

PRESIDENT'S MALARIA INITIATIVE
MALARIA OPERATIONAL PLAN (MOP)
MALI
FY 2008

EXECUTIVE SUMMARY

In December 2005, Mali was selected as one of the fifteen countries to benefit from the President's Malaria Initiative (PMI). This document presents a detailed one-year implementation plan for the first year of PMI funding in Mali. It briefly reviews the current status of malaria control and prevention policies and interventions, identifies challenges and unmet needs if the PMI goals are to be achieved, and provides a description of planned year one activities under PMI. The document was developed in close consultation with the National Malaria Control Program (Programme Nationale de Lutte Contre le Paludisme, PNLN) and with participation of most national and international partners involved in malaria prevention and control in Mali.

Malaria is one of the major causes of morbidity and mortality in Mali, and is the primary cause of all outpatient visits for children less than five years of age (39%). One-third of all reported deaths are due to malaria, and 76% of these deaths occur in children less than five years of age. The PNLN National Strategic Plan for the period 2007 – 2011 aims to achieve the following:

- Reduce malaria mortality by at least 50 % as compared to year 2000 levels;
- Reduce health-facility recorded malaria case-fatality rates 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 PNLN has defined four major strategies: 1) improved case management, 2) intermittent preventive treatment of malaria in pregnancy (IPTp), 3) vector control through the use and distribution of ITNs, destruction of mosquito breeding sites using larvicides and targeted indoor residual spraying, and 4) malaria epidemic preparedness.

Key partners of the PNLN include the Global Fund for HIV/AIDS, Tuberculosis and Malaria (GFATM), the World Health Organization (WHO), UNICEF, the World Bank, the Dutch Cooperation, USAID and NIH, as well as NGOs and PVOs. The National Institutes of Health (NIH) support is channeled through the Medical Research and Training Center (MRTC). In November 2006, the Millennium Challenge Corporation awarded Mali a five-year \$460.8 million grant to support infrastructure and policy reform for productive sectors including road construction, airport renovation and expansion of large scale irrigated agriculture. Sanofi-Aventis is launching a subsidized treatment initiated through local pharmacies to support its AS-AQ blister pack product, Arsucam.

Based on proposed activities, in Year 1 of the PMI program, the following results are expected:

Prevention:

- Approximately 2 million long-lasting ITNs (LLINs) (of which PMI will provide 660,000) will have been distributed to children under five and pregnant women;
- Approximately 86,000 houses, housing a total of 430,000 residents, in the two districts targeted by the MOH and PMI for IRS will have been sprayed; and
- Intermittent preventive treatment with SP in pregnant women will have been implemented in all health facilities nationwide.

Treatment:

- Malaria treatment with ACTs will have been implemented in all government health facilities.

The following paragraphs describe the proposed approach for each of the major interventions:

Insecticide-treated nets (ITN): The promotion and use of ITNs has been a priority intervention for the MOH. The PNLP strategy aims to achieve 80% ITN use among children under five and pregnant women by 2011. Although there is moderately high coverage of non LLINs through various distribution channels, massive efforts will be necessary through PMI and partner support to scale-up LLIN activities and achieve the objective of 85% ownership and use. PMI will contribute through the procurement of more than 660,000 LLINs targeting children under five and pregnant women. PMI will also support the distribution of free LLINs in the public sector and support an assessment of the management and logistics system related to the distribution of LLINs. In addition, PMI will help to examine net preferences, determinants and barriers to net use and relevant messaging to target populations. The results will help to define clear messages regarding correct and consistent use of LLINs for communities and PMI will support multi-channel strategies to communicate this information.

Indoor residual spraying (IRS): No systematic program for IRS is currently operational, and the country does not have experience in large-scale IRS programs. While current PNLP policy encourages IRS in epidemic-prone areas, PMI does not support wide use of IRS in epidemic prone areas. PMI will support IRS in at least two endemic districts to cover a population of about 430,000 in the Bla and Koulikoro Cercles. PMI will support the PNLP's focus on larviciding to assess the impact of this approach in conjunction with IRS. PMI will expand the work of MRTC/NIH in its efforts to assess the impact of spraying in hamlets near the Niger River on neighboring villages approximately 3-5 km away from the river; it is a possibility that the mosquitoes of the river habitats are the source of mosquitoes for villages during rainy season. Lastly, PMI will work with partners to ensure that tariffs on insecticides for IRS and larviciding are reduced or eliminated.

Malaria in Pregnancy including intermittent preventive treatment (IPTp): Utilization of antenatal care (ANC) by pregnant women has been low in Mali, and although IPTp has been a national policy since 2005, national coverage is still very low. Preliminary data from the 2006 DHS indicates that only 6% of pregnant women reported receiving any Sulphadoxine-pyrimethamine (SP) during an ANC visit, and only 4% receive two doses. To improve these statistics, PMI will procure SP with UNICEF to ensure universal coverage. PMI will also work closely with the MOH and other partners to strengthen ANC services through the support of in-service trainings and health policy/financing and treatment guideline revisions. PMI will also support adequate communication and information campaigns to increase women's awareness of risks of malaria during pregnancy, promote attendance at ANCs, early use of IPTp in the 2nd trimester, completion of the recommended two treatments and demand for proper treatment of malaria in pregnancy. Lastly, PMI will assist the National Drug Procurement and distribution scheme (PPM) in strengthening the logistics and distribution system for SP and other malaria commodities.

Case management: Malaria diagnosis in most facilities is based on clinical grounds and fewer than 10% of suspected cases of malaria are laboratory confirmed. The PNLP wants to strengthen microscopic diagnosis where it already exists and implement rapid diagnostic tests (RDT) where microscopy is not available. To support these goals, PMI will procure microscopes and other supplies to support laboratories nationwide, and work with the PNLP and other partners to strengthen in-service training and quality control for malaria diagnosis.

The overwhelming issue with malaria treatment in Mali is poor geographic and economic access to care. According to the 2006 DHS, only 31.4% of children younger than five years of age with fever received any antimalarial, and only 15.1% were treated within 24 hours. 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. Global Fund Round 6 has committed around \$4.3 million for financing ACTs in Mali from 2007-2009. PMI will support a comprehensive approach to improving ACT implementation through training, supportive supervision, policy revision for severe malaria, community-based ACT implementation and communication strategies that promote care-seeking for febrile children and compliance with treatment regimens. PMI will also procure needed ACTs and drugs for severe malaria, as well as support the logistics and distribution system, drug quality control and pharmacovigilance.

Building PNLP capacity: To help the PNLP reach its coverage targets for the key malaria interventions, PMI will collaborate with other partners to strengthen the capacity of PNLP staff and others at the national, regional, district and community levels to plan, implement, supervise, monitor and evaluate malaria control activities. In addition, PMI will work with the MOH and partners to help identify additional staffing resources to support the PNLP's activities. Key contributions will be made in training health workers and developing and strengthening capacity for supportive supervision.

Monitoring and evaluation: PMI, along with other partners, will play a major role in helping the PNLP establish a comprehensive vision and plan for monitoring and evaluation of malaria activities. The evaluation approaches will provide essential data to measure national coverage and process indicators. PMI will build upon the PNLP's existing activities within their framework and ensure that PMI M&E approach complements that of other partners. Activities will include support to the development and implementation of a comprehensive M&E plan for the national program, strengthening of sentinel sites, M&E for indoor residual spraying and other areas.

The total amount of PMI funding requested for Mali is \$15 million for FY 2008.

Acronyms and Abbreviations

ACT	Artemisinin-based combination therapy
ANC	Antenatal care
AQ/SP	Amodiaquine/sulfadoxine-pyrimethamine
ARV/ART	Anti-retroviral/therapy
ASACO	Association de santé Communautaire (Community health association)
ATN	Assistance Technique Nationale (National Technical Assistance)
BCC/IEC	Behavior change communication/information education communication
CCM	Country Coordinating Mechanism
CDC	Centers for Disease Control and Prevention
CHV/ <i>Relais</i>	Community Health Volunteer
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)
DDT	Dichloro-diphenyl-trichloroethane
DHS	Demographic and Health Survey
DHPS	Division d'Hygiène Publique et Salubrité (Division of Public Hygiene and Healthiness)
DPLM	Division Prévention et Lutte Contre la Maladie (Division of Prevention and Disease Control)
DNS	Direction Nationale de la Santé (National Health Directorate)
EPI	Expanded Program for Immunization
ESR	Epidemic Surveillance and Response
FBO	Faith-based organization
FENASCOM	Fédération Nationale des Associations de Santé Communautaire (National Federation of Community Health Associations)
GFATM	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GOM	Government of Mali
HBM	Home-based management
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
MIP	Malaria in pregnancy

MRTC	Malaria Research and Training Center
MSF	Médecines San Frontières (Doctors Without Borders)
NGO	Non-governmental organization
NIH	National Institutes of Health
PEPFAR	President's Emergency Plan for AIDS Relief
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	Sulphadoxine-pyrimethamine
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

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 high-burden countries in sub-Saharan Africa. The goal of this Initiative is to reduce malaria-related mortality by 50% after three years of full implementation in each country. This will be achieved by reaching 85% coverage of the most vulnerable groups---children under-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 FY 07, and will increase to \$300 million in FY 08, and reach \$500 million in FY 10 in 15 countries.

In implementing PMI, the U.S. Government is committed to working closely with host governments and within existing national malaria control plans. Efforts will be coordinated with other national and international partners, including the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM), 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 assessment and planning visits for PMI, as well as subsequent evaluations, will be highly consultative and held in collaboration with the PNLP and other partners.

This document presents a detailed one-year implementation plan for the first year of the President's Malaria Initiative in Mali. It briefly reviews the current status of malaria control and prevention policies and interventions, identifies challenges and unmet needs if the PMI goals are to be achieved, and provides a description of planned Year One activities under the PMI. The document was developed in close consultation with the PNLP and with participation of most national and international partners involved in malaria prevention and control in the country. The total amount of PMI funding requested for Mali is \$15 million for FY 2008.

BACKGROUND

Mali has an estimated population of 12.3 million (World Population Prospects – 2006 Revision, UN Population Division), 46% of which are under 15 years of age. The total expenditure on health in Mali represents 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 eight regions are subdivided into 49 administrative “Cercles” comprising 53 health districts. Bamako is divided into six urban communes that serve as six urban health districts. Governance is decentralized into 703 communes, each commune being 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 referral health centers (Centres de Santé de Référence or CSREF)
- Community level: 753 community health centers (Centres de Santé Communautaire or CSCOM); not all are functional. CSCOMs are controlled by a community health association (ASACO)

Health financing through cost recovery

Mali has a strong cost recovery system in place which 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 an ASACO (community health association, referred to hereafter as “ASACO”). All CSCOMs are supposed 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; 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 including membership fees, the sale of essential drugs and fees for services, which are managed by the CSCOM’s ASACO. 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 also prevents decapitalization of pharmacy stock. The ASACO purchases replacement drugs for the CSCOM through the national pharmacy system or in the private sector based on availability. Selected drugs (e.g. vitamin A, ORS) are provided free by donors. CSCOMs are required to finance the transportation of their drugs from CSREFs. Due to small profit margins, 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 PNLDP receives annual budget support from PRODESS II (the 2nd National Health and Social Development Program, 2005-9). The Comité de Suivi (evaluation committee) approves the annual PRODESS operating plan, which includes funding gaps expected to be covered by donors. Several partners (Netherlands, Sweden and Canada) provide direct budget support on an annual basis. All other donor funds are targeted to sub-sectors and programs. The Government of Mali (GOM) contributes to mostly salaries and other operating costs in PRODESS annual budgets. The GOM also uses HIPC funds to pay some MOH salaries, especially at the CSCOM

level. Overall, the GOM has steadily increased the contribution of the national budget devoted to health from about 6% in 2000 to about 8% in 2005, with commitments for additional increases in the future.

The GOM-approved fiscal year 2007 Operating Plan for PRODESS includes budget line items totaling about \$1 million for activities to be conducted by the PNLN. This does not include staffing of the PNLN, which is funded separately. Some of the highlights include LLIN procurement and distribution, surveillance, IRS, IPTp and training. Only a portion of these activities will be funded by the PRODESS budget (including resources from countries providing direct budget support); the remainder will depend on other donor funding.

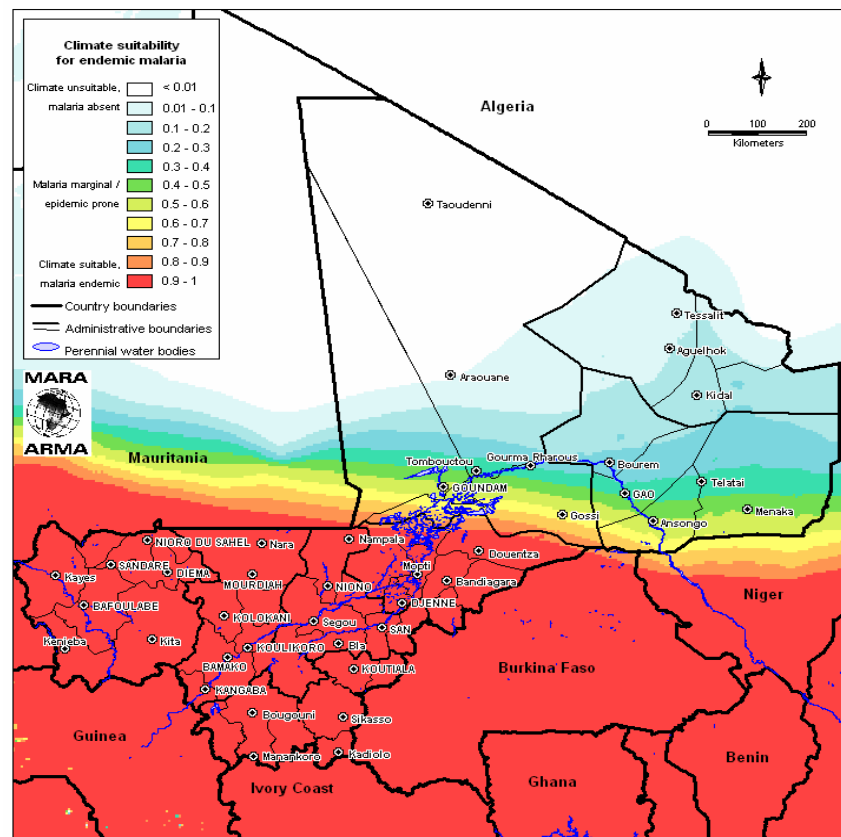
MALARIA SITUATION

Malaria is one of the major causes of morbidity and mortality in Mali. In the 2005 annual statistical summary of the national health information system (*Système Local d'Information Sanitaire* or SLIS), health facilities reported 962,706 clinical cases of malaria, accounting for 36% of all outpatient visits (all ages). Malaria is also the primary cause of all outpatient visits for children <5 years of age (39%). One-third of all reported deaths are due to malaria, and 76% of these deaths occur in children < 5 years of age.

Mali: Distribution of Endemic Malaria

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

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 ages 1-4 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



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.igo.org/ain/sds/maps/ads/ads_idx.htm

febrile children present to health facilities. In 2004, WHO estimated a rate of 450/1,000 confirmed cases among the population while the PNLN reported an annual incidence of presumed malaria cases of 70/1,000 (Source: J.O. Guintran, WHO). Overall, geographic coverage of the total population is estimated at 50% within 5km and 75% within 15 km radius from the health facility.

Plasmodium falciparum (85-90%) accounts for most 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 >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 3 months from August to October. Epidemics occur in the north and in parts of Koulikoro and Kayes regions. 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.

Key partners of the PNLN include the Global Fund for HIV/AIDS, Tuberculosis and Malaria (GFATM), the World Health Organization (WHO), UNICEF, the World Bank, the Dutch Cooperation, USAID as well as NGOs and PVOs. These include Groupe Pivot Santé, Fédération Nationale des Associations de Santé Communautaire (FENASCOM), Médecins Sans Frontières (MSF), Plan International and Mali Voices /JHUCCP. In November 2006, the Millennium Challenge Corporation awarded Mali a five-year \$460.8 million grant to support the development of key infrastructure and policy reform for productive sectors including road construction, airport renovation and expansion of large scale irrigated agriculture in the Alatoron zone in the northern region of the Niger River Delta. The National Institutes of Health (NIH) support is channeled through the Malaria Research and Training Center (MRTC) of the Applied Epidemiology Department within the School of Medicine, Odontostomatology and Pharmacy. Sanofi-Aventis is launching a subsidized treatment initiated through local pharmacies to support its AS-AQ blister pack product, Arsucam. This will extend to include their co-formulation, Coarsucam, when the drug is available for distribution.

NATIONAL MALARIA CONTROL PLAN AND STRATEGY

Through the MOH, the Government of Mali (GOM) guides and coordinates all interventions in malaria control. The PNLN was first established in 1993 and is currently within the Disease Control Division of the National Health Directorate (DNS). The PNLN mandate is to propose policies and guidelines, draft strategic orientation for all malaria interventions and support decentralized regional and district health teams through training and supervision. Due to the lower positioning of the PNLN in the organizational structure the PNLN does not participate in crucial meetings where key malaria control decisions are made (e.g. annual plan projections, budgets, etc.).

The PNLP National Strategic Plan for the period 2007 – 2011 is influenced by RBM 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 health facility recorded malaria case-fatality rates 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 strategies: 1) improved case management, 2) intermittent preventive treatment of malaria in pregnancy (IPTp), 3) vector control through the use and distribution of ITNs, destruction of mosquitoes breeding sites using larvicides, and targeted indoor residual spraying, and 4) malaria epidemic preparedness. Three strategic approaches have been adopted to support this including community mobilization and behavior change communication, operations 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. The PNLP has recently established six working groups including: drugs and case management, communication and social mobilization, vector control, ITNs, operations research, monitoring and evaluation, and capacity reinforcement. These working groups will further develop national policies, guidelines, and training materials for policy implementation.

CURRENT STATUS OF MALARIA INDICATORS

The only nationally representative health surveys conducted in Mali in the last several years have been Demographic and Health Surveys (DHS) conducted in 2001 and 2006. The malaria module in the 2001 survey 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 bednet, but lower ITN coverage and use of bednets or ITNs by the high-risk populations targeted by the PNLP and PMI. Prompt case management of children <5 years of age with fever is also very low, as are use of Sulfoxadine-pyramethamine (SP) by pregnant women for intermittent preventive treatment.

Recent Estimates of Malaria Indicators: 2006 Mali DHS (preliminary)	
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

++Data will be available in mid-2008

GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

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

- >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.

EXPECTED RESULTS – YEAR ONE

Prevention:

- Approximately 2 million long-lasting ITNs (LLINs) (of which PMI will provide 660,000) will have been distributed to children under five and pregnant women;
- Approximately 86,000 houses, housing a total of 430,000 residents, in the two Districts of Bla and Koulikoro targeted by the MOH and PMI for IRS will have been sprayed; and
- Intermittent preventive treatment with SP in pregnant women will have been implemented in all health facilities nationwide.

Treatment:

- Malaria treatment with ACTs will have been implemented in all government health facilities

INTERVENTIONS – PREVENTION

Insecticide-treated nets (ITNs)

Current Status, Challenges and Needs:

The promotion and use of ITNs has been a priority intervention for the MOH. The PNL strategy aims to achieve 80% ITN use among children under five and pregnant women by 2011. A new MOH policy adopted in July 2006 supports free distribution of LLINs to pregnant women at their first antenatal care visit and to children under five years with completed vaccination cards. MOH guidelines on implementation of this policy do not exist nor are adequate supplies of LLINs available nationwide. The GOM also renewed a second five-year presidential decree in December 2006 removing all national taxes or tariffs on imported ITNs and insecticides for re-treatment of nets.

According to the new policy, ITNs distributed in the public sector must be LLINs and clearly distinguishable from those sold commercially. Free ITNs can also be distributed to vulnerable populations affected by natural disasters and displaced by floods as well as people living with HIV/AIDS.

Mali has a “net culture” with high demand and moderately high net ownership at the household level, but coverage of vulnerable target groups with ITNs and correct use remain low.

According to the 2006 DHS, 27% of children under five and 29% of pregnant women had slept under an ITN the previous night. The average number of nets of any type per household is 1.3; the average number of ITNs per household is less than one.

Geographic distribution of ITN coverage varies by region. According to the recent DHS, the northern regions (Kidal, Gao, Tombouctou) have the lowest ITN ownership, which is probably a reflection of the low malaria transmission in these areas. To increase ITN coverage in the north, there are some potential barriers including a largely nomadic population, increased transportation costs to remote areas, lack of available preferred nets and seasonal use. Some NGO partners believe the northern Sahelian population prefers the white “Demura” cloth nets for privacy which are not widely distributed or pre-treated.

An estimated two million nets (LLINs and untreated nets) have been distributed with donor and NGO support during the last four years. Information on quantities and types of ITNs distributed is difficult to obtain since no single entity has been responsible for tracking them.

The major distribution channels for ITNs in Mali are through: (1) the public health sector at CSCOMs during routine ANC and EPI services; and (2) the private sector sold by local vendors (primarily in Bamako and urban areas). There is limited experience with mass ITN distribution or integration with national vaccination campaigns. In 2003, USAID/Mali supported the distribution of 70,000 LLINs as a stand alone campaign to targeted rural households through Malian Red Cross volunteers. In 2004, CDC distributed 15,000 ITNs to targeted districts as part of a nationwide measles campaign.

Large scale targeted LLIN distribution activities planned during 2007 will significantly increase LLIN household ownership. Along with Vitamin A supplementation, more than 220,000 LLINs will be distributed in the 3 Northern regions of Tombouctou, Gao and Kidal to cover children under five. In December 2007, a combined 5-commodities campaign will take place and includes

measles and polio vaccines, Vitamin A, Albendazole for deworming and LLINs. Given the combination of the five commodities, all children under 5 years will be targeted under the principle of “1 net per child; no more than 2 nets per mother”. The six remaining administrative regions of Kayes, Koulikoro, Sikasso, Segou, Mopti and the Capital Bamako will be covered with nearly 2.3 million LLINs. This campaign is supported by the Government of Mali, the Canadian Red Cross, UN Foundation, Malaria No More, and PMI. These LLINs will supplement (not replace) those planned for routine distribution.

Under the Global Fund Round 6 grant, Groupe Pivot in partnership with FENASCOM (Federation of ASACOs) will represent the NGO/civil society sector and play an active role in the distribution of ITNs for routine services, organized re-treatment campaigns, community mobilization and BCC/IEC activities. Civil society organizations will assist with the distribution and promotion of LLINs through the use of community health volunteers or *relais*. PSI will procure, warehouse, transport and distribute the LLINs to the CSRef level/district depots and CSCOMs will organize their own transportation to access and replenish their LLIN stocks. LLINs are planned to arrive at the end of 2007.

A vibrant private sector provides households with a large selection of nets. In a 2003 baseline survey, NetMark found that among urban households owning a net, 65% of the nets were bought in the marketplace; in rural households, this percentage was 70%. Imported nets from Southeast Asia and China are sold in markets throughout Mali and seem to be readily available in large quantities. Tailor-made nets from imported netting material are as common as commercially-made ones. The great majority of these nets are not LLINs.

Between 2003 and 2006, NetMark, with USAID support, launched a program to create a sustainable, commercial market for ITNs by improving their availability through the private sector (with re-treatment kits) and by working with four large distributors/importers of nets to help them access international ITN suppliers such as Vestegaard and Siamdutch Tana. Netmark also initiated a voucher program in one district to support a targeted subsidy for ITNs, which were distributed to pregnant women during their ANC visit and redeemable at a local retail outlet near their health facility. Of the 11,300 vouchers issued, 8,933 were redeemed (79%). The Netmark activity ended in December 2006 and reportedly has distributed more than 300,000 ITNs through the private sector.

Because net ownership is relatively high already in Mali, the PNLP supports community-based net re-treatment. Currently, PSI procures and distributes re-treatment kits, KO tabs (branded as “Bloc”), to both the private and public sectors at 250 FCFA (\$0.50) each. Between 2004 and 2007, PSI distributed more than 650,000 re-treatment kits to pharmacies, pharmaceutical wholesalers, general traders, and commercial businesses nationwide as well as to CSCOMs in the Kenya Ciwara Project districts. PSI has 100,000 re-treatment kits in country and will procure an additional 440,000 for 2007.

ITNs are not part of the Government’s Pharmacie Populaire du Mali (PPM— public sector logistics system) and the MOH has limited experience warehousing or distributing ITNs. Although the PNLP is officially responsible for coordinating ITN distribution, in practice, UNICEF and NGO partners have assisted with procuring and distributing ITNs from their central

warehouses to regional and district levels. PSI distributed the majority of its ITNs to district depots and the CSCOMs placed orders and transported the ITNs to their health centers.

Mali needs an estimated 2.8 million LLINs to cover 100% of all pregnant women and children under five, at a cost of \$19.6 million (assuming \$7 per LLIN). The country is planning to implement a strategy to scale up LLIN coverage rapidly through mass integrated campaigns targeting children under five. Twice yearly Vitamin A campaigns (conducted in June and December) have reported achieving 80% national coverage, and could potentially serve as platforms for integrating additional products such as ITNs. The 6-region integrated campaign in December 2007 reflects this new strategy on a large scale.

To sustain the high coverage levels achieved following the large-scale campaigns, pregnant women will receive LLINs during routine ANC services. It is estimated that approximately 1.0 million LLINs will be required annually to maintain 85% coverage of newly pregnant women and children under one, at an annual cost of approximately \$7 million.

Approximately 1.4 million LLINs are planned or available for the transmission period 2007-2008 for routine distribution. The Global Fund Round 6 grant will provide 300,000 LLINs annually for pregnant women and children under five over the next five years. UNICEF has planned to provide 80% coverage of pregnant women and children under five with an LLIN in four regions and is supporting more than 500,000 LLINs in 2007. With USAID/Mali funding, PSI has approximately 300,000 LLINs available for the Keneya Ciwara Project districts for distribution to pregnant women and children under five attending routine ANC and EPI services at CSCOMs. The World Bank has provided 200,000 LLINs to the PNL for distribution and an additional 50,000 LLINs are expected to arrive this year.

The estimated LLINs planned and available, LLINs needed and the projected LLIN gap for Mali in year one (2007-2008) of the PMI is present in the tables below:

LLINs Available or Planned for 2007-2008

Source	Number of LLINs	Observation
World Bank	250,000	Available for 2007 transmission season
UNICEF	541,300	Available for 2007 transmission season
Global Fund Round 6	300,000	Projected for 2008 transmission season
USAID	299,000	Majority for June 2007 coupled LLIN & Vitamin A supplementation
Total	1,390,300	

LLIN Need and Gap for Year one based on total population of 12,337,000

Target Group	Number of LLINs	Observations
Pregnant Women	616,850	
Children 0 to 12 months old (4.8%)	592,176	
LLIN Needed in Year 1 (2008 transmission season)	1,209,026	
LLINs Planned in Year 1 (2008)	300,000	Includes GF planned ITNs in 2007

sector. If the analysis shows that there is a need to strengthen the system, and the public sector is the appropriate way for LLINs logistics to be handled, PMI will support possible training of a central focal point to manage and track LLINs distributed from the central to district levels. If the public sector is not the appropriate way for logistics to be handled, PMI will explore the identification of a para-statal or other type of designated distributor.

BCC/IEC: (\$350,000) Support for BCC/IEC activities is critical, including identification of remaining barriers to hanging, use and the promotion of year-round use of nets. PMI will support assessments to examine net preferences, determinants and barriers to net use and relevant messaging to target populations. PMI will support efforts to define clear messages regarding correct and consistent use of LLINs for communities and identify multi-channel strategies to communicate this information. PMI will coordinate BCC/IEC efforts with those funded by the Global Fund and other partners. PMI will particularly emphasize use of community-based workers, including *relais*, in expanding BCC/IEC activities to promote LLIN use, and will support advocacy at the national level for engaging community based workers for this purpose.

Re-treatment kits in the private sector: (\$250,000) PMI wants to ensure that the LLINs procured through PMI focus on pregnant women and children under five. As mentioned earlier, there are a large proportion of untreated nets that are purchased by Malians. Less vulnerable populations, e.g. the male head of the household, can afford to buy nets, and PMI wants to ensure that this population does not inhibit the use of LLINs by target groups. To address this, PMI will procure a limited supply of long-lasting re-treatment kits (KO Tab 123), which is in line with the MOH's strategy for re-treatment of regular nets. Studies in Mali have shown that communities are more willing to retreat nets if there is a demonstration point near their village. PMI will explore different strategies to deliver re-treatment kits, including Nutrition Activity weeks and distribution through *relais*. PMI will also provide targeted BCC/IEC messages for re-treatment and the importance of LLINs, with the intention to increase demand for LLINs. PMI will consider a plan for phasing out support for re-treatment kits as additional supplies of LLINs become available.

Indoor residual spraying (IRS)

Current Status, Challenges and Needs:

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 budget, indoor residual spraying appears to be limited to epidemic response in the 17 northern districts. The proposed budget for IRS for 2007 includes \$33,000 for equipment, \$89,000 for insecticide and \$35,000 for campaign organization. Additionally, in the PRODESS, the GOM proposes to conduct a small IRS pilot project in selected districts of Kayes and Koulikoro with funds from Organisation Pour la Mise on Valeur du Fleuve Sénégal (OMVS) (about \$42,000 USD).

In every district, the agents of Division d'Hygiène Publique et Salubrité (DHPS) are equipped with at least one sprayer and in every region at least one fumigator. 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 are no Hudson sprayers in country.

A small stock of Sulfac 50 EC (cyfluthrine) and Ropoxur 75% WP (Baygone) is currently present at the DHPS warehouse. Other products used include chlorpyrifos, permethrine and cyhalothrine. Mali has accepted the WHO approved insecticides for IRS except for DDT. Discussions have been held by DNS to approve DDT but decreased susceptibility has been detected in some districts. Although importation tariffs have been lifted from insecticides destined for ITN impregnation, those on insecticides for IRS or larviciding were not included in the decree.

Climatic zones in Mali range from desert regions in the North with less than one month of rainfall to Sudano-Guinean Zone in the far south with 6-7 months of rainfall. Malaria transmission in the three northernmost regions and the northernmost districts of Kayes, Koulikoro, Segou and Mopti are considered zones of epidemic risk and will not be considered for IRS at present. IRS is potentially a cost-effective option in much of the remainder of the country where malaria transmission is perennial but with seasonal peaks that vary in duration from 3 to 6 months. In year one, 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 6-7 months of rain may require a second round of spraying before the end of the rainy season and thus will not be considered in the first year of IRS.

No systematic program for IRS is currently operational, and the country does not have experience in large-scale IRS programs. The DHPS carries out campaigns for mosquito and rat reduction. The district government may provide the insecticides, spray personnel and per diem for the sprayers. In other instances, communities or individuals may purchase the insecticide and the agents will carry out the spraying either as part of a campaign or at the request of an individual. 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. PMI will encourage mining companies to expand spraying activities to villages surrounding mines. No Global Fund activities or private sector activities other than in the mines are currently underway.

Insecticide resistance testing has been carried out by the PNLN with assistance from members of DHPS and MRTN. In 2005, a decreased susceptibility in *An. gambiae* was detected in the regions of Selingue and Pimperena. In the past this was funded by WHO but in 2006 no funds were available for such activities.

Proposed USG Activities: (\$1,664,200)

While current PNLN policy encourages IRS in epidemic-prone areas, PMI does not support wide use of IRS in epidemic prone areas, nor does PMI support outdoor spraying. PMI encourages the use of IRS in areas of seasonal malaria transmission where it can dramatically reduce malaria transmission and mortality. In addition to the following USG support, PMI will work with partners to ensure that tariffs on insecticides for IRS and larviciding are reduced or eliminated.

IRS: (\$1,324,200) PMI will support IRS to cover a population of approximately 430,000. The specific areas to be covered include Bla Cercle with a population of around 259,000 and Koulikoro Cercle with around 172,000 people. Criteria for district selection included high seasonal malaria transmission (assumed from high infant mortality in DHS), seasons of less than 6 months, relatively high population density, and poor coverage with other interventions. Selection of the district was done in consultation with the MOH and scientists from MRTC and CDC. Baseline entomology assessment will be conducted during the rainy season of 2007. 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. Training at the regional, district and community level will be provided, with supervision provided jointly by PMI and DHPS. IEC to inform beneficiaries, raise public awareness, promote behavior change (including environmental management and sanitation) and promote cooperation will be provided by PMI with assistance of DHPS. PMI will also provide technical support for the spraying and entomology assessment.

The local CSCOM and CSREF will ensure additional human health and environmental safety components of IRS, with PMI assistance. MRTC will provide entomological training and will assist PNL and DHPS with entomologic monitoring and wall bioassays to determine the residual effect of pesticides. Selection of IRS and larviciding sites by PNL, MRTC and CDC as well as monthly vector monitoring activities including indoor and outdoor landing catches and pyrethroid spray catches should take place in 2007 in preparation of 2008 spraying.

Larviciding: (\$110,000) GOM strongly voiced a desire for an integrated vector control program that includes larviciding and environmental management. Larval source reduction will be included in the IEC/BCC of IRS activities. In addition, PMI proposes to fund an operational research project in a small subset of houses included in the IRS program, to determine if there is an added benefit to larviciding of water sources surrounding sprayed homes. RTI and MOH will carry out activities. This will be a separate study from the IRS expansion near the Niger River described below.

Expansion of IRS near the Niger River: (\$80,000) MRTC/NIH has been studying mosquito activity in small hamlets located on the Niger River and in the neighboring villages approximately 3-5 km away from the river. During the dry season, *Anopheles gambiae* is present in high numbers in riverine hamlets due to larval habitats formed by the receding river, but in the nearby villages, mosquitoes are almost undetectable and when found are in houses on the side of the village closest to the river. MRTC/NIH hypothesizes that the mosquitoes of the river habitats are the source of mosquitoes for villages during rainy season. MRTC/NIH plans to carry out a small study aiming to reduce or eliminate mosquitoes with IRS (and perhaps larviciding) in one hamlet during the dry season and to measure mosquito activity in nearby villages as rainy season begins. PMI has added operational research funds to allow the MRTC to expand this activity to 5-10 additional hamlets along the river. Each hamlet is a small village with 20-50 houses.

IRS for Epidemic Response: (\$50,000) Sprayers, PPE, and insecticide will be pre-positioned in a central location for the epidemic prone North. This will help support WHO's plan for epidemic preparedness and response which is updated annually.

Entomological Monitoring: (\$100,000) In the height of the rainy season (September) of 2007, insecticide susceptibility will be conducted in two districts targeted for IRS. In 2008, immediately after spraying is implemented, cone bioassays using colony-reared mosquitoes will be carried out on the walls for a predetermined number of houses for two months after spraying to assess the quality of spraying. A subset of these houses will be monitored monthly thereafter to determine the duration of insecticidal activity on the wall. In addition, vector activity studies will be conducted in selected villages within the two districts from May until November. These studies will include monthly indoor and outdoor landing catches, pyrethroid spray catches (PSC), and insecticide susceptibility assays. Mosquitoes will be identified to strain level by polymerase chain reaction (PCR) and sporozoite levels will be determined by enzyme-linked immunosorbent assay (ELISA).

Malaria in Pregnancy including intermittent preventive treatment (IPTp)

Current status, challenges and needs:

Utilization of antenatal care (ANC) by pregnant women has been low in Mali, and although IPTp has been a national policy since 2005, national coverage is still very low. Preliminary data from the 2006 DHS indicates that only 6% of pregnant women reported receiving any SP during an ANC visit, and only 4% receive two doses. Recent data from MRTC and Laboratoire de Biologie Moléculaire Appliquée (LBMA) 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 growing 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.

The MOH policy for IPTp in Mali requires two doses of SP through direct observation at least one month apart between the 4th and 8th month of pregnancy. According to the PNL policy, all cases of malaria in pregnancy are to be considered severe malaria and be treated with injectable quinine; however, WHO treatment guidelines recommend treatment of uncomplicated malaria in pregnancy with oral quinine in the first trimester and ACTs thereafter.

In 2006, the MOH announced that SP for IPTp would be provided for free, however, pregnant women continue to be charged for SP. Charges are also incurred for the ANC card and for lab services, as well as fees for iron and folic acid tablets. SP for IPTp has been procured through USAID and UNICEF; in 2005/06, enough SP was purchased to cover 80% of pregnant women during their ANC visits. The projected annual need for SP to reach the PNL objective of 80% coverage is about 960,000 treatments. However, with the phase-out of chloroquine in June and potential delays in ACT availability, there could be greater use of SP as a first-line treatment of malaria, resulting in a potentially larger SP gap.

None of the medical or paramedical pre-service training schools have revised their curricula to include information on MIP and IPTp. USAID-supported and other partners worked with the

MOH's Reproductive Health Unit (with input from the PNL) 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 health providers in the public and private sectors, central and regional supervisors/trainers. Training will include diagnosis and treatment of malaria, IPTp and MIP and use and re-treatment of ITNs.

USAID-supported partners including Save the Children, CARE and Assistance Technique Nationale (ATN) have provided support for the production of technical guides for providers, IEC outreach materials for *relais*, and radio and TV campaigns on IPTp. Global Fund Round 6 includes the reproduction of technical guides for prevention of malaria during pregnancy. In addition, other USAID-supported partners including Keneya Ciwara and two Child Survival and Health Grants Programs grantees have supported the provision of ITNs to pregnant women. The grantees have used *relais* to promote key MIP messages including IPTp and the availability of free SP and ITNs 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, etc. Recently revised ANC visit cards include IPTp and ITN information.

Proposed USG component: (\$1,201,000; additional costs covered in case management)

PMI can help strengthen improved use and access to ANC by pregnant women in Mali through improved prevention, diagnosis, and treatment of MIP activities (see case management section). Additional support could be provided to advocate for overall higher quality ANC. The provision of free LLINs, commodities for IPTp, and improved case management of malaria for pregnant women along with BCC/IEC messages regarding the importance of malaria prevention and prompt and appropriate treatment of malaria in pregnancy should increase demand for ANC services and improve the delivery of malaria interventions. PMI will work with the PNL, GF and USAID-supported partners to coordinate support for improved MIP activities over the course of the Initiative, including increased advocacy for reduced or eliminated fees for recommended laboratory and diagnostic services for women who cannot afford to pay for these services.

Procurement of SP: (\$96,000) Global Fund Round 6 includes 2,436,802 SP treatments for IPTp over the next four years (about 609,000 doses/year), or about 1/2 of the need with an annual gap of about 591,000 doses. PMI will procure SP to fill this gap and work with UNICEF to quantify additional unmet needs for SP for IPTp to ensure universal coverage.

Systems strengthening for ANC: (\$605,000) PMI will work with the MOH and other partners to review the policy for the provision of free commodities (e.g. SP and LLINs) in order to find ways to implement this policy effectively without adversely affecting staffing and other service provision. PMI will also support a review of the policies related to specific commodities that incur fees (e.g. iron and folic acid) and consultation fees, potential effects on utilization of ANC services and possible opportunities to promote alternate sources of health financing (e.g. increased HIPC contributions to the health sector). In addition, PMI will help enforce the existing national policy for free provision of SP for IPTp through informative policy

dissemination workshops. An emphasis will also be placed on the revision of recommended treatment guidelines for MIP and improved treatment compliance.

PMI will work with partners to support training in the new in-service training module for comprehensive ANC, as well as the expansion of supportive supervision during the scale-up period of IPTp nationally which includes fixed and outreach services. In addition, 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.

BCC/IEC: (\$450,000) PMI will support a review of existing information on knowledge and perceptions related to MIP in Mali and the development of BCC/IEC messages to increase women's awareness of risks of malaria during pregnancy, promote attendance at ANCs, early use of IPTp in the 2nd trimester, completion of the recommended two treatments and demand for proper treatment of malaria in pregnancy. Based on the pilot work of several USAID-supported partners, additional *relais* and other community-based volunteers will be trained on these topics. Training will include the importance of sleeping under an ITN; in addition, there will be a focus on targeting men and key decision-makers in households as part of the strategy. In addition, PMI will link BCC/IEC activities with HIV/AIDS messaging where appropriate.

Logistics management: (\$50,000) The PPM is not equipped to ensure reliable transportation of commodities to the health center, PPM mandate in distribution and supply of commodities stops at the regional storage; therefore PMI will assist the PPM in strengthening the logistics and distribution system for SP and other MIP commodities. PMI and other partners will work to ensure that as the policy for free SP and LLINs is enforced, supplies are monitored routinely to avoid stock outs. This activity will complement other areas of logistics strengthening (e.g. ACTs, LLINs, etc.) in an integrated manner throughout the program.

INTERVENTIONS –CASE MANAGEMENT (INCLUDING DIAGNOSTICS)

Diagnosics

Current Status, Challenges and Needs:

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 600 FCFA (\$1.20) 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 survey of laboratory infrastructure and capacity was conducted with support from a private foundation in Bamako, Centre Charles Mérieux, 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. Additionally, the report highlighted human resource limitations and problems with the quality of reagents purchased for health facilities.

Although the Institute Nationale de Recherche en Sante 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. Training has not been conducted regularly due to insufficient funding. No established system for quality control of malaria diagnosis exists. 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 (microscopes, centrifuges, etc.) at the central level; however, most consumables (including Giemsa stain, slides, lancets, etc.) are procured at the regional or district level. The decentralized purchase of consumables significantly increases cost and results in the procurement of consumables of poor quality. The INRSP is currently working on a plan for centralized procurement of these items by the PPM.

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 the CSCOM and community health worker levels; however, the use of RDTs 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 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 under five at no cost; however, technical discussions with the PNLP suggest that policy changes are needed to reflect presumptive treatment of febrile children under five following IMCI guidelines, reserving RDT use for older children and adults. The MOH has not chosen a brand of RDT to use in health facilities but has permitted the use of Paracheck® by MSF and Optimal® by Save the Children in small operational research projects. Technical advisors appear to prefer pLDH-based tests, despite their relative heat-sensitivity when compared to HRP-2-based tests. No funds were granted in Global Fund Round 6 for laboratory training, equipment, purchase of RDTs, or quality control.

Proposed USG component: (\$580,000)

Malaria diagnosis in Mali is primarily made on clinical grounds. In order to strengthen microscopy services and improve malaria diagnosis, increased training, supervision, and quality control are needed. A national system of quality control for microscopy must be developed prior to widespread introduction of RDTs – to monitor the sensitivity and specificity of RDTs used in field conditions.

Procurement of laboratory consumables and RDTs: (\$220,000) PMI will procure additional microscopes and microscopy supplies to support laboratories in line with national norms which stipulate that all CSREF should offer lab services at all times. This includes 10 binocular microscopes, 50 EARL lights and 60 microscopy kits (slides, lancets, reagents, etc.); PMI will also provide technical assistance to INRSP, DPM, and PPM to establish a central procurement and distribution mechanism. PMI will also procure 120,000 RDTs for laboratory confirmation (microscopy or RDT) of all cases presenting to sentinel sites.

Training in lab diagnostics: (\$190,000) 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. This will include the following:

- Development and implementation of a plan for microscopy training among MOH laboratorians, including training for incoming laboratory workers and refresher training for current technicians;
- 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: (\$170,000) In addition to in-service training, PMI will develop and 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, challenges, and needs:

Because of rapidly increasing resistance to chloroquine, the national policy for the treatment of uncomplicated malaria was revised 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: AM-LU (co-formulated, each tablet contains 20 mg of AM and 120 mg of LUM). 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).

Despite these recent policy changes, ACTs have not been available in government health facilities. Currently, ACTs are available in the private sector at prices above 2000 CFA (\$4). NGO partners have made ACTs available in a few health facilities at a reduced cost, but mostly as small operational research projects. As examples, Save the Children worked with 12 health facilities in Kolondieba to provide ACTs at CSCOMs and in villages through *relais*, and MSF has also offered ACTs at 7 health facilities in Kangaba, including 6 CSCOMs and the district referral center of Kangaba. Save the Children noted that ACTs provided by *relais* were easily accessed by the community and were used with greater frequency than the ACTs at CSCOMs. MSF noted that the number of children receiving ACTs in health facilities doubled when fees were not charged. According to the 2006 DHS, 69.7% of children under five who were treated with an antimalarial in the two weeks prior to the survey received chloroquine. Caregivers also reported providing quinine, amodiaquine, and SP, but no ACTs were mentioned in the DHS due to limited distribution.

Access to and utilization of antimalarial treatment: The overwhelming issue with malaria treatment in Mali is poor geographic and economic access to care. According to the 2005 Annual Report from the SLIS, there are 753 CSCOMs in Mali. This translates into about 70% 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 31.4% of children under-five years of age with fever received any antimalarial, and only 15.1% 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. Since 1988, 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 “*caisse pharmaceutique*” project has provided malaria treatment through community health workers (*relais*) to 17,000 children over a 2-year period of time. UNICEF has

also supported the use of community health workers to deliver health messages and to encourage parents to bring ill children to health facilities, but not to deliver antimalarial treatment. Home based management of malaria with ACTs delivered by *relais* is not national policy; however, the GOM will review the results of two operational research projects to make an informed decision.

For those children who are able to reach a health facility, economic barriers may prevent timely treatment. The cost of malaria treatment in health facilities is very high due to the cost recovery system. A parent must pay a consultation fee in addition to purchasing medications if they bring their children to a health facility, whereas the medication could be purchased alone from a street vendor or pharmacy. This serves as a powerful economic disincentive to health facility use and home-based treatment with chloroquine is common. A recent decree by the MOH has stated that health care and ACTs should be provided free of charge to all children under five. This directive has not been followed in CSCOMs or CSREFs because drugs were not available and the cost of care remains high. Implementation of the directive has also been hampered by lack of ACTs.

Treatment of severe malaria: Traditional healers are often the first source of care for children with severe malaria – particularly those with seizures. Research from 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 injection or intravenous perfusion for cases of severe malaria. Parenteral quinine is changed to oral quinine as soon as patient can take oral medicines. 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 IV artesunate, IM artemether, and artemisinin suppositories are efficacious treatments that can be used for severe malaria. MSF is currently using IM artemether as a pre-referral treatment in 6 CSCOMs of Kangaba. 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 implicated in the referral system and have been involved in some operational research to improve the quality of pre-referral care.

National treatment guidelines recommend that all pregnant women with malaria be treated as severe cases with intravenous quinine. This policy should be updated to 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. Intravenous quinine (any trimester) or intravenous artesunate (second and third trimesters) could be utilized for the treatment of severe malaria in pregnancy.

Quantification of ACT needs: Global Fund Round 6 has committed \$4.3 million for financing ACTs in Mali from 2007-2009. The award includes \$1.45 million for the purchase of ACTs in 2008, but it does not include mechanisms to strengthen the capacity of the PPM to store or transport ACTs, BCC/IEC, pre- and post-market drug quality monitoring, or pharmacovigilance. Quantification of ACT needs for 2007-2009 was based upon 2005 health facility usage data which 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 problems discussed earlier. Revised estimates of the ACT need for 2008 are presented in the table below.

Age Group	ACT estimates for 2008	Global Fund for 2008	Gap in treatment courses	Cost to fill gap
<1-6 years	732,102	749,844	0	-
7-13 years	126,907	127,501	0	-
>13 years	553,912	557,407	0	-

Assumptions of ACT estimates for 2008 include: 40% 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 pregnant 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 under five 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 an essential extension of the health facility. Additional purchase of ACTs will be necessary to cover community-based treatment if it is adopted as national policy.

Supply system: Medicines for Mali's primary health care system are managed through the Pharmacie Populaire du Mali (PPM). The PPM procures drugs through international tender invitation 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 or health center level. 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, private pharmaceutical warehouses can fill orders. There are significant problems with drug storage at district pharmaceutical depots in terms of storage capacity, humidity, security and drug classification in the warehouse. CSCOMs must collect all required drugs from the district pharmaceutical depots and there is no central funding to support this mechanism.

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 relatively small (about 800 samples) and relatively few of these are post-market analyses of antimalarial drugs. In 2004, a plan was created to test products from 2-3 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. 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 taken place yet due to lack of funding.

Proposed USG component: (\$3,648,100)

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 PNL, given the country's poor access to health care, recent transition to ACTs, and the need for behavioral change among patients and health workers. The complexity of ACT implementation should not be underestimated with the short shelf-life of AS-AQ (18-24 months), and the high levels of coverage that need to be attained. Availability of ACTs is a high priority both for the PNL 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 are available to more peripheral health facilities, a review of existing training and IEC materials related to malaria case management in general and ACTs specifically will be needed and additional support provided to the MOH in training health workers and disseminating health messages about the new treatment policy.

Training/supervision for case management: (\$862,100) PMI will support in-service training and supportive supervision of health workers in the public and private sectors to ensure good ACT prescribing and dispensing practices in coordination with PNL. 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. These treatments are approved by Mali's DPM but have not previously been available in MOH facilities. Technical assistance will also be provided through CDC for the introduction of artesunate products for the treatment of severe malaria.

Community ACT compliance and distribution: (\$550,000) In order to ensure that care takers are adhering to the new formulation for treatment of malaria, PMI will support training and supervision of community *relais* to monitor ACT treatment compliance at the community level throughout the country. Also, in order to continue and scale up (including advocacy at the national level) community based distribution of ACTs, PMI will support the expansion of community-based ACT distribution in three districts.

Procurement of ACTs and severe malaria drugs: (\$1,086,000) PMI will procure supplies of AS-AQ to support community-based ACT distribution, pre-position stock in northern regions for epidemic preparedness, and to ensure adequate coverage of children under five with ACTs following implementation of the free treatment policy. PMI will also procure drugs for the management of severe malaria, including injectable artemether, rectal artesunate, oral quinine, and diazepam (for the treatment of convulsions related to severe malaria).

BCC/IEC/Advocacy for case management: (\$550,000) PMI will support multi-channel communication messages (e.g. mass media, interpersonal communication) that promote care-seeking for febrile children and compliance with treatment regimens. In addition, PMI will support national level advocacy to ensure acceptance of the new treatment regimen. PMI will also support activities that encourage prompt referral of severe malaria in children among caregivers, traditional healers, and private practitioners.

Logistics/distribution strengthening: (\$200,000) PMI will help to facilitate distribution of PMI-funded ACTs and provide technical assistance for pharmaceutical management system strengthening activities, including possible distribution to the district level and improved coordination between the PNL and PPM.

Drug quality control and pharmacovigilance: (\$400,000) PMI will 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.

INTERVENTIONS – EPIDEMIC SURVEILLANCE AND RESPONSE

Current Status, Challenges and Needs:

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 Cercles of Mopti, Segou and Koulikoro, and Kayes Regions; an estimated three million Malians are at risk.

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 increased 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 have not been followed for a sufficiently long period (needs more than 10 years of study) to develop a viable model for predicting epidemics.

The PNL strategic plans 2001-2005 and 2007-2011 included the goal of implementing a system of surveillance, prevention/detection and response to malaria epidemics. The objectives were to detect 80% of the episodes in the two weeks following their appearance and to control 80% of

episodes within two following 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 proposed Plan d'Acceleration des activités de Lutte contre le Paludisme nor in the Global Fund Round 6 budget.

The Roll Back Malaria Sahel project provided \$60,000 over a three-year period (ended 12/2006) 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 three regions in the north of Mali. Much of these funds were 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 thus data is not collected frequently enough for epidemic detection and response. The WHO-supported Surveillance Intégrée de la Maladie et de Riposte (SIMR), implemented in 2003, collects weekly data on diseases with potential for epidemics. Malaria data collection in this system is limited to the three regions of the north and is collected in the following manner: The previous week's data are reported from the CSCOMs to the CSREFs where they are combined and reported to the Regional and then National level to the DNS, DPLM and WHO. The transmission of the data is via radio phones which are powered by solar panels in each CSCOM and only CSCOMs equipped with radio phones report cases to the CSREF (J.O Guintran, pers. comm.).

A technical guide for detection and response to malaria epidemics is slated to be written in 2007, and thus, PNLP has not made recommendations for calculating the epidemic threshold. 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.

Proposed USG Activities: (Costs covered under IRS and Case Management)

PMI will provide assistance for pre-positioning of ACTs (\$50,000) and IRS supplies (\$50,000) for epidemic surveillance and response in the North. These supplies and equipment will be kept at a centralized location and use will be limited to epidemic response. Supplies with expiration dates will be rotated out annually to ensure use before expiration date.

HIV/AIDS and MALARIA

Current status, challenges and needs:

There are an estimated 80,000 to 140,000 PLWHA in Mali, and approximately 10,000 are receiving antiretroviral therapy (ART). 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 PMTCT, 39 sites providing voluntary testing and counseling, and 24 sites providing ART to PLWHA. Cotrimoxazole is provided to all PLWHA

on ART. 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 PNLN 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.

Proposed USG component: (Costs covered under LLINs, MIP and sentinel surveillance)

PMI will 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. Finally, 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).

CAPACITY BUILDING WITHIN NATIONAL MALARIA CONTROL PROGRAM

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 throughout the country.

At the national level, the PNLN is comprised of 15 staff with one Coordinator, five medical doctors, three '*technicians superieurs*', an anthropologist, an entomologist, a communications specialist and logistician who deals mainly with ITNs, as well as support staff. The organizational structure of the PNLN is not formally defined, and its current placement within the MOH is being reviewed. This situation has resulted in an increased workload for the National Coordinator, who must handle most requests and work through various MOH channels to implement activities. Entomological capacity is fairly strong both within the MOH (the PNLN and the DHPS), as well as at such institutes as the University of Bamako's Medical School and the Malaria Research and Training Center. The NIH-supported MRTN has over 50 laboratory scientists, epidemiologists, and entomologists, including 10 principal investigators, and is carrying out research projects with various institutions including US NIH, University of California Los Angeles, University of California Davis, Johns Hopkins and Tulane University.

Regional health teams (including technical and administrative supervision) are headed by a regional director who oversees implementation of integrated health interventions. A malaria focal person may exist in some regional teams, but this is not the case everywhere. The district health center (CSREF) is the first referral structure for CSCOMs; the district health team (Equipe Socio-sanitaire du Cercle) is headed by a district medical chief (Medecin Chef de Cercle) responsible for technical supervision of CSCOMs. Community health associations (ASACO) manage CSCOM staff and operations, collect proceeds from drugs sales, consultation and user fees, and pay salaries and other expenses. Some government municipalities cover salaries for nurses and health assistants. As is the case at the central level, the distribution of staff is uneven; the percentage of CSCOMs headed by a certified head nurse for at least 2 years ranged from 30% in remote Gao Region to 100% in Bamako in 2005. The number of staff employed may depend on the level of community resources to pay them.

Given that over 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 is supposed to have two *relais* trained by CSCOM staff and supervised by the ASACO. They have been trained 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. Concerns have been raised that they lack well-defined roles, are overwhelmed by their malaria and other health duties given their volunteer status, and are hard to keep trained, supervised and motivated.

The quality, completeness and frequency of malaria-specific supervision are unclear, and there is little or no funding for visits below the district level. In principle, national-level health teams supervise general health activities in regions semi-annually, with quarterly visits organized from 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. The only malaria-specific supervision is performed irregularly by national and regional teams. This may not meet the technical needs of a program about to be scaled up rapidly.

Proposed USG component: (\$160,000; additional costs covered in other sections)

To help the PNLN reach its coverage targets for the key malaria interventions, the PMI will collaborate with other partners to strengthen the capacity of PNLN staff and others at the national, regional, district and community levels to plan, implement, supervise, monitor and evaluate malaria prevention and control activities. In addition, PMI will work with the MOH and partners to help identify additional staffing resources to support the PNLN's activities.

In FY 2008, PMI will place two senior technical experts from USAID and CDC and one senior Foreign Service national in country to assist with malaria activities. Two of the three assignees will occupy working space in or near the PNLN offices to ensure close contact and maximum opportunity for building technical, managerial, and logistic capacity. This will also allow them to coordinate effectively with other parts of the MOH and various Government of Mali entities that impact malaria control activities (such as those in education and finance), along with representatives of other partners such as WHO and UNICEF that assist the PNLN.

Key contributions will be made in training health workers and developing and strengthening capacity for supportive supervision. Support for training will include pre-service, in-service and refresher training of health workers in case management, laboratory diagnosis, IPTp, IRS, commodity logistics, and effective patient communications. In its first year, PMI will focus its assistance on malaria-specific rather than integrated supervision, given the demands for supervising rapid scale-up of new interventions, such as IPTp, through ANC in both fixed and outreach settings.

At the community level, PMI will assist the MOH to review the impact of free malaria-related commodity distribution on local funding of health staff, and explore options to ensure minimal staffing levels at CSCOMs. PMI will also advocate for HIPC and other funding sources to complement salary support generated by communities. Joining efforts with Voix du Mali and other partners, PMI will help improved the skills of and expand the number of community-based volunteer workers (including *relais*) to mobilize populations for proper use of ITNs and prompt referral to health facilities for appropriate care. In particular, PMI will 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.

Health financing/policy implementation: (\$100,000) The GOM made several decisions regarding commodities that will have a potential effect on financing for the health system, including free LLINs and ACTs to pregnant women and children under-5 respectively. PMI will work with the MOH, PNLN and other partners to review the impact of changes in health financing structures and assist in the roll-out and implementation of appropriate policies as necessary for health financing.

IEC to the Ministry of Social Development: (\$60,000) PMI will work closely with the Ministry of Social Development through its various activities related to BCC/IEC for case management, LLIN distribution and IRS to ensure a coordinated plan for implementation.

COMMUNICATION AND COORDINATION

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

First established in 1993, the PNLN's mandate is to propose policies and guidelines, draft strategies for malaria interventions, and support decentralized regional and district health teams through training and supervision to implement malaria prevention and control measures. PNLN calls and facilitates meetings on a monthly basis or as needed to engage partners. Starting in January 2007, the DNS/PNLN instituted weekly meetings of malaria partners to discuss and share the latest global and national developments in malaria control. One of the outcomes of these weekly 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, operations research, monitoring and evaluation, and capacity building. The results from the working groups are being finalized into one document to be made available to all malaria partners in Mali by the end of April 2007.

The PTF was started with the adoption of the ten-year strategic plan for the health sector wide approach known in Mali as the "Plan Décennal de Développement Social et Sanitaire" (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 example of PTF coordination is the discussion underway on procurement of nets for vulnerable groups.

The CCM was first established in 2002 but was not performing 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 public sector, four from civil society, four from private sector, and four representatives from the donor community. The CCM holds regular meetings every quarter and can call special meetings as needed. The CCM chairperson and deputy chair are elected for one year term that can be extended only one time. Government staff and other partners interviewed by the assessment team felt that the CCM current level of operations and membership involvement are excellent.

Proposed USG component: (no additional cost to PMI)

PMI will fully participate in and facilitate existing communication and coordination mechanisms to ensure that PMI activities reflect PNLN priorities and complement other partners' inputs. For example, PMI's support for a comprehensive monitoring and evaluation plan, with a single list of process and coverage indicators and standardized data collection methodologies, will both benefit and contribute to these existing coordination mechanisms. In addition, PMI support will be implemented within the framework of the PRODESS in line with the malaria control five year strategic plan.

In addition to other major malaria control partners (GFATM, WHO, UNICEF, World Bank, USAID and other bilateral cooperatives), malaria control partners currently active in Mali include: (1) Government Ministries of Health, Finance, Social Development, Women and Family, and Education, including the MRTN in the School of Medicine; (2) civil society and the private sector including national and international NGO, and for-profit anti-malarial drug and bed net sellers. Groupe Pivot Santé and the National Federation of Community Health Associations (FENASCOM) represent most active NGOs. International NGOs and other USAID cooperating agencies are also active partners.

PRIVATE SECTOR PARTNERSHIPS

At this time, the only public-private partnership involved in malaria control in Mali is the Sanofi-Aventis subsidized distribution of Arsucam through private pharmacies in Bamako and other urban areas described in the case management section.

MONITORING AND EVALUATION AND MALARIA SURVEILLANCE

The Ministry of Health's Planning and Statistical Unit (Cellule de Planification et de Statistique - CPS) oversees all monitoring and evaluation (M&E) activities, in close collaboration with health training and research institutions. Activities are developed and implemented within the framework of the PRODESS sector-wide planning and monitoring process. Since the PNLN operates within the PRODESS context, it has not yet developed its own detailed M&E plan. The

national malaria policy and strategic plan did define indicators based on WHO guidelines. However, the two sets of indicators are framed under two different perspectives. The PNLP vision for M&E largely comprises supervisory activities for monitoring along with periodic household surveys for evaluation. The strategic plan reflects this approach; for M&E, it proposes supervisory visits conducted every 6 months at the national and regional levels, and quarterly from the districts; revision of supervisory tools to incorporate all relevant indicators; reporting by supervisors; and an internal mid-term review and final external evaluation. The data collection methods proposed for these activities need to be assessed for appropriateness and feasibility.

For routine reporting through the national health information system (SLIS), districts compile data on malaria cases and deaths provided by the CSCOM on a quarterly basis, and the regional health information technicians summarize data for the region and submit it to the SLIS. The data clerk at the SLIS office in Bamako enters the data and documents any inconsistencies. About half of the reports from the CSCOM reach the national level within the 45-day standard set by the SLIS. Overall, the SLIS notes a 96% rate of completeness of reporting. The SLIS summarizes data down to the district level. Data collection tools are integrated, and newly-developed tools at the CSCOM and district levels collect similar information on malaria case management, IPTp, the quantities of ITNs distributed to pregnant women and children <5 years of age, and the number of blood transfusions given. Because of PNLP's position within the MOH, it cannot access SLIS information from reporting sites until the SLIS completes its annual statistical summary. This data is not available in a timely fashion for decision making.

Malaria is also one of 22 epidemic-prone and priority communicable diseases that health facilities must report weekly to the national level as part of the WHO-supported Surveillance Intégrée de la Maladie et la Riposte (SIMR) reporting system. Malaria is only epidemic-prone in the three Northern regions (Tombouctou, Gao and Kidal), so the SIMR system only collects malaria incidence from the North. Information on other epidemic-prone and priority communicable diseases is collected from all regions and Bamako. This information is disseminated in a weekly bulletin from the DNS.

In 2000, the MOH designated 10 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 10 sites by transmission zone were: Soudan zone (Yanfolila, Kita, Kolondieba, and Bougouni); Sahelian zone (Bandiagara, Djenné); Saharan zone: (CSREF Gao); flood zone (Niono, Sélingué); and urban/peri-urban zone (Sirakoro Méguetan in Bamako). The Belgian Cooperation and WHO each funded 5 sites initially. Selection criteria included: representing a distinct transmission zone; having previously served as a sentinel site for drug sensitivity and vector resistance; past reporting performance; status of equipment; and staff skills and interest. Each site was supposed to have a laboratory with a microscope, with reporting managed by the CSREF health information manager. In practice, the system proved inadequate for providing timely data for action. Sentinel site reports must pass through each level of the health system, in parallel to the existing SLIS. The sites therefore have generally served for specific research purposes only. In 2006, WHO financed two additional sentinel sites in the north, at Kabara (near Tombouctou) and Bourem Sidi Amar (Cercle de Diré) primarily for epidemic reporting. The PNLP has not incorporated these 2 sites into their regular

sentinel system, and WHO has discontinued funding the original 10 sites. Currently, no routine data on malaria morbidity and mortality are collected outside of the SLIS's regular quarterly reporting system and the weekly SIMR reporting in the three epidemic-prone Northern regions.

Funding for malaria-related M&E is very limited. Of the approximately \$2.5 million budgeted for these activities in the strategic plan, about \$150,000 was requested for equipping and supervising the 10 sentinel sites. The Global Fund Round 6 has proposed to provide \$60,000 for sentinel site surveillance. WHO allocated \$22,000 in its 2006-2007 biennium budget covering supervision, monitoring of sentinel sites and epidemic response systems, and a small survey on malaria morbidity and mortality and use of bednets conducted to help prepare the new strategic plan.

Proposed USG component: (\$888,600)

PMI with partners can play a major role in helping the PNLN establish a comprehensive vision and plan for monitoring and evaluation of malaria activities. The evaluation approaches defined will provide essential data to measure national coverage and process indicators. PMI will build upon the PNLN's existing proposed activities within the PRODESS framework, and ensure that PMI's M&E approach complements that of other partners.

Development and Implementation of M&E plan: (\$154,200) In calendar year 2007, the PNLN's status within the MOH will likely change, and development of a comprehensive M&E plan for the national program will be timed accordingly. PMI will help build upon a consensus obtained among MOH staff and partners to implement this plan. This will include a single list of process and coverage indicators and data collection methodologies that will serve PNLN needs, respond to PMI and other major donors' reporting requirements, and reflect RBM recommendations. Support will also be provided for annual programming and planning through the MOH and PNLN.

The results of the 2006 DHS (with malaria module and anemia survey) will serve as the baseline coverage measures for PMI, thus no support for nation-wide household surveys is anticipated in Year 1. PMI will fund a Malaria Indicator Survey (MIS) or similar survey in Year 2 if the PNLN includes this in its comprehensive monitoring and evaluation plan.

Strengthening of SLIS: (200,000) PMI will also work with the SLIS to assess needs for improving the timeliness of malaria program reporting, explore opportunities for collaborating with EPI for reporting, provide training and quality control for completion of routine SLIS reporting forms, assist in analysis and quarterly feedback reports on malaria indicators, and promote use of findings at all levels to improve program performance. In addition, PMI will request that the MOH include stockouts of ACTs in the SIMR (Integrated Disease Surveillance and Response –IDSR) weekly reports to assist in the routine management of ACT stock.

Sentinel site strengthening: (\$300,000) PMI will assist the PNLN and partners (including MRTN and the INRSP) to make the existing 10 sentinel sites viable and sustainable as "centers of excellence for malaria diagnosis". PMI will 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 malaria case counts each month to show trends over time. The sites will provide laboratory diagnosis (microscopy and/or RDTs if applicable) for every case with fever. RDTs will be used for diagnosis at regular intervals to maintain competency in RDT quality control and will be used when the laboratory personnel at the sentinel sites are unavailable to perform microscopy. The sentinel sites will serve as regional reference centers for quality control of microscopy and RDTs. In addition, the 10 sentinel sites will serve as settings for monitoring the frequency of anemia and blood transfusions in different age groups, the number of laboratory-confirmed malaria cases in different age groups, the number of laboratory-confirmed inpatient cases of malaria in children under five, the number of cases of severe malaria, the number of malaria-related deaths in children under five, anemia and provide quality control for microscopy and RDTs.

PMI can also collaborate with PNLP and MRTC to support monitoring of vector resistance in FY08. Mosquitoes will be collected for insecticide susceptibility testing for the four classes of insecticides in sentinel sites at the time of peak mosquito activity in August and September. In addition, cone assays for insecticidal activity of ITNs will be done on a select number of nets at each sentinel site once per year. As part of this process, PMI will help develop protocols for sentinel surveillance, streamline current reporting structures and practices, and conduct an inventory to assess training and equipment.

On-going TA for M&E: (\$200,000) PMI will support the assignment of a contracted technical expert to work directly with the PNLP and partners on sentinel surveillance. At the end of Year 1, the PNLP with PMI support will then assess the feasibility to expand the number of sentinel sites in subsequent years. Additionally, a contracted clerical staff member will be seconded to PNLP to track commodities from PMI and other partners.

Evaluation of the EPI contact method: (\$34,400) The Expanded Programme on Immunization (EPI) contact method is a promising strategy for PMI, national malaria control programs and partners that could serve as both an intervention to increase ITN use and a monitoring tool to assess ITN coverage. This method involves the addition of several brief questions about ITN use and the treatment of febrile illness to the standard health-facility EPI reporting form. It could provide more locally-relevant data with greater frequency to guide district and facility-level malaria program planning and implementation, compared with the large-scale household surveys that are the current gold standard for assessing rates of ITN use and appropriate malaria treatment. The method also has the potential to serve as an intervention that could impact malaria treatment and prevention at a variety of different levels. However, additional research is required to assess both the validity of this method as a monitoring tool and its effectiveness as an intervention. PMI will support an operational research project to evaluate the EPI contact method.

STAFFING AND ADMINISTRATION

Two new health professionals will be hired to oversee the PMI in Mali, one representing CDC and one representing USAID. In addition, one or more FSNs will be hired to support the PMI team. 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 will share 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. Candidates for these positions will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

It is envisioned that these two 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. Both staff members will report to the USAID Mission Director or his/her designee. 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 GFATM, World Bank, and the private sector. The USAID and DCD professional staff will attend the annual PMI Africa retreat to be held in conjunction with the USAID Africa state-of-the-art (SOTA) conference, scheduled for March 2008.

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.

ANNEXES

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Annex 2: Multi-Year Country Strategy and Plan

Table 2

**President's Malaria Initiative – Mali
Planned Obligations for FY08 (\$15,000,000)**

Proposed Activity	Mechanism	Budget (commodities)	Geographic Area	Description of Activity **Lead implementing mechanism	Page Number Reference
PREVENTIVE ACTIVITIES					
LLIN Procurement	DELIVER	3,996,000 (3,996,000)	Nationwide	Procurement of 660,000 LLINS for routine distribution and campaign support and PLWHAs; branding of LLINs for free distribution	16
Distribution of LLINs	New Procurement MOH PNLP MOH EPI CDC IAA	900,000 30,000 20,000 12,100	Nationwide; specific regions	Distribution of LLINs for pregnant women and children under-1 to support routine coverage; strengthening distribution system. Rolling phased approach around bi-annual (e.g. May/December) campaigns to increase coverage of children under-5; evaluation of post-campaign. PNLP—supervision; PPM—forecasting and planning (MOH PNLP + EPI) Campaign support; technical assistance from CDC for LLIN campaign (CDC IAA)	16
LLIN logistics strengthening	SPS	200,000	Nationwide	Strengthening logistics and management (e.g. warehouses, trucks, etc.)	16/17
BCC/IEC	New procurement	350,000	Nationwide	BCC/IEC to increase coverage, advocacy for LLIN use, correct utilization Data collection on utilization rates, preferences etc. for LLINs; KAP surveys	17
Re-treatment kits	New procurement	250,000 (200,000)	Nationwide	Procurement of a limited supply of KO Tab 123 for	17

				Distribution during Intensive Nutrition Activities weeks and distribution through relais. Targeted BCC/IEC messages for re-treatment and the importance of LLINs.	
Indoor Residual Spraying	RTI** CDC IAA	1,300,000 (430,000) 24,200	1-2 districts (400k population)	Procurement of IRS equipment (insecticide, sprayers, etc.) PERSUAP, policy guidelines (WHOPES insecticide, etc.) training, implementation, data collection, protocols, guidelines, IEC/BCC, logistics support for July/August 2008 spraying.(RTI) Technical assistance for spraying/entomological assessment (CDC IAA)	19
Larviciding	RTI** NIH	70,000 40,000 (20,000)	Subset of 1 district	Larviciding following the rainy season	19
Expansion of IRS near river	NIH	80,000 (50,000)	5-10 villages	Expansion of targeted IRS/ larval control along river edge during the dry season to reduce mosquito numbers during the rainy season to retard and decrease malaria transmission peak for entomologic and parasitologic impact.	19
IRS for Epidemic Surveillance and Response	RTI	50,000 (50,000)	3 Northern Regions	Procurement of IRS supplies for epidemic surveillance and response	20
Entomological Monitoring	NIH	100,000	1-2 districts (400k population)	Support for entomological monitoring associated with IRS	20
SUBTOTAL: Preventive		7,422,300			

MALARIA IN PREGNANCY					
SP procurement	DELIVER	96,000 (96,000)	Nationwide	Procurement of SP for 2008	21
Systems strengthening for ANC	New** procurement MOH DSR	555,000 50,000	Nationwide	Support for supportive supervision (including to NGOs/FBOs), specifically for malaria focused supervision, during transition period for scale-up of national program, including fixed and outreach.	21
BCC/IEC/advocacy for increased ANC	HPI New** procurement	150,000 300,000	Nationwide	BCC/IEC; targeting groups for increased uptake of messages	22
Logistics/ management for MIP commodities	SPS	50,000	Nationwide	Strengthening logistics/distribution system	22
SUBTOTAL: Malaria in Pregnancy		1,201,000			
CASE MANAGEMENT (INCLUDING DIAGNOSTICS)					
Procurement of laboratory consumables and RDTs	DELIVER	220,000 (193,500)	Nationwide	Procurement of Giemsa, slides, lancets, EarL lights, microscopes, etc. (73,500); Procurement of RDTs for 10 sentinel sites (120k); TA to INRSP for laboratory consumable procurement	23
Training in lab diagnostics	NIH Diagnostic RFA**	40,000 150,000	Nationwide	In collaboration with Lab Diagnostic RFA, Support to semi-annual regional training of laboratory personnel, development and implementation of job aides/training materials for laboratory technicians, support supervision and on-the-job refresher training; Review of current training for laboratory personnel; support to curriculum	24

				revision/updating for laboratory training programs for pre-service training in lab diagnostics and case management	
Quality assurance/Quality control for diagnostics	Diagnostic RFA** MOH INRSP	120,000 50,000	Nationwide	Support to LNS and INRSP in strengthening malaria diagnosis and establishing a system of quality control, especially for microscopy, assist in the development and implementation of a plan for quality control of RDTs.	24
ACT training and supervision for case management	New** procurement MOH PNLP CDC IAA	700,000 150,000 12,100	Nationwide	Support supervision/refresher training of CSREF/CSCOM use of ACTs including supplemental materials (e.g. job aids) for treatment compliance and proper instruction to the caretaker for use(New Procurement); Support for training/supervision (e.g. job aides) at the CSCOM and CSREF level for management of severe malaria(MOH PNLP); Technical assistance for severe malaria (CDC IAA)	28
Community ACT compliance and distribution of ACTs	New** procurement SCF/USA	300,000 250,000	Nationwide; 3 districts	Compliance monitoring by community <i>relais</i> for ACT treatment(New Procurement); support scale up of from 1 district to 3 of SCF/USA community-based treatment project, including application of lessons learned from initial pilot study(SCF/USA)	28
ACT Procurement for HBMF, CSCOMs and epidemic response	DELIVER	1,086,000 (1,086,000)	Nationwide	ACT procurement for SCF/USA scale up of HBMF, CSCOMs and epidemic surveillance and response (3 northern regions, pre-positioning); procurement of injectable artemether, rectal artesunate, oral quinine, injectable and rectal diazepam (200k)	29
BCC/IEC/Advocacy for case management	HPI New** procurement	100,000 450,000	Nationwide	Support for a multi-channel communications strategy to encourage caregivers to bring febrile children immediately to health facilities for treatment and compliance with treatment; Support for activities that encourage prompt referral of severe malaria and seizures in children among caregivers, traditional healers, private practitioners, etc.	29

Logistics/distribution strengthening	SPS** MOH PPM	150,000 50,000	Nationwide	Reinforcement of PPM for storage and transport of ACTs, expand the capacity of distribution services, possibly to the CSCOM level	29
Drug quality control and pharmacovigilance	US** Pharmacopeia MOH LNS SPS MOH DPM	250,000 (100,000) 50,000 50,000 50,000	Nationwide	Technical support for quality control to LNS for pre- and post- market quality of ACTs (e.g. testing, laboratory equipment procurement)(US Pharmacopeia + MOH LNS); Support development and implementation of a pharmacovigilance plan through DPM(SPS + MOH DPM)	29
SUBTOTAL: Case Mgmt.		4,228,100			
MONITORING AND EVALUATION AND MALARIA SURVEILLANCE					
Development and implementation of M&E plan	New** procurement MOH PNLP CDC IAA	100,000 30,000 24,200	Nationwide	Support to the implementation of the comprehensive M&E plan with a single list of process and coverage indicators and data collection methodologies for PMI implementation and data for decision making(New Procurement); Support for annual programming and planning through the MOH and PNLP(MOH PNLP); Technical assistance for M&E (CDC IAA)	36
Strengthening of SLIS	New Procurement	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.	36
Strengthening of 10 sentinel surveillance sites	New** procurement NIH DELIVER	175,000 100,000 25,000 (25,000)	10 sentinel sites	Support to create "diagnostic centers of excellence" for the 10 sentinel sites (including resistance testing) (NIH). This includes an inventory of existing capacity and technical and financial support to equip sites and strengthen human resource capacity (New Procurement). Procurement of consumables for sentinel sites(DELIVER)	36

Ongoing TA for M&E support	New procurement	200,000	Nationwide	Direct technical assistance to the PNLN and partners on sentinel surveillance, assessment for the feasibility of sentinel site expansion, support through a seconded staff member to PNLN to track commodities from PMI and other partners.	37
Evaluation of the EPI contact method	CDC IAA	34,400		Support operational research to evaluate the EPI contact method.	37
SUBTOTAL: M&E		\$888,600			
IN-COUNTRY MANAGEMENT AND ADMINISTRATION					
In-country staff; Admin. Expenses	CDC	710,000	Nationwide	Salaries, benefits of in-country PMI staff (1), Africa retreat	37/8
In-country staff; Admin. expenses	USAID	390,000	Nationwide	Salaries, benefits of in-country PMI staff (1 PSC/1 FSN), support staff (1 FSN), vehicle, Africa retreat	37/8
SUBTOTAL: Mgmt. and Admin.		1.1 million			
OTHER					
Health financing/policy implementation	New procurement	100,000	Nationwide	Support to roll-out and implementation of policy for health financing	33
IEC to Ministry of Social Development	MOH MDSPA	60,000	Nationwide	Support for IEC for malaria activities in collaboration with other partners	33
SUBTOTAL: Other					
GRAND TOTAL		160,000 15,000,000	Commodities represent 46 % of total budget		

Table 3
Mali – Year 1 Targets
Assumptions and Estimated Year 1 Coverage Levels

Year 1 PMI Expected Results:

Prevention:

- Approximately 2 million long-lasting ITNs (LLINs) (of which PMI will provide 660,000) will have been distributed to children under five and pregnant women;
- Approximately 86,000 houses, housing 430,000 residents, in 2 districts targeted by the MOH and PMI for IRS will have been sprayed ; and
- Intermittent preventive treatment with SP in pregnant women will have been implemented in all health facilities (providing IPTp coverage to an estimated 40% of target population).

Treatment:

- Malaria treatment with ACTs will have been implemented in all government health facilities (covering an estimated 30% of Mali's total population).

Assumptions:

Population of country (estimated): 12,337,000

Pregnant women: 5 % of total population = 616,850 pregnant women

Infants (children <1): 4.7% of population = 575,000 infants (WHO estimate, 2005)

Children <5: 18% of population = 2,220,660 children under five

Average number of malaria-like illnesses per year and cost per treatment (costs given are for AS+AQ are inclusive of freight, insurance and overhead):

(18%) Children <5: 2.0 illnesses/year at \$0.61 each**

(31%) Older children 1.0 illnesses/year at \$0.98 each

(51%) Adult doses 0.5 illnesses/year at \$1.80 each (assume that the PMI will cover only one-third of adult episodes)

Cost of a LLIN (including distribution) = \$7.00 (including transport and BCC/IEC costs); average of 2.5 nets/household needed to cover all pregnant women and children under five in family

Cost of spraying a house with an average of 5 inhabitants = \$15.00

Inter-vention	Needs for 100% Nationwide Coverage over 3 Years*	Needs for 85% Nationwide Coverage over 3 Years*	Annual Needs to Achieve 100% Coverage	Needs to Achieve Year 1 PMI Targets	Year 1 Contributions
IPTp	616,850 pregnant women x 2 treatments/woman = 1,233,700 treatments/year x 3 years = 3,701,100 treatments	3,145,935 SP treatments	1,233,700 SP treatments	Target: 40 % of pregnant women receive 2 doses of IPT = 480,000 treatments	GF Rd 6 provides 2,436,802 tx over next four years or 609,000 doses/year; ½ of estimated need PMI provides 2,436,802 treatments for FY 08 to cover gap
ITNs	2.5 million households x 2.5 nets/household = 6,250,000 nets x 3 years = 18,750,000 LLINs	15,937,500 LLINs	6,250,000 LLINs	Target: 50% of children under 5 and pregnant women sleep under LLIN	UNICEF may cover gap GF Rd 6 provides 300,000 LLIN gap year 1 for 85% coverage of target groups: 1,447,210 PMI provides 660,000 for FY 08
ACTs – children < 5	2,220,660 children under 5 x 2 episodes/year = 4,441,320 treatments/year x 3 years = 13,323,960 treatments	11,325,366 treatments	4,441,320 treatments	Target: 30% of children under 5 receive ACTs = 1,320,000 treatments	GF Rd 6 provides 1.45 million for: <1-6 749,844 doses 7-13 127,501 doses >13 557,407 doses
ACTs – older children	3,824,470 older children x 1 episode/year = 3,824,470 treatments/year x 3 years = 11,473,410 treatments	9,752,399 treatments	3,824,470 treatments		PMI provides 886,000 doses for CSCOMs, ESR and community based distribution
ACTs - adults	6,291,870 adults x 0.5 episodes/year x 33% = 1,038,159 treatments/year x 3 years = 3,114,476 treatments	4,647,304 treatments	1,038,159 treatments		Assumes PMI will provide 33% of ACTs for adults
TOTAL	27,911,846 treatments	23,725,069 treatments	9,303,949 treatments		
IRS	IRS will not be implemented nationwide			Target: 85% of targeted houses to be sprayed 73,100 households to be	Year 1 will target 2 districts with a population of 430,000 430,000/ 5 per household =

				sprayed in Year 1	86,000 households
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Table 4**President's Malaria Initiative – Mali
Year 1 (FY08) Budget Breakdown by Intervention (\$15,000,000)**

Area	Commodities \$ (%)	Other \$ (%)	Total \$
Insecticide-treated Nets	4,646,000 (81)	1,112,100 (19)	5,758,100
Indoor Residual Spraying	550,000 (33)	1,114,200 (66)	1,664,200
Malaria in Pregnancy	96,000 (<1)	1,105,000 (>99)	1,201,000
Case Management	1,379,500 (33)	2,848,600 (67)	4,228,100
Monitoring and Evaluation and Malaria Surveillance	25,000 (<1)	863,600 (>99)	888,600
In-country Management and Administration	--	1,100,000 (100)	1,100,000
Other	--	160,000 (100)	160,000
Total	6,696,500 (46)	8,303,500 (54)	15,000,000

Table 5**Year 1 (FY08) Budget Breakdown by Partner (\$15 Million)**

Partner Organization	Geographic Area	Activity	Budget
MOH (PNLP, Hygiene, INRSP, MDSPA, DPM, DSR, EPI, PPM)	Nationwide	Case management, ITN, MIP, IRS, M&E	510,000
NIH	Nationwide	Case management, IRS, M&E	360,000
USAID/Mali	Nationwide	Case management, MIP, ITN, M&E, management/administration	5,512,100
USAID/W	Nationwide	Case management, IRS, ESR, MIP, ITN	7,800,900
CDC IAA	Nationwide	Case management, ITN, IRS, management/administration	817,000

ANNEX 2

Multi-Year Strategy and Plan: Mali

GOAL AND TARGETS OF THE PRESIDENT'S MALARIA INITIATIVE

By the end of the project, reduce malaria-related mortality in Mali by 50% when compared with pre-Initiative levels.

After three years of full implementation, the PMI will have provided resources to assist each country to attain the following targets in populations at risk for malaria:

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

PREVENTION ACTIVITIES

Control of malaria in pregnant women

PMI will support the prevention of malaria during pregnancy through interventions known to reduce the burden of MIP, especially the provision of SP and LLINs. At present, uptake of IPTp is limited by the fact that women come late for their first ANC visit, and do not attend the recommended number of visits. Year 1 activities will help increase uptake and increase awareness of the risks of malaria during pregnancy and perceived importance of these services among women. This includes SP procurement, systems strengthening and BCC/IEC for ANC.

Annual needs for SP are estimated at about 1.2 million doses and are currently provided through USAID and UNICEF. The support for IPTp is sufficient through the end of 2007 (estimated). In years 2 and 3 additional procurement of SP will be included as needed, as well as iron and folic acid tablets, other needs for treatment during pregnancy (oral quinine, ACTs) as referenced in case management section.

To improve the delivery of malaria prevention and treatment services for pregnant women, PMI will work to strengthen comprehensive ANC services. These activities will also strengthen other

services including PMTCT. PMI will support improving the quality of services, improved monitoring and evaluation of MIP activities and additional refresher training as needed for health workers in interventions related to MIP. Supporting integrated supervision of ANC services should help build district capacity, motivate staff and improve quality of ANC services – including IPTp and PMTCT.

Continued emphasis on IEC/BCC messages is essential to ensure that women and their families are aware of the risks of malaria during pregnancy, to promote early attendance at ANC and IPTp beginning early in the second trimester of pregnancy to complete the recommended two doses of SP, and to improve LLIN use during pregnancy.

Intermittent Preventive Treatment of Malaria in Infants (IPTi): IPTi is the delivery of an antimalarial drug (typically SP) to infants at the time of routine vaccination through the Expanded Program on Immunization (EPI). Pooled analysis of 6 trials of IPTi in Africa have demonstrated a 30% reduction in clinical malaria episodes in the first year of life, a 15% reduction in anemia, and a 38% reduction in hospitalization of infants with malaria parasitemia. However, WHO has not issued a policy statement on whether or not IPTi should be routinely implemented in malaria endemic countries. UNICEF and MRTC are collaborating in Mali on a trial of IPTi in the region of Koulikoro. The results of this investigation should be available in December 2007 or January 2008. This information will provide the PNLB with additional information on the effectiveness of IPTi in Mali and may result in the implementation of IPTi nationally. PMI will support the introduction of IPTi once the WHO position statement and/or policy decision from the MOH are finalized.

Insecticide-treated nets (ITNs)

PMI will continue working with partners to maintain high coverage of nets through various distribution channels and scaling up LLIN activities to achieve the objective of 85% ownership and use. In year 1 PMI will procure around 660,000 nets, support routine and campaign distribution to cover pregnant women and children under-5, as well as related BCC/IEC activities. In following years, PMI will continue to support the dual strategy to effectively reach national coverage. PMI will also explore options to help privatize the LLIN logistics system or create a parastatal organization to manage the distribution depending on the outcome of first year needs.

PMI will continue to support BCC/IEC activities to increase and maintain high coverage levels of LLIN use and focus on correct and consistent use. Targeted LLIN campaign strategies will take place in areas that are identified as low coverage, as well as review progress of integrated campaigns for improvements in delivery/coverage. An approach will be developed to effectively continue coverage of LLINs to the northern populations. PMI also will explore actual numbers of untreated nets for private sector, options for treating, and possible phase out of re-treatment kits and/or focusing on transition from KO Tab to KO Tab 123.

Indoor residual spraying (IRS)

Over the next three years, the focus for IRS activities will be on strengthening district-level capacity to implement spraying campaigns. By year two, recommendations made through the initial environmental assessment in year one will assist with formulating a strategy for IRS activities in the future. Pilot studies related to IRS near the river and larviciding during year one, as well as other PMI country approaches (e.g. IRS/ITN combinations) will be reviewed to plan and expand effective activities during the following years. In addition, the cost and frequency of IRS activities will determine the capacity and scale for expanded IRS activities over the next three years. PMI will work with PNLP and coordinate with other in-country malaria partners including MRTC, DHPS and GFATM to plan and potentially co-fund the next phasing of IRS activities to achieve broader national coverage. In addition, PMI will work to transfer technical and management skills to the DHPS and MRTC so that in subsequent years RTI can phase out. Districts targeted for IRS activities will continue to be chosen based on levels of malaria endemicity, LLIN, coverage, etc. PMI will also be continuing sentinel entomologic data collection and routine IRS monitoring.

CASE MANAGEMENT

The Three Year Strategy and Plan for PMI has been developed to support the PNLP's national strategic plan (2007–2011) to achieve a reduction of malaria mortality by at least 50 % as compared to year 2000 levels and to reduce by at least 85 % health facility recorded malaria case-fatality rates as compared to year 2005 levels.

In order to support the use of ACTs nationally, PMI will coordinate with other donors (such as GFATM) to purchase and supply ACTs to all health facilities and to communities with *relais* providing treatment if the MOH approves this strategy. During the first year, PMI plans to purchase injectable artemether and rectal artesunate for pre-referral treatment of severe malaria, as well as AS-AQ for use in scale-up of the community-based ACT treatment project currently led by Save the Children-USA. Continued advocacy for community-based treatment will be necessary to increase access to ACTs and to achieve targets for ACT use.

PMI will continue to support BCC/IEC for early care seeking practices and train private providers and traditional healers (and other healthcare providers) to encourage early referral and treatment of febrile illness. PMI will seek to harmonize with other child survival interventions.

PMI will support diagnosis and treatment of severe malaria including data collection to ensure accurate forecasting and supply of severe malaria drugs. Likewise, PMI will encourage prompt and effective treatment for malaria among pregnant women, and will continue support for the free SP policy for IPTp.

The three-year plan for reinforcing the laboratory diagnostic capacity for malaria will be to continue support for lab diagnostics refresher training, in-service training, and to develop a quality assurance plan for microscopy and RDTs. PMI will assist the INRSP in centralization of purchase and distribution of laboratory consumables. PMI will also review the lab equipment needs nationwide and assist with procurement/replacement with other donors and the MOH as necessary.

EPIDEMIC SURVEILLANCE AND RESPONSE

PMI will support the PNLP and other partners, mainly WHO, to ensure implementation of the epidemic surveillance and response (ESR) plan. In Year 1, PMI will support the purchase and pre-positioning of ACTs in the epidemic-prone Northern regions. PMI will also support a small supply of IRS products for use in epidemic response. PMI will continue to collaborate with the PNLP to improve the timely collection of surveillance data, and response to detected epidemics. PMI will also help support integration of unused commodities (e.g. ACTs) into the routine drug distribution system so that there is no issue regarding expiration of drugs.

MONITORING AND EVALUATION PLAN

PMI will continue to focus on capacity in order to strengthen the quality and timeliness of data collection from the districts, sentinel sites, partners, and other relevant sources. In order to accomplish this, support for M&E technical assistance to the PNLP will be essential component throughout all years of the PMI plan.

The use of currently collected, routine data from existing systems such as the SLIS and the introduction of monthly data collected from sentinel surveillance sites will be used for ongoing program monitoring and will continue through the subsequent years of PMI. PMI will fund a Malaria Indicator Survey (MIS) or similar survey in Year 2 if the PNLP includes this in its comprehensive monitoring and evaluation plan. Finally, discrete surveys or targeted evaluations related to PMI-funded activities (such as a KAP survey for ITN use) will be supported as needed.

PMI will support quality sentinel site routine monitoring, strengthening of the SLIS, annual partner review meeting for progress/process updates and PNLP planning meetings including all in-country partners to ensure a unified M&E plan and implementation.

SUSTAINABILITY PLAN

The three-year strategic plan for Mali is designed to begin addressing the complex issues of long-term sustainability and building national capacity over time. The PMI's framework for sustainability addresses several components: technical and management capacity, cost recovery/financial strengthening and human resources capacity focusing on supportive supervision.

The implementation of the PMI will result in the transfer of technical knowledge and skills to local partners including staff of the PNLP and other MOH departments, NGOs, community- and faith-based organizations, health workers, and private sector partners. PMI will continue its emphasis on training health workers and developing and strengthening capacity for supportive supervision through refresher training at all levels, as well as support malaria-specific supervision. Additional capacity building activities will be focused around sentinel site surveillance and laboratory diagnosis of malaria. PMI will ensure that other partners are involved such as WHO and UNICEF that assist the PNLP.

Under the Bamako Initiative, Mali has a strong system of cost recovery for service delivery related to commodities. Recent MOH policy changes promote free distribution of certain commodities including LLINs and ACTs. PMI will help carry out the implementation of recommendations from the MOH regarding the impact of free malaria-related commodity distribution on local funding of health staff. In addition, PMI will continue advocacy for HIPC and other funding sources to complement salary support generated by communities through a longer-term financial sustainability plan. As the role of community volunteers expands, PMI will support the use of *relais* and other community volunteers in conjunction with a strong supportive supervision system through the MOH structures as well as through NGO networks.

STAFFING AND ADMINISTRATION

Two new health professionals will be hired to oversee the PMI in Mali, one representing CDC and one representing USAID. In addition, one or more FSNs will be hired to support the PMI team. 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 will share 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. Candidates for these positions will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

It is envisioned that these two 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. Both staff members will report to the USAID Mission Director or his/her designee. 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 GFATM, 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.

Table 1**Timeline of Expected Coverage of Interventions - Mali**

Indicator	2006 Mali DHS (preliminary)	Year 1	Year 2	Year 3
Proportion of children under five years old with fever in the last 2 weeks who received treatment with an ACT within 24 hours of onset of fever.	N/A	30%	60%	85%
Proportion of women who have received two or more doses of IPTp during their last pregnancy in the last two years.	4.0%	20%	50%	85%
Proportion of households with at least one ITN	50%	70%	80%	85%
Proportion of pregnant women who slept under an ITN the previous night	29.1%	40%	65%	85%
Proportion of children under five who slept under an ITN the previous night	27.1%	40%	65%	85%
Proportion of targeted houses adequately sprayed with a residual insecticide in the last 12 months.	N/A	85%	85%	85%

Nationwide coverage of interventions will be measured on two occasions: (1) 2006 (baseline); and (2) at the end of 2011 (DHS).

Year one and year three coverage levels will be estimated on delivery of ACTs and IPTp treatments, distribution of ITNs and households protected by IRS.

Table 2**Illustrative 3-Year Budget and Expected Coverage Levels**

PMI Targets: After three years of full implementation, the PMI will achieve the following targets in populations at risk of malaria in Mali:

- i. 85% of children under five will have slept under an ITN the previous night;
- ii. 85% of pregnant women will have slept under an ITN the previous night;
- iii. 85% of pregnant women will have received two or more doses of SP for IPTp during their pregnancy;
- iv. 85% of houses targeted for indoor residual spraying will have been sprayed;
- v. 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 the onset of their symptoms.

Assumptions:

Population of Mali (estimated): 12.3 million persons

Pregnant women: 5% of total population = 616,850 pregnant women
 Children <5: 18% of population = 2,220,660 children under five
 Infants (children <1): 4.7% of population = 575,000 infants

Population of 3 Northern Regions with epidemic-prone malaria = approximately 1 million persons

Average number of persons per household = 5

Assume that 100% of total Malian population is at risk of malaria = 12.3 million persons

Average number of malaria-like illnesses per year and cost per treatment with AS-AQ:

Children <5: 2.0 febrile episodes/year (\$0.06 per treatment)

Older children/adults: 0.5 malaria illnesses/year at (assume average of \$1.34 per treatment)

Cost of IPTp with SP: \$0.16 (\$0.08 for up to three doses (\$0.02/dose) a woman receives during pregnancy)

Average household will require 2.5 ITNs to cover all children under five and pregnant women in the family

Cost of a long-lasting ITN = \$7.00 including transport and BCC/IEC costs

Costs per person for epidemic preparedness, implementation support and USG implementation costs were taken from a detailed cost analysis prepared for previous PMI countries.

Item/Activity	Annual Cost per Person	Annual Cost	3-Year Total	Assumptions/Comments
Prevention – insecticide-treated nets		\$12,750,000	\$38,250,000	12.3 million Population at risk of malaria = 2.5 million households x 2.5 nets/household x 85% coverage x \$6.00/net
Prevention – indoor residual spraying		\$ 1,540,000	\$ 9, 051,000	IRS will target a population of 431,000, or 86,200 households in year one at a cost of \$15 per household (approximate doubling of scale each year, and continuing efforts in previous year's districts)
Treatment – malarial illnesses		\$ 10,256,280	\$ 30,768,840	Children under-5: 2.2m x 2 episodes/year x 85%= 3.74 m x \$.061 = \$228,140; Older children: 3.8 m x 1 episode/year x 85% = 3.2 m x \$1.34 = 4.3m; Adults: 6.3 million adults x 0.5 episodes/year x 33% x 85% x \$1.34 = 1.2m
Treatment – IPT for pregnant women		\$ 83,892	\$ 251,675	616,850 pregnant women x \$0.16 per year x 85% coverage
Epidemic Preparedness	\$0.08	\$984,000	\$2,952,000	Based on detailed calculations from year-1 MOPs
Implementation Support	\$0.92	\$ 11,316,000	\$ 33,948,000	Commodity management, human resources, supervision, training, social mobilization, etc
Monitoring and Evaluation		\$988,600	\$2,965,800	Directly from Mali PMI M&E budget, assuming no cost sharing by other donors
Cost of Program			\$109,136,315	

USG Implementation Support Costs		\$1,100,000	\$3,300,000	Long-term expatriate advisors' salaries, benefits, travel; local staff; office supplies and equipment for PMI in-country office; TDY from CDC and USAID
Total funding needed (including USG program costs)			\$112,436,315	
Government of Mali malaria budget		\$1,000,000	\$3,000,000	GOM-approved fiscal year 2007 Operating Plan for the PRODESS this does not include staffing of the PNLP, which is funded separately.
GFATM 2-year approved funding		\$5,200,000	\$15,600,000	US\$26m for 5 years under GF round 6
Available funding from other sources			\$18,600,000	
PMI funds available (estimated):				Assumes PMI funding is divided between countries based roughly on their populations
Year 1		\$15,000,000		Assumes 15 PMI countries
Year 2		\$15,000,000		Assumes 15 PMI countries
Year 3		\$20,000,000		Assumes 15 PMI countries
Years 1 through 3			\$50,000,000	
Total Available funding			\$68,600,000	
Remaining Gap			\$43,836,315	3-year shortfall to meet total need