Report of the Programmatic Review of the National Malaria Control Programme in Thailand

Bangkok, Thailand, 16–26 August 2011
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Executive summary

The external review of the National Malaria Control Programme of Thailand was carried out at the request of the Ministry of Public Health (MoPH) by a team of four internationally recognized experts together with national staff from the Bureau of Vector Borne Diseases (BVBD), from selected national institutions, from nongovernmental organizations (NGOs) and WHO, from 15 to 26 August 2011. The general objective of the independent review was to assess the current policies, strategies, delivery mechanisms, monitoring and surveillance systems and general programmatic performance of the National Programme to reach malaria elimination goals, in order to provide advocacy for sustained support from political leaders and decision-makers for malaria elimination in Thailand, and to note any areas where a change in strategic direction is recommended. The review also focused attention on partnerships with stakeholders, NGOs and the private sector. It made recommendations to improve the cost-effectiveness of the national programme including programme management and health system strengthening towards malaria elimination. Field observations and analysis, and interviews were conducted with key stakeholders, NGOs and other Ministry of Health and government agencies directly or indirectly involved in malaria operations to identify strengths and weaknesses of the programme in the following areas: (1) programme management and policies; (2) use and flow of epidemiological information; (3) disease management (diagnosis, treatment and drug resistance monitoring); (4) vector control and entomology (ITNs– insecticide-treated mosquito nets and LLINS– long-lasting insecticide treated net, focal IRS– indoor residual spraying and vector bionomics); (5) IEC/BCC targeting migrant/mobile populations and ethnic minority communities; (6) malaria control operations at international border regions; and (7) financing. Programme funding for malaria control from national sources has been supplemented by several rounds of grants from the Global Fund to Fight AIDS, TB and Malaria (GFATM) in 2002 (R2), 2007 (R7) and 2011 (R10); national efforts to contain artemisinin resistance have been supported by grants from The Bill & Melinda Gates Foundation (BMGF) and the GFATM.

Overall, the Bureau of Vector-Borne Diseases has made significant positive programme achievements based on recommendations made during the last external programme review in 1995, having shifted from a vertical to a semi-vertical programme in 1997. Nationally reported malaria cases and deaths in Thailand had decreased steadily since the late 1980s and early 1990s when the total numbers of malaria cases were in the range of 270 000–340 000. In 2010 malaria cases were down to 22 969. This steep decline has been accompanied by a reversal of the Plasmodium falciparum/P. vivax ratio to a current slight excess of P. vivax over Plasmodium falciparum. Similarly, malaria deaths decreased from over 4000 in 1965 to 80 in 2010, with the current case fatality rate being 0.8%. While in most parts of the country transmission rates have been reduced to extremely low levels or have been interrupted, several western districts bordering Myanmar and a few in the southern part bordering Malaysia with persisting civilian conflict and southeastern parts of the country bordering Cambodia, which experience major and intense population movement (e.g. migrant workers) across international borders, still experience high transmission rates. The considerable achievements made over the years are attributable to several positive socioeconomic factors as well as extensive deforestation alongside malaria programmatic performance including enhanced...
malaria control activities as follows: (1) a change in treatment policies for \textit{Plasmodium falciparum} to artemisinin-based combination therapy (ACT) – initially in parts of the country and eventually countrywide; (2) the adoption and implementation to scale of ITNs and later, LLINs supplemented in some areas by IRS; (3) more recently, expanding health services for malaria using microscopy and rapid diagnostic tests and provide effective medicines free-of-charge to treat malaria in remote communities through malaria clinics and malaria posts; (4) implementing behaviour change communication programmes and mobilizing endemic communities including cross border population; and (5) in highly endemic border areas of the country, providing health services to migrant mobile communities who move across international borders for short or longer-term periods, as a collaboration between the MoPH and a large network of NGOs and research partners.

Following the achievements of recent years in reducing malaria incidence rates and deaths in Thailand, the national malaria control programme is now in transition from its previous national strategic plan (2006-2011) to a new strategic plan for 2011 to 2016. The major change is that the new strategy clearly enters into and adopts a dynamic elimination perspective, and sets as one of its three targets that the percentage of districts achieving interruption of malaria transmission should increase to 60% by 2016 and 80% by 2020. This will require achieving interruption of transmission in a further 121 districts by 2016 (555/925) compared with 2009 (434/925). A majority of districts targeted for malaria elimination are, however at borders requiring intensive cross border collaboration and joint action with neighbouring countries.

The current review found that as a result of the national plan for decentralization and integration of NMCP into the General Health Services which began in 1996, there had been a decreasing allocation of financial resources for malaria control due to competing health priorities of the MoPH and of the General Health Services. This posed an impending threat which may compromise national achievements of the past few decades. It called for a renewed political and financial commitment to invest seriously in malaria elimination and explore more effective ways of harnessing public, private and community and regional resources in keeping with the disease burden towards malaria elimination. Although the National Malaria Control Programme was staffed with qualified professionals and equipped to provide technical assistance to the different levels of implementation, it lacked the ability to function smoothly, as would be expected from a fully integrated system. This is partly because the NMCP had no line authority to work directly with the VBD centres and units and hospitals which were under the Office for Disease Prevention and Control. This had impeded the NMCP providing direct and efficient technical supervision and support to the provinces and districts which, in turn, did not feel obliged to systematically and consistently report to higher levels. This was compounded by the new staff organizational structure in the context of new and different roles and functions assigned to staff which has adversely affected the coordination between the central level and provincial offices.

The review found that the coverage (free of charge for Thai citizens and officially recorded migrants) of diagnosis and treatment services by the public sector for the population at risk of malaria was high in most parts of the country, extending effectively to...
the community level through an expanded system of malaria clinics and malaria posts which provided quality services. Yet, at the Thai–Myanmar border districts, even these expanded services together with the services offered by research groups (SMRU) and NGOs (Mae Tao Clinic, IRC and others) did not seem adequate to deal with the high burden of malaria in the migrant population from Myanmar who sought care in Thailand. Diagnosis and treatment policies had been appropriately reviewed and updated in the country, although recent evidence of decreasing therapeutic efficacy of artesunate–mefloquine against \textit{P. falciparum} malaria at the western border states called for a consideration of a new second-generation ACT and even non-artemisinin-based therapy in documented hotspots of falciparum resistance to artemisinins. There were also still some outstanding gaps between policy and implementation, particularly in the use of the medicine primaquine for transmission control in \textit{P. falciparum}, and preventing relapses in \textit{P. vivax}, which needed to be addressed with urgency. The contribution to diagnosis and treatment services from NGO and research partners was found to be significant in the higher burden western provinces. Several key research and development issues, pertaining particularly to improved case management of malaria were being addressed by well established international research partners. Regular programmatic links and exchange of information between the control programme and these active partners would add strength to malaria control and elimination efforts in Thailand.

Although case recording was being carried out systematically in the public sector, and case reports were being routinely transmitted to the higher levels of the system, case data are not being very useful for strategic planning and implementation, due mainly to a complex system of data flow channels. Malaria case data were, therefore, highly fragmented at the local level, which made it useless for sound epidemiological analysis, precluding its use for evidence-based planning for malaria control operations at the local level. This presented one of the greatest limitations to current malaria control and elimination operations. It was highly recommended that single line computerized reporting mechanisms were set up, accurately consolidating peripheral malaria information from different sources, alongside, if necessary, other diseases of public health importance and/or existing Alert and Response systems. Ways of scaling up user-friendly modern technologies and web-based systems which were piloted as part of the Artemisinin Resistant Containment (ARC) Project needed to be fine-tuned and supported by national decision-makers to provide accurate real-time information for immediate feedback, field action and monitoring. Malaria elimination did require an accurate real-time national database of malaria information (alongside with a consolidated national register). Other priorities included empowering peripheral staff in basic data management in order to critically analyse/display locally generated information through capacity building, supervision, monitoring, with real-time connectivity to central IT services ideally located in the MoPH. Access by the most ‘at risk’ population to malaria services and ITN/LLIN, early diagnosis and treatment coverage needed to be monitored and improved through locally driven methods and innovative financing mechanisms.

The current vector control strategy was to achieve a coverage of 1 net per 2 people in endemic villages (A1 and A2) through treating nets purchased by users from the private sector or providing long-lasting insecticidal nets and long lasting insecticidal hammock
nets targeting individuals working in risky situations outside villages. Indoor residual spraying with pyrethroids (which were also largely used in agriculture and plantations – e.g. fogging in rubber plantations) was being currently implemented in some selected areas - in principle supplementing ITNs in areas with perennial transmission (A1). If IRS was to continue, WHO recommended using a different class of insecticide from pyrethroids used on nets in order to reduce the risk of insecticide resistance spreading. There was, however, a plan to phase them out over the next five years. Environmental management and use of larvivorous fish were being promoted, and repellents were recommended for people involved in outdoor activities at night-time, but these interventions had not been properly documented as being effective in reducing transmission. A very high proportion of malaria transmission in Thailand did not occur at home but among populations sleeping or working outdoors at night-time. There were limited means of protection for these people, and they would be major obstacle to both containment of artemisinin resistance and elimination of malaria, unless all effective means were used to provide them effective and suitable personal protection. Operational research on innovative personal protection was needed. An extensive review of entomological surveillance for vector mapping was also needed as a starting point for the elimination strategy such that planning and strategy, development for control and elimination were based on valid entomological data. This would require a strong entomology capacity in the country for malaria, ideally coupled to other vector-borne disease control operations. Data collected at the provincial level on vector distribution and insecticide susceptibility had not been adequately captured at the central level in recent years, but the new online database should allow technical staff to identify problems and provide advice.

Artemisinin resistance of *P. falciparum* was confirmed in 2008 in Trat province with the resistance hotspots located in the neighbouring province of Pailin in Cambodia. Consequently, a bi-country artemisinin-resistant containment project began to be implemented in January 2009 in seven provinces of Thailand bordering Cambodia (and 10 provinces in Cambodia) in an area comprising a resident population of 7.6 million, and an estimated 350,000 mobile people. Intensive, and to some extent innovative containment activities towards elimination of artemisinin resistant strains were being implemented in Zone 1 which comprised three districts, in which artemisinin resistance had been detected and confirmed, while less aggressive containment interventions are being performed in adjacent Zone 2 areas. Intensive containment efforts are being implemented over and above routine control interventions which are managed by the Bureau of Vector Borne Disease, Ministry of Public Health (BVBD/MOPH), with the extra support provided by GFATM R7 from 2008. This has enabled the most vulnerable population (mainly non-Thai citizens) to access and use BVBD-managed malaria services throughout the country. The review found the containment strategies being satisfactorily implemented, particularly in Zone 1, with increasing engagement of the private sector in diagnosis and treatment, and through effective collaboration between the health sector and the customs and military personnel. These extra efforts led to a drastic decline of confirmed malaria cases, especially *P. falciparum* infections during the project period (2342 falciparum cases were recorded in the seven provinces in 2008 versus 309 in 2011, and no death). The proportion of *P. falciparum* patients with delayed parasite clearance...
with an ACT was 25% in 2011 against an initial target of 5% or less. This when coupled with the observed increasing therapeutic failure rate of the ACT indicates that the few remaining \textit{P. falciparum} parasites are of the most artemisinin-resistant strains. Only 55% of \textit{P. falciparum} infections in zone-1 were treated as planned with a non-artemisinin antimalarial drug (atovaquone-proguanil/AP), since the programme decided at the planning stage to give AP only to patients who could be carefully monitored. It was not clear to the review team what proportion of patients on AP were under directly observed treatments as they should have been. The vast amounts of data that were being generated and recorded in the containment project, still remained stored, largely in paper format, and were not being made utilized as a basis for strategic planning, and to drive operations.

Thus, the main problems hampering control efforts in Thailand in the country’s movement towards elimination are: (a) documented \textit{P. falciparum} resistance to artemisinin in eastern provinces bordering Cambodia and possibly on the Thai–Myanmar border; (b) unofficial cross-border population movement for socioeconomic or political reasons, (c) decreasing allocation of financial resources due to competing health priorities of the MoPH and of the General Health Services (GHS) in the provinces in the context of drastically declining malaria burden; and (d) consequent to the adoption of decentralization and integration policies, lack of smooth and fully integrated functioning between the Department of Communicable Diseases/BVBD and the General Health Services (GHS), and too little active collaboration between them and the private sector (private industries) and NGOs that delivered health and malaria services. In addition, malaria risk was particularly high in some of the remotest areas populated by ethnic minorities, where it is difficult to provide health services.

The \textit{priority policy recommendations} from the external review panel to be considered by the national malaria programme are as follows.

1. To streamline information flow on malaria in order that real time malaria case reports constituted the basis of epidemiology based plans for malaria control and elimination and build epidemiology capacity within a human resources framework, particularly at the district and provincial levels.

2. To develop work and financial plans, capacity building and advocacy plans, in collaboration with the Provincial Public Health Office (PHO) and partners, and in line with the implementation of the new National Strategic Plan for Malaria Control and Elimination and M&E Plan 2011-2016.

3. To improve and maintain technical supervision for quality assurance of services in malaria diagnostics (microscopy and RDT), implementation of updated treatment guidelines, vector control and surveillance (insecticide resistance monitoring and bio-assays of LLINS/ITNS), procurement/distribution/storage and inventory of supplies.

4. To review and revise current treatment policies to adopt a second-generation ACT for the treatment of \textit{P. falciparum} in the context of decreasing efficacy of the current first-line ACT and emerging artemisinin resistance in border areas;
for *P. vivax* treatment pertaining to the effectiveness of the 14-day primaquine regimen (which should include the systematic use of G6PD assays) as an anti-relapse medicine in light of the increasing proportion of vivax infections and the elimination targets and to implement countrywide the policy of a single dose of primaquine for *P. falciparum* for the purpose of reducing infectivity.

(5) To develop an integrated vector management approach expected to maintain a multi-disease vector control capacity that would ensure rational use of insecticides, define roles and functions for vector control personnel integrated into the GHS, build the evidence base to fine-tune strategy and monitoring and improve accountability in a highly decentralized system to enable managers at different levels to track progress against targets for vector surveillance and to develop strong field entomology capacity among junior entomologists to address all vector-borne diseases. Track LLIN retention and use through surveys, and based on the results, review distribution strategies. With the recently established online database for entomological monitoring, ensure sufficient data are available for regular review of vector control approaches.

(6) To directly address border-specific issues through innovative strategies related to malaria control among migrants and mobile populations who currently harboured the largest reservoir of malaria infection.

(7) To better engage the private sector (private industries, agricultural sector and tourism industry) towards disease elimination targets.

In high-burden western border districts, the risk of malaria lies mainly at the forest fringe and in those exposed to such areas by virtue of their occupational or other behaviour. Increasingly, the malaria burden and the infectious reservoir will reside in mobile migrant communities which do not fully benefit from the health services, as they move frequently across borders and to remote settings where health care facilities are almost non-existent. Therefore, targeted strategies to tackle forest-malaria for which most current vector control interventions are not very effective should be made a priority. These would include: (a) better profiling high risk populations and their behaviour patterns in order to target appropriate interventions; (b) more research on effective personal protection measures; and (c) effective use of behaviour change communication (BCC). *P. vivax* malaria presently accounts for the residual burden of malaria in Thailand and will increasingly continue to do so in the future. This situation calls for a review of strategies and tools being used for malaria control, taking into consideration that mobile migrant populations constitute the largest reservoir of malaria in the high-burden areas and that *P. vivax* malaria is generally less susceptible to any of the control measures as currently applied against *P. falciparum*. It would also require that greater attention be paid to *P. vivax*-specific control strategies. Research to bridge the knowledge gaps in the control of *P. vivax* malaria, and improving the safe use of primaquine against *P. vivax* relapses should be a priority.

Last but not the least, field staff engaged in malaria elimination who contribute to the success of the programme should not be removed. The situation calls for a proper
human resource plan, where staff performance is acknowledged and individual career paths are set up beyond malaria, and across the health sector.

The review team acknowledges the efforts made by the Royal Government of Thailand and the Programme to control malaria and recent positive results in reducing the malaria burden putting in perspective malaria elimination goals in Thailand before 2020. The team recommended intensification of surveillance to measure and achieve that ambitious goal in a country attracting large external investments and tourists. The team also suggested stronger focus on malaria control across international borders where the disease burden is the highest. Rather than decreasing its financial and human resource support to BVBD and provinces, the Ministry of Public health, peripheral bodies and private companies should consider maintaining or strengthening their commitment in the provision of comprehensive malaria curative and preventive services towards achievable and time-bound malaria elimination targets.
Acknowledgements

The Review team was able to accomplish its mission thanks to the assistance and full collaboration of the Bureau of Vector Borne Disease, Department of Disease Control, and with inputs from other relevant offices of the Ministry of Public Health, Nonthaburi, Thailand under the overall coordination of WHO. Team members were able to visit regional, provincial and peripheral offices, numerous partners’ institutions, and academia. Their feedback has greatly contributed to the recommendations highlighted in the report.

The WHO Mekong Malaria Programme in Thailand wishes to acknowledge the four external experts (listed in Annex 4) who dedicated their time and energy to produce the report.

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# Acronyms and abbreviations

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<th>Acronym</th>
<th>Description</th>
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<tr>
<td>A1</td>
<td>Perennial transmission area</td>
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<tr>
<td>A2</td>
<td>Periodic transmission areas</td>
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<tr>
<td>ABER</td>
<td>Annual Blood Examination Rate</td>
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<td>ACD</td>
<td>Active case detection</td>
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<td>ACPR</td>
<td>Adequate Clinical and Parasitological Response</td>
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<tr>
<td>ACT</td>
<td>Artemisin-based Combination Therapy</td>
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<td>ADB</td>
<td>Asian Development Bank</td>
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<tr>
<td>A3+M2</td>
<td>Artesunate (blisters) 3 days + Mefloquine (loose tablets) 2 days combination treatment</td>
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<tr>
<td>AP</td>
<td>atovaquone-proguanil (Malanil as trade name in Thailand)</td>
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<td>API</td>
<td>Annual Parasite Incidence</td>
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<td>ARC</td>
<td>American Refugee Committee</td>
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<td>ASEAN</td>
<td>Association of South East Asian Nations</td>
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<td>BCC</td>
<td>Behaviour Change Communication</td>
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<tr>
<td>BIOPHICS</td>
<td>Centre of Excellence for Biomedical and Public Health Informatics, Faculty of Tropical Medicine, Mahidol University</td>
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<td>BMGF</td>
<td>The Bill &amp; Melinda Gates Foundation</td>
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<td>BOE</td>
<td>Bureau of Epidemiology</td>
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<td>BVBD</td>
<td>Bureau of Vector Borne Diseases</td>
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<tr>
<td>CBO</td>
<td>Community-based organization</td>
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<tr>
<td>CCSDPT</td>
<td>Committee for Coordination of Services to Displaced Persons in Thailand</td>
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<tr>
<td>CHW</td>
<td>Community Health Worker</td>
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<tr>
<td>DDC</td>
<td>Department of Disease Control</td>
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<td>DFID</td>
<td>Department for International Development (United Kingdom aid)</td>
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<td>DHSS</td>
<td>Department of Health Services Support</td>
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<td>DOT</td>
<td>Directly Observed Therapy</td>
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<td>ECHO</td>
<td>European Commission Humanitarian Aid Office</td>
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<td>ER</td>
<td>External Review</td>
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<td>FDA</td>
<td>Food and Drug Administration</td>
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<td>FHI</td>
<td>Family Health International</td>
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<td>FSMC</td>
<td>Fixed Schedule Mobile Malaria Clinic</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GFATM</td>
<td>Global Fund to Fight AIDS, Tuberculosis, and Malaria</td>
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<td>GIU</td>
<td>Geographical Information Unit (Mahidol University)</td>
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<td>Acronym</td>
<td>Description</td>
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<tr>
<td>GMAP</td>
<td>Global Malaria Action Plan</td>
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<td>GMP</td>
<td>Good Manufacturing Practices</td>
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<td>GMS</td>
<td>Greater Mekong Sub-region</td>
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<tr>
<td>GO</td>
<td>Governmental Organization</td>
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<td>GPO</td>
<td>Governmental Pharmaceutical Organization</td>
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<td>HC</td>
<td>Health Centre</td>
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<td>HIS</td>
<td>Health Information System</td>
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<td>HR</td>
<td>Human Resources</td>
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<td>HSS</td>
<td>Health System Strengthening</td>
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<td>ITF(CAR)</td>
<td>International Task Force for Containment of Artemisinin Resistance</td>
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<tr>
<td>IEC</td>
<td>Information Education and Communication</td>
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<td>IOM</td>
<td>International Organization for Migration</td>
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<td>IPSR</td>
<td>Institution for Population and Social Research (Mahidol University)</td>
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<tr>
<td>IRS</td>
<td>Indoor Residual Spraying</td>
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<td>ITN</td>
<td>Insecticide-treated mosquito nets</td>
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<td>JICA</td>
<td>Japan International Cooperation Agency</td>
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<td>K.I. Asia</td>
<td>Kenan Institute Asia</td>
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<td>KAP</td>
<td>Knowledge Attitudes and Practice</td>
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<tr>
<td>LAO</td>
<td>Local Administrative Organizations</td>
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<td>LLIHN</td>
<td>Long-lasting insecticide treated hammock net</td>
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<tr>
<td>LLIN</td>
<td>Long-lasting insecticide treated net</td>
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<tr>
<td>M&amp;E</td>
<td>Monitoring and Evaluation</td>
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<tr>
<td>M.Sc</td>
<td>Master of Science</td>
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<tr>
<td>M1</td>
<td>Non-Thai citizen living in Thailand for more than 6 months</td>
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<td>M2</td>
<td>Non-Thai citizen in Thailand for less than 6 months (highly mobile population)</td>
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<tr>
<td>MAT</td>
<td>Malaria Association of Thailand</td>
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<td>MC</td>
<td>Malaria Clinic (under BVBD)</td>
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<td>MC Asia</td>
<td>Malaria Consortium Asia</td>
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<td>MCH</td>
<td>Maternal and Child Health</td>
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<td>MDG</td>
<td>Millennium Development Goals</td>
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<td>MDR</td>
<td>Multi Drug-resistance</td>
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<td>MESST</td>
<td>Monitoring and Evaluation System Strengthening Tool</td>
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<td>MHV</td>
<td>Migrant Health Volunteer</td>
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<td>MIS</td>
<td>Malaria Information System</td>
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<td>MLO</td>
<td>Migrant Liaison Officer (under PHO)</td>
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<td>Acronym</td>
<td>Description</td>
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<td>MMP</td>
<td>Mekong Malaria Programme (WHO)</td>
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<td>MMW</td>
<td>Mobile Malaria Worker</td>
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<td>MOE</td>
<td>Ministry of Education</td>
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<td>MOL</td>
<td>Ministry of Labor and Social Security</td>
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<td>MOPH</td>
<td>Ministry of Public Health</td>
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<td>MP</td>
<td>Malaria Post (under PHO)</td>
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<td>MPH</td>
<td>Master of Public Health</td>
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<td>MPW</td>
<td>Malaria Post Worker</td>
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<td>MW</td>
<td>Migrant Worker/s</td>
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<td>NA</td>
<td>Not available</td>
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<td>NTF(CAR)</td>
<td>National Task Force for Containment of Artemisinin Resistance</td>
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<tr>
<td>NESDB</td>
<td>National Economic and Social Development Board</td>
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<td>NGO</td>
<td>Nongovernmental organization</td>
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<td>NHSO</td>
<td>National Health Security Office</td>
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<td>NMCP</td>
<td>National Malaria Control Programme</td>
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<td>ODPC</td>
<td>Office for Disease Prevention and Control</td>
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<td>OR</td>
<td>Operational Research</td>
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<td>ORSC</td>
<td>Operational Research Steering Committee</td>
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<tr>
<td>PA</td>
<td>Planning and Administration</td>
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<tr>
<td>PATH</td>
<td>Program for Appropriate Technology in Health</td>
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<tr>
<td>PCR</td>
<td>Polymerase Chain Reaction</td>
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<tr>
<td>PHD</td>
<td>Provincial Health Department</td>
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<td>PHO</td>
<td>Provincial Public Health Office</td>
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<tr>
<td>PK</td>
<td>Pharmacokinetics</td>
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<tr>
<td>PMI</td>
<td>President’s Malaria Initiative (Washington DC, USA)</td>
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<tr>
<td>PPP</td>
<td>Purchasing power parity (GDP per capita PPP)</td>
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<tr>
<td>PSM</td>
<td>Procurement &amp; Supply Management</td>
</tr>
<tr>
<td>QA</td>
<td>Quality Assurance</td>
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<td>R2</td>
<td>GFATM Round 2</td>
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<td>R7</td>
<td>GFATM Round 7</td>
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<td>R10</td>
<td>GFATM Round 10</td>
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<tr>
<td>RBM</td>
<td>Roll Back Malaria</td>
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<tr>
<td>RDMA</td>
<td>Regional Development Mission-Asia in Bangkok (USAID)</td>
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<tr>
<td>RDT</td>
<td>Rapid Diagnostic Test</td>
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<td>RTF</td>
<td>Raks Thai Foundation</td>
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<tr>
<td>SMRU</td>
<td>Shoklo Malaria Research Unit (Mae Sot, Tak)</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>SEARO</td>
<td>WHO South-East Asia Regional Office</td>
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<tr>
<td>SOP</td>
<td>Standard Operating Procedures</td>
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<tr>
<td>SPR</td>
<td>Slide Positivity Rate</td>
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<td>SR</td>
<td>Sub-Recipient</td>
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<td>SSS</td>
<td>Social Security Scheme</td>
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<tr>
<td>TA</td>
<td>Technical Assistance</td>
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<td>TAO</td>
<td>Tambon Administration Organization</td>
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<tr>
<td>TC-Malaria</td>
<td>Technical Committee on Malaria</td>
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<tr>
<td>TOR</td>
<td>Terms of Reference</td>
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<tr>
<td>TropMed</td>
<td>Faculty of Tropical Medicine, Mahidol University</td>
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<tr>
<td>TRP</td>
<td>Technical Review Panel (of the GFATM)</td>
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<tr>
<td>TWG</td>
<td>Technical working group</td>
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<tr>
<td>TWGMM</td>
<td>Thai-Cambodia Technical Working Group on Migrants and Malaria</td>
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<tr>
<td>UC</td>
<td>Universal Health Care Policy</td>
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<tr>
<td>UNDP</td>
<td>United Nations Development Programme</td>
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<tr>
<td>UNFPA</td>
<td>United Nations Population Fund</td>
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<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<tr>
<td>USP PQM</td>
<td>U.S. Pharmacopeia Promoting the Quality of Medicines</td>
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<tr>
<td>VBDC</td>
<td>Vector Borne Disease Centre</td>
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<td>VBDU</td>
<td>Vector Borne Disease Unit</td>
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<tr>
<td>VHV</td>
<td>Village Health Volunteer</td>
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<td>VMW</td>
<td>Village Malaria Worker</td>
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<td>WB</td>
<td>World Bank</td>
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<td>WHO</td>
<td>World Health Organization</td>
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<td>WPRO</td>
<td>WHO Western Pacific Regional Office</td>
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1. Background and Rationale

The last external review of the Malaria Control Programme of Thailand was undertaken in 1995 (See Annex I). Since then, the programme has undergone many changes. A vertical programme since its inception in 1949, it was, in 1996, integrated with other vector-borne disease programmes (dengue and filariasis) into the Bureau of Vector-Borne Disease (BVBD) within the Department of Disease Control (DDC), Ministry of Public Health. The BVBD is responsible for malaria control-related research, generating policy for malaria control, and evaluation. The organization consists of 12 Disease Prevention and Control Offices (DPCOs) at the regional level, 39 Vector-borne Disease Centres (VBDCs) at the provincial level, and 301 Vector-Borne Disease Units (VBDUs) at the district level. These DPCOs, VBDCs and VBDUs are responsible for the implementation of the prevention and control strategies of malaria as well as other vector-borne diseases. In addition, there are 329 malaria clinics (MC) and recently, 300 Global Fund-supported malaria posts (MP) specifically providing diagnosis and treatment and working for the control of malaria. The National Malaria Control Programme (NMCP) has been undergoing a decentralization process for malaria control and prevention operations, integrating them into General Health Services (GHS) at the provincial and district level, resulting in a reduction of the budget (due to competing public health priorities at the national level) and attrition of specialized field malaria officials.

The programme also received several rounds of grants from the Global Fund to Fight AIDS, TB and Malaria (GFATM) in 2002 (R2), 2007 (R7) and 2011 (R10). R7 and R10 have now been merged into the single-stream funding (SSF) mechanism expecting approval and start-up implementation by Oct 2011. Interim reviews for the GF project were done to assess in particular the implementation mechanisms as well as programme success indicators/outputs at the end of the project grant (see Annex 1). The outcome/impact indicators reflect the programme success in reducing the disease burden in the last 10 years. At the conclusion of Round 2, the annual parasite incidence had gone down to 0.41 per 1 000 population (target at Year 5: 0.4), and malaria death rate was 0.15 per 100 000 population per year (target: 0.3). By 2009, the API was further reduced to 0.36/1,000 population and death rate to 0.11/100 000 population.

For implementation purposes, the country is stratified into different transmission zones (updated yearly) with specific interventions (Box 1).
Box 1: Stratification of malaria transmission risk in Thailand

A - Control area with transmission:

A1 - perennial transmission area (transmission reported for at least 6 months per year).

A2 - periodic transmission area (transmission reported but for less than 6 months per year).

B - Elimination area without transmission:

B1 - high and moderate receptivity (transmission not reported within the last 3 years but primary and secondary vectors present).

B2 - low and no receptivity (transmission not reported within the last 3 years and primary and secondary vectors absent, suspected vector may be present).

Although the country has been successful in the reduction of morbidity and mortality, malaria transmission still exists in parts of the country and the disease continues to be a public health problem, especially in mobile populations and ethnic communities residing in the highly malarious areas along Thailand’s international borders. These priority provinces along the Thai–Myanmar border are as follows: Mae Hong Son, Tak, Kanchanaburi, Prachuab Khirikhan, Chumphon, Surat Thani, Ranong, and Yala on the Thai-Malaysian border. Provinces along the Thai–Cambodia border also pose another problem with the emergence of multi-drug resistant *P. falciparum* malaria. Seven provinces are now part of the artemisinin resistance containment project: Trat, Chantaburi, Sakeo, Buriram, Surin, Srisaket and Ubon Ratchathani. The risk population in these areas is mostly young males engaged in occupational activities that expose them to malaria risk. Border conflict also results in movement of displaced populations and soldiers around endemic areas.

While the Global Fund external reviews looked at the achievement of project goals and indicators in areas receiving GF support, the entire Thai NMCP needed to be reviewed within the context of its National Strategic Plan 2007-2011 and 2011-2016. The strategic plan, which is closely aligned with the principles expounded by the World Health Organization’s Global Malaria Programme (GMP), aims to reduce mortality and morbidity through the reduction of transmission areas, and containment and elimination of artemisinin-resistant parasites.

The programmatic structure also needs to be reviewed in relation to the goals of the National Health Policy of integration of health services, decentralization of planning and budget and human resources, and assessed whether the peripheral health services are ready to assume the malaria control activities at their level.

As per official request from the Department of Communicable Diseases, MOPH, Thailand, the WHO Mekong Malaria Programme (WHO MMP) in collaboration with the
coordinator of the external review secretariat BVBD, MOPH, Thailand facilitated the external review of the national malaria programme in Thailand.

The objectives of the external review are to advise on:

- improvements to the effectiveness of the malaria elimination programme;
- advocacy with political leaders and decision-makers for sustained support to the malaria elimination programme;
- enhancement of partnerships with stakeholders, NGOs and the private sector;
- improvements to programme management (increasing problem solving and supervisory skills of national programme staff) and health system strengthening towards malaria elimination.

The current external review was undertaken from 16 to 26 August 2011 with four external reviewers specialized in their respective fields (for terms of reference, see Annex 2):

1. **Dr Kamini Mendis**: ER team leader, Case management
2. **Ms Cecil Hugo**: Programme structure and management in relation to integration and decentralization with attention to planning and budget and human resource capacities
3. **Dr Sylvia Meek**: Vector control and M&E in relation to vector control
4. **Prof. Tang Linhua**: Surveillance systems and artemisinin resistance containment and elimination

### 1.1 Country situation

Thailand is located at the centre of the Indochina peninsula, occupying an area of some 513,000 km², bordered to the north by Myanmar and Lao People’s Democratic Republic, to the east by Lao People’s Democratic Republic and Cambodia, to the south by the Gulf of Thailand and Malaysia, and to the west by the Andaman Sea and the southern part of Myanmar. Geographically, it has several distinct geographic regions, corresponding to provincial groups. The mountain range in the west largely splits Myanmar and Thailand from the north to the south, while the north of the country is mountainous. The northeast, Isan, consists of a plateau, bordered to the east by the Mekong River. The densely populated centre of the country is dominated by the predominantly flat Chao Phraya River valley, which runs into the Gulf of Thailand. Southern Thailand consists of the narrow isthmus that widens into the Malay Peninsula. The country is divided into six geographical regions which differ in population size, basic resources, natural features, and level of social and economic development; and comprises 77 provinces, including Bangkok Metropolitan.
As of 2010, Thailand has a population of some 65.5 million, with a multi-ethnic society.¹ About 75% of the population is ethnically Thai, 14% is of Chinese origin, and 3% is Malay ethnic. There are also other smaller population groups including Mon, Khmer, Vietnamese and various hill tribes and other ethnic groups in various parts of the country. The large proportion of Sino-Thai community is considered to be the best integrated in Southeast Asia. More than 85% speak a variant of Thai and share a common culture, although there is a strong sense of regional identity and pride in many areas of Thailand. Roughly one third of the population is in central Thailand, including the Greater Bangkok area; one third in the northeast, with significant Lao, Khmer, and Vietnamese ethnics; 20% in the north with various ethnic and indigenous population groups; and 15% in the south with a large proportion of Thai Muslim population, in which ethnic Malay Muslims comprise a majority in the three southernmost provinces. The population is mostly rural, concentrated in the rice-growing areas of the central, northeastern, and northern regions. However, as Thailand continues to industrialize, its urban population (47.5% of total population at present), particularly in Bangkok and its vicinities, is growing.²

With a dynamic economy, there is a great deal of internal migration, including circular and seasonal migration. The key migration flows are from the seasonally barren northeastern, which is the poorest region of the country, and the second poorest northern region to Bangkok and other provinces in the Central region. They have supported economic growth in the country by providing labour for construction, manufacturing and services, and by generating remittances to their home communities. The movement to Bangkok and the Central region is both permanent and temporary, including significant levels of seasonal migration. However, the volume of seasonal migrants is unclear and could be underestimated, and recent trends show a declining proportion of the young population group who usually contributes to the highest migration rate. However, internal migration in Thailand seems to be cyclical with macroeconomic outcomes. During the economic boom periods, migration into cities significantly increased. On the other hand, the economic downturns of 1997-1998 and 2008-2009 did not only slow the trend of migration into urban areas, particularly Bangkok, but also reversed it. Migration to provinces in the Central region other than Bangkok and the Southern region tends to be the current trend for internal migration.

The most recent Immigration Acts of 1979 permitted only professional transients to enter without quotas, and restricted other types of immigrants for economic and national security reasons. From the sixties to seventies, the country witnessed migration from neighbouring countries, especially from Indochina and Myanmar, first as refugees and later as economic migrants. As of 2009, the international population of over 3.5 million who temporarily stayed in Thailand, comprised seven key groups as follows:

(1) **Tourists**

(2) **Professional and skilled workers:** As of 2009, over 100,000 foreign professional workers were reported to be staying and working in Thailand, in addition to over 6000 foreign diplomats and officials.

(3) **Other temporary stays:** In 2009, more than 121,000 persons temporarily stayed in Thailand for various reasons such as medical treatment, higher education, retirement, and staying with Thai spouses or resident families.

(4) **Regular long-term residents:** This group comprises almost 514,000 individuals in 2009, including those who are in the process of obtaining a Thai nationality, former undocumented persons, and persons born to non-Thai parents.

(5) **Refugees, displaced persons and asylum seekers:** Thailand has accommodated refugees from neighbouring countries since the Indochina War. An estimated 7.9 million persons migrated trans-nationally to and from Thailand in 1994. Despite resettlement to third countries and repatriation among the refugees, there are still some 150,000 displaced persons and asylum seekers in Thailand today, majority of Myanmar origin, residing in the temporary shelters along the border.

(6) **Trafficked persons:** There is no official estimated number of trafficked persons in Thailand. However, the accumulated number of women and children being trafficked from the GMS region was around 30,000 in 1993.

(7) **Labour migrants and dependents from three neighbouring countries:** It is estimated that there are 2.5-3 million labour migrants and dependents from Myanmar, Lao People’s Democratic Republic, and Cambodia, the second largest group after tourists.⁶

Among the seven transnational population groups, the biggest concern to the Thai authorities in terms of national, social and health security are displaced persons residing in the temporary shelters and the labour migrants. With an economy experiencing low-skilled labour shortages, Thailand became an importer of migrants by the late 1980s. Structural factors explain large-scale low-skilled migration into Thailand during the 1990s:

- the opening of borders to increased movement of people and trade within the GMS;
- increasing demographic deficits due to extremely low population growth rate (about 0.5% in 2010), which, in turn, created demand for labour to fill the gaps in the workforce to support the rapid economic growth;
- Thailand’s function as the Sub-region’s economic engine, creating more jobs than it could fill with its own labour force as evidenced in the low

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unemployment rate (about 1% in 2010) and tight labour markets in Thailand as a shift to an ageing society began, while neighbouring countries remained youthful with surplus labour and unemployment;

- broadening disparities between Thailand and its neighbours in terms of development and poverty reduction (Thailand GDP is 6-9 fold higher than those of neighbouring countries - GDP per capita PPP is US$ 8554 as per World Bank report, Dec 2010);

- the political and economic malaise in Myanmar that push a lot of displaced persons and migrants into Thailand since the 1980’s; and

- development of migration networks and institutions.

While the Thai government tries to control its porous borders, the neighbouring workforces are secretly encouraged to come in to work for employers willing to take advantage of the cheaper labour cost. Consequently, more than half of the labour migrants are undocumented. Many migrants did not cross the border officially: many simply paid a fee for a day pass to cross the border and then overstayed, while many others used natural border crossing points. Over 80% of the labour migrants are from Myanmar, while Cambodian and Laotian have almost equal share of the rest of less than 20%. Overall, migrants from the three countries are heavily involved in four out of 24 sectors allowed by the Thai government, i.e. agriculture, construction, seafood processing, and domestic household. In agriculture, southern rubber plantations, northern rice and fruit farms, and the coastal seafood processing provinces are the biggest employers of migrants. Migrant labour is the key to the international competitiveness of Thailand’s major export sectors such as shrimp, poultry, rubber, and rice.

The first waves of migration into Thailand tended to concentrate at the border provinces, but today, the networks have expanded to other regions across all 77 provinces of Thailand, with a tendency for increased cross-border migration especially to the central region. According to the migrant registration data, migrants from Myanmar can be found more in, but not limited to, the border provinces adjacent to Myanmar, while many of them also live and work in the areas as far as the Thailand–Cambodia and Thailand–Malaysia borders to work on farms, construction sites, fishery, forestry, and gem mining. Approximately one quarter of migrant labours in the Thailand–Cambodia border area, are in fact from Myanmar. Likewise, the Cambodian migrants are also employed in the provinces along Thailand–Malaysia border and Thailand–Myanmar border, although much less in terms of number than the Myanmar migrants in Thailand–Cambodia border. It is important to note that there are also large numbers of irregular economic migrants from Bangladesh, China and Vietnam. However, as the Thai government only pays attention to migrants from the three neighbouring countries, the volume and pattern of migration from these countries are least known. With the establishment of the ASEAN

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5 Department of Employment, Ministry of Labour. Thailand.
6 ASEAN+3 member countries: Brunei Darussalam, Cambodia + China, Indonesia, Japan, Lao People’s Democratic Republic of Korea, Malaysia, Myanmar, Philippines, Republic of Korea, Singapore, Thailand and Viet Nam.
Community by 2015, mobility within the Sub-region is expected to increase for both high- and low-skilled workers, with in- or out-migration to more countries such as Malaysia, Brunei Darussalam, Singapore, the Philippines, Indonesia and Republic of Korea. 

1.2 Health care system

The Thai health care system was reformed in 2001 with the introduction of the ‘Universal Health Care Policy’. This ‘UC scheme’ aims to provide universal coverage of free medical care through a sustainable system implemented in partnership with private sector hospitals. Some limitations still exist, particularly in rural areas where health facilities are inadequate and efforts to strengthen the capacity of health personnel to effectively perform their new roles and responsibilities are ongoing. Nevertheless, the Thai health system is now one of the strongest in the Region catering relatively well to the needs of the indigenous population. There is even a health insurance scheme for documented M1 migrant workers who have the option of paying a health insurance fee of approximately US$ 40 per year to receive health services under the UC scheme. Government policies regarding undocumented M2 migrants, however, are not very clearly defined and there is no health insurance for this group. The issue of how to enable non-Thais (particularly M2 migrants) residing in Thailand to access basic health care without posing an unsustainable financial burden on the country’s health budget is proving a challenge. In 2009, the Thai government has approved a population of 1 544 902 migrants to work in the country. 

Undocumented migrants (estimated to be approximately 4.6 million) have limited access to health services in Thailand, except under special projects. This can be attributed to a combination of sociocultural and language barriers. In view of such barriers affecting utilization of health care services amongst migrants, the Global Funds Malaria R2 and R7 have supported efforts to develop migrant-friendly health services at hospitals and health centres and the creation of outreach services that employ migrant health assistants to serve migrant communities. In addition, civil society organizations (CSO), working through the Department of Health Services Support (DHSS), are effectively lobbying the Thai government to develop an effective national migrant health strategy supported as a long-term plan for public health. Some progress has been made at the national level on the issue of migrant workers with a fundamental shift in attitude amongst decision-makers to acceptance. The ‘Migrant Health Strategic Plan’ has been developed by MOPH in collaboration with other GO and NGOs. This plan includes the establishment of a migrant health service system; the promotion of health insurance among migrant populations; the strengthening of migrant communities’ participation in taking care of their own health and the development of communication and advocacy materials adjusted to the cultural backgrounds of migrants. In addition, the ‘Border Health Master Plan’ has been developed to ensure that communities (both Thai and migrant) in the border areas will have better access to health care services and benefit from an effective disease surveillance system by 2011. But whilst this strategy exists on paper, its implementation is

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yet to be realized. The border health strategies emphasize the migrant issues as well as
community participation and cross border collaboration. Another positive change is that the
new 2008 labour law allows more occupations to be included in migrant registration9.

Although Thailand has developed strategic plans on migrant health and border
health, the health budget is allocated on the basis of the population of Thai nationals in
each province, with registered M1 migrant’s registration fees topping up this budget to
give them health coverage, however, the provincial health budgets are still not sufficient
to cover the needs of undocumented M2 migrants.

1.3 **Historical perspective of the Programme: from eradication to control, and back to elimination**10

Between 1911 and 1934, as a result of several malaria epidemics recorded in the North,
malaria control activities were set up by the Ministry of Interior in Chiang Mai and
managed by the Department of Public Health. In 1943, the “Malaria Division” was
created under the Department of Health of the newly established “Ministry of Public
Health”. In response to the wide spread of severe epidemics, malaria units were set up
from 1945 throughout the country to ensure a) drug distribution (mostly chloroquine and
Atebrin® (mepacrine), b) protection against mosquitoes (e.g. mosquito control, health
education to promote the use of bed net). In 1950, 36 000 deaths attributed to malaria
were recorded (201.5/100 000 population)11. The national Malaria Control Programme
was established in 1949, technically and financially backed up by the U.S. Government,
promoting a nationwide malaria control strategy, mainly based on indoor insecticide
residual (DDT) spraying and distribution of chloroquine. Annual malarriometric surveys
were carried out in villages to assess the impact of interventions. The impact of residual
spraying with DDT was found to be encouraging. Active case detection was initiated to
complement passive detection through malaria units with treatment (chloroquine) largely
based on clinical symptoms. Radical treatments (“*definitive therapy*”) were the
responsibility of clinicians in hospitals only. As a result, the number of malaria deaths
recorded in 1957 dropped to 10 548 (43/100 000).

In 1961, the Division of Malaria Control was transferred from the Department of
Health to the Office of the Under-Secretary of Health. The National Malaria Eradication
Project (NMEP) was officially established in conformity with the World Health
Organization’s Expert Committee’s guidelines (1957) encouraging Member States to
switch from malaria control to malaria eradication as a global target. The NMEP was in
operation from 1965 to 1972. In 1963, 6 500 malaria deaths were recorded. The 8-year
eradication project was supported by WHO and USAID aiming at 84% of the country’s
total population being free from malaria and for the project to be further integrated into
general public health services. Areas and activities were stratified according to the WHO

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9 Thailand GFATM Round 10 proposal, Malaria. Sections 4.3.2 and 4.3.4
10 A Synthesis of Knowledge and Experience on the Antimalarial Drug Policy development, change and implementation in Thailand.
11 Anonymous. Malarriology 1999. Nonthaburi, Thailand: Malaria Division, Dept. of Communicable Diseases Control, Ministry of
guidelines to include the following operations: (1) indoor insecticide residual spraying with DDT – “attack phase” and “consolidation phase”; (2) assessing the impact of indoor spraying operations by annual malarialmetric surveys; (3) strengthening surveillance by active case detection (ACD), passive case detection (PCD), radical treatment and individual case follow-up, in-depth epidemiological investigation and remedial measures in localities where indigenous malaria case are detected. The Eradication Project reached its peak of operations with a significant reduction of malaria incidence (API 1.76/1000) and malaria deaths (15.2/100 000) from 1965 to 1967 (12.9/100 000) to remain as such till 1969 (10.4/100 000). However, malaria incidence started rising gradually from 1970 onwards as the Government promoted large scale agriculture increasing access of population to forest areas (where malaria vectors are) and increasing deforestation. At the same time, parasite resistance to first-line antimalarials (e.g. chloroquine) and vector resistance to DDT became evident. In 1969, it became evident for WHO and USAID and worldwide experts that malaria eradication (global eradication of malaria) was no longer realistic with existing tools. The recommendation was then to shift the eradication policy to long-range control approaches to preserve public health gains achieved, and focus efforts to areas where malaria is still of public health concern. (Global) eradication goals were back to control goals looking at minimizing the number of malaria deaths and maintaining malaria morbidity at its lowest possible level. In 1970, USAID terminated the assistance to Thailand after 20 years of support.

In 1972, malaria control activities regained official recognition from the Government as a national public health concern. The Malaria Control Programme was re-established with focus on remote areas and along international borders where deforestation and population migration were intense. The goal was to eradicate malaria wherever eradication was expected to be imminent and, wherever not, control methods continued to be scaled up. This was a long-term plan under the fifth Five-year National Socio-Economic Development Scheme fully funded by the Thai Government. The Malaria Division was transferred to the Department of Medical Services and Health in the MoPH. In 1974, the malaria control division under the newly created Department of Communicable Disease Control (CDC) was responsible for malaria control policy development, planning and evaluation, funds distribution, training, monitoring and supervision. At the national level, the Malaria Division encompassed five Malaria Regional Offices, subsequently upgraded to become five Malaria Divisions in 1991, to report directly to the Director General of the Department of CDC. Revised guidelines for implementation of malarial control activities were also issued in 1991. The country was divided into control, pre-integration and integration areas according to their epidemiological situation. Vector control activities, active case detection (ACD), passive case detection (PCD) and diagnosis/treatment through specialized malaria clinics, were the essential components of the vertical Malaria Control Programme structure. The Thai Malaria Control Programme was vertically structured in areas where malaria control operations have to be maintained, and partially integrated into general health services in areas recorded as low or malaria-free areas. With the vertical system in place, policy formulation was always made straightforward from the central level, including SOPs to be strictly implemented in endemic areas.
Following the adoption of the Global Malaria Control Strategy by WHO in 1993 and the recommendations of the external and internal review panels in 1995, the malaria control policy was revised in 1996. In 1997, during the promulgation of the new constitution of Thailand, the Asian economic crisis affected the public sector, including the health sector as a whole. After a reduction in health budgets as a result of the declining malaria incidence trends during the past decade, health system reforms were called for, including re-structuring and streamlining of the health workforce of the Ministry of Public Health (Health Policy of Thailand, 2009). Prior to this, the Department of Disease Control had already initiated its re-organization plan, e.g. the merging of National Malaria Control Programme with the Filariasis and Dengue Haemorrhagic Fever Control Programmes under the Bureau of Vector Borne Diseases (NMCP Profile, 2011). The former Malaria Divisions were dissolved and integrated into 12 Regional Offices for Disease Prevention and Control. To date, the 39 Vector Borne Disease Centers (VBDC) and 302 VBDC units were assigned to their respective Regional Offices. In addition, there are 329 malaria clinics (MC) under BVBD, and 300 Global Fund-supported malaria posts (MP) under general health services progressively scaled-up from 2002 and specifically providing Rapid diagnosis (RDT), treatment, distribution of ITN and health promotion. The NMCP is undergoing decentralization and integration of malaria control and prevention into General Health Services at the provincial and district level as a result of significant malaria reduction and the reduction of domestic budget and attrition of specialized field malaria personnel.

2. External review

The objectives of the external review are to advise the following:

- improvements to the effectiveness of the malaria elimination programme;
- advocacy with political leaders and decision-makers for sustained support to the malaria elimination programme;
- enhancement of partnerships with stakeholders, NGOs and private sector, and
- improvements to programme management (increasing problem solving and supervisory skills of national programme staff) and health system strengthening towards malaria elimination.

The current external review was undertaken from 16-26 August 2011 with four external reviewers specialized in their respective fields (for Terms of Reference, See Annex II):

1. **Dr Kamini Mendis**: ER team leader, Case management
2. **Ms Cecil Hugo**: Programme structure and management in relation to integration and decentralization with attention to planning and budget and Human Resource capacities
(3) **Dr Sylvia Meek:** Vector control and M&E in relation to vector control

(4) **Prof Tang Linhua:** Surveillance systems and artemisinin resistance containment and elimination

**Review Process**

The review methodology is summarized as follows:

- The external review team was provided with key background documents and presentations on Day1 and officially met with the BVBD-MoPH and its partners. The overview presentations included the Thailand Health Profile 2007, National Strategic Plan for Malaria Control and Elimination, the National Monitoring and Evaluation Plan 2011-2016, Global Fund Round 10 Proposal and past Review reports.

- Individual meetings were arranged within BVBD sections (diagnostic and molecular/in vitro lab, epidemiology/surveillance unit, etc.) and other relevant public health officers and key technical staff who had major influence on policy decisions related to NMCP Management, e.g. Bureau of Epidemiology, Policy and Strategy Bureau, DDC – Dept. of Planning and Finance and National Health Security Office (NHSO), etc.; the academe, partners and research groups i.e. Hospital for Tropical Diseases, Mahidol University, MORU, AFRIMS, Malaria Consortium (for full agenda 15-26 Aug, see Annex 3).

- The teams (composed of one ER member, BVBD and WHO staff) conducted field monitoring visits in selected provinces to the PHOS, district offices, VBDUs and VBDCs, LAOs and NGO partners. Findings/observations from the field visits are incorporated in the final report. People and organizations met are listed in Annex IV.

  - Teams 1 and 2. Tak province, Mae Sot & Mae Ramad districts and Umphong district
  - Team 3. Trat province, Khlong Yai & Koh Chang districts; Chanthaburi province
  - Team 4. Ranong province, Kraburi district; Surathani province, Panom & Nasarn districts

The four reviewers reviewed all aspects of the programme (with special focus on their respective TORs) and met after the field visits to share and analyse their findings, from which the recommendations were developed. Preliminary findings were reviewed with the BVBD staff in a half-day meeting prior to the final debriefing on 26 August 2011 to the larger group that included representatives of DDC management, key stakeholders, donors and partners (see Annex 5).
2.1 Programme Management

Governance - Organizational Structure, Mandate and Staffing Pattern

The Ministry of Public Health (MoPH) remains the core agency in the Thai public health system managing the country’s health care programmes. Under the Reorganization of Ministries, Sub-Ministries and Departments Act of B.E. 2545 (2002), the Ministry of Public Health has “powers” and responsibilities related to the promotion of health, prevention/control and treatment of diseases, and rehabilitation of people’s health, as well as other official functions as provided by laws which indicate that such functions are the responsibility of the Ministry of Public Health.\(^{12}\)

At present, there are three line authorities under the MoPH involved in the implementation of malaria control programme and activities. Figure 1 shows the current organizational structure.

Malaria, dengue and filariasis control programmes are merged under the BVBD of Department of Disease Control (DDC). The BVBD is responsible for malaria-related research, malaria control policy formulation, and programme evaluation. Director of the BVDB serves as the Programme Manager of the NMCP.

During the re-structuring in 1996, the five malaria control offices that used to be directly under the NMCP were integrated to the 12 Offices of Disease Prevention and Control (ODPCs) which are also under the DDC. ODPC are responsible not only for malaria but other communicable and non-communicable diseases as well. Within the OPDC is a VBDC cluster, which serves as the focal point for the implementation of the malaria control programme with the support of the 39 Vector-borne Disease Centers (VBDCs) at the provincial level, and 301 Vector-Borne Disease Units (VBDUs) at the district level. These ODPCs, VBDCs, and VBDUs are responsible for the prevention and control of malaria as well as other vector-borne diseases. In addition, there are 329 malaria clinics specifically providing treatment and control of malaria (NMCP Profile, 2011).

The Integrated Health Services (IHS) which comes under the Office of the Permanent Secretary are the ones responsible for curative services (hospitals), surveillance, case reporting and rapid response to outbreaks (Provincial Public Health Offices and the District Public Health Offices) and Health Centres/Health Promotion Centres (HC).

The Local Administrative Organization (LAO) under the decentralization to Local Government Organizations ACT of BE 2542 (1999) also has a role in social and health services in line with local administration laws. One of the major responsibilities includes improvement in the quality of life of the people, with provision of public health services being one of its statutory function.

\(^{12}\) Thailand, Country Profile 2009.
In most areas visited, vector control is implemented with support from LAOs at the different administrative levels.

**Figure 1:** Organizational structure of MoPH, 2011

(a) **Strengths**

The MoPH policy for restructuring aimed to maximize the utilization of human resources, budget and equipment for the control of all mosquito-borne diseases, and to subsequently minimize the rather high cost of malaria control programme which, at the time, was already showing a steady improvement in the malaria situation in the last decade (UNPAN; MoPH, 2006).

**National Malaria Control Programme** is staffed with qualified professionals, equipped to provide technical assistance to the different levels of implementation, capable of implementing operations research in support of policy formulation and are practised in getting the most out of the capacity of some of its technical and implementing partners in the performance of some critical malaria control activities, particularly in the border areas and areas populated by migrant and ethnic minority groups, i.e. K.I.Asi, ARC, SMRU, etc.
The Integrated Health Services covers a wide geographical area, i.e. malaria endemic and non-malarious areas; diagnostic and treatment services are provided at the district and provincial hospitals; PPHO, DPHO and HC are staffed with professional staff and trained health workers who have the potential to be capacitated on malaria prevention activities; all offices are housed in spacious and well-equipped infrastructures. In the areas visited, the PPHO have openly expressed willingness to provide administrative supervision to the VBD staff at the different levels, if it will ever be required in the process of integration.

The VBDUs and VBDCs have been quite active in seeking creative ways to cover gaps in funding field operations, particularly vector control activities, e.g. in Surathani and Ranong Provinces, the VBD staff managed to coordinate their activities with the corresponding public health offices at the different levels of implementation (e.g. VBDU of Nasarn District works with the Surveillance and Rapid Response Team under the DHO) and are able to mobilize resources both from the public health offices and local administrative authorities, who also allow them to submit proposals or participate in annual planning and budgeting. The technical capacity of the VBD staff are also recognized by the administrative authorities at these levels as necessary support in maintaining effective malaria preventive and control services in their areas. They are also seen as important technical support during emergency or outbreak response.

The LAOs, e.g. Klongsok and Nasarn Districts understands its statutory function in the provision of public health services, acknowledges the need for technical guidance from the public health and vector borne disease offices in planning (e.g. the district health officer sits as a consultant in the district health committee), provides support to proposed vector surveillance and control activities (e.g. Nasarn district provided budget for salary of temporary entomology position and mosquito survey), response to emergency situations, such as chikungunya and dengue outbreaks and advocacy for personal protection measures, e.g. promotion and distribution of mosquito repellents to families affected by the said mosquito-borne diseases.

Global Fund Round 7 supported capacity building of the General Health Services – enabling the different organizations at the Provincial and District Public Health Offices and VBDCs and VBDUs to work together, gain experience in malaria programme management and improve access and utilization of malaria control services in the remote and border areas.

There is existing manpower to undertake quality assurance of malaria diagnosis at the NMCP and the ODPC, both for malaria microscopy and rapid diagnostic testing. There is a designated reference laboratory which is already ISO certified; there is also a lab manager to supervise the QA system and accredited level1 microscopists to undertake internal QA/QC (includes sending of unknown slide panels and cross-checking of slides coming from the microscopy centre to the district then to the ODPC).
(b) Weaknesses

The re-organization in accordance with the national government’s plan of decentralization started the integration of NMCP to the general health services at the regional level in 1996, consequently resulting in the annual reduction of budget and gradual attrition of specialized malaria field officials; VBD staff who were earlier integrated in areas where malaria is non-endemic were assigned to tasks which are not related to control of malaria or other mosquito-borne diseases (NMCP Profile 2011).

The policy of non-replacement (hiring freeze) of vacated posts (of retired/retiring malaria staff) is still in effect; this is gradually leading to under-staffing of the VBDCs and VBDUs without having produced an operative programme management and technical skills transfer, particularly in the implementation of malaria vector control and surveillance activities.

While the decision-makers at the national level (Bureau of Policy & Strategy, Dept. of Disease Control of MoPH and the National Health Security Office) are quite clear in its policy direction regarding the inevitable need for the integration of malaria control programme to the general health services, the NMCP level staff are ambivalent or divided in their opinion; not all are acquiescent with the planned integration, some are unsure of the ‘real’ programme direction, while a few are already contemplating which department they are most likely to move into, should they be required to do so.

Although there is already an existing QA system for malaria diagnosis in operation under the supervision of the NMCP, hospital laboratories are not included in this system, as the mandate for QA is under the Department of Medicine.

In the current structure, the NMCP has no straight line authority to work with the VBD Centres and Units under the ODPCs, making it difficult to provide technical supervision or conduct monitoring exercises without the approval of ODPCs, which have the mandate for such functions, e.g. conducting insecticide resistance monitoring or getting reports on insecticide susceptibility status of vectors in the area.

Compounding the difficulty of coordination between the central and OPDC level staff is the modification in the way the staff are now clustered, which is in line with their new roles and functions, i.e. Network Development for Disease Surveillance and Control, Organizational Development (Reference for Standards and Procedures), Behavioural Change and Communication (development of prototypes) and Public Health Emergency and Rapid Response, Monitoring and Evaluation.

Although the available malaria control tools and interventions are considerably effective if implemented at the right time and place, malaria management and technical capacities at the General Health Services as well as in LAOs are largely inadequate for them to support malaria activities requiring specialized skills and experience e.g. entomology surveillance and vector control activities.
**National Plan, Policies and Strategies**

Based on the current malaria situation, NMCP has been effective in providing a framework for malaria control in Thailand. The strategic planning process was led by the NMCP Programme Manager and technical officers, together with the collaboration and support of technical and donor/partner organizations and stakeholders.

**(a) Strengths**

NMCP manages to optimize the use of available technical resources and mobilize them in policy formulation, planning and implementation, i.e. the development of the New Strategic Plan for Malaria Control and Elimination and M&E plan 2011-2016. The document is expected to provide a sound basis for setting the future directions of malaria control and elimination in Thailand.

The new strategic framework for malaria control and elimination is intended to be aligned with the National Health Plan and Policy towards integration of malaria into the general health services in accordance with the continuing health system reform. The new strategic plan also aims to promote human resource development to support required capacity to implement the new strategic plan. The national control policies and strategies are generally in line with regional and international standards.

**(b) Weaknesses**

The strategic plan has not been costed (based on Annual work plan – that should set the activities for the provinces and district to undertake, depending on their stratification);

There is no indication in the M&E plan when the programme intends to initiate integration of the malaria control programme into the GHS; while there is a very clear methodology for stratifying of areas, there is no set criteria for logical progression of strategies for the different stratified areas or when areas move from control to pre-elimination to elimination.

As a national health policy, integration should take place regardless of disease burden; however, because of the ambiguity of the timeframe and the re-tooling of staff that will be required for the planned integration, the human resource development plan has not yet really been fully developed in accordance with the intended direction;

Although human resource development is clearly promoted, it is not quite clear if it is in accordance with the mandate, roles and functions of the staff at the different levels and strategies that should be appropriate to the stratification of the areas where the staff will be assigned.

Not all policies have been updated or systematically dated, which is resulting in confusion as to which is presently in effect, e.g. stratification of areas and the vector control options according to each stratified area. Where policies do exist, it is yet to be
translated into standard operating procedures (SOPs). Where SOP is already available, it is yet to be fully disseminated, implemented or followed e.g. SOP on QA/QC for malaria diagnosis.

**Financing**

The national budget for malaria control has dramatically decreased since the country’s economic crisis in 1997 and since the initiation of the Implementation of the “Plans and Process for Decentralization to Local Administrative Organizations Act of 1999”. The Act called on all ministries including the Ministry of Public Health to develop action plans for decentralization of functions, resources and staff to the elected Local Administrative Organizations (LAOs) by 2010, setting a target for increased share, from 25% to 35%, of the central government budget transferred to LAOs.

Current and expected financial resources of the national malaria control programme come from MoPH/DDC budget allocation and external support from donor and partner agencies. As shown in Table 1, the national budget for malaria control in 2006-2010 was annually reduced, from US$ 12 million in 2006 to less than 1 million in 2010. Sixty to seventy per cent of this budget allocation is for salaries of the staff.

**(a) Strengths/Opportunities**

Although it was not possible to estimate or quantify, there are other domestic funding sources that can be tapped for malaria control operations (e.g. vector control and surveillance), treatment, care and prevention, i.e. OPDCS budget for the operations of the VBDC and VBDU which is based on an annual plan.

The health services delivery budget which covers the Thai population is from the Universal Health Coverage Fund (UC) which is paid by capitation of THB2000 per head. Payments are made directly by the National Health Security Office (NHSO) to healthcare facilities. This includes malaria diagnostic and treatment services provided in provincial and district hospitals. For the registered migrant population, they are covered by the Social Security Scheme, where access to health services is through the usual SSO medical benefits programme (Report on improving access to health care for migrants and refugees, 2010).

The LAOs funding, on the other hand, also comes from the UC Fund and is also paid by capitation, i.e. B40/head, but is matched or topped up from the local fund (as part of the agreement between LAOs and NHSO). This LAO funding can be accessed by the VBDC and VBDUs for the implementation of specific activities, e.g. vector control.

There is external support from donor and partner agencies, such as Kenan Institute Asia, WHO, BMGF, USAID/PMI and the Global Fund that was able to supplement

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national funding and support malaria programme initiatives, particularly in border areas and migrant populations, in sustaining malaria control and in preparing for malaria elimination.

(b) Weaknesses/threats

Malaria is no longer endemic in all provinces of Thailand; thus, it can not be included in the earmarked UHC funding from NHSO which is specially allocated for high burden diseases occurring nationwide or catastrophic in nature.

The present allocation for treatment and health promotion coming from the UHC funding is primarily for the Thai population and SSO is only for the registered migrants; the prioritization of this local funding is dependent on the technical advice of the local health committees and burden of disease in the area.

Since budget allocation at this level is also affected by the decentralization plan, priority activities are in accordance with its new mandates and functions, i.e. monitoring and evaluation, research and technical assistance. Expectedly, the budget for implementation of malaria control activities is gradually decreasing, thereby affecting the operations of VBDCs and VBDUs, weakening their capacity to respond quickly to outbreaks or emergency situations. For example PHO and VBDC staff in Ranong were trained on early recognition and response to outbreaks in 2010, and yet they were unable to act on the increasing cases, because of inadequate funds for vector control operations coming from ODPC during that year.

Table 1. Domestic and External Funding Sources of National Malaria Control Programme Thailand 2006-2010*

<table>
<thead>
<tr>
<th>Sources of funding</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
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<td><strong>Government Budget:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country Budget</td>
<td>40 000</td>
<td>46 065</td>
<td>48 824</td>
<td>59 142</td>
<td>53 125</td>
</tr>
<tr>
<td>Public Health Budget</td>
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<td>1 833</td>
<td>1 919</td>
<td>2 182</td>
<td>2 192</td>
</tr>
<tr>
<td>Disease Control Program budget</td>
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<td>106</td>
<td>100</td>
</tr>
<tr>
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<td>11</td>
<td>3</td>
<td>0.51</td>
<td>0.44</td>
</tr>
<tr>
<td><strong>External Funding:</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– The Global Fund Grant</td>
<td>0.04</td>
<td>0.03</td>
<td>4.86</td>
<td>5.09</td>
<td>3.26</td>
</tr>
<tr>
<td>– Kenan Institute Asia</td>
<td>0.01</td>
<td>0.01</td>
<td>0.14</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>– WHO</td>
<td>0.05</td>
<td>0.004</td>
<td>0.013</td>
<td>1.98</td>
<td>2.51</td>
</tr>
<tr>
<td>Total External funding</td>
<td>0.1</td>
<td>0.044</td>
<td>5.013</td>
<td>7.07</td>
<td>5.79</td>
</tr>
<tr>
<td><strong>Grand Total for Malaria Control Programme</strong></td>
<td>12.1</td>
<td>11.044</td>
<td>8.013</td>
<td>7.58</td>
<td>6.23</td>
</tr>
</tbody>
</table>

*BVBD, 2011

1US$=B34 (consider current exchange rate is 1US$=30B, Dec 2011)
As the VBDC and VBDU staffs are not yet integrated to the GHS, for them to gain access to the budgets at the district and subdistrict levels, the provincial and district levels need to strengthen negotiation and coordination skills for sound updated technical assistance.

**Recommendations**

(1) In line with the implementation of National Strategic Plan for Malaria Control and Elimination, it is recommended that the following should be developed:

- **Costed annual work plan** in collaboration with the PHOs and partners and in consultation with the Regional Inspector and ODPCs;
- **Advocacy plan** for the local administrative organizations and private sector (who need to be engaged in the implementation of malaria elimination);
- **Manual of Procedures** or Standard Operating Procedures for all the malaria control and elimination strategies;
- **Capacity building plan** based on the results of a national needs assessment; equip the different levels according to needs.

(2) A re-oriented core team should be maintained at the central level in line with the new central level function.

(3) A technical Working Group (TWG) should be established to support the national malaria control and elimination programme.

(4) New roles and responsibilities of the different levels of VBD in malaria elimination and within the integrated health services should be clarified, e.g. horizontal integration of VBDC and VBDU to PPHO and DPHO – entomology and vector control team might come under the Surveillance and Rapid Response Teams, while malaria clinics and malaria posts could work within or under the health centres where it could eventually be absorbed by the LAO/TAO.

(5) BVBD should maintain technical supervision for quality Assurance of services through the OPDC.

(6) BVBD should continue to augment technical, administrative and logistic support to operations in the provinces/districts where malaria remains high, especially in border areas, where malaria situation can be very volatile, such as areas within the artemisinin-resistant containment zone, until such time that capacity is established and malaria activities are incorporated within the local health plans.

(7) Epidemic Preparedness and Response (EPR) in pre-integration and integration areas should be supported with the following:

- Establishment of regional stockpile (drugs, insecticides and equipment);
- Identification of case management referral centres/hospitals;
- Maintenance of competencies thru inclusion of the relevant centres in the national microscopy QA scheme (in partnership or coordination with the Department of Medicine for the inclusion of hospital laboratories in the QA scheme).

(8) Mobilization and/or generation of resources from within the country should be continued to support malaria elimination activities in the border areas, including migrant population.

(9) Tapping into the border health initiatives, collaboration with international organizations covering migrant workers along the border areas should be enhanced.

(10) Criteria for evaluating pre-elimination and elimination provinces or provinces with no more reported indigenous malaria cases should be established.

(11) Incentives may be provided to PHOs/DHOs or LAOs who are able to support the establishment of structures and conduct vigilance activities needed to maintain disease-free status (indigenous cases). Likewise, recognition may be given to BVDC/BVDU staff who contributed in the elimination of malaria in those areas.

2.2 Malaria case management

Policies and strategies for case management of malaria were revised and updated over the past years. Case management policies and strategies in the country, except in the areas where artemisinin-resistance is prevalent, and where specific resistant-containment measures are being implemented, are outlined below.

**Diagnosis and treatment policy**

**Malaria diagnosis** is based on microscopy, supplemented by RDTs (specific for *P. falciparum and P. vivax*) – an RDT-based diagnosis is made available at peripheral malaria posts run by health workers, and in health facilities and institutions at times when microscopy is not available.

**Treatment:** The national first-line treatment for uncomplicated *P. falciparum* malaria is an ACT – A3+M2, artesunate in blister packs (12 mg/kg for 3 days) plus mefloquine loose tablets (25 mg/kg over 2 days) combined with a single dose of primaquine (30 mg adult). The second-line medicine is quinine tablets plus doxycycline for 7 days.
The first-line medicine for severe *P. falciparum* malaria is artesunate IV, followed by a complete course of the first-line ACT orally after per-os status is regained.

The first-line treatment for *P. vivax* malaria (uncomplicated) is chloroquine (25 mg base/kg) 3 days with primaquine 15 mg base daily for 15 days.

**Strategies for providing access to early diagnosis and prompt treatment**

Diagnosis and treatment is provided at all public sector health facilities and institutions in the country. Microscopy and RDTs are available at all district and general hospitals in the country, and at health centres (which have now been upgraded to health promotion hospitals). These services have been greatly enhanced by providing access to malaria diagnosis and treatment at the community level through malaria services as follows:

1. Malaria clinics (MC) maintained by the VBDU – there are 317 malaria clinics operating in the country since 2010, their distribution being based on the needs of each district. These are staffed by microscopists who diagnose and treat uncomplicated malaria, and maintain case records and submit them monthly to the VBDU.

2. Malaria Posts (MPs) maintained by the Provincial Health Office. Three hundred MPs were established, and maintained in the country since 2003 with support from the GFATM grant. Each is staffed by a trained village volunteer cum health worker. There are no facilities for microscopy at these Malaria Posts, and malaria diagnosis is made on the basis of RDT results. Diagnosis and treatment of uncomplicated malaria is delivered at these posts.

3. In highly endemic districts (some in Tak province) mobile clinics operate periodically to provide diagnosis and treatment services, particularly to remote areas, and to communities of migrant workers in industrial and agricultural estates.

Partner organizations and agencies play an extremely important role in providing diagnosis and treatment services particularly in western districts which border Myanmar where the malaria incidence is high, and a large proportion of cases are in migrant labor populations who move frequently across the border. In several temporary shelters in Tak province, international NGOs such as Aide Medicale Internationale (AMI); the Mae Tao Clinic; and the Shoklo Malaria Research Unit (SMRU), are the main providers of healthcare for malaria. SMRU also provides healthcare outside temporary shelters to a large proportion of migrant labor population moving frequently across the border to Thailand, and have also established some diagnosis and treatment points across the border in Myanmar.
Malaria case reporting (see also section on Data management and surveillance)

Malaria case data are being recorded at all points of diagnosis within the public sector. The system for case data reporting for malaria is, however, complex, and this relates to the administration and implementation of malaria control activities at the district level and below by at least two separate streams of the system – one being a vertical BVBD arm which maintains Malaria Clinics, and the other, a regional (provincial and district) health system which, in the context of health de-centralization, runs the Malaria Posts and receive information directly from them and all the public sector hospitals. The latter information is then transmitted up to the District and Provincial Health Offices, and onwards to the Bureau of Epidemiology. Malaria case data from the Malaria Clinics are being sent to the VBDUs and upwards to the BVBD, as well as to the District Health Office, and onwards to the Provincial Health Office, where all data from the district and province are consolidated and transmitted to the Bureau of Epidemiology. Consequently, there are at least two parallel lines of data reporting and surveillance from different sources, operating within the public sector health system. Although all data is available on request to the VBDUs at district level, the full data set on malaria at the district level is fragmented, and this does not support the optimal use of case data for planning disease control operations.

Quality of services and commodities

Routine quality control systems for microscopy are being sustained in both implementation arms of the malaria services – in PHO institutions based on internal quality control, cross-checking of microscope slides, and proficiency testing which operates under the supervision of the NMCP, and by the DMS in the health institutions (hospitals). Although the prescribed standard for blood films are thin and thick films, the BVBD system only prepares and examines thick blood films which are not prepared according to standards. On microscopy QC, BVBD aims for a 99% accuracy rate, and failures are given re-training. RDTs are also subjected to lot quality testing both on arrival of the shipment, and from lots derived from field sites in collaboration with the Pasteur Institute in Cambodia.

Regulation for antimalarial medicines has been rigorously enforced in the country in the past few years. ACTs are not widely available in pharmacies; nor are monotherapies available for sale in the private sector. Doxycycline can, however be purchased in the private sector for prophylaxis. Drug quality is being tested at 12 surveillance sites in the country, and the drug quality failure rate has been reduced from 2.5% in 2005 to around 0.5 – 1% in 2008 and 2009.

The national malaria treatment guidelines are being strictly enforced in peripheral units – Malaria Clinics and Malaria Posts. However, physicians, particularly at major hospitals in highly endemic areas tend to use their discretion when treating severe malaria, and they sometimes deviate from the national treatment policies – e.g. follow-on treatment with a course of oral ACT is not always practised in hospitals following parenteral artesunate therapy for severe malaria. Nor is the single dose of primaquine for
Inconsistencies in the use of primaquine relate to safety concerns over the risk of inducing haemolysis in patients with G6PD deficiency with primaquine, since G6PD testing is not routinely done even at hospitals. There is a lack of definitive knowledge on the prevalence of the G6PD trait, and on the risks involved in treatment with primaquine.

(a) Strengths

- Access to early diagnosis and prompt treatment has been vastly expanded in endemic regions of the country by the creation of service delivery units at the community level, malaria clinics and malaria posts - where services for malaria diagnosis and treatment are being provided free-of-charge. The coverage of diagnosis and treatment points for the population at risk of malaria is sufficiently high in most parts of the country, although at the Thai-Myanmar border districts even these expanded services together with the services offered by research groups (SMRU) and NGOs (Mae Tao Clinic) may not be adequate to deal with the high burden of malaria in the migrant population from Myanmar.

- Adequate stocks of medicines, RDTs and reagents and supplies for microscopy are being maintained under good storage conditions at the diagnosis and treatment facilities, including the malaria posts at remote areas.

- There is an existing system for timely stock replenishment and pull-push of expired drugs, RDTs and reagents.

- Case records are being maintained well at all points of diagnosis, and data is being transmitted through the established lines of reporting.

- A routine system for quality control of microscopy – both internal and external is functional. RDT lot testing is being carried out in collaboration with the Institut Pasteur, Cambodia.

(b) Issues, challenges and weaknesses

- There is evidence of a decreasing efficacy of the first-line ACT for uncomplicated malaria. In some parts of the country, ACPR- Adequate Clinical and Parasitological Response has dropped just below the threshold level (90%) at which WHO recommends changing treatment policy. This is largely attributable to a decreasing efficacy of mefloquine.

- Parasite clearance by the first-line medicine has also gradually been delayed over the past years. In Tak province, 15-25% of patients have been found to have persistent parasites on day 3 of treatment, which is an indication of a lowered efficacy of artesunate. Given that artemisinin-resistance is prevalent in Trat province bordering Cambodia, the worsening drug efficacy calls for a high degree of alert.
It has to be noted that TES in Thailand are carried out as part of the Mekong Malaria in vivo therapeutic Efficacy Study Network involving six Mekong countries (namely Cambodia, China, Lao People’s Democratic Republic of Korea, Myanmar, Thailand and Viet Nam) generating data and information on a standardized basis by using a similar research protocol coordinated by the WHO-Mekong Malaria Programme.\textsuperscript{14}

There are some discrepancies between treatment policies and clinical practices.

- Use of primaquine:
  - Although a single dose primaquine is adopted as policy in the treatment of uncomplicated \textit{P. falciparum} malaria, there is little evidence of the efficacy of the current dose (30 mg as opposed to the recommended 45 mg) and insufficient data on the prevalence of G6PD deficiency to deem this safe even as a single dose. Therefore, it is not being prescribed uniformly across the country – especially in areas where G6PD deficiency is thought to be high. Given the emergence and spread of artemisinin resistance in \textit{P. falciparum} in a restricted part of the country, it is critically important that infectivity suppressive measures are fully implemented. This calls for a review of the policy on single dose primaquine, with a view to rapid implementation.
  - Although 14 days of primaquine is adopted as policy for the prevention of relapses in \textit{P. vivax}, this too is often not practised on account of safety concerns. There is no routine G6PD testing in health facilities/hospitals in malarious areas.
  - Completion of the full course of oral ACT following successful IV treatment with artesunate for severe malaria is not being followed by clinicians in hospitals.
  - Collaboration between the national programme and public and private referral hospitals on updated treatment policies and guidelines is not optimal.

The national microscopy QA scheme which is being carried out under the supervision of the NMCP does not extend to hospital laboratories.

Although case recording is being carried out systematically and case reports are being routinely transmitted to the higher levels of the system, case data is not being very useful for strategic planning and implementation, due mainly to a complex system of data flow channels (see details in section on surveillance). VBDUs at the district or province level do not routinely get to see the full malaria picture in the district, because they get data directly from only their

\textsuperscript{14} WHO 2010:: Monitoring Resistance of \textit{P. falciparum} and \textit{P vivax} to Anti-malarial Drugs in the Greater Mekong Sub-region, Mandalay, Myanmar, 30 Sept-2 October 2009, SEA-MAL - 263
own Malaria Clinics. The rest of the malaria information from Malaria Posts and all health institutions which operate under the PHO/DHO system is not seen by the VBDUs unless they request it from the PHO at the provincial level. Malaria case data are, therefore, highly fragmented at the local level malaria, which makes it unavailable for sound epidemiological analysis, and precludes its use for evidence-based planning for malaria control operations at the local level. This presents one of the greatest limitations to current malaria control operations.

**Disease trends and impact of programme interventions in the past years**

**(a) Case incidence**

Nationally reported malaria cases have decreased steadily since the late 1980s and early 1990s when the total number of malaria cases were in the range of 270 000 – 340 000. In 2010, the total number of malaria cases was down to 22 969 (Table 2; Fig 2). This decline of malaria is attributable to enhanced malaria control activities over the years, including: (1) a change in treatment policies for *P. falciparum* to ACTs – initially in parts of the country and eventually countrywide; (2) the adoption and implementation to scale of ITNs and later, LLINs; (3) more recently, expanding health services for malaria using microscopy and rapid diagnostic tests to diagnose, and effective medicines to treat malaria at the community level through Malaria Clinics and Malaria Posts – an intervention which has enhanced the services of health centres and hospitals; (4) implementing behaviour change communication programmes and mobilizing endemic communities and (5) providing health services to migrant mobile communities who move across international borders in highly endemic border areas of the country, as a collaboration between the MoPH, NGOs and research partners.

*Figure 2. Reported malaria incidence and deaths in Thailand*
Table 2. Malaria statistics, Thailand 1965–2010

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of malaria cases</th>
<th>Proportion (%) of</th>
<th>Number of malaria deaths</th>
<th>Case fatality rate (%)</th>
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<tr>
<td></td>
<td></td>
<td>P. falciparum</td>
<td>P. vivax</td>
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<td>1965</td>
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### Year | Number of malaria cases | Proportion (%) of | Number of malaria deaths | Case fatality rate (%) |
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<td>40.93</td>
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**(b) Malaria deaths**

Nationally reported malaria deaths followed a similar pattern to the case incidence except that the decline in deaths began even earlier in the mid 1960s (Figure 2). The case fatality rate has been sustained below 2% for the past 15 years, and currently stands at 0.8%. This being affected solely by improved diagnosis, treatment and case management, and not by changes in transmission rates - the drop in the case fatality rate is entirely attributable to improved clinical and public health services for early treatment and appropriate case management.
(c) Species prevalence and trends

*P. falciparum* and *P. vivax* have both been prevalent as the major species of malaria parasites in the country with *P. falciparum* being the dominant species until the late 1990s. Since then however, as the malaria incidence continued to decrease even further, the *P. falciparum/P. vivax* ratio decreased, approaching 1 (Figure 3). In the past three years, the ratio has been reversed with the *P. vivax* incidence exceeding that of *P. falciparum*. This gradual dominance of *P. vivax* over *P. falciparum* is to be expected, given the intensified control measures which are being deployed, to all of which *P. falciparum* is generally more susceptible than *P. vivax*.
(d) Age sex-specific morbidity

Age incidence rates expressed in Figure 5 as the annual parasite incidence (per 1,000 population) have been and are still the highest in the 1-5 year age group and then steadily decrease as age increases. There has been little change in the relative age incidence rates in the different age groups over the past five years, indicating that the transmission dynamics have remained static over this period.

**Figure 5.** Age-specific annual parasite incidence, Thailand 2006 - 2010

(c) Spatial heterogeneity in malaria incidence and trends

**Figure 6.** Province-wise malaria incidence rates, 2010
Even in the highest endemic provinces and districts such as the Tak province, malaria incidence rates have decreased over the years, although the past three years have not seen a further and consistent decline in the incidence rates in these high burden areas despite continuing intervention coverage (Figure 7 A and B). Species-wise, the *P. falciparum* incidence has decreased somewhat even in the high burden provinces, but *P. vivax* remains a concern as shown by data from several sources. These unchanging transmission intensities in the past three years raise the possibility that more of the same current interventions may not have a further impact, and that newer and more appropriate strategies and tools may have to be deployed to address the residual high burden in these border provinces.

**Figure 7.** Monthly (A) and annual (B) malaria incidence, Tak Province, 2004-2009

(A)

![Graph A]

(B)

![Graph B]

(Source: Tak Provincial Health Office)
Population migration across these high endemic border provinces and districts, most of which are located at the western and southern international borders is a major factor sustaining high malaria endemicity. Mobile migrant populations in these areas have a much higher malaria incidence rates than settled migrants or Thai populations. Data show that migrant populations not only experience a higher incidence of malaria, but that when infected with \textit{P. falciparum}, they harbour gametocytes more frequently than Thai populations (Figure 7) – this being likely due to their infections being sustained over a longer period due to poorer access to health services. Data from the highly endemic western border districts show that transmission in and around domestic dwellings including in refugee camps which were formerly the seat of very high transmission rates, has been greatly reduced, and that the risk of acquiring malaria now lies largely in the adult male population – it being an occupational hazard among those who enter the forest or the forest fringe. These findings call for a greater investment in micro-epidemiological investigations as a basis for formulating innovative and more appropriate malaria control strategies to address the remaining but persistent burden of malaria.

\textit{Figure 8.} Malaria data from the Ban Mae La Thai Malaria Clinic 21 July – 18 August, 2011.

\begin{figure}
\centering
\includegraphics[width=\textwidth]{malaria_data}
\caption{Malaria data from the Ban Mae La Thai Malaria Clinic 21 July – 18 August, 2011.}
\end{figure}

\textit{(f) Conclusions and recommendations}

Thailand has achieved a steady and significant decrease in malaria cases and deaths throughout the country over the past 30 years, and with it, a reversal of the \textit{P. falciparum}/\textit{P. vivax} ratio. Whilst in most parts of the country, transmission rates have been reduced to extremely low levels or have been interrupted, several western border districts and a few in the southern and southeastern parts of the country which experience major population movement across international borders still experience high transmission rates. The residual burden of malaria in Thailand is and will continue to be increasingly due to \textit{P. vivax} malaria. These features call for a review of strategies and tools being used for malaria control taking into consideration that mobile migrant populations
constitute the largest reservoir of malaria in the high burden areas and that \textit{P. vivax} malaria is generally less susceptible to any of the control measures as currently applied against \textit{P. falciparum}. It would also require greater attention to be paid to vivax-specific control strategies. Research to bridge the knowledge gaps in the control of \textit{P. vivax} malaria, and improving the safe use of primaquine against \textit{P. vivax} relapses should be a priority.

In high burden western border districts, the risk of malaria lies mainly at the forest fringe and in those exposed to such areas by virtue of their occupation or other behaviour. Increasingly, the malaria burden and the infectious reservoir will reside in mobile migrant communities, which move frequently across borders. Therefore, targeted strategies to tackle forest-malaria for which most current vector control interventions are not very effective, should be made a priority. These would include: a) better profiling of high risk populations and their behaviour patterns in order to sharply target interventions and b) more research on effective personal protection measures, BCC methods and their effective use.

In order to tackle the residual burden of malaria, these observations call for malaria control strategies to be targeted and focused on malaria in migrant populations and formulation of implementation plans on the basis of real-time local data at the level of operations, rather than on generic plans for blanket coverage with standard interventions and strategies disregarding local realities, which would lead to little, if any, further impact.

\textbf{Recommendations}

1. The policy on microscopic diagnosis should be implemented by ensuring that both thin and thick films are prepared rather than only thick films and used for microscopy.

2. Existing anomalies between treatment policy and practice should be rectified by
   - ensuring that medical practitioners at all levels, particularly in hospitals, are updated on national treatment policies, and are included in the ongoing dialogue of treatment policy review and update;
   - addressing some of the critical gaps in knowledge to optimize the use of primaquine for preventing \textit{P. vivax} relapses and blocking transmission of \textit{P. falciparum} through operational research.

3. Current medicines and treatment policies should be revised for
   a. Uncomplicated \textit{P. falciparum} malaria:
      - Adoption of a second generation ACT instead of the current first line artesunate+mefloquine and adoption of artesunate plus doxycycline for seven days instead of the current second line quinine plus doxycycline on the basis of the efficacy and better tolerability of artesunate over quinine.
• The policy of single dose primaquine as an infectivity blocking intervention should be implemented across the country and evidence for the efficacy of the current 30 mg single dose of primaquine for reducing infectivity of *P. falciparum* has to be further investigated.

- *P. vivax* malaria – the practice of 14-day primaquine regimen for the prevention of relapses should be facilitated by providing greater access to G6PD testing and providing guidance on the risk patterns in communities through better profiling the risk of haemolysis in local populations, and a diagnosis and treatment strategy be formulated to improve the safe use of primaquine.

(4) Malaria control operations currently being implemented within multiple tracts and lines of command should be integrated into a single channel and consolidated, such that the Provincial and district health offices implement malaria control, but VBDC provides policy guidance and strategic direction, and technical advice and assistance on planning, human resource capacity strengthening for malaria control.

(5) The current data reporting system, which operates in two parallel tracks, needs to be integrated into a single channel of data flow, with case data being equally accessible to both the vertical VBD arm and the HMIS line of the BOE in real time. It would be critically important for strategic planning of malaria control that the vertical BVBD system has full and uninterrupted access to malaria case data in real-time down to the village and even household level.

(6) The web-based BIOPHICs system of malaria data management, which is under development in collaboration with the Faculty of Tropical Medicine, Mahidol University promises to deliver an effective database which is accessible for planning. It needs to take into consideration the dual if not triple systems under which current malaria control operations are taking place – the BVBD system, and the provincial and district health system, and ensure that all case data are integrated into a single national database. It should also strike a compromise in the level of sophistication of the database, between capturing malaria case information which are needed for epidemiological analysis and strategic planning, and avoiding a level of complexity which would make the system difficult to operate for local planning.

### 2.3 Vector control and entomology

**Current policies and strategies**

Following excellent achievements in recent years in reducing malaria incidence rates in Thailand, the national malaria control programme is now in transition from its previous national strategic plan (2006-2011) to a new strategic plan for 2011/2 to 2016. The major change is that the new strategy more fully enters into an elimination approach, and sets as one of its three targets that the percentage of districts achieving interruption of malaria transmission (no indigenous cases of malaria for three years) should increase to 60% by
2016 and 80% by 2020. This will require achieving interruption of transmission in a further 121 districts by 2016 (555/925) compared to 2009 (434/925). As well as requiring intensive efforts to sustain and improve monitoring, evaluation and surveillance systems to measure progress, this shift will require intensification of vector control.

The current vector control strategy is to achieve a coverage of 1 net per 2 people in A1 and A2 areas through treating nets purchased by users from the private sector or providing long-lasting insecticidal nets (LLINs) and long lasting insecticidal hammock nets (LLIHN). There is a plan to phase out indoor residual spraying (IRS) over the next five years. IRS is currently done in A1 areas twice per year and A2 once per year using pyrethroid insecticides (deltamethrin 5% WP 20 mg ai/ m²). IRS as part of the response to malaria foci may continue. Environmental management and use of larvivorous fish are promoted, and repellents are recommended for people involved in outdoor activities at night time.

For reference of stratification areas is shown below in Box 1.

**Box 1: Stratification of malaria transmission risk in Thailand**

A - Control area with transmission:

A1 - perennial transmission area (transmission reported for at least 6 months per year).

A2 - periodic transmission area; transmission reported but for less than 6 months per year

B - Elimination area without transmission:

B1 - high and moderate receptivity (transmission not reported within the last 3 years but primary and secondary vectors present).

B2 - low and no receptivity (transmission not reported within the last 3 years and primary and secondary vectors absent, suspected vector may be present).

| Table 3. Population at risk and population targeted for vector control activities (2006-2010) are shown in this table provided by BVBD |
| --- | --- | --- | --- | --- | --- | --- |
| Year | A1 (Persons) | A2 (Persons) | Total risk (Persons) | Spray protection (persons) | ITN protection (persons) | BMGF ITN protection (persons) | GF LLIN protection (persons) |
| 2010 | 399375 | 1 747 818 | 2 147 193 | 780 858 | 170 744 | 1 188 883 | 437 837 |
| 2009 | 422 705 | 1 881 909 | 2 304 614 | 656 596 | 202 438 | 946 114 | 347 746 |
| 2008 | 380 223 | 1 975 196 | 2 355 419 | 712 220 | 278 728 | 334 191 | 102 597 |
| 2007 | 380 645 | 1 985 737 | 2 366 382 | 657 023 | 129 311 |
| 2006 | 415 753 | 2 054 502 | 2 470 255 | 851 922 | 556 683 |
As part of the new strategic plan, the recently approved GFATM round 10 grant will change the target for LLIN coverage in 22 provinces targeted for artemisinin resistance containment (10 provinces bordering Myanmar, seven bordering Cambodia and five with high malaria risk and migrant populations – M1 and unrecorded M2 migrants). In A1 and A2 villages of these provinces, LLIN coverage for residents, migrants and the military will be increased to one LLIN per person, in accordance with recommendations by the artemisinin resistance containment International Task Force.

**Review findings: programme strengths, achievements, issues and challenges**

**Evidence base for vector control approaches**

Data on efficacy and effectiveness of ITNs in Southeast Asia were limited, but published studies indicated some degree of protection. On the basis of the data available, the promotion of regular use of ITNs (LLINs, LLIHNs) is appropriate, and efforts to ensure high coverage of those at risk should continue. Data on efficacy of indoor residual spraying were very old, and there was no recent evidence. Of the two primary vectors, *Anopheles dirus*. tends to bite outside the house, often within forests, and has never been considered a good target for IRS. Some older studies by Ismail and Cullen suggested that *Anopheles minimus*. has changed its behaviours from being endophilic to exophilic (either through replacement of one sibling species with another or through selection of a mutation in a single species), thus becoming less amenable to control by indoor residual spraying. The strategy to limit the use of IRS, therefore, seemed appropriate. Its role in response to active malaria foci may still be acceptable as part of an aggressive effort to eliminate malaria, but it would be worthwhile valuable to undertake more vector surveillance in these areas to determine which vector is responsible.

Some community advice, for instance to clear vegetation in streams and release of fish, did not have evidence to support the investment of time. These did not appear to be major elements of the strategy. During the visit to Tak Province, it was observed that at the district level, budget was allocated to vector control selection of approaches to vector control sometimes including fogging, although this was also for dengue control was made locally. Selection of spraying equipment and insecticide seemed sometimes to be determined on the advice of visiting sales representatives, and it was not clear where the staff at that level could obtain advice.

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Unfortunately, it was highly challenging to obtain further evidence of the effectiveness of the various interventions in an implementation setting, and was becoming more so, as malaria incidence declined and vector density became low. Members of BVBD had undertaken some efficacy studies based on measuring effects of insecticides on mosquitoes, but they had not developed studies assessing epidemiological impact. Some vector research has also been undertaken by Mahidol and Kasetsart Universities and AFRIMS (Armed Forces Research Institute of Medical Sciences).

It was difficult to obtain information on the extent of efforts in vector surveillance, as much data were apparently collected at DCP level and by VBDC, but since around 2004 until this year, there was no requirement for DCP to report process and results to BVBD, and BVBD had not requested it from the DCPs. This year, a database for vector data was set up and some information was received. It was entered online by DCP offices. This would be a great improvement, but there was a major gap in information over the past years. Although it had limited data in it yet, the database would be a key tool for the programme. It would be important to consider how it might be integrated or not in the new national malaria database.

**Vector control implementation**

**Data for planning, monitoring and evaluation**

Entomological data were a critical part of the planning process according to the programme guidelines, which suggested that all villages were classified annually as A1, A2, B1, B2, and the criteria for B1 and B2 included the presence or absence of primary, secondary or suspected vectors. It was difficult to determine during the review if the entomological data were actually used for planning. On the field visit in Tak Province, no vector control staff was available except the officer in charge in the VBDC in Mae Sot. He was able to provide some summary data on recent vector surveillance, but not detailed data, as the person who maintained it was in the field. However, monthly mosquito collection data from Tak were provided for January to September 2009 showing single specimens of *A. dirus* in January and August and more *A. minimus* and secondary vectors in most months. Similar data were presented for 2010 and 2011. Such information is highly valuable for indicating the receptivity of the areas to transmission. Without seeing more evidence from other provinces that mosquito collections are taking place according to guidelines, it was not possible to assess the completeness of the data. Full information is not collected and summarized at central level yet, but there were signs that it could now be using the new database. For instance, data on *Anopheles* density showed collections of *A. dirus*, *A. minimus* and *A. maculatus* (the three main vectors) in 10 provinces in 2011 with the highest density being *A. dirus* outdoors in Phuket.

Assessment of coverage of interventions had until recently relied mainly on the routine activity reports of net distribution and IRS activities. However, in early 2012, Thailand would undertake a household survey assessing ownership and use of LLINs, ITNs, LLIHNs and history of IRS. Collection of such population based data was an important advance, as it provided independent evidence of programme implementation.
**LLINs and other mosquito nets**

The net distribution system appeared well designed and implemented with annual distributions based on village stratification, pre-distribution census and some post-distribution assessment. This system provided frequent if not quite continuous access to those most in need. People could also obtain nets (and in Tak also hammock nets) readily from commercial outlets, but these appeared to provide untreated nets but not long-lasting nets nor insecticide retreatment kits, which was a missed opportunity.

Careful strategy development, planning and monitoring were needed for maintaining high coverage and reaching the highest risk groups. Further investigation was needed of access to LLINs by remote populations as well as by mobile and migrant populations and high risk occupations, such as military and border police.

**Indoor residual spraying (IRS)**

Thailand had a long history of managing IRS, and therefore had the systems and expertise to undertake it effectively. The review team did not have the opportunity to observe any IRS during the field visit. Apart from the lack of evidence of effectiveness of IRS in this region, the only concern was with the use of pyrethroids for both IRS and ITNs, as discussed in the next section.

**Insecticide resistance management**

Pyrethroid resistance in Africa was reported with increasing frequency, and indicated a major threat to global malaria control and elimination. Recently, WHO had made a recommendation that where IRS and LLINs/ITNs were used in the same areas, different classes of insecticide should be used in order to limit selection pressure for insecticide resistance. As pyrethroids were the only insecticides currently recommended for nets, another class (carbamate or organophosphate) should be considered for IRS. Thailand was currently not following this recommendation, and had some understandable reasons for doing which are listed as follows:

1. There was no evidence of pyrethroid resistance from tests done to date.
2. People were not familiar with use of non-pyrethroids (in the past DDT was used for many years, and in some areas malathion and fenitrothion, but this was several years ago). Now DDT was banned. Malathion was not popular because of the smell, and fenitrothion had higher requirements for safety precautions.
3. Changes in socioeconomic status and housing raised issues of acceptability.

Through many years of insecticide resistance monitoring, pyrethroid resistance was not detected in the major vectors, but limited recent data were available at the central level. In the data that now had been added to the database for 2011, *A. minimus* was found to be susceptible to several pyrethroids and a carbamate, but seemed to show resistance to the pyrethroid cypermethrin, which should urgently be investigated further.
Tests of *A. maculatus* in Tak and *A. minimus* in Kanchanaburi and Chieng Mai showed full susceptibility to pyrethroids. High agricultural and household pesticide use of pyrethroids could contribute to selection pressure. Planning to prevent resistance was not evident, but the issue of what alternative to use for IRS might resolve itself, if IRS was phased out.

Through collaboration with other departments, BVBD ensured that there was a good system of quality testing of insecticides and insecticide treated materials. 23, 29 and 11 treated nets were tested for efficacy in 2009, 2010 and January to August 2011 respectively, and some bifenthrin was found not to be working. This work was done by the Chemical Control Section, National Institute of Health, Department of Medical Sciences. The Food and Drug Administration was responsible for registration of public health pesticides in Thailand.

**Health systems issues for vector control**

Thailand still had a strong workforce of trained entomologists, which was an important resource which many countries lacked. It would be important to ensure that this capacity maintained at different levels of the system, as it would be very important for elimination activities. Vector control and entomology expertise was especially challenging to incorporate into an integrated system, as the skills were very specialized. With the declining burden of malaria and continued importance of other vector borne diseases, the focus on malaria entomology and the human resources and budget had declined.

The integration of malaria control with other vector borne disease control could, however, be an opportunity, if managed well, to maintain a critical mass of entomological capacity.

Entomological surveillance data had not been made available nor collated at the central level for several years until last year. It was unclear how effective technical oversight of local level plans was done at the central level without data. Regular oversight of entomological and vector control work at VBDC and VBDU by the central level should be encouraged. Decentralization allowed for prompt local action based on local information, but at sub-district local administration level, there appeared to be a lack of access to good technical advice for budget allocation with the risk of ineffective vector control. It was noted during the visit to Tak that the Local Authority Organisation level was active in supporting vector control and there was considerable evidence of local initiative, which was very impressive. However, good guidance from the programme was required at that level.

**Personal protection for mobile, migrant and remote/hard to reach populations**

A very high proportion of malaria transmission in Thailand was not at home, but among populations sleeping or working outdoors at night time. There were limited means of protection for these people, and they would be a major obstacle to both containment of artemisinin resistance and elimination of malaria, unless all means were used to provide them personal protection. The focus of effort on the more stable populations even in refugee camps was missing the main need.
Whilst it appeared from the monitoring systems in the refugee camps on the Thai-
Myanmar border that local transmission in the camps was very limited, the provision of
LLINs through that channel by the local NGOs was likely to serve a useful purpose both in
promoting the habit of using LLINs by people who might move to areas of higher risk later
and by making LLINs available to people who might spend some time visiting higher risk
areas.

The role of managers of migrant labourers in providing advice and protection
methods to their workers could be further developed. It appears that some already did
take on this role, and opportunities could be sought to encourage it further if the
managers promoted access to appropriate LLINs and LLIHNs or repellents.

Some research was underway on the use of repellents by people involved in night
time activities outdoors, and it would be important to disseminate the results, and build
on them. Whilst use of repellents in many circumstances was assumed not to be cost-
effective, it might be critical in this environment to protect those most at risk.

As well as protection of mobile and migrant populations, the importance of ensuring
protection of very remote populations in Western Thailand, including ethnic minority
groups, who may have less contact with mainstream public services should be
emphasized.

**Recommendations**

(1) Strategies

- Further focus on innovative personal protection for migrants and hard-to-
reach populations will be a critical component of the next phase in malaria elimination.

- Achievement and maintenance of high LLIN/LLIH coverage and use in
areas of transmission risk should be the main priority for vector control,
as the programme aims at malaria elimination;

- Criteria for withdrawing vector control measures need to be developed as
and when transmission is interrupted;

- Interaction and dialogue with the commercial sector should be
undertaken to explore opportunities for a shift in the market from
untreated nets to long lasting insecticidal nets and LLIHNs;

- Alternatives to pyrethroids should be considered for IRS, including new
longer lasting formulations of organophosphates;

- A pragmatic integrated vector management approach should be further
developed with the following objectives:

  (i) to maintain multi-disease vector control capacity; (ii) to ensure rational
  use of insecticides; (iii) to clearly define roles for vector control personnel
  integrated into the health service delivery systems (PHO, DHO etc.);
  (iv) to improve accountability in a decentralized system; (v) to enable
managers at different levels to track whether targets for vector surveillance are being met; (vi) to develop strong field entomology, capacity for all vector-borne diseases among newer entomologists; and eventually (vii) to improve the evidence base for strategy and monitoring.

(2) Evidence-based vector control
- An extensive review of vector mapping is needed as a starting point for the elimination strategy which has human resource implications; options for collaboration with relevant research institutions and NGOs should be explored;
- Entomological data need to be made available by DCP offices to the central level, so that full reports could be prepared and used for planning and strategy development.
- More focal investigations will be important to contribute to a better understanding of areas of transmission risk.
- Further attempts to evaluate efficacy and effectiveness of recommended vector control strategies should be made, bearing in mind the significant methodological challenges.

(3) Human resources
- There needs to be more accountability, so that managers at different levels track whether targets for vector surveillance are being met.
- It is important that the old strengths and skills of the Thai programme in entomological surveillance are transferred to a new generation.

3. Surveillance system and artemisinin resistance containment activities in eastern provinces bording Cambodia as part of malaria control activities in Thailand

Background

The artemisinin resistant containment project started in January 2009 in Cambodia (ten provinces) and Thailand (seven provinces). The seven provinces bordering Cambodia were included in the bi-country project with a total resident population of 7.6 million (mid-year 2008) and an estimated number of mobile people (5%) of around 350 000. Intensive containment towards elimination of artemisinin resistant strains strategies were designed\textsuperscript{17} according to the documented \textit{P. falciparum} resistance status to artemisinins and ACTs with particular attention and effort in zone one (so-called tier one according to GPARC)\textsuperscript{18} experiencing the worst situation (in three districts) while less aggressive containment interventions were to be performed in zone (tier) two. Project objectives,


\textsuperscript{18} World Health Organization (WHO) Global Plan for Artemisinin Resistance Containment. http://www.malaria.who.int
interventions, milestones, indicators and targets by tier were described in the document so-called “Strategy for the containment of artemisinin tolerant malaria parasites in South-East Asia (ARCE)”\textsuperscript{19}. It should be noted that containment interventions were designed on top of routine control interventions managed by MoPH/BVBD taking into account the extra support provided by the GFATM R7 (from 2008) enabling the most vulnerable population to access free of charge BVBD-managed malaria services countrywide\textsuperscript{20}.

One out of the four teams of external reviewers was in a position to review activities performed and progress made in selected districts and provinces situated in containment tiers 1 and 2. Generally speaking, as per reports from BVBD, the containment project was instrumental in strengthening existing human resources (HR) skills of additional staff in the two tiers with all malaria clinics under their line of command. They also allowed general health care services to be fully staffed and equipped to adequately perform they planned tasks with defined terms of reference and Standard Operating Procedures (SOPs). To ensure proper management of data and information, data managers have been posted in six provinces and in all targeted districts (#27). At least two staff each were posted in all malaria posts and clinics and Khmer-Thai / Thai-Khmer translators made available in key locations around borders to enhance communication. Extra equipment such as microscopes, motorcycles and pick-ups were procured to fully support the above activities. Malaria clinics and posts backed up respectively by VBDCs and VBDUs and health care facilities contributed to perform the following interventions: (a) to ensure follow-up of all confirmed individual \textit{P. falciparum} cases under treatment (Atovaquone-proguanil -Malarone- and A3+M2) at least seven times until day 28;(b) to ensure index case investigation of each positive case to detect and treat secondary cases if any; (c) to strengthen the malaria surveillance system towards the set up of a \textit{real time} web-based alert and response mechanism; (d) to reach to and make mobile workers and migrants (so-called M2 staying less than 6-month in Thailand) easily access free services delivered by either the BVBD-driven malaria service network or private company owners willing to collaborate with BVBD; and (e) to perform Cam-Thai harmonized IEC/ BCC activities (malaria posts).

The team visited and controlled senior and junior staff working in the following locations

- ODPC3 Chon Buri, PHO Trat; VBDC 3.4, VBDU 3.4.6 in Koh Chang;
- hotel business owner in Koh Chang including workers (Thai and non-Thai);
- seafood processing factory owner including migrant workers (M1) hired;
- staff at border check point in Had Lek (VBDC 3.4);
- plantation owners and rubber tappers (mainly from Mon state) in one plantation in Borai;
- temporary check point (in Soi Dao) in charge of screening temporary migrants;

\textsuperscript{20} Partnership towards malaria reduction in migrants and conflict-affected populations in Thailand, July 2007 www.theglobalfund.org/.../rounds/7/.../7THAH_1...
- focal screening malaria mobile clinic (FSMC) located at marine base including discussions with staff and marines regarding malaria activities along border in connection with VBDU 3.5.7;
- Soi Dao fruit/corn/cassava plantation;
- migrant community and camps;
- immigration officers;
- surveillance system managed by BIOPHICS; and
- IT / field staff (re: data collection) in selected VBDUs.

**Impact of the containment activities**

From data and information presented by the Office of Disease Prevention and Control (ODPC) 3 in Chon Buri and by the Provincial Health Office (PHO) in Trat (jointly with VBDC 3.4), a drastic decline of confirmed malaria cases (all species but especially falciparum infections) was noticed during the last five years (1103 malaria cases in 2006 to 215 in 2010). Surprisingly, data from 2011 (at least January to June) were not presented either at the regional or the provincial level. In the containment zone, the proportion of vivax infections among declining malaria cases was increasing to fluctuate between 80 and 90% (countrywide is around 60%) which was considered as a reasonably good impact indicator of a successful malaria control programme towards pre-elimination targets, since the current available techniques^{21} *P. falciparum* elimination was more feasible than *P. vivax*. The proportion of mixed infections somewhere stated as high and justifying then the use of ACT should be carefully monitored.

![Figure 9. Total confirmed malaria cases in containment zones 1 and 2 by fiscal year (from 2008)](image)

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^{21} WHO Informal consultation on malaria elimination: setting up the WHO agenda, Tunis, 25-26 February 2006
http://www.malaria.who.int
The overall API in Trat is low in 2010 but is around three times higher in non-Thai long-term residents M1 (1.83) than Thai residents (0.5). In Trat province, there is only one village (A1) where perennial transmission is documented out of a total of 261 villages. In 2010, the highest APIs were noted in Koh Kood, Borai and Koh Chang districts.

No malaria death was recorded in Trat province since 2006 as per hospital-generated data. It has to be noted that the MoPH/DDC/VBDC is not directly involved in death quality audit and so not in a position to monitor how the final diagnosis of deaths attributed to malaria is made by physicians and further cross-checked with clinicians and laboratory specialists. Severe malaria cases are not officially reported as part of the MoPH/VBVD surveillance system. There are different reporting lines, (see also section on case management) channels and databases, somewhere duplicating and inconsistent since they are generated by/from different sources (e.g. from DDC – BVBD – VBDCs – VBDUs - malaria clinics and independent PS/hospitals – health care facilities – malaria posts reporting channels, Bureau of Epidemiology, the Ministry of Interior data and National Statistics Office and NGOs).

In addition to the above general observations, findings from the External Review team were as follows:

- The proportion of Pf infected patients treated with A3+M2 and still positive at day3 was 25% in 2011 with an initial target of 5% or less. Those data need further in-depth analysis case by case. However, those preliminary observations when coupled with an increasing therapeutic efficacy failure rate of A3+M2 (ACPR <90%) showed that the few remaining falciparum parasites are the less susceptible strains to ACT. Those day3 positive trends were suggested by participants in the 1st ITF meeting in Phnom Penh in 2009 and later on supported by mathematical models.

- API of 1.74 was noticed in zone 1 against less than 0.2 expected. Those figures need to be checked.

- 55% of falciparum infections in zone1 were treated with Atovaquone-Proguanil (AP). It was not clear to the ER team to which extent all Pf patients under AP were actually treated on DOT.

- Malaria case detection rate in M2 (highly mobile population) was 4.37. How was it calculated? With a very small and fluctuating denominator for M2, the API had to be analyzed with caution, since those denominators which were captured by VBDUs staff through annual surveys (in June each year) were hugely fluctuating and depending on the highly variable number of seasonal workers (M2) year by year. It was suggested to use the resident population only as denominator rather than the resident and mobile population number to assess trends and set targets with API.

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22 Reference is made to the 1st ITF report available on request.
23 Maude RJ et al. The last man standing is the most resistant: eliminating artemisinin-resistant malaria in Cambodia. *Malaria J* 2009, 8:31
Current FY 2011 data were surprisingly missing and staff unable to provide such missing information at short notice.

All three VBDUs visited were fully equipped with dedicated staff to perform containment activities. All malaria cases were reported on extremely detailed sheets (but some cells are not filled in), manually mapped and computerized with BIOPHICS’ assistance (see section on surveillance). Different papers (EPI forms 1 to 7) and to some extent maps on the wall were still in use with discrepancies noted between computerized data and reports and figures on paper. There was no system in place to cross check data (completeness and accuracy) and consolidate reports.

From June 2011, all falciparum cases were managed with AP in Trat and Chantaburi provinces (in addition to the first three districts in zone1 from August 2009).

**Hotel resort and migrants**

The team met a 5-star hotel owner in Koh Chang island and discussed with Thai and non-Thai staff working in the hotel about malaria. The hotel owner was cooperating with VBDC staff to control vector-borne diseases such as malaria and dengue. For example, fogging operations took place every two weeks in the compound. Ground staff were long-standing employees with work permit in Koh Chang speaking Thai and aware of malaria.

**Fisheries and migrants**

The team visited the owner of a fishery with more than 20 non-Thai workers with work-permits. The fishery owner was collaborating with VBDC staff to control vector-borne diseases (e.g. malaria) and keep workers aware of basic malaria control activities and enable them to access basic health services.

**Temporary and permanent customs and migrants**

The team met with a customs official (previously working in VBDC) screening cross border people (2000 per day) for health in general. It was not clear to the team what the customs health official in charge was exactly doing at this particular border to screen people for malaria.

**Private owners and migrants (FSMC)**

The team visited outreach malaria services managed by VBDC close to the border where temporary (seasonal) Cambodian workers could be screened freely for malaria. Screening operations supported by a Khmer-Thai translator seemed to be well organized with a long queue of migrant workers accessing IEC materials in their language, awaiting for blood smear to be taken and results to be given.
(a) Strengths

Main positive findings to further build on containment activities

- Full and effective coverage of control and containment operations in zone 1 (3 districts) was leading to significant malaria incidence reduction in 2011 (almost zero Pf case in tier 1), mostly vivax infections noted among recorded cases;
- Implementation of containment interventions was less effective in zone 2 but there was as well a substantial decline of confirmed cases with an increasing proportion (>80%) of vivax infections (See Fig 9 above);
- An increasing engagement of the private sector was noticed together with malaria and PHO staff to improve screening and access of malaria services by recorded long-term and seasonal migrant workers;
- Articulated IEC/BCC messages in Khmer and Thai were produced and displayed. Thai-Khmer translators had been hired;
- Effective collaboration with custom officers and soldiers was in place;
- There was increasing collaboration at the provincial level between all sectors during the containment project. Regular meetings took place with private owners (fisheries, rubber, orchid plantations, etc.) in order to engage them in the protection of seasonal and long term migrant workers. “Malaria information corners” similar to “tuberculosis corners” were set up in several factories, LLINs were made available and information on diagnosis and treatment provided. This was good practice to be further scaled up bearing in mind that yet many migrant workers were unofficially employed and so, not officially recorded and so not in a position to access basic health services.
- Huge amount of data and information was generated and computerized especially from zone 1.

(b) Weaknesses

Main negative findings to be addressed containment

- A lot of detailed data/information were still spread in many papers, which were not properly managed, consolidated or used to guide activities;
- Computerized data were not fully used for action and reporting at peripheral and PHO levels;
- Discrepancies were noticed between data and information expected to be consolidated at BVDU, BVDC and PHO levels leading to persistent confused information (too much depending on sources);
- Mapping of malaria transmission clusters was missing;
- The performance of index case investigations and procedures was questionable;
The strategy to reach M2 and for M2 reaching malaria services was still problematic,

Supervision and monitoring mechanisms from VBDC to VBDU (and other entities) and feed back from VBDC to VBDU were unclear;

Collaborative mechanisms (and stream line official guidance) between general health services and vertical malaria services (e.g. to provide malaria services and consolidate information for action) were made on an “ad hoc” basis or non existent,

Insufficient follow-up (DOT) of patients treated by AP (Malarone) was noted in Chanthaburi and Trat provinces.

General observations: surveillance, control and containment operations

National health data for the MoPH were computerized, analyzed and reported by the Bureau of Epidemiology (BoE) which operated under the Department of Diseases Control (DDC);

Hospital / health care facility data were sent to the Permanent Secretary (PS) office and managed by the BoE under the DDC;

(Vertical) Malaria data generated by VBDUs / VBDCs were jointly managed by the ODPC / PHO and VBDC. ODPC data were sent to the BoE and VBDC data to BVBD under DDC;

NGOs operating in camps or outside camps reported to either SMRU or/and to CCSDPT or did not report at all;

(unrecorded) Migrants and M2 in general were not part of the routine recording system;

There were several web-based reporting systems which were somewhere duplicated;

A lot of data (e.g. confirmed cases) were generated from passive and active detection systems from the most peripheral levels almost covering the whole country. However, data generated from Active Detection Investigations were not part (or this is not clear to the review team) of routine data management by the BoE;

Malaria data were still generally paper- and map paper-based and transmitted to the above level to be further analysed and consolidated and eventually transmitted to BVBD/BoE. If a large and interesting detailed amount of data was generated on a daily basis by dedicated field teams, they did not seem to be properly analysed at VBDU, VBDC and POH Levels to provide the requested information to fine-tune and guide strategic operations at the most peripheral level and to provide strategic aggregated information / direction at the national level.

24 The Malaria Programme – (BVBD) - has decided to treat all Pf infected patients in all districts of Chantaburi and Trat by AP from June 2011.
The above official routine reporting lines led to persistent inconsistencies in data management in general and in consolidating provincial, regional and national malaria data and subsequently in overall reporting. Such national data register was ultimately requested as part of any National Malaria Elimination Programme.

**Recommendations:**

It should to be noted that most findings from the external review carried out in 2011 were quite similar to those highlighted during the previous programmatic review in 1995 and as part of GFR7 assessment mission, namely, on surveillance and information systems, border areas, private sector engagement and BCC). It may be concluded that the national programme (BVBD) in those areas has made limited progress to improve the situation. The following steps may be taken:

1. Streamlining information: exploring ways to set up single line computerized reporting mechanisms accurately consolidating peripheral malaria information from different sources was a must. Such mechanisms could be set up alongside other diseases of public health importance and/or alert and response systems,

2. Using user-friendly modern technologies to provide accurate real-time information for action should be explored. Web-based systems as modern and fast techniques might contribute to consolidate a set of (standardized) data and information at regional and national levels, whatever sources of information. Malaria elimination required the set up of an accurate real-time national database. Web-based technology might help to consolidate a single recording system;

3. Empowering peripheral staff in basic data management in important. The capacity of local staff from PHO to health care facilities/VBDC and VBDU to critically analyze/display their locally generated information (capacity building, supervision, monitoring) with strong articulation and real-time connectivity with central IT services should be strengthened;

4. Exploring locally-driven methods through volunteers/health workers to monitor access by the most at risk population to malaria services and ITN/LLIN coverage and needs;

5. Engaging epidemiologists and/or students in epidemiology/public health to look at data (with field staff) and available basic information as a means to improve data management for action and to increase the interest of young generations in public health;

6. Strengthening existing mechanisms and partners’ effort to engage other sectors besides than health at peripheral (private industries and farms) and national level (strategy and policy) was a must, especially to improve migrant health in general and setting up sustainable alternative financial mechanisms to make malaria services available and free of charge to non-Thai migrant worker citizens. This was hugely debated across sectors and highly sensitive.
Annex 1


Summary of 1995 External Review

The 1995 Thai-External Review was based on a documents review, discussions, observations and analysis of the Malaria Control Programme (MCP) of Thailand. Strengths, weakness and opportunities were identified in the following areas: (1) programme management and policies, (2) purpose and use of epidemiological information, (3) disease management (diagnosis and treatment and drug resistance), (4) vector control (phase out spraying/DDT, introduce insecticide impregnated nets), (5) health education and training, (6) operational/applied research and (7) financing.

Significant programme achievements were made in the last three decades, with 93% of the population now living in non-malarious areas. The main problems hampering control efforts include drug resistance, in-country migration for economic reasons, isolation of the programme from other disease control programmes within DCC and from the general health services in the provinces, inequitable resource allocation, and cross-border population movement. Specifically under programme management, closer collaboration with the GHS, the private sector and NGOs that deliver health services was needed.

The following priority policy recommendations from the external review panel underline the changes and improvements that had to be made in 1995:

(1) The NMCP should shift emphasis from detection of infection to disease management in order to prevent severe illness and death. The goal should be the availability of continuous, affordable, culturally, acceptable services providing an immediate diagnosis and effective treatment to populations at risk.

(2) The dipstick diagnostic method should be considered for introduction into specified sectors of the health system, especially in remote areas and in the general health services.

(3) Residual house spraying for vector control should be replaced rapidly in high risk areas with insecticide impregnated mosquito nets (ITN). MCP should accelerate the use of ITN and determine the most effective operational strategies for attaining maximal coverage.
(4) Malaria disease management should be incorporated into the basic curative function of the GHS. In transmission areas with inadequate coverage by the general health services, malaria clinics should continue to be deployed.

(5) The Malaria Control Programme must work with the private sector, as well as NGOs, for disease management and information flow as well as some aspects of disease prevention and health promotion.

(6) Information systems should be improved to become more comprehensive and relevant to local decision-making.

(7) The critical situation of malaria along international borders should be brought to the attention of appropriate political and administrative authorities in relation to implications for commerce and trade, and for resource utilization. In the short term, the provision of effective services to all populations at risk in border areas in the most appropriate measure to prevent the resurgence of malaria in receptive areas with Thailand. In the long term, sustainable and synchronized malaria control measures must be established through bilateral collaboration.

(8) Reallocation of human and financial resources to high risk areas is necessary. To allow maximum flexible deployment of human resources, consideration should be given to merging of malaria units into operational human resources pools.

(9) Consideration should given to detailed assessment of the implications for financing of malaria control which derive from the major policy changes proposed here, recognizing that these changes will involve modification of strategies as well as shifts in priorities, human and financial resources, and technologies. All of these have potential impact on effectiveness of the Malaria Control Programme.


Thailand received the support of the Global Fund to fight AIDS, TB and Malaria (GFATM) in 2002, and was fully operational by Q1 2004. The objectives of the external evaluation were to assess the outcomes and impact of the project at the conclusion of Round 2, based on project performance indicators for each of the GF project objectives, which were; (1) To enable the population in the targeted 300 villages to be aware of good health and be involved in home and community-based activities for malaria control; (2) To increase access to early detection and prompt effective anti-malaria treatment at the local health sectors as well as in the community; (3) To introduce insecticide-treated net (ITNs) as a tool for protection from mosquito and reducing malaria transmission in the targeted areas, and (4) To prevent excess of malaria transmission in targeted areas through the establishment of malaria epidemic preparedness and control system. The assessment team reviewed and analyzed programme documents, interim progress and monitoring reports from BVBD, the Provincial/District Health Offices and the Malaria Association of Thailand, and conducted field visits to observe programme activities on-site in three of the 18 project provinces.
The evaluation team rated the overall performance based on actual results as compared to target key indicators of the four project objectives as A2 (Expected: 80-100%). In terms of outcome/impact of prevention and control activities, Round 2 project implementation contributed in part to the national effort for people in malaria risk areas to have obtained the benefits from the wide coverage of preventive control measures. The malaria morbidity (API of 0.41 vs. Yr 5 target of 0.4) and mortality rates (0.15/100,000 population vs. Yr 5 target of 0.3) decreased dramatically as per expected target. MoPH should continue to sustain the Malaria Control Programme activities including personnel capacity building, allocation of budget for improvement of health service facilities at the peripheral level and active surveillance system.

Recommendations from the evaluation team underlined and captured the observed technical and operational weaknesses/challenges faced by programme implementers:

1. Training of volunteers
   - Use of standard operating procedures (SOPs) should be established, pre-tested and implemented for activities and functions of malaria post workers (MPWs)/volunteers in all project sites;

2. Behaviour Change Communication (BCC) activities
   - An MPW training curriculum and instructional package should be developed and pre-tested with MPW’s for use with various risk-groups using a life skills approach;
   - A national strategy for malaria BCC/IEC should be developed to address specific risk groups and risk behaviours focused on high-risk ethnic minorities, mobile and migrant populations, and explore effective channels for distribution of IEC materials to target groups;
   - Guidelines should be developed for standardized reporting of data on BCC and health education activities for use in Provincial and district health offices.

3. Early diagnosis and prompt treatment
   - SOPs for transport, storage, use, and interpretation of results should be developed with close supervision and monitoring to prevent false negative/positive interpretation of results, resulting into unnecessary treatment or complications.
   - For monitoring safety and efficacy of anti-malarial drugs, guidelines on direct observed therapy (DOT) and follow-up should be prepared to detect the occurrence of anti-malarial drug resistance.

4. Insecticide treated nets (ITNs) and long-lasting insecticide-treated nets (LLINs)
   - Procurement of ITNs and LLINs need to be improved for the timely use of insecticide solutions to treat bednets and LLIN distribution prior to onset of the malaria transmission season;
- The data recording form in progress reports and the flow of the reporting system should be improved, including data editing and analysis for timely data collection.

(5) Malaria epidemic preparedness and control system
- The existing system appears to be functioning well, staff are satisfied, it is easy to use, and could detect several epidemic incidents; but concerns were raised about future technical and financial support to sustain and upgrade the system.
- The system had its drawbacks, related to distance and delays in reporting, making it too late for the system to detect epidemics in a timely manner. To make the system functional in all settings, the staff should recognize the importance of early detection and maximize efforts to enter, transmit, analyze and use available information.

(6) Financial management
- For future GF projects, a very conservative exchange rate should be used in the budget. If possible, the amount of funds needed for procurement from offshore sources requiring US dollar payments should be kept in a dollar account to avoid costs of exchanging currency twice.
Annex 2

Terms of reference of four external reviewers and bio-data

A. Terms of reference

Dr Kamini Mendis, formerly Coordinator of Case Management and Research in WHO/HQ

As team leader of a group of four international experts and in collaboration with the secretariat, the incumbent will perform the following tasks in Thailand:

1. To taken critical look at malaria case management in general from a policy to implementation view point. Special attention will be paid to policy implementation and reporting at all health care levels including individual patient follow up, surveillance, reporting and collaboration between vertically-driven services and general health care facilities;

2. To review the results from last therapeutic efficacy studies (Falciparum and vivax) of antimalarials used in Thailand by the MOPH and partners;

3. To review national policies to manage P. vivax infections including their application in the field;

4. To critically look at malaria research activities in Thailand and how the research agenda if any contributes to programmatic decision and malaria elimination goals; and

5. As team leader, to lead group discussion during the review and endorse the final external report and its conclusions

Dr Sylvia Meek, Technical Director of the Malaria Consortium

As part of a team of four international experts and in collaboration with the secretariat, the incumbent will perform the following tasks in Thailand:

1. To review vector control strategies and policies within and outside the malaria elimination programme including connectivity, if any, with non-health sectors strategies looking at pest control;

2. To assess through field visits the relevance and performance of current vector control operations according to malaria stratification in Thailand;

3. To review monitoring and evaluation indicators in relation to vector control and personal protection measures expected to target the most vulnerable populations;
(4) To review the current programmatic structure of the malaria programme [in MOPH/BVBD] from the centre to the periphery in relation to vector control;

(5) To review the connectivity, if any, with other vector-borne disease programmes of relevance in a context of malaria elimination;

(6) To make specific recommendations on the above to the MOPH.

Ms Cecilia Hugo, Executive Coordinator of the ACTMalaria Foundation, Manila and former Malaria Programme Manager, Philippines

(1) To review the current human resource plan and staffing towards malaria elimination in Thailand and capacity building in general. Special attention will be paid at the lowest level of interventions pertaining to surveillance;

(2) To review QA-QC malaria diagnosis systems set up in Thailand and links, if any, with other non malaria programmes. Special attention will be given to procedures to improve such systems in an elimination context.

(3) To assess vector control QA (including insecticide resistance monitoring)

(4) To review the programmatic structure in relation to increasing integration of health services, decentralization of planning and budget in relation to elimination in Thailand. Special attention will be given to M&E capacity (HR) primarily on information system and data management

(5) To provide recommendations on the above to the MOH/BVBD

Prof TANG Linhua, former Director of the National Institute of Parasitic Diseases (NIPD), CDC, Shanghai

(1) To evaluate the achievement and adequacy of malaria prevention, control and surveillance activities in reducing the mortality and morbidity towards malaria elimination;

(2) To evaluate the contribution of developmental partners, private sector, communities and research institutions in malaria control / elimination;

(3) To review activities and achievements of artemisinin resistant containment operations in provinces bordering Cambodia and provide guidance to the programme to further eliminate falciparum resistant strains.

B: Modus operandi

They would work closely with WHO MMP and the review secretariat to ensure that relevant documents were available to external reviewers in a timely basis. The two-week external review would be divided in two parts: tentatively five days in Bangkok to brief and debrief participants and six days in the field. The team leader will work two additional days at home to finalize the report.
Four teams are expected to be formed. Each reviewer will be assigned to a team assessing malaria control activities on the Thai-Myanmar border and the Thai-Cambodia border (6-day field visit).

The incumbent is expected to summarize critical findings to be part of the final review document to be presented to the Director of the Department of Communicable diseases, MoPH.

B. Bio-data

Kamini Mendis, MBBS, MD, PhD, DSc

Dr Kamini Mendis is an independent Consultant on malaria and tropical medicine, having retired in October 2010 as the Coordinator of malaria treatment, and malaria elimination in the World Health Organization, Geneva. She began her career as a clinician and moved to research on immunology and vaccine development in malaria, and then onto a wide range of fields in the areas of immunology, epidemiology, clinical studies, pathogenesis, and disease control in malaria. In 1980 she founded the Malaria Research Centre at the Faculty of Medicine, University of Colombo, established a postgraduate training programme in research, supervising many PhD and MSc students and building a network of young scientists in Sri Lanka. She continued academic pursuits in Sri Lanka as the Professor in Parasitology until 1997, when she left for Geneva. She has made several original contributions to scientific knowledge on malaria. Her work on malaria research has been honoured by national and international awards, as the National Presidential Award (1983), the Chalmers Medal of the Royal Society of Tropical Medicine and Hygiene (1991), and the Ashford Bailey Medal of the American Society of Tropical Medicine and Hygiene (1993). She has served on international scientific and review boards and committees on malaria and on international health, chaired several such international committees and delivered keynote addresses at international events in Tropical Medicine, including being the Gorgas Memorial Orator, USA in 2000.

She helped establish the Global Forum for Health Research in Geneva in 1997, and then served in the Transition Secretariat of the then Director-General-elect of the World Health Organization. She was instrumental in the planning and launch of the Global Roll Back Malaria Initiative in 1998 and then headed the component on treatment and elimination of malaria at the Global Malaria Programme in WHO, where she was engaged in global efforts to reduce the burden of malaria. She is currently engaged in malaria control efforts in the South-east Asia Region, and also serves as a malaria adviser to international funding agencies, and as a member of several international expert committees on malaria. Her current interests and pursuits involve supporting regional and international efforts to strengthen the evidence-to-policy pathway for malaria by bridging the research and control gaps in the field, and promoting epidemiology-based malaria control to enhance the movement of countries from control to elimination of malaria; addressing health issues in the context of poverty; and helping build critical human resource capacities for evidence-based malaria control.
Sylvia Meek, PhD, MSc, MA

Dr Sylvia Meek is a programme implementer and adviser on malaria and other vector-borne disease control. She is Technical Director of the Malaria Consortium, a specialist technical non-profit organization, leading its technical strategic development and overseeing the regional offices and global work to guide priorities and ensuring technical quality. The Malaria Consortium implements and improves public health programmes in Africa and Asia based on evidence. It focuses on malaria as an entry point to related health needs, especially communicable diseases, child health and systems to deliver services for these. It works with existing systems of government and partners to achieve sustainable impact. All of its projects and programmes are underpinned by rigorous monitoring, evaluation and research. As technical director, she works regularly in Nigeria, Uganda, South Sudan and Mozambique and has special responsibility for developing programmes in South-east Asia (mainly Cambodia, Myanmar and Thailand), where the focus has been on developing and implementing strategies for artemisinin resistance containment and elimination.

She is also an Honorary Senior Lecturer, London School of Hygiene & Tropical Medicine, UK. She has 30 years’ experience working on malaria control and related vector-borne disease control and child health programmes. Previously, she set up and led the DFID Resource Centre for Malaria Control from 1994, and before that she worked for five years for WHO in Solomon Islands, Namibia and Cambodia and six years with the World Food Programme and UNDP setting up and running vector-borne disease programmes for displaced people on the Thai-Cambodian border. She has an M.A. Zoology, M.Sc. Animal Parasitology, Ph.D. mosquito genetics and control (filariasis vectors). She has engaged in various stages of the strategic development of the Roll Back Malaria (RBM) Partnership.

Cecilia T. Hugo, BSA, DAPE

Ms Cecilia Hugo has more than 20 years of experience working with malaria and other mosquito-borne diseases in various capacities at research, training and public health service. She joined ACTMalaria in 2003, focusing on activities that emphasized project or programme quality improvement and capacity building in organizationally diverse national programme settings. Her analytical interests and experience working with diverse cultures have also enhanced her understanding of different country programmes and partners. In relation to her current work, she obtained a Certificate and Licensure for Professional Teachers at the Philippine Women’s University and the Professional Regulation Commission, respectively.

She started at the Research Institute for Tropical Medicine in 1987 doing mosquito colonization/experimental infection and other entomological studies related to epidemiological research and outbreak investigations. Her career in public health service started in 1991 as a regional entomologist, moving on to the Malaria Control Service (MCS) at the Department of Health (DOH) Central Office, Manila, where she acquired a better understanding of control programme implementation and the general health services, working with other cross-cutting priority programmes of the DOH, e.g. EPI and...
MCH. She was heavily involved in intervention evaluation studies and policy development, particularly advocating for the implementation of malaria control through PHC approach, shift in the use of ITN as a primary vector control measure, cost-sharing in the provision of mosquito nets and capability building of rural health units and community volunteers. In 2000, she became the Malaria Programme Manager of NMCP, in the newly decentralized programme, when malaria was merged with all communicable diseases under the National Centre for Disease Prevention and Control. During this transition period, she developed skills on networking and partnership-building with other DOH National Agencies, Regional Health Offices and the academe, for the development of malaria control policies & guidelines, technical assistance provision, resource mobilization, M&E and training/tools development. In addition to the programme, she managed and coordinated the different MCP projects with USAID, AUSAID, JICA, WHO-RBM and the NAMRU2 grants on resource assistance and capacity building. These projects largely facilitated the establishment and development of the programme’s QA system on malaria microscopy, the Insecticide Resistance Network and the National Drug Policy change to ACTs.

Cecil has a BSA degree major in Medical and Veterinary Entomology at the University of the Philippines, and completed MSc units in Entomology and Public Health; she was Top Student at the Diploma in Applied Parasitology and Entomology (DAPE) course of the Institute of Medical Research in Kuala Lumpur, Malaysia. She also had in-service trainings on Epidemiology at the Institut pour le Development de l’Epidemiologie at Fondation Marcel Merieux in Annecy, France; Remote Sensing and GIS in Groupement pour le Developpement de la Teledetection Aerospatiale in St. Agnes, France; on Planning and Directing Management Information Systems in Management Sciences for Health in Boston, Ma., and JSPS Fellowship on Malaria Biology Research in Osaka University.

Professor Tang Lin-Hua

Professor Tang Linhua is the former Director of the National Institute of Parasite Diseases, Chinese Centre for Disease Control and Prevention (2001-2010). Prof Tang graduated from Harbin Medical University, China in 1983, and Mahidol University, Thailand on 1987 in Tropical Medicine. His experience is in parasitic diseases research and control, especially in epidemiology, clinical treatment and drug research on malaria. He received Second Prize of Award for Science and Technology Achievement issued by the Ministry of Health, China in 1997; and Wu Jieping Medical Research Award & Paul Janssen Pharmaceutical Research Award in 1996. Prof Tang is the Director of Key Laboratory on Parasitic Disease and Vector Biology, Ministry of Health; Chairman, Committee on Health Criteria for Parasitic Diseases, Ministry of Health, China, and also the Deputy Chief of Branch for National Steering Committee for Malaria Elimination Programme, China. He is also the Chairman of Chinese Parasitology Society; Chinese Preventive Medicine Association; Chief Editor of the Chinese Journal of Parasitology and Parasitic Diseases; a member of TDR’s Scientific and Technical Advisory Committee (STAC) on Neglected Tropical Disease, and a member of the malERA International Advisory Committee. Prof Tang was the Chairman of Expert Advisory Committee on Parasitic Diseases (2004-2010), Ministry of Health of China and now works as an expert for MOH.
Annex 3

External Review of the Thai Malaria Control Programme,
18-23 August 2011

Teams 1 and 2. Field visit to Tak Province

Team Leaders: Dr Kamini Mendis, Dr Sylvia Meek; BVBD coordinator: Dr Pongwit Bualombai; WHO Secretariat: Mr Chawalit Tantinimitkul, Ms Nattakarn Sumon

Observer
Dr Nalaka Mendis

BVBD
Dr Prayuth Sudathip
Dr Piti Mongklagoon
Mr Rungniran Sugaram
Mrs Kattaliya Plywong

VBDC Tak
Mr Sathid Boonpeng
Tak Provincial Public Health Office
Mr Samrid Boopheng
Chief of VBDC 9.3 Tak
Mr Amnat Poowadon
VBDC 9.3 Mae Sot
Mr Chaivat Chantar
VBDC 9.3 Mae Sot (Epidemiologist)
Mr Sompong Chuenchom
Chief of VBDU 9.3.8 Mae Ramat
Mr Amnat Kunklon-anusorn
Chief of VBDU 9.3.1 Mae Sot
Mr Kritsana Suk-aum
Chief of VBDU 9.3.10 Mae Tan

Mea Sot General Hospital
Dr Ronnatrai Rueangweerayut
Director of Mea Sot General Hospital

Thai Customer Department (Mae Sot)
Mr Pongtap Buasap
Chief of Mae Sot Customs House

Mae Tao Clinic
Dr Cynthia Maung
Mae Tao Clinic
Ms Pattinee Huanphasert
Mae Tao Clinic (Coordinator)
Mr Mu Ni
Mae Tao Clinic (Medical IPD Manager)

Umphang General Hospital
Dr Worawit Tantiwattanasap
Director of Umphang General Hospital

Mae La Camp Center
Mr Chatchai Ponsen
Assistant chief of Mae La Camp Centre

SMRU Office
Mr Aona Kay To
Institut Pasteur Cambodia
Mr Kittisak Amornpaisamloet
International Organization for Migration (IOM)
Mr Didier Morelle
A.M.I. Programme Coordinator

Sammeun Sub district
Mr Uthai Meehinkong
Sammeun Sub district Administration Organization
Team 3. Field visit to Trat and Chantaburi Province

Team leader – Prof Tang Linhua
BVBD coordinator - Miss Surawadee Kitchakarn
WHO coordinators – Dr Charles Delacollette, Dr Krongthong Thimasarn

Trat Province

Visit ODPC 3 Chonburi Province / Visit PHO Trat 18 August 2011

Mr. Yuthana Pranuch
Deputy Director, ODPC 3 Chonburi

Mr. Siwarang Sangthong
Chief, VBDC 3.4 Trat

Mr. Vijarn Yisarakun
Public Health Officer, VBDC 3.4 Trat

Dr. Chumpon Suwan
Director, PHO Trat

Dr. Chokchai Sakornpanich
Deputy Director, PHO Trat

Mr. Songwit Pirompakdee
Public Health Technical Officer, PHO Trat

19-22 August 2011
- Visit to VBDU 3.4.6 Koh Chang and interview business owner
- Visit to VBDU 3.4.1 Laem Klad, Seafood factory and Had Lek Border Check point
- Visit to VBDU 3.4.4 Bo Rai, Borai Hospital and rubber plantation owner

Mr. Sema Ruchayow
Chief, VBDU 3.4.6 Koh Chang, Trat

Mr. Roongsak Chukampaen
Chief, VBDU 3.4.4 Bo Rai, Trat

Mr. Thongchai Hongtanu
Chief, VBDU 3.4.1 Laem Klad, Trat

Director of Borai hospital

Chanthaburi Province 23 August 2011

- Visit to Subtaree temporary check point (Soi Dao), FSMC, MC Ban Laem and immigration office

Mr. Paiboon Somchinda
Chief, VBDC 3.5 Chanthaburi IT staff, VBDU 3.5.7 Soi Dao, Chanthaburi

Mr. Chalermchai Techarat
Public Health Technical Officer, VBDC 3.5

Mr. Paramate Chaijirakunanon
Chief, VBDU 3.5.3 Pong Nam Ron, Chanthaburi

Mr. Somyoth Chanthalert
Chief, VBDU 3.5.7 Soi Dao, Chanthaburi
Team 4. Field visit to Ranong and Surat Thani Provinces

Team leader Ms Cecilia Hugo
BVBD coordinator Miss Rungrawee Tipmontree
WHO coordinators – Dr Dorina Bustos
Ms Benja Sae-seai

18 August 2011

Ranong Provincial Public Health Office
Ms Warunee Tuntiwisuthi
Mr Tanee Sriprapalertkul
Ms Kamoltip Homsakul
Mr Chakorn Wipadawutikul
Mr Samart Teawsakul

Kraburi District Public Health Office
Mr Sombat Lertkan

Ranong VBDC 11.5
Mr Rachaek Rawirachaporn
Mr Kittipong Konglai

Ranong Disease Control Checkpoint
Mr Pramoot Kaewyod

22 August 2011

Surat Thani PHO, LAO Klongsok, MC
Panom
Dr Jaraspong Sudri
Mr Sompong Saladkaew
Mr Wanchai Klangnarong (VBDC 11.3)
Mrs Auranas Yucinglkong
Mr Komate Klommuang
Mr Suthip Yodmak (BVDC 11.3)
Ms Wilai Wongrat (BVDC 11.3)
Mr Wihan Sithijinda (BVDC 11.3)
Ms Pornpen Petchu (District Public Health)
Mr Dumrong Tangnual (Chief of LAO)
Ms Nalumol Mukta
Mr Manul Maungkaew
Mr Teeradech Teepapal (Chief VBDU)
Ms Benjarat Meekaew (VBDU 11.3.3)
Mr Kimoonpong (VBDU 11.3.3)

23 August 2011

LAO Ban Na Sarn (Nasarn District)
Mr Komate Klommuang (PHO)
Mr Suthin Poolmas (VBDU 11.3.4)
Mr Sinchai Vongjinda
(Deputy Chief LAO Prupee)
Mr Prawet Lukhachai
(Chief LAO Prupee)
Annex 4

Briefing meeting on
“Review of the Thai Malaria Control Programme”
16 August 2011 Meeting room Fl.4th ,Bureau of Vector Borne Disease, Department of Disease Control

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Activities</th>
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<tbody>
<tr>
<td><strong>Monday 15 August 2011</strong></td>
<td></td>
</tr>
<tr>
<td>10.00-14.00 hrs</td>
<td>Briefing on review agenda (WHO and BVBD secretary) by Dr.Wichai Satimai (4th floor)</td>
</tr>
<tr>
<td><strong>Tuesday 16 Aug 2011</strong></td>
<td></td>
</tr>
<tr>
<td>09.00-09.30 hrs</td>
<td>Courtesy visit to DG/DDG, DDC</td>
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<tr>
<td>Briefing venue :4th Fl., BVBD meeting room, DDC, MoPH, Nonthaburi</td>
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<tr>
<td>09.30-10.00 hrs</td>
<td>Introduction to the National Malaria Control Programme Review (background, objectives and expected outcomes, introduction of the reviewers) By Dr.Charles Delacolette</td>
</tr>
<tr>
<td>10.00-10.30 hrs</td>
<td>Organization of the review (activity and filed arrangements) By Dr.Rungrwee Tipmontree</td>
</tr>
<tr>
<td>10.30-12.00 hrs</td>
<td>Overview of National Malaria Control Programme (20 mins presentation, 10 mins questioning)</td>
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<tr>
<td></td>
<td>• Malaria situation, Programme management by Mrs Saowanit Vijaykadga</td>
</tr>
<tr>
<td></td>
<td>• Malaria vectors and vector control by Dr Piti Mongklakoon</td>
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<tr>
<td></td>
<td>• Case management by Dr Kanungrnit Congpuong</td>
</tr>
<tr>
<td>13.00-15.00 hrs</td>
<td>Overview of National Malaria Control Programme (Cont.) (20 mins presentation, 10 mins questioning)</td>
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<td></td>
<td>• Epidemic and emergency preparedness and response, Malaria surveillance by Dr.Supawadee Poungsombat</td>
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<tr>
<td></td>
<td>• Advocacy, IEC and community mobilization by Dr.Rungrawee Tipmontree</td>
</tr>
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<td></td>
<td>• Malaria commodities procurement and supply management by Mrs.Suteera Poolthin</td>
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<td></td>
<td>• M &amp; E malaria related research agenda (including operational research) in Thailand By Dr. Prayuth Sudathip</td>
</tr>
<tr>
<td>15.00-15.30 hrs</td>
<td>Activities of NGOs in malaria control by Dr Thet Win</td>
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<tr>
<td>15.30-16.00 hrs</td>
<td>Plenary discussion and summary (Moderator: Dr Wichai Satimai)</td>
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<tr>
<td>16.00-17.00 hrs</td>
<td>External review team discussion</td>
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### Report of the Programmatic Review of the National Malaria Control Programme in Thailand

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Activities</th>
<th>Venue</th>
<th>Participants</th>
<th>Focal point</th>
</tr>
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<tbody>
<tr>
<td><strong>Wednesday 17 August 2011</strong></td>
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<tr>
<td><strong>Dr Kamini Mendis</strong></td>
<td>09.30-10.00 hrs</td>
<td>Visit to Faculty of Tropical Medicine, Mahidol University</td>
<td>Faculty of Tropical Medicine, Mahidol University, Bangkok</td>
<td>Assoc. Prof. Pratap Singhasivanon, Dean FTM</td>
<td>Dr. Kanungnit Congpuong</td>
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<tr>
<td></td>
<td>10.00-11.00 hrs</td>
<td>Visit to WHO CC for Clinical Management of Malaria (WHO CC)</td>
<td>Hospital for Tropical Diseases, FTM, Mahidol University</td>
<td>Asst. Prof. Udomsak Silachamroon, Director, Hospital for Tropical Diseases</td>
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<td></td>
<td></td>
<td>Visit to Faculty of Tropical Medicine, Mahidol University</td>
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<td>Prof Polrat, Wilairatana, Prof Srivicha Krudsood</td>
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<td></td>
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<td>Visit to WHO CC for Clinical Management of Malaria (WHO CC)</td>
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<td></td>
<td></td>
<td>Visit to Armed Forces Research Institute of Medical Sciences (AFRIMS)</td>
<td>AFRIMS office, Bangkok</td>
<td>USA: COL Arther E.Brown, THA: COL Jariyanart Gaywee</td>
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<td></td>
<td>11.00-11.30 hrs</td>
<td>Visit to Armed Forces Research Institute of Medical Sciences (AFRIMS)</td>
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<td>Prof Nicolas White, Dr Arjen M. Dondorp</td>
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<td>11.30-12.00 hrs</td>
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<td>Prof Nicolas White, Dr Arjen M. Dondorp</td>
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<td></td>
<td>14.00-15.00 hrs</td>
<td>Discussion on malaria drug policy, related laws &amp; regulation/logistic</td>
<td>Meeting room Fl.4th, BVBD (Small room)</td>
<td>Mrs Saowanit Vijaykadga, Dr Kanungnit Congpuong, Dr Apinya Niramitsantipong</td>
<td>Mrs Saowanit Vijaykadga</td>
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<td></td>
<td>15.00-15.30 hrs</td>
<td>Discussion on QA/QC of laboratory (RDT/Microscopy/PCR) (including Bureau of Laboratory Quality Standards, DMS)</td>
<td>Meeting room Fl.4th, BVBD (Small room)</td>
<td>Dr Pongwit Bualombai, Dr Kanungnit Congpuong, Ms Pratoompit Wimonwattrawat</td>
<td>Dr Pongwit Bualombai</td>
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<tr>
<td></td>
<td>16.00-16.30 hrs</td>
<td>Discussion on malaria related research agenda in Thailand</td>
<td>Meeting room Fl.4th, BVBD (Small room)</td>
<td>Dr Prayuth Sudathip, Dr Pongvit Bualombai</td>
<td>Dr Prayuth Sudathip</td>
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
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<tbody>
<tr>
<td>Wednesday 17 Aug 2011</td>
<td>09.00-10.30 hrs</td>
<td>Meet Centre of Excellence for Biomedical and Public Health Informatic (BIOPHIC) Collaboration and contribution on MCP</td>
<td>Meeting room Fl. 5th, BVBD</td>
<td>Ass Prof Jaranit Kaewkungwal</td>
<td>Dr Prayuth Sudathip Dr Krongthong Thimasarn</td>
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<td></td>
<td>10.30-12.00 hrs</td>
<td>Meet Malaria Consortium Collaboration and contribution on MCP</td>
<td>Meeting room Fl. 5th, BVBD</td>
<td>Dr David Sintasath</td>
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<td></td>
<td>13.00-14.00 hrs</td>
<td>Meet Bureau of Epidemiology (BOE) National surveillance and malaria elimination</td>
<td>Meeting room Fl. 5th, BVBD</td>
<td>Dr Darin Areechokchait BOE Dr Supawadee Poungsombat</td>
<td>Dr Supawadee Poungsombat Dr Krongthong Thimasarn</td>
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<td></td>
<td>14.00-16.30 hrs</td>
<td>Working with BVBD focal point on country epidemiology, M&amp;E and surveillance system</td>
<td>Meeting room Fl. 5th, BVBD</td>
<td>Dr Supawadee Poungsombat Dr Prayuth Sudathip</td>
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<tr>
<td>Dr. Sylvia Meek</td>
<td>10.30-12.00 hrs</td>
<td>Discussion on entomological issues, vector control (including IVM), its surveillance</td>
<td>Vector and vector control section, Fl. 5th, BVBD</td>
<td>Mr Boonserm Aumaung Dr Piti Mongkalangkoon Dr Kanutcharee Thanispong</td>
<td>Mr Boonserm Aumaung</td>
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<tr>
<td></td>
<td>13.30-14.30 hrs</td>
<td>Discussion on Pesticide Analysis</td>
<td>Vector and vector control section, Fl. 5th, BVBD</td>
<td>Ms Jittanan Chalauliem Dept. of Agriculture</td>
<td>Mr Boonserm Aumaung</td>
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<tr>
<td></td>
<td>14.30-15.30 hrs</td>
<td>Discussion on Pesticide Registration</td>
<td>Hazardous Substance Control Section, Fl. 5th, FDA</td>
<td>Ms Sunantha Pantuwan Dr Doolalai Sethajintanin</td>
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<tr>
<td></td>
<td>15.30-16.30 hrs</td>
<td>Discussion on Pesticide Bioefficacy testing</td>
<td>Vector and vector control section, Fl. 5th, BVBD</td>
<td>Mr Kasin Supaphathom Dr Pungasem Paeporn</td>
<td></td>
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<tr>
<td>Date</td>
<td>Time</td>
<td>Activities</td>
<td>Venue</td>
<td>Participants</td>
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<td>Wednesday 17 Aug 2011</td>
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<tr>
<td>Ms. Cecilia T.Hugo</td>
<td>08.00-08.30 hrs</td>
<td>Discussion: integration of malaria to general health system</td>
<td>Bureau of Planning and Strategy (Fl4, BPS, Tel.1387)</td>
<td>Dr Supakit Sirilak</td>
<td>Dr Supawadee Poungsombat</td>
</tr>
<tr>
<td></td>
<td>10.00-11.00 hrs</td>
<td>Discussion: Financing mechanism and linkage with HIV and TB program</td>
<td>Meeting room Fl.5th Malaria matrix</td>
<td>Dr Sombat Thanprasertsuk</td>
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<td></td>
<td>11.00-12.00 hrs</td>
<td>Discussion: Capacity building for malaria personnel</td>
<td></td>
<td>Dr Jeerapat Sirichaisinthop, Ms Bussabong Chaotanond</td>
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<td></td>
<td>13.00-14.00 hrs</td>
<td>Discussion: Financial scheme related to malaria control (Government budget)</td>
<td>Planning Section, DDC</td>
<td>Director, Planning section</td>
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<tr>
<td></td>
<td>14.00-15.00 hrs</td>
<td>Working with BVBD focal points on national malaria control system,</td>
<td>Meeting room Fl.5th Malaria matrix</td>
<td>Dr Wichai Satimai, Mrs Saowanit Vijaykadga, Dr Prayuth Sudathip</td>
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<td></td>
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<td>decentralization and elimination</td>
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</table>
**Review of the Thai Malaria Control Programme**

**FIELD TRIPS 18th -23rd August 2011 Team 1 and 2: Tak Province**

<table>
<thead>
<tr>
<th>Team 1: Location: Tak Province (Mae Sot District)</th>
<th>Team 2: Tak province (Umphang Distric)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Dr Kamini Mendis External Review Team, Team leader</td>
<td>1. Dr Sylvia Meek External Review Team, Team leader</td>
</tr>
<tr>
<td>2. Mr Chawalit Tantinimitkul WHO Secretariat 081 902 3482</td>
<td>2. Ms Nattakarn Sumon WHO Secretariat 084 033 0990</td>
</tr>
<tr>
<td>3. Dr Nalaka Mendis Observer</td>
<td>3. Dr Prayuth Sudathip BVBD (Epidemiology, M&amp;E) 086 043 8558</td>
</tr>
<tr>
<td>4. Dr Pongwit Bualombai BVBD (Dx and Rx) 087 679 0691</td>
<td>4. Dr Piti Mongklagoon BVBD (Entomology&amp;VC) 086 002 9858</td>
</tr>
<tr>
<td>5. Mr Rungniran Sug-aram BVBD (Dx and Rx) Coordinator 086 543 0520</td>
<td>5. Mr Satit Boonpeng PHO Tak Coordinator 081-0463917</td>
</tr>
<tr>
<td>6. Mr Amnat Poowadon VBDC 9.3 Mae Sot Coordinator 081 2802098</td>
<td>6. Mr Samrid Boonpheng VBDC 9.3 Mae Sot, Coordinator 087 3120194</td>
</tr>
<tr>
<td>7. Mrs Kattaliya Ploywong BVBD, Coordinator 081 994 7076</td>
<td></td>
</tr>
<tr>
<td>Date/Time</td>
<td>Team 1: Dr. Kamini Mendis</td>
</tr>
<tr>
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</tr>
<tr>
<td><strong>Thursday 18 August 2011</strong></td>
<td>13.00-14.00 hrs Visit VBDC 9.3 Tak Brief: Malaria situation, prevention and control, challenges in malaria control program by PHO &amp; VBDC</td>
</tr>
<tr>
<td></td>
<td>14.30-15.30 hrs Visit Mae Sot Hospital</td>
</tr>
<tr>
<td></td>
<td>15.30-16.30 hrs Visit Mae Sot Border check point</td>
</tr>
<tr>
<td></td>
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<tr>
<td><strong>Friday 19 August 2011</strong></td>
<td>08.00-9.00 hrs Visit Mae Tao Clinic</td>
</tr>
<tr>
<td></td>
<td>9.00-10.30 hrs Travel to Mae La Temporary Shelter</td>
</tr>
<tr>
<td></td>
<td>10.30-12.00 hrs Visit Mae La Temporary Shelter,</td>
</tr>
<tr>
<td></td>
<td>Malaria situation, prevention and control measures</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td>13.00-14.00 hrs Visit Mae La Temporary Shelter (con’t)</td>
</tr>
<tr>
<td></td>
<td>Provision of health services at health facilities</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td>14.00-16.00 hrs Visit MC Ban Mae La, MP Ban Mae Og Hoo</td>
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</tbody>
</table>
### Saturday 20 August 2011

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.00-12.00</td>
<td>Visit migrant community in Mae Sot, Observe community characteristics and its population, Interview with business owners/foremen</td>
</tr>
<tr>
<td></td>
<td>Overnight in Mae Sot</td>
</tr>
<tr>
<td>09.00-12.00</td>
<td>Visit migrant community in Mae Sot, Observe community characteristics and its population, Interview with business owners/foremen</td>
</tr>
<tr>
<td></td>
<td>Overnight in Mae Sot</td>
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</table>

### Sunday 21 August 2011

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Talk writing</td>
</tr>
<tr>
<td></td>
<td>Overnight in Mae Sot</td>
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</tbody>
</table>

### Monday 22 August 2011

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.30-09.00</td>
<td>Travel to Mae Ramad Dist.</td>
</tr>
<tr>
<td>09.00-10.00</td>
<td>Visit Local Administrative Organization Ban Sam Meun, Mae Ramad Dist., Discussion on: Contribution and cooperation in Malaria control and prevention</td>
</tr>
<tr>
<td>11.00-12.00</td>
<td>Visit SMRU malaria clinic at Wang Pha sub-dist., Provision of malaria related services</td>
</tr>
<tr>
<td>14.00-15.00</td>
<td>Visit SMRU laboratory, Mae Sot</td>
</tr>
<tr>
<td>15.00 hrs</td>
<td>Meet NGOs at SMRU Office (AMI, IRC, IOM, Mae Tao)</td>
</tr>
<tr>
<td></td>
<td>Overnight in Mae Sot</td>
</tr>
</tbody>
</table>

### Tuesday 23 August 2011

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.00 hrs</td>
<td>Travel to BKK, Nok Air DD8117 dep.12.05 Arr.13.20</td>
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</table>

### Wednesday 24 August 2011 – Thursday 25 August 2011

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.00-17.00</td>
<td>ER group working to prepare draft report and presentation for debriefing. Venue: Malaria matrix room, Fl.5th</td>
</tr>
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</table>

### Friday 26 August 2011

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.00-12.00</td>
<td>Debrief ** Plenary discussion, Venue: Meeting room Fl.4, DDC</td>
</tr>
<tr>
<td></td>
<td>List of participants: See list below</td>
</tr>
<tr>
<td></td>
<td>Focal point: BVBD and WHO Secretariat</td>
</tr>
</tbody>
</table>
**Review of the Thai Malaria Control Programme Team 3:** Location: Surat Thani and Ranong

1. Ms Cecilia T. Hugo External review Team
2. Dr Wichai Satimai Director, BVBD
3. Dr Dorina Bustos WHO Secretariat
4. Ms Benja Sae Seai WHO Secretariat
5. Dr Supawadee Poungsombat BVBD 081 8311270
6. Dr Rungrawee Tipmontree BVBD 089 662 1849
7. Ms Chanthana Sovat Field trip coordinator, BVBD 081 7201606

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Activities</th>
<th>Joined participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday</td>
<td>14.30-15.30 hrs</td>
<td>Visit PHO Ranong Brief: Malaria Situation, prevention and control, challenges regarding migrants issues and the way forward by PHO representative</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.30-17.00 hrs</td>
<td>Visit migrant community crossing point at Dan Pak Nam</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18.00 hrs</td>
<td>overnight in Muang District, Ranong</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>06.00-08.00 hrs</td>
<td>Travel to Kraburi District</td>
<td>Mr.Suthon Koomphet, PHO Ranong Mr.Rachaek Rawirachaporn VBDC 11.5 Ranong (089-1957722)</td>
</tr>
<tr>
<td></td>
<td>09.00-10.00 hrs</td>
<td>Visit Kraburi hospital Interview director or a representative regarding malaria diagnosis and treatment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.00-11.00 hrs</td>
<td>Visit health centre Tungmapraw (รพ. สต. ทุ่งมะพร้าว)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11.00-12.00 hrs</td>
<td>Visit MP and border check point</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13.00-14.00 hrs</td>
<td>Visit migrant communities</td>
<td></td>
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<tr>
<td></td>
<td>14.00-16.00 hrs</td>
<td>Visit ARC (invite other NGOs to attend) Discussion:Roles and responsibilities, collaboration and challenges working with migrants</td>
<td>ARC contact : Mr. Robert A. Sadang, Project Manager 077-506671</td>
</tr>
<tr>
<td></td>
<td>16.00-18.00 hrs</td>
<td>Travel to Chumpon, overnight in Chumpon</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>Travel to Surat thani,</td>
<td></td>
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<tr>
<td>Sunday</td>
<td>Report writing/Free time</td>
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</table>
**Monday 22 August 2011**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Contact Person(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08.30-10.00 hrs</td>
<td>Visit PHO Surat Thani&lt;br&gt;<strong>Brief:</strong> Malaria situation, challenges and malaria in tourist areas&lt;br&gt;Interview director, PHO Surat Thani or a representative</td>
<td>Mr. Sompong Saladkaew, PHO Surat Thani 081-7977616&lt;br&gt;Mr. Wanchai Klangnarong, Chief, VBDC 11.3 Suratthani 081-3971431&lt;br&gt;Chief, VBDU Panom</td>
</tr>
<tr>
<td>10.00-12.00 hrs</td>
<td>Travel to Panom District&lt;br&gt;Visit Local Administration Organization (LAO) Klongsok</td>
<td></td>
</tr>
<tr>
<td>13.00-14.00 hrs</td>
<td>Visit MC Panom</td>
<td></td>
</tr>
<tr>
<td>13.00-15.00 hrs</td>
<td>Visit rubber and/or palm oil plantation (with migrant workers)&lt;br&gt;Overnight in Muang, Surat Thani</td>
<td></td>
</tr>
</tbody>
</table>

**Tuesday 23 August 2011**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Contact Person(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.00-10.00 hrs</td>
<td>Travel to Nasarn District</td>
<td>Mr. Sompong Saladkaew, PHO Surat Thani 081-7977616&lt;br&gt;Mr. Wanchai Klangnarong, Chief, VBDC 11.3 Suratthani 081-3971431&lt;br&gt;Chief, VBDU Nasarn</td>
</tr>
<tr>
<td>10.00-11.00 hrs</td>
<td>Visit LAO Ban Na Sarn</td>
<td></td>
</tr>
<tr>
<td>13.00 hrs</td>
<td>Travel to Maung District, Leaving to airport&lt;br&gt;Depart from Surat Thani&lt;br&gt;TG258 (19.35-20.45)</td>
<td></td>
</tr>
</tbody>
</table>

**Wednesday 24 August 2011 – Thursday 25 August 2011**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Focal point: BVBD and WHO Secretariat</th>
</tr>
</thead>
<tbody>
<tr>
<td>09.00-17.00 hrs</td>
<td>ER group working to prepare draft report and presentation for debriefing&lt;br&gt;<strong>Venue:</strong> Malaria matrix room, Fl.5th</td>
<td></td>
</tr>
</tbody>
</table>

**Friday 26 August 2011**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Venue: <strong>Meeting room Fl.4, DDC</strong>&lt;br&gt;List of participants: See list below</th>
<th>Focal point: BVBD and WHO Secretariat</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.00-12.00 hrs</td>
<td>Debrief ** Plenary discussion&lt;br&gt;<strong>Meeting room Fl.4, DDC</strong>&lt;br&gt;List of participants: See list below</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Review of the Thai Malaria Control Programme** Team 4: Location: Trat and Chanthaburi

1. Prof Tang Lin-hua External Review Team
2. Dr Charles Delacollette WHO Secretariat, Mobile: 081 911 1705
3. Dr Kroonghong Thimasarn WHO Secretariat
4. Mrs Saowanit Thimasarn BVBD, Mobile: 089 7865605
5. Ms Suraweadee Kitchakarn BVBD (Case Mx for BMGF), Field Coordinator, Mobile: 086 5430520
6. Mrs Siripom Yongsiri BVBD (Entomology&VC for BMGF project), Mobile: 084 1397733

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Activities</th>
<th>Joined participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday 18 August</td>
<td>07.00 hrs</td>
<td>Hotel check out and travel to Chonburi Province</td>
<td>Mr Yuthana Yampranuch ODPC 3 Chonburi Province, Mobile: 081-3842823</td>
</tr>
<tr>
<td></td>
<td>09.30-10.00 hrs</td>
<td>Visit Office of Disease Prevention and Control 3, Chon Buri</td>
<td>Mr Songwit Pirompak, PHO Trat 083 7894754</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brief: Malaria situation, prevention and control, lessons learned, challenges and the way forward,</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Interview director of ODPC 3 or a representative</td>
<td>Mr Siwarang Sangthong, Chief, VBDC 3.4 Trat Mobile: 089 829 5636</td>
</tr>
<tr>
<td></td>
<td>10.00-14.00 hrs</td>
<td>Leaving to Trat Province, Lunch on the way</td>
<td></td>
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<tr>
<td></td>
<td>14.00-16.00 hrs</td>
<td>Visit PHO Trat (joined by VBDC)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Brief: Malaria situation, prevention and control, lessons learned, challenges and the way forward,</td>
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<tr>
<td></td>
<td></td>
<td>Interview director of PHO or a representative, chief of VBDC 3.4 Trat</td>
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<td>Overnight in Trat Province</td>
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<tr>
<td>Friday 19 August</td>
<td>10.00-12.00 hrs</td>
<td>Visit VBDU 3.4.6 Koh Chang</td>
<td>Mr Siwarang Sangthong, Chief, VBDC 3.4 Trat</td>
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<tr>
<td></td>
<td></td>
<td>Observe anti-malarial activities including pre-elimination, malaria in tourist area management</td>
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<td>Interview VBDU staff, village health volunteers</td>
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<tr>
<td></td>
<td>13.00-15.00 hrs</td>
<td>Interview business owners (hotel, resort or tourist business), workers (Thai and Non-Thai) regarding malaria, its preventive measures</td>
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<tr>
<td></td>
<td>17.00 hrs</td>
<td>Return to Trat, Overnight in Trat Province</td>
<td></td>
</tr>
<tr>
<td>Saturday 20 August</td>
<td>09.00-10.30 hrs</td>
<td>Visit VBDU 3.4.1 Laem Klad Interview Chief of VBDU and staff regarding reporting system, use of malarone, slide checking</td>
<td>Mr Siwarang Sangthong, Chief, VBDC 3.4 Trat</td>
</tr>
<tr>
<td></td>
<td>10.30-12.00 hrs</td>
<td>Visit seafood factory with M1 migrant workers hired</td>
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<td></td>
<td></td>
<td>Interview business owner (contributions and collaboration)</td>
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<td>Interview M1 migrants workers (malaria prevention)</td>
<td></td>
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<tr>
<td></td>
<td>13.00-14.00 hrs</td>
<td>Visit Border check point (Had lek) Observe cross border population and interview with border control staff</td>
<td></td>
</tr>
<tr>
<td></td>
<td>14.00-16.30 hrs</td>
<td>Visit VBDU 3.4.1 Laem Klad (continue) Interview Chief of VBDU and staff regarding reporting system, use of malarone, slide checking</td>
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<tr>
<td></td>
<td></td>
<td>Overnight in Trat Province</td>
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<tr>
<td>Sunday 21 August 2011</td>
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<tr>
<td>Report writing</td>
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<thead>
<tr>
<th>Monday 22 August 2011</th>
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<tbody>
<tr>
<td>08.30-10.00 hrs</td>
<td>Visit Rubber Plantation in Bo Rai Interview owner of rubber plantation / tappers(Cambodian, Myanmar, and Mon: both M1 and M2) Mr Siwarang Sangthong, Chief, VBDC 3.4 Trat Mr Roongsak Chukampaen, Chief, VBDU 3.4.4 Bo Rai, VBDC 3.4 Trat</td>
</tr>
<tr>
<td>11.00-12.00 hrs</td>
<td>Visit VBDU 3.4.4 Bo Rai Observe Surveillance system done by BIOPHICS</td>
</tr>
<tr>
<td>13.00-15.00 hrs</td>
<td>Visit Bo Rai Hospital Interview medical doctor regarding malaria case management, referral system and reporting system</td>
</tr>
<tr>
<td>15.00 hrs</td>
<td>Travel to Soi Dao District, Chantaburi province</td>
</tr>
<tr>
<td></td>
<td>Overnight in Soi Dao, Chanthaburi Province</td>
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<thead>
<tr>
<th>Tuesday 23 August 2011</th>
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<tbody>
<tr>
<td>07.30-09.00 hrs</td>
<td>Travel to Subtaree border market, Soi Dao Visit Subtaree border market Observe fake/substandard drugs Discuss with staff and marines about malaria activities along border</td>
</tr>
<tr>
<td></td>
<td>Visit FSMC (located at marine base) Observe provision of service for migrants</td>
</tr>
<tr>
<td>09.00-10.00 hrs</td>
<td>Travel to Bann Laem Checkpoint</td>
</tr>
<tr>
<td>10.00-10.30 hrs</td>
<td>Visit VBDU 3.5.7 Soi Dao Observe and interview staff at MC Interview staff on the use of Malarone/ D3 positive</td>
</tr>
<tr>
<td>10.30-11.00 hrs</td>
<td>Visit MC Ban Laem Interview MC staff (use of Malarone, M2 issues)</td>
</tr>
<tr>
<td>11.00-12.00 hrs</td>
<td>Visit immigration office Meet Immigration officers</td>
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<thead>
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<tbody>
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<tbody>
<tr>
<td>10.00-12.00 hrs</td>
<td>Debrief ** Plenary discussion</td>
</tr>
<tr>
<td>Venue: Meeting room Fl.4, DDC</td>
<td>List of participants: See list below</td>
</tr>
<tr>
<td>Focal point: BVBD and WHO Secretariat</td>
<td></td>
</tr>
</tbody>
</table>
List of Invitees for briefing and debriefing

- Permanent Secretary/Deputy Permanent Secretary (Debriefing only)
- Director General, DDC - BVBD
- Bureau of Policy and strategy
- Bureau of Epidemiology – FDA
- Faculty of Tropical Medicine, BIOPHICS, MORU
- NGOs (based in BKK or feasibility to join with their own funding): MC, AMI, IRC, SMRU, KENAN, Raks Thai, IOM, CCSDPT, ARC, USP - AFRIMS
- Donors: USAID, PMI, EU, ECHO, TUC, CDC, DFID, JICA
- Ministry of Interior

<table>
<thead>
<tr>
<th>Name</th>
<th>Tel.</th>
<th>Fax</th>
<th>Mobile</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Rungrawee Tipmontree</td>
<td>02 590 3134</td>
<td>02 5918422</td>
<td>089 662 1849</td>
<td><a href="mailto:rtipmontree@gmail.com">rtipmontree@gmail.com</a> ; <a href="mailto:morning@health.MoPH.go.th">morning@health.MoPH.go.th</a></td>
</tr>
<tr>
<td>Mrs. Siriporn Yongchaitrakul</td>
<td>02 590 3147</td>
<td>02 5918422</td>
<td>084 1397733</td>
<td><a href="mailto:yoosiriporn@yahoo.com">yoosiriporn@yahoo.com</a>; <a href="mailto:yoosiriporn@gmail.com">yoosiriporn@gmail.com</a></td>
</tr>
<tr>
<td>Ms. Chanthana Sovat</td>
<td>02 590 3134</td>
<td>02 5918422</td>
<td>081 7201606</td>
<td><a href="mailto:sainam_artist@yahoo.com">sainam_artist@yahoo.com</a></td>
</tr>
<tr>
<td>Dr. Charles Delacollette</td>
<td>02 643 5859</td>
<td>02 643 5870</td>
<td>081 911 1705</td>
<td><a href="mailto:Delacollette@sair.d.d.go.th">Delacollette@sair.d.d.go.th</a></td>
</tr>
<tr>
<td>Dr. Krongthong Thimasarn</td>
<td></td>
<td></td>
<td></td>
<td><a href="mailto:thimasarnk@sair.d.d.go.th">thimasarnk@sair.d.d.go.th</a></td>
</tr>
<tr>
<td>Mr. Chawalit Tantinimitkul</td>
<td>02 590 1506</td>
<td>02 591 8199</td>
<td>081 902 3482</td>
<td><a href="mailto:chawalit@sair.d.d.go.th">chawalit@sair.d.d.go.th</a></td>
</tr>
<tr>
<td>Dr. Maria Dorina Bustos</td>
<td>02 643 5859</td>
<td>02 643 5870</td>
<td>085 334 9909</td>
<td><a href="mailto:bustosm@sair.d.d.go.th">bustosm@sair.d.d.go.th</a></td>
</tr>
<tr>
<td>Ms. Kallayanee Laempoo</td>
<td>02 590 1509</td>
<td>02 591 8199</td>
<td>080 551 4090</td>
<td><a href="mailto:laempook@sair.d.d.go.th">laempook@sair.d.d.go.th</a></td>
</tr>
<tr>
<td>Ms. Benja Sae-Seai</td>
<td>02 590 1524</td>
<td>02 591 8199</td>
<td>081 808 7145</td>
<td><a href="mailto:saeseaib@sair.d.d.go.th">saeseaib@sair.d.d.go.th</a></td>
</tr>
<tr>
<td>Ms. Nattakarn Sumon</td>
<td></td>
<td></td>
<td>084 033 0990</td>
<td><a href="mailto:peanutakarn@hotmail.com">peanutakarn@hotmail.com</a></td>
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</tbody>
</table>
Annex 5

Debriefing Meeting on “External Review of the Thai Malaria Control Programme”

26 August 2011
Pramern Chanthawimon Meeting Room, Department of Disease Control

List of participants

**Department of Disease Control**

Dr Nopporn Cheunklin  
Deputy Director-General  
Department of Disease Control  
Ministry of Public Health  
Thailand

Dr Saravudh Suvannadabba  
Senior Expert in Preventive Medicine  
Department of Disease Control  
Ministry of Public Health  
Thailand

Dr Sombat Thanprasertsuk  
Medical Physician, Advisory level  
Department of Disease Control  
Ministry of Public Health  
Thailand

Dr Jeeraphat Sirichaisinthop  
Medical Physician, Advisory level  
Department of Disease Control  
Ministry of Public Health  
Thailand

**Bureau of Epidemiology**

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The external review of the National Malaria Control Programme of Thailand was facilitated by the World Health Organization Mekong Malaria Programme (WHO MMP) together with the Bureau of Vector Borne Diseases (BVBD), Ministry of Public Health, Thailand from 15 to 26 August 2011. The general objective of the review was to assess the current policies, strategies, delivery mechanisms, monitoring and surveillance systems and general programmatic performance of the national programme, in order to provide advocacy for sustained support from political leaders and decision-makers for malaria elimination in Thailand. Reviewers also looked at the cost-effectiveness of programme management and health system strengthening towards malaria elimination. Overall, the BVBD has made significant positive programme achievements based on recommendations made during the last external programme review in 1995. However, more needs to be done to achieve the elimination targets. The field observations, interviews and discussions with main stakeholders in Thailand have resulted in an analysis of strengths and weaknesses, followed by recommendations being made to the Ministry of Health in the following domains: (1) programme management and policies; (2) use and flow of epidemiological information; (3) disease management (diagnosis, treatment and drug-resistance monitoring); (4) vector control and entomology, and vector bionomics; (5) information, education and communication/behavior change communication (IEC/BCC) targeting migrant/mobile populations and ethnic minority communities; (6) malaria control operations at international border regions; and (7) financing.