

PRESIDENT'S MALARIA INITIATIVE
NEEDS ASSESSMENT

MADAGASCAR

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3. EXECUTIVE SUMMARY

In December 2006, Madagascar was selected as one of eight countries to receive funding during the third year of the President's Malaria Initiative (PMI). The objective of this Initiative is to assist African countries, in collaboration with other partners, to rapidly scale up to 85% coverage of vulnerable groups with four highly effective interventions: artemisinin-based combination therapy (ACT), intermittent preventive treatment for malaria in pregnancy (IPTp), insecticide-treated mosquito nets (ITNs), and indoor spraying with residual insecticides (IRS).

As part of the planning process for the PMI in Madagascar, a team from the U.S. Agency for International Development (USAID), the Centers for Disease Control and Prevention (CDC), the World Health Organization (WHO), and the United Nations Children's Fund (UNICEF) worked with staff from the Service de Lutte contre le Paludisme (SLP) and the USAID/Madagascar Mission to conduct an assessment of the current status of malaria prevention and control activities in Madagascar and identify gaps and unmet needs. In addition, the team evaluated the feasibility and potential of a small number of high-impact activities that could be initiated during the first 3-6 months of the Initiative in Madagascar to launch the Initiative in the country.

Malaria is a major cause of morbidity and mortality in Madagascar and the government considers control of malaria one of its highest priorities. Madagascar is the recipient of three malaria grants with a total of \$53 million from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), most of which has been dispersed. With support from WHO, UNICEF, and other national and international partners, a scaling up of malaria prevention and control interventions has already started and considerable progress has been made.

The Ministry of Health and especially the SLP provided constant support to the team during the assessment. The team met on multiple occasions with partners from all the sectors who are either currently engaged in malaria program implementation, or that have an interest in malaria control, including representatives of various Ministries, staff from the country offices of multi- and bilateral agencies such as WHO, UNICEF, the World Bank, USAID, JICA, representatives of a number of private sector organizations, and representatives of 18 non-governmental organizations. The PMI is committed to supporting existing national malaria control strategies and plans and complementing the funding and efforts of other partners.

Areas identified by the assessment team as needing additional support and attention include:

1. Scaling-up nationwide coverage with ITNs through a variety of strategies adopted by the SLP;
2. Supporting well-organized IRS programs in areas targeted for IRS by the MOH;
3. Supporting effective scale up of IPTp through antenatal clinics;
4. Improving the quality of laboratory diagnosis of malaria and extending the use of rapid diagnostic tests to peripheral levels of the health system;
5. Supporting safe and effective treatment through implementation of ACTs nationwide including at the community level;
6. Strengthening the MOH's pharmaceutical and logistics management systems;
7. Scaling-up successful community mobilization models to promote appropriate malaria prevention and care;

8. Strengthening the monitoring and evaluation capacity of the SLP;

9. Building capacity within the SLP and other departments of the Ministry of Health (MOH) that deal with malaria at the national, regional, district, and service delivery levels, and
10. Help fill essential gaps in key commodities.

A list of potential activities in each of these areas was agreed upon by team members. Before departure the team debriefed with USAID and the National Malaria Control Program.

The team also discussed potential jump-start activities. One would be the mass distribution of free long-lasting ITNs during the October 2007 bi-annual mother and child health week, where PMI could assist with community mobilization, distribution of education materials and logistical support as all commodity needs for this event are covered by other partners. Another potential jump-start activity for PMI would be to support the IRS campaign in the highlands in November of 2007, which currently has no funding from other donors.

4. ACRONYMS and ABBREVIATIONS

AS/AQ	Artesunate-amodiaquine
ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal care
AQ	Amodiaquine
BCC	Behavior change communication
CCM	Country Coordinating Mechanism
CDC	Centers for Disease Control and Prevention
CHD I	<i>Centre Hospitalier de District</i> (staffed by a nurse)
CHD II	<i>Centre Hospitalier de District</i> (staffed by a doctor)
CHW	Community health worker
CSHGP	Child Survival and Health Grants Program
DAMM	<i>Direction de l'Agence du Médicament de Madagascar</i> (Drug Regulatory Authority)
DDS	<i>Département de District Sanitaire</i> (Health Department Directorate)
DDT	Dichloro-diphenyl-trichloroethane
DHS	Demographic and Health Survey
DPLMT	<i>Département des Pharmacies, des Laboratoires, et de la Médecine Traditionnelle</i> (Department of Pharmacies, Laboratories, and Traditional Medicine)
DPM	<i>Direction des Pharmacies et du Médicament</i> (Directorate of Pharmacies and Medicines)
DPT	Diphtheria Pertussis Tetanus
DSF	<i>Direction de Santé Familiale</i> (Directorate of Family Health)
EML	Essential medicines list
FANOME	Government Cost Recovery System
FBO	Faith-based organization
GFATM	The Global Fund to Fight AIDS, Tuberculosis and Malaria
GOM	Government of Madagascar
HBM/F	Home-based management/of fever
HMIS	Health Management Information System
IDA	International Development Association
IEC	Information, education, communication
IMCI	Integrated Management of Childhood Illnesses
INSTAT	<i>Institut National de Statistiques</i> (National Institute of Statistics)
IPM	Institut Pasteur Madagascar
IPTp	Intermittent preventive treatment in pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated bed net
LLIN	Long-lasting insecticide-treated net
LNR	<i>Laboratoire National de Référence</i> (National Reference Laboratory)
LQAS	Lot quality assurance sampling
M&E	Monitoring and evaluation
MAP	Madagascar Action Plan
MARA	Mapping Malaria Risk in Africa

MCH	Maternal and child health
MICS	Multiple Indicator Cluster Survey
MIP	Malaria in pregnancy
MIS	Malaria Indicator Survey
MOH	Ministry of Health
NGO	Non-governmental organization
PLWHA	People living with HIV/AIDS
PMI	President's Malaria Initiative
PMTCT	Prevention of mother-to-child transmission
PSI	Population Services International
PSSE	Postes Sentinelles de Surveillance Epidémiologique
PSSI	Postes Sentinelles de Surveillance des Indicateurs RBM
PVO	Private voluntary organization
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RTI	Research Triangle Institute
SIS	<i>Système d'Information Sanitaire</i> (Health Information Management System)
SLP	Service de Lutte contre le Paludisme (National Malaria Control Program)
SP	Sulfadoxine-pyrimethamine
SSD	<i>Service de Santé de District</i> (District Health Service)
UNICEF	United Nations Children's Fund
WHO	World Health Organization

5. THE PRESIDENT'S MALARIA INITIATIVE

In July 2005, the United States Government 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 the President's Malaria Initiative (PMI) 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 and pregnant women – with proven preventive and therapeutic interventions, including artemisinin-based combination therapies (ACTs), insecticide-treated nets (ITNs), intermittent preventive treatment (IPT) of pregnant women, and indoor residual spraying (IRS).

The PMI began in 2006 in Angola, Tanzania, and Uganda with \$30 million in funding. Proposed funding levels are \$300 million in FY08 and FY09, and \$500 million in FY10. The aim is to cover a total population of about 220 million in 15 countries by 2010. Madagascar was selected as a PMI country in December 2006.

In implementing this Initiative, the United States Government is committed to working closely with host governments and within existing national malaria control strategies and plans. Efforts will be coordinated with other national and international partners, including the World Health Organization (WHO), United Nations Children's Fund (UNICEF), Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM), Roll Back Malaria (RBM), the World Bank Malaria Booster Program, and the non-governmental and private sectors, to ensure that investments are complementary and that RBM and Millennium Development Goals can be achieved.

Objectives of the Needs Assessment Visit

To facilitate the planning process for the PMI, a team from USAID, CDC, WHO, and UNICEF visited Madagascar from 18-30 March, 2007. The objectives of this visit were to:

1. Assess the current status of malaria prevention and treatment interventions within Madagascar and identify unmet needs and ways in which PMI could complement funding of other partners and help the Service de Lutte contre le Paludisme (National Malaria Control Program; SLP) achieve its goals;
2. Identify one or two high impact malaria prevention or treatment interventions that could be implemented over the initial 3-6 months of the PMI in Madagascar as a means of launching the Initiative within the country; and
3. Brief the SLP and partners on the PMI planning process, and to provide them with a longer-term vision of activities, including the planning visit scheduled for May, at which in-country and international partners are expected to play an active role in development of a 3-year strategy and a detailed 1-year implementation plan for the Initiative as part of the national strategy and plan.

The agenda of the team and of the persons contacted and documents consulted are shown in Annexes 1-3.

6. COUNTRY BACKGROUND

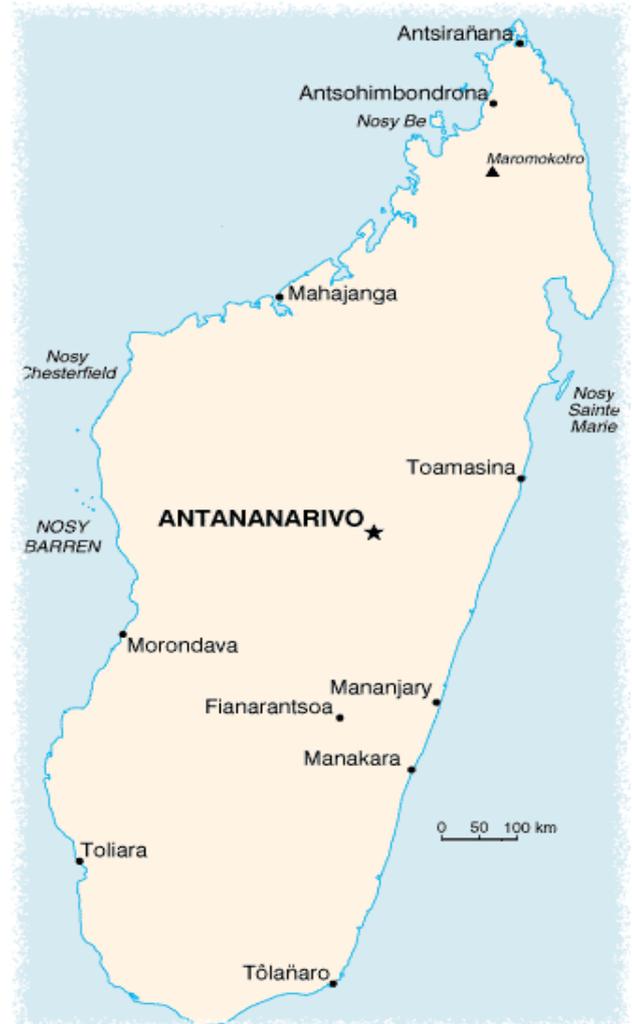
6.1 General Information

Madagascar has a population of approximately 18 million, 16.7% of whom are children under five years of age. One of the poorest countries in the world, the average per capita income is only \$255 (World Bank 2005); 46% of the population is illiterate; 70% of the population lives below the poverty line; and 49% of children under age five are malnourished (DHS 2004). The most common causes of death among children under five are malaria, diarrheal diseases, respiratory infections often associated with malnutrition. Life expectancy hovers at 55 years. This dire social situation springs from several factors: a weak health system, poor economic growth, and a high population growth rate of 2.8%.

The 2002 political crisis brought to power a democratic government with a reform agenda and renewed hope for the future. The new democratic Government of Madagascar (GOM) recognizes that improvements in health, nutrition, and food security are critical components for rapid and sustainable economic development and have incorporated ambitious health objectives in the new Madagascar Action Plan, including a bold goal to eliminate malaria by 2012.

The last decade has witnessed marked health improvements in Madagascar, especially among children. According to the 2004 Demographic and Health Survey (DHS), infant and child mortality fell by 43% and 41%, respectively, between 1997 and 2004. It should be noted that several partners have raised questions about the reliability of the child mortality figure due to interviewee recall. However, other determinants of child survival – such as morbidity and coverage of important health interventions – have improved significantly. For instance, the prevalence of diarrhea in children decreased about 63% and the proportion of anemic children fell about 31% between 1997 and 2004. At the same time, the coverage of vaccinations, vitamin A supplementation, and exclusive breastfeeding increased.

Despite these recent improvements in child health indicators, Madagascar still faces major health challenges, which threaten social and economic development. Health service quality is substantially below standard and basic medicines and supplies are regularly in short supply. Public and non-governmental sector capacity to plan effectively and manage health programs is weak, particularly in the areas of financial and administrative management, and the use of data for program planning and monitoring. National health infrastructure, information and commodity management and logistics systems are extremely weak, and much remains to be done at central and regional levels to ensure sustainable health financing.



Administratively, the country is divided in 6 provinces (which are being phased out), 22 new regions (created in 2005), and 111 districts.

6.2 National Health System

The health delivery system in the country consists of a four-step pyramidal system. The basic health centers (Centre de Santé de Base I or CSB I and Centre de Santé de Base II or CSB II) represent the first level of the health system. The distinction between CSB II and I is that the former is staffed with a physician whereas the latter is staffed by nurse provider or other healthcare worker. In each of the 111 districts, the CSBs are under the Service de Santé de District (SSD). In 2004, there were 1,842 CSB II and 1,106 CSB I in the country. There are also 85 district hospitals Centre Hospitalier de District (CHD I) offering similar services to those offered in a CSB II. The next level in the pyramid is composed of CHD II or district hospitals offering emergency surgery and comprehensive obstetrical care. There were 55 CHD II in 2004, and 4 Centres Hospitaliers Régionaux offering second referral services. There are 6 Centres Hospitaliers Universitaires offering comprehensive national referral services.

The private sector, mainly concentrated in urban areas, represents an important source of service delivery. About one out of every five primary health care facilities and two out of every five referral hospitals are privately owned. The majority of these facilities are concentrated in Antananarivo and other major cities. The private sector has an even larger presence in the retail sale of pharmaceuticals. There are 203 pharmacies, mainly concentrated in Antananarivo, and 1,625 drug retailers more evenly distributed. The public sector, particularly the primary health care facilities (CSB I and II), offer the bulk of health care services in the country, especially in rural areas.

With around 30% of the population living more than 5 kilometers from a health center the GOM places high priority on reaching remote rural areas with health care services. There is a growing network of over 12,000 volunteer community health agents that provide education and services for rural families. The health agents are trained and supervised by local, international, and faith-based non governmental organizations (NGOs). USAID provides the majority of support for the NGOs and community health agents, through an innovative performance-based approach called Champion Commune or Kominina Mendrika, reaching an estimated in over 400 communes. The commune leaders establish annual targets to improve maternal and child health indicators and work in partnership with the NGOs, community health agents, the health center, schools, churches and community groups to achieve them. The health agents mobilize communities and educate families in the integrated management of child hood illnesses, to seek early care at the health centers, improve nutrition, and the value of family planning. The NGOs also are supported by the social marketing program which provides training and a start-up stock of education materials, health products including safe water solution, and long-lasting insecticide ITNs that the agents sell at a highly subsidized price. The revenue from these products allows the agents to procure replacement stock and make some income as well. This system motivates the volunteers to remain in service and is a proven effective rural outreach strategy. Some, but not all of the health agents are adequately linked to the public health center. The MOH is currently in the process of formalizing a structure that would recognize the volunteers and create a stronger relationship with the public health clinics.

6.3 Financing of the Health Sector

Foreign aid represents the main source of finance for the health system, followed by public then private funds. A National Health Account exercise for 2003 estimated that donor funds represented 37% of all finances flowing to the health sector. Public funds represent about 32% of the total, and include resources that the Ministry of Economy, Finance, and Budget allocates for health-related expenditures, other public funds (direct loans to the treasury), and public employee funds. The majority of the public resources come from general taxation although a share comes from loans from external agencies, including the World Bank. Finally, the private sector represents 31% of the total financing by source. Households themselves are the main source of private financing. The majority of household expenditure is out-of-pocket expenditure in both public and private facilities as pre-payment mechanisms only cover a small proportion of the formal sector workers. Community health insurance schemes are starting in the country, but they currently cover a very small percentage of the population.

6.4 Health Sector Challenges and Issues

The health sector in Madagascar faces many challenges relating to the level of overall financing, utilization of health services, distribution of health personnel, availability of drugs and medical supplies in health facilities, and internal administration of the health system, especially in respect to budget execution.

Level of health financing: Resource mobilization and resource allocation remain the cornerstones of the health sector strategy in Madagascar, as the country strives to increase the resources allocated to the health sector. According to National Accounts of Health, 2003, total expenditure of health in Madagascar is estimated to be approximately US\$ 11.9 per person, equivalent to about 3.5% of the gross domestic product. In terms of distribution, there are large inequalities across regions, with richer regions receiving relatively more resources. Also, not enough resources flow to the CSBs, which partially explains the low quality of the services rendered at the periphery.

Demand for and utilization of health services: A large proportion of the population does not receive care when in need. Data from a 2005 household survey shows that only two out of every five people receive care in case of illness or injury. In addition, there are large regional differences in the proportion of people receiving care, with about 65% of people reporting an illness or injury in Diana region receiving care compared to only 23% in Vatovavy Fitovinany and Melaky, two of the poorest regions in the country.

Financial and access barriers to access health care represent the main cause of low utilization of health services. The 2005 household survey shows that the cost of receiving care is the main reason reported for non-utilization of services in case of illness. These financial barriers are often related not only to the direct cost of the services but also to other expenditures, such as transportation costs and the opportunity cost of seeking care.

After the 2001 economic crisis, health service fees were abolished, including co-payment on drugs, following which utilization of health services increased significantly. However, as the increase in health resources – mainly from HIPC – was not sufficient to compensate for the loss of user fees, drug stock-outs became common and the quality of services deteriorated further, with an increase in the workload of the already over-extended health personnel. At the end of 2003, the Government reinstated user fees, and by 2004 a new cost recovery system – FANOME – was put in place. This system was accompanied by an exemption mechanism to ensure that the poor had access to health care. Further, a small percentage of the sale of drugs (2.2%) is now set aside for the Equity Fund in each CSB to allow free access to drugs for the poor.

Despite the documented high prevalence of poverty among the general population and the introduction of payment mechanisms to provide the poor with access to basic health services only a small percentage of people utilize this health services benefit. This indicates that there may be significant cultural barriers to identifying oneself publicly as poor or indigent. Similar measures have been gradually introduced in hospitals, given the impoverishing effects of hospitalization, where most surgical and other consumables are not available and must be purchased in private outlets, resulting in unreasonably expensive bills.

Geographic access to health care facilities is limited in rural areas. A health mapping exercise done in 2004 showed that 23% of the population lives further than 10 km from a health facility, though this situation has improved somewhat with the establishment of 216 new facilities.

Distribution of health personnel: A fundamental issue underlying the uneven production and delivery of health services in Madagascar is the large variation in the allocation, training and competency levels of medical personnel. Almost 50% of the personnel of the MOH are concentrated in the region where Antananarivo is located. A few hospitals in the large cities have disproportionately high number of doctors and specialists, whereas there are many unsatisfied needs for certain vital specialties such as gynecology, surgery, pediatrics, etc. at the provincial level. Likewise, the distribution of doctors across rural and urban areas also shows large imbalances. In addition, the relatively low productivity of medical personnel in the public sector also poses a major problem. Besides absenteeism, low productivity can be attributed to poor basic training of the medical personnel, lack of essential equipment to facilitate diagnosis and treatment, and low levels of remuneration. As a result, quality of care suffers, especially at the level of the CSBs particularly in rural areas. The system is marked by little or no integration of preventive and curative care, the absence of continuity of care, and irrational use of drugs. Even non-clinical activities are of poor quality, with bad patient reception, long waiting times, and absence of communication with the patient.

Supply chain management: A steady supply and distribution of drugs and medical supplies to the health facilities is still not assured. After the 2001 crisis, the GOM eliminated user fees at facility level and started to distribute drugs free of charge. During this time a health facility survey recorded widespread drug stock-outs in the CSBs. Only 15% of the CSBs did not suffer shortage in the supply of a group of essential drugs. About 30% of facilities had shortages of chloroquine, cotrimoxazole, mebendazole, and alcohol; about 46% had shortages of paracetamol; and more than half had no acetylsalicylic acid. The mean duration of the stock-outs varied from 32 days for mebendazole to 70 days for acetylsalicylic acid. After the re-introduction of user fees and the cost-recovery/Equity Fund, the situation improved, although drug shortages are still a problem. Over 20% of health facilities, particularly in rural areas, have shortages of oral rehydration salts, serum glucose, folic acid, and lidocaine. For some of these drugs, the median duration of stock-out was three months.

The 35% markup on generic drugs in Madagascar is among the lowest in Africa; however, this low mark-up does not leave much room for additional resources to improve quality of the delivery system. While the Government has succeeded in maintaining low drug prices through subsidies to compensate for the 2004 devaluation, it will have to carefully manage the restoration of prices reflecting drugs' real cost in the near future.

Other challenges in public health facilities: Indicators of low quality of services at public facilities include: only 59% of public basic health centers having access to clean water, 53% with electricity,

and only 16% with transportation. Furthermore, only 21% of public facilities collected all the information required by the IMCI protocol (age, weight, health card, temperature, and breathing frequency). Similarly, in only 8 of 58 public facilities, children were examined for the standard four signs of health risk (vomiting, convulsions, anemia, and capacity to drink).

The health system performs poorly at the hospital level also, limiting referral to urban areas and only when it is not further compounded by financial barriers. The quality of services at hospital level is affected by the lack of medical specialists, equipment, maintenance, essential drugs and consumables. However, the creation of the health regions has significantly modified the set-up of district health facilities and reference hospitals. With support from development partners, hospital level services are being reviewed and this should lead to a reorganization of the referral system and a transformation of the role and mandates of district and regional hospitals for more effective and efficient service delivery.

Budget execution: Health system management at the local level is improving, although budget management capacity remains a major challenge. The planning, programming, and monitoring functions of regional and district health management teams have been strengthened. All regions and districts have adjusted their budgeting process to the new budget/program format, and some have begun to introduce performance-based planning using management tools and technical support from various partners. The performance of the district management teams has started to improve as a result of technical support and staff recruitment. All but a few of the districts are now able to formulate their three-year plans and develop annual work programs along clear norms and criteria. However, implementation of those annual plans is still weak due to insufficient resource flows to the regions and districts and low capacity for procurement of the large quantities of commodities and equipment needed to expand health services. Furthermore, support from regional and communal administrative authorities is still weak.

Health Sector Reform Program: The MOH is continuing to implement initiatives to improve access and utilization of health services and improve health outcomes. A new sector policy was adopted in June 2005, in which emphasis was placed on the need to re-orient health resource allocations to underserved areas and improve public expenditure management. Prevention and treatment of malaria and other major communicable diseases were also among the key priorities. Moreover, the policy sought to achieve closer integration and coordination of health sector interventions with other activities that impact health status such as water and sanitation, nutrition, transport, and rural development, and aimed to expand the coverage of risk-coping strategies such as mutual health insurance schemes and solidarity mechanisms.

Madagascar's efforts to provide services to the poor focus on increasing the availability of quality services and ensuring the financial accessibility of these services. Health is a key goal of Madagascar's poverty reduction strategy, and health policy issues feature prominently in the country development plans, including the Madagascar Action Plan (MAP), 2007-2011. The MAP sets very ambitious targets in the areas of maternal and child mortality, fertility rate, malaria, tuberculosis, sexually transmitted diseases, HIV/AIDS control, and reduction of malnutrition in children under the age of five. Following the publication of these broad objectives, the MOH prepared a National Health Sector Strategy and Development Plan (Plan de Développement du Secteur Santé) for the period 2007-2011, which seeks to define the various interventions necessary for the realization of the MAP objectives in a logical framework of priorities, activities, and results. The primary focus of reforms in the health sector is to strengthen the health system and increase its capacity to provide the necessary production, financing, delivery, and management support for

delivery of services necessary to meet the eventual objectives of reducing child and maternal mortality, controlling illnesses due to malaria, and sexually transmitted diseases including HIV.

7. MALARIA SITUATION IN MADAGASCAR

7.1 Epidemiology

Malaria is endemic in 90% of Madagascar. Malaria is ranked as the leading cause of under-five mortality and according to UNICEF, it kills approximately 20,000 children under five every year. The epidemiology of the disease differs distinctly according to location and so, for malaria control purposes, the country has been stratified into four distinct zones (Figure 1): West, Central, East and South. The key epidemiological factors in each are highlighted in Table 1. In the West and in the East transmission is stable and perennial (although in the West, transmission does decrease somewhat in July and August). In both regions, immunity amongst adults is reported to be high and morbidity and mortality is mainly amongst children under five and pregnant women. In the highlands of the Central Region, transmission is seasonal and moderately unstable (see table below). In the semi-desert of the South, transmission is also seasonal but very unstable and in many years is almost absent. In both the Central Highlands and in the South, immunity is limited and the whole population is vulnerable to periodic epidemics, which are often associated with high levels of mortality in all age groups. The most recent large-scale epidemic in the late 1980s killed an estimated 30,000 people. For then past 14 years, these epidemic-prone areas have been targeted for IRS spray campaigns on a yearly basis (highlands) and in response to an outbreak (south). Almost one third of the central highlands lie above 1,500 meters where malaria transmission tends not to occur. All four species of human plasmodia are endemic in Madagascar. While *Plasmodium falciparum* predominates in all areas, other species appear to be most abundant in the highlands. The rainy season usually starts in late October/ early November and can last until April.

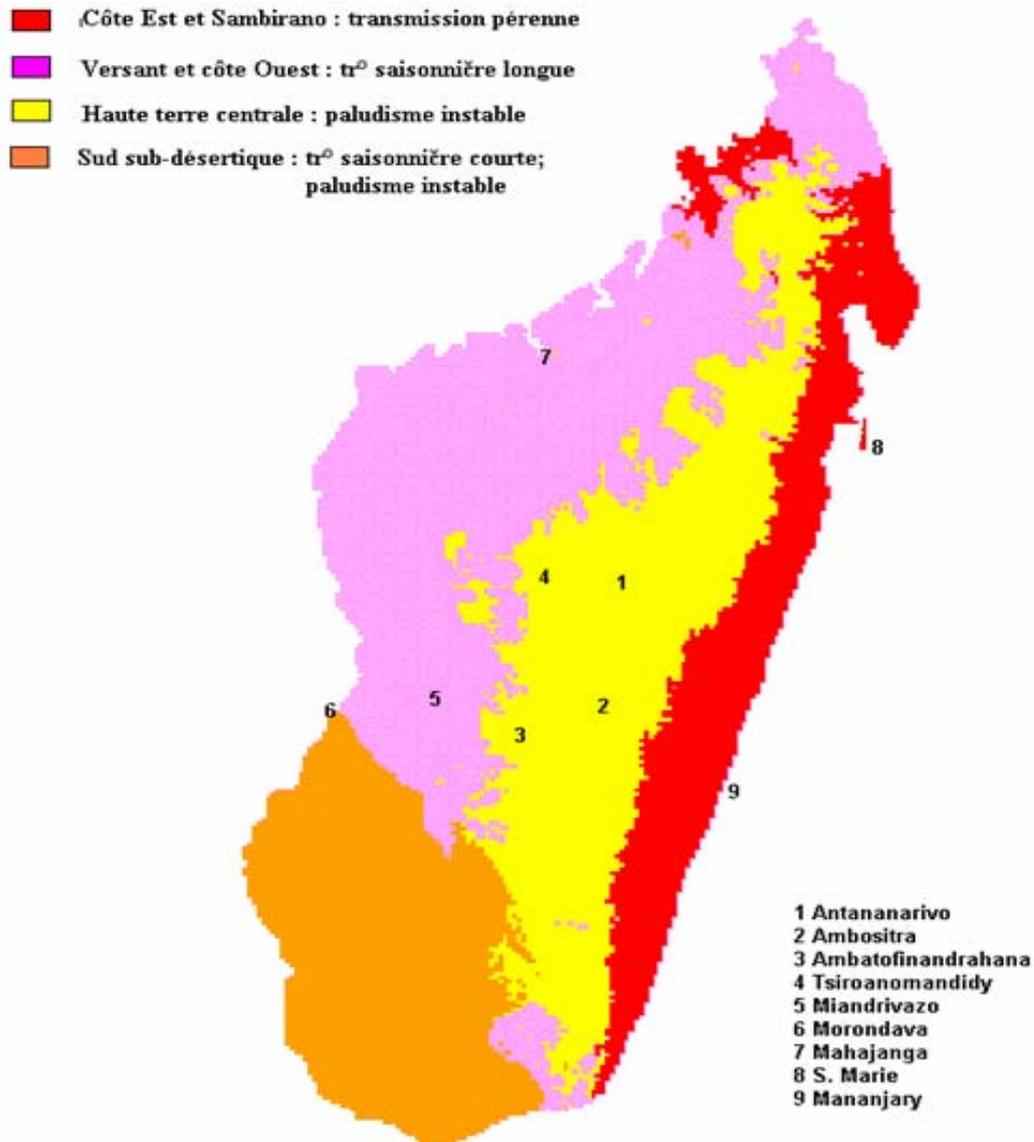


Figure 1. Malariometric stratification of Madagascar: Red, lowland perennial transmission; Pink, lowland long transmission season; Yellow, highland unstable seasonal transmission (epidemic prone); Orange, semi-desert unstable seasonal transmission (epidemic prone).

Key malaria related characteristics by epidemiological zone. (Source: Institute Pasteur de Madagascar)

	West	Central	East	South
Ecology	Tropical lowlands	Highlands	Tropical lowlands	Lowland semi-desert
1° Vector	<i>An. gambiae s.s.</i>	<i>An. funestus</i>	<i>An. gambiae s.s.</i>	<i>An. funestus</i>
Endophily	+	+++	+	+++
Anthropophily	+++	++	+++	++
2° Vectors	<i>An. arabiensis</i> , <i>An. Funestus</i>	<i>An. arabiensis</i>	<i>An. arabiensis</i>	<i>An. arabiensis</i> <i>An. gambiae s.s.</i>
Ratio of <i>P. falciparum</i> to other species (N) ¹	90:10 (48)	85:15 (26)	100:0 (4)	95:5 (48)
Transmission	Almost perennial	Seasonal	Perennial	Seasonal
Peak season	September-June	Jan-Feb & Apr-May		
Low season	July-August	Jun-Sept	-	?
Endemicity	High	Low	Medium	Low
Epidemic prone	No	Yes	No	Yes
NMCP surveillance	No	Yes	No	Yes
Prevention	LLIN & IPT	IRS (routine and responsive)	LLIN & IPT	IRS (responsive only)
Diagnosis	RDT (for patients of all ages)			
Treatment	ACT (irrespective of <i>Plasmodium</i> species), no treatment for children <1 and no community based emergency treatment for patients unable to swallow (artesunate rectocaps).			
Proportion of clinical cases RDT positive ² .	1-26%	45-48%	1-2%	24-31%

7.2 Entomology/Transmission

The two primary vectors are *Anopheles gambiae* (west and east) and *Anopheles funestus* (central highlands and south). *Anopheles arabiensis* is also present in all four epidemiological zones. *Anopheles funestus* increases in density during the rice-growing season and was the primary vector responsible for the outbreaks that occurred in the central highlands in the late 1980s. Since this vector is very endophilic (rests mostly indoors), it is quite sensitive to IRS. *Anopheles arabiensis* is also present in the highlands, but as it is more exophilic (rests mostly outside), IRS has less of an impact on it. In coastal areas (<1,000 meters altitude) the exophilic *An. gambiae* predominates and ensures stable malaria transmission year round.

¹ N= number of *P. falciparum* cases in sample on which estimate is based.

² Study conducted by Institute Pasteur in 2006.

7.3 Baseline Estimates on Key Indicators

Indicator	Past results (2003/2004 DHS, which are nationally representative)	Current national data
<i>Core evaluation indicators</i>		
All-cause mortality among under-5s (deaths per 1000 live births)	94	/
% of households with a pregnant woman or under 5 that own at least one ITN	39	45 ⁺
% of under 5s who slept under an ITN the previous night	36	39 ⁺
% of pregnant women who slept under an ITN the previous night	35	28 ⁺
% of households in geographic area targeted for IRS that were sprayed	Not measured	97 ⁺⁺
% of under 5s who slept under an ITN the previous night or in a house protected by IRS (assume no IRS at baseline)	/	Not measured
% of pregnant women who slept under an ITN the previous night or in a house protected by IRS (assume no IRS at baseline)	/	Not measured
% of women who have received ≥ 2 doses of IPTp during their last pregnancy in the last 2 years	SP not yet implemented	35 ⁺⁺
% of under 5s with suspected malaria who received treatment with ACTs within 24 hours of onset of their symptoms	ACTs not yet implemented	52 ⁺
1.1.1 Supplemental evaluation indicators		
% of children 6–59 months old with moderate or severe anemia (hemoglobin <8g/dl)	68	?

8. CURRENT STATUS OF MALARIA CONTROL INTERVENTIONS

8.1 Insecticide-Treated Nets

Ministry of Health Policy on ITNs: Since 2004, the GOM has adopted a policy of distribution of long-lasting insecticide treated nets (LLINs), and has a three-pronged approach for distribution, supporting both free distribution and sales of highly-subsidized LLINs:

1. Free distribution through health centers for pregnant women coming for pre-natal care and children that visit for their third DPT vaccine;
2. Free distribution in campaigns during the bi-annual Mother and Child health weeks that provide free services and products for mothers and children with the intent to reinforce the use of regular services;
3. Highly subsidized nets distributed through the vast network of community health outreach workers and general shops.

The goal of the MOH is to provide two ITNs per household, with an estimated need of 10 million total nets to achieve this target.

The ITN distribution strategy varies by region; the first targeted and highest priority area was the highly endemic east coast, while the west coast, with somewhat lower transmission, is currently

being targeted. The epidemic-prone South and Highland areas are not targeted for generalized ITN distribution. There is a culture of net use in Madagascar, with relatively high coverage of locally made nets, which are generally untreated, and a high community awareness of and demand for ITNs. Since 2001, 3.65 million ITNs have been distributed: 2.1 million were sold through community agents and general shops, and 1.55 million free through antenatal and immunization visits and campaigns. From these complementary approaches, Madagascar has achieved national household ownership of 45% of households owning one or more ITNs (PSI TRaC Survey, 2006).

The MOH strategy is procurement only of LLINs, and since 2003, all nets procured on behalf of the MOH by Population Services International (PSI), UNICEF, and GFATM have been LLINs. Recently the MOH decided to procure LLINs of larger than standard size (150x180x190cm) to 190x180x180cm. These large nets will be likely at least \$0.50 more expensive than standard-sized nets with potentially longer lead times for production.

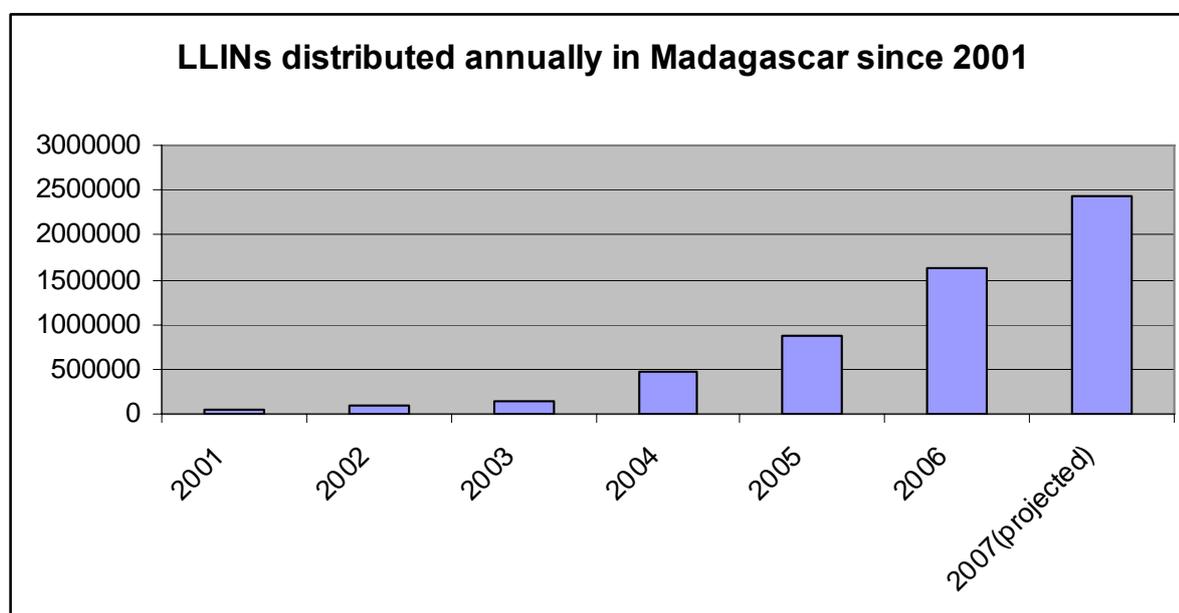
Nets distributed through public health facilities: The MOH, with support from the World Bank, GFATM, UNICEF, JICA, USAID, and others, is distributing LLINs to pregnant women on their first ANC visit. Infants also receive free nets on completion of vaccination, at around 9 months of age, at the CSBs. Some clinics are giving these nets at the time of delivery to women who give birth in a health facility to encourage use of health facilities for labor and delivery. Since 2003, approximately 1.1 million nets have been distributed through this mechanism. ITN distribution has been focused on the East Coast, which experiences high transmission year round. In 2006, 818,000 LLINs were distributed through CSBs on the East Coast. A total of 264,000 LLINs are programmed for distribution in 2008. Because of procurement and distribution problems as well as high demand, there are frequent stock outs of LLINs at clinics, so clinics that have run out of ITNs refer their patients to the social marketing sector for ITN purchase.

Nets through integrated campaigns: LLINs have been distributed free of charge through integrated national health campaigns including the national measles campaign in 2004 (approximately 23,000 ITNs), and through biannual Mother and Child health weeks, which began in October 2006. The forthcoming Measles Malaria Campaign in October 2007, which will be associated with the Mother and Child Week, provides an opportunity to continue the scale up of coverage (from 20% to 45% household coverage between 2004 and 2006). As the east coast was first targeted for LLIN distribution through CSB mechanisms and has received the bulk of LLINs distributed in Madagascar; therefore, this campaign will focus on the west coast. Approximately 1,537,800 LLINs are required to cover all children under five years of age up to a maximum of two nets per household in 59 districts in the North and West. Approximately 936,000 nets are available for the integrated campaign through the CRESAN Round 4 phase 2 grant. However, the procurement needs to be completed immediately for the nets to be available in time. The International Federation of the Red Cross, with support from Canadian Red Cross and CIDA, has another 601,800 nets available. The Malagasy Red Cross will participate in the distribution.

Nets in Emergency Situations: UNICEF distributed 200,000 LLINs free of charge as part of the emergency flooding response in the South during March and April, 2007.

Social Marketing: Social marketing of highly subsidized LLINs through community health agents and commercial outlets is a complementary strategy to establish market demand for net use and expand rural reach. Given that 50% of the Malagasy population lives more than 10 km from a CSB, community and commercial distribution has offered an alternative network for routine distribution. Social marketing of LLINs is accomplished through volunteer community health agents that are trained and supported by NGOs, to perform education, home-based management of

fever, and many other health services, in addition to social marketing of LLINs. Demand for LLINs is high, and community health agents consistently report being unable to meet the demands of the populations they serve. PSI, in cooperation with a network of local and international NGOs, has been the primary partner in LLIN distribution through social marketing, and was one of the Principal Recipients of the Round 4 GFATM grant. PSI introduced the social marketing of LLINs (Permanets®) in 2001 through the commercial sector. Between 2001 and 2002, 141,000 LLINs were sold at a full cost recovery price of US\$ 6 per net. In 2003, with the support of USAID, GFATM, and World Bank/CRESAN, PSI was able to subsidize LLINs and reduce the price to US\$ 1.50. Since this price reduction, PSI has sold an additional 1,848,000 LLINs at this reduced price up to the end of 2006 (123,000 of which have been funded by USAID). They are expected to sell approximately 900,000 LLINs in 2007. Revenue from the sale of these LLINs has been reinvested into additional LLIN purchases, with 250,000 LLINs having been distributed in Madagascar using revenue generated from LLIN sales. All PSI GFATM funds for LLIN procurement have been disbursed, and no further funds are available for socially-marketed LLINs beyond 2007.



Community Mobilization, Information, Education, Communication, Behaviour Change Interventions for ITN use: Mobilizing community leaders and civic organizations to support malaria prevention and the use of LLINs by pregnant women and children under 5 is critical for achievement of the national malaria strategy and PMI objectives. With the MOH, NGOs and RBM partners established innovative and effective IEC and behaviour change strategy. Partners use mass media, including radio shows, mobile videos with local actors and print materials. To complement the mass media efforts, community-based behaviour change interventions are implemented through NGOs and community health agents. Community health agents work with local civic groups to implement malaria prevention education through participatory radio listening groups, skits and local drama, education sessions, mobile videos (Mobile Cinemas), and marionettes, which are popular in Madagascar. Community health agents also can be instrumental in encouraging pregnant women and women with children needing vaccinations to visit the health center to receive a free ITN. These efforts have been limited to date because of the unreliability of stocks at the public health centers. However, when stocks are assured, a promotion campaign could be easily included in the health agents' work. The community health agents that distribute socially-marketed products are also responsible for educating local residents on ITNs and their use.

Ownership and Usage: A community-based household survey carried out by PSI in 2006 found that while 64% of households in endemic areas owned a net of some kind, only 45% owned an ITN, up from 22% in a similar survey in 2004. In 2006, in endemic areas, 38.5% of children under five and 28% of pregnant women slept under an ITN the previous night. Knowledge of the efficacy of nets is high, as the same survey reported that 82% of mothers of children under five knew that sleeping under a net was an effective way to prevent malaria. In areas where NGOs have been actively involved in community mobilization and education, these numbers are somewhat higher.

Net re-treatment: The MOH policy is to distribute only LLINs, and there is no MOH policy on or efforts directed to net re-treatment. Some NGOs distribute K.O. tabs for net re-treatment via social marketing through their community health agents for \$0.10 per sachet. In 2005, a re-treatment campaign was conducted in the northern districts of Sava and Diana, with support from WHO, UNICEF, the Dutch Government, and involvement of Red Cross volunteers, in which 300,000 nets were retreated. These districts were chosen because an earlier survey indicated that 80% of households owned a net, many untreated. Since then, there have been no further large-scale re-treatment campaigns.

ITN indicators and annual targets of Ministry of Health Plan

INDICATOR	2004*	2006*	Target 2008	Target 2009	Target 2010	Target 2011	Target 2012
Percentage of households owning at least one ITN in selected districts	22%	45%	70%	80%	90%	95%	100%
Percentage of children under-five sleeping under an ITN in selected districts	14%	39%	50%	60%	65%	75%	85%
Percentage of pregnant women sleeping under an ITN in selected districts	15%	28%	40%	50%	65%	75%	85%
Districts with biennial monitoring of insecticide susceptibility	2	2	2	0	2	0	2

*PSI TRAC Survey 2004, 2006

LLIN distribution mechanisms

There are no import duties on LLINs. LLINs purchased with GFATM resources are managed by CRESAN and PSI. CRESAN contracts out the warehousing and distribution of the LLINs to the level of the district (SSD). Communities served by a CSB, and sometimes the doctor at the CSB, bear the costs of transporting the LLINs from the district to the community. Distribution for socially marketed LLINs is done by the NGOs themselves and via commercial networks. SSDs and CSBs may store these nets in cooperation with the NGO, but the responsibility of collecting the nets from those levels falls to the community health agent.

Total LLIN needs for distribution through CSBs and social marketing

	2007	2008	2009	2010
Total Population at risk ¹	13,749,720	14,134,712	14,530,484	14,937,338
Expected pregnancies ²	618,737	636,062	653,872	672,180
Expected infants	618,737	636,062	653,872	672,180
Total for distribution through social marketing ³	580295	596543	613246	630417
Planned procurements ⁴	2,437,800	264,000	0	0
Total LLINs needed	-620,030	1,604,667	1,920,990	1,974,778

¹ Population of Madagascar outside the Central Highlands; assumes a population growth rate of 2.8% annually.

² Assumes 4.5% of the population becomes pregnant annually; includes 100% coverage of pregnant women and infants; if this full number cannot be accessed through CSB-based distribution in remote areas, community-based strategies may be employed.

³ Assumes mean household size of 5 members, 30% of households have neither a pregnant woman nor a child under five and thus no access to free ITNs through CSB or campaign mechanisms, and each household needing to buy a new net every other year to maintain the goal of two nets per household. (Total population*0.2*0.30*0.5)

⁴ 2007 procurements include nets procured for distribution during integrated campaign; 2008 procurements are planned procurements by CRESAN using their GFATM Round 4 grants and are for distribution to the districts primarily in the western coastal region.

8.2 Indoor Residual Spraying and other vector control activities

IRS activities 1993 to present: The SLP Policy includes IRS as a major prevention strategy for malaria in areas of seasonal or unstable transmission such as the central highlands of Madagascar. IRS campaigns first started in the central highlands in 1993 and have been carried out every year since then until present with the exception of the years 2000 and 2001 due to a lack of funding (see table below). Until 2004, DDT was the insecticide of choice for all spray campaigns. In 1999, 2002 and 2003 small amounts of deltamethrin were also used in selected sites. In 2004, alphacypermethrin was chosen as the primary and only insecticide for all the spray campaigns (Table 2). The switch from DDT to alphacypermethrin was done in part to slow the development of insecticide resistance and partly in response to increasing international pressure following the Stockholm convention on persistent organic pollutants.

Although spray campaigns are expected to be carried out in November/December at the beginning of the rainy season, the spray campaigns are often delayed due to late arrival of funds from donor agencies. The 2006/2007 campaign, for example, did not occur until January/February. Also, because the spray campaigns are dependent on funds from donor agencies, their population coverage varies greatly between the years. For example, from 1993 to 1998 the IRS campaign protected a total of 2.3 million people/per year/per campaign compared to 2004 when only 510,000 people were protected (Table 1). Actual coverage of IRS in the target areas is high with between 95-98% of the houses targeted for IRS sprayed during each campaign [SLP annual reports]. The last spray campaign (2006/2007) covered 184,494 households in 33 communes protecting a total

population of 1,117,511. This represents 97% of households targeted for IRS that have actually been sprayed.

Overview of insecticide usage and population protected by IRS since 1993. (Source: SLP)

Year	DDT (tons)	Deltamethrin (tons)	Alpha- cypermethrin (tons)	Population protected (million)
1993	992			2.3
1994		-	-	2.3
1995		-	-	2.3
1996		-	-	2.3
1997		-	-	2.3
1998		-	-	2.3
1999	100	1.1	-	1.3
2000	-	-	-	-
2001	-	-	-	-
2002	60	1.2	-	0.87
2003	40	0.06	0.3	0.5
2004	-	-	8.5	0.51
2005	-	-	17	1.25
2006	0	0	18	1.32

The strategy for IRS since 2004 follows a focalized spraying pattern; the main reason for this has been the lack of sufficient funding for a blanket campaign. The units targeted for IRS each year are communes which vary in population size from 4,000 to 10,000/15,000 with some as large as 40,000. All dwellings and adjacent buildings in target communities are sprayed. The selection criteria for target communes are based on: altitude (between 900 and 1500 meters), exclusion from the previous two spray campaigns, and reported caseload exceeding the “epidemic threshold” during the previous transmission season. The epidemic threshold is a significantly greater number of cases in a week than the previous week.

The SLP also has an epidemic response strategy in which focal spraying of affected areas is carried out in response to outbreaks. The program has implemented a malaria specific reporting system in all epidemic-prone areas (all of the highlands and 9 districts of the southern region) which collects weekly data on malaria case loads reported at health facilities. When the cases significantly exceed those reported during the previous week the health centre reports at the district level and a district representative reports personally to the SLP director at headquarters. A team is then dispatched to carry out IRS of the area.

IRS strategy 2007-2012: For the past 14 years, IRS campaigns have focused on the central highlands of Madagascar. In 2005, WHO reviewed the national IRS strategy and proposed conducting blanket spraying in the central highlands for three years instead of the previous focalized spray campaigns. This new strategy will allow some time for the development and implementation of a new resistance management policy including the development of a reliable entomological surveillance system and the strengthening of the epidemiological surveillance system. The development and strengthening of a monitoring system may eventually contribute to more effective target spraying, treating only when necessary. It has also been suggested to prolong the three-year IRS campaign strategy with the objective to eliminate *An. funestus* from the highlands. WHO consultants proposed that spray campaigns should utilize a combination of insecticides (rotational use of a pyrethroid, carbamate and DDT over a 3-year period) to stop an

increase in DDT resistance and to delay and/or prevent any other insecticide resistance (Drs. Guillet and Govere. Rapport de mission 7-19/11/2005).

In addition, the SLP has suggested conducting biannual spray campaigns in the western region of the country in combination with other interventions such as LLINs, IPTp, ACT/RDTs, and HBMF. Until present, the SLP and partners have not reached a consensus regarding the proposed plans and it is crucial that a long-term strategy for IRS be developed, including a detailed budget as the proposed plans will increase the IRS budget from \$1 million to \$10 million.

IRS indicators and annual targets of Ministry of Health Plan

INDICATOR	Base line 2002	Target 2005	Target 2006	Target 2007	Target 2008	Target 2009
Percentage of households targeted for IRS that are sprayed	75%	85%	90%	95%	97%	100%
Percentage of total population who live in IRS targeted areas	5%	12%	12%	12%	12%	12%
Number of districts chosen for annual quality control monitoring of IRS campaigns	3	5	7	8	10	15
Districts with biennial monitoring of insecticide susceptibility	11	9	9	9	9	9

Funding: In the past, IRS campaigns were fully funded through CRESAN (World Bank). With the CRESAN project ending in May 2007, funding for spraying was limited and USAID funded part of the 2006 campaign. There is no further funding available from CRESAN for future IRS campaigns.

Logistics: IRS campaigns have been organized and implemented by the SLP. Insecticides were procured through a private contractor, PROCHIMAD, and stored briefly at a central depot before being distributed to district-level warehouses in IRS targeted areas. The SLP has set up a strong management system for IRS activities at the various levels of implementation. Each level of management has well defined roles and responsibilities with appropriate checklists and reporting forms.

Evaluation of spray campaigns: Periodic evaluations of spray campaigns are conducted by PROCHIMAD and AVIMA, companies involved in insecticide marketing and procurement. The last evaluation was completed in January 2007 and generally found a well planned and implemented spray operation. Based on the PROCHIMAD/AVIMA evaluation report, personal protective gear need to be upgraded (boots, socks, additional pair of overalls, etc.) and old spray pumps should be replaced. Storage of insecticide is acceptable under the current program using pyrethroids (i.e. alphacypermethrin). However, if DDT or other more toxic insecticides are used in the future, a more rigorous stock management system will need to be developed, including renting secure storage facilities.

Larval Control: No larval control activities are currently going on in Madagascar.

Human Resources: There are three entomologists working at the SLP along with two to three assistants. Two senior staff members are directly involved with all IRS activities (head of the epidemiology and entomology department and an entomologist). Additional personnel, such as mosquito collectors, are hired on a case-by-case basis.

Community Mobilization, Information, Education, Communication for IRS: IRS does not require individual behaviour change or community normative change. However, a safe and effective IRS campaign does require the community leaders' support and adequate clear information for the population about what to expect and what to do when their house is to be sprayed. To date, the IEC efforts around IRS campaigns have been carried out by the SLP staff and the people hired to do the spraying. IRS campaigns have been conducted over the past 14 years and are generally well accepted by the population. If the MOH and partners reach consensus to carry out a broader IRS campaign in areas where ITNs are in use, it is likely that a more robust and adapted IEC campaign will be required.

Cost of IRS campaign for focalized spray campaigns in the central highlands targeting 1.25 million people as proposed by the SLP (based on costs from previous spray campaigns

(Note: a proposed strategy of blanket spraying and expansion to the west would increase the annual budget from approximately \$1.2 million to over \$10 million.)

	2007	2008	2009	2010
Insecticides	500,000	500,000	500,000	500,000
Operational Cost	989,000	989,000	989,000	989,000
Training, IEC	55,000	55,000	55,000	55,000
Insecticide resistance and entomological monitoring	12000	12000	12000	12000
Total needed	1,556,000	1,556,000	1,556,000	1,556,000
IRS in response to an outbreak	75000	75000	75000	75000
Contributions	0	0	0	0
Total gap	1,631,000	1,631,000	1,631,000	1,631,000

Cost (US\$) of generalized IRS as proposed in the latest version of the newly developed strategic plan

	2008	2009	2010	2011	2012	2013
Insecticide	1,800,000	5,400,000	5,400,000	5,400,000	1,800,000	1,800,000
Operational cost; entomological and epidemiological monitoring	7,000,000	8,000,000	6,000,000	6,000,000	2,600,000	7,000,000
Training	100,000	150,000	150,000	150,000	100,000	100,000
Total	8,900,000	13,550,000	11,550,000	11,550,000	4,500,000	8,900,000

Insecticide Resistance Monitoring: The MOH currently supports four sites (two sites on the east coast and two sites in the northwest) for monitoring of insecticide resistance, and conducts knockdown tests of locally-caught mosquitoes on ITNs, but there is currently no mechanism for testing the concentration of insecticide on nets locally. An additional site will be established in the south after the distribution of LLINs (GFATM Round 4) to prevent increased malaria transmission following the most recent cyclone. To conduct a baseline evaluation of insecticide resistance for LLINs, the SLP has the intention to increase the number of sites in the high transmission areas.

Last year, insecticide resistance monitoring in IRS targeted areas was conducted at three sites in the region around Antananarivo (Anjozorobe - Ankazobe – Antananarivo) and two sites in the region of Fianarantsoa (Ambatofinandrahana – Fanjakana). These activities are conducted by staff from the SLP and were financed by GFATM Round 3. However, studies on insecticide resistance are conducted on a case by case basis when funding is available. There is no official collaboration with experts from the Institute Pasteur Madagascar, however in the past, molecular and biochemical testing has been done at the Institute (lack of adequate supplies at the SLP). The SLP plans to develop a reliable network of sentinel sites to monitor insecticide resistance and they planned to establish a national reference laboratory to conduct biological, biochemical and molecular testing.

8.3 Malaria during pregnancy / Intermittent Preventive Treatment in Pregnancy (IPTp)

National Policy: The 2003/2004 DHS estimates that 80% of women have one or more prenatal consultations, and the 2004 MIS estimated that 68% of women have one or more prenatal consultations, although many of these occur very late in pregnancy. In June 2004, the MOH adopted the strategy of providing two doses of directly observed sulfadoxine-pyrimethamine (SP) for prevention of malaria during pregnancy in 92 coastal and lowland districts nationally, where malaria transmission is stable or seasonal. Nineteen districts in the central highlands, which are epidemic-prone, were excluded from this policy. The first dose of SP is to be given when the mother first senses fetal movements, but not before the 16th week of gestation, with a second dose not less than 30 days later. A third dose is recommended for HIV-positive mothers. Voluntary counseling and testing is available, although the prevalence of HIV is low. SP is provided free of charge at the CSBs by personnel with a medical, nursing, or midwifery background. Documentation of administration is noted on the ANC card and in the clinic log. All antenatal care activities, including tetanus vaccination and malaria prevention activities are integrated at the level of the CSB. The SLP works closely with the Direction de la Santé Familiale (DSF; Directorate of Family Health) to plan and implement IPTp and malaria in pregnancy activities.

Malaria during Pregnancy: It is national policy to treat any malaria infection during pregnancy as severe and to treat with quinine, but this practice is highly variable. Some health workers give chloroquine during the first trimester and SP during the second and third trimesters. Treatment with iron-folate (one tablet per day for the last 6 months of pregnancy) is also recommended by national policy to decrease the incidence of maternal anemia, although this is not free of charge. In addition, tetanus vaccination is given, as well as 200,000 U of Vitamin A eight weeks after delivery.

Implementation: The MOH began the training of health workers in the CSBs on delivery of IPTp in fall 2004, with the support of USAID through the Malaria Action Coalition (CDC, WHO-AFRO, RPM+, and JHPIEGO). To date, 2,300 CSB staff nationwide, mostly midwives, have been trained in delivery of SP for IPTp and in distribution of ITNs in areas of stable transmission. An

additional 14 trainers and 6 regional supervisors have since been trained, and a training manual, materials for midwives, and wall posters for health clinics have been developed as the strategy was rolled out. An additional 363 CSB staff have been identified in the highlands for training for potential implementation of IPTp in those areas. Although it is not national policy to administer IPTp in the Highlands, there had been some confusion about the differential implementation, and an informational training was requested. SP is only administered in health facilities and there are currently no plans to involve community health workers in the delivery of IPTp. However, the community health workers trained by numerous NGOs play an essential role in increasing the use of antenatal services by educating their communities about the importance of prenatal consultation and encouraging women to attend prenatal clinics.

Procurement and Distribution: UNICEF currently donates nearly all of the SP (Projet Hollandais gave a one time donation of 1.2 million tablets, but has no further plans to do so) and uses its own distribution channels to deliver the SP to the level of the district. The Service de Santé de District (SSD) is responsible for assigning the estimated number of SP needed by each CSB. CSB staff or community members are responsible for transporting the SP from the SSD to their local CSB. The SP administration kits include cups for administration of SP and water purifier (Sûr'Eau).

Performance Indicators: CSBs collect data on the number of women who attend prenatal consultation and receive one or two doses of SP and forward this information to the district level. Reporting from the district to the central level is incomplete, and number of women who receive the second dose of SP is currently not included in data requested centrally. The data transmitted are of questionable quality. As a result, exact national figures for coverage of IPTp are not yet available. For 2006, SIS data regarding the number of women took the first and second doses of SP are available for 30 districts, with fairly even geographic distribution. Of the 30 districts that reported, 43% of women took at least one dose of SP, and 35% took the second dose. The proportion of women who receive SP under direct observation, as is policy, is unknown. A survey was conducted in November 2006 by SLP and partners of women exiting 44 CSBs that had implemented IPTp. Of those women, 80% had at least two prenatal consultations, 42.5% had at least one dose of SP, and 35.3% had taken the second dose. Neither of these two sources provides reliable population based data, and likely overestimate the percentage of women who receive IPTp.

There is currently no reliable baseline data on a community level in areas where IPTp has been implemented, and development of a system to collect the indicators is paramount. In addition, it is unclear why the percent of women who receive IPTp is so much lower than percent of women who receive prenatal care.

Community Mobilization, Information, Education, Communication, Behaviour Change Interventions for IPTp: Mobilizing community leaders and civic organizations and families to support IPTp is critical for achievement of the national malaria strategy and PMI objectives. While the third round GFATM NGO recipients have made some inroads in this area, there is much to be done. Establishing a strong national IEC/BCC strategy for IPTp including mass media and community-based education will assure that a greater percent of women seek prenatal care and that IPTp is a component of the package that includes iron-folate, Tetanus vaccine, a free LLITN and vitamin A. Community health agents will be extremely important to carry out the community based education and interpersonal communications. Because the health agents are from the commune, they are often among the first to know when a woman is pregnant and could be instrumental in referring her to the health center for IPTp and the package of prenatal care. Communes that included increased percentage of pregnant women receiving iron-folate during

prenatal visits as one of their annual targets for Kominina Mendrika, showed dramatic improvements in rates of prenatal visits. Thus, another strategy could be to add IPTp to the Kominina Mendrika targets. Such demand creation strategies as these, will need to go hand in hand with SP logistic management to assure that there is an adequate quantity of stock available at the health centers.

Resistance Monitoring: Recent antimalarial drug efficacy conducted by the Institute Pasteur Madagascar indicate that *in-vivo* resistance to SP is less than 5% in a 14 day follow up trial conducted by Institut Pasteur.

Estimate of Needs: The assumptions used by the MOH to estimate the SP required for IPTp are listed in the following table. Currently 92 of the 111 districts have implemented IPTp, covering an estimated population of approximately 13 million. It is estimated that 4.5% of the total population (1993 census) is expected to become pregnant annually, therefore 574,358 pregnancies would be estimated to occur in areas covered by IPTp in 2008. The MOH calculates the SP need based on the assumption that 80% of pregnant women will attend ANC at the health facilities and each woman would receive 2 doses of SP. Based on these assumptions, an estimated 3.4 million tablets of SP, at 6 tablets per woman (3 per dose), will be needed annually.

Estimated SP needs and gaps for IPTp at ANCs from 2007-2010¹

	2007	2008	2009	2010	Total
Est. target population ²	12,415,876	12,763,521	13,120,899	13,488,285	51,788,581
Est. number of new pregnancies ³	558,714	574,358	590,440	606,973	2,330,486
Est. percentage of pregnancies seen at ANC ⁴	391,100	430,769	472,352	485,578	1,779,800
No. of SP needed (tablets) ⁵	2,346,601	2,584,613	2,834,114	2,913,469	10,678,797
Planned SP purchases for IPT ⁶	UNICEF has committed to purchasing the required SP through 2008, most likely throughout the life of the program.				
Gap (Total need-contributions)	0	0	0	0	0

Notes:

¹ This quantification does not make any adjustments for expected uptake of the policy. Preliminary consumption data for the first quarter of 2007 show that approximately 75% of the SP for IPT distributed for use in that quarter had actually been used. If this situation does not change, then these requirements may represent an overestimation of the real requirements. Timely and accurate consumption tracking will be required to track use and make the required adjustments to these estimated requirements.

² Assumes that IPT will be applied to only 92 of the 111 districts, (excluding the districts in the central highlands, which are in Antananarivo and Fianarantsoa provinces) and that the population will continue to grow at 2.8% annually

³ Assumes that pregnant women constitute 4.5% of the population each year

⁴ Using the estimated number of pregnancies in 2004 and the number of ANC consultations from the 2004 HMIS data, we calculated that 68% of pregnant women are seen at the ANC each year. Thus, this quantification assumes that the proportion of pregnant women who will have prenatal care at the CSB, and thus receive IPT, will be 70% in 2007; 75% in 2008; 80% in 2009; 85% in 2010.

⁵ Assumes each pregnant woman will receive 2 doses of SP (6 tablets) during the course of a pregnancy.

⁶ These planned purchases only include the donations from UNICEF, and does not include the planned purchases by Salama as these have not been categorized as solely for IPT. In February 2007, Salama had 776,600 tablets of SP in stock, with 363,000 on order. They had provisionally planned to procure an additional 1,000,000 tablets of SP in 2007.

As demonstrated above, there is currently no gap in SP procurement. One area in which PMI could contribute are integration of the distribution system of SP within the national medical commodity distribution system (Salama) strengthening of supply chain management and documentation of actual usage of SP. A second is support of the IEC/BCC activities to educate women about the benefits of prenatal care in a timely fashion, both by mass media and by the activities of volunteer community health agents. Finally, ongoing education and supervision of CSB staff responsible for administration of IPTp is crucial to ensure that the women who come to the clinic for prenatal care receive IPTp.

8.4 Diagnosis

The recently adopted national policy for malaria (Politique Nationale de Lutte Contre le Paludisme a Madagascar, 2005) describes the diagnosis of malaria at three levels.

- At reference facilities, malaria diagnosis should be determined based on microscopic examination
- At CSBs diagnosis should be based on laboratory diagnostic examination, either microscopy or rapid diagnostic test (RDT). Where these examinations are not available, diagnosis is clinical after all other causes of fever have been eliminated

- At the community/home level, diagnosis is clinical and determined on the basis of fever in regions of stable transmission

Each of the 111 Service de Santé de District (SSDs) and all hospitals in Madagascar are mandated to have a functional laboratory capable of microscopic diagnosis of malaria. There are no recent reports to indicate how many of these are actually functional. Quality control is not being done at present but, as part of the GFATM Round 4, 24 laboratory technicians, including one each for the 22 regions of the country, will be trained as trainers for microscopic diagnosis of malaria. These individuals will conduct refresher training for the technicians from each of the SSDs in their region and serve as a part of a quality control system managed under the SLP. How this system will work was not well defined at the time of the team's visit.

SSDs are referral centers for the more than 2,500 CSBs in the country, and as such generally perform diagnosis only on referral cases. Of the 2,114,400 suspected malaria cases in Madagascar who seek treatment at a health facility, the vast majority go to a CSB. Until 2006 all fever cases were treated presumptively with chloroquine. Under the new policy, all individuals seeking treatment for fever at a CSB will be tested using a rapid diagnostic test (RDT). RDTs may also be used in reference facilities, but those must be confirmed using microscopic examination. Field observation and interviews with health workers in peripheral health facilities and with SLP staff indicate that health workers have little confidence in negative tests results and general treat clients in spite of negative results.

Two RDTs showed high sensitivity and specificity in tests in Madagascar OptimalTM and CareStartTM³ and both have been used in health facilities. Health workers from all CSBs in the East Province were trained in 2005/2006 on the use of RDTs and appropriate delivery of AS/AQ. The initial phase of a national roll out was begun in twenty-one districts in the East Province using CareStart as the RDT. During 2006 1,400,000, were delivered in 3 batches, unfortunately the initial shipments were delayed and arrived so late in that a large proportion of the first two batches of RDTs will not be used before the expiry dates of March/ April 2007.

The Institut Pasteur of Madagascar is under consideration by WHO as a regional quality control laboratory for RDTs. Researchers at IPM compared RDTs from three companies to guide the MOH decisions on which RDTs to use. It is expected that IPM will continue to support the MOH and provide quality control as needed for RDTs.

The expected need for RDTs in the coming years is presented in the following table:

³ Ratsimbaoa A, Randriamanantena A, Raherinjafy R, Rasoarilanlao N & Menard D. 2007. Am J Trop Med Hyg, 76: 481-485

Estimated RDT needs and gaps at CSBs¹ from 2007-2010

	2007	2008	2009	2010	Total
Total number of outpatient consultations	8,874,477	9,122,962	9,378,405	9,641,000	37,016,844
Est. number of uncomplicated malaria cases ²	1,548,667	1,592,030	1,636,607	1,682,432	6,459,737
Planned RDT purchases ³	500,000	0	0	0	500,000
Gap (Total need-contributions)	1,048,667	1,592,030	1,636,607	1,682,432	5,959,737

Notes: RDT requirements for distribution at CSBs

¹This quantification does not make any adjustments for expected uptake of the new malaria case management policy. The limited preliminary consumption data available for 2006 and for the first quarter of 2007 show that approximately 10% of the RDT distributed in 2006 had actually been used. If this consumption rate does not change, then these requirements may represent a gross overestimation of the real requirements. Timely and accurate consumption tracking will be required to better track and report the consumption of RDT and make the required adjustments to the estimated requirements.

²This assumes that the malaria cases as a proportion of total outpatient consultation remains at 14% (2005 level)

³These are the planned procurements by CRESAN using the GFATM RD 4 grant and are for distribution in districts in the west coast region. There is no data available on what the total quantity of RDTs that were distributed in 2006 are still available for use in 2007 so no adjustments so this has not been factored into the gap analysis.

8.5 Treatment

Since 1996, the Institut Pasteur of Madagascar, working with the SLP, has monitored *in vivo* and *in vitro* drug resistance. A recent investigation in 2004, following WHO guidelines for 14-day *in vivo* drug efficacy testing, reported resistance to chloroquine (CQ) at 37% among children under 5 years receiving treatment based on weight and 24% among under 5s receiving pre-packed, age specific doses. That same study reported 100% efficacy for amodiaquine⁴.

Based on these and other findings, the MOH took the decision in 2005 to change the first-line treatment for *P. falciparum* malaria from CQ to artesunate/amodiaquine (AS/AQ) combination therapy. The second-line is artemether/lumefantrine (AL; Coartem[®]) and the third-line, and for cases of severe malaria, is quinine in association with tetracycline or doxycycline (Politique Nationale de Lutte Contre le Paludisme a Madagascar, 2005). In the public health system there is no consultation fee charged for sick child visits and treatment for uncomplicated malaria is free.

⁴Randrianarivojosia M 2004 Etude de l'efficacité thérapeutique de la chloroquine et de l'amodiaquine dans le traitement des accès palustres non compliqués à Plasmodium falciparum à Sainte Marie (Nosy Boraha). Rapport technique, Institut Pasteur de Madagascar.

The treatment dose presented in the policy guide for AS/AQ is shown in the table below:

Prescription of AS+AQ combination		
Age	Artesunate 50 mg	Amodiaquine 153 mg
2 – 11 months	25 mg	75 mg
1 – 6 years	50 mg	150 mg
7 – 13 years	100 mg	300 mg
> 14 years	200 mg	600 mg

The rollout of this treatment policy began in 2006 in the East Province where malaria transmission has historically been the highest. Twenty-one districts received AS/AQ and RDTs purchased with GFATM support. Use of AS/AQ has been lower than anticipated, and at the present rate of consumption a significant proportion of an early batch of AS/AQ will not be used before the expiry date of December 2007.

The national policy also supports community/home-based treatment of fever. In regions of stable transmission or in other regions during epidemics, all children under five years with a fever should receive presumptive treatment for malaria at the home or community level. Several NGOs are providing support for community-based treatment of children under five with fever through community health agents using subsidized, pre-packed chloroquine (PaluStop[®]), produced by PSI in collaboration with the SLP. Treatment doses are sold for 100 AR (\$0.05). Since 2005, major NGO partners, have implemented this strategy in 47 SSDs in the East. It is estimated that about 2,275,000 PaluStop treatments, representing about 65% of a total of 3,500,000 treatments sold in Madagascar in 2006, were sold through community-based volunteers (Mary Kante, PSI, personal communication). There are plans to use this structure to launch community-based treatment using AS/AQ in 11 SSDs in the fourth quarter of 2007. The current USAID, UNICEF, and MOH pilot experience with community-based distribution of Zinc for diarrhea treatment and cotrimoxazole for acute respiratory infections could provide a model for AS/AQ community-based distribution.

The 2004 DHS survey reported that 21% of children under five years had a fever during the previous two weeks with the highest prevalence among 6-23 months (30%)⁵. There are no recent data available on treatment-seeking behavior for fever in children under five years, but data from ongoing activities indicate that private sector plays a significant role. PSI's social marketing project targets private sector establishments including pharmacy depots and general shops. PaluStop is sold at a cost of 100 AR (\$0.05). In 2006 about 1,125,000 treatments of PaluStop were sold through this network (Mary Kante, PSI, personal communication).

Community Mobilization, Information, Education, Communication, Behaviour Change Interventions for treatment of malaria: Mobilizing community leaders and civic organizations and families to support treatment-seeking behaviour for fever in children under five is critical for achievement of the national malaria strategy and PMI objectives. In addition, with the switch to ACTs for treatment there is much to be done to change provider behaviours with regard to treatment. The roll-out of community-based treatment with ACTs will be complex requiring substantial training for NGOs and community health agents and assuring supervision by CSB providers. Establishing a strong national IEC/BCC strategy for treatment both at the community and health center level including mass media and community-based education will be important.

⁵ Institut National de la Statistique (INSTAT) [Madagascar] and ORC Macro. 2005. Enquête Démographique et de Santé, Madagascar 2003–2004: Rapport de synthèse. Calverton, Maryland, USA: INSTAT and ORC Macro.

Community health agents will be extremely important to carry out the community based education and interpersonal communications to assure that mothers and care takers are appropriately applying home-based treatment, and recognize danger signs and when to seek treatment at a health center.

Monitoring Drug Efficacy: Strengthening capacity in the SLP in recent years has made it possible to transfer the responsibility for *in vivo* monitoring of therapeutic efficacy of antimalarial drugs from the Institute Pasteur de Madagascar to the SLP. There are plans to reduce the number of sites from nine to one and to conduct monitoring activities every two years. Training in PCR and other laboratory techniques has improved the capacity of the SLP and an eventual transfer of monitoring for biological markers is being discussed. The Institute Pasteur Madagascar will remain responsible for *in vitro* drug resistance monitoring.

Quantification of Antimalarial Needs – AS/AQ: The absence of reliable consumption data on the use of antimalarials in Madagascar makes accurate estimation of requirements challenging as only the morbidity method of quantification can be used. CRESAN has been responsible for estimating the requirements of AS/AQ and RDTs procured to date and the SLP has been responsible for estimating the requirements of SP for IPTp procured on their behalf by UNICEF.

The assumptions used by CRESAN in quantifying for AS/AQ and RDT for use at CSBs are summarized in the table below. These assumptions were used to determine the additional quantities of these products to be procured using UNITAID and GFATM funds. The most recent complete data from the SIS suggests the average health facility utilization rate in 2004 was 49.4% though the health facility utilization rates used in the calculation is projected to decrease from 55% in 2007 to 50% in 2008 and 2009. From the SIS data, suspected malaria is 16.8% of the total number of consultations; as opposed to the uniform 10% used by CRESAN.

Assumptions used in the quantification by CRESAN of AS/AQ and RDTs for use at CSB

	2007	2008	2009
Number of districts covered	111	111	111
Population	17,871,131	18,371,523	18,885,926
Health facility utilization	55%	50%	50%
Suspected malaria as a % of health facility utilization	10%	10%	10%
Confirmed malaria as a % of suspected malaria	40%	40%	40%
AQ/AS (<7 years) - as a % of confirmed malaria cases	34%	34%	34%
(7 - 13 years) – as a % of confirmed malaria cases	20%	20%	20%
(14+ years) – as a % of confirmed malaria cases	46%	46%	46%
RDT use (as a % suspected malaria cases)	100%	100%	100%

Using these assumptions, CRESAN estimated that 2,177,953 doses of AQ/AS and 5,444,883 RDT kits will be required for use in CSBs in 2007 – 2009. These figures have not been adjusted for the slow uptake of the new treatment policy that has been demonstrated by the currently available consumption data, and it will be important to review this quantification in a few months once additional consumption data becomes available.

Assumptions used to quantify AQ/AS for use at community level

	2007	2008	2009
Number of districts covered	91	91	91
Population	12,250,159	12,593,164	12,945,772
Est. pop (% of tot. Pop) 0 – 11 months	4%	4%	4%
1 - 4 years	12%	12%	12%
> 5 years	84%	84%	84%
Estimated number of episodes of malaria each year (for <5 population)	2	1.6	1.2
Estimated % of <5 with malaria episodes who will be reached by community based approach in the targeted districts	75%	75%	75%
Estimated % <5 with malaria episodes that are reached by community approach who will actually receive treatment	45%	45%	45%

The assumptions used to estimate requirements for AS/AQ for distribution at the community level are listed in the table below. It is expected that the community distribution will only occur in 91 districts (excluding the low transmission districts in the highlands). The calculations assume that the expected number of malaria episodes per child <5 will decline from 2 episodes per year in 2007 to 1.2 episodes per year in 2009. It is not clear why these figures were chosen and there was no data readily available at the time of the assessment to make a determination as to the accuracy of these estimates. Using these assumptions, it was estimated that 3,249,953 AS/AQ treatments will be required for community distribution in 2007-2009 (PSI also plans to procure and distribute 1,435,000 AS/AQ treatments for distribution at community level in 2008 using their GFATM Round 4 grant though this does not appear to have been included in the gap analysis done by CRESAN).

Estimated AS/AQ needs and gaps at CSBs¹ from 2007-2010

	2007	2008	2009	2010
Est. number of uncomplicated malaria cases ²	1,548,667	1,592,030	1,636,607	1,682,432
Estimated requirements <7 years (doses) ³	343,446	323,640	332,702	310,925
Planned procurements <7 years(doses)	255,764	239,024	245,716	0
Gap <7 years (Total need-contributions)	87,682	84,616	86,986	310,925
Estimated requirements 7 - 13 years (doses) ⁴	117,789	121,087	108,918	111,968
Planned procurements 7 – 13 years(doses)	150,450	140,602	144,539	0
Gap 7 – 13 years (Total need-contributions)	-32,661	-19,515	-35,621	111,968
Estimated requirements >13 years (doses) ⁵	274,841	282,537	254,142	261,258
Planned procurements >13 years(doses)	346,034	323,385	332,440	0
Gap >13 years (Total need-contributions)	-71,193	-40,848	-78,298	261,258
Total estimated requirements	736,076	727,264	695,762	684,150
Total planned procurements⁶	752,248	703,011	722,695	0
Total Gap (all ages)	-16,172	24,253	-26,933	684,150

Community-based Treatment: Several important variables related to community-based treatment cannot be accurately predicted, such as the pace of implementation of this intervention. This made it impossible for the team to develop an accurate quantification table for 2008 ACTs needs during their visit.

8.6 Pharmaceutical management

Policy and Regulatory Requirements

Registration: All antimalarials currently included in the national treatment policy have been registered for use in the country by the drug regulatory authority (*Direction de l'Agence du Médicament de Madagascar* (Drug Regulatory Authority); DAMM). Also registered is a quinine combination (Quinimax®), which is not included in the current treatment policy, and is most likely in use only in the private sector at this time.

List of registered antimalarial products (February 2007)

Chloroquine phosphate tablet
Quinine dihydrochloride solution injectable
Quinine resorcine sol. injectable
Quinine sulfate injectable
Amodiaquine tablet
Combination of arthemeter + lumefantrine (Coartem®)
Combination of artesunate + amodiaquine
Sulfadoxine – pyrimethamine tablets
Combination of quinine dichlorhydrate + quinidine chlorhydrate + cinchonine chlorhydrate + cinchonidine chlorhydrate (Quinimax®)

Essential Medicines List: The *Département des Pharmacies, des Laboratoires et de la Médecine Traditionnelle* (DPLMT) is the primary regulatory authority for the pharmaceutical sector within the MOH. It is responsible for the development of the National Pharmaceutical Policy and the Essential Medicines List (EML). Both of these were last revised in 2006 though they are still awaiting printing. The antimalarial medicines included in the EML as of 2005, as well as the level of the health facilities where they may be used are listed in the table below. While according to the EML quinine tablets should only be available in the CHD1 level, they were available and in use in all the CSBs visited during the field visits suggesting that this requirement is not being enforced.

<u>Item</u>	<u>CHD I</u>	<u>CSB II</u>	<u>CSB I</u>
Chloroquine 150 mg tablet	x	x	x
Doxycycline 100 mg tablet	x	x	x
Quinine 300 mg/ml injectable in 2 ml ampoule	x	x	x
Quinine 300 mg tablet	x		
Sulfadoxine-pyrimethamine 500 mg/25 mg tablet	x	x	

The assessment team understood that artesunate-amodiaquine has been included in the revised EML however this could not be confirmed at the time of the assessment. In the event that it has not been included, the SLP can request a temporary authorization from the DPLMT for its inclusion while awaiting the next revision of the EML, which occurs every 2-3 years.

Quality Assurance

The *Agence du Médicament de Madagascar* is responsible for testing nearly all pharmaceutical products destined for use in the country, and for conducting tests of products already in the market. The *Agence du Médicament de Madagascar* is able to conduct tests of AS/AQ combination and other antimalarials although its capacity to conduct a test is still limited to three to four samples per week due to insufficient financial and human resources and insufficient equipment or testing reagents. The *Agence du Médicament de Madagascar* conducts testing of antimalarial pharmaceutical products on behalf of Salama⁶ and CRESAN, the two main agents currently procuring antimalarials in the country. Given the limited capacity, they only conduct tests on a sample of products from each batch. To decentralize its testing operations and reduce the burden at the central laboratory, the *Agence du Médicament de Madagascar* is in the process of establishing peripheral minilabs. The first four have been established in Mahajanga, Toliara, Fianarantsoa and Toamasina. A fifth and sixth minilab sites are planned for Anstiranana and suburban Antananarivo. Approximately 50 samples are analyzed at each minilab site per trimester.

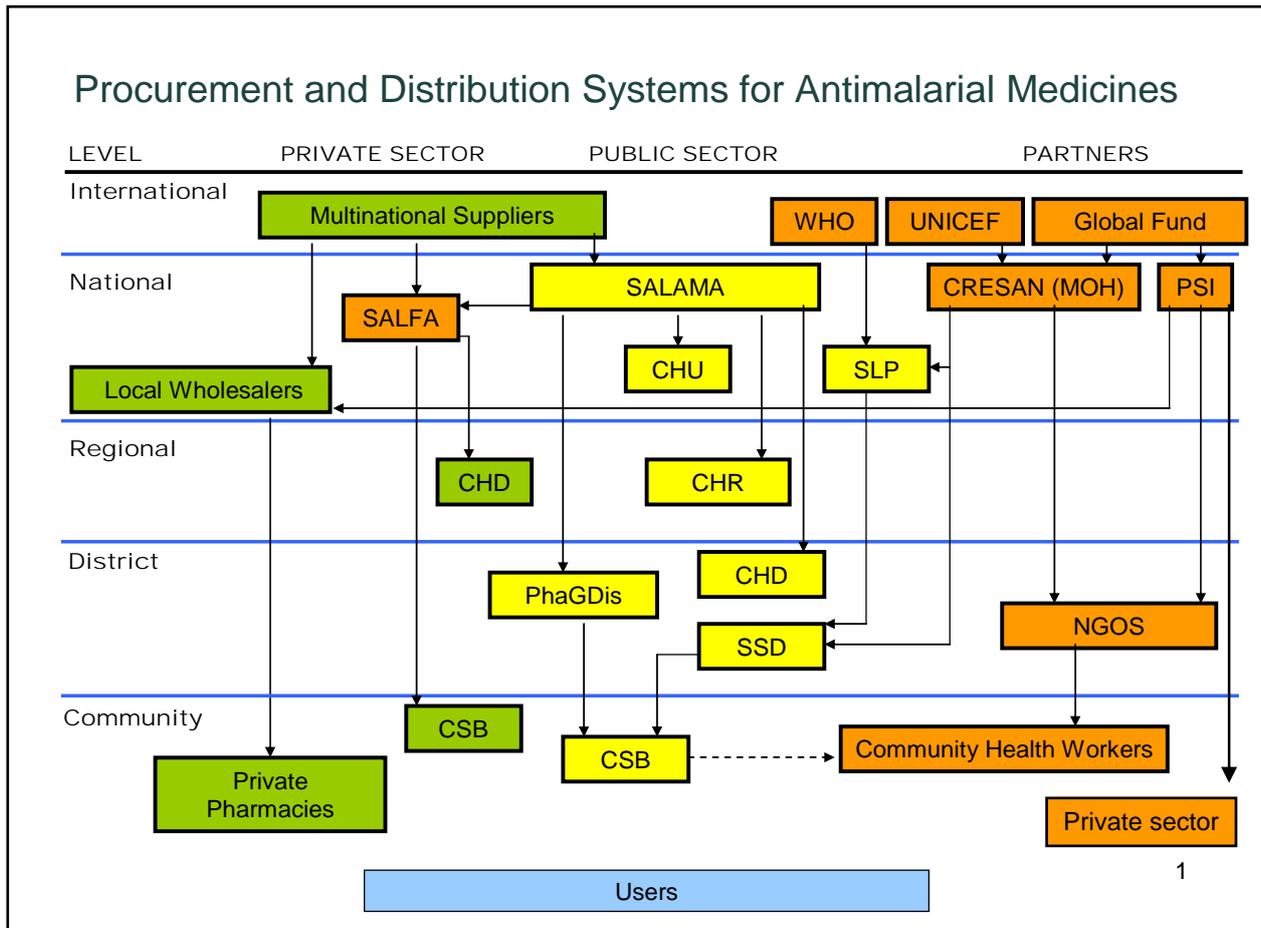
There are only five technicians/pharmacy inspectors and one supervisor currently working at the *Agence du Médicament de Madagascar*⁷, all based at the central level⁸ who are responsible for post-marketing surveillance. There are no pharmacy inspectors working at the regional level. This limits their ability to conduct regular and effective post-marketing surveillance and they only intervene when a specific problem is suspected and referred by prescribers.

⁶ Salama also sends its samples for testing to laboratories in France and South Africa

⁷ There are approximately 200 registered pharmacists in Madagascar of which only 5 are currently working in the public sector. The only pharmacy school in the country has only been functional since 2006 and the first graduates from the school are expected in 2010

⁸ 11 pharmacy inspectors have been trained, most of whom are working in the private sector and are available if needed. They are all working at the central level.

Procurement and Distribution



Procurement and distribution system of antimalarials and other health related products such as ITNs and RDTs in Madagascar

Public Sector

Financing: Currently the GOM's main contribution to the procurement of antimalarial medicines and supplies is through its regular procurement mechanism based on a cost-recovery model. The procurement of products for use in the public sector and their distribution to the district level is the role of Salama, the central purchasing agency of the MOH. Salama is an autonomous non-profit organization that was established in 1997 with the support of various donors, to serve as the central purchasing agent for essential medicines on behalf of the MOH. They finance all their activities from the resources generated by their sales.

Each financial year, the DPLMT receives a predetermined budget from the government for the purchase of pharmaceuticals, which it uses to maintain a line of credit at Salama on behalf of the health facilities. The DPLMT is responsible for determining the line of credit that will be available for each health facility from this budget. When the health facility purchases a product that is on the EML from Salama, they draw down on their line of credit. Each health facility is responsible for determining how to allocate the line of credit to cover all the required products on the EML with oversight from the district health teams and the DPMLT as needed. Once exhausted, there is no additional credit if available for the health facility to use until the next financial year. The health facilities can also use the money they generate as part of the cost recovery process to make

additional purchases from Salama (and this is usually the only option available to them to make purchases at Salama once they have exhausted their line of credit). All medicines dispensed at public health facilities are sold at a margin of +35% of the Salama price.

At the regional level, the district depots (Pharmacie de Gros de District – PhaGDis) are the intermediary points in the public sector supply chain. They are managed primarily by NGOs under a contract with the MOH through the DPLMT. These contracts are issued every three years following a national open tender process. The contractors' performance is evaluated based on the specifications in the contract which provide a general outline of the financial and operational requirements that the contractor is expected to follow. The PhaGDis adds 7% margin to its sales to the health facility pharmacies (Pharmacie de Gros de Commune – PhaGCom), 6% to pay the *prestataire* (depot manager) and 1% to pay a watchman.

Central level procurement and distribution: Procurement is done once a year through an international open tender. The tenders are developed in consultation with the DPLMT. The tenders are ranked based on their price, quality, services included, and business samples included in the tender documents. Salama has a procurement commission that reviews all the tenders received, and assigns a code for each of the four key elements. They then use a computerized system to provide a ranking based on the codes entered. The system can rank up to 60 suppliers. The final selection of suppliers is done during an open meeting to review all of the tenders, and participation of all affected programs is encouraged during this process. It takes approximately 1.5 months from the time a tender is advertised to the selection of a successful bidder. After placing an order, the lead time to delivery is approximately 4 months. All procurement done through Salama is tax free.

Salama is only authorized to procure items that are included in the national EML. Procurement of items that are not included on the EML can be only done after submission of a special request to Salama by the MOH. For antimalarial medicines, Salama is currently not procuring any ACTs or RDTs, as these had not yet been included in the EML at the time of their last procurement, and it had not received any special authorization to procure them. Once they are added to the EML, Salama plans to begin procuring them⁹. It has been procuring quinine, SP, and chloroquine. It also procures the related consumables including intravenous kits and syringes, and laboratory reagents for microscopy. It had been procuring ITNs but stopped doing so as it was not cost-effective given the availability of free and subsidized nets.

Salama's contract with the government only authorizes it to distribute products to the PhaGDis, Salama develops a distribution plan for delivery of pharmaceuticals to all 111 PhaGDis every December, in consultation with the PhaGDis and the district health teams. Distribution occurs every three months to the PhaGDis in accessible areas and every six months to the PhaGDis in hard-to-reach areas¹⁰. As Salama does not maintain its own transportation fleet, it contracts out the actual transportation of the products to the districts to private transport companies. It selects the private transport companies through annual national tenders.

The introduction of the free distribution of some antimalarial products through the public sector has resulted in the establishment of alternative procurement and distribution channels for these products. The CRESAN project, as the principal recipient of the GFATM Round 3 and 4 grants on

⁹ Given the strategy of a phased implementation of ACTs in the country, Salama says it would be possible to restrict purchases of the ACTs to only those PhaGDis in districts that have already received authorization and training from the SLP to begin the implementation. This would require it to work directly with the SLP to ensure compliance.

¹⁰ For districts that are inaccessible by road, e.g. Befotaka district in Fianarantsoa province, the items are deposited in the neighboring district depot.

behalf of the MOH, is procuring ACTs, RDTs, ITNs and some laboratory equipment and is distributing them to the district level. CRESAN has rented some warehouse space in Antananarivo for short-term storage of their shipments before their transportation to the districts¹¹. UNICEF has also procured or plans to procure ITNs, ACTs, SP (for IPTp) and prepackaged chloroquine as their donations, and on behalf of other agents including CRESAN, PSI, JICA. UNICEF also contracts out the transportation of the products to the district level, as needed.

While the quantity of antimalarials distributed to the districts by Salama is determined by the districts and the information sent to Salama at least two months before delivery (a ‘Pull’ system of distribution), the quantity of the free products procured and distributed to each district by UNICEF and CRESAN, is determined centrally in consultation with the SLP (a ‘Push’ system).

Given the multiple procurement and distribution strategies currently in use, good coordination is critical to ensure that no wastage due to excess products occurs. This is particularly important for the procurements done through the regular public sector supply system which relies on cost-recovery funds to meet their operating costs and provide funds for additional purchases. This coordination has been poor resulting in excess chloroquine and SP stocks in the PhaGDis and PhaGCom in the districts currently implementing ACTs.

Salama can also serve as procurement agency on behalf of non-GOM clients that wish to provide free or donated pharmaceutical products for use in the public sector. Their preferred option would be to procure, store and distribute the products as they would then be able to assume responsibility for all quality assurance requirements. However, they are also able and willing to only store and distribute previously procured products as required by the donor agency. There is a fee associated with these activities which depends on the weight and volume of the products, and the frequency of distribution. Large volume items (e.g. ITNs) or distribution outside the regular Salama schedule would require the hiring of additional transport vehicles and would increase the charges.

Peripheral level procurement and distribution: As with the central level distribution, there are multiple channels for distributing antimalarial medicines and products at the district level. The free and donated antimalarial products are received and managed by the SSD while the products from Salama are managed by the PhaGDis. In both circumstances, the CSBs are responsible for the actual collection and transportation of their supplies from the district level, thus limiting the quantities that most of them can transport at any one time as they mainly rely on public transportation.

Private sector

Non-commercial Private Sector: Several NGOs and faith-based organizations also procure and/or distribute antimalarial medicines and supplies. SALFA the health agency for the Lutheran mission in Madagascar is one of the largest of the faith-based organizations working in the country. It procures and distributes pharmaceuticals, including antimalarials, for its network of 27 health facilities and affiliated community health workers. These health facilities purchase the pharmaceuticals at a 15%-25% margin from SALFA.

PSI is the largest organization involved in the procurement and distribution of chloroquine and ITNs for distribution in the private sector and the community as part of a social marketing strategy. The items are distributed to NGOs, private sector pharmacies and private doctors through PSI-

¹¹ We did not have sufficient time during the assessment to inspect the warehouse and assess the quality of this warehouse space.

contracted pharmaceutical wholesalers. PSI determines the margins at which these items are sold to the consumers by these private providers. In 2007, PSI plans to stop the distribution of chloroquine and begin the distribution of ACTs to the *depôts pharmaceutiques* through the wholesalers, and to the community health workers through pre-identified NGOs.

Commercial Private Sector: There is also a small but active distribution system of antimalarials in the commercial private sector, particularly within the urban areas in the country. There are at least three local manufacturers who mostly import finished products for repackaging and sales, approximately 20-30 wholesalers, approximately 200 private pharmacies and approximately 2000 *depôts pharmaceutiques*. FARMAD, the largest local manufacturer, currently sells several antimalarials as part of its regular sales. As of February 2007, there were six antimalarial drugs on sale through FARMAD.

- Neoquine® (chloroquine) 100 mg tablets
- Amodiaquine 200 mg tablets
- Artesunate 50 mg tablets
- CombiPalu® (artesunate-amodiaquine)
- Quinine injectable 600 mg/2 ml ampoule
- Paludar® (sulfadoxine-pyrimethamine)

FARMAD has also been working with PSI to repackage chloroquine for sale as PaluStop® for distribution through its networks.

Storage and Inventory Management

PhaGDis and PhaGCom: Standard inventory management forms and registers have been developed by the DPLMT; however, their use and the quality of the storage conditions and inventory management procedures in place depend on who is managing the PhaGDis and PhaGCom. Some of the inventory management problems identified include: non-existence of stock records or incomplete records; expired medicines still on the shelves and included in records of available medicines; inability to correctly determine the quantities of products to order (despite the existence of a formula developed by DPLMT and Salama); and dirty, hot, humid storage rooms.

The DPLMT has direct oversight over the PhaGDis and is responsible for their regular supervision and training. Reports on the activities of the PhaGDis, including information on their sales receipts, expenses and inventory are supposed to be sent to the DPLMT each month. This appears to be the only central source of data on consumption of any pharmaceutical product by the health facilities. We were not able to review any copies of these reports to determine their accuracy and completeness, nor were we able to obtain any consumption data for peripheral level facilities during this visit. The DPLMT provides training to the depot managers of the PhaGDis when the contract is first issued based on conversations with depot managers at the PhaGDis visited by the team, there is follow-up training except during the occasional supervision visits.

The PhaGCom, which serve as the health facility dispensaries, are owned by the community and managed by a community health management committee which includes a representative of the district health team. This committee nominates a president and a treasurer to directly manage the operations of the PhaGCom. The president is responsible for the inventory management, including all stock records, while the treasurer is responsible for the accounting and financial records. The district chief medical officer and health team responsible for supervising the activities of the PhaGCom though most of them have had no training in proper inventory management procedures nor do they have standardized supervision tools to use during their supervision visits.

Management of donated antimalarials at district level: The establishment of a separate supply system for donated antimalarials and those purchased from GFATM grants through the SSD has required that they store and manage pharmaceuticals although they do not have warehouses to do so. In some districts with large SSD offices, the medicines are stored there while in some districts; the Médecin-Inspecteur has reached an agreement with a neighboring PhaGDis to store the medicines for them. No standard inventory management forms or registers have been provided for their use.

At the health facility level, the ACTs and RDTs are managed by the physician in charge while the SP for IPTp is managed by the midwife (or whoever is in-charge of the ANC). These workers have not had any training in inventory management nor do they have standardized stock records. In some health facilities visited, they had decided to use the same stock records as those used by the PhaGDis.

Pharmacovigilance

2006 marked the debut of Madagascar's national pharmacovigilance center and system. Since then, the center has developed its national strategy, developed a national adverse events reporting form, conducted an initial training of trainers workshop (with the assistance of the Moroccan pharmacovigilance center) and conducted trainings in four districts of the Atsinanana region (around Toamasina) which were coupled with the scheduled ACT trainings executed by WHO/Madagascar and the national malaria control program. In addition, a pharmacovigilance focal person for the *Direction de l'Agence du Médicament de Madagascar* has also been hired and she recently completed a three-month internship at the pharmacovigilance center in Morocco. The impetus for the development and establishment of an effective pharmacovigilance system has come from the SLP as part of the introduction of the new treatment policy.

Community Mobilization, Information, Education, Communication, Behaviour Change Interventions: The GOM has placed a high priority on civic participation, engaging communal officials and communities in their development. The MOH supports this directive to make communes responsible for the health and well being of their population. Furthermore, the isolation of many communities coupled with difficult access to health services means that a durable community health outreach approach bringing services and products close to the households is paramount. USAID supports a robust community mobilization and behaviour change approach, called champion commune or Kominina Mendrika that empowers community leaders who work closely with the public health centers, NGOs and volunteer community health workers to promote healthy behaviours and improve use of health services. The community health workers are trained to provide health education, services and products for the integrated management of childhood infections and appropriate treatment of fever at the household, essential nutrition actions, neonatal care and family planning. NGOs partner with the MOH to implement information education communication, behaviour change communication activities including participatory radio shows and listening groups, local drama, education sessions, mobile videos (Mobile Cinemas), and marionettes, which are popular in Madagascar.

The community health agents that distribute socially-marketed products are also responsible for educating local residents on ITNs and their use.

We could add some data and results here.

8.7 Surveillance, monitoring and evaluation

One of the major priorities for the SLP is to measure the results of their activities and use the information in order to improve the program, and disseminate best practices. The SLP is currently developing the national monitoring and evaluation strategy, which is expected to be completed in the near future.

The surveillance system consists of 3 primary components which routinely collect information: 1) the National Health Information System, 2) sentinel sites located in all six provinces collecting RBM malaria indicators, and 3) sentinel sites located in the two epidemic-prone zones monitoring the reported number of malaria cases for epidemic surveillance (PSSE). The two separate sentinel surveillance systems use the same data collected from the national Health Information System reporting forms.

The weaknesses of the overall health surveillance system appear to be:

- 1) limited access of the population to health facilities due to cost or logistics with approximately 40% utilization of health services
- 2) lack of adequate analytic capacity for staff at health facilities
- 3) no community level data
- 4) minimal evaluation by partners implementing activities
- 5) no budget devoted to monitoring and evaluation
- 6) no central database for the harmonization, synthesis, and centralization of data from various sources such as national system, NGO reports, surveys

Health Information System (Système d'Information Sanitaire – SIS): The SIS collects data monthly from all health facilities on outpatient diagnoses and inpatient morbidity and mortality aggregated by age categories (0-11 months, 1-4 yrs, 5-14 yrs, 15-24 yrs, 25+ yrs). Other data collected include vaccinations, laboratory tests (microscopy and RDTs), and number of days of medication stock outs (quinine injectable, chloroquine, folic acid). Following the recent changes in malaria interventions, additional information such as that related to stocks of ACTs available or number of RDTs used is recorded on the front of the monthly report form as a temporary solution until an updated standard form is developed. The CSBs and CHDs are requested to complete the monthly reports and deliver them to the District Health Service. Compilation and data entry occurs at the district level, and transmission of data to the regional and central levels should occur before the 10th of the following month.

According to the SISS, the timeliness and completeness of the monthly reports is estimated at 80% for both. The reasons cited for delayed reporting are insufficient personnel especially at the district level, malfunctioning computers, limited ability for the districts to transmit reports to the regional or central level via the wireless internet connection, and inadequate financial resources to purchase registers for the CSBs.

Sentinel Sites for Roll Back Malaria Indicators (Postes Sentinelles de Surveillance des Indicateurs RBM – PSSI):

In 2004, the SLP established a system of sentinel surveillance in order to monitor the progress of malaria control activities. The objective of the PSSI included measuring malaria-associated morbidity and mortality, the impact of prevention interventions, early diagnosis and treatment strategies, and community mobilization activities. The 12 PSSI are situated in each of the 6 former provinces (two per province). These sites are located in Antsiranana, Sambava, Antsohihy,

Mahajanga, Morondava, Toliara, Anjozorobe, Tsiroanomandidy, Toamasina, Moramanga, Fianarantsoa, and Manakara. There are 12 trained physicians (1 assigned per site) working in collaboration with the regional supervisor for malaria activities to collect data from all health facilities within their catchment areas (CSB, CHD, CHU). This system reinforces the established national health information system.

The populations targeted for the PSSI include hospitalized patients with suspected malaria, outpatients, and pregnant women delivering at the health facilities. Data is collected through review of registers, review of monthly reports, and microscopic slide readings. The following chart lists the collected indicators:

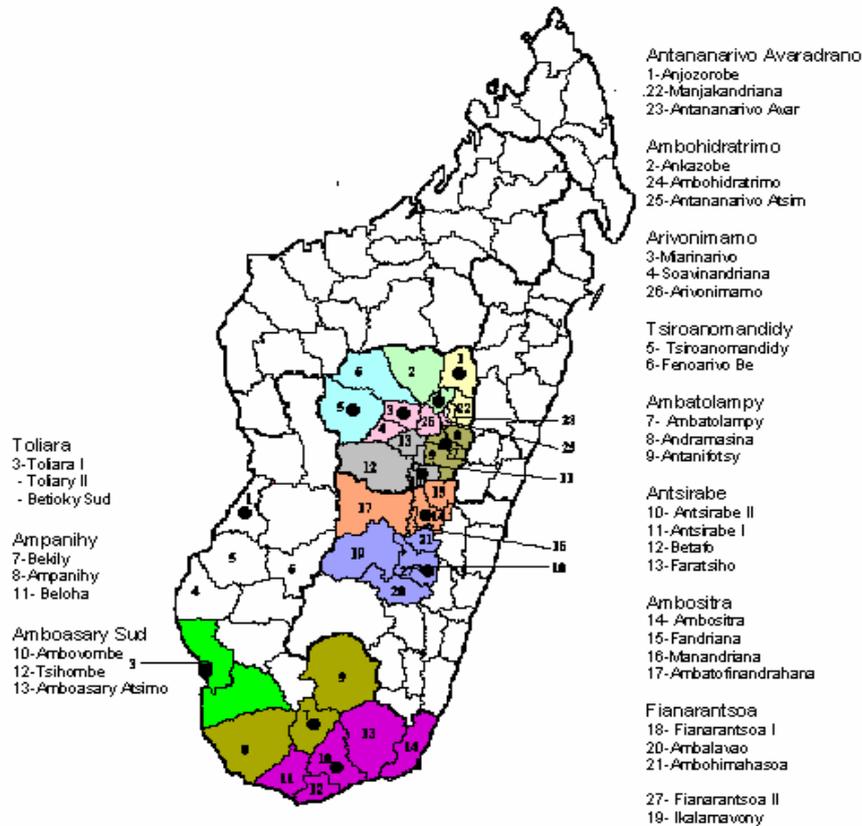
Impact Indicators	All cause and malaria-specific morbidity and mortality rates in the hospitals aggregated by age.
	Number of uncomplicated and severe cases of malaria (presumed and confirmed) reported by all health facilities.
	Prevalence of placental malaria among women delivering at the maternity wards.
Outcome Indicators	% of children under five years old hospitalized for fever who have received an appropriate antimalarial at home within 24 hours of hospitalization.
	% of laboratory confirmed cases of malaria among children < 5 years.
	% of children < 5 years old with uncomplicated malaria or with severe malaria who have received an appropriate antimalarial treatment within 24 hours after admission to the health facility.
	% of health facilities having a stock-out of the antimalarial medication required by national policy lasting greater than one week within the last three months.
	% of patients hospitalized for malaria and % of women delivering at the health facility who use an ITN, non-treated net, or no net.
	% of women delivering at the health facility who have received IPT according to national policy.

Funding for the support of the PSSI is available through the World Bank until April 2008.

Sentinel Sites for Epidemic Surveillance (Postes Sentinelles de Surveillance Epidémiologique - PSSE):

Madagascar, as a signatory of the Abuja Declaration targets and Millennium Development Goals, aims to control and detect at least 80% of malaria epidemics within the first two weeks of their onset. With support from WHO, GFATM and other partners, the SLP has been gradually improving its capacity to forecast and detect malaria epidemics by using meteorological information as well as weekly case-based surveillance data (presumed uncomplicated and severe cases of malaria) from the health facilities within the catchment area. There are 12 sites (nine in the central highlands and three in the southern epidemic-prone area) collecting data from 36 districts and covering approximately seven million people. Each site is supposed to have a physician/technician and laboratory equipped with the capacity for microscopy. Funds from the GFATM have supported the establishment of micro-weather stations in all 36 districts of the PSSE system in order to collect data on rainfall, temperature, and humidity. At the time of this assessment, all 12 sites were collecting reported malaria cases from the health facilities in their catchment areas, while some micro-weather stations were reported to have malfunctioning equipment that were in the process of repairs. No entomological data are routinely collected at the PSSEs, however, when case detection surpasses the alert threshold and the alert is confirmed, an entomologic survey is conducted to confirm the epidemic and to guide the response.

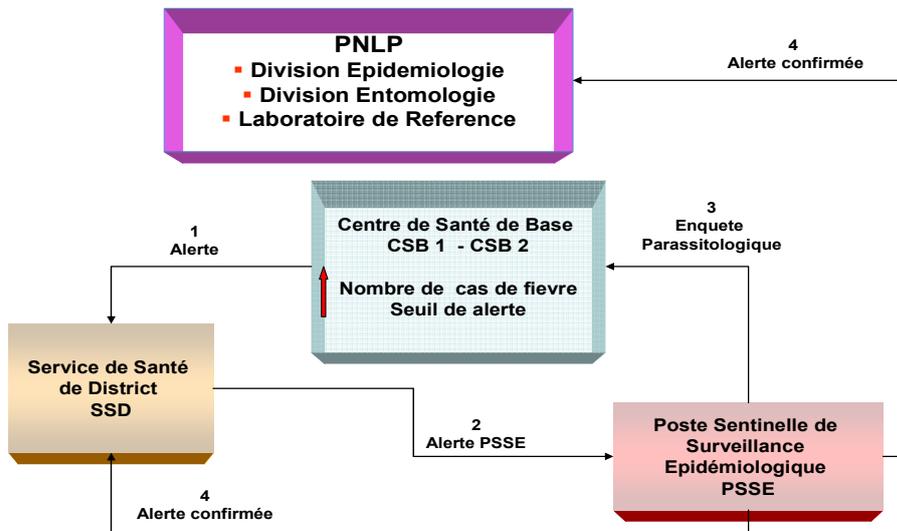
Sentinel surveillance sites for malaria epidemic monitoring



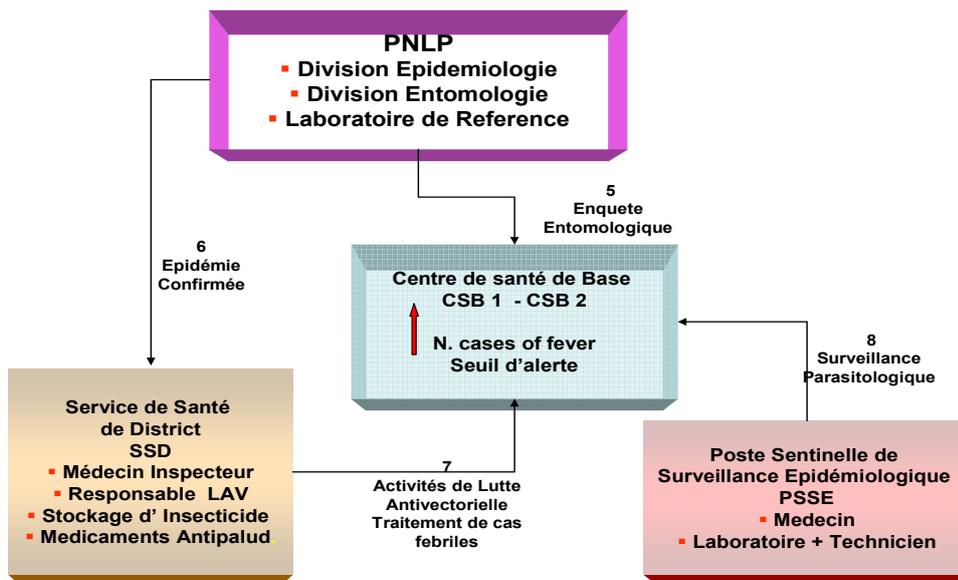
In November 2005, WHO-Madagascar organized a two-week training in basic field epidemiology, Epi-info, data management, geographic information system, Health Mapper, and informatics tools to manage the digital meteorological weather stations. The Madagascar National Meteorological Service was also actively involved in the training. Refresher training for the staff in the southern epidemic zone has been planned.

Funding support for the 12 malaria epidemic surveillance sites is provided by GFATM Round 3 and will cover the time period of 2004-2009. The system of the PSSE is as follows:

SYSTEME DE SURVEILLANCE EPIDEMIOLOGIQUE DU PALUDISME (1)



SYSTEME DE SURVEILLANCE EPIDEMIOLOGIQUE DU PALUDISME (2)



The alert threshold for malaria cases is set at +2 standard deviations above the mean for the five or more previous years' number of weekly cases. To illustrate the high sensitivity and relatively low specificity of the PSSE, over a five-year period, case detection surpassed the threshold 4,197 times, and only 718 (17%) of the alerts were confirmed as true outbreaks.

Other data sources:

National Institute for Statistics (Institut National de la Statistique – INSTAT): INSTAT coordinates and provides technical support for national-level surveys in collaboration with partners such as universities, the World Bank, the Millennium Challenge Account, or in sectors involving health, education, and agriculture. The role of coordination also involves harmonizing survey indicators with the national plan. Information on the health infrastructure, health-related human

resources, access to health facilities, and information related to development and health is available through this agency. At the present time, INSTAT is involved with the planning for the next DHS survey, which is scheduled to take place in 2008; however, due to the need for a mapping of the population in order to develop a sampling framework, the timeframe for the survey is uncertain. Approximately one-half of the country has been mapped, and the World Bank has agreed to fund the remainder of the mapping.

NGO Surveys: Another relevant national household survey includes the bed net KAP survey conducted by PSI ever 2 years – most recently done in 2006 and the final report is pending.

8.8 Epidemic prevention, preparedness, and response

According to the national strategy, IRS is the main malaria prevention activity in the central highlands and the fringe areas between unstable and stable transmission zones that are more likely to experience epidemics when environmental and meteorological factors favor transmission. In preparation for epidemics, medicines, insecticides, RDTs, and ITNs are pre-positioned at the regional level for deployment. The response using targeted IRS is based on surveillance information, altitude and monitoring of key entomological, environmental, and demographic variables. Larval control and other source reduction interventions, particularly targeting rice fields, are to be considered although not yet applied routinely in the country. The response also uses mass treatment with ACTs (AS/AQ) distributed by community health workers in targeted areas. To illustrate the epidemic response in the central highlands, a recent outbreak of malaria cases was detected in the village of Miarinarivo in late December of 2006. One week after the epidemic was confirmed, 2,500 doses of AS/AQ were given over a 17 – 20 day period to all <5s in the affected communities and to all household members of the cases. No additional IRS was used in this particular situation since the community had already been treated with IRS in early December during the planned seasonal IRS program.

In the semi-arid southern part of the country, ITN distribution, prompt case management and IEC are the main strategies to prevent malaria epidemics. During emergencies related to cyclones and flooding, risk factors are assessed and interventions are put in place to respond to the situation accordingly. The main intervention during complex emergencies in Madagascar is mass distribution of ITNs coupled with IEC and behavior change interventions.

Due to the recent cyclone in early March of 2007 and subsequent flooding in the southeastern region of Madagascar, 200,000 ITNs originally purchased by UNICEF for distribution during the integrated ITN-measles campaign will be redirected to the epidemic-prone region affected by the cyclone.

8.9 HIV/AIDS and Malaria

Although the 1% sero-prevalence of HIV infections in Madagascar is low compared to other southern African countries, the prevalence of the infection is rising and Madagascar has a high rate of sexually transmitted diseases. Since the inauguration of the new government in 2002, there has been a strong political commitment to aggressively fight the spread of the infection. A National HIV/AIDS Strategic Framework was approved in late 2001 and then modified after the first national sero-prevalence survey in 2003. This plan focuses on behavior change and prevention, treatment of HIV infections and sexually transmitted disease and AIDS education. With funding

from the GFATM, USAID, the World Bank, and other donors increasing numbers of voluntary counseling and testing sites have been opened and emphasis is being placed on prevention of mother to child transmission (PMTCT), improving access to health care for patients living with HIV/AIDS, and prevention and treatment of sexually transmitted diseases.

8.10 Human resources / MOH capabilities

The SLP is responsible for policy development, establishing norms, and planning, organizing, and oversight of malaria control activities throughout the country. Its offices are located within the Institute of Hygiene in Antananarivo. The SLP has 22 professional and technical staff based in the capital, including eight physicians, specialists in case management (3), entomology (3), surveillance, monitoring and evaluation (6), and IEC (3), and laboratory technicians (3). Before the political-administrative boundaries of the country were redrawn in 2006, each of the six provinces had a medical officer responsible for malaria, supported with GFATM funding. Two new malaria officers are in training, but with the new division of the country into 22 regions, many regions now have no malaria supervisors. A request for funding for these additional staff was included in the unsuccessful Round 6 GFATM proposal.

9. ROLES AND CAPABILITIES OF PARTNERS

9.1 Global Fund

Madagascar has benefited from three GFATM grants for Malaria (Round 1, Round 3, and Round 4). The total amount of funding of the proposals is \$53,562,646. In Round 1, PSI was the principal recipient of grant, MDG-102-G01-M-00, for a total amount of \$2,000,063. The duration of the project was February 2003 to July 2005. The total amount of the grant was dispersed. The proposal focused on prevention of malaria through a social marketing approach working through the private sector. CRESAN was a principal recipient of the Round 3 grant, MDG-304-G05-M for the amount of \$10,035,054. The project began in October 2006 and ends October 2009. The proposal used a horizontal approach with decentralized management, and involvement of the community and civil society to increase access to and coverage of malaria prevention and treatment. In Round 4, there are two principal recipients, CRESAN and PSI. CRESAN manages MDG-405-G06-M, to scale up successful malaria treatment and prevention initiatives in Madagascar. The total amount of the grant was \$22, 067,868. The duration of the project was February 2007-February 2008. PSI manages MDG-405-G07-M for the total amount of \$19,459,661. The duration of the grant is February 2007 to February 2009. The grant focused on scaling up malaria prevention and treatment through the provision of highly subsidized long lasting insecticide treated nets and prepackaged treatment kits for home treatment through community-based distribution.

9.2 World Health Organization

The World Health Organization provides technical assistance to improve health services through policies and programs that enhance equity and integrate pro-poor, gender responsive and human right based approaches to the member States. To fulfill its mandate, WHO provides leadership, strengthens governance and fosters partnership and collaboration in engagement with countries to reduce morbidity and mortality and improve health during key stages of life, including pregnancy, childbirth, the neonatal period, childhood and adolescence.

WHO country office in Madagascar works in the following areas : surveillance of infectious diseases, surveillance and care of the non-infectious diseases, promotion of the health, incapacity

and the trauma, mental health and drug addiction, child and adolescent health,, sustainable development, health and environment, preparation and response for emergency situations ,organization of the services.

For the biennium 2004 – 2005, WHO country office worked with a budget of about US\$ 8.420.000. A large part of this amount was used to the fight and prevention of malaria and the control and eradication of infectious diseases.

With regard to infectious diseases, specifically Malaria, WHO supports the country in its malaria control efforts. WHO/Madagascar provides technical orientation and support to the National Malaria Control Program in order to reduce the malaria related mortality and give access to effective treatment to individuals suffering from malaria with international and local staff.

To support malaria control in Madagascar, WHO uses several strategies which rely on a clearly defined policy:

- Building and strengthening partnership at all level of implementation
- Taking technical interventions to scale up : Intermittent Preventive Treatment to pregnant women and treatment to children under 5 years
- Strengthening monitoring & evaluation system, information and research in order to contribute to Health sector reform
- Encouraging the community participation integrating malaria control activities into primary health care and taking benefit from suitable combination of personal and community protective measures such as LLINs and indoor residual spraying
- Improving infrastructures at national level (office, equipment, vehicles) and training to improve staff efficiency (technical support provided by consultant from WHO/AFRO and participation of NMCP staff to international courses/meeting
- Promoting Information, Education and Communication (IEC) and Behavioural change and Communication (BCC)
- Supporting the implementation of the strategic interventions for malaria control and national policy
- Identifying potential and international funding sources or technical assistance (GFATM, Italian Cooperation, USAID, World Bank, Principauté de Monaco Cooperation, etc...)
- Strengthening vector control strategies in various epidemiological settings (Indoor Residual Spraying IRS)
- Improving epidemiological system and developing epidemic surveillance, early warning detection and response

During biennium 2004-2005, WHO performed the following activities in malaria control:

- Technical support to NMCP (strategies, policy, implementation, M&E)
- Training of national staff: capacity increase for 11 national malaria staff at national and regional level
- National anti-Malarial Treatment Policy change towards Artemisinin based combination therapy
- ACT
- Adaptation of the modules of training on the case management and prevention of the malaria
- 57.000 posters IEC edited on the main malaria strategies
- 8.700.000 chloroquine blister packs for children less of 5 years were distributed
- 210.000 insecticide treated nets (LLIN) were distributed to the target groups (pregnant women and children under 5 years) and 300.000 were re-treated

- Support to the campaigns of indoor residual spraying was led in epidemic prone areas of the country to protect about 1000.000 persons.
- Training on the focused antenatal care and IPT was held at national level
- A network of 12 posts epidemiological sentinel sites was set up in the epidemic districts

WHO country office managed some projects related to these strategies such as Monaco project in Saint Marie Island, Dutch Project, Italian Cooperation funds, and Malaria Action Coalition activities.

WHO HQ and AFRO provided technical support mainly on epidemic surveillance early warning detection and response, implementation of the pharmacovigilance, evaluation of indoor residual spraying, development and redaction of political and strategic document related to different strategies including new policy of treatment, management of malaria control strategy.

9.3 UNICEF

UNICEF supports malaria prevention and control as part of its integrated maternal and child survival programming. This includes the distribution of free LLINs to pregnant women on their first antenatal visit, and to infants through routine vaccination, integrated national campaigns, and Mother and Child Health weeks which include measles vaccination, de-worming, vitamin A, and LLINs. Between 2003 –2006, UNICEF also procured 1.5 million LLINs on behalf of Madagascar’s government (out of a total of 3.6 million distributed by the government). Using program funds, 200,000 ITNs have been procured already in 2007, to be distributed as part of emergency malaria prevention to flood-affected areas in the south of the country. UNICEF is currently in discussion with the NGO, Malaria No More, to procure and distribute 110,000 ITNs as part of the integrated campaign in October 2007.

UNICEF will procure approximately 6.5 million treatment doses of AS/AQ as part of partnership with UNITAID and GFATM over the next three years for the MOH and PSI. Additional operational costs are still required to support the distribution of these treatments.

UNICEF is increasingly involved in monitoring and evaluation including support to an operational research project to provide intermittent preventive treatment (IPTi) to some 25,000 infants in malaria endemic zones.

To enhance the capacity of the government to strengthen malaria prevention and treatment, the UNICEF office is increasing staff capacity and resources, including an international malaria specialist, national malaria officer, international logistics specialist, three child survival officers at regional level, and IPTi staff including a health economist and anthropologist. In the country program 2008-2011, UNICEF will put increased emphasis on malaria, including community-based treatment of malaria with ACTs, pneumonia (with antibiotics) and diarrhea (with zinc). Additionally, increased effort will be placed on strengthening the health system supply chain.

9.4 The World Bank

The World Bank has been supporting the health sector through a number of health specific and multi-sectoral projects in the past decade. These include the Second Health Project (CRESAN 2), which was approved in November 1999 in the amount of US\$ 40 million, with the objective of contributing to the improvement of the population's health status through more accessible and better quality of health services, especially primary health care services in rural areas. Specific to malaria control, the World Bank through CRESAN 2 has been the sole support for IRS and sentinel surveillance in the epidemic-prone region of the central highlands from 1999 through the end of the project in 2006. A limited funding extension of US\$ 18 million for select program activities is available until September 2007; however, this will not be used to support the IRS activities in the central highlands for this year.

The proposed Madagascar Health SWAp Project represents the next stage with respect to the World Bank and other development partners' support for the health sector. The amount of Bank funding through the SWAp is US\$ 10 million for 2 years and will support the MOH's priorities in the following areas: 1) health services, 2) human resources, 3) stimulation of demand/utilization, 4) development of the financial strategy for health system, and 5) monitoring and evaluation. Although the SWAp is not a true system of basket funding (donors will be able to direct resources to individual activities), this approach will allow for more flexibility of funds by aligning with the government program as outlined in the Madagascar Action Plan, harmonizing and coordinating with other donors, and integrating a sector-wide approach to health.

9.5 CRESAN

CRESAN is a project implementation unit of the World Bank health project that has also been a principal recipient of GFATM Round 3 and Round 4 grants.

9.6 USAID

With an annual budget of about 12 million dollars a year, USAID/Madagascar's Health, Population, and Nutrition (HPN) program is advancing community health and food security priorities established under Madagascar's MAP by promoting reproductive, maternal, and childhood health; intensifying essential nutrition activities; and reducing infectious diseases (especially malaria). This integrated program includes mobilizing communities to action, engaging the private-and non-governmental sectors to partner with the public sector, promoting positive behavior change with innovative interventions.

At the commune level, USAID's community approach called Kominina Mendrika reaches households in nearly 400 communes with behavior change interventions, and improved access to health services and commodities. Last year, USAID trained 1,820 volunteer local community based health agents and hundreds of NGO staff who are actively working in these communes. These community health agents, ensure the availability of contraceptives and life-saving commodities such as ITNs, and malaria treatment for children at the household level.

USAID supports IPTp, some net procurement and distribution through community based distributors, as part of the IRS campaign, and efforts to transition from chloroquine to ACT. USAID trained providers and improved availability of drugs for IPTp. Last year, this effort was expanded from a pilot activity in a dozen centers to cover all the community health centers in the stable malarial zones. The promotion of ITNs through community-based networks was

substantially expanded. USAID also supported a three day national workshop to develop a practical one-year plan for the transition from chloroquine treatment to ACTs.

In the area of child health at the national level, USAID supported the development and validation of the national child health policy that will guide implementation of more effective interventions to save children's lives at the household and clinic levels. The policy includes the adoption of community-based use of zinc for diarrhea and cotrimoxazole for childhood pneumonia, which together with malaria are the top three killers of children in Madagascar. The roll-out of these new treatment therapies at the community level has already begun and will be taken to national scale in the next fiscal year. This could offer a model for the roll out of community-based distribution of ACTs.

USAID's HPN integrated program is implemented through a variety of partners. HPN has created synergies among the implementing partners by linking them through the two primary bi-lateral agreements, with PSI that supports social marketing and health promotion, and SantéNet, a consortium with Chemonics, JHPIEGO, Helen Keller, Training Resources Group, Georgetown, Prospect, and Medical Care Development International (MCDI). The other pillar partners include the three PL 480 Title II cooperating sponsors, CARE, the Adventist Development Relief Agency (ADRA), and Catholic Relief Services, and the Child Survival Grantees, ADRA and MCDI. Other key implementing partners include globally awarded projects including, BASICS, Health Communication Program, Family Health International, Malaria Action Coalition, World Learning, US Pharmicopia, and Rational Pharmaceutical Management. USAID also provides support to a host of local NGOs through SantéNet and the other partners. All of the implementing partner activities contribute to and are aligned with the MOH health sector strategy.

9.7 Institut Pasteur Madagascar

Institut Pasteur has been working in Madagascar for over a century on various research activities such as malaria, tuberculosis, plague and viral infections. It has a relatively large facility in Antananarivo with a strong staff of research scientists who also have access to the extensive network of scientists working at Institut Pasteur worldwide. The Institute is involved in various research activities relating to malaria such as drug resistance testing for antimalarials, quality control analyses of RDTs and some insecticide resistance testing. They have also done various operational and clinical research projects relating to antimalarial treatment. Recently the Institut Pasteur Madagascar has been working in 9 sites (located in the east, west, south and central highlands) on antimalarial drug resistance testing. They have also done a comparison study of three different RDTs to help the MOH reach an informed decision on which RDTs to procure. In addition, they have trained over 400 health workers (doctors and nurses) on the utilization of RDTs (nationwide). The Institut Pasteur in Madagascar also hosts an annual malaria workshop, which is attended by doctors and scientists from many other African countries. The Institut Pasteur does not currently have any collaborative research projects with the SLP. Collaboration between the Institut Pasteur and SLP is dependent on program activities and funding.

9.8 Japanese International Cooperation Agency (JICA)

JICA supports programs in health, education and water within their social development activities. Malaria has not been singled out as a particular area of focus, but over the past two years JICA has purchased 44,000 Olyset[®] LLINs for distribution in areas where they have ongoing field projects. UNICEF and MOH have partnered with JICA and taken responsibility for distribution of the LLINs. A first shipment of about half of the LLINs went to Toamasina, Antsiranana and

Fianarantsoa. A second shipment will be sent to the region of Menabe. In view of long delays in getting the second shipment out of the port, JICA has undertaken an evaluation of their strategy of LLIN donations. A decision on whether they will undertake new initiatives in this area will be made after an evaluation has been completed in early April, 2007.

9.9 European Union

The European Union supports a community-based intervention to combat filariasis and malaria in three districts in the East Province through an NGO, Reggio Terzo Mondo. Along with the geographical expansion of this initiative, PaluStop for distribution to children under five with fever was added in 2007. This package has been approved for funding for 5 years, i.e. through 2010.

9.10 Red Cross Madagascar

The Red Cross has a long history of involvement in malaria control efforts in Madagascar, and was active from 1905-1975 in delivery of weekly chloroquine to children. Since then, its involvement in malaria control has diminished, and though it maintains a strong network of 8,000 community volunteers in all 22 regions, they have been principally involved in nutrition, community alerts prior to cyclones, disaster relief, safe water, and most recently, in partnership with Spanish Red Cross, implementation of life-saving devices for vessels on Malagasy waterways. They are partnering with Canadian Red Cross in the Measles Malaria campaign for October 2007 to help with net distribution.

9.11 Population Services International (PSI)

PSI began social marketing activities in Madagascar in November 1998. Currently, PSI/Madagascar distributes eight essential health care products including LLINs and pre-packaged treatment for uncomplicated malaria. In 2001, PSI/Madagascar launched socially marketed LLINs. While these nets were distributed at cost-recovery price of \$6.00, a pilot program managed by PSI/Madagascar and funded by CDC targeted the distribution of LLINs to pregnant women and children under 5 through clinics in two districts at a subsidized price of \$1.50. The successful results of this pilot program led the RBM partners to develop a national strategy to scale up LLIN coverage by subsidizing net prices in all endemic zones. With the support from the MOH through the World Bank/CRESAN (300,000 nets donated), USAID and GFATM (Rounds 1 and 4), approximately 1,700,000 LLINs under the brand name *Super Moustiquaire* have been distributed by PSI through the commercial sector and through partner NGOs at a subsidized price of \$1.50.

Pre-packaged chloroquine for home management of uncomplicated malaria cases for children under five was introduced in Madagascar by PSI in December 2003. With support from the World Bank (1.3 million kits donated) and Global Fund Round 4, the program was rapidly scaled up. To date, approximately 6 million kits under the brand name *PaluStop* have been distributed through the pharmaceutical and commercial sectors as well as through NGOs at a subsidized price of \$0.025. PSI/Madagascar is now working closely with the MOH/NMCP, Institut Pasteur and NGO partners to prepare the introduction of AS-AQ PPT kits for home management. These kits will be distributed through pharmacies and trained community health workers. The launch is planned for October 2007.

The commercial distribution network for LLINs and malaria pre-packaged treatment currently reaches more than 800 authorized wholesalers and 4,000 retailers, approximately 20

pharmaceutical wholesalers, 200 pharmacies and 1,500 medicine shops (Dépôts de Médicaments). However, more than 77% of the Malagasy population lives in rural areas, which are often remote and have limited access to health services and traditional outlets. In order to improve access to health products, PSI/Madagascar has developed a network of NGOs partners in 2003 which have rural outreach programs and networks of community-based agents who distribute health products and messages to populations with the least access to formal services. NGOs and other partners account for approximately 40% of *Super Moustiquaire* and 10% of *PaluStop* distributed by PSI/Madagascar.

Behavior change communications and promotional campaigns are continuously conducted to encourage proper malaria prevention and to educate the population on home management of malaria, via mass media (radio, television), mobile video units and community health workers.

9.12 Non-governmental organizations/ private volunteer organizations

Many NGOs and faith-based organizations are active in malaria prevention and treatment in Madagascar. With funding from USAID, GFATM and other donors, most are working at the community level and focus on community mobilization, education and behavior change. The NGOs work with and train voluntary community health workers that sell the highly subsidized social marketing products including LLINs and provide home-based management for malaria. These community health agents are expected visit a minimum number of households monthly for the purpose of education about management of fever, especially in children under five, use of LLINs, prevention and treatment of malaria during pregnancy, and other health-related messages. The home-based management of fever in children under five is currently with chloroquine, though this will be changing to ACTs and will require substantially more training and supervision.

9.13 Private sector

Exxon Mobil in Madagascar will begin exploratory drilling for oil off the northwest coast of the country near Mahajanga. While Exxon Mobil maintains a presence in the country, they have indicated their willingness to discuss potential contributions to malaria control activities. Exxon has supported the purchase of ITNs in other countries such as Angola and could provide similar support to the malaria control strategy in Madagascar.

Qit Madagascar Minerals, an ilmenite extracting company and a member of the Rio Tinto Group, is established in the Anosy region in Southern Madagascar. QMM is currently developing a community malaria program and has contacted USAID for a potential MOU-type of collaboration. Although QMM is an extracting profit-making company, they have shown keen interest and commitment to implementing a social program; they have recently conducted a survey in their intervention zone and will be contacting the National Malaria Control Program to discuss areas of collaboration. Their objective is to launch pilot malaria control activities with a view towards replication in other regions with the agreement of NMCP.

10. POTENTIAL AREAS FOR SUPPORT BY THE PRESIDENT'S INITIATIVE

10.1 Insecticide-Treated nets

There remains a significant ITN gap. The October 2007 campaign provides an opportunity to rapidly increase net coverage on the west coast. The need for ITNs for the October 2007 campaign has been met, although opportunities remain for involvement through community mobilization and publicity activities. The demand for ITNs for routine distribution through CSBs during antenatal care and vaccination visits, and social marketing is consistently greater than the supply. GFATM Round 4 funding, which has provided the bulk of ITNs both for free distribution in MOH clinics and for distribution through social marketing, has been exhausted, and although an application for Round 7 is being prepared, funding is not certain. A role for PMI may be increasing the supply of ITNs available for routine distribution through antenatal services, immunization visits, and distribution via social marketing. The distribution system in the public sector for ITNs has been unreliable, and another role for PMI is facilitating the distribution the ITNs through Salama and improving its supply chain management Supporting the scaling up and expansion of successful community mobilization models, such as the Kominina Mendrika approach that engage communities in malaria prevention and use of ITNs is also another major area for contribution (see Community mobilization, BCC section below). In addition, PMI may be involved in increasing the capacity of the SLP for insecticide resistance monitoring, and for monitoring the amount of insecticide present on nets.

10.2 Indoor Residual Spraying and other vector control activities

As of 2007, IRS activities in Madagascar have no further funding (actual spray campaigns). PMI resources for spraying do not cover the expanded strategy of the SLP, which would require additional donor support. However, it is essential that the national malaria control program reaches consensus on the future strategy of IRS whether to expand to the western region and whether to switch to generalized/blanket spraying in the highlands using 3 different insecticides sequentially.

Insecticide resistance monitoring and entomological monitoring will also need to be financed (supplies and personnel).

10.3 Malaria during pregnancy / Intermittent Preventive Treatment in Pregnancy (IPTp)

SP is provided and distributed to the district level by UNICEF, but there is not a mechanism for transportation to the CSBs and this is currently the responsibility of the community or the CSB. This may create a barrier to maintaining a stock of SP in the CSBs.

While education and materials for CSB staff are in place, supervision is largely lacking in quality and quantity. Though some efforts have been made to improve supervision, the frequency and quality of supervision need to be improved.

There are numerous NGOs involved in educating women on the importance of prenatal consultation and prevention of malaria during pregnancy, but there is still significant work to be done in this area. Community health workers may need improved tools for education. Supporting the scaling up and expansion of successful community mobilization models, such as the champion commune approach that engage communities in malaria prevention is also another major area for contribution (see Community mobilization, BCC section below). In addition, ensuring that CSBs always have ITNs in stock for distribution during antenatal visits may dramatically improve prenatal consultation attendance.

10.4 Diagnosis

The high cost of AS/AQ, particularly for adults, makes it imperative to reduce the over treatment that occurred when chloroquine was the first-line antimalarial. Improving microscopy is important to ensure that referrals are correctly diagnosed but only a very small proportion of malaria cases are diagnosed by microscopy. Placing RDTs at the CSB level is essential but also presents many challenges.

- Support purchase and distribution of RDTs to the CSB level.
- Work with SLP and partners to develop training approaches that will build confidence in and support for the new protocols for diagnosis and treatment
- Work with SLP and partners to develop supervisory and quality control systems that will reinforce proper use of RDTs
- Work with SLP and partners to develop detailed plan for use of malaria diagnostics
- Work with SLP and partners to strengthen supervisory and quality control for microscopy
 - Review the condition of microscopes, availability of supplies and capabilities of laboratory technicians at referral facilities and other facilities where the MOH supports microscopy

10.5 Treatment

Clarity on the treatment policy and developing detailed operational plans for the roll out of AS/AQ nationally at the health centers and community level are essential to the success of the SLP malaria control plans.

To bring about changes needed at the service delivery level, doctors and nurses not only need to learn new skills related to laboratory diagnosis, but also develop confidence in the test and follow official algorithms. This will require monitoring and supervision above the current level. In addition, BCC should be used to build the population's confidence in the new drugs and protocols (see IEC/BCC section below).

Rolling out the community-based distribution of ACTs will require a detailed action plan, strengthening the relationship among the NGOs working at the community level, the Community Health Agents, and the CSB; and development of education materials and job aids.

- Work with SLP and other partners to develop a detailed written plan for implementation of AS/AQ nationwide, including .
 - standard treatment guidelines
 - plans for phasing out of CQ for treatment of *P. falciparum*, but its retention for *P. vivax* cases;
 - standardized guidelines for administration of AS/AQ by CHWs as part of a community-based integrated child health approach;
 - coordination with IMCI;
 - how to deal with patients who fail to respond to treatment;
 - how to deal with patients with symptoms of malaria and a negative blood smear or RDT;
 - how to recognize signs of severe illness in children and take appropriate actions
 - Support training and supportive supervision of health workers at all levels on the new diagnosis and treatment for malaria

- Work with SLP and partners to support development of BCC strategy targeting caregivers on the new treatment for malaria

10.6 Pharmaceutical management

A clear treatment policy and operational plan will provide the foundation needed to accurately project supply needs. Other factors, such as the shorter shelf-life and higher cost of AS/AQ relative, will also place pressure on the management of commodities. In addition to supporting purchase of commodities, there is a need for capacity building for supply management and forecasting.

Several of the weaknesses identified in the current systems for supply and management of antimalarials will have to be strengthened to ensure regular access to required medicines and supplies. Some suggested areas for support include:

- Integration of the existing parallel public sector distribution systems for antimalarials - this includes strengthening Salama to become the main supply system for all antimalarials in the public sector.
- Improvement of the drug management information system to begin collecting and tracking availability and consumption data for all medicines from the peripheral level facilities.
- Development of standard operating procedures and standard guidelines for use in the PhaGDis and PhaGCom
- Training in inventory management for district level managers and dispensers
- Strengthening capacity at the AMM for quality assurance of antimalarials
- Providing support to strengthen supervision of peripheral level pharmacies.
- Procure AS/AQ to supplement GOM purchases and other donations to ensure a steady supply throughout the system
- Provide support to the national drug agency related to their national pharmacovigilance center and drug quality control unit
- Support to the drug quality control unit for reagents, additional minilabs and training of med students on proper usage of the minilabs (check with USP what they plan to support in the future)

10.7 Surveillance, monitoring and evaluation

The specific gaps identified here are of a priority because they result in missing reports from the CSBs, delayed reporting mainly from the district level to the regional and central levels, and lack of information from the community. The activities needed to address the gaps for each of the surveillance and M&E components are as follows:

Health Information System

- Reinforce supervisory capacity at the district level to promote routine visits to the CSBs for quality control
- Support the establishment of a system that ensures the availability of updated data collection forms and registers for case reporting at the CSBs, and for retrieving the compiled monthly reports from the districts
- Support the availability of personnel and computers at the district level for compilation of data from the CSBs
- Support refresher training at the CSBs and CHDs in case reporting (standardized case definitions; systematic method of record keeping), and in data management

Sentinel Surveillance for Roll Back Malaria Indicators

- Since the sentinel surveillance for indicators uses information collected in the Health Information System (SIS), strengthening the SIS will also improve the capacity of the PSSI
- Support a technical review to assess the capacity of the sites in greater detail
- Support the development of a community based component which incorporates the information gathered by the community health workers, and information from NGO monitoring and evaluation activities that would complement data collected by the PSSI
- Funding from the World Bank will end April 2008 – continuation of funding will need to be secured

Sentinel Sites for Epidemic Surveillance

- Support strategy to adjust the “sensitivity” of the system to decrease the number of false alerts
- Funding support is available from Global Fund Round 3 through 2009

DHS

- Funding to complete the mapping activity has not been secured – it is essential that this be resolved in order to complete the mapping in time to develop a sampling framework for the DHS in 2008
- Final decisions regarding which modules will be included in the DHS need to be made, and funding for the DHS will need to be secured

National Monitoring and Evaluation Strategy

- The strategy is currently being developed; additional support may be needed to carry out the M&E plan once it is finalized
- Support for additional personnel at the SLP to coordinate and implement M&E activities, and to develop a system to collect and warehouse information

10.8 Epidemic prevention, surveillance and response

The PSSE will be supported by GFATM until 2009. The remaining gaps and possible supportive measures include:

1. Overly sensitive case alert system – support the provision of technical assistance to review the actual process of case reporting; provide refresher training on case reporting and to reinforce the case definition; provide refresher training on the use of diagnostics (RDTs) for case confirmation to increase the proportion of laboratory confirmed cases; support increased frequency of routine supervisory capacity for the quality of case reporting
2. Increased risk of epidemic in the south due to recent cyclones and flooding – support the purchase and distribution of additional ITNs to add to the available 200,000 ITNs from UNICEF for the epidemic-prone southern region; support the increased stockage and pre-positioning of ACTs for an epidemic response.

10.9 Community mobilization, IEC and BCC

About 35% of the Malagasy population live over 5 km from a health center and access to quality health care remains a national challenge.

Supporting the scaling up and expansion of successful community mobilization models, such as the champion commune approach that engage communities in malaria prevention and treatment is also another major area for contribution. This support could include the following:

- Expanding community mobilization efforts to communes that have not yet been reached
- Providing support for national level communication, education, and behavior change efforts including support for mass media messages through interactive radio programs and mobile video units, and other innovative channels.
- Develop a ‘minimum package’ of IEC materials capturing the best of what materials and messages are currently being used. This may include updating existing materials to reflect new protocols, drugs, policies and recommendations.
- Support for community education and interpersonal communications through the vast network of Volunteer Health Workers including training and materials
- Developing a standardized package of training materials and ‘job aids’ for Community Health Workers and NGOs
- Developing complementary creative innovative materials and tools that Community Health Volunteers can use to refer pregnant women and children for vaccinations to the CSB.
- Reinforcing and systematizing the relationship between the NGOs, Community Health Workers and the local CSB.
- Support for community level data collection and reporting.

Information, Education, Communications and Behavior Change interventions will also be extremely important for changing care taker and provider perceptions about new drugs and protocols. The community-based distribution of ACTs will require skillful information and education tools for care takers and Volunteer Health workers, and suggests the need for continuous monitoring and feedback.

10.10 Operational Research

Several operation research questions were identified and will be discussed with the SLP during the planning stage.

ANNEX

APPENDIX 1

Needs assessment and field visit agenda -March 18 to March 30, 2007 (April 4, 2007)-

Date	Time	Activities	Meetings Venue	Objective	Attendants
Sun. 18	22:50 p.m.	<i>PMI Team's arrival Cotte, Thwing, Chang, Greer, Adeya</i>	Hotel Colbert		
Mon. 19	8:30 - 9:00	Introduction of PMI team to Mission	USAID/Masoala, 6th Floor	To introduce PMI team and brief on the objectives of assessment	Ambassador, DIR, CONT, SO5, SO6, PDA, EMB, PC and MCC
	9:00 - 10:30	PMI working session	USAID/Masoala, 6th Floor	To review PMI assessment objectives, schedule, team roles & responsibilities, final prep of ppt	PMI & HPN team
	11:00 a.m. - 12:30 pm	Meeting with PNL staff, Malaria Laboratory, Entomologists, DULMT	IHS/Soarano	To introduce PMI team and to review roles, responsibilities, expectations and discuss pm meeting	PMI, Noé, Wendy, Fabie, Dr. Louise/SLP, Dr. Jocelyn/IPM, Dr. Désiré/SLP, Dr. Mosa, DULMT
	12:30 pm - 2 pm	Working lunch	TBD	To refine the ppt, integrate comments from previous mtg with technicians	PMI, Noë, Wendy, Fabie
	2:30 - 5:00 pm	Briefing with RBM Partners	MinSan/MOH Conference room	Malaria in Madagascar: context and accomplishments; assessment terms of reference and schedule; PMI overview	MOH staff, DDDS, DAM, DPLMT, focal point person for Stockholm Convention, Ministries of Agriculture, of Environment, of Education, JICA, see Malaria Stakeholders list
	5:30 PM	Courtesy visit	MOH/FP office	To introduce the PMI team to MOH, present objectives of assessment	Minister Dr. Jean-Louis Robinson, Vice-Minister, Dr. Raveloson/SLP

Date	Time	Activities	Mtgs Venue	Objective	Attendants
Tue. 20	8:30 a.m.	Meeting with DSF	Institut d'Hygiène Social (IHS)	Overview of MOH/MCH program; overview of PMI program; discuss linkages	Dr. Eugénie, staff from IMCI, Mother & Child Health, MOH Malaria Lab ctc Dr Louise
	2:30 p.m.	<u>Group 1</u> : Meeting with WHO	WHO office	Strategic/technical meeting	Dr. Leonard Tapsoba, WHO Representative, Wendy, Dr. Raveloson/SLP, part of team
	2:30 p.m.	<u>Group 2</u> : Meeting with Institut Pasteur	IPM	Strategic/technical meeting	Dr. Antoine Talarmin, IPM Director, Noé, Dr. Ranaivo/SLP, part of team
	4:00 p.m.	<u>Group 1</u> : Meeting with World Bank	World Bank	Strategic/technical meeting	Dr. Robert Blake, WB Representative, Mme Anne-Claire Haye/Tech Manager, Wendy, Dr. Raveloson/SLP, part of team
Wed. 21	All day 8:30 am - 4 pm	Technical partners workshop	USAID/Masoala, 6th floor	team group by technical areas (ACT, IRS, ITN, Home based education, IPT on a) what are they doing? b) where? c) accomplishments?	see Malaria Stakeholders list*
	2:00 p.m.	Meeting with INSTAT and MOH Malaria Info System		Overview of information collection; use of information; discussion re statute of DHS/MIS and regular data collection and use	CDC folks to meet with DG Mr. Jean Razafindravonona
	5:00 p.m.	Meeting with Global Funds, CCM	USAID/Andohahela, 8th floor	Strategic/technical meeting	Christine Onyango/GF, Lucien Ratovo/CCM
	22:50	<i>Trent Ruebush's arrival on AF 908 -</i>	Hotel Colbert		

Date	Time	Activities	Meetings Venue	Objective	Attendants
Thurs 22		Courtesy visit with the President of Madagascar (Marc Ravalomanana)			Trent Ruebush, Wendy Benazerga, Henderson Patrick, Dr. Jean-Louis Robinson (Minister of Health)
Thurs 22- Sat 24	Field Visit: Group A: Mahajanga, Group B: Tamatave (Toamasina), Group C: Central Highlands and Farafangana				
Mon 26	8:30 a.m.	Meeting with ExxonMobil Director	ExxonMobil Office	Introduction & strategic/technical meeting	Drew Goodbread, Director
	10:00 a.m.	Visit of Centrale d'achat Salama, + Grace Adeya	Salama, Ivato	Discussion about pharmaceutical and management distribution chain; issues and strategies	Dr. Tahina Andrianjafy, Director
	pm	Writing			
Tue. 27	10:00 AM	Meeting with Red Cross Malagasy, Mr. Claude Rakotondranja & Fanja Ratsimbazafy, SG	Red Cross office		Julie, Noé, Claude Rakotondranja, Fanja Ratsimbazafy
	10:00 AM	Meeting with JICA	JICA office		George, Fabie, Dr Raveloson, Kozu Muneyuiki, Panification
	10:30 AM	Meeting with Chargé and QMM	Chancery		Michelle Chang, Wendy, Gary O'Brien, President of QMM Board of Directors
	11:00 am - 12:30 pm	Meeting with SLP staff	SLP office	Discussion and clarification on national policy and observations from the field	All
	2:00 PM	Writing redaction...	USAID/Masoala		
	4:00 PM	Meeting with World Bank Consultants	World Bank		Trent and Dr. Raveloson

Date	Time	Activities	Meetings Venue	Objective	Attendants
Wed 28	8:00 AM	Meeting with PSI	USAID, 6th floor	Discussion about Health Information System	Mary Kante, Lalah Rambeloson, Brian McKenna
	9:00 AM	Meeting with MIS Service	Ex-Ecole de Médecine Befelatanana		Annett Cotte, Julie Thwing and Michelle Chang, Noe, Dr Jean Louis
	2:30 PM	Présentation des résultats 2ème pré tests Pre-Packaged Treatment à base d'ACT pour la PEC communautaire	PSI conference room, Ampefiloha		Noé went
	6:00 PM	Meeting with CRESAN & PSI	CRESAN		Grace Adeya, Remi Rakotomalala, Jacky Razanakolona, Mary Kante, Lalah Rambeloson
Thurs 29	All day	Writing redaction...	Hotel		
Frid 30	9:00 a.m.	Debriefing with RBM and stakeholders partners (same participants as March 19th briefing) + Dr Raveloson	MOH/FP conf. room		see Malaria Stakeholders list*
	11:30 A.M.	Debriefing with USAID internal	USAID/Andohahela		
Apr 3rd	4:00 - 5:00 pm	Meeting with USAID	USAID, 8th floor	Administrative and budget discussion	Annett, Wendy, Noé, Fabie, Camille & Eric of Controllers Office, Ross of Executive Office

Field visit program

Thursday, March 22 - Saturday, March 24

Group A: West Coast, Mahajanga & Marovoay
Dep: 12:05 pm, Thu. 3/22 - Ret: 4:20 pm, Sat. 3/24

George Greer	USAID/W
Julie Thwing	CDC
Bodo Razafindratsita	UNICEF/NY
Dr. Louise Ranaivo	MOH/SLP
Dr. Luciano Tuseo	WHO/Tana
Emmanuel Wansi	Basics
Lucie Raharimalala	SantéNet
Mary Kante	PSI
Fabienne Ranjalahy	USAID/HPN

Group B: East coast, Toamasina I & II, Fénérive-Est, Andranobolahy, Ambodikoko, Brickaville, divided into Team B1, Team B2 and Team B3
Dep: 7:20 am, Thu. 3/22 - Ret: 10:15 am, Sat. 3/24

Annett Cotte	CDC	B1
Wendy Benazerga	USAID/HPN	B1
Christine Onyango	GFATM	B1
Dr. Harintsoa Ravony	MOH/SLP	B1
Dr. Charles Paluku	WHO Afro	B2
Volkan Cakir	SantéNet	B2
Dr. Claire Raharinoro	MOH/DSF	B2
Nilda Lambo	UNICEF	B3
Mariama Barry	SantéNet	B3
Brian McKenna	PSI	B3

Group C:

Thu. 3/22: Ankazobe

Trent Ruebush	USAID/W
Michelle Chang	CDC
Dr. Raveloson	MOH/SLP
Dr. Frank	MOH/SLP
Dr. Jeremy	MOH/SLP
Grace Adeya	RPM +
Issa Coulibaly	UNICEF/Tana
Noé Rakotondrajaona	USAID/HPN

Fri. 3/23: Farafangana

Trent Ruebush	USAID/W
Michelle Chang	CDC
Grace Adeya	* RPM +
Issa Coulibaly	* UNICEF/Tana
Wendy Benazerga	USAID/HPN
Noé Rakotondrajaona	USAID/HPN
Eliane Razafimandimby	* PSI

Group A: Mahajanga divided into Teams A1 & A2

West coast, seasonal malaria transmission zone

Thursday, March 22			
01:10 pm	Arrival		
2:30 - 3:00 pm	Courtesy visit to Chef de Region, DRS, SSD1 & 2	Both teams	Information on health services delivery system regional & district levels, planning, coordination, monitoring of malaria control program
3:00 – 6:00 pm	PhaGDis, PhaGCom, Mosquito net factory, Salama	Team A1	Info on logistic management : commodity distribution, supply/resupply channels
3:00 – 6:00 pm	CHU/Lab, Service des Maladies Infectieuses	Team A2	Info on epidemic surveillance, diagnosis and management
7:00 – 8:00 pm	MVU	Both teams	IEC/BCC
Friday, March 23			
7:30 - 9:30 am	Drive out of Mahajanga	Both teams	Health services delivery, logistics management, commodity distribution at district level; case management, malaria prevention during pregnancy
8:30 - 9:00 am	Visit one commune on the way : CSB, PhaGDis		
9:00 - 10:00 am	Continue to Marovoay		
10:00 - 3:00 pm	Marovoay: CHD1, CSB, SSD		
3:30 - 5:30 pm	Kominina Mendrika / ASOS		
	Drive back		
Saturday, March 24			
8:00 - 10:30 am	Information meeting with technical partners: discuss field visit, problems identified, partners experience, etc.	Both teams	Information on sub-national level partnership achievements and challenges List to be developed, venue tbd
12:00 – 1:00 pm	Lunch		
1:15 pm	Leave hotel to airport for Air Mad flight to Tana, 3:15 pm		

Group B: Toamasina, divided into Teams B1, B2 & B3

East coast, perennial malaria transmission zone

Thursday, March 22			
9 :05 am	Arrival		
10 - 10:30 am	Courtesy visit to Chef de Region, DRS, SSD1 & 2	All teams	Information on health services delivery system regional & district levels, planning, coordination monitoring of malaria control program
11 am - 12:30 pm	Information meeting with technical partners: discuss field visit, problems identified, partners experience, etc.	All teams	Information on sub-national level partner-ship achievements and challenges List to be developed, venue tbd
2 :00 – 6 :00 pm	SSD in Toamasina II, CHD, PhaGDis, CSB	All teams	Info on prevention and care : malaria during pregnancy, ITN, ACT, RDT Sites to be identified
6:30 – 7:30 pm	Dinner		IEC/BCC
7:30 – 8:30 pm	MVU		

Friday, March 23			
All day	Drive West of Toamasina out to Andranobolahy and Ambodikoko, about 1 hour of interesting drive: CRS, Kominina Mendrika (4*) ; night in Toamasina	Team B1	Info on IEC/BCC, community education, home management, diagnosis and treatment, logistic management, CBD workers network Rural setting
	Drive out North to Fénérive-Est (DRS, SSD, PhaGDis, CARE site) and to Foulpointe (ADRA child survival activities), night in Toamasina	Team B2	
	Drive out to Ambodibonara, Fanandrana, Brickaville, night in Toamasina	Team B3	

Saturday, March 24

8:00 am	Leave hotel to airport for Air Mad flight to Tana, 9:30 am	All teams	
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Group C: Ankazobe,

Highlands, seasonal malaria transmission zone

Thursday, March 22		
6:30 - 7:00 am	From hotel to Talatamaty	
tbd	Stop en route to visit a CSB in Marondry	Info on epidemic surveillance
10:30 – 12:00 pm	Continue to Ankazobe In Ankazobe, visit PhaGDis, PhaGCom	Info on logistics management, case management, IRS
12:30 - 1:30 pm	Lunch	
2:00 pm	Leave Ankazobe	
tbd	On drive back, stop to visit SSD and Poste Sentinelle in Ambohidratrimo	Info on epidemic surveillance, sentinel p district level planning, coordination and monitoring of malaria control program
6:00 pm	Continue and arrive in Tana	

Group C: Farafangana,

South-East, perennial malaria transmission zone

Friday, March 23		
All hours tbd **		*** Ask MAF
6:00 am	From hotel to airport	
7:00 am ***	Take-off to Farafangana	
9:00 am	Courtesy visit to Chef de Region	
9:30 – 12:00 pm	Working session with DRS, SSD and visit PhaGDis, PhaGCom, CSB, SSD	Info on IEC/BCC, community education based management, diagnosis and treatment logistics management, CBD workers net Rural setting
12:00 - 1:30 pm	Lunch	
2:30 pm	Take-off to Tana	

APPENDIX 2

Persons contacted

Ministère de la Santé, du Planning Familial et de la Protection Sociale:

Jean-Louis Robinson, Minister
Josua Andriamahefazafy, MOH/Cabinet

President's Office:

Fanja Rajoelisololo, Présidence
Damoela Randriantsimaniry, Présidence

Ministère de la Santé, du Planning Familial et de la Protection Sociale /Service de Lutte contre le Paludisme:

Andrianirina Raveloson, Director, Service de Lutte contre le Paludisme (SLP)
Benjamin Ramarosandratana, Monitoring and Evaluation
Louise Ranaivo, Laboratory
Harintsoa Ravony, Pregnant women and children
Aimée Ravaoarinosy, Case Management
Raharimanga Rakotoson, MOH/SLP/DULMT
Jean-Désiré Rakotoson, Vector control

Other MOH departments:

Monique Ravaoarimanana, Collaboratrice Palu, DRS Mahajanga
Eugénie Rasamihajamanana, DSF
Hélène Razanatsoarilala, SSE
Claude Radnriamanana, Chef SSEA
Dieudonné Rasolomahefa, MOH/DDDS
Zohra Bayant, Directeur régional (région de Atsinanana) de la sante et du planning familial
Donat Rakotomanana, Agence du Médicament de Madagascar, Manager-Pharmacovigilance unit
Sabrina Lock Njarasoa, Agence du Médicament de Madagascar
Jean Razafjndravonona, INSTAT-General Director
Bien-Aimé Robinson, INSTAT
Jean Louis Razafimahatratra, Système d'Information Sanitaire (health information system)

Salama (Centrale d'achats de médicaments essentiels et de matériel médical):

Tahina Andrianjafy, General Director
Andriamandranto Razafimandimby
Barthélémy Rakototiana

Partners :

GFATM :

Christine Onyango, Portfolio Manager
Lucien Ratovo, Country Coordination Mechanism
André Rabemanana, Country Coordination Mechanism
Rémi Rakotomalala, CRESAN

UNICEF :

Bruno Maes, UNICEF country representative
 Issa Coulibaly, UNICEF Tana
 Nilda Lambo, UNICEF Tana
 Bodo Razafindratsita, UNICEF Tana
 Melanie Renshaw, UNICEF New York

World Health Organization :

Léonard Tapsoba, WHO country representative
 Charles Paluku, WHO Hararé
 Luciano Tuseo, Medical Officer Roll Back Malaria

World Bank :

Robert Blake, World Bank country representative
 Anne-Claire Haye,
 Stefano Paternostro, Economist

Population Services International :

Lalah Rambeloson-Tana
 Eric Ratsaravolana-Tana
 Eliane Razafimandimby-Tana
 Brian McKenna-Tana
 Velonirina Andrianifahanana, PSI-Mahajanga
 Mary Kante, PSI-Nairobi

Santé Net:

Mariama Barry
 Volcan Cakir
 Philippe Lemay
 Lucie Raharimalala

Institute Pasteur:

Antoine Talarmin, Director
 Didier Ménard
 Jocelyn Ratoconjato
 Vincent Richard
 Milijaona Randrianariveლოსია

SALFA :

Elmine Raharivonjy
 Aimé Ravoninjatovo

Agence Francaise de Developpement : Danielle Rabenirina

Japanese International Cooperation Agency :

Chinese Embassy : Wang Cui, Ambassade de Chine

NGOs/PVOs/FBOs

ADRA: Joshua Poole (ADRA-Tana) ; Josué Mpayamaguru, (ADRA Toamasina)

Action Socio-sanitaire Organisation Secours (ASOS) : Jean-Claude Rakotomalala

Basics : Emmanuel Wansi, Projet Basics Washington

BIONNEX : Jean Walter, BIONNEX

CARE: Jennifer Loucks (CARE-Tana); Elaine, (CARE- Toamasina)

Exxon Mobil : Drew Goodbread

FIAVAMA : Rivonavalona Andriamanalina

INSPC : Elisette Rakotondrazanany

MCDI: Joséa Ratsirarson

PACT: Ravaka Ranivoarianja

PENSER Madagascar : Robertine Rahelimalala

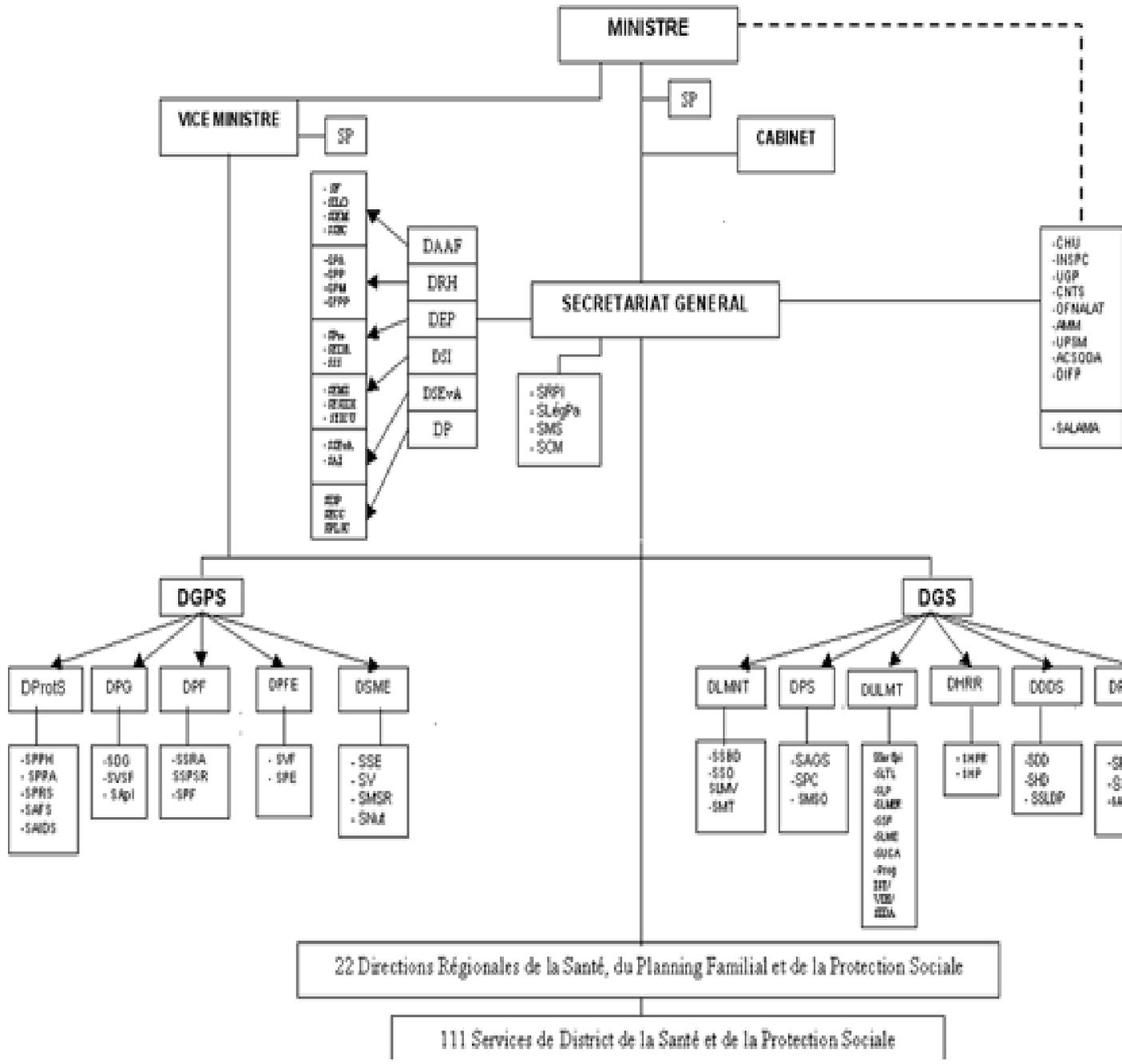
PROCHIMAD : Fidimalala Andriantsihoarana

Red Cross Madagascar: Edouard Randriamiary

Reggio Tezzo Mondo: Matteo Caprotti; Edmond Randrianarivony

APPENDIX 3

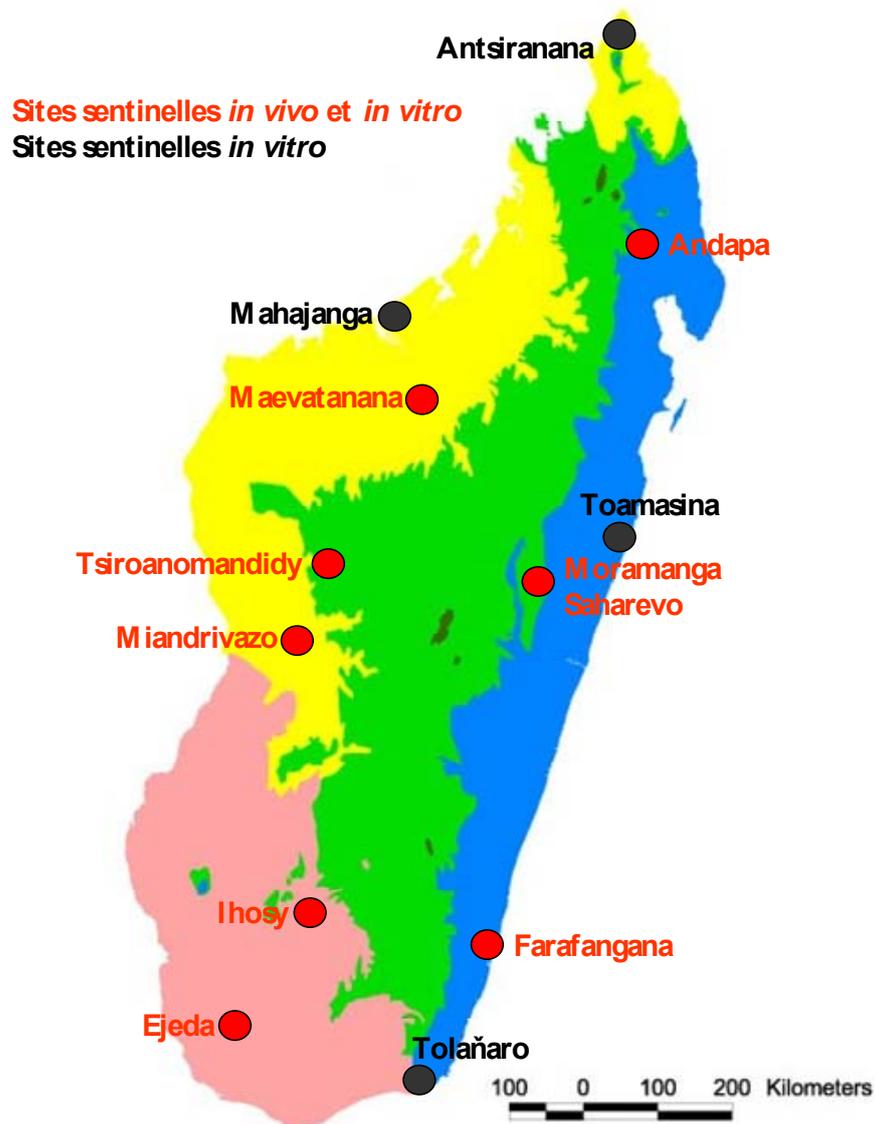
Ministry of Health Organizational Diagram



APPENDIX 4

-Drug resistance monitoring by IPM-

(Source: IPM annual report 2006 by Didier Menard)



APPENDIX 5

Documents Consulted

Ministry of Health documents

- Plan stratégique national de lutte contre le paludisme
- Politique Nationale 2006
- Estimation des coûts pour la mise à l'échelle nationale des ACT
- Power Point presentations by SLP on malaria prevention and control (past to present) in Madagascar

History & Background

- Joncour, 1956; La lutte contre le paludisme à Madagascar
- Lumaret, 1959; Les moyens mis en oeuvre et leurs résultats
- Ralamboson, 1964; Evolution du paludisme à Madagascar
- Gastineau et Rakotoson, 2005; L'évolution de la population à Madagascar
- Mouchet et al., 1993; Recrudescence du paludisme dans les Hautes Terres d'Afrique et de Madagascar
- Waltisperger et al., 1998; La mortalité à Antananarivo de 1984 à 1995

Global Fund proposals

- 6th Round, August 2006
- 5th Round, June 2005
- 4th Round, June 2004
- July 2002

Reports

- INSPC; Analyse de la situation dans les districts de Miarinarivo, Vatomandry et Betioky-Sud
- MAC report: 2004-2006
- IPM annual report 2006
- IPM annual report 2005
- IPM annual report 2004
- IPM, 2004; Etude de l'efficacité thérapeutique de la chloroquine et de l'amodiaquine
- Madagascar Health Sector Wide Approach, Project Appraisal Document (SWAP), World Bank (Feb 2007)
- WHO (Dr Diallo) : Rapport sur l'appui technique au Service de Lutte contre le Paludisme à l'organisation de l'évaluation des stratégies de lutte contre le paludisme pendant la grossesse (Nov 2006)
- WHO (Dr Diallo) : Rapport sur l'évaluation de la mise en oeuvre du traitement préventif intermittent (Oct 2005)
- WHO (Drs. Guillet and Govere). Rapport de mission 7-19/11/2005. La resistance des vecteurs du paludisme aux insecticides : propositions pour la mise en place d'un suivi et d'une politique de gestion à Madagascar.
- WHO (Dr Namboze): Report on introduction of use of ACTs at community level (Apr 2005)
- WHO (Dr Traoré, Dr Fall, Dr Da Silva, Dr Robalo) : Rapport sur l'appui technique à Madagascar pour la résolution des problèmes liés à la lutte contre le paludisme (Aug 2006)

- RTI (Sean Hewitt) : Review of IRS related planning, implementation, supervision and monitoring in Madagascar (Feb 2007)

Surveys

- SLP, 2005; Enquête sur l'utilisation des MID
- IPM, 2006; Surveillances des indicateurs du paludisme
- Rakotomanana, 2003; Rapport méthodologique sur l'enquête CAP à Marovoay et Soanierana-Ivongo
- Joint MOH, CRESAN, CARE, ASOS, SALFA, INSTAT, 2005; Synthèse de l'enquête de base
- CARE, 2006; Synthèse de l'enquête d'évaluation à mi-parcours
- Rakotoson, 2007; Résumé des enquêtes entomologiques à Marondry, Ankazobe

Other resources

- Malaria Strategic Plan for the SADC Region 2007-2015
- From Malaria Control to Elimination in the WHO European Region 2006-2015
- Informal Consultation on Malaria Elimination, Feb 2006
- Randrianarivelosia M 2004 Etude de l'efficacité thérapeutique de la chloroquine et de l'amodiaquine dans le traitement des accès palustres non compliqués à *Plasmodium falciparum* à Sainte Marie (Nosy Boraha). Rapport technique, Institut Pasteur de Madagascar.

APPENDIX 6

Baseline data used for quantification (2004)

Estimated National Population (111 districts)	16,545,451
Estimated population growth rate	2.8%
Estimated population between ages 0-11 months (% of total population)	4%
Estimated population between ages 1-4 years (% of total population)	12%
Estimated population greater than 5 years (% of total population)	84%
Expected pregnancies (% of total population)	4.5%
Outpatient consultations at CSBs (% of total population)	49.4%
Use of ANC at CSB (% of expected pregnancies)	67.6%
Proportion of children 0-11 months who received measles vaccination	82.1%
Proportion of uncomplicated malaria seen at CSB (% of total outpatient consultations) ²	17.8%
Proportion of malaria cases referred by CSB (% of total outpatient consultations) ³	0.04%
<p>¹Source: Annuaire des Statistiques du Secteur Sante de Madagascar 2004. (This was the most recent complete version available)</p> <p>² In 2005, 1,227,632 cases of suspected malaria (14% of outpatient consultations) were seen compared to 1,458,428 cases seen in 2004 (an estimated 16% decrease).</p> <p>³ In 2005, 2788 cases of severe malaria were referred from the CSBs (0.03% of outpatient consultations) compared to 3023 cases in 2004 (an estimated 8% decrease)</p>	