

NATIONAL CENTER FOR GLOBAL HEALTH AND MEDICINE, JAPAN

NCGM REPORT

October 2013

**Assessment of health systems in relation to
interface between malaria control programs
and health system strengthening:
Comparative study among Lao PDR, Nepal
and Viet Nam**



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ISBN 978-4-909675-17-0

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Contents

Executive summary	06
Abbreviations	10
Background	11
Objective	13
Methods	14
I. General health system	18
I-1 Outline of general health system in the three target countries	18
I-2 Characteristics of the general health system of each country	20
1) Viet Nam	
2) Nepal	
3) Lao PDR	
II. Malaria control with special references to health system	25
II-1 Outline in the three countries	25
II-2 Characteristics of malaria control in relation to the health system of each country	27
1) Viet Nam	
2) Nepal	
3) Lao PDR	
II-3 Special notes on malaria control in relation to health systems	33
II-4 Arising problems	35
II-5 Assessment of integration between the National Malaria Control Program and general health systems in Lao PDR	36
III. Good practices in malaria control	38
IV. Bottlenecks and possible interventions	40
V. GFATM support for malaria control in the three countries	42
Discussion	44
Acknowledgements	46
Bibliographies	47
Attachment 1 (Good practices in malaria control)	50
Attachment 2 (Bottlenecks and possible interventions)	52

Executive summary

Global Health Initiatives (GHIs) such as the Global Fund against AIDS, Tuberculosis and Malaria (GFATM) and the Global Alliance for Vaccines and Immunization (GAVI) have supported disease specific programs, resulting in effective control measures in many developing countries. However, there is still some debate regarding the interaction between these programs and the general health systems, as well as some bottlenecks that hinder the smooth implementation of the programs.

This assessment was undertaken with malaria control programs in three countries (Lao PDR, Nepal and Viet Nam) as entry points, in order to assess the interface between malaria control programs supported by GFATM and health systems strengthening, with special reference to interaction between disease specific programs and general health systems. Good practices and bottlenecks in the implementation of the control programs were identified, and possible solutions for these bottlenecks along with synergic health system interventions to be incorporated into disease control programs were discussed.

Primary surveys in this report were conducted in Viet Nam (2009), Lao PDR (2011) and Nepal (2012). In Viet Nam and Nepal the surveys were carried out with special emphasis on best practices and bottlenecks in the implementation of malaria control programs, while in Lao PDR, surveys were carried out on the integration of malaria control programs into the general health systems. In each country, the survey was conducted at various levels (from Ministry of Health to primary level) by document reviews, key informant interviews, and observation of facilities. The results of the primary surveys were analyzed, summarized in reports and submitted to HSD/WPRO. Based on these reports, updating and supplementing more information, and comparative analysis among these three countries, were performed.

In the three countries in this survey, malaria morbidity along with mortality rates were quite high in the past and malaria was given the highest priority in the health policy by the administration. However, since the mid-1990s, malaria controls were actively implemented in these countries based on the National Malaria Control Programs (NMCPs)

and principles of Roll Back Malaria, which consists of strategic priorities including vector control and personal protection, early diagnosis and prompt treatment (EDPT), malaria surveillance and epidemic preparedness, behavioral change communication (BCC), and improving program management. In particular, since early 2000s, GFATM has contributed a large budget to malaria control programs. Recently, malaria in these countries has decreased remarkably; reaching pre-elimination levels (Viet Nam and Nepal) or is no longer listed among from the top 10 diseases (Lao PDR).

In Viet Nam, the government has made great efforts to strengthen the existing health systems since the 1990s (both malaria specific and general health systems) and the international community also cooperated with the policy implementation of Vietnam at various health system levels. Malaria control measures were effectively implemented under the strong leadership of the National Steering Committee, further strengthening and utilizing the existing health system and mobilizing mass organizations.

In Nepal, the general health system, which was fragile in the past, was strengthened and utilized in greater part in the malaria control program. During the period of political instability (1996-2006), health systems were affected, but the influence on malaria control was minimal compared with other disease control programs due to the high governmental priority placed on malaria control and continuous support of the international community.

In Lao PDR, both general health systems (horizontal systems) and specific health systems for malaria control (vertical systems) were weak. After the GFATM intervention, large funds were invested in vertical systems and dissociation from horizontal systems became noticeable. Integration of a malaria control program in the general health system is still limited or partial, and budgetary dependence on GFATM is quite large.

Generally, at upper levels, collaboration among disease specific programs is limited, and a health staff, as well as an infrastructure, is dedicated to each program. However, there is

greater integration at lower levels of health care (in Vietnam and Nepal). By coordinating with the community and social organizations in the village, health workers carry out various tasks such as primary health care, implementation of national health programs, preventive medicine, IEC activities, etc. GFATM and other assistant partners provide support by strengthening training and supplying essential medicine and equipment. Malaria control has gradually been more integrated with the primary health care system.

As a result from the surveys in Viet Nam and Nepal, best practices were identified. Among them intensified education for residents focusing on disease prevention, strengthening of facilities at primary level such as health posts along with training of health workers, utilization of health volunteers at the primary level, high priority attached to frontier areas, and setting up mobile teams, were noteworthy and recognized in common in the two countries. In addition, effective implementation under the strong leadership of National Steering Committee could be seen in Vietnam, utilizing the existing health system was outstanding. The management system of vertical health programs appeared to have a good impact on the general health system.

In Lao PDR, a survey was conducted focusing on the integration between the malaria control program and general health systems, and the results showed that the extent of integration was quite limited in many elements of program implementation. Particularly, in health information, supply management (procurement, storage, and distribution), and monitoring & evaluation, separate systems were set up between malaria control program implementation and the general health systems. The national health management and information system (HMIS) was considered to be weak, incomplete and unresponsive. Separate financing, governance and planning functions for other disease specific programs, such as Tuberculosis and HIV, distinct from those of the general health system, were also observed.

Bottlenecks/challenges in implementing malaria control were identified in two countries (Viet Nam, Nepal), and points in common included malaria control in frontier areas (many

hard-to-reach areas, shortage & low skill of manpower, etc.), low incentives for health workers, a poorly developed reporting system from the private health sector, inadequate quality assurance system for malaria testing (particularly in Nepal). Most health workers are concentrated in large cities and towns, while many health facilities at the primary level (Health Centers; HCs, Primary Health Care Centers; PHCs, Health Posts; HPs, Sub-Health Posts; SHPs) and at some district hospitals the health personnel and/or medical supplies are insufficient. Weak coordination between the local government and GFATM in the distribution of bed nets was pointed out in Nepal. In addition, the current heavy dependence on GFATM undermines the assurance of sustainable malaria control.

Disease specific programs such as malaria control have had some synergic effects on the general health system, particularly at the primary level. The management system of vertical health programs appeared to have a good impact on the general health system at various levels. However, it can be said that dissociation between vertical malaria control program and horizontal general health system also exists. In addition, coordination between malaria control programs and other disease specific programs is limited in many cases. It is true that in implementing malaria control programs, carrying out a vertical health system is important, but scaling up the malaria control program does not automatically lead to general health system strengthening. More effort is needed to realize the maximum synergy between disease specific programs and the general health system, as well as among different health programs.

Abbreviations

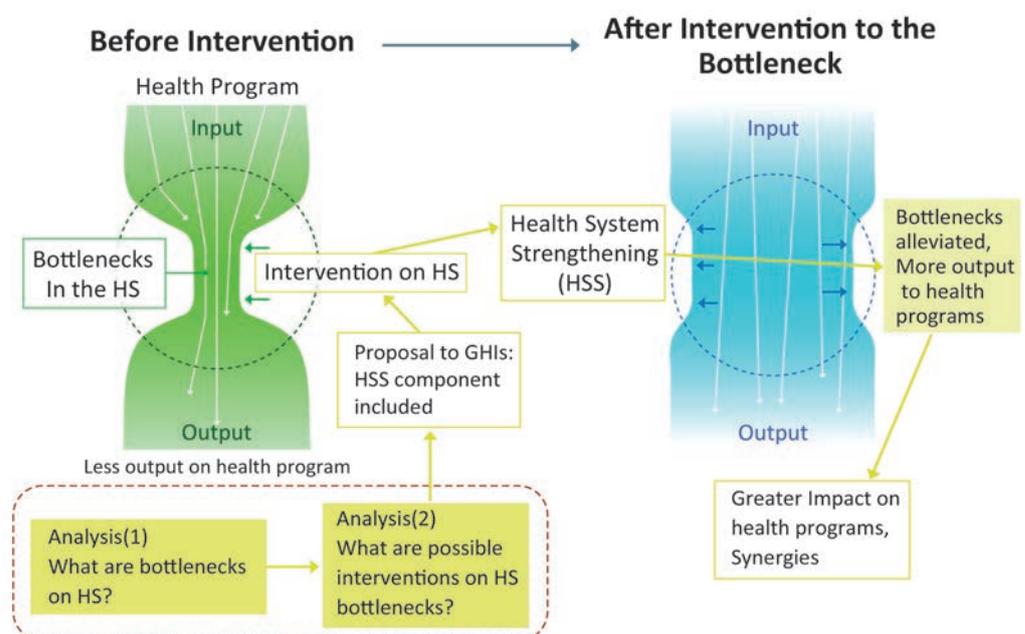
ACT	Artemisinin Combination Therapy
BCC	Behavioral Change Communication
CHS	Commune Health Station
CMPE	Center for Malariology, Parasitology and Entomology (Lao PDR)
DHO	District Health Office
EPI	Expanded Program on Immunization
EDCD	Epidemiology and Disease Control Division (Nepal)
FCHV	Female Community Health Volunteers (Nepal)
GAVI	Global Alliance for Vaccines and Immunization
GFATM	Global Fund against AIDS, Tuberculosis and Malaria
GHIs	Global Health Initiatives
HC	Health Center
HMIS	Health Management Information System
HP	Health Post
HSD	Health System Development
IEC	Information, Education and Communication
IRS	Indoor Residual Spraying
ITNs	Insecticide-treated Bed nets
LLINs	Long Lasting Insecticidal Nets
MCH	Maternal and Child Health
MOH	Ministry of Health (Viet Nam, Lao PDR)
MOHP	Ministry of Health and Population (Nepal)
NCGM	National Center for Global Health and Medicine, Japan
NGO	Non Governmental Organization
NIMPE	National Institute of Malariology, Parasitology and Entomology (Viet Nam)
NMCP	National Malaria Control Program
PHC	Primary Health Care Center
PHD	Provincial Health Department (Viet Nam, Lao PDR)
PR	Principal Recipient
RCC	Rolling Continuous Channel
RDT	Rapid Diagnosis Test
RHD	Regional Health Department (Nepal)
SHP	Sub-health Post
WHO	World Health Organization

Background

Since 2000, Global Health Initiatives (GHIs; GFATM, GAVI, etc.) have provided a new era for infectious disease control programs and have achieved a degree of progress at country level. However, since their initiation, interaction between GHIs and Health System Strengthening (HSS) has been debated: whether disease specific programs have actually contributed to the strengthening of the general health system and whether disease control programs are well integrated into the general health system.

In the program implementation process, smooth implementation of the disease control programs has often been hindered by bottlenecks that exist in the health system. Through the effective intervention to these bottlenecks, expansion of the health programs and strengthening of the general health system are expected, which will bring a synergic effect on other disease specific programs as well (Fig. 1).

Fig. 1
Concept of bottleneck analysis and possible interventions to scale up synergic effects on other diseases specific programs



The Bureau of International Medical Cooperation, National Center for Global Health and Medicine (NCGM) in Tokyo has been designated as a WHO Collaborating Center since July 2009 with the following terms of reference:

- 1) To undertake the assessment of health system strengthening interventions particularly regarding their coordination with various health programs
- 2) To provide technical consultations on health system strengthening in relation to disease control programs

With the aim of sharing lessons learned from specific country experiences with regard to good practices, bottlenecks and/or challenges in the implementation of disease specific programs, as well as the effects of disease specific programs supported by GHIs on health system strengthening, NCGM conducted surveys in Cambodia (on EPI and HIV) and Vietnam (on malaria and EPI) in 2009 as entrusted by HSD/WPRO. The results of these surveys were presented at the Workshop on Synergies between Global Health Initiatives and Health Systems, which was held at WPRO in Manila in November 2009. Subsequently similar surveys were conducted in Lao PDR (on Malaria) in 2011 and Nepal (on Malaria) in 2012.

In 2012-13, NCGM intends to review and summarize the surveys over the past 3 years and summarize them. The present report focuses on malaria control programs supported by GFATM, the interaction between disease specific programs and health system strengthening, as surveyed in three countries (Vietnam, Lao PDR and Nepal). Results are summarized and a cross-sectional assessment has been performed.

Objective

To assess 1) the interface between malaria control programs and health system strengthening, with special reference to the interaction between vertical and horizontal health systems, 2) good practices and bottlenecks in the implementation of control programs, and 3) synergic health system interventions to be incorporated into disease control programs.

Specific Objectives

- 1) Share lessons learned from specific country experiences of interventions to bottlenecks (good practices).
- 2) Identify existing bottlenecks in health systems, which prevent the smooth implementation of the malaria control programs, and discuss feasible interventions for these bottlenecks.
- 3) Investigate the integration of the National Malaria Control Program into the general health system.
- 4) Identify synergic health system interventions to be incorporated into disease control programs,
- 5) Compare the results among the three countries.

The studies in Viet Nam and Nepal mainly focused on 1), 2) and the study in Lao PDR on 3).

Primary surveys in this report were conducted in Viet Nam (2009), Lao PDR (2011) and Nepal (2012), by setting the NMCPs supported by GFATM as entry points. In Vietnam and Nepal, the surveys were conducted with special emphasis on good practices and bottlenecks in implementing malaria control program. In Lao PDR, the survey was conducted on the integration of a malaria control program into the general health program. The dates of the surveys and the places where the surveys were conducted are shown in Figs. 3-5. Study methods consisted of the following:

1) Document reviews:

Documents related to health systems, NMCPs, health statistics, GFATM supports, etc. were collected and reviewed.

2) Key informant interviews:

Key informant interviews were conducted with the health staff at each level (central, regional, district, and community level) of the health facility, health managers at the district and provincial levels, and program managers of MOH (MOHP), NGOs, and other partner agencies. Leading contents of the interview included an outline of the health system, general information on malaria control programs in relation to health system. Good practices and strengths to overcome bottlenecks, and on-going interventions for the existing bottlenecks, integration between NMCP and general health system, etc., were also considered

3) Field surveys :

In addition to surveying the capital cities of each country, malaria endemic areas where Malaria Control Programs have been implemented with the support of GFATM were selected. General information on health and medical care, information on health system and health program implementation, etc. were collected at Provincial Health Offices, District Health Offices, followed by surveys at health facilities at the primary level (or commune level)(HCs, PHCs, HPs, SHPs).

4) Analysis:

Information obtained from the interviews, field surveys, documents were summarized from the viewpoint of interface between malaria control programs and the general health system in accordance with the 6 building blocks of a health system (Leadership and governance, Service delivery, Workforce, Information system, Medical products and technology, and Financing) proposed by WHO. These results were analyzed and compared among the three countries and then assessed.

Data from the three countries was updated as long as possible, based on information obtained by supplemental survey (in Viet Nam and Nepal) during 2012-13 and by documents.

The framework of analysis on good practices conducted for malaria control to overcome the bottlenecks and current bottlenecks vs. possible interventions (Viet Nam, Nepal) were summarized in Table 1. The framework on integration between the National Malaria Control Program and the general health system (Lao PDR) were summarized in Fig 2 .

Table 1
Framework of Analysis (Nepal, Viet Nam)

6 building blocks of Health System (HS)	Bottlenecks (past) / Good practices	Bottlenecks (current) / Possible solution	Effects on HS, PHC principle, Synergy
Leadership and Governance			
Service delivery			
Workforce			
Information system			
Medical products and technologies			
Financing			

Fig. 2
Framework of Analysis (Lao PDR)

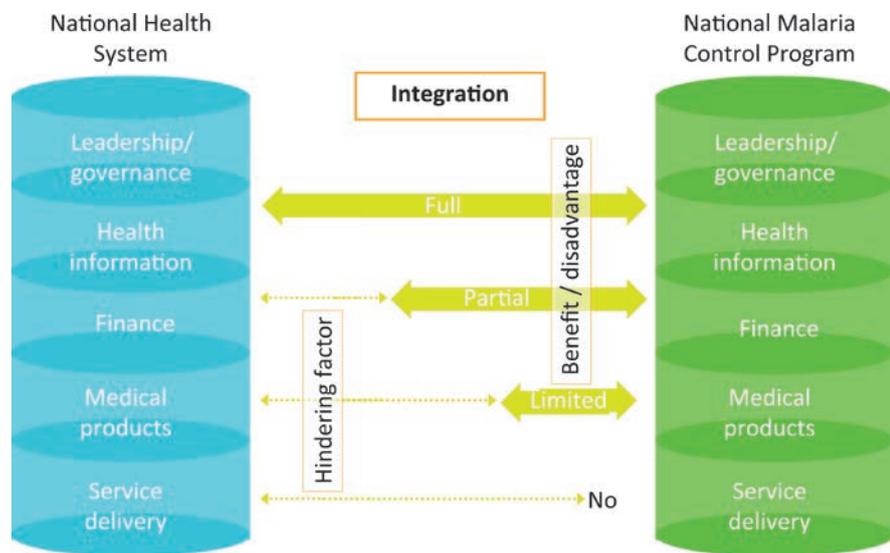


Fig. 3
Survey in Viet Nam

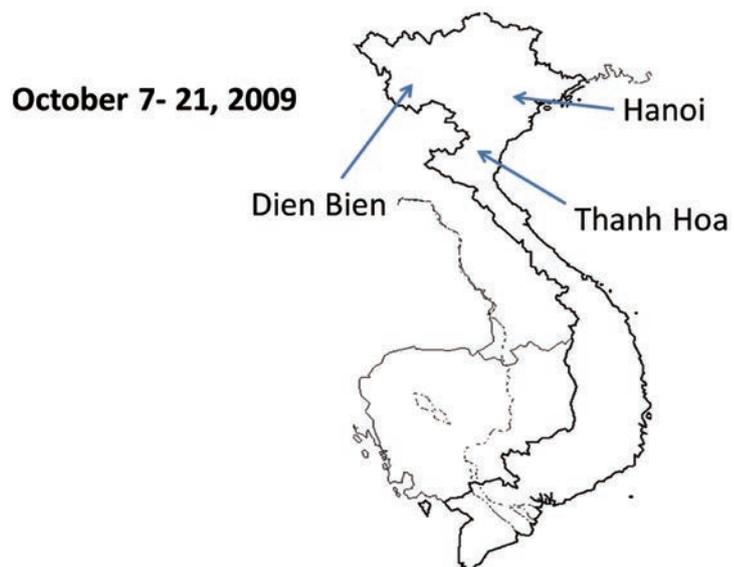


Fig. 4
Survey in Nepal

January 26- February 7, 2012

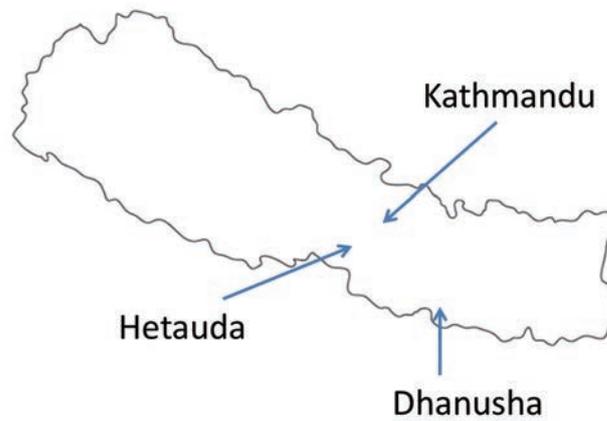


Fig. 5
Survey in Lao PDR

January 31- February 18, 2011

The survey in Laos attached high importance to integration between the National Malaria Control Program and the general health systems.

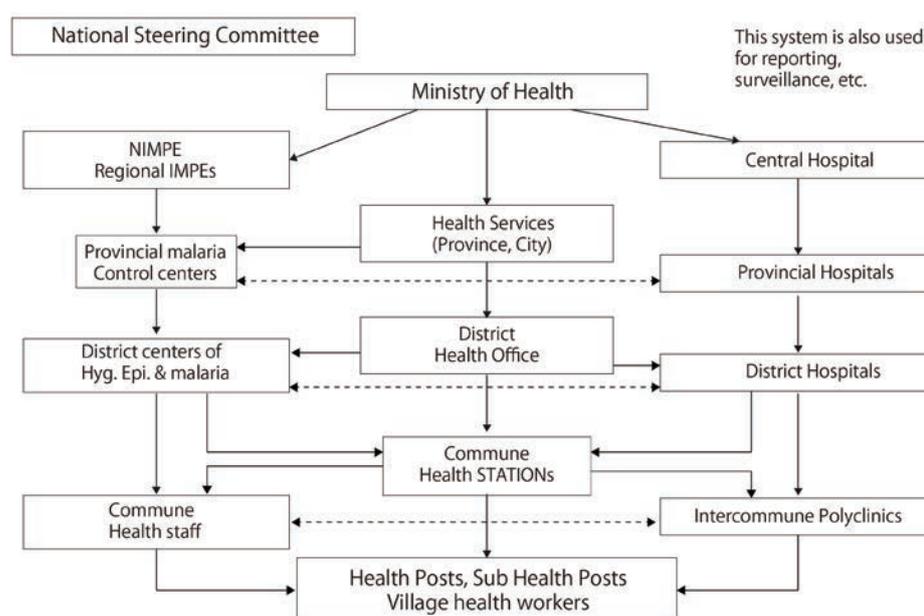


I. General health systems

I-1. Outline of the general health system in the three targeted countries:

Health networks in the three target countries have been created from the central to commune level in accordance with the administrative strata (eg. in Viet Nam; central - provincial - district - commune levels, in Nepal; central - regional - district - commune levels, in Lao PDR; central - provincial - district - commune levels). Curative care systems as well as preventive care systems have also been basically constructed in accordance with the administrative strata. (i.e. central, provincial (or regional) and district hospitals and commune health stations, etc.). A referral system, as well as health information and supply systems, is functioning based on this network. The preventive care systems basically consist of national institutes, provincial (or regional) preventive health centers, district preventive health centers (or preventive health teams) and commune health center and health stations. Fig. 6 shows the Health System in Viet Nam (including the Malaria Control System).

Fig. 6
Health System & Malaria Control System (Viet Nam)



NIMPE Vietnam, 2012

Medical institutions at the central level, which are directly under the control of Ministry of Health (MOH)(in Nepal Ministry of Health and Population; MOHP) and located in large cities, provide the highest level of medical services (as top referral hospitals, research, prevention and training centers, etc.).

At the provincial (regional) level, the Provincial Health Department (Regional Health Office) is responsible for medical services. Medical institutions at this level consist of General Hospitals (at least one hospital is set up in a province), Specialized Hospitals, Preventive Health Centers, Malaria Control Centers, Middle Level Schools or Colleges, etc.

At the district level in Viet Nam, the District Health Office (DHO) functions as the management office of medical services in the district and the District Health Center (DHC) is a technical agency responsible for the practice of curative and preventive medicines. Under the DHC there are General Hospitals, District Hospitals, Regional Polyclinics and Prevention Centers (or Prevention Teams), etc. The DHC is also responsible for managing the health facilities at the primary level (CHSs, HCs, HPs, and SHPs).

Commune Health Stations (CHSs) in communes* provide health care at the primary level. These CHSs have the tasks of providing primary health care services, treating common diseases, attending to normal deliveries, early detection of epidemic outbreak, family planning practices, health promotion, etc. Activities in the CHSs are conducted in close communication with the provincial and district level medical institutions.

There are commune (village) health workers (most of them are qualified and newly trained or volunteers with small allowance or incentive) in each commune (village). Village health workers are under the direct management and direction of the CHSs and village leaders. They conduct various tasks, such as primary health care, implementation of national health programs, preventive medicine, IEC activities, etc., in coordination with the community and social organization in the village, and participate in first aid, disease examination and treatment, prenatal care, and assistance in deliveries.

* Under the commune health stations there are health posts (HPs) and sub-health posts (SHPs) although this situation differs slightly in each country.

I-2. Characteristics of the general health system of each country

1) Viet Nam

Leadership and governance

Since the 1990s the government has made great effort to strengthen the general health system. The international community has also cooperated with policy implementation of Viet Nam at various levels. For National Health Programs, National Steering Committees are organized and programs are managed more intensively and efficiently with strong leadership and intersectoral collaboration. Related major national institutes are responsible for the executive centers of the respective health programs, as well as the provision of technical advice, operational research and staff training (eg. The National Institute of Malariology, Parasitology and Entomology for malaria and the National Institute of Hygiene and Epidemiology for EPI).

Service delivery

Health programs are implemented to maximize use of the health system network from the central level to the commune level, particularly preventive health network. The local administration is organized with provincial, district and communal political units which are responsible for the implementation of the programs. All medicines and medical equipment are supplied from the government through the province and district. Participation of health facilities under the military, police and other sectors to provide medical services to the population has helped to increase health care coverage.

Workforce

Since the 1990s, human resources for health care have been developed both quantitatively and qualitatively. Improvement has been observed in the capacity to increase human resources through training. Nevertheless, the annual increase of health workers in the public health system is insufficient to meet the actual needs. Many well qualified health staff hesitates to work at the grassroots level. Consequently, patients seek health services at a higher level, leading to an overload at these facilities.

Information system

The reporting and information system functions efficiently, where reports from the grassroots level are transmitted to upper levels and feedback is carried out. The role of mobile team is outstanding in transmission of information and guidance for program implementation.

Medical products and technologies

One characteristic of the Vietnamese health sector is its focus on applying technology to the development of pharmaceutical materials that draw on local sources of medical plants. Particularly, extraction of artemisinin from *Artemisia annua* and the subsequent manufacture and distribution of injectable Artesunate and its suppository has contributed to the treatment of malaria. Development of the pharmaceutical industry has contributed considerably to the implementation of essential drug policies targeting primary health care.

Managing drug quality according to good practice criteria is based on the standards and guidelines for drug production, quality control, storage and distribution. Currently, all facilities are to follow the standards of Good Manufacturing Practice (GMP)-WHO.

Financing

A broad orientation of health financing was determined in the 1990s through the development of the health insurance, partial user fee policy, and the Government's resolution on "social mobilization" in areas of education, health and culture. The government also focused on subsidies to users of health services, for example health care for the poor and children under 6 years of age. The collective state health budget, as well as national health spending including both state and private sectors, has continued to increase along with the economic development of the country.

2) Nepal

Leadership and governance

A comprehensive framework for health policies, strategies and plans has been in place in accordance with National Health Policy 1991. The current long-term health plan (1997-2017) aims to provide health services throughout the country, particularly extending the primary health care system to the rural population and improving the health status of vulnerable populations, such as women and children, the rural population, the poor, the under-privileged and the marginalized.

Service delivery

The health system hierarchy (MOHP→ Regional→ Zonal→ District→ PHC→ HP→ SHP) has been designed to ensure that the majority of population has access to public health care facilities and minor treatment at affordable prices. SHPs are the first contact point for basic health services and the venue for community-based activities such as PHC outreach clinics and EPI clinics.

Workforce

Since the establishment of the Institute of Medicine, Tribhuvan University as the first medical school in 1980, the number of medical schools has markedly increased (20 schools in 2012). The increased number of medical doctors, nurses, and other co-medical staff has contributed to the health and medical care of the Nepalese people.

Information system

The routine monitoring system has greatly improved over the years. The management information system in the form of the Health Management Information System (HMIS), Logistics Management Information System (LMIS) and Fiscal Management Information System (FMIS) has also been well developed over the last 10 years.

All health related activities are recorded and reported right from the lowest health unit: i.e. from SHPs to district hospitals. In addition to the HMIS, there are also other sources

of information from individual programs, according to the nature of their activities. Such information may be in the form of general or specific monitoring visit reports or surveillance reports.

Medical products and technologies

In 2007, the National Drug Strategy was revised and the National Essential Drug List was established. In order to manage the above processes effectively, HMIS is used. The pull system for essential drug supply was expanded to all 75 districts in 2010.

Financing

Total health expenditure as a percentage of GDP has increased since 1998. In 1998, it was 5.1%, 5.2% in 2002 and 6.3% in 2010. The share of public expenditure in the total health expenditure declined from 67.2% in 1998 to 56.6% in 2010, whereas the share of private expenditure increased.

3) Lao PDR

Leadership and governance

Under MOH, a sector-wide coordination mechanism consisting of MOH affiliated centers/institutions, universities and developing partners has been organized. The secretariat of the sector-wide coordination developed a sector common work-plan and monitoring framework, a managerial tool of the sector working group at the operational level, in order to monitor the progress of all priority programs in the health sector.

Service delivery

Anti-malarial drugs and bed-nets are usually procured by external donors from outside countries. Storage and distribution of these items are separately managed from other disease specific programs and general health system. Each province has a different logistic system.

Workforce

At the community level, averages of two nurses are employed at each health center. Each nurse has a multi-functional role, such as being in charge of malaria, EPI, tuberculosis, or MCH. Generally, one or two health volunteers are employed in each village. The per diem rate given by the GFATM for each program is much higher than that of the government.

Information system

The Department of Planning and Finance (DPF) of the MOH introduced the HMIS as a national information system supported by the World Bank project in 2004. As of 2010, 91% of the districts are reporting HMIS data. However it is assumed that the proportion of the Health Centers using the HMIS is much lower. HMIS includes four indicators relating to malaria. HMIS data is periodically sent to upper levels using designated report forms. In addition, there are some other parallel reporting systems according to disease specific programs and infectious disease surveillance systems. Regarding information on malaria, the GFATM form, which includes patient information, symptoms, methods of laboratory diagnosis, and medicine described, is used and is sent monthly from lower levels to the upper levels.

Medical products and technologies

The quality control system in the general health system is fragile. There is no quality control system at the district level. Quality control for malaria, HIV, and tuberculosis testing is conducted using a GFATM budget separate from the general health system.

Finance

The proportion of the national budget spent in the health sector was approximately 4% over the last 5 years. Periodical submission of an accounting report is required from the provincial level to the DPF, but since decentralization in 1996 and user fee introduction, most of the provinces do not actually do so.

II. Malaria control with special reference to health systems

II-1. Outline in the three countries

Previously, malaria was a major public health problem in the three countries and was given highest priority in national health programs. However, after the mid-1990s, a marked decrease was observed, as shown in Figs. 7-9. Main interventions which led to such a rapid control of cases of malaria included the introduction of bed nets (Insecticide Treated Nets; ITNs, Long Lasting Insecticidal Nets; LLINs) and anti-malarial drugs (eg. Artemisinin derivatives such as Artesunate) through vertical health systems, and the education of residents, training of health workers, etc.

Currently malaria control activities in the three countries are implemented based on National Malaria Control Programs and the principles of Roll Back Malaria, which consists of strategic priorities including vector control and personal protection, early diagnosis and prompt treatment (EDPT), malaria surveillance and epidemic preparedness, behavioral change communication (BCC), and improved program management. Implementation of the programs has been supported by GFATM and other assistant partners.

Malaria surveillance and epidemic preparedness

In addition to existing surveillance networks, vertical surveillance systems focusing on malaria and early warning systems for malaria outbreaks have been established in the three countries. Emphasis has been placed on hospital based surveillance for severe malaria and associated mortality, and monitoring of drugs and insecticide resistance is conducted regularly at the sentinel sites (Viet Nam, Nepal). Active case detection is conducted as required. Stocks of rapid diagnosis tests (RDTs) and anti-malarial drugs have greatly increased at the central and local levels supported by GFATM.

Vector control and personal protection

Currently, bed-nets, particularly LLINs, play a very important role in the implementation of malaria control programs. LLINs are supposed to be distributed (basically one LLIN per 2 people every three years- assuming a three year life for the LLIN) in the three countries to all people living in high risk areas, with special emphasis given to pregnant women receiving antenatal care. In Nepal, delivery of LLINs is managed by the Population Service

International (PSI) under the supervision of EDCD. At local level, delivery is managed by NGOs/other partners and implemented by a broad range of community based organizations.

At present, alphacypermethrin and pyrethroid group insecticides are used for Indoor Residual Spraying (IRS). IRS has a lower priority in malaria control but is sometimes carried out as an integrated vector control program.

Early diagnosis and prompt treatment (EDPT)

Diagnosis includes clinical diagnosis, microscopy and RDTs (in peripheral areas where microscopy is not available). Quality control for microscopy and RDTs is an integral part of malaria diagnosis. All antimalarial drugs are provided free of charge at all public health facilities in endemic areas (and also by community health volunteers). However, a charge is incurred at private health facilities. Treatment is conducted according to the National Malaria Treatment Protocols of each country. Artemisinin-based combination therapy (ACT) is usually used as the standard method for laboratory-confirmed falciparum cases, but chloroquine and quinine are also used.

Behavioral change communication (BCC)

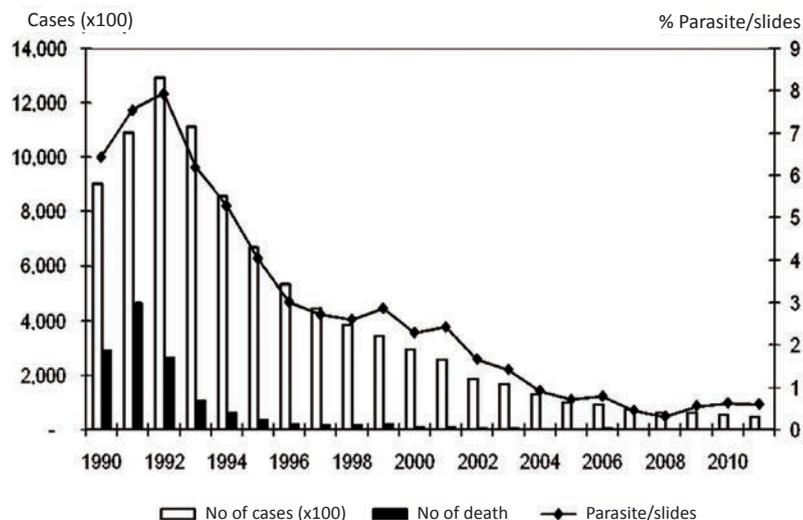
The strategy of BCC includes five methodologies: interpersonal communication, primary and secondary education, mass media, special events (campaigns, etc.) and high level advocacy.

II-2. Characteristics of malaria control in relation to the health system of each country

1) Viet Nam

A malaria program has been integrated into the health system since 1957. However, the budget for malaria control has been very limited. After the start of the National Malaria Control Program in 1991, malaria has decreased markedly. The program has been enforced with the strong leadership of the Government and National Steering Committee, which consists of multi-sector members, fully utilizing the vertical malaria system along with general health system. The general health system has been strengthened and is also used for malaria control program, especially clinically. NIMPE has taken the initiative in the malaria control program. The role of mass organizations, such as women's unions and youth unions in the implementation of health programs (malaria control has been given highest priority) and the collaboration with the military in hard-to-reach areas are also noteworthy. Currently, a higher incidence of malaria is observed in Tay Nguyen area (central highland area bordering Lao PDR and Cambodia). (Fig. 7)

Fig. 7
Transition of the number of malaria cases and mortality in Vietnam



Report from National Institute of Malariaology, Parasitology and Entomology, Vietnam (2012)

Medicines for malaria treatment (Artemisinin), insecticides, and bed nets needed for the programs have gradually produced locally and are delivered to the peripheral level under the proper guidance of the government. Widespread of artemisin suppositories at the primary level has greatly contributed to a lower mortality rate. Although a user fee was introduced in 1993, medical fees are still set low, and the system and measures, such as insurance, relief for poor people, and no medical fee for children under 6 years old, have contributed to the control of malaria.

Reporting and information systems are functioning efficiently. Reports from the primary level are transmitted to upper levels and feedback is provided. Currently, considerable parts of these systems are integrated into the general health system. There are many examples of rapid and appropriate response in cases of disease outbreak. The role of the mobile team is outstanding in transmission of information and in the provision of guidance for program implementation. A high literacy rate, effective use of school health education and preparation of guidelines have also enabled the smooth implementation of the program. The Malaria Program in Viet Nam has achieved great success over the past 20 years (Fig.7). Existing leading problems include limited coverage and quality of malaria control measures among populations living in remote areas (especially, ethnic minorities), imported malaria from neighboring countries, and increasing resistance of falciparum malaria to anti-malarial drugs (spread of artemisinin resistant malaria).

Viet Nam has received assistance from GFATM since 2004 (starting from round 3 for malaria control). In recent years special attention has been given to malaria in high risk groups and high risk areas, including ① malaria in migrants (mainly ethnic minority groups), ② border malaria (Vietnamese from non-endemic areas working in endemic areas, and immigrants from Lao PDR, Cambodia, and China) and ③ forest malaria (people in remote mountainous areas, people staying overnight in the forest). GFATM has greatly contributed to the expansion of the malaria program by strengthening activities for high risk groups.

2) Nepal

Efforts to control malaria in Nepal began in 1954 through the Insect Borne Disease Control Program. Then in 1958, a malaria eradication program was launched. However its objective could not be achieved due to increased DDT resistance, which was the most commonly used insecticide of the day, and consequently the program reverted to malaria control in 1978.

Since 1993, the Epidemiology and Disease Control Division (EDCD) under MOHP has taken the initiative in the malaria control program. Since 2004, GFATM (Round 2, 7, Rolling Continuous Channel; RCC) has greatly contributed to the prevention and treatment of malaria, particularly through the distribution of LLINs, ACTs and RDTs in high risk areas, along with BCC activities for the residents.

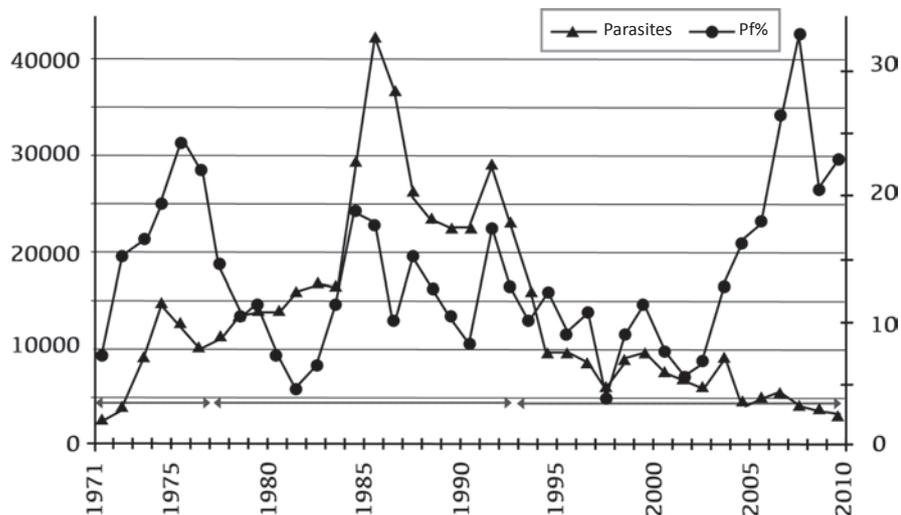
Treatment is being conducted according to the National Malaria Treatment Protocol from the peripheral up to the top referral level. Treatment medicines are administered to patients free of charge at public medical facilities nationwide and diagnostic services for malaria are provided free of charge at all public sector health facilities in high endemic areas. Recently, GFATM has also attached high importance to health education and health system strengthening at the peripheral level.

Currently, a higher incidence has been observed in Terai (southern plain area bordering India). The National Malaria Control Strategic Plan has been implemented since 2007, based on the principles and practices of WHO's Global Malaria Program and the revised Malaria Control Strategy of SEA Region, which targets of 65 out of 75 districts. This plan consists of 4 strategic priorities (vector control and personal protection, EDPT, malaria surveillance and epidemic preparedness, and BCC), and 2 conditional priorities (improving program management and operational research).

Through great effort by the Government of Nepal and assistant partners, malarial infections have shown a declining trend and have reached the pre-elimination stage in

2011. However, despite such marked decrease in malaria morbidity and mortality rates, some border areas still have a high morbidity rate or resurgence of malaria. Possible causes for this include the introduction of malaria associated with mobile populations, breakdown of control measures at the local level and inappropriate distribution of LLINs. Although malaria cases are decreasing, rate of falciparum malaria in all malaria cases is increasing in recent years (Fig. 8).

Fig. 8
Transition of the number of malaria cases and rate of falciparum malaria in Nepal

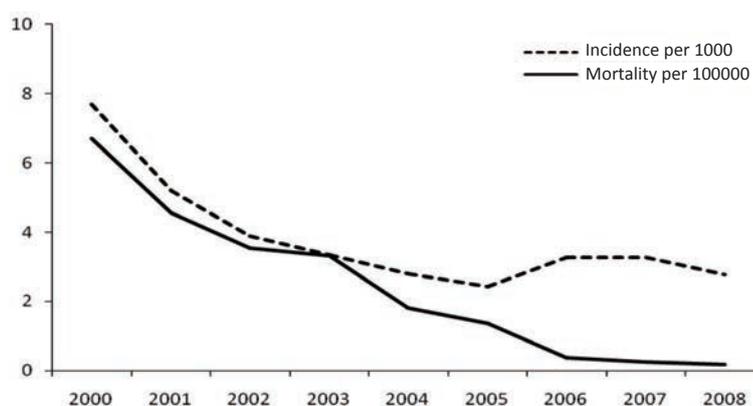


Report from the Ministry of Health and Population in Nepal (2011)

3) Lao PDR

Malaria control program in Lao PDR started in the early 1960s and a control network was established in 1975. The National Malaria Control Program, which was launched in 1997, has been conducted based on a network involving village health volunteers integrated in PHC focusing on distribution of ITNs, education of residents on prevention and treatment, and EDPT. At provincial malaria stations, mobile teams detect active malaria cases, and health volunteers have been organized at the primary level. Malaria station staff sometimes conducts outreach activities jointly with other departments or programs. While the stock of ACTs sometimes runs out, chloroquines and quinines are locally procured and are readily available. As a result, coverage of bed nets (ITNs and LLINs), case detection, and treated cases have steadily increased and morbidity and mortality rates have markedly decreased (Fig. 9). Malaria is no longer among the top 10 disease burdens in Lao PDR. Despite these impressive reductions in malaria burden, there remained 9 provinces in 2006 that showed an increase. In addition, in 2011-2012 a sharp increase in morbidity and mortality was reported in the southern provinces.

Fig. 9
Incidence rate of confirmed malaria and mortality rate of probable and confirmed malaria in Lao PDR



National Strategy for Malaria Control and Pre-elimination 2011-2015, Ministry of Health, Lao PDR

At the central level, the Center for Malariology, Parasitology and Epidemiology (CMPE), under the MOH, is responsible for malaria control. Supervision of malaria control programs, such as epidemiology, entomology, data management and quality assurance of microscopic diagnosis, is conducted with the initiative of CMPE. Although collaboration in every health system component, such as governance, planning, information system, service delivery including medicine & equipment management, quality management, and human resource development, has been gradually facilitated, integration of the malaria control program supported by GFATM into general health system is still far away. Procurement and distribution of medicine and equipment from CMPE to provincial malaria stations is carried out according to the GFATM plan. When there is a delay in budget approval, distribution cannot be completed in time for the malaria endemic season.

A disintegrating reporting system has been causing an increased workload, especially for community health workers. The fundamental cause of these problems is that the majority of the budget for the national malaria control program (about 97%) is provided by GFATM. The country is said to be at the stage where dependence on GFATM should be reduced in order to distribute risk and ensure sustainability. Effective integration of a malaria control program into the general health system of MOH along with sustainability is a major challenge.

II-3. Special notes on malaria control in relation to health systems:

1) Strong leadership in Viet Nam

The malaria control program in Viet Nam achieved great success in 1990s characterized by the strong leadership of Central Steering Committee with maximum use of the existing vertical health system, which were closely related to the People's Committee, the military, and social and group organizations. The Central Steering Committee consisted of multi-sector members (department leaders or senior staff of line ministries along with leaders of institutions and professors of universities) with the Vice Prime Minister as representative and the Minister of MOH as chairman. Budgets from the government and international donors were effectively allocated to implement malaria control program.

2) Political instability period and malaria control in Nepal

Nepal suffered political instability from 1996 to 2006 followed by a transition from the Kingdom of Nepal to the Federal Democratic Republic of Nepal in 2008. The political instability affected economic growth and compromised the delivery of social and public health interventions in the country.

According to the EDCD and local health offices, the influence of this instability was minimal for malaria control compared with other control programs. This fact is due to great effort by the government and the continuous support of foreign assistant partners for malaria control even during this difficult time. However, upon close observation, some stagnation is suspected in implementation of the malaria control program during this time, particularly regarding the distribution of LLINs, training of a health staff, quality assurance of testing, etc. The frequent change of managers during this time is thought by some to have affected program implementation.

3) Involvement of village volunteers, etc. in malaria control at the primary level

The role of mass (group) organizations, such as women's unions and youth unions, in the implementation of health programs in Viet Nam and the collaboration with the military in hard-to-reach areas are noteworthy. In Nepal and Lao PDR, Female Community Health Volunteers (FCHVs) and village health volunteers, respectively, carry out a significant role

in health care activities at the primary level.

4) Private sector

In Nepal and Viet Nam, an increasing number of private clinics and hospitals have been set up. However, coordination between the public and private sectors is lacking. In Nepal medical information from the private sector is dissociated from the public sector and a limited amount of information on diseases are reported to the upper levels. Anti-malarial drugs are provided for a fee in the private sector, even in heavy malaria endemic areas, while they are free in the public sector.

5) Malaria control in hard-to-reach areas

In the three countries, malaria control in hard-to-reach areas remains a significant issue and most bottlenecks preventing smooth implementation of control measures are related to control in these areas. Malaria in migrants, forests, and border malaria cases are difficult to control. In mobile communities (mainly ethnic minorities) and communities with border malaria, the number of village health workers is extremely insufficient compared with other communities.

II-4. Arising problems

The following is a list of arising problems in the three countries in recent years. Although they are not always health system related, they do affect health systems and involvement of the approach from health system strengthening seems to be crucial for their control.

1) Population movement and imported malaria

The rate of imported malaria has increased year by year in the targeted three countries. Malaria associated with domestic population movement due to migrants or internally displaced people is also on the increase. All malaria control programs are under government control, but malaria in migrants, forest, and border malaria are difficult to control. In Nepal, malaria from neighboring country India, mostly through migrant Nepalese labor (2-3 million/year) and the Indian population, is a growing concern. For example in 2004, 65% of cases were indigenous, 16% were imported and 19% were unclassified. In 2011, 23% of the cases were imported. Recently, significant number of refugees from Butan brought malaria into eastern Nepal and some outbreaks were reported.

2) Formation of new endemic areas

Generally, the incidence of malaria has been decreasing in the three countries in recent years, but new endemic areas have been reported. Environmental and social factors are suspected to be causative factors, but further studies on this issue are needed. Shift in the distribution of vector mosquitoes to the north in Nepal due to changing climate (global warming) and environment has been observed. Migration of population, deforestation, and hydropower development are also suspected to being related to this issue.

3) Increase of drug resistant malaria

Resistance of Plasmodium falciparum to chloroquine is widespread in the three countries and the drug is no longer the first choice for treatment of falciparum malaria. Currently ACT is recommended for falciparum malaria. However, artemisinin resistant malaria is also spreading, originating from the Thailand-Cambodia border to Viet Nam.

II-5. Assessment of integration between the National Malaria Control Program and the general health system in Lao PDR

Integration between the Malaria Control Program and the general health system in Lao PDR was intensively assessed according to the building blocks of a health system. These results indicate that integration was limited or partial (Table 2). The contrast between poor general health system and rich vertical system was outstanding in this investigation. However, the management system of the vertical health program suggested a good impact on the general health system.

Key findings:

- The NMCP uses program reporting forms introduced by the GFATM.
- The NMCP is completely dependent on the GFATM for procurement of ACTs.
- There were separate administration lines between public health laboratories and clinical laboratories.
- The NMCP conducts quality assurance of laboratory diagnosis of malaria cases in parallel.
- Annual planning of the NMCP is not fully integrated into the general health system. Two different forms of plan for malaria control were developed (one for MOH, the other for GFATM).
- Timing of the annual budget of the GFATM differs from the government fiscal year. As a result, joint planning between the general health system and the malaria control program is difficult.

Assessment results on the extent of integration between the NMCP and the general health systems, according to the criteria proposed by Coker, et al., (2010), are shown in the following table 2.

Table 2**Extent of integration between the Malaria Control Program and general health system in Lao PDR**

Health system functions	Elements of integration between NMCP and general health systems	Extent of integration
Leadership and Governance	Accountability framework	Limited*
	Regulatory mechanism	Limited
	Planning	Limited
	Monitoring	Partial**
	Supervision	Limited
Health information	Health statistics report	Partial
	Infectious disease surveillance	No
Finance	Budget	Limited
	Accounting report	Limited
Medical products	Procurement	Limited
	Distribution	Limited
	Storage	Partial
Service delivery	Human resources for laboratory testing	Partial
	Human resources for care and treatment	Partial
	Outreach for remote villages	No
	IEC activities	Partial

*This element is not, or only to a very limited extent, integrated into the health system as a whole, that is, this element is (quasi) exclusively under the management and control of a specific program-related structure that is distinct from the general healthcare system.

**This element is partially integrated into the health system, or this element is integrated in some, but not all, cases, that is, it is managed and controlled by both the general health care system and a specific program-related structure.

III. Good practices in malaria control

Tables 3, 4 (described briefly) and Attachment 1 (described in detail) summarize good practices in malaria control which have been carried out up to now. Among these, the following practices (*) are considered to have contributed to the strengthening of the health system and the improvement of other health programs. In other words, activities supported by GFATM have led to health system strengthening and brought synergic effects to various disease controls.

Table 3
Good practices in malaria control in Viet Nam

1	Control measures were effectively implemented under the strong leadership of National Steering Committee, utilizing the existing health system and assistance of doctors effectively.
2	High Priority was attached to control in frontier areas.*
3	Functions of Malaria Control Centers and Health Centers (training of staff, equipment, medicines, etc.) were strengthened.
4	Monitoring and reporting systems were strengthened.*
5	Effective control measures were conducted at peripheral levels mobilizing mass organization and military organization.*
6	Education on malaria for residents were intensively conducted.
7	The referral system among medical institutions was strengthened.*
8	Better treatment was ensured by preparing artemisinin suppositories at grassroots level

*Contributing to strengthening health system and scaling up health problems

Table 4
Good practices in malaria control in Nepal

1	Government attached high importance to promoting education among residents and many primary schools were constructed in rural areas.*
2	Education among residents focusing on disease prevention was intensified.*
3	Government supported by GFATM strengthened health posts.*
4	Sentinel sites were set up for outbreak surveillance.
5	Reporting and monitoring systems from the peripheral level up to the Ministry of Health and Population (MOHP) were strengthened.*
6	The budget amount for the health programs funded by the government and rate of the health budget within the total budget were increased*
7	Female Community Health Workers were organized at the community level for integrated activities including malaria.*
8	Training of health workers is conducted with the support of GFATM at the peripheral level.*
9	Number of doctors and nurses was greatly increased.*
10	Mobile teams were organized (prevention, diagnosis, treatment) in 25 districts.*
11	The pull system was introduced in logistics management in 75 districts.*

*Contributing to strengthening health system and scaling up health programs

IV. Bottlenecks and possible interventions

Tables 5, 6 (described briefly) and Attachment 2 (described in detail) summarize existing bottlenecks/challenges in malaria control. Possible interventions are discussed in the attachment (on-going interventions are also included).

Table 5-1
Malaria control: current bottlenecks / challenges -1

Bottlenecks/Challenges		Viet Nam	Nepal
A. Leadership and governance			
1	Weak program management capacity		++
2	Increase of malaria associated with population movement	++	++
3	Fragile health system in remote (frontier & boarder) areas	+	++
4	Weak relationship between medical institutions, public-private sectors and laboratories	+	++
B. Service delivery			
5	Inequity of bed nets distribution (to vulnerable people)		++
6	Many hard-to-reach areas	+	++
7	Weak coordination between local government and GFATM in the distribution of bed nets		++
C. Workforce			
8	Shortage of health manpower in remote areas	++	++
9	Low skills of health workers in remote areas	+	+
10	Frequent change of health manpower in remote areas	+	++
11	Limited number of entomologists		++

Table 5-2
Malaria control: current bottlenecks / challenges -2

	Bottlenecks/Challenges	Viet Nam	Nepal
D. Information system			
12	Fragile private health sector	+	+
13	Poorly developed reporting system from the private health sector	++	++
14	Weak infectious disease surveillance system		+
E. Medicines and technologies			
15	Inadequate quality assurance system for malaria testing	+	++
16	Weak function of the National Reference Laboratory		++
17	Difficulty in treatment due to increasing resistance of <i>P. falciparum</i> to anti-malaria drugs	++	++
F. Health financing			
18	Shortage of health manpower in remote areas	+	++
19	Low skills of health workers in remote areas	++	++
20	Frequent change of health manpower in remote areas	+	++
Others			
21	New endemic areas have been reported (environmental and social factors are suspected)	++	++
22	Increase of imported malaria cases	+	++

++: much bottlenecks/challenges, +intermediate, No mark : little

V. GFATM support for malaria control in the three countries

Since the early 2000s, malaria controls in Viet Nam, Nepal and Lao PDR have been implemented with the support of GFATM under several rounds. Leading support items include bed nets (ITNs, LLINs), RDTs, ACTs, microscopes and training for health workers (particularly at the primary level). Approximate proportions of GFATM budget within total malaria control budget in each country are as follows: Viet Nam 60-65%, Nepal 70-78%, and Lao PDR 97%. While remarkable progress has been observed in malaria control after the start of GFATM support, the malaria control budgets of the three countries, particularly Lao PDR, considerably depend on GFATM.

From 2004 to 2009, GFATM Round 2 was implemented in Nepal. The malaria component in GFATM Round 2 supported 13 high risk districts in cooperation with the MOHP, with successful outcomes. GFATM Round 7 began in 2009 as a five year project targeting 13 high risk districts in malaria components. Moreover, RCC by GFATM has been carried out since 2011 as a consolidated stage of GFATM Round 2, targeting 18 marginal high risk districts. Implementation of RCC is scheduled until 2015, with the main purpose of reducing the incidence of malaria to less than 2 per 1,000 persons and achieving a malaria treatment success rate of 90 per cent nationally.

As of 2013, the malaria control program in Nepal has been supported by GFATM Round 7 and RCC with a total of 31 targeted districts. Furthermore, Nepal has been attempting to apply GFATM for Transitional Funding Mechanism. Most funds under the malaria grant are used for procurement of LLINs to prevent malaria and ACT for treatment. The remaining funds are utilized to create a preventive and supportive environment against malaria along with BCC for residents. Since the start of GFATM support in 2004, the EDCD has played a crucial role as a Principal Recipient (PR) for GFATM. In addition, since December 2005, Population Service International (PSI) has been another PR and has contributed to the management of GFATM in close collaboration with EDCD.

Following GFATM Round 4 in Laos, Round 7 support has begun and is in Phase 2. This is expected to provide NMCP with a total of US\$16 million for the 2010–2013 period. This

amount accounts for 97% of the total budget for malaria control.

Discussion

In the three countries targeted in this survey, malaria was heavily endemic, but since the active implementation of control programs since the 1990s, successful results have been achieved. In the process of malaria control, the contribution by GFATM is large. Strategies of GFATM support of the health systems included improved access to health services, institution strengthening and capacity building, and the delivery of add-on interventions, such as health education, as well as GFATM supported interventions at the community level.

Generally, at the upper levels, collaboration among disease specific programs has been limited, and a staff and infrastructure is dedicated to each program. At the lower levels of health care, however, there is greater integration. Early diagnosis and treatment of malaria have been successfully decentralized to various levels of health care, and malaria control has gradually become more integrated with the primary care system. These outcomes have contributed to the strengthening of the general health system and synergy with other programs.

Disease specific programs in Lao PDR, such as malaria control, were shown to still be quite vertical and had the weakest integration with respect to the general health system. Demand for timely reporting to funding agencies, including GFATM, and the need for various process and output indicators has led to the need to create parallel structures for data collection and reporting. Facilities at the primary level greatly contribute to malaria control in the three countries, but the health staff working at such facilities carries out various tasks for low wages and with an insufficient number of workers. Disintegrated reporting systems lead to an increased workload especially for community health workers.

As seen in the results in Lao PDR, it seems that if the general health system is weak, a strong vertical health system supported by GFATM can function separately from the general health system. These findings were also observed in Nepal and Viet Nam, particularly at the early stage of support by GFATM, where disease specific programs

utilize procurement, information, monitoring systems, etc., outside of the MOH (MOHP), with varying levels of support and input provided by the disease specific divisions.

Leading bottlenecks in malaria control in frontier areas were identified. In addition, serious issues regarding sustainability were also seen due to the high dependency rate of the control budget by GFATM. Introduction of malaria due to population movement, increased drug resistant malaria, and the emergence of new endemic areas have become growing issues in malaria control in recent years in many endemic countries. Although these may seem to be separate from the health systems, they do affect the health systems in terms of governance, service delivery, medicines and technologies, and health financing. Such growing challenges are often related to political issues, poverty, and a changing environment due to indiscriminate development, global warming, etc. In order to address these growing challenges, strong government leadership, a sector-wide approach, and intersectoral collaboration are required.

It is crucial to implement effective malaria control programs which address these challenges and bottlenecks, seeking their elimination. Particularly, greater efforts to strengthen the health systems in remote areas, training of the health staff at the peripheral level, diagnosis based on accurate quality assurance, promotion of public-private relationship and addressing the issue of imported malaria, are desired. To create sustainable health systems, serious consideration of the issue of availability of domestic resources, including workers, supplies and local participation, as well as budgetary resources, is needed. Moreover, good practices which have been identified in this survey are expected to provide useful lessons in the effective implementation of malaria control in endemic countries. Addressing these issues will directly lead to further strengthening of the health systems and eventually to the effective implementation of various health programs.

Acknowledgements

This assessment, and the primary surveys in Viet Nam, Lao PDR and Nepal were conducted by the National Center for Global Health and Medicine, as the WHO Collaborating Center for Health System Research, with the Grants for International Health Research (22-3, 22-12, 24-5) from the Ministry of Health, Labour and Welfare, Japan

We wish to express our sincere gratitude to all the interviewees who took part in these assessments and surveys.

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Good practices

*Synergic effects with general health system and/or other programs are suspected

	Viet Nam	Nepal
A: Leadership and governance	<ul style="list-style-type: none"> Control measures were effectively implemented under the strong leadership of National Steering Committee, effectively utilizing the existing health system and assistance of donors. High priority was attached to control in frontier areas.* Functions of Malaria Control Centers and Health Centers (training of staff, equipment, medicines, etc.) were strengthened.* Education on malaria for residents was intensively conducted. 	<ul style="list-style-type: none"> Government attached high importance to the promotion of education among residents. Many primary schools were constructed.* Education among residents focusing on disease prevention was intensified.* The government strengthened health posts with the support of GFATM* A control program was implemented, basically, using the existing health system.*
B: Service delivery	<ul style="list-style-type: none"> A vertical health system was already in place before the national malaria program began. The functional formation of the steering committee made the malaria control program effective and integration of malaria program into the vertical health program was successful. The Army Medicine, People’s Committee, Women’s Union and other local organizations helped in the delivery of bed nets, and other services in the control program. The referral system among medical institutions was strengthened.* Better treatment was ensured by preparing artemisinin suppositories at the primary level. 	<ul style="list-style-type: none"> Mobile teams were organized (prevention diagnosis, treatment) in 25 districts.* Monitoring teams for ITNs and LLINs were organized at the district level. Cold chain for vaccination was used for storage of RDTs, etc. RDTs and microscopy were available as diagnosis tools for malaria at HPs. The Logistics Management Division expanded the pull system of essential drugs in all 75 districts in collaboration with its supporting partners.
C: Workforce	<ul style="list-style-type: none"> Village health workers worked for various programs. The incentive rate has been fixed by the government (Ministry of Financing) and there is not much difference between programs (the current rate is between \$2.5-\$3.0) * The government has implemented a policy to train health workers, foreign donors also have cooperated with this training.* Effective control measures were conducted at the peripheral levels, mobilizing mass (group) organizations and the military. 	<ul style="list-style-type: none"> Female Community Health Volunteers (FCHVs) were organized at the village level for integration activities including malaria control.* Training of health workers has been conducted with the support of GFATM at the peripheral level.* The number of doctors and nurses has greatly increased during the past 10 years.* Training on malaria control for the health staff has been integrated with other disease control.*

	Viet Nam	Nepal
D: Information system	<ul style="list-style-type: none"> Supervision through the vertical health systems, as well as more training, was provided as the budget increased. 	<ul style="list-style-type: none"> Sentinel sites were set up for outbreak surveillance. Reporting and monitoring systems in the public sector from the peripheral level up to the Ministry of Health and Population (MOHP) level have been strengthened.*
E: Medical products and technology	<ul style="list-style-type: none"> Refrigerators were provided to all communes with assistance from international donors. * Production of anti-malarial drugs has begun in Viet Nam with assistance from international donors. 	<ul style="list-style-type: none"> A considerable amount of ITNs, LLINs, RDTs, ACTs, and slide glasses for microscopic testing were provided at the peripheral level. Monitoring of ACT, chloroquine resistance has begun.
F: Financing	<ul style="list-style-type: none"> The government sought to increase the malaria program budget in the beginning, and the People's Committee also financially supported for the program. 	<ul style="list-style-type: none"> The amount of the budget for health programs funded by the government, and the percentage of the health budget within the total budget were increased.

Viet Nam

	Current Bottlenecks	Possible Interventions
A: Leadership and governance	<ul style="list-style-type: none"> Control in mobile communities, especially for the malaria control program, by the health sector alone is difficult. 	<ul style="list-style-type: none"> If coordination between the health sector and border guard forces, police and local authorities, were closer, control of immigration would be easier. Register families which members repeatedly suffer from malaria as malaria high risk families, in order for commune health staff members to narrow the target for malaria control.
B: Service delivery	<ul style="list-style-type: none"> GFATM supports the distribution of ITNs, but transportation costs are covered only from the provincial level to the district level (and the district health department only partially pays for transport). This does not cover the distribution transport to communes. High risk groups do not always receive benefit from the malaria control program. <ol style="list-style-type: none"> malaria in migrants (mainly ethnic minority groups) border malaria (Vietnamese from non-endemic areas working in endemic area, and immigrants from Lao PDR, Cambodia, and China) forest malaria (people in very remote mountainous areas, people staying overnight in the forest). 	<ul style="list-style-type: none"> A motorcycle or a bicycle at a commune health center can be used for remote areas. Obtaining the understanding and cooperation of village leader on health programs is important.
C: Workforce	<ul style="list-style-type: none"> Preventive medicine cannot recruit doctors due to a lower salary than that of clinical doctors. Serious shortage of a health staff in remote areas. The number of microscopes has increased, but the staff members who can properly use the microscopes are insufficient. Training opportunities are limited in remote areas and areas where interventions by foreign donors have not yet been carried out. After controlling malaria in the 1990s, young medical staff members do not recognize malaria symptoms since malaria endemic areas are mainly remote and forest areas, and the medical staff rarely sees malaria patients these days. 	<ul style="list-style-type: none"> Among targeted high risk groups, educating family members of persons who work in the forest and/or in the malaria endemic areas, so as to increase the number of program collaborators, is important. Training opportunities among health workers should be increased in remote areas and areas where interventions by foreign donors have not yet been carried out. Improvement in the training curriculum according to the conditions of the area is requested. Improvement of the curriculum on PHC, health programs, rural health, etc., in under- and post- graduate education is desired.

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D: Information system	<ul style="list-style-type: none"> The reporting system from the private health sector is not sufficiently developed. 	<ul style="list-style-type: none"> Promotion of active surveillance is needed. Enhancement of IEC activities to enlighten the residents, particularly in remote areas, is recommended.
E: Medical products and technology	<ul style="list-style-type: none"> Microscopes are not placed in commune health stations despite the need for diagnosis of <i>P. falciparum</i> and <i>P.vivax</i>. Due to increasing resistance by <i>P. falciparum</i> to anti-malaria drugs, treatment has been difficult. The quality assurance system for malaria testing is insufficient in remote areas. 	<ul style="list-style-type: none"> Setting up an appropriate quality control system is needed.
F: Financing	<ul style="list-style-type: none"> All the budgets are determined at the central level and support by international donors is also determined at the central level in detail, with no chance of change at the provincial level. More than half of the budget for malaria (2 billion VND out of 3.8 billion) has been allocated to purchase equipment such as microscopes, computers and medicine at the central level. The provincial level receives less than half for staff wages, training fees, and supervision. Anyone can receive malaria treatment free of charge. However, bed nets are free only to poor people and many people in the remote villages are poor. Management costs at the commune health stations are covered by the government, but government support for transportation fees is insufficient. A transportation fee is allowed 80,000VND (\$4.50) only for the head of the commune health station and 20,000VND (\$2.2) for the head of the village health workers. Low incentive for health workers 	<ul style="list-style-type: none"> Preparing a minimum requirement costs at the commune health stations (maintenance cost, transportation fee, etc.) is desired. Improvement of the system to reflect the opinions and requests of the lower levels to the upper levels is desired.

Nepal

	Current Bottlenecks	Possible Interventions
A: Leadership and governance	<ul style="list-style-type: none"> • <i>Population movement and imported malaria</i> Malaria associated with population movement (from neighboring countries such as India and Butan, as well as by the domestic mobile population) is a growing concern. • <i>Program management</i> Program management capacity is still weak due to insufficient trained manpower and weak supervision and monitoring. • <i>Coordination between local government and GFATM</i> At the central level, coordination between the government and GFATM is preferentially carried out. However, at the local level, collaboration is insufficient, and closer communication has been requested. 	<ul style="list-style-type: none"> • The Disease Control Unit of the EDCD should be strengthened for more effective malaria control implementation. Recruitment of entomologists, epidemiologists, and support technicians and communication specialists is needed. • Strategies should be set for the prevention and treatment of imported and cross-border malaria cases (the Nepalese government is setting up check points at border areas to address this problem). • A sector-wide approach is needed to address the issues of imported malaria, cross-border malaria and new endemic areas. • Strengthening the district health system is a key area to be targeted and focused on for effective program planning and management in each district.
B: Service delivery	<ul style="list-style-type: none"> • <i>Distribution status and practicability of bed nets</i> Bed nets are not always distributed to the most needed or vulnerable populations. The nets are bulky and safety issues regarding pesticides sometimes make distribution and safe storage a challenge. Even when LLINs are distributed, utilization rates may be low for several reasons: aesthetics, uncomfortable sleeping under the net due to temperature, lack of awareness regarding disease reduction. • <i>LLIN distribution system</i> At the peripheral level, LLIN distribution is often carried out separately from local government by local NGOs. The government system is not fully utilized for LLIN distribution (cf. monitoring after the distribution of LLIN, treatment medicine and diagnosis kits is conducted by government). • <i>Hard-to-reach areas</i> Although hard-to-reach areas have decreased in Nepal, there are still some areas where the health services have not reached the population. 	<ul style="list-style-type: none"> • Strengthening the logistic management system including preventive, curative and emergency commodities, diagnostic materials and basic equipment is recommended. • The EDCD and health offices in the districts should be asked to consolidate partnership with PSI and widen the malaria partnership, in order to increase the use of ACT, RDT, LLINs and IRS. • Updating and development of technical guidelines/SOPs in key areas, based on the current epidemiological situation in the country for diagnostics, case management, entomological surveillance, monitoring drug and insecticide resistance, vector control, and IEC/BCC, in order to promote improvement in key interventions, should be carried out. • GFATM supports the expansion of a control program to remote areas and the strengthening of the health systems in hard-to-reach areas, as well as the provision of health services in these areas.

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C: Workforce	<ul style="list-style-type: none"> • <i>Manpower</i> There is a significant shortage of manpower at the peripheral level. In most health posts and sub-health posts, one health worker bears many tasks and the amount of time work they can devote to malaria is limited. A large proportion of their work is said to be allocated to EPI. • <i>Skills of FHCV</i> At the commune level, treatment is often provided only based on symptoms by FHCVs who were briefly trained and with limited skills. Incorrect identification may lead to increased incidence of resistance to drugs. • <i>Frequent change of the health staff</i> Training of the health staff at the peripheral level is carried out, but many staff workers leave within a short period of time. • <i>Number of entomologists</i> The number of entomologists in Nepal is quite limited. This situation prevents the smooth implementation of malaria control from the point of view of vector control. 	<ul style="list-style-type: none"> • Health workers especially in the SHPs, HPs and PHCs should be trained with regards to simple and serious cases of malaria. There is a need to ensure systematic annual pre-season refresher training especially in high-risk transmission districts. • The EDCC, VBDTRC and Health offices should continue capacity building, with the technical support of WHO effectively. Recruitment and training of entomologists is crucial. • Training and development of entomologists is necessary. • Increasing the salary and incentives to health workers and volunteers is necessary. • More training opportunities are needed to ensure qualified health workers (both for newly employed workers and for refresher training).
D: Information system	<ul style="list-style-type: none"> • <i>Report from private sectors:</i> There are many private clinics, hospitals, medical colleges in Nepal and increasing number of the population goes to these places for treatment in recent years. However health data is only collected from government facilities. 	<ul style="list-style-type: none"> • The enrollment of private medical colleges and hospitals, as well as clinics along with the Government hospitals, in the reporting system is needed.
E: Medical products and technology	<ul style="list-style-type: none"> • <i>Drug resistant malaria</i> In addition to chloroquine resistant <i>P. falciparum</i>, the potential emergence of resistance to artemisinin is a major threat to treatment effectiveness. The use of antimalarial drugs to treat patients only on the basis of clinical symptoms at the community level may be responsible for emergence of drug resistance in malaria cases. 	<ul style="list-style-type: none"> • Quality assurance systems for both microscopy and RDT need to be strengthened. • Procurement of antigen-based RDTs should be standardized and quality assurance of products should be centralized and carried out regularly. • Quality assurance of malaria control products should follow WHO guidelines on product specifications and be based on the current epidemiological situation of the country.

	Current Bottlenecks	Possible Interventions
	<ul style="list-style-type: none"> • <i>Quality assurance system</i> The quality assurance system is inadequate or non-existent, affecting accuracy and trust in diagnosis for case management and for monitoring of disease burden. • <i>Function of National Reference Laboratory</i> Implementation of a comprehensive quality assurance system for malaria microscopy and RDT through the referral laboratory network should be carried out by the VBDRTC (at the district, regional and central levels). However, the current function of the VBDRTC as a National Reference Laboratory is insufficient. 	<ul style="list-style-type: none"> • There is a need to develop a national malaria diagnosis reference center. Strengthening the links between laboratories will complement the network for quality control, research and training. The function of the VBDRTC as a national center should be strengthened. • The capacity of laboratory technicians (microscopists) at hospitals and PHC should be improved.
F: Financing	<ul style="list-style-type: none"> • <i>Sustainability of commodities supply</i> While ACT is highly effective, price is a significant barrier to widespread use. The cost of RDT is also cited as a barrier to its use. Currently these are supported by GFATM, but such sustainability is doubtful. • <i>Incentives for FHCVs</i> FHCVs greatly contribute to medical care and health promotion, including malaria control for residents at the peripheral level. However their incentive is quite limited. 	<ul style="list-style-type: none"> • Higher incentives for FHCVs, in order to promote motivation, is desired.

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NCGM REPORT October 2013

Assessment of health systems in relation to interface between malaria control programs and health system strengthening: Comparative study among Lao PDR, Nepal and Viet Nam

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