. The community health association purchases replacement drugs for the CSCOM through the national pharmacy system or from the private sector based on availability. Selected drugs (e.g. vitamin A, oral rehydration solution) are provided free by donors. The CSCOMs must finance the transportation of their drugs from CSREFs. However, due to small profit margins and the loss or use of revenues for non-pharmaceutical purposes, CSCOM drug stores often become decapitalized.

National financial planning for malaria and health/social development
The PNLP receives annual budget support from the 2nd National Health and Social Development Program, 2005-9. The *Comité de Suivi* (Evaluation Committee) approves the annual operating plan, which includes funding gaps expected to be covered by donors. Several partners (including the governments of the Netherlands, Sweden and Canada) provide direct budget support on an annual basis. Other donors target their funding to sub-sectors and programs. The Government of Mali (GOM) contributes mostly to salaries and other operating costs in the 2nd National Health and Social Development Program annual budgets. The GOM also uses Highly

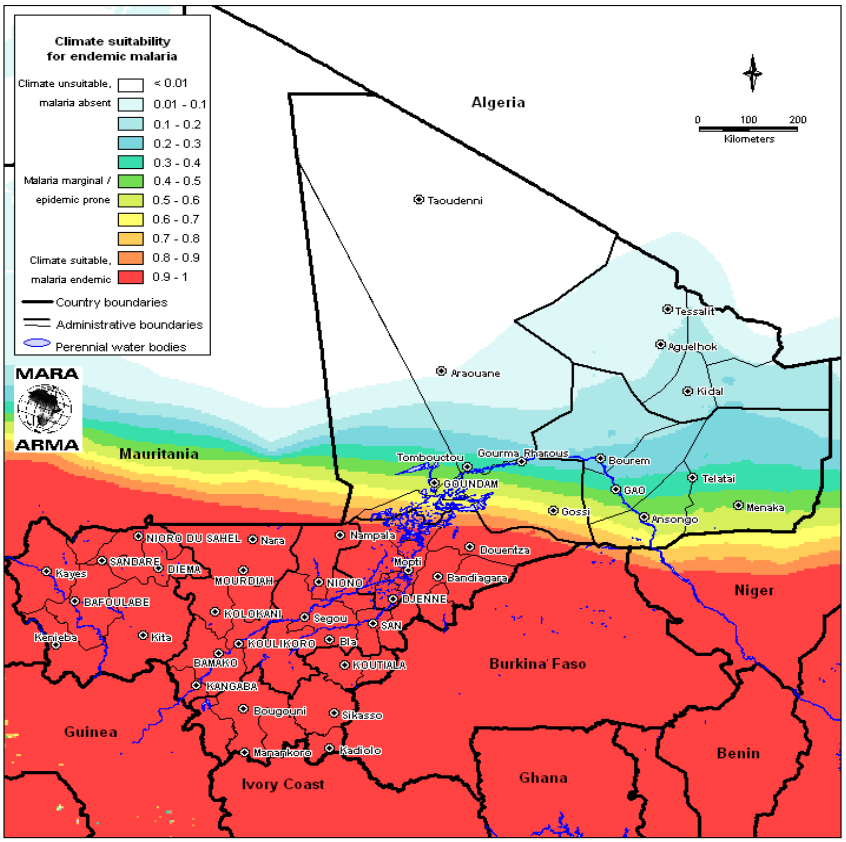
Indebted Poor Countries (HIPC) program funds to pay some MOH salaries, especially in CSCOMs. Overall, the GOM has steadily increased the contribution of the national budget devoted to health from about 6% in 2000, to 8% in 2005, and to about 11% in 2007 with commitments for additional increases in the future.

The GOM-approved FY07 Operating Plan for the 2nd National Health and Social Development Program includes budget line items totaling about $1 million for activities to be conducted by the PNLP. This does not include staffing of the PNLP, which is funded separately. Some of the highlights include LLIN procurement and distribution, surveillance, IRS, IPTp and training. This budget, including resources from countries providing direct budget support, funds only a portion of these activities; the remainder depends on other donor funding.

E. MALARIA SITUATION

Malaria is one of the major causes of morbidity and mortality in Mali. In the 2006 annual statistical summary of the national health information system (*Système Local d'Information Sanitaire* or SLIS), health facilities reported 1,022,592 clinical cases of malaria, accounting for 38% of all outpatient visits (all ages). Malaria also accounts for 41% of all outpatient visits for children less than five years of age. Thirty seven percent of all reported deaths and 56% of deaths in children under five are due to malaria. Children less than five years of age represent 64% of all reported malaria deaths. However, this number could result from incorrect reporting and lack of diagnostic capabilities; many febrile illness deaths are reported as malaria deaths.

Distribution of Endemic Malaria and Climate suitability for endemic malaria (Source: MARA/ARMA)



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

According to the SLIS, the reported incidence of suspected cases of malaria in 2005 was 82 per 1,000 population nationally, with regional incidence ranging from

52/1,000 in Mopti to 115/1,000 in Bamako. Infants had the highest reported incidence of 247/1,000, followed by children aged one to four years at 135/1,000. Actual malaria incidence may be much higher, since many patients with malaria do not seek care from health facilities. In fact, only an estimated 15-20% of febrile children present to health facilities. Overall, only about 50% of the population lives within five kilometers of a health facility, and 75% within a 15-kilometer radius (*Rapport Comité de Suivi*, May 2007).

Plasmodium falciparum accounts for 85-90% of malaria infections while *P. malariae* (10-14%) and *P. ovale* (1%) make up the remaining infections. There is also recent evidence of *P. vivax* in epidemic-prone regions of the north.

Malaria generally is endemic to the central and southern regions (with over 90% of Mali's population), and epidemic in the north. 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 peak transmission season is shorter in the Sahelian Zone, lasting approximately three months from August to October. Malaria transmission is endemic in the Niger River delta and areas around dams and with rice cultivation, and is endemic with low transmission in urban areas including Bamako and Mopti. Epidemics occur in the north and in parts of Koulikoro and Kayes regions.

Key partners of the PNLP include the Global Fund for HIV/AIDS, Tuberculosis and Malaria (Global Fund), the WHO, UNICEF, the World Bank, the Dutch Cooperation and USAID. The Non-governmental organization (NGO) and private voluntary organization (PVO) partners include *Groupe Pivot Santé*, *Fédération Nationale des Associations de Santé Communautaire* (FENASCOM), *Médecins Sans Frontières* (MSF), Plan International and Mali Voices /JHUCCP. The National Institutes of Health (NIH) supports the Malaria Research and Training Center (MRTC) of the Applied Epidemiology Department within the School of Medicine, Odontostomatology and Pharmacy. Sanofi-Aventis has launched a subsidized treatment initiated through local pharmacies to support its artesunate-amodiaquine (AS-AQ) products, Arsucam® and Coarsucam®. In November 2006, the Millennium Challenge Corporation awarded Mali a five-year $460.8 million grant to support infrastructure development and policy reform for productive sectors including road construction, airport renovation and expansion of large-scale irrigated agriculture in the northern region of the Niger River Delta.

F. NATIONAL MALARIA CONTROL PLAN AND STRATEGY

The MOH guides and coordinates all interventions in malaria control. The PNLP was first established in 1993 and until July 2007 remained under the oversight of a section within the Disease Control Division of the National Health Directorate (DNS). In July 2007, the PNLP was raised to a Directorate level in the MOH organizational chart. The new PNLP's director supervises four technical divisions and reports directly to the Secretary General of Health. Due to this higher profile in the MOH, the PNLP will be able to participate in and influence decision making about malaria control, including development of MOH work plans and budgets.

The PNLP's mandate is to formulate vision and strategies for all malaria interventions, coordinate research, propose policies, norms and guidelines, and develop and oversee implementation of work plans. The PNLP also supports decentralized regional and district health teams through training and supervision.

The PNLP's National Strategic Plan for 2007 – 2011 reflects RBM guidelines and the April 2000 Abuja Declaration. The national strategy aims to achieve the following:

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

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

In 2006, the MOH decreed that ITNs should be distributed free-of-charge through public health facilities for children under five and pregnant women, as should treatment for children under five with ACTs. In 2007, the PNLP established six working groups facilitated by PNLP staff and involving all malaria partners. The working groups include: 1) drugs and case management, 2) communication and social mobilization, 3) vector control, 4) ITNs, 5) operational research, monitoring and evaluation, and 6) capacity building. These working groups developed detailed implementation plans for national policies, guidelines, and training materials, and will continue to advise on future policy development and implementation. With the resumption of IRS, the PNLP recently established an IRS Steering Committee comprising representatives from the Ministries of Agriculture, Environment, and Territorial Administration, as well as from civil society, UNICEF, WHO, PMI, and other relevant MOH technical divisions. The committee, chaired by the Secretary General of Health, will be expanded to include all vector control aspects.

G. CURRENT STATUS OF MALARIA INDICATORS

The Demographic and Health Surveys (DHSs) conducted in 1996, 2001 and 2006 are the only nationally-representative health surveys conducted in Mali in recent years. The malaria module did not address all critical indicators. The 2006 DHS, was conducted from May to December, which includes the peak malaria transmission season in Mali (August-November). The results show relatively high household coverage with any net, but low ITN coverage and even lower use of nets or ITNs by high-risk groups (pregnant women and children). Prompt case management of children less than five years of age with fever is also very low, as is use of sulfadoxine-pyrimethamine (SP) for IPTp.

Recent Estimates of Malaria Indicators: 2006 Mali DHS	
Indicator	**Estimates**
Proportion of children under five years old with fever in the last two weeks who received treatment with an antimalarial according to national policy within 24 hours of onset of fever	15%
Proportion of children under five years old with fever in the last two weeks who received treatment with ACTs within 24 hours of onset of fever	N/A*
Proportion of households with at least 1 ITN	50%
Proportion of children under 5 years old who slept under an ITN the previous night	27%
Proportion of pregnant women who slept under an ITN the previous night	29%
Proportion of women who received 2 or more doses of IPTp during their last pregnancy in the last 2 years	4%
Proportion of targeted houses adequately sprayed with a residual insecticide in the last 12 months	N/A++

*Data will be available in the next household survey

++Mali has not sprayed on a large-scale before; 2008 will be the first year for IRS

H. GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

The goal of PMI is to reduce malaria-associated mortality by 50% compared to pre-Initiative levels in PMI countries. By the end of 2010, PMI will assist Mali to achieve the following targets in populations at risk for malaria:

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

I. EXPECTED RESULTS – YEAR TWO

Prevention:

- Approximately 1.2 million long-lasting insecticide-treated nets (LLINs), of which PMI will provide approximately 570,000, will be distributed to children less than five years of age and pregnant women. This is expected to result in more than 70% of households owning one or more ITNs;
- Approximately 87,000 houses in the two Districts of Bla and Koulikoro targeted by the MOH and PMI for IRS will be sprayed, reaching approximately 445,000 residents;
- Approximately one million tablets of SP for IPT in pregnant women will be procured in conjunction with the Global Fund and UNICEF to cover 100% of SP needs.

Treatment:

- 500,000 treatment courses of ACTs will be purchased for the NMCP to implement home-based management of fever for children less than five years of age using community *relais* (all ACTs needs for health facilities will be met by the Global Fund);
- Approximately 50,000 treatments of artesunate suppositories and injectable (intramuscular) artemether drugs for severe malaria will be purchased to support introduction in government health facilities in one region.

J. INTERVENTIONS – PREVENTION

Insecticide-treated nets (ITNs)

Current Status:

In 2006, the MOH decreed that ITNs should be distributed free-of-charge through public health facilities for children under five and pregnant women. Since 2006, the MOH has supported free distribution of LLINs to pregnant women at their first antenatal care visit and to children less than five years of age with completed vaccination cards. The GOM renewed a second five-year presidential decree in 2006 that removed all national taxes and tariffs on imported LLINs and insecticides for net retreatment. The PNLP supports LLINs, not ITNs needing retreatment, as the preferred long-lasting net.

In 2007, Mali focused significant effort on scaling-up nationwide LLIN distribution through campaigns. As a pilot for a large national campaign, 220,000 free LLINs were distributed in June 2007 to children less than five years of age in Tombouctou and Gao regions. This free distribution was conducted during the "National Intensified Nutrition Activities Week" that provides Vitamin A and deworming medication to children twice a year. Based on this successful experience, the country conducted a five-commodity integrated campaign in December 2007, during which nearly 2.3 million free LLINs were distributed to children less than five years of age in all regions except Tombouctou and Gao. PMI worked with the Canadian Red Cross to mobilize additional resources and bring in new partners, including the

UN Foundation, Malaria No More, Global Fund, and NGO partners. Through this collaboration, partners contributed LLINs as reflected in the table below:

Partner	LLIN Contribution
Canadian Red Cross	1,801,622
Malaria No More	165,000
PMI	169,800
United Nations Foundation (Nothing But Nets)	133,000
Total	**2,269,422**

Campaign organizers used 2007 immunization program estimates for children less than five years of age to estimate LLIN needs. Each vaccinated child received an LLIN with a limit of two LLINs per mother. Although some stock outs were reported during the campaign, the MOH had organized a system of providing vouchers to missed children to redeem for a LLIN at health facilities once routine stocks had been replenished. A MOH follow-up campaign survey conducted in February 2008 assessed coverage of all commodities, including LLINs, and reported that 80% of children less than five years of age who were vaccinated during the campaign had received a campaign net. This finding suggests a significant increase in ownership over the last year when compared with the 2006 DHS findings of 50% of households with at least one ITN. Because of concerns raised about the survey methodology, the MOH with support from the Canadian Red Cross, PMI, and other partners will conduct a more rigorous survey during the rainy season in August-September; this will measure both ownership and use among the target population, and provide estimates by sub-region. In addition, other assessments by PMI partners found that in Kayes region, approximately 80% of children less than five years of age had received a campaign net, while children in 53% of rural households and 65% of urban households had slept under a campaign net the night before the survey. The survey also reported that 35% of households had an ITN that was not being used and that there was a lack of knowledge about malaria transmission and its severity in these households.

In addition, the MOH continues to provide free LLINs through routine health facility services to pregnant women at their first antenatal care visit and to children under one year receiving vaccinations at expanded program for immunization (EPI) services. The projected annual LLIN need for a total population of 12.7 million people (estimate for 2008), is approximately 1.2 million LLINs (635,000 pregnant women and 508,000 infants), or approximately 100,000 nets per month for approximately 800 CSCOMs nationwide. Additional nets will be needed for people living with HIV/AIDS.

The following LLINs are planned and available for January 2008 to July 2009.

Source	Number of LLINs	Observations
MOH	569,000	MOH remaining stock from 2007, an additional 500,000 nets were delivered in January 2008 to the CSREF level.
USAID (FY07 funds)	287,000	USAID remaining stock with PSI from 2007 and an additional 212,000 nets delivered in

		February 2008 for district distribution.
Global Fund Round 6	390,000	Delivered in March/April 2008.
UNICEF	400,000	200,000 nets are available and 200,000 planned (however some uncertainty about the target group e.g. possibly given to school youth)
PMI (FY08 funds)	600,000	Delivery scheduled for September 2008
Total	2,246,000	

The PNLP anticipates that these nets will cover routine distribution needs through June 2009, before the beginning of 2009 high transmission season. The PNLP projects that in 2009-2010, the country will need 1.2 million LLINs and will receive an estimated 700,000 nets, including 300,000 LLINs from UNICEF and 400,000 LLINs from the Global Fund Round 6 grant. The Senegal River Basin Project (French acronym, OMVS) may provide 300,000 LLINs, but this is yet to be confirmed. Therefore, a potential gap of 500,000 LLINs exists, which PMI plans to cover in FY09. While the MOH does not anticipate another mass LLIN distribution in 2009, reported low measles vaccination coverage may make a follow-up campaign possible in 2010, thus providing another opportunity for integration with LLINs. Results of the August 2008 survey will help identify specific regions to target for supplemental nets and expanded efforts to increase ownership and use.

With the influx of LLINs over the past year, lack of coordination among MOH/PNLP and donor partners has resulted in some confusion about the quantities, timing, and delivery of nets for routine distribution. Population Services International (PSI), with PNLP participation, is carrying out a nationwide inventory to assess the current availability of stock at district-levels, and to redistribute LLINs among district health facilities before the peak of the malaria transmission season. PSI found adequate supplies at the CSREF-level in districts warehouses in both Bamako and Sikasso regions to meet local needs for the next six months. However, many CSCOMs did not have the minimum stock required and had no means of transporting nets to their facilities from the district warehouse. PSI will collaborate with the PNLP to conduct a repeat assessment of LLIN distribution in six months.

The Global Fund Round 6 Principal Recipients, PNLP and *Groupe Pivot*, have finalized their workplans and budgets for the annual procurement and distribution of nets. *Groupe Pivot* in partnership with FENASCOM is assisting with the distribution and promotion of LLINs at the community-level through community health volunteers, or *relais*. As a sub-partners of the Global Fund Round 6 grant, PSI is procuring, warehousing and distributing nets to the district CSREF-level and further to the CSCOM-level based on need. PSI outsources its entire LLIN logistic system from warehousing to transportation. Since many of the regional warehouses do not have the capacity to handle the weight and volume of LLINs, PSI works directly with the district depots to ensure adequate stocks are available for the CSCOMs. However, the CSCOMs do not have means to transport nets to their facilities and recover costs. PSI has issued private sector bids to trucking companies to deliver to the district-level and then issued a second tier of contracts with the districts to deliver to the CSCOM facilities.

Progress to date:

The PNLP and partners are conducting BCC/IEC activities as follow-up to the December net campaign, reinforcing correct behaviors and practices around net use. PMI initiated several media messages by radio and TV focused on malaria transmission and increasing year-round net use. Mali has generally high demand for LLINs, but consistent year-round use among target groups remains low, especially during the dry season when people are less likely to sleep under a net.

In Year One, USAID Mali procured 212,000 LLINs for distribution through EPI and ANC routine services. PMI also procured 169,800 LLINs for the December campaign and is procuring 600,000 LLINs to support routine services at health facilities, including support for distribution to the facility-level. This is in addition to the 2.3 million nets procured by partners including Malaria No More, Canadian Red Cross, and others.

PMI is also supporting implementing partners to work with the MOH Directorates involved in quantification, procurement and distribution of drugs and other health commodities. The first beneficiary of the technical assistance is the Government's *Pharmacie Populaire du Mali* (PPM) which manages the central-level public sector logistic system. PMI will carry out an initial needs assessment of MOH and partner capabilities in warehousing, logistic and distribution systems. PPM's role in the management of LLIN logistic systems is still to be determined since it has not traditionally been involved. The PNLP M&E Planning Division is responsible for forecasting net quantifications in collaboration with other MOH offices including the DPM, PPM and EPI.

The PNLP and partners are conducting BCC/IEC activities as follow-up to the December campaign, reinforcing correct behaviors and practices around net use. PMI initiated several media messages by radio and TV focused on malaria transmission and increasing year-round net use. The Canadian Red Cross is designing a pilot regional door-to-door "hang up/keep up" activity for August and September using their Red Cross volunteers. If shown to be effective, this approach could serve as a model for other NGO partners to implement nationwide. To ensure the high coverage levels and net effectiveness, BCC/IEC messages may need to address care and maintenance of nets as well as determinants in net use and preferences.

Proposed USG component for FY09: ($4,976,600)

PMI will continue to contribute to scaling-up coverage and use of free LLINs among the principal target groups (children less than five years of age and pregnant women) by supporting free distribution through public sector routine delivery channels. PMI will also strengthen the capacity of the MOH and partners to coordinate donor inputs, track LLINs and manage logistic and distribution systems. The following PMI Year 2 activities are planned:

LLIN procurement: ($3,425,000) PMI will procure approximately 570,000 LLINs for free distribution to children under five and pregnant women, as well as targeting vulnerable groups such as PLWHAs. This will close the estimated annual LLIN gap for 2009-2010. PMI will also provide support to the PNLP and MOH/EPI for supervision, forecasting, planning and

coordination of net distribution. PMI will work closely with other partners including PNLP to leverage additional support and funding for LLINs to meet any new gaps, especially if surveys identify regions needing supplemental activities and nets.

Distribution of LLINs: ($596,600) PMI will also support distribution of free LLINs to pregnant women and children under five in the public sector by ensuring nets are delivered to the district-level for routine distribution at health facilities during ANC and EPI services. PMI will help CSCOMs improve their distribution and reporting systems and ensure proper labeling of public sector LLINs.

Private sector support: ($100,000) PMI will focus on strengthening the private sector's understanding of the importance of procuring and selling quality long-lasting insecticide treated mosquito nets. This support will counter the influx of large quantities of untreated mosquito nets from Asia, which families prefer because of their large size, relative low cost, and availability. Learning from previous private sector approaches, PMI will work with the private sector and the GOM to discuss the role of the private sector in improving LLIN coverage and use. This dialogue will generate strategies to consider for providing subsidized LLINs through the private sector to specific non-vulnerable target groups (e.g., school-aged children and newly married couples) to help achieve high coverage levels in both the general and vulnerable populations. Specific activities will include training at least five bed net importers and 50 private sector distributors about advantages of selling long-lasting quality nets, and monitoring the types and quality of these nets. Based on these activities, PMI and PNLP will determine which approaches are most effective in ensuring the availability of affordable, high quality LLINs in the private sector.

LLIN logistics strengthening: ($225,000) PMI will support the PNLP, PPM and other key implementing partners who are involved with LLIN logistics from central- to district-levels. Based on an FY 08 PMI-funded needs assessment of the supply chain management system for LLINs, PMI funds will be used to strengthen the commodity management to adequately forecast, plan and track distribution of LLINs, and carry out quarterly inventory controls of LLIN stocks. This includes advising on the transportation and other inputs needed to ensure routine stocks are available. Funding will support improved monthly stock and reporting forms as well as inventory and supervision checklists. A portion of the funds will also be used to support end-use verification of LLINs.

BCC/IEC: ($560,000) Support for BCC/IEC activities is even more critical in Year 2 following mass distribution of nets to key target groups, especially given the low use levels noted from the post-campaign dry season survey. Identifying the remaining barriers to correct hanging, use and maintenance of nets and promoting year-round use is extremely important to help meet PNLP and PMI goals. PMI will support innovated ways to combine tracking of LLINs with targeted BCC messages, and will identify multi-channel strategies to communicate this information, including engagement of community-based workers. Finally, PMI will explore support for door-to-door, hang up/keep up activities using community workers to move towards year round use of LLINs.

Indoor residual spraying (IRS)

Current Status:

The PNLP's Strategic Plan 2007-2011 envisions an integrated vector control program that includes ITNs, indoor and outdoor spraying, destruction of larval habitats, larviciding, and environmental clean up in urban zones. In the proposed PNLP 2007 budget, IRS was limited to epidemic response in the 17 northern districts. The GOM has proposed to conduct a small IRS pilot project in selected districts of Kayes and Koulikoro with funds from Senegal River Basin Organization (OMVS), but this is still in the planning stages.

In every district, the agents of the *Division d'Hygiène Publique et Salubrité* (DHPS) are equipped with at least one sprayer, and in every region they receive at least one spray pump. In 2004, 100 sprayers were purchased and 20 more were purchased yearly thereafter. Brand names for equipment include Shogun, Matabe and Roxy, each with a capacity of 16-18 liters; there were no Hudson sprayers in Mali until the start of PMI IRS activities this July.

A small stock of cyfluthrine and propoxur is currently present at the DHPS warehouse. Other products used include chlorpyrifos, permethrin and cyhalothrin. Mali has accepted the WHO-approved insecticides for IRS except for DDT. The DNS has held discussions to approve DDT, but decreased vector susceptibility has been detected in some districts. Although the GOM lifted importation tariffs for insecticides destined for ITN impregnation, the Presidential decree did not include those on insecticides for IRS or larviciding. However, no tariffs were charged on insecticides imported for IRS in 2008.

Climatic zones in Mali range from desert regions in the North with less than one month of rainfall to the Sudano-Guinean Zone in the far south with six to seven months of rainfall. The three northernmost regions and the northernmost districts of Kayes, Koulikoro, Segou and Mopti Regions are considered zones of epidemic risk for malaria transmission and will not receive routine IRS at present. Instead, the PNLP will pre-position insecticide and sprayers in case of an epidemic in Kidal, Gao, or Tombouctou. IRS is potentially an effective option in much of the remainder of the country where malaria transmission is perennial but with seasonal peaks that vary in duration from three to six months. In Year 1, IRS will not be considered in rice growing areas and zones of irrigation and around the Niger River Delta where transmission is holoendemic or in the urban areas of Bamako and Mopti, where malaria is endemic with limited transmission. Depending on the duration of the insecticide effectiveness on the walls, areas with six to seven months of rain may require a second round of spraying before the end of the rainy season and thus will not have spraying in the first year.

The DHPS carries out campaigns to control mosquitoes and rats. In some cases, the district government may provide the insecticides, spray personnel and per diem; in others, communities or individuals may purchase the insecticide and the agents will carry out the spraying either as part of a campaign or at an individual's request. IRS is conducted in a consistent manner in the gold mine areas of Sadioloa, Yatela, Loulou, Morila and Kalana, but is limited to the mines and surrounding villages rather than district-wide. No Global Fund or other private sector activities are currently underway.

The PNLP has conducted insecticide resistance testing with assistance from staff of DHPS and MRTC. In 2004, a decreased susceptibility to several pyrethroids and DDT in *An. gambiae* was detected in the districts of Selingue, Pimperena, Doneguebougou and N'Gabakoro Droit. In the past, WHO funded these tests but since 2006 no funding has been available.

Entomologists at the MRTC in collaboration with an NIH scientist have conducted extensive studies on the biology and behavior of anopheline mosquitoes in several regions. Observations made in one of their recent studies may be useful in developing more cost-effective strategies. The data suggest that *An. gambiae s.l.* survives during the dry season in puddles of water found in depressions along the Niger riverbed as it recedes after the rainy season. These scientists observed that although *An. gambiae* is found year-round in the hamlets along the Niger River, it disappears in larger villages a few kilometers inland during the dry season. The "river" anophelines may be the primary source, or inoculum, for the mosquito population which surge increases inland after the rains start. These investigators have hypothesized that controlling mosquitoes during the dry season in hamlets along the rivers edge may reduce malaria transmission in villages further away from the river.

Progress to date:

In 2008, PMI Year 1 funds supported Mali's first large-scale IRS campaign in the *Cercles* of Bla and Koulikoro. After completing logistics and environmental assessments and receiving clearances from both the USG and the GOM, PMI supported the training of more than 350 spray trainers, supervisors and operators, the purchase of all commodities and protective equipment, and all communication, supervision, monitoring, and environmental compliance activities. Activities to promote and mobilize the population around IRS were launched in April. About 1,848 community *relais* (1221 in Bla and 627 in Koulikoro) received training and materials to conduct information group meetings and carry out door to door mobilization for IRS. Spray activities began the week of July 14 and concluded August 30th. It is estimated that approximately 87,198 houses were sprayed, protecting about 405,936 residents.

The NMCP and its in-country partners chose *lambda-cyhalothrin* (ICON-CS®) as the insecticide for IRS. They based this decision in part on an evaluation of *An. gambiae* insecticide susceptibility that MRTC conducted with PMI support in October and December of 2007 in Bla and Koulikoro. An entomologist from MRTC is conducting entomological monitoring in villages in both districts. The monitoring activities include cone bioassays on walls to test for insecticidal activity, knockdown spray catches, and human landing catches to detect potential changes in mosquito activity and behavior.

Additional hamlets have been mapped to expand IRS along the Niger River, and entomologic monitoring was carried out during the rainy season of 2008. The hamlets are scheduled to be sprayed in December 2008, with monitoring continuing until May 2009. While they originally planned to conduct a small study with one treated hamlet and one control hamlet and their associated villages, PMI has provided funds to allow them to expand it in order to better assess the effect of this targeted control method.

In support of the NMCP's strongly voiced desire for integrated vector management including larviciding, PMI agreed to conduct a small-scale larviciding study in conjunction with IRS. In preparation for the larviciding activities, mapping and monitoring of larval sites in selected sites in Koulikoro district will occur in October 2008 and May 2009. PMI will purchase larviciding materials and equipment prior to May 2009 in order for the larvicidal treatments to begin before the rainy season starts.

Proposed USG component for FY09: ($3,234,000)

PMI will continue to encourage the use of IRS in areas of seasonal malaria transmission where it can dramatically reduce malaria transmission and mortality. While current PNLP policy encourages IRS in epidemic-prone areas and outdoor spraying, PMI will not fund either activity.

IRS: ($2,900,000) PMI will continue to support IRS in Bla and Koulikoro *Cercle*s to cover a population around 445,000. PMI will procure materials including insecticide, spraying equipment, and personal protective clothing and equipment for spray operators and supervisors, and will cover expenses for trainers and spray teams and rental of insecticide storage facilities. Other support includes training at the regional-, district-, and community-level, and joint supervision by PNLP and DHPS. Communications materials will also be provided to inform beneficiaries, raise public awareness, promote behavior change (including environmental management and sanitation) and promote cooperation with the DHPS spray teams. PMI will also provide technical support for the spraying and entomological assessments in IRS districts.

The local CSCOMs and the CSREF in each *cercle* will ensure additional human health and environmental safety measures for IRS, with PMI assistance. MRTC will provide entomological training and will assist PNLP and DHPS with entomologic monitoring and wall bioassays to determine the residual effect of pesticides.

In 2009, IRS partners will emphasize strengthening of national and local capacity for IRS to set the stage for transferring responsibilities for IRS activities to the MOH by 2011. The first steps will be to develop a coordination mechanism, led by the PNLP, which will include all partners supporting the malaria control program. Within this mechanism an IRS oversight committee, composed of members of MOH including the DHPS, PNLP, RTI, and PMI team members, will develop a sustainability plan for the MOH.

Entomological Monitoring: ($120,000) Immediately after spraying is implemented in 2009, PMI will support cone bioassays on the walls for a predetermined number of houses monthly using colony-reared mosquitoes to assess the quality of spraying and the duration of insecticidal activity on the walls. In addition, PMI will support vector activity studies in selected villages within the two districts from May until November. These studies will include monthly indoor and outdoor landing catches, pyrethroid spray catches, and insecticide susceptibility assays. Mosquitoes will be identified to strain level by polymerase chain reaction and sporozooite levels will be determined by enzyme-linked immunosorbent assay.

Larviciding: ($50,000) GOM voiced a strong desire for an integrated vector control program that includes larviciding and environmental management. PMI will support inclusion of

targeted larval source reduction in the overall IEC/BCC strategies for IRS. In addition, PMI will continue to fund an operational research project by MRTC in a small subset of houses in Koulikouro Region that is included in the IRS program, to determine if there is an added benefit to larviciding of water sources surrounding sprayed homes. The activities began in 2008 and will continue until December 2009. Preliminary results should be available in late 2009.

Expansion of IRS along Niger River: ($60,000) MRTC/National Institutes of Health (NIH) originally planned to carry out a small study to reduce or eliminate mosquitoes with IRS in one hamlet during the dry season and to measure mosquito activity in nearby villages as rainy season begins. Ultimately, this study will help the NMCP and PMI target vector control activities more efficiently in specific geographic areas of Mali. The 2008 OR funds allowed MRTC to expand this project to eight hamlets and four villages. In 2009, PMI will fund MRTC to continue monitoring the effect of the dry season IRS throughout the rainy season in the expansion areas from June to December 2009.

IRS for Epidemic Response: (no additional cost to PMI) Insecticides pre-positioned but not used in 2008 will be recycled for use for IRS in 2009, and a new stock of insecticide will be pre-positioned into in a central location for the epidemic-prone North. This will help support the MOH's and WHO's plan for epidemic preparedness and response. In addition, trainers from epidemic zones will join those trainers from the two districts targeted for IRS.

Technical assistance for entomology: ($24,200) A CDC entomologist will provide technical assistance for the implementation of entomological monitoring activities including quality control and ensure the completion of operational research projects.

MOH DHPS: ($50,000) PMI will provide support to the PNLP and the Hygiene Division (DHPS) for capacity building and supervision of spray operations. Support will include training, development and refinement of standard operating procedures, design of supervisory processes and standards and provision of limited travel expenses.

Environmental Compliance Monitoring: ($30,000) Support will be provided for routine monitoring of IRS field activities, to ensure that environmental and human health mitigation measures are adequately addressed.

Malaria in Pregnancy

Current status:

Utilization of antenatal care (ANC) by pregnant women and coverage of IPTp are still low in Mali, although IPTp has been a national policy since 2005. The MOH policy for IPTp in Mali requires two doses of SP under direct observation at least one month apart between the 4th and 8th month of pregnancy. However, the DHS (2006) indicates that only 16% of pregnant women reported receiving any SP during their last pregnancy, and only 4% receive the recommended two doses at ANC visits. Recent data from MRTC and *Laboratoire de Biologie Moléculaire Appliquée* indicate that SP is still effective for the treatment of malaria in Mali; resistance of *P. falciparum* to SP is only 10-15% but apparently increasing and will require monitoring to assess

its continued efficacy. However, SP has been shown to reduce anemia and placental parasitemia even when therapeutic efficacy for treatment of clinical malaria is low.

In 2006, the MOH announced that SP for IPTp would be provided for free; however, pregnant women continue to pay for SP, and the decree is neither final nor disseminated widely. USAID and UNICEF procured SP for IPTp, with enough SP purchased to cover 80% of pregnant women during their ANC visits. PMI requested that the PNLP discuss the SP issue with the PPM and that SP should no longer be available for sale in any pharmacy in Mali. The projected annual need for SP to maintain the PNLP objective of 80% coverage is about 1,016,000 treatments, based on 5% of the population (635,000) being pregnant women and each woman receiving 2 doses. However, with the phase-out of chloroquine and the surplus of free SP available at CSCOMS, there may be greater use of SP as a first-line treatment of malaria, potentially resulting in shortages. Global Fund Round 6 includes 2,436,802 SP treatments for IPTp over the next four years (approximately 609,000 doses/year), or slightly more than half of the need with an annual gap of about 407,000 doses.

To date, none of the medical or paramedical pre-service training schools have revised their curricula to include information on malaria in pregnancy and IPTp. In May 2006, USAID-supported and other partners worked with the MOH's Reproductive Health Unit (with input from the PNLP) to develop a revised in-service training module for comprehensive ANC that includes MIP and IPTp. Global Fund Round 6 includes support over the next 4 years for in-service training of health providers in the public and private sectors, and of central and regional supervisors/trainers. Training will include the diagnosis and treatment of malaria, IPTp and malaria in pregnancy and use and re-treatment of ITNs.

USAID-supported partners including Save the Children, Keneya Ciwara and *Assistance Technique Nationale* (ATN) have helped produce technical guides for providers, IEC outreach materials for *relais*, and radio and TV campaigns on IPTp. In addition, other USAID-supported partners including Keneya Ciwara and two Child Survival and Health Grants Programs grantees have supported the provision of LLINs to pregnant women. The grantees have used *relais* to promote key malaria in pregnancy messages including IPTp and the availability of free SP and LLINs at ANC consultations.

Information is collected and reported quarterly through the national SLIS on the number of ANC visits (including early ANC visits), postnatal consultations, SP doses administered, and deliveries by a skilled birth attendant. Recently revised ANC visit cards were released that include IPTp and LLIN information.

As noted in other intervention areas, there is a need for improved supply chain management for malaria in pregnancy commodities.

Progress to date:

In Year 1, PMI is procuring SP to fill the gap and work with UNICEF to quantify additional unmet needs for SP for IPTp to ensure universal coverage. PMI is supporting national-level policy dialogue and consensus building on the guidance for free provision of SP. PMI

implementing partners, along with the MOH, recently held a workshop in March 2008 to discuss the impact of free commodities such as SP, LLINs, and ACTs at health facilities. PMI will support additional technical discussions and workshops to facilitate the roll out of the new policy and analyze its effect on utilization and access to services.

To address the new policy for IPTp, PMI is supporting training in the new in-service training module for comprehensive ANC, as well as the expansion of supportive supervision during the scale-up of IPTp nationally among facility staff at the CSREF and CSCOM levels. As part of its overall M&E plan, PMI will support the training and supervision of health workers to complete the IPTp portion of the new MOH health facility reporting form, and to use the information locally to improve IPTp quality and coverage.

PMI is supporting a review of existing information on knowledge and perceptions related to malaria in pregnancy in Mali and the development of BCC/IEC messages to increase women's awareness of risks of malaria during pregnancy, promote attendance at ANCs and early use of IPTp early in the 2nd trimester, completion of the recommended two IPTp courses treatments and demand for proper treatment of symptomatic malaria in pregnancy. Based on the pilot work of several USAID-supported partners, additional *relais* and other community-based volunteers are being trained on these topics as well as on the importance of sleeping under an ITN. There will be a focus on targeting men and key decision-makers in households as part of the malaria in pregnancy strategy and increasing uptake of IPTp. In addition, PMI will link BCC/IEC activities with HIV/AIDS messaging where appropriate.

Lastly, PMI is supporting the national pharmacy (PPM) in strengthening the logistics and distribution system for SP and other malaria in pregnancy commodities such as iron folate. This activity is complementing the strengthening of logistics for other commodities such as ACTs and LLINs.

Proposed USG component for FY09: ($1,080,000; other costs covered in case management section)

SP Procurement: ($100,000) PMI will continue to support the annual need along with UNICEF and the Global Fund to supply 100% of the needs for SP to cover all pregnant women with the full recommended treatment of two doses during pregnancy (the need increased since last year (over 635,000 pregnant women per annum).

Facility level service provider strengthening: ($480,000) PMI will use the information from the national policy workshops and analyses to update supervision and training materials as necessary and assist implementing the malaria in pregnancy guidelines. Efforts will focus on the revision of recommended treatment guidelines for malaria in pregnancy, including treatment with oral quinine in the first trimester and ACTs in the second and third trimesters, and improved treatment compliance. PMI will work to ensure nationally that every cadre of health provider is providing appropriate services at ANC visits.

PMI will work with partners including the MOH Reproductive Health Division and Midwives Association to support training in the new in-service training module for comprehensive ANC, as

well as the expansion of supportive supervision during IPTp implementation nationally through facility and community outreach activities. As part of its overall M&E plan, PMI will continue to support training and supervision of health workers to complete the IPTp portion of the new MOH health facility reporting form, and to use the information data locally to improve IPTp quality and coverage.

Policy support for ANC and IPTp: ($150,000) Even though the policy for IPTp was adopted in 2005, the uptake and roll-out has been particularly slow. This is partly due to cultural practices, in which women hide their pregnancies until it is physically visible. Religious leaders and traditional opinion leaders could address this issue if properly informed about the benefits of early antenatal care. PMI recognizes the need to support workshops for consensus building to accelerate this process, using Imams and traditional leaders. PMI/Mali must help ensure that the national leadership understands the importance of IPTp and develops policies to improve care at regional- and district-levels. In 2006, the MOH announced that SP for IPTp would be provided for free; in reality, pregnant women continue to pay for SP, and the decree is not officially recognized nor disseminated widely. PMI/Mali will support finalizing this decree at the national-level, and will continue to assist in the dissemination to ensure SP is being provided free for pregnant women and is used appropriately. PMI, through its partners, will ensure adequate technical input at the national-level to work closely with the PNLP to address these bottlenecks.

BCC/IEC for ANC and IPTp: ($300,000) Following the development of the integrated communications strategy, PMI will support its roll-out targeted towards pregnant women and women of child bearing age 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 early in the 2nd trimester, completion of the recommended two treatments courses of IPTp, and demand for proper treatment of malaria in pregnancy. The PMI will continue to support refresher training for *relais* and other community-based volunteers, with a focus on targeting men and key decision-makers in households. PMI will link BCC/IEC activities with HIV/AIDS messaging where appropriate.

Logistics strengthening: ($50,000) In order to ensure reliable transportation of commodities to health centers, PMI will continue to support the PPM to strengthen the logistics and distribution system for SP and other malaria in pregnancy commodities, along with those for ACTs and LLINs. This includes routine monitoring of supplies to avoid stock outs.

K. INTERVENTIONS –CASE MANAGEMENT

Diagnostics

Current Status:

Malaria diagnosis in most MOH facilities is based on clinical grounds and fewer than 10% of suspected cases of malaria are laboratory confirmed. Microscopic diagnosis is performed in four national, six regional, and 59 district hospitals at a cost of 300-600 FCFA ($0.75-1.50) per blood smear. The MRTC estimates that approximately 100 rural physicians have also been

trained to perform, stain, and read blood smears. Mali's public health laboratory system faces multiple challenges, including inadequate numbers of skilled laboratory personnel, as well as limited and/or non-functional physical infrastructure and equipment. A private foundation in Bamako, Centre Charles Mérieux, conducted a survey of laboratory infrastructure and capacity at the end of 2005. Results from this self-reported survey revealed that at least 21 CSREFs do not have electricity, and only 50% of CSREFs have regular quality control of laboratory instruments. The report also highlighted human resource limitations (few qualified lab staff) and problems with the quality of reagents purchased for health facilities.

The PNLP wants to strengthen microscopic diagnosis where it already exists and implement RDTs where microscopy is not available. There has been some operational research on the use of RDTs at CSCOMs; however, the use of RDTs in routine care has been limited and no national policy exists for training, quality control, or supervision of RDTs. While the PNLP's national policy states that all cases of malaria, regardless of age, should be laboratory-confirmed prior to the administration of ACTs, there is no capacity to follow this directive. A recent MOH decree allows for the provision of ACTs and RDTs to children less than five years of age at no cost; however, technical discussions with the PNLP suggest that policy changes are needed to reflect presumptive treatment of febrile children less than five years following IMCI guidelines, reserving RDT use for older children and adults. The MOH has permitted the use of Paracheck® by MSF and Optimal® by Save the Children in small operational research projects, but the PNLP now seem to prefer Paracheck® because of its lower cost, high sensitivity in local evaluation, and ease of use. The DPM has registered both products for use in Mali. The MRTC has included guidelines for performing Optimal® RDTs in the current training documents; however, the PPM has recently procured and distributed Paracheck® RDTs. Training materials are under revision to include standard procedures for performing both tests. Funds were not granted in Global Fund Round 6 for laboratory training, equipment, purchase of RDTs, or laboratory quality control. At the time of proposal development, the CCM decided to submit a five year funding proposal not to exceed $30 Million, with procurement of ACTs as the major pressing need, thus maximizing the chances of getting selected.

Although the *Institut National de Recherche en Santé Publique* (INRSP) is responsible for the training and supervision of malaria microscopists and quality control of malaria microscopy, the MRTC plays a substantial role in training of laboratory technicians. Insufficient funding has prevented regular training. No established system for quality control of malaria diagnosis exists. The INRSP conducts quality control of malaria microscopy when the regional or district health teams request an evaluation, but this does not appear to occur regularly or on a national scale. The INRSP has no comprehensive strategy for quality control of malaria microscopy or of laboratory services in general. Quality control has been established for several studies conducted in Mali according to protocol requirements, but no national policy exists for the regular collection of blood smears or RDTs for quality control at the central level. The MOH procures laboratory equipment (such as microscopes and centrifuges) at the central level; however, most consumables (including Giemsa stain, slides and lancets) are procured at the regional or district level. The decentralized purchase of consumables often results in the procurement of consumables of poor quality. Previously the PPM procured laboratory consumables centrally, but the districts found local prices cheaper and therefore did not procure from the PPM. As a result, the PPM no longer procures laboratory consumables.

Progress to date:

PMI is conducting a laboratory needs assessment in August 2008 to identify existing gaps in equipment and training at CSREFs. PMI is also facilitating the review of current laboratory training manuals for malaria microscopy and performance of RDTs. PMI will partner with the INRSP and MRTC to support quality assurance of malaria diagnostics.

Proposed USG component for FY09: ($600,000)

Malaria diagnosis in Mali is primarily made on clinical grounds. PMI will continue to support the improvement of malaria diagnosis by microscopy through increased training, supervision, and quality control. PMI will also support the development of a national system of quality control for microscopy prior to widespread introduction of RDTs – to monitor the sensitivity and specificity of RDTs used in field conditions.

Procurement of laboratory consumables and RDTs: ($300,000) The PNLP wants to provide RDTs universally, while PMI is concentrating on sentinel sites to maintain quality control of RDTs and encourage appropriate response to a negative test. PMI will procure additional microscopy supplies to support laboratories in line with national norms that stipulate that CSREFs should offer laboratory services continuously. PMI will also procure RDTs and other consumables for laboratory confirmation (microscopy or RDT) of all cases presenting to sentinel sites. The number of microscopy kits, replacement bulbs for microscopes, lab consumables and RDTs will be based upon the laboratory needs assessment conducted with FY08 PMI funds and the utilization of RDTs and lab consumables at sentinel sites.

Training in lab diagnostics: ($150,000) PMI will work with the PNLP, INRSP, and MRTC to strengthen in-service training for laboratory technicians in malaria diagnosis, including both microscopy and RDTs. FY08 funds will support the development and implementation of a plan for microscopy training among MOH laboratorians, including training for incoming laboratory workers and refresher training for current technicians. In FY09, PMI will support implementation of the microscopy training plan including:

- Support to pre-service training for laboratory diagnosis and case management; and
- In-depth refresher course on malaria for sentinel site and regional level laboratory supervisors, coordinated with activities related to improving laboratory diagnosis of other diseases (e.g. HIV/AIDS, TB).

Quality assurance/quality control for diagnostics: ($150,000) In addition to in-service training, PMI will assist the PNLP and INRSP to implement a plan for quality control of microscopy and RDT diagnosis, including regular supervisory visits, systematic review of a predetermined percentage of positive and negative blood smears and simultaneous use of both tests in a percentage of cases to monitor the quality of RDT diagnosis.

Case Management

Current status:

Because of rapidly increasing resistance to chloroquine, the MOH revised the national policy for the treatment of uncomplicated malaria in 2005. Artesunate-amodiaquine (AS-AQ) is the only ACT approved for government health facilities. The treatment regimens recommended by the PNLP are as follows:

Uncomplicated malaria:

First-line treatment: AS-AQ (blister package of 3 artesunate tablets 50mg each and 3 amodiaquine tablets 153 mg base each). Dosing schedule (3 doses over 3 days)*:

Weight	Age	Artesunate tablets/dose	Amodiaquine tablets/dose
<10 kg	<1 year	1/2	1/2
10-20 kg	1-7 years	1	1
21-40 kg	7-13 years	2	2
>40kg	> 13 years	4	4

*Technical note: The age categories included in this dosing schedule are those recommended by the PNLP. The manufacturer's recommended dosing includes a different age distribution. This discrepancy will be addressed in collaboration with the PNLP as training manuals for ACT use are updated.

Alternative treatment: artemether-lumefantrine,AL (co-formulated, each tablet contains 20 mg of artemether and 120 mg of lumefantrine). Dosing schedule (6 doses over 3 days):

Weight	Age	Number of tablets/dose	Total number of tablets
<5kg	<1 year	Not recommended	
5-14 kg	<3 years	1	6
15-24 kg	3-8 years	2	12
25-34 kg	9-14 years	3	18
>34kg	> 14 years	4	24

Severe malaria*:*

Quinine: 20 mg/kg (loading dose) IV followed by 10 mg/kg every 8 hours (adults) or every 12 hours (children); changed to oral quinine as soon as patient can take oral medicines. If no IV access can be obtained, give 10mg/kg IM every 8 hours. Treat hypoglycemia.

Malaria in pregnant women*:*

Quinine: 20 mg/kg (loading dose) IV followed by 10 mg/kg every 8 hours (always start IV treatment regardless case severity).

The MOH has decreed that ACTs should be provided free to children less than five years of age, but this has not been signed into law; there is still confusion about this policy in much of the country. Because consultations by children less than five years of age represent 60% of

consultations at CSCOMs, it is also unclear how facilities will recover the income lost by complying with this directive. Older children and adults pay 600-980 CFA ($1.50-2.40) for ACTs at government health facilities. ACTs are also available in the private sector at prices above 2000 CFA ($5). NGO partners have made ACTs available in a few health facilities at a reduced cost, but mostly as small operational research projects. As an example, MSF has offered ACTs at seven health facilities in Kangaba, including six CSCOMs and the district referral center of Kangaba. The number of children receiving ACTs in these health facilities doubled when fees were not charged.

Access to and utilization of antimalarial treatment: The overwhelming challenge with malaria treatment in Mali is poor geographic and economic access to care. According to the 2006 Annual Report from the SLIS, there are approximately 800 CSCOMs in Mali. This translates into about 75% of the population with geographic access to public health services according to WHO standards (living within 15 km of a first-line health facility). According to the 2006 DHS, only 31% of children less than five years of age with fever received any antimalarial, and only 15% were treated within 24 hours. NGO partners are working to develop systems of community-based care that will help to overcome the problem of geographic access, but these projects have been relatively small in scope and have not been scaled-up nationally. Currently there is no policy to standardize the qualifications of community health workers (*relais*), their source of motivation, their activities, or their supervisory structure. Each NGO partner has developed its own model for utilizing community *relais*.

For example, Save the Children has expanded a community-based treatment program to over 470 villages in the health districts of Bougouni, Kolondeiba, and Yolanfila. These programs include community case management of malaria, diarrhea, acute respiratory infections, distribution of ITNs, essential newborn care, essential obstetric care, behavior change communication, and selected family planning services. The Save the Children's *caisse pharmaceutique* project has provided malaria treatment through community *relais* to 17,000 children over a two-year period of time. Save the Children noted that the community easily accessed ACTs provided by *relais* and used them with greater frequency than the ACTs at CSCOMs. Alternatively, UNICEF has supported the use of *relais* to deliver health messages and to encourage parents to bring ill children to health facilities, but not to deliver antimalarial treatment. The PNLP has reviewed the Save the Children pilot project and has agreed to expansion of the project in Sikasso Region.

Treatment of severe malaria: Traditional healers are often the first source of care for children with severe malaria, particularly those with seizures. Research by the INRSP and MRTC indicates that severe malaria in children is often perceived to have little chance of recovery and therefore only a small proportion of severely ill children present to health facilities. National guidelines recommend quinine by intramuscular injection or intravenous perfusion for cases of severe malaria. Parenteral quinine is changed to oral quinine as soon as patient can take oral medicines, but oral quinine is rarely available in health facilities. The cost of parenteral quinine in health facilities is a major barrier to prompt treatment of severe malaria. The PNLP is producing severe malaria "kits" containing quinine, syringes, dextrose, and diazepam that will be available at no cost to children less than five years of age and pregnant women. There are currently no recommendations or guidelines for the use of artemether injections or rectal artesunate suppositories in national treatment guidelines. However, national training manuals

do state that intravenous (IV) artesunate, intramuscular (IM) artemether, and artemisinin suppositories are efficacious treatments that can be used for severe malaria. *Medecins Sans Frontières* is currently using IM artemether as a pre-referral treatment in six CSCOMs of Kangaba. National policies indicate that severe malaria cases are to be referred to the CSREF for further management. However, in practice, CSCOMs treat most cases of severe malaria seen in health facilities, even though they lack the capacity to monitor parasitological response or hypoglycemia. Traditional healers have been encouraged to refer patients and have been involved in some operational research through MRTC to improve the quality of pre-referral care.

National treatment guidelines recommend that all pregnant women with malaria be considered as severe cases and be treated with intravenous quinine. This policy does not reflect current WHO treatment guidelines that recommend quinine (oral or IV) in the first trimester of pregnancy and ACTs in the second and third trimesters of pregnancy for cases of uncomplicated malaria. Intravenous quinine (any trimester) or intravenous artesunate (second and third trimesters) could should be utilized for the treatment of severe malaria in pregnancy. The MOH's guiding document for health service delivery, the Policies, Norms and Procedures, needs to incorporate these guidelines.

Quantification of ACT needs: Quantification of ACT needs for 2007-2009 was based upon 2005 health facility usage data that suggest that approximately 20% of patients with fever seek treatment at public health facilities. Assumptions were made that with increasing availability of ACTs, health facility usage would increase annually by 5-10%. In 2005, 962,706 cases of suspected malaria were reported from health facilities. This represents 0.08 cases per person per year, which reflects poor utilization of health services due to access or other problems. The GOM procured and distributed ACTs to public health facilities in June 2007. The number of ACTs procured in 2009 is unchanged in the Global Fund Round 6 grant. Global Fund Round 6 has committed $4.3 million for financing ACTs in Mali from 2007-2009. Although this award includes $1.45 million for the purchase of ACTs in 2008 and $1.6 million for the purchase of ACTs in 2009, it does not include activities to strengthen the capacity of the PPM to store or transport ACTs, BCC/IEC, pre- and post-market drug quality monitoring, or pharmacovigilance. The table below presents revised estimates of ACT needs for 2009.

Age Group		Global Fund for 2009	Gap in treatment courses	Cost to fill gap
<1-6 years	805,312	824,828	0	-
7-13 years	139,598	140,251	0	-
>13 years	609,303	613,148	0	-

Assumptions of ACT estimates for 2009 include: 50% health facility usage, extrapolated from 2005 incidence data from HMIS, constant population growth rate, no change in the incidence of malaria, and 5% adult population being pregnant and therefore not receiving ACTs.

Global Fund financing may provide enough ACTs to cover current needs at MOH facilities, but these projections are based upon the number of cases presenting to health facilities, which is less

than 20% of all malaria cases. The effect of the ministerial decree that malaria treatment will be free for all children less than five years is unknown and current projections have not accounted for possible increased ACT needs following implementation of this new policy. In order to attain 85% coverage of febrile children with ACTs, community-based treatment will be essential extension of health facility-based efforts. Additional purchase of ACTs will be necessary to cover community-based treatment if it is adopted as national policy. The ACT distribution system will also need to be supported to meet the increased demands of community-based distribution. Currently the PNLP has permitted Save the Children to expand from the two facilities in the initial pilot to the entire district of Kolondieba in Sikasso Region. They plan further extension in 2009.

Supply system: The *Pharmacie Populaire du Mali* (PPM) manages medicines for Mali's primary health care system. The PPM procures drugs through international tender from qualified suppliers and distributes them to the nine administrative regions. The PPM has no capacity to ensure reliable transportation of commodities to the district, health center or community. The district pharmacies purchase drugs from regional depots based upon monthly orders from health facilities (CSREFs and CSCOMs) and the average number of drugs expected to be distributed within the district's catchment area. If a drug is unavailable in the regional PPM stores, private pharmaceutical warehouses can fill orders. There are significant problems with drug storage at district pharmaceutical depots regarding storage capacity, humidity, security and drug classification in the warehouse. While CSCOMs must collect all required drugs from the district pharmaceutical depots, there is no central funding to support the transportation and logistics.

Regulation and drug quality: Several Ministerial Decrees target the management of pharmaceuticals in Mali. These include the formation of a national committee to oversee pharmacy retailers responsible for quality control, inspection, licensure and ensuring a basic package of pharmaceutical products. The National Essential Drug List is reviewed bi-annually. Laws are in place to ensure quality control for imported drugs. The *Direction de la Pharmacie et du Médicament* (DPM) issues visas and import licenses only after the exporter meets certification and other requirements. The *Laboratoire National de la Santé* (LNS) samples drugs and verifies quality, and has regulatory authority to monitor pre and post-market quality of drugs, water, food, and other products (including insecticides and bednets). According to their annual summary, 17,000 products were tested in 2006. However, the number of medicines tested is fairly small (about 800 samples), and relatively few of these are post-market analyses of antimalarial drugs. In 2004, the Laboratory developed a plan to test products from two – three districts in each region at the health center level. Medicines collected from the national PPM and regional storage facilities were found to be of high quality (~2% failure rate). With limited resources, only 54 medicines were tested from CSCOMs in 2006; eight of 54 (14.8%) samples failed quality testing and all ten samples from street markets failed quality testing.

Pharmacovigilance: Following training in Morocco, the pharmacovigilance department at the DPM has developed an action plan, adverse events notification form, and timetable. Implementation of the plan has not yet taken place due to lack of funding.

Progress to date:

There has been limited progress to date in terms of case management of malaria because many of the FY08 planned activities are dependent upon policy changes from the PNLP. Given that the PNLP has just been reorganized under new leadership, none of the policy changes that were discussed in the FY08 MOP have moved forward. These issues include the following:

- Adoption of a HBMF policy
- ACTs for pregnant women in the second and third trimesters
- Oral quinine for pregnant women in the first trimester without signs of severe disease
- Rectal artesunate or IM artemether for pre-referral treatment of severe malaria
- Clarification of guidelines on when to refer severe malaria cases
- Inclusion of dosing and administration information for IV artesunate in national treatment guidelines (currently listed as acceptable alternative)

PMI will assist the PNLP in conducting a review of current case management policies and will support dissemination of resulting policy changes, training materials, and supervision guidance. Likewise, PMI must await a policy change to allow pre-referral treatment of severe malaria cases with IM artemether or rectal artesunate before implementing these strategies in the region of Sikasso. Although currently there is no national policy supporting the treatment of uncomplicated malaria by community *relais*, the PNLP is permitting Save the Children to expand its activities to three districts in the region of Sikasso.

PMI will assist in forecasting ACT needs and improving malaria commodity management by the PPM. PMI will also support the LNS to evaluate antimalarial drug quality, and will help the DPM establish a system for pharmacovigilance.

Proposed USG component for FY09: ($4,077,100)

Ensuring prompt, effective, and safe ACT treatment to 85% of patients with confirmed or suspected malaria in Mali will represent one of the greatest challenges for the PNLP, given the country's poor access to health care, recent transition to ACTs, and the need for behavioral change among patients and health workers. Implementation of ACTs is complex, given the short shelf-life of AS-AQ (18-24 months), and the high levels of coverage needed. Availability of ACTs is a high priority both for the PNLP and PMI; PMI will encourage the MOH to adopt community-based treatment of fever as a way of increasing access to effective antimalarial therapy. As ACTs become available in more peripheral health facilities, PMI will need to help the PNLP review existing training and IEC materials related to malaria case management in general and ACTs specifically, train health workers, and disseminate health messages about the new treatment policy.

Malaria case management: ($665,000) In coordination with the PNLP, PMI will support in-service training and supportive supervision of health workers in the public and private sectors in the urban areas of Bamako to ensure good practices for prescribing and dispensing ACTs. This includes the development of job aides to improve health worker performance and treatment compliance. PMI will also support training on severe malaria recognition and case management through the development of job aides and other resources for supportive supervision. PMI will

also provide support for the introduction of rectal artesunate and injectable artemether as pre-referral treatment for severe malaria per WHO guidelines once the MOH has approved these drugs for use and a policy exists. The DPM approved these treatments but they have not previously been available in MOH facilities. These funds are inclusive of the capacity building activities mentioned for study tours for key staff at the NMCP (see capacity building section).

Technical assistance on severe malaria: ($12,100) A CDC medical epidemiologist will provide technical assistance for the introduction of artesunate products for the treatment of severe malaria.

Home-based management of fever (HBMF) implementation/community ACT compliance and distribution: ($550,000) To ensure that care takers adhere to the new formulation for treatment of malaria, PMI will continue to support training and supervision of community *relais* to monitor ACT treatment compliance at the community-level throughout the country based on training materials used during the Sikasso implementation. This will be crucial as policies are adopted for community-based treatment.

Procurement of ACTs and severe malaria drugs: ($1,100,000) PMI will procure supplies of ACTs to support community-based ACT distribution, and to ensure adequate coverage of children less than five years of age with ACTs following implementation of the free treatment policy. PMI will also continue to procure drugs for the management of severe malaria, including injectable artemether, rectal artesunate, and oral quinine. Injectable artemether and rectal artesunate will be introduced in Sikasso Region using FY08 funds and distribution will be expanded in collaboration with the PNLP based upon the results of the initial implementation and a policy approval.

Policy support for case management: ($100,000) The case management target is likely to be the most challenging of all PMI goals to achieve. Because the Malian healthcare system is based on a cost-recovery system that is not likely to change, it has been difficult to obtain a ministerial decree on the provision of free ACT to children under five, free SP to pregnant women, free LLINs to infants and pregnant women, and free severe malaria drugs. PMI/Mali recognizes that continued advocacy for free commodities in a cost recovery system is essential. The USG played a key role in advocating for these policy changes, along with other non-malaria policies as well, and assisted the Ministry in drafting the policies. PMI will advocate for the introduction of artemisin-based treatments for severe malaria and ACTs in the second and third trimester of pregnancy. This will help create a more favorable environment, and increase support from top leaders to ensure that policies and implementation directives are rolled out nationally.

BCC/IEC for case management: ($400,000) PMI will assist in the dissemination of the multi-channel communication strategy (e.g. mass media, interpersonal communication) developed in FY08. The strategy will promote care-seeking for febrile children and compliance with treatment regimens. This also includes support for training and refresher training on treatment of malaria with ACTs at the facility level. Funds will also support training in compliance monitoring by community *relais*. The *relais* will also educate care givers on complications that require referral.

Health financing and policy implementation: ($50,000) PMI will continue to support the review and next steps agreed upon following national workshops regarding the implications of free commodities on a cost recovery system.

Logistics distribution strengthening: ($200,000) PMI will help to facilitate distribution of PMI-funded ACTs and provide technical assistance for pharmaceutical management, including possible distribution to the district-level and improved coordination between the PNLP and PPM. Pharmaceutical and supply chain strengthening activities will also include end-use verification/monitoring of availability of key antimalarial commodities at the facility-level. Specifically, this will entail regular supervisory/monitoring visits to a random sampling of health facilities and regional warehouses to detect and trigger further action on the following critical areas: ACT (or other drug) stockouts; expiration dates of ACTs at health facilities; leakage; anomalies in ACT use; and verifying assumptions on quantification and consumption.

Drug quality control and pharmacovigilance: ($400,000) PMI will continue to support pre- 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 and ITNs. PMI will also support the development and implementation of a pharmacovigilance plan through the DPM. The pharmacovigilance plan will specifically address adverse events reporting during the widespread implementation of AS-AQ.

L. INTERVENTIONS – EPIDEMIC SURVEILLANCE AND RESPONSE

Current Status:

An estimated three 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 *Cercle*s of Mopti, Segou and Koulikoro, and Kayes Region.

The periodicity of epidemics generally ranges from two to seven years. The northern Sahelian region is subject to irregular rainfall amounts, and climatic conditions such as increased rainfall and temperatures appear to play a significant role in the occurrence of epidemics. Researchers at MRTC have been comparing climatic conditions in the years surrounding the two most recent epidemics in 1999 and 2003. The event that was limited to the two epidemic years was rainfall amounts above 200mm that fell within the month of August. Nevertheless, climatic data must be followed for more than 10 years of study to develop a viable model for predicting epidemics.

The PNLP strategic plans 2001-2005 and 2007-2011 included the goal of implementing a system for surveillance, prevention, detection and response to malaria epidemics. The objectives were to detect 80% of the episodes epidemics in the two weeks following their appearance and to control 80% of episodes epidemics within two weeks of their detection. In the proposed budget for 2007-2011, $1.75 million was suggested for epidemic control, but no budget for such activities was included in the National Plan for Accelerated Malaria Control, or in the Global Fund Round 6 budget.

The Roll Back Malaria Sahel project provided $60,000 over a three-year period through December 2006 to analyze current capacity, to emphasize the importance of epidemic monitoring and to fill in gaps for epidemic monitoring and implementation of epidemic control measures in the three northern regions. Most of this funding was used to train personnel at the regional- and district-levels in planning and implementation of an epidemic control program and to train community volunteers and laboratory technicians. In addition, emergency stocks of medications (chloroquine and SP) were put into place, sentinel sites set up in Dire and Tombouctou, and a campaign to impregnate ITNs was conducted.

Two surveillance systems for malaria exist in the north. The SLIS, managed by the DPLM, compiles malaria data every three months for the whole country and reports it annually; thus data are not collected frequently enough for epidemic detection and response. The WHO-supported Integrated Disease Surveillance and Response system (SIMR), implemented in 2003, collects weekly data on diseases with potential for epidemics. Malaria data collection in this system is limited to the three northern regions and is collected as follows: the CSCOMs report the previous week's data to the CSREFs where they are combined and reported to the Regional and then the National level to the DNS, DPLM and WHO. In the SIMR system, an epidemic is declared when the number of cases doubles from one week to the next and remains at that level during the third week.

Progress to date:
PMI is participating in discussions with the PNLP about the materials to be pre-positioned, and anticipates that the materials will be in place in late 2008. PMI is also ensuring that chloroquine and SP are replaced appropriately with ACTs.

Proposed USG Component for FY09:

In 2009, PMI will rotate out supplies of ACTs and IRS which were pre-positioned in 2008 for epidemic surveillance and response in the North. These supplies and equipment are kept at a centralized location and use is limited to epidemic response. In addition, six IRS trainers from the districts of Gao, Kidal and Tombouctou will be trained during the IRS preparations for Bla and Koulikoro *Cercles* (no cost incurred in FY09).

M. BEHAVIOR CHANGE COMMUNICATION

Current status:

Support for BCC/IEC activities for malaria prevention and control is critical to achieve sustained success of interventions. PMI is supporting the development of am integrated multi-channel communication strategy (e.g. mass media, client provider interaction, utilization of community health workers). The strategy will include LLIN utilization for year round use, community mobilization for IRS, early uptake of ANC services including appropriate management of malaria in pregnancy, and case management. As policies change (e.g. HBMF) it will be critical to ensure that target populations understand and demand appropriate services for malaria prevention and control. PMI is supporting BCC/IEC strategy development at all levels, ensuring consistency of technical messages and appropriate adaptation of the channels and target

audiences. PMI is exploring possibilities to ensure that the most effective methods are being utilized to maximize desired behavioral outcomes. Beyond the community, PMI will include primary schools (teachers and school children) in targeted BCC/IEC activities and messages, as well as local and religious leaders where appropriate. Lastly, PMI is linking BCC/IEC activities with HIV/AIDS messaging where appropriate.

Proposed PMI Year 2 Activities: (costs referenced in other sections)

PMI will continue to support BCC/IEC activities for IRS, ITNs, MIP, HBMF, case management, and epidemic detection and response in Year 2 of PMI. A detailed description of BCC/IEC activities can be found in each of the above mentioned sections.

N. HIV/AIDS and MALARIA

Current status:

There are an estimated 80,000 to 140,000 people living with HIV/AIDS (PLWHA) in Mali, and approximately 25,000 are receiving antiretroviral therapy; this number is expected to increase at to 30,000 clients by end of 2008. Overall HIV incidence is relatively low in Mali, but several risk groups have been identified including truck drivers and commercial sex workers. There are currently 75 sites providing prevention of mother-to-child transmission (PMTCT) services, 39 sites providing voluntary testing and counseling, and 24 sites providing antiretroviral therapy (ART) to PLWHA. Cotrimoxazole is provided to all PLWHA on antiretroviral therapy. In collaboration with partners, including CDC and USAID, the MOH has developed a network of 16 sentinel surveillance sites for HIV/AIDS, though these sites differ from the PNLP malaria sentinel sites. These sentinel sites have a centralized system for quality control of HIV rapid diagnostic tests through comparison with ELISA and Western Blot results. There are plans to try to develop a regional system of quality control for rapid tests in either Segou or Sikasso.

Progress to date (costs covered in other sections):

In FY08, PMI is supporting a targeted distribution of about 30,000 LLINs to targeted PLWHA (pregnant women and children) in antiretroviral therapy sites and their immediate family members as well as the provision of SP to pregnant women with HIV who are not receiving daily prophylaxis with cotrimoxazole.

Proposed USG component for FY09 (costs covered in other sections):

PMI will continue to support the distribution of LLINs to PLWHA in ART sites and the provision of SP to pregnant women with HIV who are not receiving daily prophylaxis with Cotrimoxazole. In addition, PMI will support continued laboratory training for malaria and increase the technical capacity of sentinel surveillance sites that are also HIV surveillance sites (CSREF Gao and CSREF Kita).

O. CAPACITY BUILDING WITHIN THE NATIONAL MALARIA CONTROL PROGRAM

Current Status:

The MOH reports a critical shortage of staff at all levels of the public health system, especially for service provision below the national-level. In 2005, the ratio of doctors to the population varied from 1/4,981 in sparsely populated Kidal to 1/41,654 in Sikasso Region, compared with the WHO standard of 1/10,000. Health workers are not evenly nor proportionately distributed through out the country. Regional directors oversee health teams that implement integrated health interventions. Some but not all regional teams have malaria focal persons. The district health center (CSREF) is the first referral structure for CSCOMs; the district health team is headed by a medical chief responsible for technical supervision of CSCOMs. Community health associations manage CSCOM staff and operations, collect proceeds from drug sales, consultation and user fees, and pay salaries and other expenses. As is the case at the central-level, distribution of staff is uneven. The percentage of CSCOMs headed by a certified head nurse for at least 2 years ranged from 30% in Gao region to 100% in Bamako in 2005. The number of staff employed may depend on the level of community resources to pay them.

Entomological capacity is fairly strong both within the MOH and at research institutes such as the University of Bamako's Medical School and MRTC. The NIH-supported MRTC has over 50 malaria experts including laboratory scientists, epidemiologists and entomologists. MRTC has ongoing collaborations with the NIH, University of California (at Los Angeles and Davis), Johns Hopkins University and Tulane University.

The quality, completeness and frequency of malaria-specific supervision are unclear, and there is limited funding for visits below the district-level. In principle, national-level health teams supervise general health activities in regions-annually, with quarterly visits organized from the regional- to district- to CSCOM-levels. District teams, health staff and ASACO members participate in program monitoring in CSCOMs every six months to examine overall progress in achieving community objectives, including those in health. Support for monitoring comes through the PRODESS using HIPC or partner funding. District-level teams carry out integrated supervision for all health interventions at CSCOMs, using a supervision guide. National and regional teams perform malaria-specific supervision irregularly. For FY08, PMI is funding malaria-focused supportive supervision geared toward the rapid scale-up of all key interventions. This support includes direct funding to the PNLP plus technical assistance through PMI's implementing partners. In addition, the Global Fund supports 10 supervisory trips by PNLP staff each year for five years, specifically to address pharmacovigilance for ACTs in the sentinel sites.

In March 2008, the Ministry of Health took an important step towards creating a strong, sustainable framework for capacity in malaria control by approving a new organizational structure for the PNLP. Until recently, the structure was not defined officially, and its placement within the MOH structure prevented it from having significant decision-making authority. Thus, the PNLP had to handle most requests through other MOH channels, which impeded its ability to obtain data and respond quickly to program needs. The new structure elevates the PNLP to the same level as the National Directorate for Health, enhancing its profile significantly. The Government officially named the new director, Dr. Klenon Traoré, and the

chiefs of the four programmatic divisions (planning, monitoring and evaluation; prevention and case management; epidemiological surveillance and research; and communication and social mobilization), and one administrative and finance unit. Each division or unit has between two to four focal persons, though the Government has not yet officially confirmed them. Once fully staffed, the PNLP will have 22 members. The new structure gives the MOH, PMI and other partners an important opportunity to strengthen the leadership and vision for malaria control and to improve collaboration and communications.

Progress to date:

In FY08, PMI is contributing substantially to building capacity of the PNLP and other Malian Government entities (including MRTC and the Ministry of Social Development) through direct funding of specific activities. This is a direct result of their demonstrated capacity to managed USG funds appropriately. Approximately $1 million of FY08 funds were given to specific departments in the MOH for supervision and monitoring of PMI activities, and most of the activities began in August 2008.

Malian Government Entity	Activity Supported
Malaria Control Program (PNLP)	Supervise LLIN distribution, train and supervise health workers on case management, and disseminate the malaria monitoring and evaluation plan
Division of Reproductive Health	Train and supervise health workers on IPTp, and evaluate LLIN distribution and IPTp practices in antenatal clinics
Ministry of Social Development	Train social development agents at the national and regional levels on malaria communications strategies
National Immunization Program (EPI)	Work with the PNLP to estimate LLIN needs for infants and supervise LLIN distribution during routine vaccination services
Directorate of Pharmacy and Medicines	Train and supervise health agents who prescribe ACTs at all levels to recognize and notify about adverse events
National Pharmacy (PPM)	Assess practices, inform key partners about proper ACT procurement, and conduct supervision.
Malaria Research and Training Center (MRTC)	Conduct operational research on larviciding during the rainy season and IRS near the Niger River, and to support entomological monitoring and surveillance activities in five sentinel sites
National Health Laboratory (LNS)	Train pharmacists and laboratory technicians on quality control for LLINs and malaria medicines, refurbish equipment and purchase consumables

Malian Government Entity	Activity Supported
National Institute of Public Health Research (INRSP)	Train CSREF laboratory technicians and regional pharmacists on malaria diagnostics

Given that approximately one-quarter of the population lives more than 15 kilometers from a CSCOM, volunteer community health workers, such as the *relais,* can play an important part in improving malaria control, especially in rural populations. Ideally, each village should have two *relais* trained by CSCOM staff to educate communities about bednet use, prompt care-seeking for malaria, referral to CSCOMs for treatment, and proper sanitation. At present, the *relais* serve only one-quarter of the population. Even in some areas well supported by NGOs, they cover only half of their target populations. In addition, the Government has not officially acknowledged their status in the health structure. Concerns have been raised that they lack well-defined roles, are overwhelmed by their duties given their volunteer status, and are hard to keep trained, supervised and motivated. In FY08, PMI is supporting training and supervision of the *relais* for BCC/IEC at the community-level, including the promotion of LLIN use and monitoring compliance to treatment with ACTs. In addition, PMI advisors with other partners continue to advocate for official clarification of the status of *relais.*

Proposed USG component for FY09: (costs covered in other sections)

Strengthening PNLP functions: (costs included in other sections) To help the PNLP reach its coverage targets for the key malaria interventions, the PMI will collaborate with other partners to support the new PNLP structure and staff, and to increase capacity at all levels to plan, implement, supervise, monitor and evaluate malaria prevention and control activities. Supporting PNLP managerial capacity in its new personnel will be critical as PMI support scales up. Therefore, PMI will support both an assessment of current managerial capacity needs as well as specific training, using $100,000 in FY07 USAID Mali funds as well as with FY08 PMI funds. The assessment will use the standardized tool, and will provide clear recommendations for actions that PNLP can take to improve managerial capacity, and potential support from partners. In addition, PMI will advocate for the GOM to confirm the focal persons officially in each PNLP division so that they have clear terms of reference and authority to carry out their duties.

Direct support to the PNLP and other Government partners (costs included in other sections): Support will continue in FY09 for assisting the PNLP and other Government partners to design or refine training and conduct supportive supervision in all malaria program interventions supported by PMI. Activities are described in the various subsections of the MOP. In FY09, PMI will give special attention to training and mentoring PNLP staff in particular 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, as appropriate, for collaborating with PNLP in building staff managerial and technical capacity.

Study tour of malaria control and PMI activities in another country (costs included in case management section): Given that a new PNLP structure is in place and the management is still learning how to function effectively, PMI will support a visit by two PNLP staff members,

accompanied by a PMI representative, to one of the other countries supported by PMI. The goal is to learn about another malaria control program's policies, guidelines, staff roles and responsibilities, and approaches to different technical and operational challenges. Host counterparts will address such issues as the scaling-up of LLIN distribution, home-based case management and implementation challenges for IRS. Recent experience with MOH using attendance at an exchange on community-case management resulting in an acceleration of policy dialogue shows that such study tours are extremely useful to help accelerate policy change and implementation.

Advocacy for adequate staffing levels: At the community-level, PMI will continue to assist the MOH to explore options to ensure minimal staff levels at CSCOMs. A recent review by a USAID implementing partners on the impact of free malaria-related commodity distribution on local funding of health staff will provide an important framework for PMI and partners to help solve the critical issue of income shortage and its implications for the lowest service delivery level. As one approach, PMI will continue to advocate for HIPC and other funding sources to complement salary support generated by communities. Joining efforts with the Mali Voices Project and other partners, PMI will help improve the skills of and expand the number of community-based volunteer workers (including *relais*) to mobilize populations for proper use of LLINs and prompt referral to health facilities for appropriate care. In particular, PMI will continue to advocate for official recognition of the status of *relais* as vital players in community health; explore ways to better define their role in malaria control (as part of an integrated package of services); identify areas underserved by *relais*; fund training and supervision to increase their numbers substantially; explore creative ways to keep them motivated; and identify other potential volunteer pools.

P. COMMUNICATION AND COORDINATION

Communications among malaria control partners in Mali are coordinated through the PNLP partners meetings, through the Technical and Financial Partners' Forum (PTF), and through the Global Fund-initiated Country Coordinating Mechanism.

First established in 1993, the PNLP's mandate and coordination responsibilities are described in detail earlier in this document (Section D). The PNLP calls and facilitates meetings on a monthly basis or as needed to engage partners. Starting in January 2007, the DNS/PNLP instituted weekly meetings of malaria partners to review the latest global and national developments in malaria control. One outcome of these meetings was the decision to design an accelerated implementation plan for the new strategic plan (2007-2011). Six working groups were formed to propose activities for the plan in six priority areas: drugs and case management, communication and social mobilization, vector control, ITNs, operational research, monitoring and evaluation, and capacity building. The working groups finalized the plan and disseminated it to all malaria partners in Mali in April 2007.

The PTF began with the adoption of the ten-year strategic plan for the health sector wide approach known as the Ten Year Plan for Social and Health Development (PDDSS), operationalized through the five-year health development program (PRODESS). The PTF meets monthly to share information on ongoing programs, new initiatives, strategies, and policies, to

coordinate interventions, and to help leverage resources. An excellent example of PTF success was the mobilization of resources, planning and implementation of the December 2007 integrated campaign that included distribution of long-lasting nets to 2.3 million children less than five years of age. Many malaria implementation partners consider this campaign to be one of the most effective examples of GOM and partner collaboration and coordination in recent years.

The CCM was first established in 2002 but initially did not perform well due to an excessively large membership. In 2004, a USAID-supported institutional analysis of the CCM provided recommendations on clarifying roles and restructuring that led to a manageable size of its membership. Currently, the CCM has 24 members including: eight from the public sector, four from civil society, four from private sector, and four representatives from the donor community. The CCM holds quarterly meetings and can call special meetings as needed. The CCM chairperson and deputy chair are elected for a one-year term that can be extended only once.

Q. PRIVATE SECTOR PARTNERSHIPS

N/A

R. MONITORING AND EVALUATION

Current Situation:

The Ministry of Health's Planning and Statistical Unit oversees all monitoring and evaluation (M&E) activities, in close collaboration with health training and research institutions. As part of the reorganization of the PNLP, the Government created the Division of Planning and Monitoring and Evaluation, which is tasked with developing operational plans and monitoring and evaluating program implementation. While the Ministry has officially confirmed the new division director's post, it has yet to confirm those of the three unit chiefs for documentation, statistics, and training and M&E. The new Division of Epidemiological Surveillance and Research includes a specific unit on Sentinel Surveillance and Research, which will provide the M&E Division data for analysis.

While the PNLP operates within the PRODESS context for M&E, until recently it did not have its own detailed M&E plan beyond the general activities outlined in the malaria policy and strategic plan documents. To review the current M&E system, meet conditions for the Global Fund Round Six second disbursement, and prepare for future Global Fund applications, the Ministry of Health hosted a Monitoring and Evaluation Systems Strengthening Tool (MESST) workshop in January 2008. Participants identified numerous challenges and deficiencies, such as inadequately trained staff, insufficient funding for M&E, lack of a data evaluation manual and instructions to verify data quality, partial completion of reports at the program level, lack of dissemination of M&E data, and weak coordination among partners on M&E.

For routine reporting through the national health information system, or SLIS, districts compile data each quarter on malaria cases and deaths provided by the CSCOMs. Regional health information technicians summarize the regional data and submit it to the national-level, where

the SLIS office compiles it and verifies accuracy. While the SLIS reports high-levels of completeness of reporting, data from the CSCOM to the national-level do not usually meet the 45-day reporting target. Data collection tools are integrated and include aggregate data on malaria case management, IPTp, the quantities of ITNs distributed to pregnant women and children under five years of age, and the number of blood transfusions given. In the new configuration of the MOH, with the PNLP and the National Health Directorate (DNS) at the same hierarchical level, the regions will report on malaria directly to the PNLP rather than through the Directorate. This will increase access to critical information for program planning and timely response. In the three epidemic-prone northern regions, health facilities report weekly on malaria to the DNS via radio system, as part of the Integrated Disease Surveillance and Response system (SIMR). It has also been proposed that stock-outs of ACTs be reported through the SIMR system nationally on a weekly or monthly basis. The SIMR reporting forms are being updated to reflect this change.

The Ministry of Health has designated 12 sentinel sites to monitor drug sensitivity, vector resistance, and trends in malaria morbidity and mortality by transmission zone, as well as to strengthen diagnostic and case management skills. The 12 sentinel sites were chosen to represent the five different transmission zones, hence the high number of sites. At present, the sites are not well-equipped and lack trained and well-supervised staff to provide meaningful data for program monitoring. Since the sites have not included case-based reporting for each person with fever, PMI is supporting five of the sites selected by the PNLP currently: Bamako Commune IV, Niono, Selingué, Kita and Djenné. The goal of PMI support is to provide technical and financial support to equip sites and train and supervise staff regularly, so that each site can provide reliable and accurate laboratory-confirmed case counts every month. The FY08 MOP also provided for support of monitoring of vector resistance in the sentinel sites, involving insecticide susceptibility testing in mosquitoes and cone assays for insecticidal activity of ITNs. PMI will not support *in vivo* drug efficacy trials at the sites in FY09.

Mali's GFATM Round 6 grant includes over $100,000 per year for M&E activities. We have not identified specific commitments from other donors for M&E support; however, UNICEF is considering supporting a Multiple Indicator Cluster Survey (MICS) in 2009.

Progress to date:

Since March 2008, the PNLP with support from PMI and other partners has developed an integrated national malaria M&E plan. This comprehensive plan, based on the findings of the MEEST workshop, targets capacity building in M&E, improving tools and providing equipment and supplies to collect and analyze data, creating a reliable data base on malaria through routine measurement of program indicators, and improving the quality of information collected on malaria at each level and by partners. A *Comité d'Orientation*, comprising representatives of government and academic institutions, non-governmental organizations and partners, will meet twice yearly to oversee M&E activities. Data will be collected through nationally-representative household surveys such as the DHS, the MICS or Malaria Indicator Survey (MIS) every two to five years; bi-annual health facility surveys; quarterly reporting through the health information system, or focused reports. The 21 sentinel site indicators are consistent with those used by PMI with some modifications. The 61 process, outcome and impact indicators, while numerous,

reflect the inputs and priorities of various MOH staff and partners. Following review by the WHO Regional Office for Africa, the PNLP finalized the plan on July 2, 2008.

In addition to the Global Fund support for supervisory trips by PNLP staff to address pharmacovigilance for ACTs at sentinel sites, PMI is supporting five of the sentinel sites by funding an inventory of existing capacity in microscopy, data management, and staffing at five of the sentinel sites, developing reporting forms and procedures; providing consumables such as laboratory supplies; training staff; and ensuring quality control for microscopy and rapid diagnostic tests (RDTs). The first two sites (tentatively, Bamako Commune IV and Selingué) should begin reporting in October 2008, with the remaining three reporting by the end of 2008. The Malaria Research and Training Center (MRTC) is the organization responsible for staff training and monitoring at these sites.

Finally, PMI has provided funding to assess the quality and timeliness of reporting for malaria through the SLIS, to assist with analysis and feedback, to promote data use to improve program performance.

Proposed USG component for FY09: ($967,100)

Implementation of M&E plan: ($30,000) In response to the MESST recommendation, PMI will support a workshop and associated efforts to conduct an annual review of the M&E workplan, specifically addressing the status of the M&E indicators, quality of data collection practices, plans for surveys, feedback of information for decision-making, and development of subsequent annual plans.

Strengthening SLIS: ($200,000) In FY 2009, PMI will use the results of the data quality assessment to help focus support for improving reporting on malaria through the routine SLIS. Areas of emphasis will continue to be training, quality control, timeliness of reporting, analysis, feedback, and use of findings to improve program performance.

On-going technical assistance in country for M&E: ($200,000) Support for assistance to the PNLP and partners will continue for general M&E capacity building and for sentinel surveillance, including the secondment of a staff member to help the PNLP track commodities. Noting the importance given in the M&E plan to supervisory reports, PMI will emphasize efforts to collect, summarize and use report findings and recommendation to refine program plans and strategies. Technical assistance will be provided through the PMI team on the development and strengthening of the M&E system.

Technical assistance on sentinel surveillance and M&E planning: ($12,100) A CDC medical epidemiologist will provide technical assistance on the sentinel sites and on-going M&E support activities by PMI implementing partners. If feasible, the assistance will coincide with the annual MOH review of the M&E work plan.

Strengthening and expansion of sentinel sites: ($290,000) Following a PNLP review of its first year of operations, PMI will support the expansion of the sentinel reporting system to eight sites. Specific support will include refining the reporting system and tools, continued training or

retraining, human resource support for the initial data collection, intensive supervision and quality control, and assessment of progress to inform future expansion of sentinel surveillance. In addition, the activities planned in 2008 for monitoring of vector resistance will be expanded to the eight sentinel sites in 2009 as appropriate. Funds will cover training, transportation, cone assays, replacement LLINs and chemical analysis.

Support to national survey: ($200,000) The results of the 2006 DHS serve as the baseline coverage measures for PMI. For measurement of interim progress, PMI will contribute to inclusion of a malaria module in the MICS proposed by the MOH and UNICEF, or in another national survey. Inclusion of measurement of parasitemia in the MICS or another national survey is under discussion. As part of the planning process, PMI will negotiate with the PNLP and partners to have access to the survey data as soon as possible for further analysis.

Completion of evaluation of EPI Contact Method: ($35,000) In FY08 PMI committed $34,400 of Mali country funds to support the introduction and evaluation of the WHO-proposed EPI contact method. Both a promising strategy to help achieve PMI and PNLP targets for LLIN use and treatment of fever and a potential source of complementary M&E data, the method involves using child immunization contacts to monitor and promote LLIN use in infants and to encourage prompt and effective treatment of febrile illness. These funds will continue to support the qualitative data collection portion of this evaluation.

S. STAFFING AND ADMINISTRATION

USAID hired one new health professional to oversee the PMI in Mali, and CDC will hire an additional health professional. One foreign service national (FSN) technical advisor was hired to support the PMI team, and a second FSN will be hired to assist with administration. All PMI staff members will be part of a single inter-agency team led by the USAID Mission Director or his/her designee in country. The PMI team shares the responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, managing collaborating agencies and supervising day-to-day activities.

The PMI professional staff will work together to oversee all technical and administrative aspects of the PMI, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, and reporting of results. The CDC staff person will be supervised by CDC both technically and administratively. All technical activities will be 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 (for example, the contractor position to support sentinel site surveillance) 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.

T. TABLES/ANNEXES

Annex 1 - Tables

1. Table 1 - Timeline of Activities
2. Table 2 – Planned Obligations
3. Table 3 – Budget Breakdown by Intervention
4. Table 4 – Budget Breakdown by Partner

ANNEX 1

Table 1

President's Malaria Initiative – *Mali*
Year 1 (FY09) Timeline of Activities

ACTIVITY	2008	2009											
	OCT-DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Purchase commodities (ACTs; LLINs; SP, RDTs, IRS equipment, diagnostic/lab equipment, severe malaria drugs, etc.)													
Distribution of LLINs													
Policy support for health financing, uptake and roll out of policies, etc.													
BCC/IEC for LLINs, CM, MIP, etc.													
IRS campaign													
Environmental compliance monitoring													
Larviciding													
Training and supervision for health providers for MIP, CM, QA/QC in lab diagnostics													
Strengthen MOH logistics management system													
ACT implementation at national, district, community level													
Roll out of pharmacovigilance plan													
Implementation of M&E plan													
Strengthening of SLIS and expansion of sentinel sites													
MICS/MIS (TBD)													

Table 2

President's Malaria Initiative – *Mali*
Planned Obligations for FY09 ($15,400,000)

***Designates lead partner of activity**

Proposed Activity	Mechanism	Budget (*commodities)*	Geographic Area		Page Number Reference
PREVENTIVE ACTIVITIES					
LLIN procurement	DELIVER	3,425,000 (3,425,000)	Nationwide	Procure and distribute approximately 570,000 LLINs for routine services, vulnerable populations & people living with HIV/AIDS	17
Distribution of LLINs	PSI* MOH PNLP MOH EPI	596,600 (596,600) 50,000 20,000	Nationwide; specific regions	Distribute LLINs for pregnant women and children under-1 to support routine coverage; strengthening public and private sector capacity to distribute LLINs. Strengthening of tracking nets (EPI), oversight, coordination and supervision of LLIN distribution (PNLP)	18
Private sector support	PSI	100,000	Nationwide	Strengthen the private sector's understanding of the importance of procuring and selling quality long-lasting insecticide treated mosquito nets; train at least five bed net importers and 50 private sector distributors, and monitor the types and quality of these nets	18
LLIN logistics strengthening	SPS* PPM	200,000 25,000	Nationwide	Strengthen PNLP & PPM to do LLIN logistics management based on 08 SPS assessment of capacity. PPM will provide supervision of activity in conjunction with SPS.	18
BCC/IEC	PKC* MOH MDSPA	500,000 60,000	Nationwide	Conduct BCC/IEC to increase coverage, advocacy for LLIN use, correct utilization; Hang up activities through *relais*	18

				going door to door, support of UNICEF trained *relais* for BCC/community mobilization; oversight and coordination (MDSPA)	
Indoor residual spraying	RTI** MRTC MOH DHPS CDC IAA	2,900,000 (957,000) 120,000 (30,000) 50,000 24,200	2 districts (approximately 445k population, 86,000 house holds)	Procure IRS equipment (insecticide, sprayers, etc.), policy guidelines (WHOPES insecticide, etc.) training, implementation, data collection, protocols, guidelines, IEC/BCC, logistics support for July/August 2009 spraying.(RTI) IRS entomological monitoring (MRTC); Support to central level (DHPS) hygiene services for capacity building and supervision; Technical assistance for spraying/entomological assessments (CDC IAA)	21/2
Operational research related to integrated vector management	MRTC	110,000 (20,000)	Subset of 1 district	Continue two operational research projects on IRS near the Niger River (60,000) and larviciding (50,000)	22
Environmental compliance monitoring	New central award	30,000	2 districts	Support environmental compliance monitoring associated with IRS	22
SP procurement	DELIVER	100,000 (100,000)	Nationwide	Procure SP for 2009; 600,000 pregnant women	24
Training of health facility staff in MIP/ANC	TASC 3* MOH DSR MOH midwives association	400,000 50,000 30,000	Nationwide	Conduct supervision, training & rollout of MIP guidelines; dissemination and uptake of policies at facilities; revision of manual for treatment with oral quinine and ACTs for pregnant women; supportive supervision of IPTp, training (MOH DSR); additional assistance for in/pre-service training for midwives (midwives association)	24/5
Policy support for ANC and IPTp	HPI	150,000	Nationwide	Help ensure that the national leadership understands the importance of IPTp and develops policies to improve care at regional and district levels. Support to finalize free SP	25

				decree at the national level and continue to assist in the dissemination to ensure SP is being provided free for pregnant women and is used appropriately. Ensure adequate technical input at the national level to work closely with the PNLP to address these bottlenecks.	
BCC/IEC for ANC and IPTp	PKC	300,000	Nationwide	Strengthen MIP, ANC and IPTp at community level through interpersonal communication and other methods to encourage pregnant women to seek services at the CSCOMs	25
Logistics management for MIP commodities	SPS	50,000	Nationwide	Strengthen logistics/distribution system	25
SUBTOTAL: Prevention					
CASE MANAGEMENT					
Procurement of laboratory consumables and RDTs	DELIVER	300,000 (300,000)	Nationwide	Procure Giemsa stain, slides, lancets, light sources, microscopes, etc.; procurement of RDTs for 8 sentinel sites to ensure quality	27
Training in lab diagnosis	MRTC* IMaD	125,000 25,000	Regional level	Support semi-annual regional and refresher training of laboratory field personnel, development and implementation of job aides/training materials for laboratory technicians, support supervision and on-the-job refresher training; review policy for Optimal/Paracheck differences in guidelines and roll out updated training as appropriate	27
Quality assurance/quality control for	MOH INRSP* MRTC IMaD	100,000 25,000 25,000	Nationwide	Support LNS and INRSP in strengthening malaria diagnosis and establishing a system of quality control, especially for microscopy, assist in the development and implementation	27

diagnostics				of a plan for quality control of RDTs; QA/QC for blood smears and RDTs (INRSP); QA/QC for diagnostics at sentinel sites (MRTC)	
Malaria case management	TASC 3 MOH PNLP MOH PNLP CDC IAA	500,000 150,000 15,000 12,100	Nationwide	Support national supervision/training of CSREF/CSCOM staff in the use of ACTs including supplemental materials (e.g. job aides) for treatment compliance and proper instruction to the caretaker for use (TASC 3); Support for training/supervision (e.g. job aides) at the CSCOM and CSREF level for management of severe malaria (MOH PNLP); Support field visit to other PMI country to review home-based management of fever progress (MOH PNLP); Technical assistance for severe malaria (CDC IAA)	32/3
HBMF implementation/ community ACT compliance and distribution	PKC	550,000	Nationwide; Targeted districts	Provide training in compliance and monitoring by community *relais* for ACT treatment; support scale up of from 3 districts SCF/USA community-based treatment project, including application of lessons learned from initial pilot study and PKC pilot studies	33
Procurement of ACTs and severe malaria drugs	DELIVER	1,100,000 (1,100,000)	Nationwide	Procure ACTs for HBMF and CSCOMs; procure injectable artemether, rectal artusenate, and oral quinine	33
Policy support for case management	Health Policy Initiative	100,000	Nationwide	Continue advocacy for free commodities in a cost recovery system. Advocate for the introduction of artemisin-based treatments for severe malaria and ACTs in the second and third trimester of pregnancy.	33
BCC/IEC for case management	PKC	400,000	Nationwide	Roll out a multi-channel communications strategy to encourage caregivers to bring febrile children immediately to health facilities and compliance with treatment; relais support, training and refresher training on treatment of malaria with ACTs at the facility including compliance; monitoring and follow up after treatment and checking for side effects; training on care taker recognition of	33

				complications that require referral	
Health financing and policy implementation	TASC 3	50,000	Nationwide	Continue FY 08 policy work to review the implications of free commodities on a cost recovery system	34
Logistics distribution strengthening	SPS* MOH PPM	150,000 50,000	Nationwide	Reinforce PPM for storage and transport of ACTs, expand the capacity of distribution services, possibly to the CSCOM level; review of cold chain including options for cool boxes	34
Drug quality control	USP* MOH LNS	250,000 (100,000) 50,000	Nationwide	Provide technical support for quality control to LNS for pre- and post- market quality of ACTs (e.g. testing, laboratory equipment procurement)	34
Pharmacovigilance	SPS* MOH DPM	50,000 50,000	Nationwide	Support roll out of pharmacovigilance plan through DPM	34
SUBTOTAL: Case Mgmt.					
MONITORING AND EVALUATION					
Implementation of M&E plan	MOH PNLP	30,000	Nationwide	Support the MOH PNLP annual review of M&E plan	43
Strengthening of SLIS	Measure III	200,000	Nationwide	Support training and quality control/timeliness for completion of routine SLIS reporting forms, assist in analysis and feedback on malaria indicators and promote use of findings at all levels to improve program performance.	43
Ongoing TA for M&E support	Measure III CDC IAA	200,000 12,100	Nationwide	Provide direct technical assistance to the PNLP and partners on sentinel surveillance, assessment for the feasibility of sentinel site expansion, support through a seconded staff member to PNLP to track commodities from	43

				PMI and other partners; technical assistance for M&E (CDC IAA)	
Strengthening and expansion of sentinel sites	MRTC	290,000	Up to 8 sentinel sites	Strengthen and expand sentinel sites based on FY 08 inventory of existing capacity and technical and financial support to equip sites and strengthen human resource capacity for initial data collection (250k) sentinel site insecticide resistance and entomological monitoring (40k)	43
Support to national survey	TBD	200,000	TBD	Support a MICS in collaboration with the MOH and UNICEF, or another national survey, to provide data on interim progress.	44
Operational research evaluation of the EPI contact method	CDC IAA	35,000	2 districts	Support OR to evaluate the EPI contact method for monitoring and promoting LLIN use through health facilities.	44
SUBTOTAL: M&E					
IN-COUNTRY MANAGEMENT AND ADMINISTRATION					
In-country staff; administrative . expenses	CDC	315,000	Nationwide	Provide the salary, benefits and other headquarters-based costs for the CDC PMI Resident Advisor	44
In-country staff; administrative. expenses	USAID	750,000	Nationwide	Provide salaries, benefits of in-country PMI staff (1 PSC/1 FSN), support staff (1 FSN), payment of local support costs of CDC Resident Advisor	44
SUBTOTAL: Mgmt. / Admin.					
GRAND TOTAL		**15,400,000**	***Commodities represent 42.4 % of total budget***		

Table 3

President's Malaria Initiative – Mali
Year 1 (FY09) Budget Breakdown by Intervention ($15,400,000)

Area	Commodities $ (42.4%)	Other $ (57.6%)	Total $
Insecticide-treated Nets	4,021,600 (81%)	955,000 (19%)	4,976,600
Indoor Residual Spraying	1,007,000 (31%)	2,227,200 (69%)	3,234,200
Case Management	1,400,000 (34%)	2,677,100 (66%)	4,077,100
Malaria in Pregnancy	100,000 (0.1%)	1,080,000 (99%)	1,180,000
Monitoring and Evaluation	0 (0%)	967,100 (100%)	967,100
Administration	0 (0%)	1,065,000 (100%)	1,065,000
Total	6,528,600 (42.4%)	8,971,400 (57.6%)	15,500,000 (100%)

Table 4

Year 1 (FY09) Budget Breakdown by Partner* ($15.4 Million)

Partner Organization	Activity	Geographic Area	Budget
MOH (PNLP DPM, Hygiene, INRSP, DSR, EPI, MDSPA, PPM)	Capacity building, training and supervision, M&E (PNLP), EPI strengthening of tracking nets, net forecasting, capacity building (PNLP + EPI Section), pharmacovigilance (DPM), quality assurance/control for laboratory diagnostics (INRSP), drug quality control (LNS), BCC/IEC (DSR, Midwives Association), logistics strengthening (PPM)	Nationwide	730,000
MRTC	IRS monitoring, larviciding, training, quality assurance and quality control in lab diagnostics, sentinel site strengthening, entomologic monitoring, Bancouma IRS spraying	Nationwide	720,000
PKC II	BCC/IEC for LLINs, IPTp, case management, community ACT roll out, HBMF scale up	Nationwide	1,750,000
PSI	Public/private sector net capacity, LLIN distribution	Nationwide	696,600
ATN + (TASC 3)	Facility level service provide training, training and supervision for case management, health financing and policy implementation	Nationwide	950,000
DELIVER	Procurement of LLINs, SP, ACTs and severe malaria drugs	Nationwide	4,925,000
HPI	Advocacy for IPTp and case management	Nationwide	250,000
MEASURE III	Strengthening SLIS, TA for M&E support	Nationwide	400,000
New award (TBD)	Environmental compliance monitoring	Nationwide	30,000
RTI	IRS Commodities and operational costs	Nationwide	2,900,000
SPS	LLIN, MIP, CM logistics management	Nationwide	450,000
USP	Drug quality control; Pharmacovigilance	Nationwide	250,000
TBD	MICS or MIS	Nationwide	200,000
CDC IAA	TA for IRS, case management, EPI contact method	Nationwide	83,400

*Does not include staffing/administration of $ 1,065,000