



LAO PEOPLE'S DEMOCRATIC REPUBLIC
Peace Independence Democracy Unity Prosperity

Ministry of Health

**National Strategy for Malaria Control and Pre-
Elimination**

2011-2015

JULY 2010



Foreword

To execute the 7th decree of the 8th Party Congress and the VIth the Health Master Plan of the Ministry of Health which has put great emphasis on the basic health for all, especially for populations living in malaria endemic and remote areas. In this connection both the Party and Government of the Lao People's Democratic Republic as well as countries in the world, have given importance to malaria control, especially the health care of the population living in very remote areas, which has endured the impact from malaria since long. The directive of the health development considers that disease prevention comes first but disease management is important to ensure the quality of the health service is made accessible to all areas and to improve continually the quality of health care.

The Ministry of Health has issues policies in malaria control as a guide for the implementation of malaria activities from the central level down to the grass-roots level. This policy is based upon the specific geographical situation, the accessibility, the way of life of the population and ethnic groups, the situation of malaria outbreaks in each area and also the acquired experiences and lessons from the past implementation. In the past decade through all national efforts, the malaria control has achieved tremendous successes which has resulted in a significant reduction of malaria mortality and morbidity and this has moved malaria out from the top ten diseases reported by the MoH. Very recently CMPE has carried out a detailed re-stratification of malaria nation wide where, thanks to the application of malaria rapid diagnostic test (RDT) and artemisinin combination therapy (ACT) at the grass root level over the last 5 years, malaria risk has now been determined and mapped in over 6,000 villages in Laos.

In this regard, in order to improve the management of the program and ensure health services are delivered based on the real need of the population in both urban and remote areas, there is an urgent need for strategies to ensure the proper and adequate intervention to the target malaria at risk population on a cost-effective basis. These strategies and policies in malaria control will serve as an important tool and as well as a reference for project management at the macro level for the health service. It expresses the policies with regards to planning, strategy, project management, field implementation, responsibilities, reporting and integration at all levels from the central down to the village level.

In order to initiate and implement successfully malaria control policies, the contribution of the population as well as the advocacy of the local authority becomes the main deciding factor. Forseeing that more sectors and partners are and will be needed directly or indirectly in the malaria control programme, there is also a need to ensure a uniform and streamlined policies and strategies with regard to malaria control activities in the country.

Inter-sectorial collaboration is a must to ensure sustainability of the programme in the future.

These policies on malaria control have received guidance from the Ministry of Health and the scientific committee in the compilation and review of its contents through comments and many constructive suggestions from different components through various meetings and workshops at different levels, including international organizations and partners. It has been approved unanimously by all.

Therefore, on behalf of the Ministry of Health, we would like to congratulate and express our thanks to all who have contributed their efforts and knowledge to the final draft on this policy and we do hope that it will be of great use in your daily practical work. Our committee welcomes any comments and

suggestions and will consider them when an amendment is required to make the polices on malaria control as perfect as possible.

Vientiane, June 2010

*Minister of Health
Dr. Ponemek Dalaloy*

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ANNEX 3: Performance framework for GFATM Round 7 Phase 2 (2010 – 2012) [subject to GFATM approval mid 2010]

ANNEX 4: Log frame of Malaria National Strategic Plan 2011-2015

List of acronyms

ACD	Active Case Detection
An.	Anopheles
ACT Malaria	Asian Collaborative Training Network for Malaria
ACT	Artemisinin-based Combination Therapy
BCC	Behaviour Change Communication
CCM	Country Coordination Mechanism
CMPE	Centre for Malariology, Parasitology and Entomology
DAMS	District Malaria Nucleus/Station
DOT	Directly Observed Treatment
GDP	Gross Domestic Profit
GF	Global Fund
GOL	Government of Lao PDR
G6PD	Glucose 6 Phosphate Dehydrogenase
HC	Health center
IMR	Infant Mortality Rate
IPC	Interpersonal Communication
IRS	Indoor Residual Spraying
IEC	Information, Education and Communication
ITN	Insecticide Treated Net
INGO	International Non-Government Organization
IPC	Inter-Personal Communication
LFA	Local Funding Agent
LLIN	Long-Lasting Insecticide treated bed net
MDG	Millennium Development Goals
MIS	Malaria Information System
MOH	Ministry Of Health
M&E	Monitoring and Evaluation
MNCH	Maternal and Child Health
NMCP	National Malaria Control Programme
NSP	National Strategic Plan
NGO	Non-Government Organization

PAMS	Provincial Malaria Station
PCD	Passive Case Detection
PCR	Polymerase Chain Reaction
PQ	Primaquine
PR	Principal Recipient, GFATM
QA	Quality Assurance
RDTs	Rapid Diagnostic Tests
SOP	Standard Operating Procedures
SR	Sub Recipient, GFATM
TA	Technical Assistance
TBA	Traditional Birth Attendant
TWG	Technical Working Group
VHV	Village Health Volunteer
VMW	Village Malaria Worker
WHO	World Health Organization
WHOPES	WHO Pesticide Evaluation Scheme
WPRO	WHO-Western Pacific Regional Office

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5. Malaria in Lao PDR – A review, Laura Watson (EU Malaria Project), 1999
6. WHO Country Cooperation Strategy (CCS) in the Lao People's Democratic Republic 2009 – 2011
7. Annual Malaria Reports, CMPE 2006, 2007, 2008 and 2009

PART I

BACKGROUND

Country Profile

Socio-economy,

Health and

Overview of Malaria in Laos

1. Introduction

The first section of this document provides background information relevant to the strategic plan for malaria control in Lao PDR. It includes a brief country profile, the health system and an overview of malaria (covering epidemiology, history and the current situation).

The second section describes the National Strategy for Malaria Control and Elimination 2011-2015, description of the program framework, budgets, quantification of commodities and related indicators.

2. Country profile

Demography

The Lao PDR is a landlocked country bordering China, Vietnam, Cambodia, Myanmar and Thailand with an estimated population of 6 million people (2008 mid year estimate, population growth 2.1 percent). Due to geographic proximity, there is significant connection and influence between these countries on health matters, including cross-border disease transmission, and movement of people to obtain treatment in neighboring countries. The majority of the Lao population (63%) lives in rural areas. Population density is low with 24 persons per km. The average family size in 2005 was 4.5 children per family.

The topography breaks into lowland areas along the Mekong River that depend predominantly on paddy rice, and highland areas that depend on upland rice and the gathering of non-timber forest products for livelihoods. The population is young, but there are signs of changes in the demographic structure; the percentage of the population under 15 years of age decreased from 44% to 39% between 1995 and 2005. The nation is rural, with the beginnings of a rural-to-urban shift; the percentage of the population living in rural areas decreased from 83% to 73% from 1995 to 2005. The latest census identified 49 distinct ethnic groups. Approximately 50% of the general population resides in the lowlands.

Political situation

The Lao People's Democratic Republic was founded in 1975. The rule of law has continuously been strengthened by new laws, including several health sector laws in respect of public health, curative services, food safety, drugs and medical devices. The Government reports to the National Assembly

on the implementation of its 6th National Social and Economic Development Plan 2006-10 (NSED), which includes national strategies on poverty eradication.

The country comprised 17 provinces and 142 districts. The security in the country is considered stable.

Socio-economic situation

The Lao PDR is a low-income country with a per capita GDP of US\$ 630. It is ranked 133 out of 177 countries on the Human Development Index in 2006. Economic and social transformations which began in 1986 were initially slow-paced. However, since 1997, the economic growth in Lao PDR has rapidly increased. In parallel with these economic transformations, the proportion of people below the national poverty line fell from 45% in 1993 to 30.7% in 2005. Between 2003 and 2007, the average economic growth rate was 7.1%. Nevertheless, the economic growth is not equally distributed and is mainly concentrated in urban areas. Inflation in Laos has averaged above 7 percent over the past few years.

The official poverty rate fell from 39% in 1997 to 33.5% in 2002. Poverty is higher in remote and highland areas and inversely correlates with road or river access. Proxy indicators of poverty, such as access to sanitation and electricity, also point to the vulnerability of the population. The latest Lao Reproductive Health Survey found that, in 2005, 50% of households had no toilet and over 40% had no electricity. Safe water is accessible to 60% of the population. Disparities between urban and rural areas are still pronounced. For example, 96% of urban households have access to electricity, compared with only 33% in rural areas without road access.

An individual must now earn 192,000 kip a month to be classified as living above the poverty line (2010). The government has raised the average per capita minimum monthly income for a person to be classified as poor from 85,000 kip to 192,000 kip. The government planned to free about 72,000 families from poverty in the 2009/2010 fiscal year, adding that growing foreign investment, jobs and income and a better business climate will help more people leave poverty behind.

Literacy has improved in the last decade, attaining among females 66.6% and males 80% in the population above 15 years of age in 2007, compared with an average of 60% in 1995. Schooling has improved for children from 6 to 16 years of age. Net primary school enrolment rate (both sexes) in 2006 was 83.6% compared with 66% for boys and 56% for girls in 1995.

Ethnic diversity presents a major challenge in health care delivery and education due to cultural and linguistic barriers. Women have lower literacy rates than men and girls have lower school completion rates. These gaps are accentuated in the rural and highland areas, where the level of poverty is highest. There is some evidence of decreased treatment-seeking behaviour for women when ill.

The Government has strengthened its policy on resettlement of villagers from the highlands to lowland areas closer to roads and essential public facilities. The resettlement policy, combined with increased environmental pressure affected by the building of new hydropower projects and other programs has brought with it tremendous challenges in delivering social services to the resettled communities.

Health status

National health indicators have been improving steadily over the past three decades but, despite the efforts of the national authorities, they remain below international targets. The infant mortality rate declined from 82.2 to 70 per 1,000 live births from 2000 to 2005. And under 5 mortality declined from 107 to 98 per 1,000 live births from 2000 to 2005. Over the same period, the maternal mortality ratio fell from 530 to 405 deaths per 100,000 live births 2000 to 2005. The crude death rate also declined, 9.6 deaths per 1,000 inhabitants in 2005, while the total fertility rate (average number of children per women) fell from 2.3 in 2000 to 2.2 in 2005 and the crude birth rate (number of births per 1,000 inhabitants) from 41 to 34 in 2000 to 2005. At the same time, life expectancy at birth rose more than 10 years in a decade, from 59 years in 2000 to 61 (female 63, male 59) in 2005. 37% of children less than 5 years old in 2006 were underweight for age.

Health system

The national health priorities are articulated in three documents: the 20-year Health Strategy to the Year 2020 (2000); the Lao Health Master Planning Study (2002); and the National Growth and Poverty Eradication Strategy (NGPES, 2001). The principles and visions of these documents have been included in the current sixth 5-year National Socio and Economical Development Plan (NSED, 2006-10) as well as the sixth National Health Sector Development Plan (2006-10).

The Health Strategy to the Year 2020 has four basic concepts: full health care service coverage and health care service equity; development of early integrated health care services; demand-based health care services; and self-reliant health services. This then leads to six health-development policies:

- strengthening the ability of providers;

- community-based health promotion and disease prevention;
- hospital improvement and expansion at all levels, including remote areas;
- promotion of traditional medicine, integration of modern and traditional care, rational use of quality and safe food and drugs, and national pharmaceutical product promotion;
- operational health research; and
- effective health administration and management, self-sufficient financial systems, and health insurance.

The Minister of Health has called for more integrated approaches, particularly for maternal and child health and immunization, decentralized service delivery methods, improved methods of health care financing, a unified and simplified health information system, and an emphasis on quality improvement in the next five years, rather than quantity improvement, which was emphasized over the past few years.

Organization of health services and delivery systems

The public health system is predominant, although a private alternative is growing. There are no private hospitals, but there are around 1,865 private pharmacies and 254 private clinics, mainly in urban areas. The state system is underutilized, especially in the peripheral areas. In its efforts to increase access through village volunteers and village revolving drug funds, the Government has managed to reach 5,226 villages.

There are four administrative strata in the health system: the central (the Ministry of Health); provincial (provincial health department); district (district health offices); health centers levels. The main network for health care service provision remains the public system.

In 2005, its health facilities consisted of four central teaching hospitals; four regional hospitals, 13 provincial hospitals; 127 district hospitals; and about 746 health centers. District hospitals are further classified as category A or B, category A meaning that the facilities have surgical capacity, unlike category B. A total of 5,081 hospital beds were available in 2005, 0.9 beds per 1,000 inhabitants.

The Government has announced future autonomy for public health facilities. In 2007, the Lao Health Maintenance Organization was created under the Health Care Department MoH, which foresees the opening of the first fully private hospital in the country by 2009/2010.

Health policy, planning and regulatory framework

In 2001/2002, the Ministry of Health, with support from the Japan International Cooperation Agency (JICA), conducted the Lao Health Master Planning Study. The study identified seven 'precedent programs' to be implemented and 31 'very high priority' programs. The need for sector-wide coordination is emphasized in the study report and initial steps toward such coordination have been taken since 2005 with the support of the sector-wide coordination process financed by the Japanese Government in close collaboration with other major donors, WHO and other United Nations agencies working in the health sector.

The National Growth and Poverty Eradication Strategy (NGPES) focuses on poverty and the poorest districts, of which 72 poor, 47 poorest, and outlines 12 health priorities.

The Sixth National Socio-Economical Development Plan (2006-10) (NSED) integrates the NGPES and serves as its core. The NSED was presented to and discussed widely with both internal and external partners, but there remains a large funding gap for implementation in all sectors, including health.

The actual strategy of the Ministry of Health is based on a 'healthy village' model that will include the eight components of primary health care (PHC), as expressed in national PHC policy, and will provide health for all.

Lao PDR's current draft 7th National Health Sector Development Plan (NHSDP) 2011-15 which outlines the following:

A. Goals

1. Create the basic human, financial, material and technological infrastructure for bringing the health sector out of the Least Developing Health status by 2020
2. Strengthen the health system in synergy with the rapid industrialization, modernization and socialization of the tasks and responsibilities.
3. Continuously contribute to eradicate poverty for improving the people's quality of life aiming to achieve the 5 health related MDGs.

B. Strategic areas

1. Eight Primary Health Care (PHC) Elements for Lao Model Health Villages (MHV):

E= Education on health (IEC) = Health literacy

L= Local disease control and prevention

E= Expanded Programme Immunization (EPI)

M= Mother and Child Health (MCH)
E= Essential drugs
N= Nutrition
T= Treatment common diseases
S= Safe water, Sanitation and environment.

2. New elaborated MNCH Package
3. Nutrition (prevent and cure malnutrition) and disasters and epidemics preparedness package
4. Human resources development (HRD) towards overall quality improvement
5. Organization building and strengthening (within MoH and associated institutions)
6. Sustainable health financing package development
7. Foods, drugs and traditional medicine quality and safety
8. Sector wide coordination mechanism = Implementation of "Vientiane Declaration" on Aid Effectiveness

The following policy and strategy documents have recently been developed and endorsed by the Ministry of Health and other government authorities:

- National Nutrition Policy (2008);
- National Food Safety Policy (2009);
- Skilled Birth Attendance Development Plan 2008-2015 (2008);
- Strategy for Integrated Package of Maternal Neonatal and Child Health Services 2009-2015 (2009).
- National Health Information System Strategic Plan 2009-2015

Health care financing

A recent report by Ministry of Planning and Investment, GOL and supported by UN, (Lao PDR March 18, 2010) estimates resources needed for meeting the MDG targets in Lao PDR by 2015, total annual cost is USD1,265 million with the total annual government investment costs estimated at USD800 million. *Table 1* below presents a breakup of the US\$788 million proposed for the government component of health sector, during 2010/11-2014-15.

Table 1: Proposed government component of health sector, during 2010/11-2014-15.

Expenditure head	US\$ M
General interventions (clinical facilities, equipment, medicines – up-gradation + new)	407.10
Personnel (recruiting + training)	105.06
Others in general interventions (incl. nutrition)	38.25
Maternal, Child and Neo-natal Health	171.59
HIV/AIDS	51.23
Malaria	10.09
Tuberculosis	5.05
Total	788.37
Expenditure by who incurs	
Govt. Fixed	513.94
Govt. Recurring	154.68
Govt. Total	668.62
Non-govt. Fixed	89.81
Non-govt. Recurring	24.95
Non-govt. Total	119.75
Total	788.37

Note: Expenses on rural water and sanitation appear under 'Water and Sanitation', though this activity lies under MOH

Source: Ministry of Planning and Investment, GOL and supported by UN, (Lao PDR March 18, 2010)

More than two-thirds of the expenses are earmarked for scaling-up the existing infrastructure – buildings, repair, equipment, up-gradation, staffing, etc. However, there is a notable share allocated to MNCH, and this is a response to the high IMR, CMR and MMR in the country, and the relative small progress in these ratios.

Current estimated per capita health expenditure is US\$ 24, about 55% coming from households, 30% from donors, and 15% from the government hospitals, which are highly dependent on user fees for recurrent expenditure. There are emerging health insurance systems for both the formal and non-formal sectors and the civil service scheme is being reformed. Equity funds - third party mechanisms that pay for health services used by the poor - are being expanded.

Total health expenditure made up 3.7% of GDP in 2007, and donor spending is estimated to have made up 30% of total public sector health spending in the same year. Salaries account for the bulk of domestic public expenditure on health (75%).

The meeting between Ministry of planning and Investment and UNDP have calculated MBB (Marginal Budget for Bottlenecks) and found that to reach the millennium goals an estimated 23\$/person/year (versus only 8.94\$/person/year in the 6th years plan (MDG Costing, UNDP, Draft April 2010), Executive Summary 7th 5 years Health Development Plan (2011-2015).

Human resources for health

The Lao People's Democratic Republic faces similar challenges to all low-income countries as regards human resources for health (HRH) issues: under funding of salaries and wages, mal-distribution of qualified staff among geographic and health system levels, limited numbers of qualified health workers, and low staff productivity.

The total health workforce in 2005 numbered 18,017 workers, corresponding to a ratio per 1,000 inhabitants of 3.2. That included regular staff (civil servants) under the Ministry of Public Health, as well as contractual staff. It also included the health workers under the two other ministries that manage non-public health facilities: the Ministry of Defence and the Ministry of Public Security. Around 70% of all health workers are under the Ministry of Health.

High- and mid-level medical staff under the Ministry of Health, defined as physicians, nursing staff and midwives with more than two years of formal training, account only for 23% (4,123, i.e. 0.74 workers per 1,000 inhabitants). The 8,942 regular health workers under the Ministry work in hospitals, health centers and district health offices/hospitals, with district-level facilities accounting for the majority. However, the bulk of the staff at district level are mid- and low-level health workers (88%), with physicians representing only 6% of district-level staff. Health centers are almost totally served by low-level (81%) and mid-level (18%) staff.

Mal-distribution of staff, both geographically and by facility level, exacerbates the crisis. There are only 2,992 regular high- and mid-level medical staff at health-facility level, corresponding to 0.53 workers per 1,000 inhabitants, far below the recommended WHO target of 2.5. These workers tend to be concentrated in socioeconomically better-off regions to cope with the limitations of their salaries and wages. Such a situation, combined with the limited number of new posts created in recent years (the workforce has grown more slowly than the population in the last decade), is limiting the development of the health system and its response to the needs of the population.

In 2007, with WHO support, a national HRH database was designed and tested. A national conference on HRH was held and the drafting of a framework for the development of HRH in the Lao People's Democratic Republic was initiated.

3. Malaria in Laos

Brief history of malaria in Laos

It is not documented exactly when formal malaria control first began in Lao PDR. A 1959 report (Donaldson and Johnson) documents that it first began in 1953 and says that in 1953 DDT was sprayed twice, at 2gm/m². In 1954 a malaria control program existed with administrative staff, four surveillance teams and entomology and hematology laboratory staffed by three technicians and two assistants trained at the Pasteur Institute in Saigon. In addition, each of the then 12 provinces had a DDT spraying team (WHO 1954).

The Eighth World Health Assembly in 1955 formally endorsed the worldwide malaria eradication program. Between 1957 and 1960 a malaria eradication program began, supported by the United States Operations Mission (USOM). DDT residual spraying was carried out along with extensive baseline epidemiological and entomological surveys. Results showed that parasite rates ranged from 27-68% and spleen rates from 37-75%. From 1957 to 1960 DDT was sprayed in many areas. No spraying took place between 1961 to 1969. From 1969 to 1975 limited DDT spraying took place plus mass drug administration (MDA) of Chloroquine, mostly in Vientiane Province, supported by the World Health Organization (WHO). From 1975 to 1977 no spraying took place. Spraying and Chloroquine MDA recommenced in 1977 under the auspices of the new government, with the assistance of WHO, and continued until 1988 when DDT was banned in donor countries. DDT was banned in Lao PDR in 1990. By then, ten of the then thirteen provinces had some malaria control activities.

The Institute of Malaria, Parasitology and Entomology (IMPE) was created in 1981 along with a countrywide network of malaria units.

After the loss of DDT as a control method, improved diagnosis and treatment and then impregnated bed nets (IBN) were embraced as control methods. The use of impregnated bed nets (IBN) was first initiated in small-scale trials in three villages in Paksane District, Bolikhamxay Province in 1988. The program was then expanded to four provinces; Luang Phabang (Xieng Ngeun District), Salavane (Tha Oy District), Vientiane (Phonh Hong and Phalavek Districts) and Savannakhet (Song Khone District).

On 11-13 June 1990 the First National Meeting on Malaria and future activities was held in Thalath, Vientiane Province. It was funded by UNICEF and WHO with technical support from WHO.

Treatment policies, methods for drug resistance monitoring, and stratification were discussed for the first time (Storey and Palmer, WHO, 1990). The first stratification was attempted for Vientiane Province (Karzine, WHO, 1990). In February 1991 another tripartite meeting was held between the Lao Government, UNICEF and WHO. The malaria control plan was revised with the emphasis changed to preventative measures particularly the use of mosquito nets impregnated with Permethrin. For the period 1991-1993 over US\$ 1 million was made available for malaria control from WHO and UNICEF. This began with the distribution of 4130 IBN in Salavane Province and 1300 IBN in Vientiane Province.

In December 1992 another meeting was held between UNICEF, the Ministry of Health and IMPE. This resulted in an outline malaria control strategy based on the marketing of IBN using a variety of communication channels (UNICEF, 1994). From 1993 to 1996 the project operated in Oudomxay and Xieng Khuang Provinces involving 7 districts and 300,000 people (Schapira 1995).

In 1996 the Third National Malaria Meeting took place. From 1996 several large malaria control projects began, all concentrating on IBN distribution.

In 1996 - 2001 the World Bank project began, operating as a soft loan with Belgian technical assistance. This project operated in eight provinces, Bokeo, Luang Namtha, Luang Phabang, Savannakhet, Champassack, Salavane, Attapeu and Sekong Provinces with initial IBN distribution in selected districts.

In 1996 ADB took over the UNICEF project in Xieng Khouang and Oudomxay Provinces and extended it to cover Saysomboune Special Zone (1996-2000).

The Lao EU Malaria control program began in 1997 and is based in seven provinces, Phongsaly, Houaphan, Sayabouly, Vientiane Province/Municipality, Bolikhamxay, and Khammouane Provinces (1997-2001). IBN distribution has begun in two districts per province.

During the same period, the Japanese Grant Aid also supported some districts of Khamouane, Bolikhamxay, Vientiane Province and Oudomxay. In 2000, the bilateral Vietnamese government cooperation supported malaria activities in Nonghed district (Xiengkhouang province), Kamkheut district (Bolikhamxay province) and Ed district (Huaphan province).

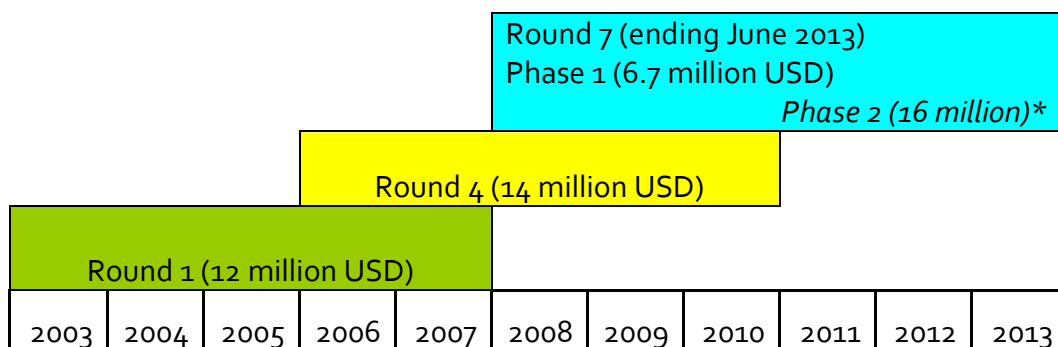
From 1997 – 2001, for the first time all provinces in the country had an active malaria control programme.

Current malaria situation

Malaria is still considered an important contributor to morbidity and mortality, with 70% of the population at risk (2003), although recent efforts to combat the disease with Global Fund support have had a positive impact. With the GFATM grants, the NMCP was able, through a single funding source, to extend both preventive and curative malaria strategies nation wide to all 17 provinces with an estimated 3.6 million population at risk.

A summary of GFATM grants with their periods and budgets are summarized in *table 2* below.

Table 2

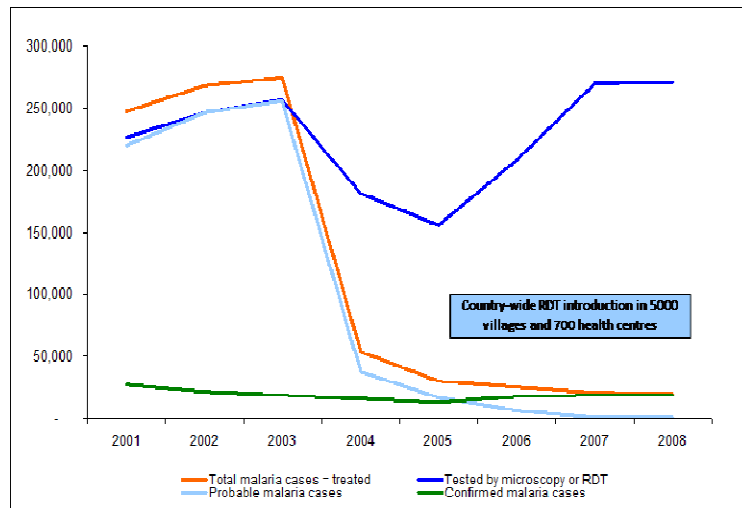


* Subject to GFATM approval

As of June 2008, Lao PDR is successfully implementing malaria control activities supported by national funds and Global Fund (GF) grants (from rounds 4 and 7). Budget from the Lao government allocated for the NMCP is about US\$ 594,912 (2008). GF Round 7 in its Phase 2, is expected to provide NMCP with a total of US\$16 million for the period 2010 - 2013. While the national budget supports 3%, GF support covers 97%.

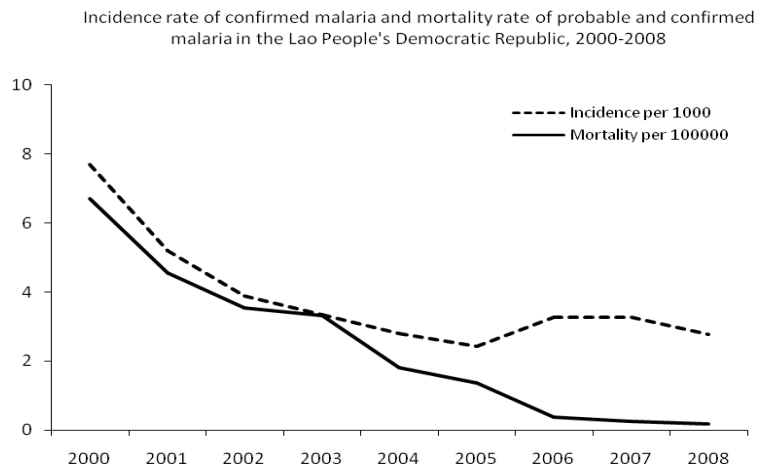
Artemisinin-based combination treatment (ACT) with Coartem[®] (Artemether+ Lumefantrine) was introduced in 2004 following increasing malaria-drug resistance. Since the introduction of ITNs/LLNs, ACT/RDTs, there has been remarkable reduction of malaria cases as well as severe malaria including deaths due to *P. falciparum* malaria. The number of cases in 2006 when compared to 2005 was reduced by 42% in 8 provinces. Despite these impressive reductions in malaria burden, there remained 9 provinces in the year 2006 that showed increases. These apparent increases in incidence have been attributed to the scale-up and expansion of early diagnosis and treatment (EDAT) (*figure 1a*) through RDTs (Paracheck[®], a *P. falciparum* only specific RDT) and ACTs (Coartem[®]) to villages and to better reporting from peripheral sites.

Figure 1(a)



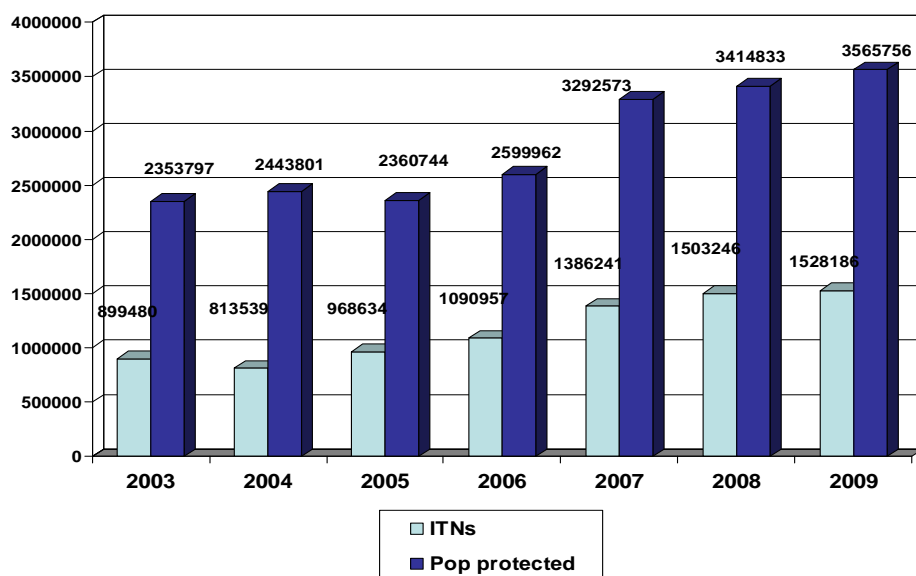
The reported annual incidence of confirmed malaria per 1,000 population decreased from 7.7 to 3.1 between 2001 and 2008 (*figure 1b*). In the same period, the malaria mortality (probable and confirmed) declined from 4.6 to 0.2 per 100,000 population. The number of malaria deaths in hospitals reduced drastically from 187 (2003) to 11 (2008).

Figure 1(b)



In 2009, the total cumulative number of ITN and LLN is 1,528,186 [ITNs: 1,164,310 + LLNs: 363,876 (new 76,918 + old 286,985)] and total 3,565,756 (99 % of target 3.6 million) of people at risk are now protected by Insecticide Treated Nets (ITN) and LLNs). *Figure 1(c)* illustrates.

Figure 1(c): Number ITNs and Population Protected (2003-2009)



Since the commencement of the Round 1 GFATM grant in 2003, the program has monitored its performance through numerous impact, outcome and process indicators (table 3). These are in addition to the routine set of indicators that are reported to WHO regional office (WPRO) and lately to the Global Malaria Program (WHO World Malaria Report).

Table 3

Indicator	Baseline	Baseline date	Achieved till June 2008	Target till June 2009	Achieved June 2009
IMPACT/OUTCOME INDICATORS					
Incidence of clinical malaria cases- Number of malaria cases reported (probable and confirmed) per 1000 population	5.5	2001	2.86	1.5	3.14
Annual Parasite Incidence per 1000 population	5.2	2001	3.26	0.9	3.16
Number of malaria deaths in hospital.	187	2003	14	20	11
% children under 5 sleeping under bednets (ITN and LLN)	28%	2006 (MICS)	NA	NA	NA
Number of households that own an ITN.	69.56% (4,170/5,995)	2006 (MICS)	NA	NA	NA
SERVICE DELIVERY INDICATORS					
1. Number of ITN distributed	136,523	01-Dec-01	1,503,246	1,179,960	1,524,441
2. Number of community members trained in malaria case management	120	01-Jan-05	12,854	56,560	6,524

3. Number and percentage of patients with uncomplicated <i>P. falciparum</i> malaria receiving diagnosis (RDT and/ or microscopy) and adequate treatment in the public and private sector among total number of confirmed uncomplicated malaria cases (ACT)	0.25%	00-Jan-00	89% (13,492/ 15,097)	80%	89.36% (15,693/17,561)
4. Number and percentage of severe malaria cases receiving treatment (Artesunate IV).	0	01-Dec-03	90% (3,306/3,676)	80%	95.33% (1,021/1,071)
Number of staff trained and/or re-trained on MIS, Malaria surveillance	72	2007	72	58	59
5. Number and percentage of provincial health facilities submitting timely and complete report on ACT use and stock report as defined by national guidelines (Logistic Management Information System=LMIS).	0	2007	0	8/17 (47%)	8/17 (47%)
5. Number and percentage of district health facilities submitting timely and complete report on ACT use and stock report as defined by national guidelines (Logistic Management Information System=LMIS).	0	2007	0	30%	60/114 (52.6%)
6. Number of villages mobilized for the use of LLNs			2,016	2,531	2,474

Epidemiology

Topography

Malaria is endemic throughout most of the country, but the intensity of transmission varies greatly between the different ecological zones, with low transmission in the plains along the Mekong river and in areas at high altitude (>1,000 m) to intense transmission in hilly forested areas. Urban zones and villages located at altitudes above 1,200 meters are generally considered free from malaria; however few studies have been performed in villages at high altitude. Malaria incidence is highest in the southern part of the country. The five southernmost provinces, Savannakhet, Saravane, Sekong, Champasack and Attapeu account for 90% of all cases reported in 2008.

Malaria species

P. falciparum is the predominant species accounting for 98% of all confirmed cases (2008 data). The reported number of *P. vivax* cases is generally low but varies greatly between districts. In 2008, *P. vivax* was only reported in 7 provinces, mainly in the northern part of the country, but also from Attapeu, Sekong and Savannakhet in the south. The number of *P. vivax* cases is likely to have been underestimated since only provincial and district hospitals, and a few health centers have microscopy and can perform species specific diagnosis. Prevalence studies conducted in the late 1990s and recently in 2009, have found high proportion of *P. vivax* (ranging from 8 to 32%).

Malaria vectors

There are four recognized malaria vectors in the Lao PDR: *Anopheles dirus*, *An. minimus*, *An. maculatus*, and *An. jeyporiensis*. Among these *An. dirus* and *An. minimus* are considered primary vectors. While *An. minimus* is widespread and have been identified in all provinces, *An. dirus* is most common in the central and southern part of the country and is considered rare in the north. *An. dirus* is the most important malaria vector in the southern part of Lao PDR. The mosquito breeds in stagnant and shaded waters (e.g. hoof prints, small rain fed pools) in rainforest, forested foothills or in agricultural plantations, but has also been found to breed in scrub lands with low vegetation. *An. dirus* is mainly exophilic and exophagic. The species is predominantly anthropophilic, but feeds also on domestic animals. Recent studies from Attapeu province indicate that biting cycles of *An. dirus* is between 19:00 and 06:00 (peak 22:00 hours). *An. minimus* breeds in running streams in hilly areas, irrigation ditches, and rice fields. The mosquito feed mainly on humans but also on cattle and is endophagic and endophilic.

Key risk population

There are four main categories of people affected by malaria in Lao PDR: ethnic minority groups, forest fringe inhabitants, temporary migrants and seasonal workers, and new forest settlers. The epidemiology of the disease varies considerably from one group to another and in many cases the different situations require different malaria control strategies, adapted to risk group behavior, local health infrastructure and environmental conditions.

Ethnic minority groups. Traditional forest inhabitants belong to over 57 different ethnic groups. Most have their own distinct language making communication of health messages extremely problematic. Poverty in these communities is often extreme. Minority groups tend to be concentrated in remote border areas where access to healthcare services (both public and private sector) is often limited.

Many groups have large communal villages which are left all but empty for much of the year as families spend months away tending their crops in small farms scattered through the nearby forest. In addition, individuals (usually young men) may spend short periods away from their homes or forest farms, hunting or collecting forest products. Access to healthcare is often made even more difficult as a result.

All age groups tend to be exposed seasonally to long periods of sometimes intense transmission. Adults are usually partially immune but children and pregnant women are extremely vulnerable. The micro-epidemiology of malaria in areas of intense transmission is not well understood: It is not clear exactly where within a community most transmission occurs. It could be in the village (either inside the house, outside the house or at springs on the outskirts of the village) or it could be at the forest farms.

Forest fringe inhabitants. Many people live in rice growing communities close to the forest. Villagers (predominantly young men) make frequent overnight visits to the forest to hunt and to collect wood and other products. These visits frequently result in the men contracting malaria. Cases returning to the village can infect anopheles mosquitoes breeding in and around the rice fields and although these species (e.g. *Anopheles maculatus*) are less efficient vectors than the ones found in the forest, limited local transmission can occur. All age groups are therefore at risk but the majority of cases are found in adult males.

Temporary migrants and seasonal workers. People working in the forest for extended periods such as gem miners, soldiers, workers involved in infrastructure development projects (such as building roads and dams), illegal loggers and sandal wood collectors are at high risk of contracting malaria. *Seasonal workers* harvesting rubber, coffee or rice close to the forest are also at high risk. While the first group is mostly made up of men, the second is made up of men and women. In each case workers may come from villages near the forest but many also come from far-flung regions when seasonal demand for labour in those areas is low. Often they have little or no immunity to malaria.

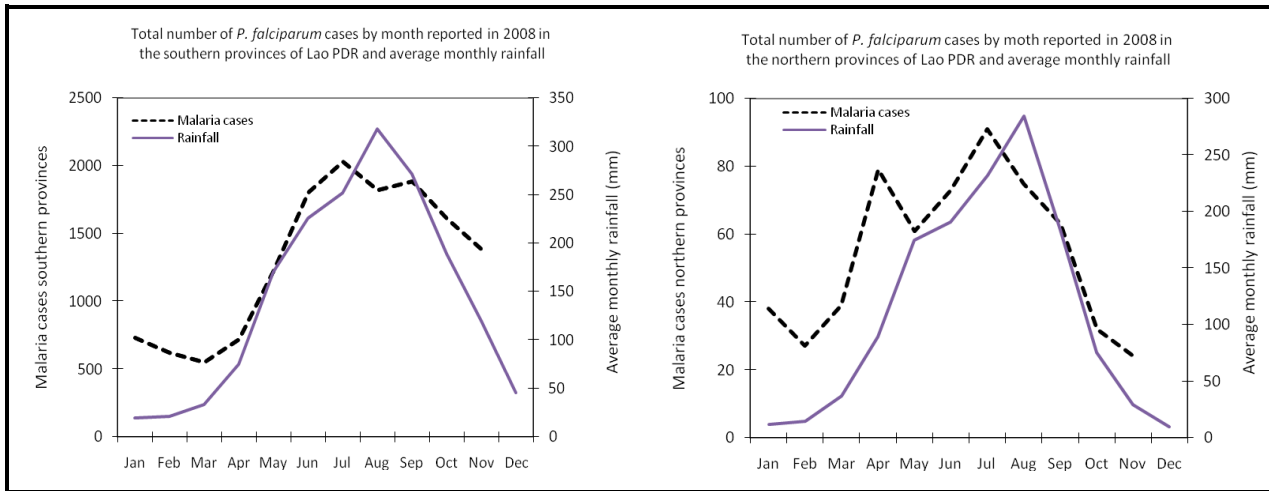
New forest settlers. Families who, for economic or political reasons, relocate to forested areas to establish farms are initially at high risk of contracting malaria. Their immunity is usually low. Malaria transmission in these new communities typically diminishes year by year with continued development and deforestation of settled areas.

Climate

Temperature and humidity play an important role in the transmission of malaria. The optimum temperature for sporogony is between 25°C and 30°C. The sporogonic cycle for *P. vivax* and *P. falciparum* halts at temperatures below 15°C and 18°C respectively. Rainfall affects the abundance of breeding sites, and thus mosquito density, while humidity influences mosquito survival, which increases at a humidity >60%. The tropical climate in Lao PDR with an average annual temperature of 25-30°C and average humidity 55% is highly suitable for the transmission of malaria. However, in some areas in the northern part of the country, temperatures regularly drop below 18°C in the cold season at high altitude and during this season transmission of *P. falciparum* may be interrupted temporarily.

Comparing the monthly incidence of *P. falciparum* in 2008 with average monthly rainfall in the northern and southern part of the country separately suggests a close association between the rainy season and malaria transmission (*figure 2*).

Figure 2



Source, CMPE 2009

Drug resistance

Routine sentinel malaria drug surveillance is done in 3 sites. There are currently no reports of *P. falciparum* resistance to Coartem® the first line antimalarial drug in the Lao PDR.

4. Current malaria control strategies

Malaria Vector Control

Vector control in the Lao PDR is at present exclusively based on insecticide treated bed nets (ITN). In recent years, Long Lasting Nets (LLNs) have also been introduced in some provinces. The overall plan is to gradually replace ITNs with LLN in the population at risk by 2013. In 2008, 82% of the estimated population at risk of malaria had access to ITNs.

Malaria Diagnosis and Treatment

Early diagnosis and treatment (EDAT) is one of the cornerstones in the national malaria control strategy in the Lao PDR. Until 2006, laboratory based malaria diagnosis was largely restricted to provincial and district hospitals, and a limited number of health centers with microscopy. In late 2004, RDT (Paracheck) and ACT (Artemether+ Lumefantrine, Coartem®) was introduced as a pilot intervention for early diagnosis and treatment (EDAT) in 3 provinces (Attapeu, Sekong and Saravane) covering a total of 6 districts and 60 villages. For the first time, village based diagnosis and treatment was introduced where 2 village health volunteers (VHV) per village were selected and trained. Following the pilot phase a consensus workshop was organized in 2005 and village based EDAT was adopted as a national strategy and scaled-up gradually to cover 6,462 villages (60% of all

villages in Laos) by the end of 2008. During this same period RDT and ACT were introduced in over 700 health centers.

In district and provincial hospitals, RDT and ACT are also available although emphasis is placed on microscopic diagnosis. Artesunate injectables are available for the treatment of severe malaria. A national malaria treatment guideline (2006) for health workers and village volunteers was disseminated.

Public Private Mix (PPM) for malaria diagnosis and treatment

The Public Private Mix (PPM) for malaria diagnosis and treatment was started in 8 districts of 4 target provinces in September 2008. The main objectives were to increase coverage of services (*figure 3*) and reduce the availability of fake antimalarials in the formal private sector. A total of 98 private pharmacies and 10 physicians from private clinics were trained on using of RDT and ACT for uncomplicated malaria case management and reporting system. Over a period of 18 months (Sep 2008 – Dec 2009), a total of 19,365 suspected cases of malaria have been tested and detected 2,554 cases (test positivity rate of 13%). An external assessment was done in October 2009 and future scale up is planned in more districts in the existing PPM pilot provinces as well as expanding to new provinces.

Figure 3: Number of persons tested for malaria in the PPM pilot districts: Public health facility vs Private sector (Sep 2008 – August 2009) showing the added value of the initiative by increasing coverage of diagnosis



Disease Surveillance

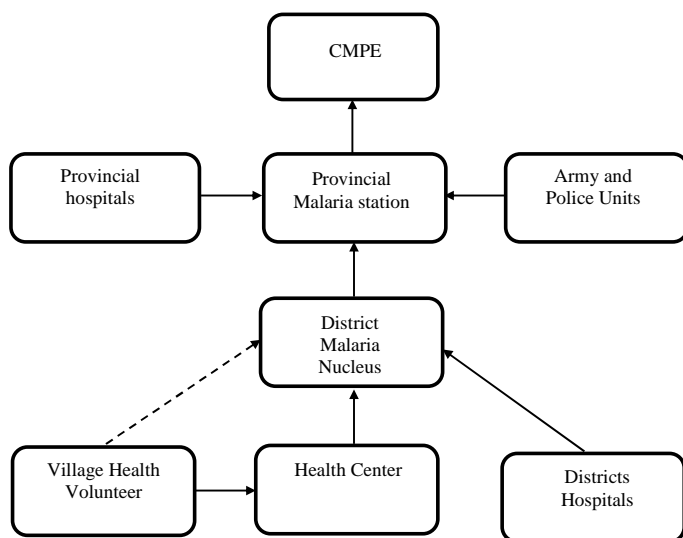
The national Malaria Information System (MIS) is based on passive case detection. Prior to the introduction of RDT and ACT at village and health centre level, notification of confirmed malaria

relied on data from provincial and district hospitals and a limited number of health centers with microscopy.

The first level of the surveillance system is the village health volunteers who are required to report number of RDT confirmed *P. falciparum* cases (alongside other indicators) every month to the health centre or in some cases directly to the district malaria nucleus. The health centre aggregates the data from all villages in the catchment area by sex and age-group and submits this information to the district malaria nucleus which is responsible for summarizing the data from all health centers (including village data) in the district as well as collecting data from district hospitals.

This information is forwarded to CMPE through the provincial malaria stations, whose role is to validate the district data and to collect data from provincial hospitals, military and police. The structure of the notification system is outlined in *figure 4*.

Figure 4: Flowchart of malaria notification in the Lao People’s Democratic Republic



Despite the extension of malaria diagnosis (and surveillance) to the most peripheral level of the health system, issues of data completeness remain. It has been estimated that the level of reporting from VHVs (by district) ranged from 1% to 100% in 2008. Furthermore, cases diagnosed in the private or informal sector are not captured by the MIS.

Health Education

CMPE produces IEC materials, booklets and pamphlets in the field of malaria prevention for all levels according to the local and specific conditions of each region and specifically for EMGs as well.

Messages are disseminated by a number of means including radio and television broadcasts,

newspaper articles, poster campaigns and through the deployment of mobile IEC teams. The aim is to increase the population's awareness of issues relating to malaria and its prevention and control. Various modes of delivering health education for malaria prevention and control were continued at central, provincial, district and village levels.

Control strategies for ethnic minorities

The NMCP proposes through its GF Round 7 grant to adopt in an intensive advocacy, communication and social mobilization project, involving 5 provinces in a total of 782 villages (over the 5 year term of this proposal ending June 2013) where malaria transmission is intense and ethnic minorities are predominant reaching an estimated 15 major ethnic groups with an approximate population of 260,000. This specific objective engage, as the main implementing agents from NGOs (Health Unlimited) and a local Lao civil association, Promotion for Education and Development Association (PEDA) as well as vital coordination roles of civil societies (Lao Womens Union, Lao Youth Organisation) and including them in all phases of scaled-up malaria control efforts in these ethnic populations.

Training of Human Resources

CMPE supports and provides training in malaria control for all malaria staff with a focus on the field of epidemiology, entomology/vector control, treatment and management of severe malaria, project management and financial management, public health and English and basic and advanced computer courses. This involves in country as well as overseas training, and both short and long-term study.

Operational Research

CMPE has conducted a range of operational research including: malariometric surveys; drug resistance monitoring; effectiveness studies; KAP studies; and cost-effectiveness studies. A few of these conducted in the recent years are listed below:

- (1) The Passive Case Detection (PCD) and Malaria Information System (MIS) survey*
- (2) Baseline survey for knowledge, behavior and practices of Ethnic Minority Groups (EMGs)*
- (3) Active Case Detection (ACD) and Entomology surveys*
- (4) Assessment of Option Appraisal VHWs Incentive Program*
- (5) Baseline survey on malaria health education materials and its acceptance*
- (6) National Malaria Bed Net survey*
- (7) Community acceptance of LLNs and bioassay of LLNs*
- (8) MIS survey - KAP survey on Malaria Information System*

5. Malaria Risk Stratification

The last stratification of malaria in the Lao PDR was performed in 1997 which was based on data from most provinces up to district level only based on cases detected by microscopy (hospital and some health centers). It was this stratification model that was used as baseline for the R1 and R4 GFATM grant (ie – estimated 3.6 million people at risk). There was no specific control strategies for the different risk areas, ie – low, moderate and high. As a result of the R1 and R4 GF grants, from 2003 – 2008, about 6,000 + villages of different risk levels in the whole country adopted the same control strategies.

In 2005 Lao PDR introduced a pilot intervention using Pf rapid diagnostic tests (RDTs) and Artemisinin Combination Therapy (ACTs) in 3 provinces (Attapeu, Sekong and Saravane) covering a total of 6 districts and 60 villages. For the first time, village and health centre based diagnosis and treatment was introduced where 2 village health volunteers (VHV) per village were selected and trained. In 2006, the scale up of RDT and ACT begun nation wide. By 2008, the scale up was completed with about 6,000 villages, 700 health centres, 114 district hospitals and 52 provincial hospitals. Along with this scale up of RDTs and ACTs, protection measures through bed nets were also scaled up to achieve 3.6 million persons protected.

In order to perform a detailed stratification of *P. falciparum* risk in Lao PDR, between December 2008 and January 2009, CMPE initiated a nationwide data survey to collect monthly data on number of persons tested by RDT (or microscopy where available) and number of confirmed *P. falciparum* cases for the period 2006-2008 in health centres and villages with RDT/ACT. Data on annual confirmed malaria cases diagnosed by RDT or microscopy in district hospitals between 2006 and 2008 were collected in a separate survey in January 2009. Malaria data from provincial hospitals, provincial malaria stations, and army/police medical units, were obtained from the malaria information system (MIS). The survey was conducted in 135 districts throughout the 17 provinces. A detailed account of the stratification is found in a published *article (High heterogeneity in Plasmodium falciparum risk illustrates the need for detailed mapping to guide resource allocation: a new malaria risk map of the Lao People's Democratic Republic (Malaria Journal 2010).*

The results of the stratification indicate that *P. falciparum* transmission is pervasive in the southern part of the country, with very high incidence rates in poor remote villages inhabited by Ethnic Minority Groups (EMGs) along the border with Vietnam. In the central part of the country, *P. falciparum* is sporadic and occurs only in small pockets within large areas of no transmission. In the Northern provinces, *P. falciparum* transmission is sporadic and focal mostly with low to medium incidence rates (*figure 5*).

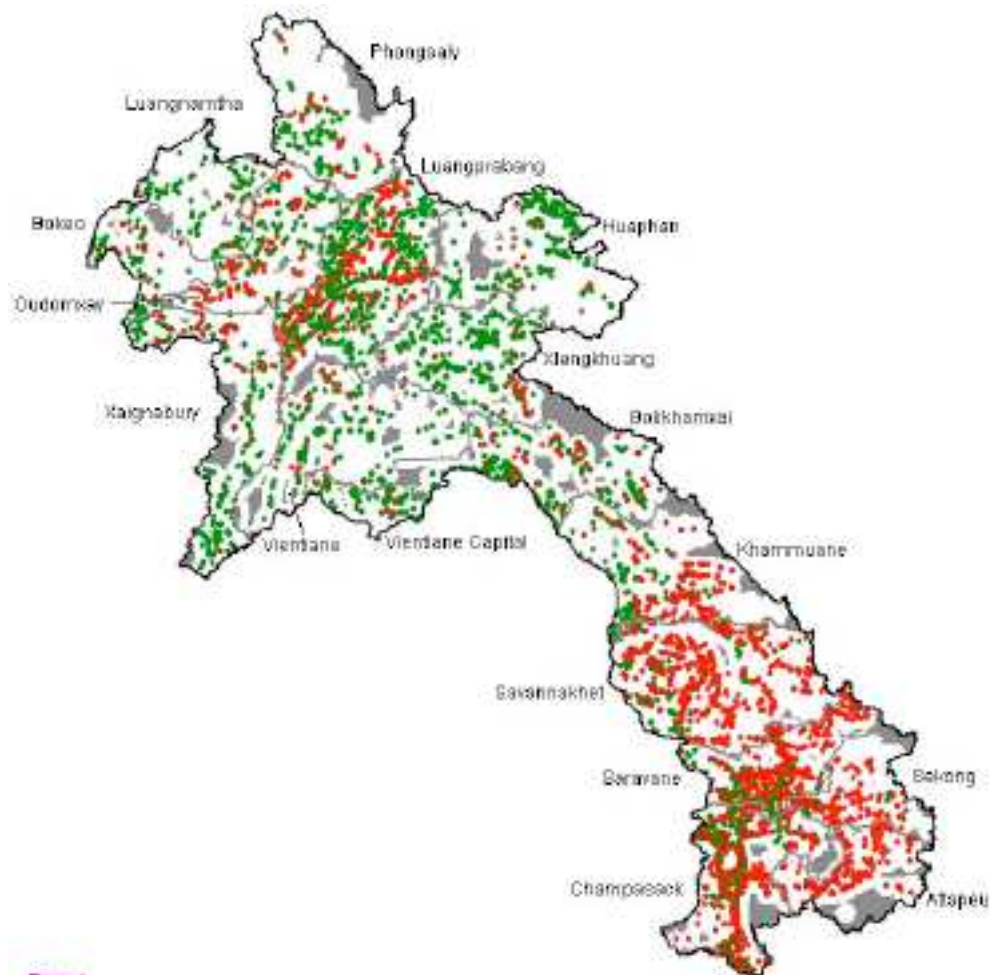


Figure 5: Distribution of *P. falciparum* diagnosed health centres and villages included in the survey. Red dots: Villages or health centres reporting at least one confirmed case of *P. falciparum* between 2006 and 2008, green dots: Villages or health centres which did not report any confirmed cases of *P. falciparum* between 2006 and 2008. Grey areas signify unpopulated areas.

For the purposes of targeting malaria control interventions, following in depth discussions with malaria control experts from WHO in 2009, the various zones were combined to form 3 main Strata. Villages categorized as 'Unknown risk' were villages where incidence rates were not available through the survey primarily because these were not targeted for RDT and ACT in the past. Table 4 and 5 summarize.

Table 4: Population at risk in different incidence strata.

PROVINCES	Population Stratum 1	Population Stratum 2	Population Stratum 3	Population 'Unknown' risk	Total Population
Incidence/1,000	0-0.1	0.1-10	>10		
VTC	58,434	1,542	-	-	59,976
PSL	59,060	1,409	1,040	43,993	105,502
LNT	81,542	756	-	6,850	89,148
ODX	106,236	15,122	590	5,101	127,049
BK	77,116	8,844	920	21,285	108,165
LPB	213,421	30,510	6,409	-	250,340
HP	118,659	2,282	125	35,764	156,830
XBL	162,274	4,861	427	6,343	173,905
XK	132,409	2,593	173	1,403	136,578
VTP	93,702	9,565	-	83,922	187,189
BLX	116,139	2,029	221	1,552	119,941
KM	71,016	15,384	8,201	16,943	111,544
SVK	131,714	110,796	67,371	9,212	319,093
SRV	66,710	51,299	47,455	-	165,464
SK	21,647	6,685	21,466	6,027	55,825
CPS	173,289	120,885	33,724	1,417	329,315
ATP	8,476	23,599	51,666	424	84,165
Total	1,691,844	408,161	239,788	240,236	2,580,029
	66%	16%	9%	9%	

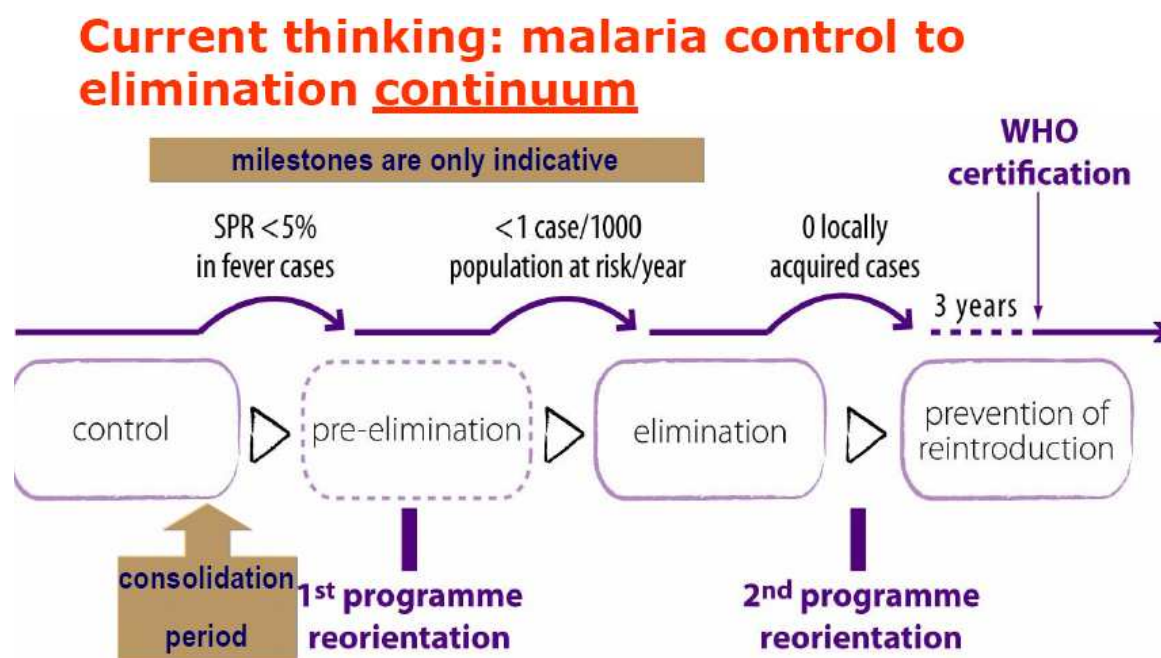
Table 5: Malaria risk strata – Number of villages, districts and summary populations by province

	Strata 1 villages	Strata 2 villages	Strata 3 villages	Unknown risk	TOTAL villages
VTC	60	2	0	1	63
PSL	220	6	5	159	390
LNT	269	3	0	22	294
ODX	282	30	2	14	328
BK	175	5	1	57	238
LPB	526	80	24	0	630
HP	343	5	1	116	465
XYL	263	8	1	14	286
XK	336	5	1	4	346
VTP	135	11	0	118	264
BLX	238	3	1	5	247
KM	175	38	28	49	290
SVK	288	174	176	28	666
SRV	148	104	147	0	399
SK	75	17	83	31	206
CPS	305	167	71	1	544
ATP	23	36	108	2	169
<i>districts</i>	131	86	57	58	
<i>villages</i>	3,861	694	649	621	5,825
<i>population</i>	1,691,844	239,788	408,161	240,236	2,580,029

While the stratification results would suggest that there would be geographical areas that could be considered for pre-elimination of malaria (*Figure 6*), the consensus of the NMCP and MoH is that given the current resources, more work and focus is needed in intensifying control measures nation wide especially in the south of Laos along with strengthening the routine surveillance system. It was felt that the stratification results need to be implemented over a course of 1-2 years before a decision for pre-elimination or focal elimination of malaria is considered.

The current NSP 2011-2015 however does include pre-elimination or focal elimination as an objective by 2015.

Figure 6



SPR: slide or rapid diagnostic test positivity rate

Source: WHO Global Malaria Programme

PART II

National Strategy for Malaria Control and Elimination 2011-2015

1. National strategy development process

The entire national strategy development process, which was led by government, was fully transparent, consultative and participatory. The logical framework which forms the basis of this national strategy was developed during a workshop attended by multiple stakeholders (20 persons) at CMPE from 23rd to 25th September 2009. Preparation of the narrative and budget was led by CMPE with technical assistance provided through WHO-Western Pacific Regional Office (WPRO). The resulting draft was reviewed by a broad range of stakeholders (34 persons) during a second workshop held from 25th – 27th November 2009 before being finalized. The final version was then endorsed by the same group of stakeholders prior to final endorsement by MOH.

Although the various 'key risk populations' in Laos were not directly involved in the proposal preparation process, there was broad involvement by national experts from provincial and central level and from international experts (WHO WPRO) throughout. Many of these experts have had long experience working with high-risk communities in the region and so indirectly the groups presented in 'Key Risk Population' (above) were well represented.

2. Context within National Development Framework

The National Strategic Plan for Malaria Control and Elimination (NSPMCE) '2011-2015' is fully in-line with the principles set out in the sixth 5-year National Socio and Economical Development Plan (NSED, 2006-10) and in the sixth National Health Sector Development Plan (2006-10). At the time of developing this NSPMCE the 7th national development plans were still working drafts but the NSPMCE is in line with its principles and with the national timeframes of 2011-2015.

3. Programme approach

The National Strategic Plan for Malaria Control and Elimination (NSPMCE) '2011-2015' is based on the principles set out in WHO's Global Malaria Action Plan and more specifically is fully aligned with the policies and strategies presented in WHO's 'Action Plan for Malaria Control and Elimination in the Western Pacific (2010-2015)'.

The activities described in the programme framework below are considered to be feasible, locally appropriate, equitable and evidence based.

Sustainability

Efforts have been made to ensure that the programme activities outlined in this application can be sustained beyond the end of the grant. For example, the program will continue to base diagnostic

services on an efficient microscopy network. RDTs will be used sparingly in a limited number of clearly defined circumstances. As well as maximizing ownership and uptake, continued emphasis on community mobilization for implementation of the ITN programme will ensure that the overall cost-effectiveness (and thereby sustainability) of the programme will be improved.

Support for capacity strengthening at all levels is an investment that will provide long-term benefits for all those affected by malaria in Laos.

Equitable access

All services and commodities described in the NSP will be provided free of charge.

Malaria in Laos is closely associated with the country's most marginalized groups. Ethnic minorities living in the forest and on the forest fringes often carry the greatest burden of poverty and disease. In Laos, well targeted malaria control efforts by their very nature therefore cater to the needs of some of the least privileged. Recently introduced village level targeting of activities ensures that malaria control services are delivered directly to those most in need.

The highly focused nature of the activities proposed in this NSP will enhance the quality of life for people living in high risk areas. It is anticipated that this project approach will deliver short-term gains to project beneficiaries in malaria control provinces and at the same time move progressively towards the longer term gains associated with the cessation of malaria transmission in malaria elimination provinces.

4. Programme framework

The overall goal of the National Strategy for Malaria Control and Elimination (NSMCE) 2011-15 is to 'Intensify malaria control efforts, targeting remaining endemic communities and key risk groups, and progressively roll out malaria elimination in selected provinces'.

Projected outcomes will be achieved through the implementation of activities grouped under eight programme objectives:

- (1) Optimize the functionality of national malaria control and elimination efforts by strengthening programme management.
- (2) Maximize access to effective vector control and personal protection measures.
- (3) Improve access to early, effective diagnosis for malaria.
- (4) Support routine case management for malaria in all public sector health facilities, at community level in Stratum 3 villages and in selected private sector health facilities in more endemic districts.
- (5) Strengthen routine Malaria Information System.

(6) Maintain malaria epidemic preparedness and response capabilities.

(7) Progressively roll out malaria elimination in selected provinces.

(8) Maximize utilization of malaria services through IEC/BCC and strengthen community mobilization efforts especially in elimination provinces.

The programme's targets at the impact level are to:

1. Reduce annual incidence of uncomplicated malaria (probable and confirmed) to 0.8 cases per 1,000 population by 2015 (compared to 2008 baseline of 3.14 per 1,000 population).
2. Reduce API (Annual Parasite Incidence) to 0.6 per 1,000 population by 2015 (compared to 2008 baseline of 3.13 per 1,000 population).
3. Maintain the number of reported malaria deaths in hospital at below 15 per annum throughout the programme period (compared with a 2008 baseline of 11 malaria deaths in hospital).

The programme's key targets at the outcome level are to:

- Increase the proportion of facilities at province and district level submitting complete stock management reports on schedule every quarter to 94% (compared to a 2009 baseline of 47%).
- Increase the proportion of children under 5 sleeping under a treated bed net (ITN or LLN) last night to 80% by 2012.
- Increase the proportion of the target population protected by LLN in stratum 3 to 95% by 2012.
- Increase the proportion of the target population protected by ITN in stratum 2 and stratum 3 to 80% from 2010.
- Increase the proportion of the target population covered by indoor residual spraying to 80% from 2010.
- Maintain the proportion of suspected malaria cases with parasite based diagnosis at 95%.
- Increase the proportion of microscopists with sensitivity >95% and specificity >98% to X% by 201X.
- Increase the proportion of Stratum 3 villages with no stock out of combo-RDTs during the last 12 months to 95% by 2015.
- Increase the proportion of health facilities with no stock out of combo-RDTs during the last 12 months to 95% by 2015.
- Increase the proportion of confirmed *falciparum* malaria cases who received treatment with ACT to 95% by 2015 (compared to 2008 baseline of 88%).
- Increase the proportion of confirmed *vivax* malaria cases who received treatment according to national treatment guidelines (including radical treatment) to 90% by 2015.

- Increase the proportion of health facilities with no stock out of first-line antimalarials during the last 12 months to 95% by 2015.
- Increase the proportion of Vows with no stock out of first-line antimalarials during the last 12 months to 95% by 2015.
- Increase the proportion of facilities submitting complete surveillance reports on schedule every month to 90% by 2015 (compared to 2009 baseline of 50%).
- Increase the proportion of private sector providers in elimination provinces providing data for monthly reports to 100% by 2015.
- Ensure that all cases identified in elimination provinces are properly investigated.
- Increase the proportion of people in stratum 2 and 3 who know the cause, symptoms, treatment of, or preventive measures for malaria to 90% by 2015 (compared to 2009 baseline of 80%).
- Increase the proportion of people in stratum 2 and 3 with fever in the last two weeks who sought healthcare within 48 hours to 80% by 2015 (compared to 2009 baseline of 39%).

Progress towards each of the eight objectives will be achieved through the implementation of a number of activities. These are described in detail below and are annexed as a log frame (*Annex 4*):

Objective 1: Optimize the functionality of national malaria control and elimination efforts by strengthening programme management involves 13 major activities:

Activity 1.1 is strengthening technical, administrative and financial management capacity at central, provincial, district, health centre and community level. This activity is broken down into 9 sub-activities (sA):

sA 1.1.1 is to conduct a detailed review of the Malaria Programme Management structure taking into account decentralization. The review process was initiated in 2009 during a planning workshop managed by CMPE and supported by WHO. The workshop was attended by representatives from all public sector stakeholders. Organograms for central, provincial and district level were revised in light of the newly developed logical framework for the NSPMCE. Revisions were made to ensure clear roles and responsibilities for staff involved in malaria control and thereby ensure that projected programme outcomes can be achieved at all levels. Detailed terms of reference will now be developed for each post. Further work is planned to identify exactly how many staff will be needed at each level to cope with the changed demands of the new NSPMCE. This work should be completed by the end of the first quarter in 2010. Thereafter, the management structure will be reviewed periodically as part of the routine annual programme review (activity 1.2 below).

sA 1.1.2 is to develop a comprehensive HR capacity development plan and integrate it into the NSPMCE. A consultant with proven experience in Human Capacity Development will be recruited for this task through WHO early in 2010.

sA 1.1.3 is to recruit new staff (or reassign existing staff) as necessary according to the requirements of the new organizational structure.

sA 1.1.4 is to develop training materials based on WHO regional training templates where these are available. This work will be overseen by the long-term technical and administrative advisors with support from external technical assistance where necessary.

sA 1.1.5 is training. This important sA is further broken down into 2 sub-sAs (ssA):

ssA 1.1.5.1 is to provide training for staff at all levels according to needs (including volunteers). This will involve a comprehensive programme of training will cover everything from international training at masters level to in-house training on specific areas of operational importance, and to mentoring of key staff by short and long-term technical advisors. Subjects will include: Project management; Project cycle management; MSc Sociology; MSc Entomology; MSc Parasitology; MSc Health economics; MSc Epidemiology; MPH; DTM&H; DAPE; Statistics short course; Malaria epidemiology short course; Data analysis and interpretation; Epidemiology (basic); Malaria entomology (basic); Malaria entomology (advanced techniques); Management of severe malaria; Management of uncomplicated malaria; Drug resistance monitoring; Microscopy; Microscopy QA; Microscopy repair; Rapid diagnostic tests; Serology; Logistics and supply management; Outbreak preparedness and response; Malaria surveillance; Bed net distribution; Indoor residual spraying; Office administration; Financial management; English (advanced); English (intermediate); English (communication and report writing); Computer training; Mapping; Integrated training for VHV; GIS Training for Transfer of Technology; IEC/BCC; and Design of IEC/BCC materials and methodologies. The training will be allocated to individuals in a transparent manner based on needs, merit and age.

ssA 1.1.5.2 is to support national [and regional] study tours as an adjunct to the formal training programme in order to further develop capacity in specific areas. This will allow participants to share lessons learned and develop a deeper understanding of key issues affecting malaria control and elimination efforts in the region.

sA 1.1.6 is to support the revitalization of the library at CMPE (including the latest information technology) which will form a key learning resource for the national programme.

sA 1.1.7 is to promote staff periodically according to qualifications, experience and performance. This will form an important aspect of the new human capacity development scheme and will help to minimize staff attrition and strengthen and improve the sustainability of the programme.

sA 1.1.8 is to support incentives for project staff at all levels (including village malaria volunteers). In countries such as Lao PDR where public sector salaries still lag far behind those of the private sector the importance of staff incentives have been well demonstrated. Similarly, as the range and depth of tasks required of 'volunteers' in the health sector has grown, the importance of ensuring adequate incentives to maintain project momentum has been clearly demonstrated both in Lao PDR and elsewhere.

sA 1.1.9 is to establish technical working groups (TWGs) for key programme areas including: vulnerable, poor and marginalized populations at high risk of malaria; IEC/BCC; Diagnosis and treatment (including drug monitoring and drug QA); Vector control and personal protection (including insecticide resistance and QA); Surveillance and outbreak response; Operational research; and, Training. Groups will be made up of a broad range of stakeholders from the health sector and beyond and from both public, private and NGO sectors as appropriate. Sub-groups may be formed to deal with specific issues as necessary. The TWGs will meet annually and on an *ad hoc* basis as necessary.

Activity 1.2 is to periodically review and adjust malaria control and elimination policies and strategies as appropriate. This activity is broken down into 3 sub-activities (sA):

sA 1.2.1 is to prepare the annual programme report and annual workplans. This activity will be carried out by provincial and national level teams working in close association with one another.

sA 1.2.2 is to carry out an annual review of all national policies and strategies and revise and disseminate updates as appropriate. This activity will be carried out by the central level management team working in association with long-term advisors, TWGs, WHO and external technical assistance where appropriate.

sA 1.2.3 is to review and expand national policy on engagement with private sector in malaria diagnosis, treatment and reporting. This will become increasingly important with the arrival of the AMFm. Study tours to neighbouring countries already implementing private sector engagement plans as well as specialist technical assistance will be used to speed the development of a comprehensive policy.

Activity 1.3 is to develop and implement guidelines on the management and judicious use of public health insecticides, including annual reporting of insecticide usage and safe disposal of expired insecticide.

Activity 1.4 is to strengthen commitment for malaria control through advocacy. This activity is broken down into 2 sub-activities (sA):

sA 1.4.1 is to document the successes of the malaria control programme and disseminate the resulting information amongst stakeholders. Documentation will be performed by key members of the relevant TWG working with long-term advisors and where necessary with technical support from WHO. Dissemination formats and dissemination methodology will both be designed specifically for each target group.

sA 1.4.2 is to provide regular briefings to high level government officials and opinion leaders. The programme director, assisted by senior staff and long-term advisors will brief leaders during high level meetings and other events. In addition CMPE will host *ad hoc* briefing events as the project reaches important programmatic milestones.

Activity 1.5 is to secure adequate financial support for malaria control and elimination. This activity is broken down into 3 sub-activities (sA):

sA 1.5.1 is to develop a fully costed National Strategy every 5 years (this current strategy is due to be updated in late 2014). This task will be carried out by CMPE's senior administrative and technical staff. The process will last several months and will involve a number of workshops which will be attended by key representatives from a broad range of stakeholders selected from public, NGO and private sectors. Technical assistance will be provided through WHO.

sA 1.5.2 is to identify funding gaps and secure funding from internal and external sources. This task will be carried out by CMPE's finance department working in association with senior administrative and technical staff. Technical assistance will be provided through WHO.

sA 1.5.3 is to incorporate malaria as an agenda item in other development initiatives. This task will be the responsibility of the programme director and may be delegated as appropriate.

Activity 1.6 is to develop and support inter- and intra-sectoral collaboration and partnerships. This activity is broken down into 2 sub-activities (sA). A focal point for both these activities will be appointed within the technical management unit at CMPE:

sA 1.6.1 is to integrate malaria control with other public health programmes maximizing synergies where possible. This will include developing and rolling-out add-on interventions for the diagnosis and treatment of diarrhoea and acute respiratory tract infections to the existing community-based malaria diagnostic and treatment services. In addition, vector control/personal protection initiatives such as LLINs will be channeled through Traditional Birth Attendants in communities in Stratum 2 and Stratum 3.

sA 1.6.2 is to strengthen inter-sectoral cooperation and promote integration of malaria control involving the public, private and NGO sectors. Diagnosis and treatment is likely to be a key focus with the launch of the Affordable Medicines Facility for Malaria (AMFm), currently being piloted in Cambodia and in other countries outside the region. In addition, vector control/personal protection initiatives such as LLINs, retreatment of existing bed nets and the provision of repellents will be channeled through the army, the police, construction and plantation companies and private sector retailers according to national strategy.

Activity 1.7 is to establish a 'model province' in each region and then transfer lessons learned from these to weaker neighbours. A focal point for this activity will be appointed within the technical management unit at CMPE. Additional resources will be allocated to these model provinces during the first two years of this 5 year plan.

Activity 1.8 is to maintain international exchange and cooperation. A focal point for this activity will be appointed within the foreign affairs unit at CMPE to liaise with regional malaria networks including WHO-WPRO, ACTMalaria, Asia Vivax Network and SEAMEO TROPMED.

Activity 1.9 is to strengthen cross-border collaboration. This activity is broken down into 2 sub-activities (sA). A focal point for both will be appointed within the foreign affairs unit at CMPE:

sA 1.9.1 is to develop and implement cross-border malaria action plans and synergize with 'Mekong Basin Disease Surveillance' cross-border activities.

sA 1.9.2 is to support regular cross-border meetings at national, provincial and district levels.

Activity 1.10 is to support regular meetings for planning and coordination at central (monthly), provincial (monthly) and district (quarterly) levels. This activity will be coordinated by the planning and finance department at CMPE and by their counterparts at Provincial and District levels.

Activity 1.11 is to utilize technical assistance (TA) to strengthen programme performance where necessary. A focal point for the management of TA will be appointed within the technical management unit at CMPE. In order to maximize capacity development within CMPE, each technical adviser will be allocated a counterpart. International TA will be sourced through WHO.

Activity 1.12 is to strengthen and maintain programme infrastructure. This activity is broken down into 4 sub-activities (sA) which will be coordinated by the administrative management unit at CMPE:

sA 1.12.1 is to renovate programme offices and laboratories where necessary (including the development of an 'operations room' at central level, and 3 reference laboratories and 2 training centres at regional level).

sA 1.12.2 is to maintain programme offices.

sA 1.12.3 is to maintain programme vehicles (replacing as necessary).

sA 1.12.4 is to maintain programme equipment (replacing as necessary).

Activity 1.13 is to manage procurement, supply and related quality assurance (QA). This activity is broken down into 5 sub-activities (sA). The first four of these will be managed by the logistics and supply unit at CMPE and, where appropriate, by their counterparts at the logistics and warehouse management unit at provincial level:

sA 1.13.1 is to support timely procurement of quality products. All procurement will be through open tender exactly according to national procurement and supply management guidelines. Key health products required include: Insecticide (WHOPES recommended), Spray equipment; LLINs (WHOPES recommended); RDTs (according to WHO product testing results); Quality slides and reagents; ACT; Other antimalarials. Key non-health products required include: vehicles, IT equipment, office furniture and equipment.

sA 1.13.2 is to improve storage facilities and equipment at Provincial, District, Health Centre and village levels in association with Food and Drug Department (including provision of cool boxes for RDTs and ACT where there is no electricity).

sA 1.13.3 is to strengthen supply management at all levels monitoring stocks through SMS text messaging. The development of this activity will require periodic TA.

sA 1.13.4 is to implement Quality Assurance for key health products (ACT, RDT [using positive control wells], insecticide and LLINs) through batch testing and testing samples from routine field collections. The development of this activity will require periodic TA.

Activity 1.14 is to conduct needs based research. This activity is broken down into 4 sub-activities (sA) which will be overseen by the research unit at CMPE:

sA 1.14.1 is to identify research priorities.

sA 1.14.2 is to review research findings and adjust policies, strategies, plans and research priorities on an annual basis as appropriate. This will be achieved through an annual workshop attended by key stakeholders including a WHO regional/global representative and where necessary specialist TA.

sA 1.14.3 is to conduct research. Each project will be conducted in partnership with at least one expert from a national or international institution. Experts will be appointed by the relevant TWG. Immediate priority research areas include:

1.14.3.1 Epidemiology of malaria among mobile workers in development projects (mining, rubber plantation, dam construction...)

1.14.3.2 An investigation of continuing malaria transmission in villages with high ITN coverage and access to community based diagnosis and treatment.

1.14.3.3 An assessment of Primary School Based treatment and distribution of Bed nets in remote areas of Laos.

1.14.3.4 Mapping of G6PD deficiency in Laos.

1.14.3.5 An assessment of incentive schemes for improving the performance of VHV's participating in Malaria, TB and HIV/AIDS programmes.

1.14.3.6 Other research (to be identified through annual review of priorities).

sA 1.14.4 is to disseminate research findings. Data analysis, interpretation and study write-up will be carried out under the guidance of the TWG appointed experts. Research findings will be presented in a variety of formats designed for specific target audiences (e.g. Briefing pamphlets, power-point presentations, posters, scientific papers).

Activity 1.15 is to implement routine supportive supervision at all levels (integrated with M&E where appropriate). This activity will be managed by the M&E and routine supervision units at CMPE and at Provincial level and by their counterparts in the administration units at District level.

Activity 1.16 is to support technical monitoring. This activity is broken down into 3 sub-activities (sA), each managed by the relevant technical unit at central level:

sA 1.16.1 is to support monitoring of drug resistance in 3 sentinel sites. This activity will be managed by the treatment unit at CMPE according to WHO guidelines.

sA 1.16.2 is to support monitoring of insecticide resistance in 17 provinces. This activity will be managed by the entomology unit at CMPE according to WHO guidelines.

sA 1.16.3 is to support monitoring of vector bionomics (including sporozoite ELISA, PCR and cytogenetic studies for species complex identification). This activity will be managed by the entomology unit at CMPE according to WHO guidelines.

Activity 1.17 is to support programmatic monitoring and evaluation. This activity is broken down into 4 sub-activities (sA):

sA 1.17.1 is to conduct periodic M&E needs assessment. This activity will be managed by the M&E and routine supervision unit at CMPE. The assessment will use the standard M&E Systems Strengthening Tool developed by GF and partners.

sA 1.17.2 is to support routine programmatic monitoring (integrated with supportive supervision where appropriate). This activity will be managed by the M&E and routine supervision units at CMPE and at Provincial level and by their counterparts in the administration units at District level according to procedures established under GF support.

sA 1.17.3 is to support joint mid-term and final evaluation (2011 and 2014). This activity will be carried out by a small team comprising National and International experts selected in association with WHO.

sA 1.17.4 is to support periodic internal/external technical and financial audit (2010, 2012 and 2013). This activity will be carried out by a team of experts assembled from within CMPE.

Objective 2: Maximize access to effective vector control and personal protection

measures involves 3 major activities. These activities will be implemented under the direction of the vector control unit at CMPE, the vector control and epidemiology unit at provincial level and by the epidemiology and entomology unit at district level. An overview of all of these activities by risk group and by stratum is provided in tabular form in *annex 1*:

Activity 2.1 is to maximize access to Insecticide Treated Bednets. This activity is broken down into 8 sub-activities (sA):

sA 2.1.1 is to provide free LLNs for all people in stratum 3 villages according to standard operating procedures (SOPs).

sA 2.1.2 is to treat/retreat existing conventional bednets with long-lasting insecticide in stratum 2 and 3 villages according to SOPs.

sA 2.1.3 is to provide free LLNs for pregnant women in stratum 2 and 3 villages. This sA will be implemented in partnership with the Maternal and Child Health Department through their network of traditional birth attendants.

sA 2.1.4 is to engage with major employers in stratum 2 and 3 areas to ensure that they provide employees with LLNs according to national guidelines.

sA 2.1.5 is to provide free LLNs for soldiers and police operating in Stratum 3 areas. CMPE staff will train their counterparts in the army and in the police force to follow SOPs.

sA 2.1.6 is to provide treatment/retreatment of existing conventional bednets with long-lasting insecticide for soldiers and police operating in Stratum 2 areas. As above, CMPE staff will train their counterparts in the army and in the police force to follow SOPs.

sA 2.1.7 is to provide additional single LLNs for Stratum 3 villagers practicing chamka/paddy field agriculture for use in forest farms. This sA will be implemented in parallel with sA 2.1.1 above.

sA 2.1.8 is to sell subsidized LLNs to seasonal agricultural workers and people involved in forest based activities through selected public sector outlets and PPM registered private retailers.

Activity 2.2 is to provide free indoor residual spraying in response to outbreaks and in areas of intense transmission according to national vector control guidelines and SOPs. As well as villages, this service will cover settlements associated with large scale construction projects, plantation communities, and military and police camps.

Activity 2.3 is to provide free/subsidized insect repellent to construction and plantation companies, the army, the police force and, through PPM registered private retailers, to other high risk groups operating in Stratum 3 areas.

Objective 3: Improve access to early, effective diagnosis for malaria involves 7 major activities. The first five activities will be managed by the laboratory unit and the last two by the serology unit at CMPE. At province and district levels the activities will be managed by the diagnosis and laboratory units respectively. Training and refresher training will be an important feature of strengthening diagnostic services (see sA 1.1.5.1 above).

Activity 3.1 is to maintain and strengthen the public sector microscopy network. Fully functional microscopy services will be made available at all public sector health facilities from 2012. The programme is expected to provide X¹ new microscopes for X new microscopy points and to replace X old or damaged microscopes in existing microscopy points.

Activity 3.2 is to develop and implement robust QA for microscopy. This will involve establishing 3 regional reference laboratories. QA services will be implemented according to SOPs.

Activity 3.3 is to provide combination-RDT based diagnosis at all Stratum 3 villages through the Village Malaria Worker network. During the course of the programme it is expected that X million combo-RDTs will be used at community level and that these tests may result in up to X malaria cases being diagnosed each year (most of which would probably have been missed by conventional public sector channels).

Activity 3.4 is to support combination-RDT based diagnosis at all public sector health facilities for use in emergencies, for post-treatment diagnosis and for when microscopy services are not available.

Activity 3.5 is to support parasite based diagnosis at selected PPM registered private sector pharmacies and clinics.

¹ X – to be determined after baselines established in 2010

Activity 3.6 is to gradually roll out G6PD testing. Current testing procedures are complex and require skilled technical staff and so initially the service will be introduced only at hospital level. It is expected that user friendly tests will become available in the medium-term so that eventually testing will be made available at all public sector health facilities and through Vows.

Activity 3.7 is to develop and maintain a high throughput PCR based diagnostic facility to maximize case detection and support malaria elimination. This facility will be modeled on the system currently under development in Cambodia.

Objective 4: Support routine case management for malaria in all public sector health facilities, at community level in Stratum 3 villages and in selected private sector health facilities in more endemic districts involves 4 major activities. Unless stated otherwise these activities will be managed by the treatment units at CMPE and provincial level and the laboratory unit at district level. Training and refresher training will be an important feature of strengthening treatment services (see sA 1.1.5.1 above) This training will cover areas such as ante-natal screening and interpersonal communication for behaviour change in addition to the usual range of clinical topics:

Activity 4.1 is to support antimalarial treatment in public sector health facilities according to national treatment guidelines.

Activity 4.2 is to support community based treatment services in Stratum 3 villages according to simplified national treatment guidelines.

Activity 4.3 is to support antimalarial treatment in selected private sector health facilities in more endemic districts, through training and supportive supervision.

Activity 4.4 is to support AMFm. This activity will be managed by the technical management unit at CMPE. The approach will be developed once the results of pilot studies in Cambodia and elsewhere have been made available.

Objective 5: Strengthen routine Malaria Information System) involves 4 major activities. These activities will be managed by the long-term technical advisor with the support of the surveillance and response units at central and provincial levels and the statistics unit at CMPE:

Activity 5.1 is to apply SOPs for malaria surveillance. These will be developed with technical support from WHO as necessary.

Activity 5.2 is to revise the MIS form and develop guidelines for its use. Training associated with roll-out of the new forms will be carried out under sA 1.1.5.1 above.

Activity 5.3 is to introduce WHO epidemiological surveillance software. This activity will be carried out with technical support from WHO as necessary.

Activity 5.4 is to strengthen and support data analysis and interpretation. Again, this activity will be carried out with technical support from WHO as necessary.

Objective 6: Maintain malaria epidemic preparedness and response capabilities involves 3 major activities. These activities will be managed by the long-term technical advisor with

the support of the surveillance and response units at central and provincial levels and the epidemiology and entomology units at district level. The country's emergency response capability will be strengthened to ensure rapid and decisive responses to any future outbreaks:

Activity 6.1 is to develop and implement a system for early detection of outbreaks at district and health centre level. The outbreak early detection system will be developed with support from WHO as necessary. The system will be rolled-out and strengthened through special training for epidemiologists in the periphery (see 1.1.5.1 above).

Activity 6.2 is to provide epidemiological support by central level staff to periphery. This will entail regular twice yearly supervision of epidemiological activities at provincial level by central level specialists and quarterly supervision of epidemiological activities at district level by provincial level specialists (see 1.15 above).

As a result of inputs 6.1 and 6.2 it is expected that X²% of health centers will be participating in the outbreak early detection system by 201X.

Activity 6.3 is to maintain epidemic preparedness through the provision of equipment, supplies and training. The programme will ensure that all districts remain fully equipped with spray pumps and adequately supplied with insecticide and other essential commodities. The programme will support a comprehensive package of 'trickle-down' training for IRS teams (see 1.1.5.1 above).

Activity 6.4 is to support rapid response in the event of outbreaks. In the event of an outbreak, response teams will implement curative and preventive measures according to SOPs.

Objective 7: Progressively roll out malaria elimination in selected provinces involves 6 major activities. The activities associated with this objective are supplementary to the routine activities associated with 'Malaria control' described above:

Activity 7.1 is to reorient malaria programme in provinces adopting elimination and familiarize public sector and other stakeholders with elimination strategy and associated roles and responsibilities. This activity will be managed by the technical management unit at CMPE with support from the long-term technical and administrative advisors.

Activity 7.2 is to maximize case finding. This activity is broken down into 2 sub-activities (sA). Both will be managed by the surveillance and response unit at CMPE, the statistics and data analysis units at provincial level and the epidemiology and entomology units at district level:

sA 7.2.1 is to maximize case finding in the public sector (ensure daily reporting of all malaria cases detected). An SMS text messaging system will be established to ensure rapid low cost communication regarding any new cases.

sA 7.2.2 is to maximize case finding in the private sector (establish and maintain monthly data collection). A liaison officer will make monthly data collection visits to private sector providers. Visits will incorporate training/education and supportive supervision.

Activity 7.3 is to implement comprehensive epidemiological investigations for each case identified. Case investigation forms will be developed by the elimination TWG for use by clinical staff. These staff will be trained to use the forms as part of their elimination reorientation training (see sA 1.1.5.1).

¹ X – to be determined after baselines established in 2010

Activity 7.4 is to conduct prompt in-depth investigations in all suspected transmission foci. These field investigations will follow SOPs which will be developed in association with WHO. They will be managed by the surveillance and response unit at CMPE, the statistics and data analysis units at provincial level and the epidemiology and entomology units at district level.

Activity 7.5 is to provide timely and effective IRS in all confirmed transmission foci. IRS will be conducted according to elimination specific IRS SOPs. IRS will be managed by the epidemiology and entomology units at district level.

Activity 7.6 is to provide directly observed radical treatment for all confirmed cases (including gametocyte drugs for Pf) according to National Treatment Guidelines. This activity will be carried out by clinical staff at every level, working in association with VMWs where appropriate.

Objective 8: Maximize utilization of malaria services through IEC/BCC and strengthen community mobilization efforts especially in elimination provinces involves 2 major activities:

Activity 8.1 is to conduct regular review and continuous development of targeted BCC materials and methodologies (including inter-personal communication between healthcare providers and their patients) in partnership with other stakeholders (National and Regional).

The programme will establish and support a BCC TWG comprised of specialist staff from CMPE, Center for Information Education for Health (CIEH) MoH and Ministry of Education as well as international experts from the INGO community. The TWG will be responsible not just for malaria IEC/BCC but also vector borne diseases and possible links to other disease/health messages, ie – ARI, diarrhoeal diseases etc. The TWG will meet annually to review progress and on an *ad hoc* basis to deal with issues as they arise.

Every two years an external assessment of BCC methodology and approaches will be carried out and findings will be presented to the TWG. Revisions to the strategy will be made where appropriate.

The required IEC/BCC materials and methodologies will be developed during workshops attended by all available members of the TWG and by other interested stakeholders. They will be field tested by specialists from CMPE' education unit (and partners) along with CIEH and adjusted where necessary until approved for production by the TWG. Production of materials will be out-sourced.

The finished products will be made available in all target areas. Delivery strategy will depend on the nature of the final products but is likely to include: inter-personal communication (IPC) through health workers (see training under 1.1.5.1 above), health volunteers and peer group educators (the latter especially in the case of mobile populations); roadside bill-boards targeting border crossers and migrant workers; posters targeting patients attending public and private sector health facilities; radio and television news articles, shows and advertisements targeting the overall population.

The programme will coordinate its BCC activities with other health programmes, incorporating malaria related information into broader BCC communications where appropriate. At least one member of the TWG will be supported to attend all relevant BCC related meetings held under the umbrella of MoH.

Activity 8.2 is to implement IEC/BCC campaign in association with partners at Central, Provincial, District and Community levels.

Effective utilization of bednets and other personal protection measures will be promoted through a targeted BCC campaign. The programme will provide group specific and locally appropriate IEC/BCC materials for people living in or entering malaria endemic areas.

BCC to promote prompt utilization of diagnostic and treatment facilities will focus on inter-personal communication (IPC) through community groups and healthcare providers. The programme will support strengthening IPC by health care workers. All VMWs and clinical staff at public sector health facilities will be trained in IPC for behaviour change. This training will be incorporated into the routine clinical training described in 1.1.5.1 above.

The programme will support a vigorous IEC campaign in all provinces reorienting from control to elimination. This will include special events, celebrity sponsorship and mass communication (radio and television news articles, shows and advertisements). The overall aim will be to raise awareness and gather support for the elimination programme. A key output will be the creation of a sense of social responsibility amongst the target population encouraging people to notify the public sector of any suspected malaria cases.

5. Quantification of commodity needs

A detailed spreadsheet which was used to perform the programmatic assessment of commodity needs for the first implementing year as summarized and attached as *annex 2*. Subsequent 2 year summary breakdown by category can be viewed in the budget tables below.

6. Indicators and targets

Clearly-described output, outcome and impact indicators (including their source of information) with related multi-year targets are presented. These targets will be used to measure progress and will enable donors to make performance-based funding decisions. The current donor (GFATM) funding period ending 2012, has a proposed indicator set has largely been prior determined in 2008. These are annexed in *annex 3*, pending approval by GFATM Phase 2 continuation (2010-2012). It will be expected that the NMCP will be able to adopt the NSP indicators gradually over this period and indeed for the period beyond 2012.

7. Risk assessment and mitigation measures

As malaria control efforts succeed and endemicity falls, there is a tendency for complacency and for donor fatigue to set in. This can have severe consequences and dramatic resurgences have been seen in a number of countries where malaria was once brought under control. Malaria needs to be sustained on the government's top priority for health.

8. Finance

This section includes a detailed 5 year budget and work plan, details of the financial gap analysis carried out as part of the budget development process, key budget assumptions, details of fund allocation procedures, and an overview of the financial management system and audit procedures.

Costing for malaria

A detailed budget has been costed for the Phase 2 of GFATM Round 7 Malaria grant expected to commence early 2nd half of 2010. The tables below (*table 6, 7 and 8*) summarize the budgets for a 3 year term (of Phase 2) till June 2013. These tables are based on those developed for GF applications and outlines budgets in terms of major activity, category of activity and category of implementing partner.

Table 6

NSP Year		YEAR 1	YEAR 2	YEAR 3	
		2011	2012	2013	
A- SUMMARY BUDGET BREAKDOWN BY EXPENDITURE CATEGORY					
#	Category	PHASE II of GF R7			Total
		Y3 (July 2010 – June 2011)	Y4 (July 2011 – June 2012)	Y5 (July 2012 – June 2013)	
1	Human Resources	621,462	532,838	689,637	1,843,937
2	Technical Assistance	684,945	514,489	517,892	1,717,326
3	Training	1,262,726	1,011,734	904,536	3,178,995
4	Health Products and Health Equipment	2,478,335	550,801	1,939,967	4,969,102
5	Medicines and Pharmaceutical Products	83,921	67,857	59,591	211,369
6	Procurement and Supply Management Costs	316,718	269,350	304,350	890,418
7	Infrastructure and Other Equipment	48,020	64,506	39,859	152,385
8	Communication Materials	76,172	79,337	79,337	234,846
9	Monitoring and Evaluation	680,726	584,480	482,264	1,747,471
10	Planning and Administration	102,031	75,408	76,382	253,821
11	Overheads	281,484	272,717	273,699	827,899
12	Other	21,004	22,884	27,002	70,890
TOTAL		6,657,545	4,046,401	5,394,516	16,098,461

Table 7

B. SUMMARY BUDGET BREAKDOWN BY PROGRAM ACTIVITY					
Macro-category	Service Delivery Area	PHASE II of GF R7			Total
		Y3 (July 2010 – June 2011)	Y4 (July 2011 – June 2012)	Y5 (July 2012 – June 2013)	
Mal:Treatment	Prompt, effective anti malaria treatment	617,839	548,828	521,260	1,687,928
Mal:Prevention	Insecticide-treated nets (ITNs)	2,558,353	505,060	1,913,528	4,976,941
Mal:Prevention	BBC-Community outreach	378,433	417,587	426,506	1,222,525
Mal:Supportive environment	Other	3,096,420	2,550,206	2,533,221	8,179,847
Mal:Health System Strengthening	Information system & Operational Research	6,500	24,720	0	31,220
TOTAL		6,657,545	4,046,401	5,394,516	16,098,461

Table 8

C. SUMMARY BUDGET BREAKDOWN BY IMPLEMENTING ENTITY						
No	Name	Type of Implementing Entity	PHASE II of GF R7			Total
			Y3 (July 2010 – June 2011)	Y4 (July 2011 – June 2012)	Y5 (July 2012 – June 2013)	
1	Principal Recipient	MoH	426,108	254,428	343,914	1,024,450
2	CMPE	MoH	5,923,929	3,474,791	4,713,661	14,112,381
3	PEDA	NGO	126,067	126,067	126,067	378,202
4	HU	NGO	181,440	191,114	210,873	583,428
TOTAL			6,657,545	4,046,401	5,394,516	16,098,461

Malaria financial gap analysis

	2008	2009	2010	2011	2012
National funding resources (USD) [Communicable diseases]	726,547	756,309	850,119	NA	NA
External source: Private Sector/grants/ contributions (International) (USD)	4,105,820	2,634,963	6,657,545	4,046,401	5,394,516
TOTAL	4,700,732	3,289,366	7,377,388	4,838,228	6,265,526

From the table above, a 5 year average would require USD 5,294,248 per year. However, if more recent trends on needs are considered (2010-2012), then USD 6,160,381 per year would be a better reflection of funding needs. Beyond, 2012, assumptions are summarized in 2 scenarios described below.

Key budget assumptions

1. The government contribution (in country resource) is used for staffs salary and administrative cost such as office and building maintenance. Expected domestic/national funds beyond 2012 are not known but it is unlikely that government funds would be able to extend in meeting programatic needs.

2. Current external source is primarily GFATM. Current GFATM grant term expires in 2012, implementation ending June 2013. Performance based funding determines continued funding in GFATMs current 6 monthly disbursement cycle.

3. At the time of this NSP finalization, the Phase 2 (Years 3-5: July 2010 – June 2013)) of the GFTAM Round 7 grant submission has just been completed. Figures in the tables above are subject to GFATM Board approval expected sometime July 2010.

4. The costing exercise and budgets are considered adequate to meet planned essential program needs and targets for the period 2011 till mid 2013. It does not take into account the possible elimination objective during this period.

Beyond 2013, 2 scenarios are likely:

Scenario 1: Control measures have attained sustained progress and maintenance sufficient to warrant a move to a pre-elimination/focal elimination agenda. In such a case, a thorough costing exercise would need to be done at that point in time that would reflect a reassessment of objectives, activities and intended targets for a NMCP re-orientation from one of control to that of pre-elimination/elimination. It would be justified to assume at this stage however that the annual funding needs would be significantly higher than the previous years.

Scenario 2: Control measures have attained sustained progress and maintenance but insufficient to warrant a move to a pre-elimination/focal elimination agenda. In such a case, assuming needs are adequately met for the period 2011-2013; an estimate of USD 5-6 million annually would be required to maintain a similar level of control.

Financial management system

The National Malaria Programme has in the past received funds from various donors which include World Bank, JICA, European Union, and World Health Organization. Commencing 2004, the GFATM has been the sole source of external funding for the programme which accounts for more than 90% of total programme funds. With GFATM grant management structures, there has been a gradual improvement in the financial management system with the establishment of the Principal Recipient (PR), Sub-recipients (SR) and Sub SRs at provincial levels. Quarterly disbursement requests are used to document progress against the work plans and also function to request funds for the following period of grant implementation (see below for the forms used for reporting). The disbursement requests contain information on:

- Programme progress – intended results, actual results, reasons for programmatic deviation (if any), other issues, lessons learned and proposed changes
- Cash reconciliation and requirement
- Quarterly budget projection
- Work plan and budget for next quarter by activity

Reports are reviewed and commented on by the LFA prior to final submission to the Global Fund through the LFA. The Global Fund examines final reports and LFA's comments prior to making final decision on the next disbursement.

Audit procedures

Under GFATM, the PR has worked in close association with the LFA to design a robust financial monitoring system. This system includes regular external audits to ensure that the handling of project funds (Global Fund and Government contributions) is fully transparent. In addition the NMCP annual reports when combined with the findings from periodic programmatic updates, disbursement requests and external technical reviews.

ANNEXES

Summary interventions by strata

strata	strata 3	strata 2	strata 1	unknown risk
villages	649	694	3,875	623
HR	VMW, HC, District and Provincial	VHV, HC, District and Provincial	HC, District and Provincial	VHV, HC, District and Provincial
Vector control and personal protection	free LLN to all	free LLN to all	pop procure new nets from private	free LLN to all
	free LLN to pregnant women attending ANC or TBA	free LLN to pregnant women attending ANC or TBA		free LLN to pregnant women attending ANC or TBA
	engage through regular meetings with project developers	engage through regular meetings with project developers		
	retreat existing ITN (including army/police) with long lasting insecticide for R7Y3 only	retreat existing ITN (including army/police) with long lasting insecticide for R7Y3 only	retreat existing ITN (including army/police) with long lasting insecticide for R7Y3 only	
	provide single LLN to mobile populations			provide single LLN to mobile populations
	insect repellent through VMW and PAMS&DAMS			
	<i>** IRS to be implemented within IRS plan to be finalized 1st Q Y3</i>			
EDAT	Combo RDT down to village	Combo RDT down to village	Combo RDT down to HC	Combo RDT down to village
	G6PD testing down to HC	G6PD testing down to HC	G6PD testing down to HC	G6PD testing down to HC
	ACT down to village	ACT down to village	ACT down to HC	ACT down to village
	PQ down to HC	PQ down to HC	PQ down to HC	PQ down to HC
IEC	IPC through VMW, Mass media	Community outreach through district team, mass media	Mass media only	Community outreach district team, mass media
Note:	<i>VMW: village malaria worker: paid</i>			
	<i>VHW: village malaria volunteer: voluntary</i>			

	<i>BY 2011, all villages in strata 'unknown risk' will be relisted under strata 1,2 or 3</i>
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Quantification of commodity needs (July 2010-June 2011 only)

Currency: US\$

Budget line	DESCRIPTION					Health Products				
						Pharmaceutical Products (included Transport)	All other Health Products			Health Equipment / Maintenance (included Transport and installation)
	DESCRIPTION	Unit	Total Quantity	Estimated unit Price	Estimated Total Price	Pharmaceutical Products	Rapid Diagnostic Test	All other Reagent and Health Consumable and other Health products	Bed Net, LLIN, Condom, Insecticide	Health Equipment and Maintenance
1.2 - 704	Provide Pan (Combo Test) specific RDTs for strata 2, 3 and 'unknown risk' upto village level and for Strata 1 upto health center only				\$193,024					
	Malaria Rapid Diagnostic Test (Combo test - falciparum/Vivax)	Test	208,000	\$0.80			\$166,400			
	Additional cost for Leaflet/packaging/Sticker (Lao language)	Box	8,320	\$0.20			\$1,664			
	Transport Cost (CIF/CIP) => Included VPP Charge and VPP Buffer	Rate	15%	\$166,400.00			\$24,960			
1.3 - 705	Provide 21,873 doses of ACTs for treatment of confirmed Pf and PV				\$82,654					
	Artemether 20mg / Lumefantrine (benflumentol) 120 mg, 6x1, Box of 30 blisters	Box	438	\$10.80		\$4,730				
	Artemether 20mg / Lumefantrine (benflumentol) 120 mg, 6x2, Box of 30 blisters	Box	541	\$21.60		\$11,686				
	Artemether 20mg / Lumefantrine (benflumentol) 120 mg, 6x3, Box of 30 blisters	Box	431	\$32.40		\$13,964				
	Artemether 20mg / Lumefantrine (benflumentol) 120 mg, 6x4, Box of 30 blisters	Box	772	\$39.00		\$30,108				
	Additional cost for Leaflet/packaging/Sticker (Lao language)	Blister	65,460	\$0.20		\$13,092				
	Transport Cost (CIF/CIP) => Included VPP Charge and VPP Buffer	Rate	15%	\$60,488.40		\$9,073				

Budget line	DESCRIPTION					Health Products				
						Pharmaceutical Products (included Transport)	All other Health Products			Health Equipment / Maintenance (included Transport and installation)
	DESCRIPTION	Unit	Total Quantity	Estimated unit Price	Estimated Total Price	Pharmaceutical Products	Rapid Diagnostic Test	All other Reagent and Health Consumable and other Health products	Bed Net, LLIN, Condom, Insecticide	Health Equipment and Maintenance
1.5 - 705	Provide Artesunate injectable for treatment of severe cases				\$1,268					
	Artesunate injectable	Vial	1,500	\$0.70		\$1,050				
	Additional cost for Leaflet/packaging/Sticker (Lao language)	Pack of 5 Vial	300	\$0.20		\$60				
	Transport Cost (CIF/CIP) => Included VPP Charge and VPP Buffer	Rate	15%	\$1,050.00		\$158				
1.7 - 704	Procurement of G6PD deficiency screening test kits. Estimate 5,000 to be used for confirmed Pv only				\$4,450					
	G6PD Deficiency screening test Kit (Rapid Diagnostic Test)	Test	5,000	\$0.60			\$3,000			
	Additional cost for Leaflet/packaging/Sticker (Lao language)	Test	5,000	\$0.20			\$1,000			
	Transport Cost (CIF/CIP) => Included VPP Charge and VPP Buffer	Rate	15%	\$3,000.00			\$450			
2.2 - 704	Procurement of long-lasting insecticide for treating/retreating existing conventional bednets with in strata 1 in Year 3 only				\$829,003					
	Insectide - Long Lasting Insecticide Kit, Individual packaging sachet (WHO recommended)	Kit	473,716	\$1.50					\$710,574	
	Additional cost for Leaflet/packaging/Sticker (Lao language)	Sachet	473,716	\$0.10					\$47,372	

Budget line	DESCRIPTION					Health Products				
						Pharmaceutical Products (included Transport)	All other Health Products			Health Equipment / Maintenance (included Transport and installation)
	DESCRIPTION	Unit	Total Quantity	Estimated unit Price	Estimated Total Price	Pharmaceutical Products	Rapid Diagnostic Test	All other Reagent and Health Consumable and other Health products	Bed Net, LLIN, Condom, Insecticide	Health Equipment and Maintenance
	Transport Cost (CIF/CIP) => Included VPP Charge and VPP Buffer	Rate	10%	\$710,574.00				\$71,057		
2.9 - 704	Procure family size LLNs for all people in stratum 3, 2 and 'unknown risk' villages.				\$1,080,833					
	LLIN	Unit	196,873	\$4.90				\$964,678		
	Additional cost for Leaflet/packaging/Sticker (Lao language)	Unit	196,873	\$0.10				\$19,687		
	Transport Cost (CIF/CIP) => Included VPP Charge and VPP Buffer	Rate	10%	\$964,678				\$96,468		
2.10 - 704	Procure family size LLNs for pregnant women in strata 3 villages through ANC and TBAs				\$46,341.09					
	LLIN	Unit	8,441	\$4.90				\$41,360.90		
	Additional cost for Leaflet/packaging/Sticker (Lao language)	Unit	8,441	\$0.10				\$844.10		
	Transport Cost (CIF/CIP) => Included VPP Charge and VPP Buffer	Rate	10%	\$41,361				\$4,136.09		
2.11 - 704	Provide additional single LLNs for Stratum 3 villagers practicing chamka/paddy field agriculture for use in forest farms.				\$191,395					
	LLIN (FOB)	Unit	43,598	\$3.90				\$170,032		

Budget line	DESCRIPTION					Health Products				
						Pharmaceutical Products (included Transport)	All other Health Products			Health Equipment / Maintenance (included Transport and installation)
	DESCRIPTION	Unit	Total Quantity	Estimated unit Price	Estimated Total Price	Pharmaceutical Products	Rapid Diagnostic Test	All other Reagent and Health Consumable and other Health products	Bed Net, LLIN, Condom, Insecticide	Health Equipment and Maintenance
	Additional cost for Leaflet/packaging/Sticker (Lao language)	Unit	43,598	\$0.10					\$4,360	
	Transport Cost (CIF/CIP) => Included VPP Charge and VPP Buffer	Rate	10%	\$170,032					\$17,003	
2.14 - 704	Provide free insect repellent to VMWs to distribute free to at risk populations in Stratum 3 areas. Repellents to be available in PAMS and DAMS in Strata 3 for construction and plantation worker, the army, the police force depending on need.				\$24,416					
	Repellent Bottle	Btle	21,800	\$0.80					\$17,440	
	Additional cost for Leaflet/packaging/Sticker (Lao language)	Unit	21,800	\$0.20					\$4,360	
	Transport Cost (CIF)	Rate	15%	\$17,440					\$2,616	
2.17 - 704	Provide free indoor residual spraying IRS (according to national vector control guidelines) in response to outbreaks and in areas of intense transmission (covering villages, construction, plantation, military and police camps)				\$60,505					
	Insecticide (ICOn)	Liter	650	\$70.00					\$45,500	
	Hudson sprayer	Pce	25	\$280.00						\$7,000
	Additional cost for Leaflet/packaging/Sticker (Lao language)	Unit	650	\$0.20					\$130	
	Transport Cost (CIF)	Rate	15%	\$52,500.00					\$7,875	
Total Estimated Total Price						\$83,921	\$197,474	\$0	\$2,225,493	\$7,000

Performance framework for GFATM Round 7 Phase 2 (2010 – 2012)
[subject to GFATM approval mid 2010]

(enclosed PDF)

Annex 4
Malaria National Strategy 2011-2015 Log frame